Niagara Falls Wastewater Treatment Plant
Annual Performance Summary Report Treatment and Collection
Reporting Year: 2024

Niagara Region

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NF-T-1 Wastewater Treatment Process Description

The Niagara Falls Wastewater Treatment Plant (WWTP) is located at 3450 Stanley Avenue in the City of Niagara Falls and provides wastewater treatment to the City of Niagara Falls and portions of the Town of Niagara-on-the-Lake (NOTL). The Niagara Falls WWTP is a class IV treatment facility and has been designed to treat an average daily flow (ADF) of 68,300 cubic meters per day (m^3/d). This facility can fully treat all flows up to 136,400 m^3/d and provides primary treatment for wet weather flows greater than 136,400 m^3/d up to a maximum flow rate of 205,000 m^3/d.

The Niagara Falls WWTP operates under the following Ministry of Environment, Conservation and Parks (MECP) Environmental Compliance Approvals (ECA):

Environmental Compliance Approval (Sewage):

- A-500-5110411564 Revision 1, issued August 22, 2021

Environmental Compliance Approval (Air):

- 6480-7ZUMEH, issued January 19, 2010

The Niagara Falls WWTP uses the following processes to treat wastewater:

- Imported Sewage Receiving
- Screening
- Raw Influent Pumping
- Grit Removal
- Flocculation
- Phosphorus Removal
- Primary Treatment
- Secondary Treatment (Rotating Biological Contactors and Settling)
- Disinfection (Chlorination and Dechlorination)
- Solids Handling – sludge digestion, dewatering and transportation

Imported Sewage Receiving Station: To provide service to Niagara Region residents outside the wastewater servicing area, the Niagara Falls WWTP accepts Hauled Sewage from commercial haulers and recreational vehicle holding tanks. Receiving stations are situated to ensure all hauled 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.

Raw Influent Pumping: Screened wastewater enters a wet well, equipped with raw sewage pumps. The wet well provides a low point for the collection system to discharge. The raw sewage pumps then lift the wastewater from the well (low point) to the beginning of the

treatment process (high point) to allow the remainder of the treatment process to occur by gravity.

The Niagara Falls WWTP is equipped to pump all wastewater received up to 205,000 m^3/d. During wet weather events, high flows above 205,000 m^3/d will back up in the incoming sewer and discharge directly to the Queenston-Chippawa Power Canal. This is called a Plant Overflow.

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

Flocculation: Polymer and coagulant is added to the wastewater and mixed in flocculation tanks. Flocculation brings small solids together into larger bunches. The larger bunches of solids are heavier and improve settling in the downstream primary clarifiers.

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.

For flows less than 136,400 m^3/day, the effluent from the primary clarifiers flows to the secondary treatment process for full treatment, disinfection and dechlorination. Flows greater then 136,400 m^3/d will bypass the secondary treatment system and disinfection/dechlorination system and flow to the OPG canal. This is called a secondary overflow.

Secondary Treatment:

Rotating Biological Contactors (RBCs): A shaft with multiple large round discs stacked close together are slowly rotated into a shallow tank of wastewater. Microorganisms (or “bugs”) grow on the discs and remove dissolved and suspended organics and nutrients when in contact with the wastewater. While the portions of the disc are exposed to the air, the microorganisms get the oxygen they need to remain healthy.

Coagulation and Phosphorus Removal: A polymer and metal salt solution, ferric chloride, is added to assist with phosphorus removal and solids settling in the secondary clarifiers.

Secondary Clarifiers: Secondary clarifiers receive effluent from the RBCs which separates the remaining solids. Solids settle as waste sludge on the bottom of the clarifier while a clean effluent overflows from the clarifiers to be disinfected and discharged to the environment. The waste sludge collected on the bottom of the clarifier is pumped to the solids handling process for anaerobic digestion.

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 Queenston-Chippawa Power Canal.

Solids Handling:

Anaerobic Digestion: Sludge from the primary and secondary clarifiers is directed to primary anaerobic digesters, which overflow into a secondary digester for thickening. Anaerobic digestion allows a further breakdown of pollutants and pathogens in the collected sludge. The digested sludge is stored for further dewatering.

Dewatering: Digested sludge is mixed with a polymer and processed through a centrifuge. A centrifuge spins the sludge at a high rate of speed to separate the solids from the liquid portion. Centrifuging produces a dewatered cake material which is transported from site for further processing into a pelletized fertilizer. The liquid portion, or centrate, is normally returned to the liquid treatment process for full treatment and discharge to the environment.

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

Review of 2024 Plant Flows

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

Table NF-T-1: Table of Niagara Falls WWTP Treated and Imported Sewage Flows

Flow Statistic	Value
Design Average Daily Flow (ML/d)	68.300
Design Peak Flow Rate - Dry Weather (ML/d)	136.400
Design Peak Flow Rate - Wet Weather (ML/d)	205.000
Total Volume Processed (ML)	15,237.847
Annual Average Daily Flow (MLD)	41.633
% Annual Average Daily Flow Utilization	61%
% Increase/Decrease over prior year	-3%
Volume Imported Sewage Received (ML)	1.047
% Increase/Decrease Imported Sewage over prior year	173%

Flow Statistic	Value
Imported Sewage as % of Flow	0.01%

Reviewing the treated flows in 2024, it was observed that, on average, the plant is utilizing 61% of its design Average Daily Flow. This indicates that the facility has hydraulic capacity to meet the needs of the collection system with room for additional future 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 2024, there were 26 instances where the flow to the plant was greater than the design Average Daily Flow, amounting to approximately 7% of the year. These instances occurred during times of wet weather or heavy snow melt. The Niagara Falls 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 completed. This can be observed below in Figure NF-T-1 below. No trends were observed indicating that the average flow at the plant is increasing or decreasing. Spikes during typical wet weather seasons, spring and fall, demonstrate impacts of wet weather on the Niagara Falls collection system and wastewater treatment plant. Lower flows were observed during 2020 and 2021, which can be attributed to COVID-19 pandemic restrictions and its impact on tourism.

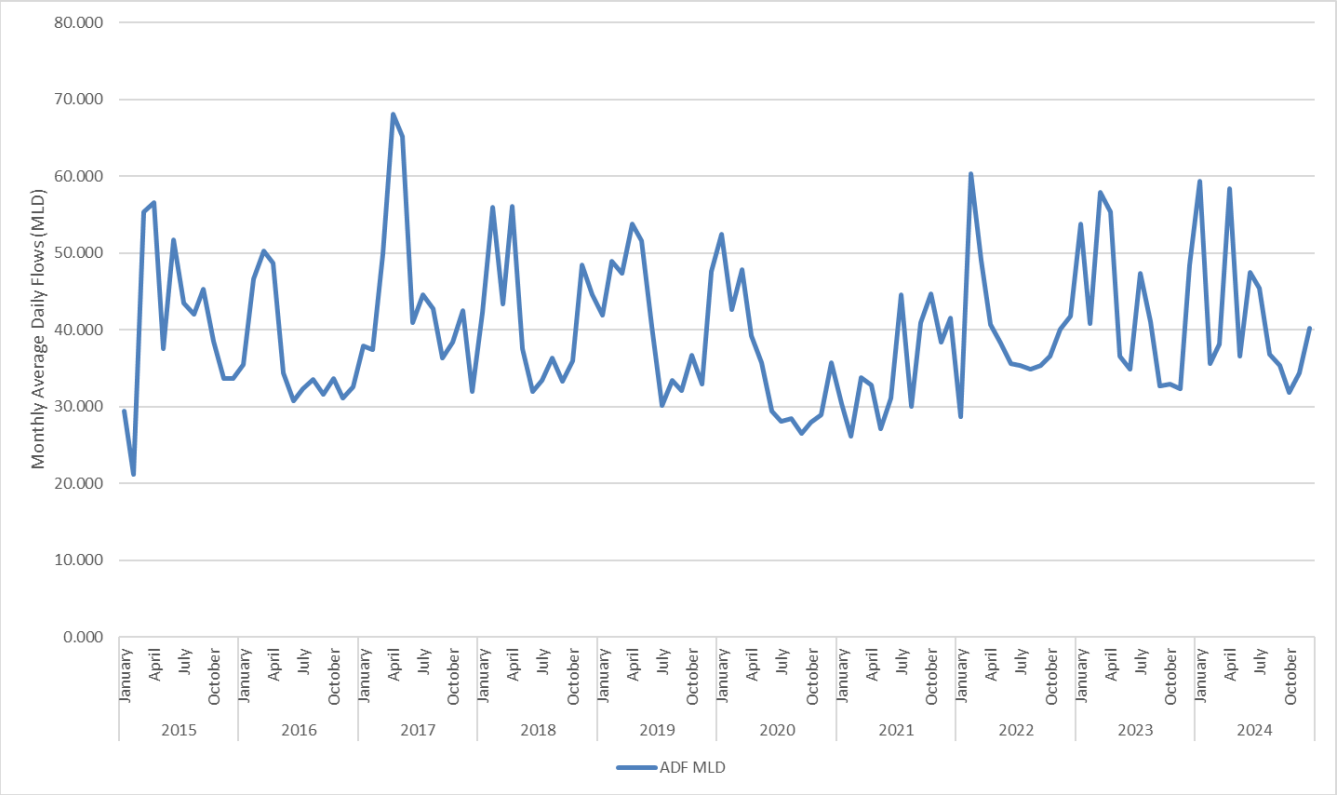

Figure NF-T-1: Graph displaying the Monthly Average Daily Flow Rate in MLD

The volume of imported sewage received at this facility increased by 173% compared to the prior year.

Due to final effluent quality issues and ongoing non-compliance with ECA limits, the imported sewage receiving station is operating under restricted conditions including:

- Limited to domestic wastewater from within the City of Niagara Falls boundaries only
- Daily received volume limit of 100 m^3
- Daily sewage disposals would be stored in the hauled sewage holding tank to be released slowly into the influent stream over time
- Plant will receive imported sewage Monday, Tuesday, and Wednesday or at the discretion of the Plant Operations Manager

These restrictions were put in place starting July 17, 2023, to ensure no adverse impacts to the plant occurred from the receipt of imported sewage. Prior to this period, no imported sewage was received at the site in 2023.

The increase in imported sewage in 2024 versus the previous reporting year can be attributed to the station only receiving imported sewage for approximately half of 2023 (starting July 2023).

No instances of exceedance of the daily volume limit occurred with a maximum daily total of 75.0 m^3 received on August 14, 2024.

Review of Influent Sampling and Monitoring Activities

In 2024, 104 samples of influent were collected and tested. An annual summary of influent sampling can be observed in Table NF-T-4: Annual Summary of Niagara Falls Plant and Imported Sewage Flows, Influent and Effluent Sampling and Monitoring Results.

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 shows 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 NF-T-2, is a graph depicting four commonly monitored pollutant loadings to the plant for the period of 2022-2024.

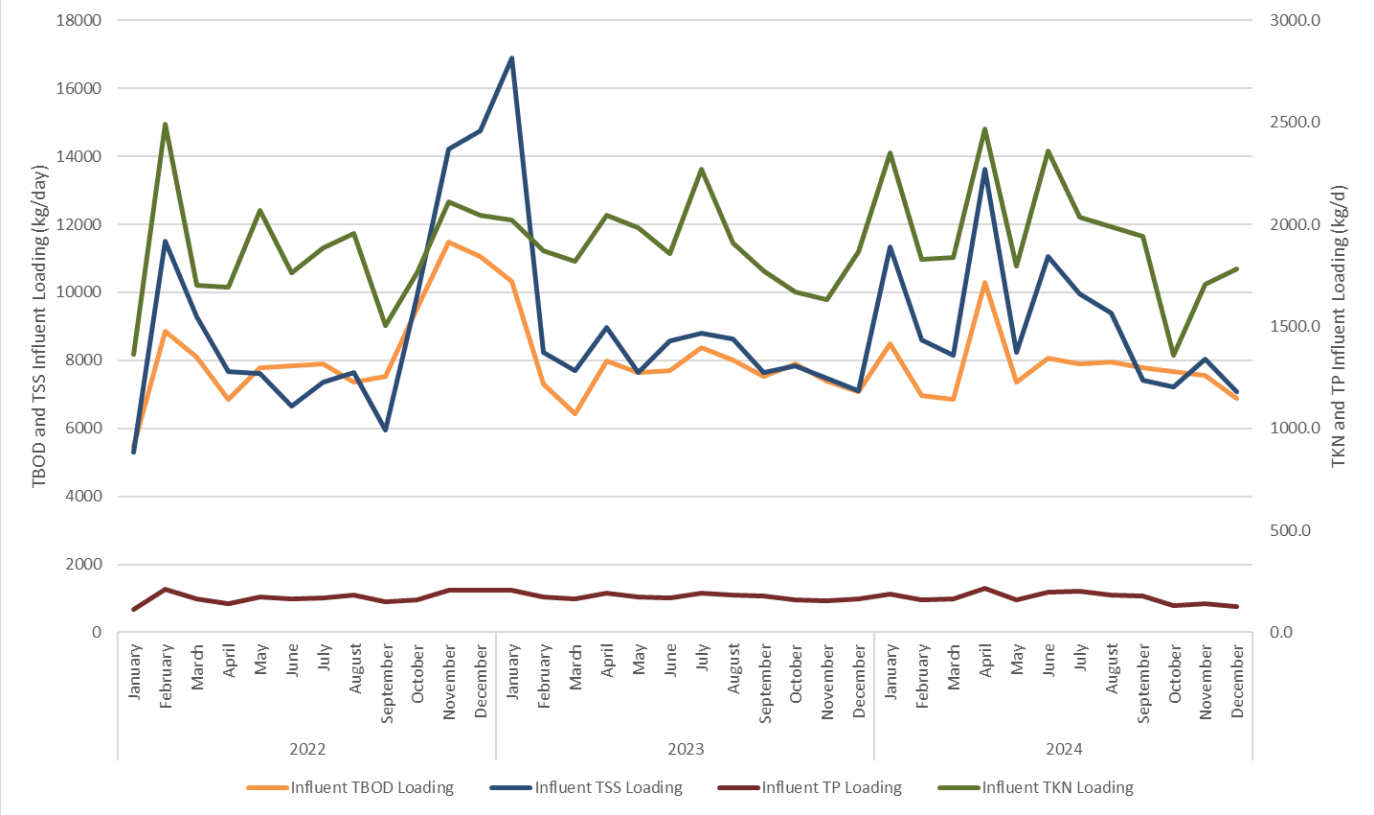

Figure NF-T-2: Figure of monthly plant loadings to the Niagara Falls WWTP for Total Biochemical Oxygen Demand (TBOD), Total Suspended Solids (TSS), Total Kjeldahl Nitrogen (TKN) and Total Phosphorus (TP), in kg/d, for the period 2022 to 2024.

Reviewing the calculated loadings for TBOD, TSS, TKN and TP for the past 3 years shows no change in influent loading.

Review of Imported Sewage Sampling and Monitoring

Imported sewage is sampled weekly to ensure sewage being received will not have an adverse impact to the treatment process or the beneficial re-use of biosolids resulting from the wastewater treatment process. In 2024, 47 samples of imported sewage were collected and submitted for testing by an ISO 17025:2017 accredited laboratory. Results were reviewed and compared to the Niagara Region SUBL. Where exceedances of the by-law were noted, the source of the imported sewage is investigated. Exceedances of treatable parameters (TBOD, COD, TSS, TP, TKN and pH) are allowable under the SUBL.

Table NF-T-2: Table of Imported Sewage monthly average analysis results.

Analyte	Units	SUBL Limit	January	February	March	April	May	June	July	August	September	October	November	December
Total Solids	mg/L	-	13,803	12,478	3,767	2,990	3,385	8,075	1,024	2,598	437	2,202	697	1,168
Phosphorus	mg/L	10	37.01	32.30	33.47	13.87	36.50	80.78	16.00	59.53	4.35	17.46	8.87	7.46
Arsenic	mg/L	1	0.06	0.06	0.05	0.04	0.04	0.04	0.01	0.05	0.02	0.13	0.04	0.06
Cadmium	mg/L	0.7	0.02	0.02	0.02	0.01	0.01	0.01	0.00	0.02	0.01	0.05	0.01	0.02
Chromium	mg/L	3	0.45	0.07	0.06	0.04	0.05	0.07	0.01	0.10	0.02	0.14	0.04	0.06
Cobalt	mg/L	5	0.02	0.02	0.02	0.01	0.01	0.02	0.00	0.02	0.01	0.05	0.01	0.02
Copper	mg/L	3	2.63	1.38	1.43	0.86	0.82	7.15	0.22	0.37	0.29	0.53	0.25	0.45
Lead	mg/L	1	0.37	0.19	0.15	0.04	0.04	0.17	0.01	0.05	0.02	0.13	0.04	0.06
Mercury	ug/L	10	1.96	1.30	1.72	0.20	0.96	0.05	0.05	0.05	0.43	0.29	0.14	0.10
Molybdenum	mg/L	5	0.07	0.04	0.06	0.02	0.02	0.02	0.01	0.03	0.01	0.06	0.02	0.03
Nickel	mg/L	2	0.31	0.10	0.04	0.06	0.03	0.04	0.01	0.02	0.02	0.06	0.02	0.03
Selenium	mg/L	1	0.06	0.06	0.05	0.04	0.04	0.04	0.01	0.05	0.02	0.13	0.04	0.06
Zinc	mg/L	3	7.68	3.50	4.27	1.43	1.88	1.98	0.48	0.93	0.31	1.58	0.42	0.70
Aluminum	mg/L	-	19.77	11.23	11.93	3.31	4.99	24.05	2.00	3.09	0.68	3.69	0.88	2.98
Antimony	mg/L	5	0.11	0.11	0.10	0.08	0.08	0.08	0.03	0.10	0.03	0.27	0.07	0.13
Barium	mg/L	-	1.18	0.87	0.47	0.18	0.22	0.36	0.04	0.08	0.03	0.15	0.05	0.25
Beryllium	mg/L	-	0.06	0.06	0.05	0.04	0.04	0.04	0.01	0.05	0.02	0.13	0.04	0.06
Boron	mg/L	-	1.10	1.10	1.00	0.80	0.80	0.80	0.28	0.95	0.33	2.68	0.73	1.25
T BOD	mg/L	300	3,014	1,269	1,055	1,284	1,151	1,895	406	1,164	107	1,014	277	745
COD	mg/L	600	14,980	6,453	5,350	3,336	4,303	4,958	1,308	4,005	264	3,311	584	1,381
Conductivity	mg/L	-	1,010	1,250	1,933	851	2,878	4,188	1,884	5,593	660	1,378	1,211	862
Iron	mg/L	-	38.39	35.60	21.59	6.42	8.66	43.39	2.68	3.74	0.81	3.65	2.22	11.64
Manganese	mg/L	-	0.73	0.78	0.60	0.30	0.25	1.03	0.08	0.19	0.07	0.29	0.11	0.23
pH		6-11	7.00	7.45	7.30	7.38	7.45	8.08	7.68	8.33	7.57	7.62	7.90	7.53
Silver	mg/L	5	0.06	0.06	0.06	0.04	0.05	0.04	0.01	0.05	0.02	0.13	0.04	0.06
Tin	mg/L	5	0.19	0.11	0.10	0.08	0.09	0.08	0.03	0.10	0.03	0.27	0.07	0.13
Total Volatile Solids	mg/L	-	10,768	10,858	2,640	2,428	2,265	5,103	480	1,578	233	1,662	360	818
Vanadium	mg/L	-	0.03	0.03	0.02	0.02	0.02	0.04	0.01	0.02	0.01	0.06	0.02	0.03
Total Kjeldahl Nitrogen	mg/L	100	217	181	260	97	301	595	196	705	46	140	86	61
Total Suspended Solids	mg/L	350	12,488	3,732	3,047	2,987	2,013	7,451	340	2,048	126	1,676	239	547

Review of Final Effluent Sampling and Monitoring Activities

In 2024, 103 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 NF-T-3 below summarizes the number of monthly objective and compliance limit exceedances at the Niagara Falls WWTP in the reporting year.

Niagara Falls exceeded the ECA compliance limit and objective for CBOD and TSS 12 months in 2024.

The compliance limit for TP was exceeded three months – February, March and June 2024. The ECA objective for TP was not achieved 12 months of 2024. TP objective exceedances are related to the TSS exceedances noted above as solids that carryover into the final effluent contain phosphorus. The ECA annual average loading limit for TP of 68.3 kg/d was achieved in 2024.

The Niagara Falls WWTP final effluent quality is impacted by deficiencies in the secondary treatment process. A new secondary treatment process is currently under construction to replace the current aging infrastructure. This will greatly enhance the facility's ability to effectively treat wastewater and meet and achieve ECA requirements in the future. A status update regarding the ongoing construction is included in section NF-T-4 Proposed Works – Status Update below. A full review and discussion of ECA compliance and objective exceedances is included in section NF-T-3 below.

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

- Carbonaceous Biochemical Oxygen Demand (CBOD) – 96%
- Total Suspended Solids (TSS) – 97%
- Total Phosphorus (TP) – 91%
- E.Coli – 16%
- pH – 0%

Niagara Falls WWTP exceeded ECA objectives greater than 50% of the year for the parameters CBOD, TSS and TP. The facility effluent was not compliant with the ECA in 2024. Factors attributing to the objective and limit exceedances are covered in further detail in section NF-T-3 below. An annual summary of monthly average final effluent sample results can be observed in Table NF-T-4 below.

Table NF-T-3: Evaluation of Final Effluent sample results to ECA objectives and compliance limits

Parameter	ECA Monthly Concentration Objective	ECA Monthly Concentration Limit	Monthly Loading Limit (kg/d)	Number of Monthly Objective Concentration Exceedances	Number of Monthly Limit Concentration Exceedances	Number of Monthly Loading Limits Exceeded
pH[1]	6.5-8.5	6.0-9.5	-	0	0	-
CBOD5	15 mg/L	25 mg/L	-	12	12	-
Total Suspended Solids	15 mg/L	25 mg/L	-	12	12	-
Total Phosphorus	0.5 mg/L	1.0 mg/L	68.3 kg/d	12	3	0
Total Residual Chlorine[2]	non-detect	0.02 mg/L	-	0	0	-
E-Coli (geomean) [2]	200 CFU/100 mL	200 CFU/100 mL	-	0	0	-

[1] pH must meet objectives/limits at all times (inclusive)
[2] TRC/E.Coli monitoring only required April 01 to October 31 inclusive

Table NF-T-4: Annual Summary of Niagara Falls 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 Tested
Influent - Monthly Average TSS (mg/L)	191	242	214	233	225	233	219	255	210	227	234	176	222	
Number of Influent TSS Samples	10	8	8	8	9	8	10	8	9	9	8	9		104
Influent - Monthly Average TBOD5 (mg/L)	143	196	180	176	201	170	174	216	220	241	220	171	192	
Number of Influent TBOD5 Samples	10	8	8	8	9	8	10	8	9	9	8	9		104
Influent - Monthly Average TP (mg/L)	3.2	4.5	4.3	3.7	4.3	4.2	4.4	5.0	5.1	4.2	4.1	3.1	4.2	
Number of Influent TP Samples	10	8	8	8	9	8	10	8	9	9	8	9		104
Influent - Monthly Average TKN (mg/L)	39.58	51.34	48.18	42.23	49.08	49.76	44.83	54.04	54.89	42.74	49.64	44.29	47.55	
Number of Influent TKN Samples	10	8	8	8	9	8	10	8	9	9	8	9		104
Total Plant Flows (ML)	1839.794	1032.071	1181.613	1752.282	1134.898	1423.433	1408.344	1141.516	1059.744	986.152	1031.452	1246.548	15237.847	
Average Daily Flow (MLD)	59.348	35.589	38.117	58.409	36.610	47.448	45.430	36.823	35.325	31.811	34.382	40.211	41.633	
Maximum Daily Flow (MLD)	153.958	49.605	48.619	153.642	49.980	101.395	111.577	59.372	58.720	53.460	79.824	80.893	**MAX**	153.958
Minimum Daily Flow (MLD)	29.428	28.727	28.718	32.174	29.538	30.643	29.729	30.614	26.147	26.828	27.062	26.828	**MIN**	26.147
Volume Imported Sewage Received (ML)	0.047	0.102	0.058	0.070	0.094	0.117	0.112	0.192	0.094	0.087	0.044	0.031	1.047	
Final Effluent - Monthly Average TSS (mg/L)	40.4	33.6	28.9	30.0	32.0	35.0	32.2	32.5	33.4	25.9	31.0	34.4	32.4	
Final Effluent - Average Daily TSS Loading (kg/d)	2398	1196	1102	1752	1172	1661	1463	1197	1180	824	1066	1383	1351	
Number of Final Effluent TSS Samples	10	8	8	8	8	8	10	8	9	9	8	9		103
Final Effluent - Monthly Average CBOD5 (mg/L)	27.5	30.5	25.1	28.6	31.3	26.8	26.9	34.5	42.4	44.2	39.5	38.1	33.0	
Final Effluent - Average Daily CBOD5 Loading (kg/d)	1632	1085	957	1671	1146	1272	1222	1270	1498	1406	1358	1532	1372	
Number of Final Effluent CBOD5 Samples	10	8	8	8	8	8	10	8	9	9	8	9		103
Final Effluent - Monthly Average TP (mg/L)	0.95	1.06	1.03	0.84	0.94	1.08	0.91	1.00	0.92	0.78	0.75	0.78	0.92	
Final Effluent - Average Daily TP Loading (kg/d)	56.38	37.72	39.26	49.06	34.41	51.24	41.34	36.82	32.50	24.81	25.79	31.36	38.30	
Number of Final Effluent TP Samples	10	8	8	8	8	8	10	8	9	9	8	9		103
Final Effluent - Monthly Average TKN (mg/L)	28.19	38.28	37.06	37.24	42.01	44.18	36.61	47.83	44.92	35.32	44.90	43.57	40.01	
Number of Final Effluent TKN Samples	10	8	8	8	8	8	10	8	9	9	8	9		103
Final Effluent - Monthly Average NH3 (mg/L)	24.69	31.60	32.90	30.23	33.00	33.14	30.49	33.44	35.94	23.63	31.80	28.49	30.78	
Number of Final Effluent NH3 Samples	10	8	8	8	8	8	10	8	9	9	8	9		103
Final Effluent - Monthly Average NO3 (mg/L)	0.63	0.54	0.88	0.40	0.20	0.45	0.24	0.35	0.29	0.41	0.28	0.32	0.42	
Number of Final Effluent NO3 Samples	10	8	8	8	8	8	10	8	9	9	8	9		103
Final Effluent - Monthly Average NO2 (mg/L)	0.23	0.13	0.13	0.11	0.18	0.23	0.38	0.30	0.12	0.17	0.11	0.13	0.19	
Number of Final Effluent NO2 Samples	10	8	8	8	8	8	10	8	9	9	8	9		103
Final Effluent - Monthly Geomean E.Coli (cfu/100mL)			100	44	11	20	48	33	46	6			28	

Measured Parameter	January	February	March	April	May	June	July	August	September	October	November	December	Total / Average	Samples Tested
Number of Final Effluent E.Coli Samples			1	9	9	8	9	9	9	9				63
Final Effluent - Monthly Average TRC (mg/L)			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	
Number of Final Effluent TRC Samples			4	30	31	30	31	31	30	31				218
Final Effluent - Monthly Average Temperature (°C)	12.15	13.23	12.83	13.53	16.06	20.98	22.03	22.28	21.33	20.18	18.49	15.26	17.36	
Number of Final Effluent Temperature Samples	10	8	8	8	8	8	10	8	9	9	8	9		103
Final Effluent - Monthly Average pH	7.35	7.25	7.24	7.16	7.08	7.05	6.96	6.95	6.91	6.89	7.04	7.01	7.07	
Number of Final Effluent pH Samples	10	8	8	8	8	8	10	8	9	9	8	9		103

Quarterly sampling and testing of Final Effluent for Acute Lethality to Daphnia Magna[3] and Rainbow Trout[4] is a requirement of the ECA at the Niagara Falls WWTP. This testing includes introducing Daphnia or Rainbow Trout to a sample of Final Effluent. The sample is aerated and observed for multiple days.

- For the Daphnia Magna, the number of test subjects that die during the 48-hour testing period are counted. If more then 50% of the total Daphnia die, the sample fails.
- For Rainbow Trout, 10 fingerling trout are tested in the effluent for 96 hours. If more than five trout die during the testing period, the sample fails.
    - Typically during the 96 hour testing period for Rainbow Trout, the action of aerating the effluent will cause the pH of the sample to rise due to the evolution of carbon dioxide. The increase in pH causes ammonium and ammonia concentrations present in the sample to shift resulting in a higher amount of un-ionized ammonia that can be toxic to fish. This is a result of the testing conditions and is not a true representation of the toxicity of the effluent.
    - As the pH shifted sample is not reflective of the actual effluent pH, the Rainbow Trout test can also be conducted using pH stabilization. This means the pH is measured at the beginning and during the test. If it begins to change, the pH is adjusted back to the originally measured value at the beginning of the test.
    - Both the standard Rainbow Trout test as well as the pH stabilized version are run at the same time as a precaution and means to determine if final effluent toxicity is occurring due to the pH shift that can occur during testing

Test results for 2024 can be observed in Table NF-T-5 below.

Table NF-T-5: Summary of Daphnia Magna and Rainbow Trout Acute Lethality Results

Sample Date	Acute Lethality to Daphnia Magna Pass/Fail	Acute Lethality to Rainbow Trout Pass/Fail	Acute Lethality to Rainbow Trout - pH Stabilized Pass/Fail
2024-02-26	Pass	Fail	Test error – re-test required
2024-03-04	-	-	Fail
2024-03-12	-	-	Pass
2024-03-25	-	-	Pass
2024-04-09	-	-	Pass
2024-04-29	Pass	Fail	Pass
2024-08-06	Pass	Fail	Pass

[3] Acute Lethality to Daphnia Magna is carried out as per Environment Canada Publication EPS 1/RM/14

[4] Acute Lethality to Rainbow Trout is carried out as per Environment and Climate Change Canada publication EPS 1/RM/13 and EPS 1/RM/50 for pH Stabilization

Sample Date	Acute Lethality to Daphnia Magna Pass/Fail	Acute Lethality to Rainbow Trout Pass/Fail	Acute Lethality to Rainbow Trout - pH Stabilized Pass/Fail
2024-11-18	Pass	Fail	Fail
2024-11-25	Pass	Fail	Fail
2024-12-03	Pass	Fail	Pass
2024-12-16	Pass	Fail	Pass
2024-12-30	Pass	Pass	Pass

Three (3) samples of treated effluent collected at the Niagara Falls WWTP, March 4, 2024, November 18, 2024 and November 25, 2024, failed pH-stabilized acute lethality to Rainbow Trout testing.

The cause of failure is covered in detail in section NF-T-3 Operating Issues Encountered below.

Toxicity test reports are available upon request.

Niagara Falls WWTP receives landfill leachate from the collection system for treatment and discharge. To monitor impacts of landfill leachate on the Final Effluent, the ECA requires quarterly testing for landfill leachate related parameters. Table NF-T-6 below summarizes landfill leachate testing results for reporting year 2024.

Table NF-T-6: Summary of landfill leachate testing required by Niagara Falls WWTP ECA

Analyte	Units	2024-02-12	2024-05-06	2024-08-13	2024-11-04
Arsenic	mg/L	<0.01	<0.01	<0.01	<0.01
Bis(2-ethylhexyl) Phthalate	ug/L	1.2	3.0	<1.0	<10
Boron	mg/L	0.2	0.2	<0.2	<0.2
Cobalt	mg/L	<0.003	<0.003	<0.003	<0.003
Magnesium	mg/L	20.7	18.8	16.4	14.4
Manganese	mg/L	0.14	0.13	0.12	0.16
Potassium	mg/L	12.7	14.1	14.5	14.1
Strontium	mg/L	0.44	0.42	0.41	0.32

Effluent Quality Assurance Measurements and Control Measures

To ensure Niagara Falls 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 Niagara Falls 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 2024, 12 deviations from the scheduled sampling days occurred. Table NF-T-7 below provides the instances where a deviation occurred and a reason for the deviation.

The 2025 sampling schedule is available upon request.

Table NF-T-7: Table of 2024 sampling schedule deviations

Sampling Date Deviation	Sample Type(s)	Reason
2024-05-29	Influent, Final Effluent	Sample submission error – samples discarded.
2024-07-22	Final Effluent	Final effluent sampler malfunction. Sample was submitted following day.
2024-01-15 2024-03-20 2024-05-01 2024-05-15 2024-06-03 2024-09-18 2024-10-21 2024-11-13 2024-12-02 2024-12-23	Imported Sewage	Weekly sampling of imported sewage was scheduled. Samples were sometimes not available on the scheduled day as no disposals were made.

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

CBOD and TSS Monthly Compliance Limit Exceedances – 2024

The Niagara Falls WWTP did not achieve ECA objectives for CBOD, TSS and TP in 2024. Additionally, the plant did not meet compliance limits for CBOD and TSS in 2024. The compliance limit for TP was not achieved three months of 2024.

Significant capital upgrades are required at the facility to replace the aging rotating biological contactors (RBCs) with a more robust secondary treatment system to better treat fluctuating wastewater loads to the facility. A new moving bed biofilm reactor (MBBR) process has been designed, approved by MECP and currently under construction. The new secondary treatment system has an anticipated completion date of 2025.

The monthly compliance limit and objective for CBOD was not achieved 12 months in 2024. Several breakdowns of RBC units occurred over the reporting year. Table NF-T-8 below outlines the average number of RBC units in service during 2024. Daily COD monitoring of the influent has also shown higher than average COD loading to the Niagara Falls WWTP. The RBC treatment process is not robust enough to adapt quickly to changes in plant loading. The new MBBR technology will provide a better treatment solution for the variable loadings observed at the Niagara Falls WWTP.

Table NF-T-8: Average Number of RBCs In Service for reporting period 2024

Month Name	Average Number of RBC Units in Service
January	7
February	9
March	9
April	9
May	11
June	9
July	9
August	12
September	13
October	11
November	12
December	15

Currently, 16 of 35 RBC units are out of service (45.7%). Starting in April 2021, an RBC maintenance and repair strategy was implemented, however, as RBCs are repaired and brought back online for service, other RBCs continue to fail due to the age and condition of the equipment. Due to the age of the equipment, many replacement parts need to be fabricated causing long lead time for repairs. Ongoing secondary treatment construction activities are making it challenging to access certain failed RBCs.

To address final effluent CBOD quality, the following measures have been taken:

- All centrate generated by the onsite centrifuge is being removed by truck and discharged to the other Niagara Region wastewater treatment plants for further treatment to reduce BOD loading to the Niagara Falls plant. Centrate has high amounts of soluble organics that the RBC units are not able to effectively remove. This has been ongoing since February 2021.
    - In 2024, over 450 loads of centrate were removed from site
- Daily COD influent, primary effluent, RBC effluent and final effluent sampling to monitor performance of the RBC units, plant loadings and process change impacts more closely.
- Restrictions are in place for the receipt of imported sewage.
- Sludge from Queenston WWTP has been diverted from Niagara Falls WWTP.
- Increased sewershed monitoring

Final Effluent TSS results were over the ECA objective and limit 12 months in 2024. TP monthly results were over ECA objectives 12 months during 2024 as well as three (3) TP monthly non-compliances. Solids handling is still limited at the plant while primary digester #2 is out of service. TP exceedances are tied to solids carryover.

To improve solids handling at the Niagara Falls plant, the following actions continued or were taken in 2024:

- Operations staff continue with process optimization efforts that have been ongoing at the facility since 2019.
- Dosing of polymer to the RBC effluent to improve settling in the final clarifiers is still occurring. Polymer system optimization was undertaken with the supplier to ensure that the polymer in use and the dosage applied is still the best option available.
- New ferric chloride dosing pumps have been installed to address issues with the current ferric chloride system. Flow meter installation and pacing of the system to flow was completed in 2023.
- Flushing of the ferric chloride lines is completed on a weekly basis.
- Niagara Falls Water Treatment Plant has been redirecting the discharge of residuals away from the sanitary sewer. Sludge from the Queenston WWTP was redirected to other WWTPs.

- Sampling of discharges to the collection system from industries has been increased to determine additional loadings to the plant.

All incidents of non-compliance were reported as required to the MECP and Environment and Climate Change Canada.

Acute Toxicity Failures – March 2024 and November 2024

The Niagara Falls final effluent was found to be acutely toxic to rainbow trout on:

- March 4, 2024
- November 18, 2024
- November 25, 2024

Determining the cause of acute toxicity is challenging as there can be many undetectable sources of toxicity in wastewater. However, typically for wastewater effluent, toxicity failure occurs from three causes: ammonia, poor effluent quality, or chemical usage (either from something put in the sewer upstream of the plant, or from chemicals used within the plant).

Based on the toxicity results from the samples on March 4, 2024, and November 18 and 25, 2024, it is likely that poor effluent quality is the primary cause of the failures, with ammonia as a contributing factor.

The poor effluent quality is a direct result of secondary treatment equipment at the plant that has passed its useful life expectancy. This results in frequent breakdowns and equipment out-of-service regularly and impacts the plant's ability to remove pollutants effectively. Despite ongoing repair and maintenance efforts, treatment efficiency was reduced by an average of 30% in 2024 due to the state of deterioration of the secondary treatment process.

The following actions have been completed or are currently underway to address the effluent quality at Niagara Falls WWTP:

- A capital project is underway to replace the secondary treatment process. The new equipment is anticipated to come online in spring of 2025.
- Maintenance efforts continue to support the existing secondary treatment equipment to the extent possible.
- A polymer is being added in the primary and secondary clarifiers to optimize settling of solids and TSS removal.
- Hauled sewage receiving has been restricted to domestic sewage from sources within the City of Niagara Falls boundaries only. Specifically, barring winery waste helps to reduce pollutant loading to the facility.
- Increased sewershed monitoring activities to identify any additional pollutant loading to the facility.

NF-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 Niagara Falls WWTP:

- On going maintenance and repairs to RBC units including gearbox rebuilds, bearing replacements and rotating assembly rebuilds
- Replacement of sludge draw off #5
- Rebuild of channel blower #3
- Replacement of rag press and #2 screw
- Repair bar screen spring assemblies
- Repairs to boiler #1 and #2
- Repair of #5 screw conveyor
- Rebuild of primary clarifier #4 chain and flights
- Rebuild of primary clarifier #3 chain and flights
- Replacement of coagulant mixer
- Primary clarifier#1 motor replacement
- Replacement of primary clarifier chain pins and retainers
- Repairs to RBC bypass gate and valves
- Digester effluent line replacement
- Grit blower replacement
- Replaced coagulant pump
- Rebuild of effluent pump #3
- Chlorine contact tank cleaning

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 Niagara Falls WWTP:

- Niagara Falls WWTP phase one secondary treatment upgrades – in construction

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 2024, 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

ECA A-500-5110411564 version 1.0 includes the following Proposed Works:

- Upgrades to grit treatment system
- Installation of new Moving Bed Biological Reactor (MBBR) secondary treatment system to replace failing RBC units
- Decommissioning of RBC units
- Improvements to secondary clarifiers
- Influent flow measurement
- Improvements to coagulation and flocculation processes
- Construction of new chlorine contact tank
- New Final Effluent flow measurement

Construction of phase one secondary treatment upgrades is and has been ongoing following the necessary Asbestos Containing Material (ACM) abatement.

The project has experienced delays related mainly to site conditions. Project substantial completion is now anticipated to be July 23, 2025. An updated construction schedule is available upon request..

Process upgrades to the grit treatment system are complete (deficiencies being addressed). Improvements to all secondary clarifiers are complete. Installation of one (1) coagulant pump system was installed in 2024 with another to be installed in 2025. The new chlorine contact tank is complete and only requires to be tied into the process.

The new moving bed biological reactor (MBBR) secondary treatment system tankage is complete with installation of process piping and equipment continuing.

NF-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 NF-T-9 provides a summary of flow meter calibration.

Table NF-T-9: Summary of Flow Meter Calibration

Meter Name	Date Calibrated	Comments
Niagara Falls Final Effluent Meter	2024-12-12	Passed
Niagara Falls Secondary Overflow Meter	2024-12-12	Passed
Niagara Falls Plant Overflow Meter	2024-10-03	Passed

Calibration certificates are available upon request.

A new plant overflow meter was installed in 2024.

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 NF-T-10 below.

Table NF-T-10: Summary of Calibration/Verification of Effluent Monitoring Equipment

Equipment Description	Date Calibrated	Comments
pH Meter (asset 51045)	2024-09-17	Passed
pH Meter (asset 39917)	2024-09-17	Passed
COD Reactor	2024-09-17	Passed
Spectrophotometer (DR1900)	2024-09-17	Passed
Dissolved Oxygen Meter	2024-09-17	Passed
Turbidimeter (TU5200)	2024-09-17	Passed
Turbidimeter (2100Q)	2024-09-17	Passed
Chlorine Pocket Colorimeter II	2024-09-17	Passed

Equipment Description	Date Calibrated	Comments
Balance	2024-09-09	Passed

Calibration certificates are available upon request.

NF-T-6 Solids Handling

Processed Organics Received

No processed organics were received at the Niagara Falls WWTP in 2024. Sludge from Queenston WWTP is usually accepted at this site but this has been redirected to other wastewater treatment plants to limit loading to the facility.

Volumes Sludge Generated and Removed From Site

Solids removed from the treatment process are stored and centrifuged on site to produce a thickened product called dewatered cake. Dewatered cake is transported from site for further processing and conversion to a pelletized fertilizer. Additional sludge unable to be dewatered on site is transported 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 NF-T-11 provides a summary of 2023 and 2024 sludge volumes removed from site.

Table NF-T-11: Summary of Niagara Falls 2024 Sludge Production and Handling

Month	2024 Volume Sludge Dewatered On Site (ML)	2024 Dewatered Cake Yield (Dry tons)	2024 Volume Digested Sludge Hauled to Garner Road Biosolids Facility (ML)	2024 Volume Raw Sludge Hauled Off Site (ML)	Prior Year Total Sludge Produced (ML)
January	7.023	164.14	0.607	0.000	9.220
February	7.304	139.46	0.304	0.000	8.762
March	7.437	149.14	0.000	0.000	8.205
April	8.22	179.46	0.000	0.000	7.602
May	6.081	121.14	1.344	0.000	8.871
June	6.002	162.62	0.000	0.000	10.311
July	6.205	161.61	1.778	0.000	7.513
August	7.089	180.47	0.130	0.000	7.977
September	6.275	161.72	0.000	0.000	7.508
October	8.347	201.41	0.000	0.000	7.101
November	7.651	162.79	0.000	0.000	9.653
December	5.076	104.04	2.515	0.000	6.798
TOTAL	**82.710**	**1888.00**	**6.677**	**0.000**	**99.521**

Sludge removed from site decreased by 10% in 2024 versus 2023. Decreased flows to the plant were experienced in 2024.

No changes are anticipated for sludge handling in 2025 at the Niagara Falls WWTP.

Sludge Quality Monitoring

Digested sludge is sampled and analyzed bi-weekly to meet regulatory requirements of the Garner Road Biosolids Facility and Niagara Falls WWTP ECA and maintain our ability to beneficially re-use biosolids. Results are trended and compared to Nutrient Management Act 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 2024 biosolids analysis from the Niagara Falls WWTP is included in Table NF-T-12.

Table NF-T-12: Summary of Monthly Average Sludge Results

Analyte	Units	NMA Limits	January	February	March	April	May	June	August	September	October	November	December
Total Solids	%	-	2.17	2.00	2.25	2.40	2.40	3.05	3.05	3.00	2.75	2.55	2.30
Ammonia as N	mg/kg	-	917	885	970	835	980	960	980	955	1,000	895	950
Nitrate+Nitrite	mg/kg	-	0.99	0.99	1.00	1.00	1.00	0.99	0.99	0.99	1.00	1.00	1.00
Phosphorus	mg/kg	-	24,600	23,450	24,100	21,200	26,800	24,100	25,000	25,100	25,400	27,750	29,350
Arsenic	mg/kg	170	4.57	4.25	3.68	3.50	2.40	2.45	3.90	2.65	3.45	3.15	2.75
Cadmium	mg/kg	34	0.53	0.50	0.50	0.30	0.50	0.50	0.70	0.50	0.50	0.50	0.50
Chromium	mg/kg	2,800	91.63	82.70	76.15	84.00	82.90	83.00	104.00	104.50	110.50	127.00	128.50
Cobalt	mg/kg	340	3.47	2.80	2.10	3.20	3.10	3.20	3.65	2.50	4.50	3.10	3.00
Copper	mg/kg	1,700	452	410	434	449	476	464	426	458	504	525	521
Lead	mg/kg	1,100	90.33	49.50	337.50	861.00	185.00	67.00	31.50	26.00	30.50	22.00	378.00
Mercury	mg/kg	11	0.15	0.18	0.17	0.13	0.13	0.18	0.09	0.17	0.13	0.17	0.07
Molybdenum	mg/kg	94	13.00	11.50	11.00	12.40	9.00	12.00	11.00	11.00	14.00	17.00	18.00
Nickel	mg/kg	420	52.33	11.70	8.15	17.50	12.00	14.60	31.60	7.40	21.35	23.15	20.20
Potassium	mg/kg	-	4,233	4,775	4,040	3,730	3,730	2,830	2,935	2,665	2,845	2,905	3,610
Selenium	mg/kg	34	1.10	1.28	1.37	2.00	2.40	1.85	1.95	1.50	2.05	2.15	1.75
Zinc	mg/kg	4,200	605	589	580	595	635	601	610	649	661	675	668

NF-T-7 Complaints

Four (4) Odour complaints were received regarding the operation of the Niagara Falls 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. Nine (9) complaints were received regarding operation of the collection system and are included in section below.

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

Bypasses and Overflows

There were 24 secondary overflows events at the Niagara Falls WWTP in 2024. Secondary overflows from this facility receive primary treatment prior to discharge to the environment including screening, grit removal, phosphorus removal and settling (solids removal). The facility also had 13 plant overflows. Plant overflows occur when flows to the plant increase above the raw sewage pumping capabilities of 205,000 m^3/d. Plant overflows receive no treatment prior to discharge to the environment. Table NF-T-13 provides a monthly breakdown of overflow events occurring at the Niagara Falls WWTP during the reporting period. A complete listing of individual events is available upon request.

Table NF-T-13: Summary of Secondary and Plant Overflow Events by Month

Month	Number of Secondary Overflow Events	Total Secondary Overflow Volume (ML)	Number of Plant Overflow Events	Total Plant Overflow Volume (ML)
January	5	87.097	3	54.676
February	0	0.000	0	0.000
March	0	0.000	0	0.000
April	4	50.727	2	14.100
May	1	0.060	0	0.000
June	6	23.982	4	16.900
July	2	17.440	2	13.570
August	2	0.089	1	0.010
September	1	0.616	1	6.607
October	0	0.000	0	0.000
November	0	0.000	0	0.000
December	3	2.190	0	0.000
Total	**24**	**182.201**	**13**	**105.863**

Overflow events are sampled and submitted for analysis. Overflow events are to be sampled at the start of an event and every 8 hours during an event. Results for secondary overflow event samples collected in 2024 are shown in Table NF-T-14 below. Results for plant overflow event samples collected in 2024 are shown in Table NF-T-15 below.

Table NF-T-14: Niagara Falls WWTP Secondary Overflow Sampling Results

Date/Time	TBOD (mg/L)	TSS (mg/L)	TP (mg/L)	TKN (mg/L)	Ammonia as N (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	E.Coli[5] (cfu/100mL)
2024-01-09/ Event Start	120	137	4.3	44.9	24.5	0.20	0.10	
2024-01-09/ 8 Hour Sample	109	111	4.5	42.9	25.6	0.20	0.10	
2024-01-12/ Event Start	88	111	1.6	23.5	12.2	0.20	0.10	
2024-01-24/ Event Start	124	190	3.3	31.2	17.4	0.20	0.20	
2024-01-25/ 8 Hour Sample	118	182	3.4	29.3	17.80	0.20	0.10	
2024-01-25/ 16 Hour Sample	45	56	1.0	15.0	10.30	0.20	0.10	
2024-01-25/ 24 Hour Sample	51	55	1.6	20.7	13.00	0.20	0.10	
2024-01-26 Event Start	42	54	0.9	14.5	8.4	0.20	0.10	
2024-01-26/ 8 Hour Sample	40	54	0.9	10.4	6.7	0.90	0.20	
2024-01-26/ 16 Hour Samples	40	72	1.1	11.0	8.0	1.00	0.10	
2024-01-28/ Event Start	54	72	2.5	29.1	20.3	0.60	0.30	
2024-04-03/ Event Start	112	125	3.0	37.7	24.8	0.20	0.10	4,790,000
2024-04-03/ 8 Hour Sample	131	127	3.2	38.2	26.9	0.20	0.10	4,610,000
2024-04-11/ Event Start	129	80	3.4	30.6	23.1	0.20	0.10	1,990,000
2024-04-11/ 8 Hour Sample	74	66	1.9	16.4	12.2	0.20	0.10	1,920,000
2024-04-11/ 16 Hour Sample	80	58	2.1	18.6	12.3	0.20	0.10	2,380,000
2024-04-12/ 24 Hour Sample	40	75	0.9	11.3	7.1	1.70	0.20	510,000
2024-04-12/ 32 Hour Sample	46	91	1.6	13.8	7.5	0.20	0.10	960,000
2024-04-12/ 40 Hour Sample	40	44	1.0	12.2	6.6	0.20	0.10	1,920,000
2024-04-13/ 44 Hour Sample	60	102	1.5	17.1	11.1	0.20	0.10	910,000
2024-04-14/ Event Start	40	50	1.1	27.8	19.7	0.70	0.10	2,010,000

[5] Sampling of E.Coli is completed April 01 to October 31 annually

Date/Time	TBOD (mg/L)	TSS (mg/L)	TP (mg/L)	TKN (mg/L)	Ammonia as N (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	E.Coli[5] (cfu/100mL)
2024-04-18/ Event Start	106	78	2.3	28.5	20.6	0.20	0.10	2,850,000
2024-05-28/ Event Start	170	242	3.2	33.6	17.0	0.20	0.10	5,480,000
2024-06-06/ Event Start	160	83	3.4	47.3	29.3	0.20	0.10	7,270,000
2024-06-07/ Event Start	100	101	3.5	37.4	22.8	0.20	0.10	5,790,000
2024-06-09/ Event Start	64	114	1.7	12.6	4.7	0.20	0.10	3,450,000
2024-06-10/ 8 Hour Sample	55	82	1.6	12.7	4.9	1.00	0.10	3,450,000
2024-06-18/ Event Start	57	92	3.7	37.2	25.3	0.50	0.10	5,480,000
2024-06-20/ Event Start	76	58	1.9	32.3	15.8	0.20	0.10	7,700,000
2024-06-29/ Event Start	72	83	2.8	24.9	16.4	0.20	0.10	4,350,000
2024-07-10/ Event Start	45	74	1.7	19.4	13.4	0.20	0.30	4,880,000
2024-07-10/ 8 Hour Sample	40	84	2.2	14.2	9.1	0.70	0.10	3,650,000
2024-07-11/ Event Start	20	40	1.7	16.4	8.8	0.90	0.10	1,870,000
2024-07-11/ 8 Hour Sample	80	81	2.4	25.7	17.6	0.20	0.10	10,500,000
2024-07-15/ Event Start	80	61	2.3	30.6	22.2	0.20	0.10	5,790,000
2024-08-05/ Event Start	170	103	4.8	60.2	34.7	0.20	0.10	24,196,000
2024-08-18/ Event Start	134	59	3.6	67.0	54.7	0.20	0.10	17,300,000
2024-09-09/ Event Start	97	102	2.6	27.2	15.6	0.20	0.10	10,500,000
2024-12-09/ Event Start	97	134	2.4	31.5	19.7	0.20	0.10	
2024-12-10/ Event Start	129	172	1.5	27.0	17.6	0.20	0.10	
2024-12-29/ Event Start	78	44	1.5	41.0	21.8	0.20	0.10	
2024-12-29/ 8 Hour Sample	75	35	1.9	43.2	23.1	0.20	0.10	

Table NF-T-15: 2024 Niagara Falls WWTP Plant Overflow Sampling Results

Date/Time	TBOD (mg/L)	TSS (mg/L)	TP (mg/L)	TKN (mg/L)	Ammonia as N (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	E.Coli[6] (cfu/100mL)
2024-01-09/ Event Start	220	356	4.4	41.0	22.7	0.2	0.1	
2024-01-09/ 8 Hour Sample	53	84	1.0	14.8	8.1	1.4	0.1	
2024-01-24/ Event Start	81	114	1.4	16.4	10.3	1.2	0.2	
2024-01-26/ Event Start	40	77	1.1	11.1	6.1	0.7	0.2	
2024-01-26/ 8 Hour Sample	60	73	1.4	14.5	9.4	0.2	0.1	
2024-01-26/ 16 Hour Sample	40	64	1.6	14.0	10.5	0.2	0.7	
2024-04-03/ Event Start	198	378	3.7	30.4	12.7	0.2	0.1	4,610,000
2024-04-03/ 8 Hour Sample	96	167	2.0	15.4	6.8	0.7	0.1	1,560,000
2024-04-12/ Event Start	69	75	1.3	22.6	16.8	0.2	0.1	730,000
2024-04-12/ 8 Hour Sample	106	101	1.6	13.3	6.5	0.2	0.1	3,450,000
2024-04-13/ Event Start	40	67	0.8	15.6	9.6	0.6	0.3	720,000
2024-06-06/ Event Start	130	112	2.3	33.9	16.9	0.2	0.1	2,610,000
2024-06-09/ Event Start	68	231	1.6	10.5	3.6	0.3	0.1	3,450,000
2024-06-18/ Event Start	180	338	2.2	11.1	6.5	0.2	0.1	5,790,000
2024-06-20/ Event Start	101	239	3.0	30.6	16.3	0.6	0.1	5,480,000
2024-07-10/ Event Start	134	310	3.1	30.8	21.6	0.3	0.1	5,790,000
2024-07-10/ 8 Hour Sample	20	43	1.6	5.9	1.9	0.4	0.1	1,450,000
2024-07-15/ Event Start	196	346	3.8	36.3	16.6	0.2	0.1	9,210,000
2024-08-05/ Event Start	160	269	3.7	26.5	10.2	0.2	0.1	8,660,000
2024-09-09/ Event Start	170	578	2.0	15.2	3.3	0.5	0.1	1,990,000

[6] Sampling of E.Coli is completed 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, spills can also be a necessity to complete required maintenance to critical equipment in a safe way. These are “Planned Spills” and approval is obtained prior to the spill from the MECP.

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 NF-T-16 summarizes spills that occurred at the Niagara Falls WWTP in 2024.

Table NF-T-16: Summary of spills occurring at the Niagara Falls WWTP during the reporting year

Spill Date	MECP Incident Number	Short Description of Spill	Link to Public Report
No spills in reporting year 2024			

Abnormal Discharges

An abnormal discharge is a discharge to the environment that is abnormal in quality or quantity. There were no instances of abnormal discharge to the environment in 2024.

NF-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 mg/L for TP.

As described above in section NF-T-1 and Table NF-T-4, Niagara Falls struggles to achieve effluent quality that meets design objectives and secondary treatment equivalence as defined by procedure F-5-1. The plant is currently under construction to replace the failing RBC secondary treatment process with MBBR technology. Many optimization efforts have been and continue to be implemented at the facility in an effort to improve effluent quality. This was described above in section NF-T-3 above.

Summary of Efforts – Procedure F-5-1 and F-5-5 – Bypassing from Combined Sewer Systems

The Niagara Falls WWTP receives sewage from portions of the City of Niagara Falls 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 Niagara Falls and the Town of Niagara-on-the-Lake to reduce overflows 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 inflow and infiltration 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 2024, Niagara Region had an approved budget totaling $2.0M for the overflow reduction cost sharing program. Three projects were approved for cost sharing with the City of Niagara Falls totaling $584,500 supporting sewer separation work.

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. As Niagara Falls WWTP services a collection system that is impacted by wet weather flow, fully treating the combined sewage and stormwater is not feasible. Niagara Falls is equipped with primary treatment capacity for flows greater than 136,400 m^3/d, up to a maximum flow of 205,000 m^3/d. Chemically enhanced primary treatment is available to provide enhanced solids and phosphorus removal before being discharged to the Queenston-Chippawa Power Canal. This additional primary treatment capacity treats flows up to five times greater than what is handled on an average day at the Niagara Falls WWTP.

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 now in place ensuring better protection of Niagara Region wastewater infrastructure.

NF-C-1 Overview of the Niagara Falls WWTP Collection System

The Niagara Falls WWTP collection system is a class IV system that collects wastewater from domestic, commercial and industrial sources from the City of Niagara Falls and the Village of St. David's in the Town of Niagara-on-the-Lake (NOTL). The collection system consists of the following:

- Local sanitary sewers
- 20.9 kilometres of regional gravity mains
- 25.8 kilometres of regional force mains
- 21 pumping stations:
    - Bender Hill Sewage Pumping Station
    - Calaguiro Estates Sewage Pumping Station
    - Central Sewage Pumping Station (Niagara Region) and High Rate Treatment Facility (City of Niagara Falls)
    - Dorchester Road Sewage Pumping Station
    - Drummond Road Sewage Pumping Station
    - Garner Southwest Sewage Pumping Station
    - Grassy Brook Sewage Pumping Station
    - Kalar Road Sewage Pumping Station
    - Lundy's Lane Sewage Pumping Station
    - Meadowvale Sewage Pumping Station
    - Mewburn Sewage Pumping Station
    - Muddy Run Sewage Pumping Station
    - Neighbourhood of St. David's Sewage Pumping Station
    - Oakwood Sewage Pumping Station
    - Rolling Acres Sewage Pumping Station
    - Royal Manor Sewage Pumping Station
    - Seneca Street Sewage Pumping Station
    - South Side Low Lift Sewage Pumping Station (Niagara Region) and Detention Tank (City of Niagara Falls)
    - South Side High Lift Sewage Pumping Station
    - St. David's #1 Sewage Pumping Station
    - St. David's #2 Sewage Pumping Station
- Eight Combined Sewer Overflows (CSOs) at sewage pumping stations
- Two Sanitary Sewer Overflows (SSOs) at sewage pumping stations

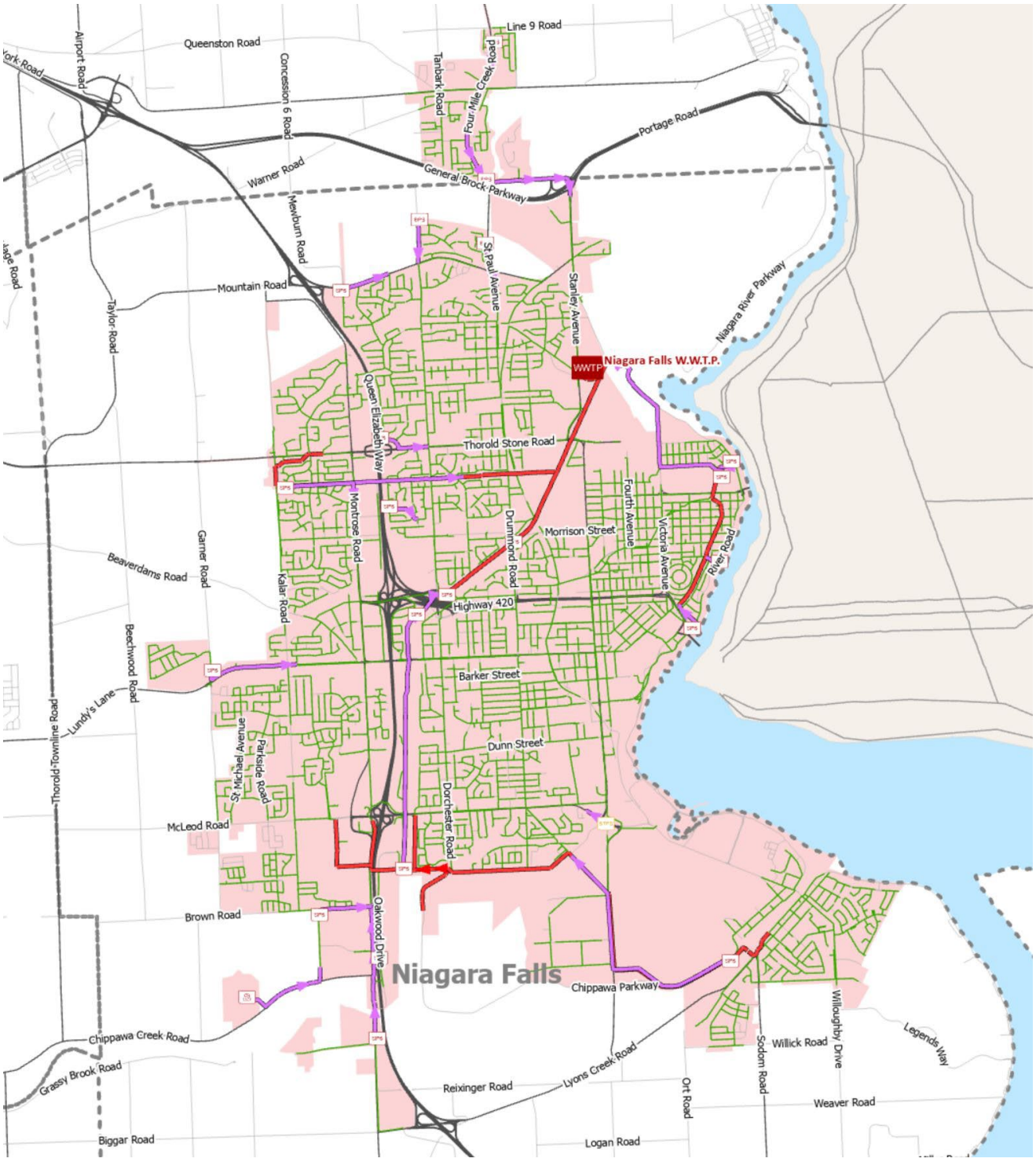

Figure NF-C-1: Map of Niagara Falls WWTP Collection System

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

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 during wet weather from deficiencies 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:

- Niagara Falls Wastewater Catchment System, 007-W603, issue number 2

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

NF-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 Niagara Falls 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 2024, operations staff conducted 10 visual inspections of sanitary sewer overflow locations and wet weather storage tanks.

Sanitary Sewer Closed-Circuit Television Inspection Program

Niagara Region owns and maintains 145 kilometers of trunk sanitary gravity sewers, 161 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.

Table NF-C-1 details the total length of sewers inspected over the past four years.

Table NF-C-1- CCTV Program Summary

Measurement in Kilometers (km)	2021[7]	2022	2023	2024
Inspection Length (km)	18.5	59.3	33.0	31.3

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.

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

Pump Stations and Forcemains

No operational issues were experienced with the pump stations or forcemains in 2024.

Gravity Trunk Sewers

No operational issues were experienced with any gravity trunk sewers in 2024.

NF-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

[7] 2021 marked the end of one inspection contract and the start of a new contract. Delays in the procurement process due to competing priorities resulted in a gap in inspection contracts. As a result, the length of sewers inspected in 2021 was less than in prior years.

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 Niagara Falls Collection System:

- South Side Low Lift SPS - purchasing of new pumps
- South Side High Lift SPS – rebuild of pump #4
- Lundy's Lane SPS – repairs to wet well concrete
- Central SPS – replacement of discharge piping on all five pumps
- Central SPS – replacement of pump #2 check valve
- Central SPS – repair of electrical failure of pump #1
- Central SPS – replacement of station programmable logic controller (PLC)
- St Davids #2 SPS – pump discharge piping replacement
- St Davids #2 SPS – Replacement of pump #1
- Installed overflow meter at Muddy Run SPS

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 Niagara Falls Collection System:

- Bender Hill SPS Upgrades – currently in design
- Mewburn SPS – currently in design
- Rolling Acres SPS – currently in design
- Thundering Waters trunk sewer rehabilitation – construction anticipated for 2025

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 2024, 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.

NF-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 NF-C-2 below provides a summary of calibrations completed in the collection system in 2024.

Table NF-C-2 - Summary of Calibration Activities Undertaken in the Niagara Falls Collection System

Equipment Description	Date Calibrated	Comments
South Side High Lift SPS Overflow Meter	2023-06-16	Passed
St. David's #2 SPS Station Discharge Flow Meter	2024-11-06	Passed
Central SPS Station Effluent Flow Meter	2024-12-12	Passed
Central SPS Station Overflow Meter	2023-06-06	Passed
Dorchester Road SPS Station Overflow Meter	2024-07-30	Passed
Drummond Road SPS Station Overflow Meter	2024-12-12	Passed
Muddy Run SPS Overflow Meter	2024-11-05	Passed

Calibration certificates are available upon request.

Calibration of the overflow meters at Central SPS and South Side high Lift SPS was not completed as part of the 2024 meter calibration. These meters will be completed as part of the 2025 annual calibration program.

NF-C-6 Summary of Complaints

Nine (9) odour complaints were received in 2024 from operation of the Niagara Falls collection system. When a complaint is received, Operations staff investigate the complaint and try to identify any source of odour. Where odours are confirmed and related to the operation of the collection system, corrective actions are taken as needed. All complaints are recorded along with corrective actions taken.

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

Collection System Overflows

The Niagara Falls 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 NF-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.

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

Table NF-C-3: Summary of Collection System Overflow Events

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[8] (MPN/100 mL)	Was the Overflow Disinfected (Yes/No)	Were Any Adverse Impacts Observed (Yes/No)	Corrective Actions Taken
Bender Hill	2024-06-09	0.312	00:06	12.5	64.6	0.4	3.5	4,880,000	No	No	Awaited End of Event
Bender Hill	2024-06-18	5.360	0:44	804.0	2256.6	20.9	191.9	6,870,000	No	No	Awaited End of Event
Bender Hill	2024-07-10	6.147	5:13	663.9	2212.9	19.7	201.6	4,610,000	No	No	Awaited End of Event
Bender Hill	2024-08-31	2.968	0:49	445.2	661.9	13.4	177.2	9,210,000	No	No	Awaited End of Event
Bender Hill	2024-09-09	4.446	1:01	369.0	1845.1	8.0	65.8	2,600,000	No	No	Awaited End of Event
Central SPS	2024-01-26	13.520	35:24	486.7	892.3	16.9	172.4	1,819,753	No	No	Awaited End of Event
Central SPS	2024-04-03	9.658	07.45	1110.7	2462.8	34.8	291.7	8,660,000	No	No	Awaited End of Event
Central SPS	2024-04-11	12.810	05.53	1575.6	3266.6	46.1	491.9	11,200,000	No	No	Awaited End of Event
Central SPS	2024-04-12	1.224	01.47	61.2	96.7	1.5	26.2	730,000	No	No	Awaited End of Event
Central SPS	2024-05-25	1.762	00.27	422.9	1409.6	13.2	106.4	8,160,000	No	No	Awaited End of Event
Central SPS	2024-06-09	3.890	02.20	482.4	4823.6	14.0	84.8	12,000,000	No	No	Awaited End of Event
Central SPS	2024-06-18	9.631	01.54	1444.7	3524.9	38.5	375.6	4,610,000	No	No	Awaited End of Event
Central SPS	2024-06-20	0.661	00.30	57.5	135.5	2.0	20.8	9,210,000	No	No	Awaited End of Event
Central SPS	2024-06-29	0.490	04.09	57.3	199.4	2.3	17.5	6,130,000	No	No	Awaited End of Event
Central SPS	2024-07-10	2.320	13.39	222.7	791.1	7.2	71.9	4,610,000	No	No	Awaited End of Event
Central SPS	2024-09-09	4.819	01.34	481.9	2530.0	10.1	72.3	1,930,000	No	No	Awaited End of Event
Central SPS	2024-12-29	0.089	04.25	6.0	7.6	0.2	4.3	2,604,419	No	No	Awaited End of Event
Dorchester SPS	2024-01-09	2.241	9:26	260.0	564.7	7.4	59.8	-	No	No	Awaited End of Event
Dorchester SPS	2024-01-26	13.024	10:56	605.6	2370.4	14.6	134.1	-	No	No	Awaited End of Event
Dorchester SPS	2024-04-03	2.516	7:52	332.1	573.6	8.8	73.5	7,270,000	No	No	Awaited End of Event
Dorchester SPS	2024-04-11	0.118	1:06	15.3	39.9	0.4	4.5	1,990,000	No	No	Awaited End of Event
Dorchester SPS	2024-04-12	2.891	5:48	156.1	199.5	4.9	64.8	790,000	No	No	Awaited End of Event
Dorchester SPS	2024-05-23	0.016	0:17	3.2	4.9	0.1	0.8	7,270,000	No	No	Awaited End of Event
Dorchester SPS	2024-06-06	0.523	8:01	56.0	44.5	1.3	16.3	4,350,000	No	No	Awaited End of Event
Dorchester SPS	2024-06-07	0.452	2:37	57.9	264.9	2.1	15.9	5,480,000	No	No	Awaited End of Event
Dorchester SPS	2024-06-09	1.689	2:34	194.2	1597.8	5.4	30.4	13,000,000	No	No	Awaited End of Event
Dorchester SPS	2024-06-18	5.819	4:10	989.2	3927.8	26.8	259.5	5,480,000	No	No	Awaited End of Event
Dorchester SPS	2024-06-20	0.721	1:29	58.4	121.8	2.5	39.7	3,130,000	No	No	Awaited End of Event
Dorchester SPS	2024-06-29	0.018	1:41	1.9	4.6	0.1	0.6	5,480,000	No	No	Awaited End of Event
Dorchester SPS	2024-07-10	5.966	9:14	352.0	1246.9	11.9	106.2	1,470,000	No	No	Awaited End of Event

[8] E.Coli sampling and analysis is required April 01 to October 31 annually.

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[8] (MPN/100 mL)	Was the Overflow Disinfected (Yes/No)	Were Any Adverse Impacts Observed (Yes/No)	Corrective Actions Taken
Dorchester SPS	2024-07-15	0.589	1:28	58.9	48.9	1.7	16.8	9,210,000	No	No	Awaited End of Event
Dorchester SPS	2024-08-05	0.001	0:12	0.1	0.5	0.0	0.0	6,290,000	No	No	Awaited End of Event
Dorchester SPS	2024-08-18	0.037	0:19	6.7	5.2	0.1	2.3	24,196,000	No	No	Awaited End of Event
Dorchester SPS	2024-09-09	1.074	1:15	103.1	486.5	2.6	18.2	2,480,000	No	No	Awaited End of Event
Drummond SPS	2024-01-26	0.064	0:27	4.1	7.0	0.1	1.0	-	No	No	Awaited End of Event
Drummond SPS	2024-05-23	0.578	0:12	127.2	200.0	2.2	28.8	4,610,000	No	No	Awaited End of Event
Drummond SPS	2024-05-25	0.160	1:12	32.0	134.6	1.0	9.0	11,200,000	No	No	Awaited End of Event
Drummond SPS	2024-06-06	0.459	0:26	43.1	148.7	1.1	15.1	8,160,000	No	No	Awaited End of Event
Drummond SPS	2024-06-09	1.540	0:41	87.8	405.0	3.2	17.4	3,870,000	No	No	Awaited End of Event
Drummond SPS	2024-06-18	10.488	1:35	1887.8	6712.3	48.2	488.7	8,160,000	No	No	Awaited End of Event
Drummond SPS	2024-07-10	6.121	6:54	654.9	2117.9	20.2	195.3	4,880,000	No	No	Awaited End of Event
Drummond SPS	2024-07-15	1.660	0:34	232.4	355.2	7.1	67.6	10,500,000	No	No	Awaited End of Event
Drummond SPS	2024-08-05	0.231	0:12	37.0	59.8	1.3	11.5	15,500,000	No	No	Awaited End of Event
Drummond SPS	2024-08-18	1.189	0:29	185.5	160.5	4.8	74.9	24,200,000	No	No	Awaited End of Event
Drummond SPS	2024-09-09	5.868	1:04	528.1	2863.6	11.7	86.8	1,990,000	No	No	Awaited End of Event
Muddy Run SPS	2024-01-26	0.114	01:58	4.6	18.2	0.1	0.6	-	No	No	Awaited End of Event
Muddy Run SPS	2024-06-09	0.210	01:31	7.8	32.3	0.3	2.3	-	No	No	Awaited End of Event
Muddy Run SPS	2024-06-18	0.109	01:30	17.4	36.8	0.4	4.3	-	No	No	Awaited End of Event
Muddy Run SPS	2024-07-10	0.031	00:20	1.2	3.3	0.0	0.1	-	No	No	Awaited End of Event
Muddy Run SPS	2024-09-09	0.030	00:57	2.8	16.6	0.1	0.5	-	No	No	Awaited End of Event
Royal Manor SPS	2024-01-26	2.259	01:56	155.9	234.9	3.8	35.5	-	No	No	Awaited End of Event
Royal Manor SPS	2024-06-18	1.006	0:54	201.2	677.0	4.5	45.2	4,880,000	No	No	Awaited End of Event
Royal Manor SPS	2024-07-10	0.817	0:23	32.7	227.9	0.5	4.0	1,150,000	No	No	Awaited End of Event
Seneca St SPS	2024-06-09	0.473	1:57	15.1	40.2	0.5	5.1	2,990,000	No	No	Awaited End of Event
Seneca St SPS	2024-06-18	0.473	2:02	75.7	185.4	2.1	19.6	3,870,000	No	No	Awaited End of Event
Seneca St SPS	2024-06-20	0.003	0:09	0.3	0.6	0.0	0.1	7,270,000	No	No	Awaited End of Event
Seneca St SPS	2024-07-10	0.153	7:47	15.8	52.2	0.6	4.5	5,790,000	No	No	Awaited End of Event
Seneca St SPS	2024-08-18	0.066	0:19	11.9	9.3	0.3	4.2	15,500,000	No	No	Awaited End of Event
Seneca St SPS	2024-08-18	0.083	0:13	14.1	8.5	0.3	5.2	24,196,000	No	No	Awaited End of Event
South Side high Lift SPS	2024-01-09	8.401	11:02	966.1	1974.2	21.8	210.0	-	No	No	Awaited End of Event
South Side high Lift SPS	2024-01-24	0.690	05:24	51.1	65.6	1.1	11.6	-	No	No	Awaited End of Event
South Side high Lift SPS	2024-01-26	19.880	26:03	815.1	3101.3	21.9	224.6	-	No	No	Awaited End of Event
South Side high Lift SPS	2024-04-03	6.169	16:14	1573.1	5027.7	40.1	272.1	5,790,000	No	No	Awaited End of Event

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[8] (MPN/100 mL)	Was the Overflow Disinfected (Yes/No)	Were Any Adverse Impacts Observed (Yes/No)	Corrective Actions Taken
South Side high Lift SPS	2024-04-12	8.578	09:23	651.9	1037.9	17.2	187.0	1,685,000	No	No	Awaited End of Event
South Side high Lift SPS	2024-06-09	0.015	04:13	0.8	2.6	0.0	0.2	3,080,000	No	No	Awaited End of Event
South Side high Lift SPS	2024-06-18	0.413	05:30	70.2	162.3	1.5	16.2	8,660,000	No	No	Awaited End of Event
South Side high Lift SPS	2024-06-29	0.145	04:28	15.2	35.2	0.6	5.3	5,790,000	No	No	Awaited End of Event
South Side high Lift SPS	2024-07-10	2.170	13:29	145.4	735.6	5.9	40.1	3,250,000	No	No	Awaited End of Event
South Side high Lift SPS	2024-12-29	0.007	01:17	0.5	0.6	0.0	0.3	3,280,000	No	No	Awaited End of Event

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. Spills can also be a necessity to complete required maintenance to critical equipment in a safe way. Occasionally, a planned spill may be 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 verbally to the MECP Spills Action Centre upon discovery and written reports are submitted as required to regulatory authorities. Below in Table NF-C-4 summarizes spills that occurred in the Niagara Falls collection system in 2024.

Table NF-C-4: Summary of Spills Occurring in the Niagara Falls Collection System

Spill Date	MECP Incident Number	Short Description of Spill	Link to Public Spill Report
2024-01-09	1-4KX12J	Equipment Malfunction - Central SPS/HRT	CWCD 2024-13 (https://www.niagararegion.ca/council/CouncilDocuments/2024/council-correspondence-feb-09-2024.pdf)

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

Projects Undertaken to Reduce Bypasses or Overflows

The Niagara Falls WWTP is impacted by wet weather causing overflow in the system and at the wastewater treatment plant. Being a two-tier system, Niagara Region works closely with the City of Niagara Falls and Town of Niagara-on-the-Lake to reduce overflows. Niagara Region participates in a cost sharing strategy with lower tier municipalities to fund overflow reduction projects. In 2024, Niagara Region had an approved budget totaling $2.0M for the overflow reduction cost sharing program. Three projects were approved for cost sharing with the City of Niagara Falls totaling $584,500 supporting sewer separation work.

The Niagara Region portion of the Niagara Falls collection system had 69 overflows from eight overflow locations in 2024. In addition to work being completed by City of Niagara Falls and Town of NOTL, the Niagara Region is undertaking projects to support the reduction of overflows at the WWTP and in the collection system. The proposed South Niagara Wastewater

Solution study is anticipated to provide broad benefits to multiple municipalities across Niagara Region including optimization of wet weather and minimizing overflows and flooding events across the study area. More information regarding this project can be found on the Niagara Region website. (https://www.niagararegion.ca/projects/south-niagara-falls-treatment-plant/default.aspx)

A new overflow meter was installed at Muddy Run SPS in 2024. This meter will provide an accurate measure of combined sewer overflows occurring at this station. Volumes from this station were previously estimated.

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)

An active project is underway to improve public reporting of bypasses and overflows including making the data available in near real time.

In 2024, Niagara Region 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 NF-C- 2 - Image of Sanitary Sewer Overflow Public Signage