



**Sunderland Water Pollution Control Plant
2022 Annual Performance Report**





The Regional Municipality of Durham

Sunderland Water Pollution Control Plant 2022 Annual Performance Report

Environmental Compliance Approval (ECA): 9252-8CUNBZ Dated June 28, 2012
Amendment to ECA: 9252-8CUNBZ Dated June 28, 2017

The Sunderland Water Pollution Control Plant (WPCP) 2022 Annual Performance Report provides staff, stakeholders and customers an overview of the performance of the Sunderland WPCP. Further, this report fulfills the annual reporting requirements of the Ontario Ministry of the Environment, Conservation and Parks (MECP). This report demonstrates the commitment of ensuring that the WPCP continues to deliver wastewater services to our customers in an environmentally responsible manner.

Water Pollution Control Plant Process Description

General

The Sunderland WPCP located in the Community of Sunderland in the Township of Brock is owned and operated by the Regional Municipality of Durham (Region). The plant is operated according to the terms and conditions of the ECA and its amendment. This MECP Class 1 wastewater treatment plant is designed to treat wastewater at a rated capacity of 632 cubic metres per day (m³/d) and utilizes a seasonal retention wastewater stabilization lagoon system. The Sunderland WPCP has a service population of approximately 1,581 residents.

Raw Influent

Wastewater is collected through 9.5 kilometres of sanitary sewers in the Sunderland service area and is conveyed to the treatment facility by a sanitary sewage pumping station (SSPS) located on River Street.

Lagoon Treatment

The Sunderland WPCP is a two cell lagoon system where the wastewater enters a retention stabilization lagoon and overflows into an exfiltration cell giving a combined retention time of approximately 182.5 days. The ECA permits two seasonal discharges per year. Spring discharge is for 20 days in May and fall discharge is for 20 days in November. Prior to and during discharge to the Beaver River, samples are collected to verify the effluent meets the limits established in the ECA.

Environmental Compliance Approval

Under Condition 9.(4) of ECA #9252-8CUNBZ the Region must produce an annual performance report that contains the following information:



a) Summary and interpretation of all monitoring data and a comparison to the effluent limits;

The raw wastewater flowing into the lagoons is sampled and analyzed for its chemical and physical composition. Monitoring of the raw wastewater is performed in accordance with the conditions in the ECA. Table 2 Raw Influent Analyses summarizes the raw wastewater characteristics during the reporting period.

The Sunderland WPCP effluent was determined to be compliant with the approval limits during the reporting period. The plant operated at 59.6% of its rated capacity and received a maximum daily flow of 631 cubic metres per day (m³/d) on February 23, 2022. The total treated effluent discharged to the Beaver River in 2022 was calculated to be 162,518 cubic metres (m³).

b) Description of any operating problems encountered and corrective actions taken;

In 2019, the Region contacted the MECP office after 2 of the 5 newly installed groundwater monitoring wells showed elevated ammonia and total kjeldahl nitrogen (TKN) values when compared to historical results from decommissioned wells. The wells are used for the monitoring of groundwater levels and water quality analysis around the lagoons. In 2020, ground penetrating radar technology was used to map water movement between the lagoon and groundwater to detect if the lagoon infrastructure was possibly breached or if the elevated results are due to a historical release that was not identified until the new wells were installed. In 2022, a third-party consultant was provided with all data collected to date to propose next steps. They proposed further studies to determine if the eastern containment structures of the lagoons could be contributing to the elevated ammonia and TKN results. The Region examined its operations at its other existing lagoons in Cannington. In the case of Cannington, a partial clean out of the lagoon around the influent inlet pipe was conducted. Sampling of the monitoring wells around the lagoon revealed that levels of ammonia and TKN decreased after the partial clean out. Based on the success in Cannington, a partial clean out of the inlet area of the Sunderland facultative lagoon was carried out in October 2022. Following the clean out and subsequent monitoring, should the results show the work to not be effective, further steps will be taken including dye testing from the sanitary sewer pumping station to the lagoon.

c) Summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the Works;

No maintenance was performed on major equipment during the reporting period.

d) Summary of any effluent quality assurance or control measures undertaken in the reporting period;

In-house lab test results are compared to the results of the Regional Environmental Laboratory on comparable samples to determine the in-house accuracy. Results were found to be in an



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acceptable range. Temperature and pH are monitored in the field, all other routine process control tests are performed at the Lake Simcoe WPCP laboratory in Beaverton.

e) Summary of the calibration and maintenance carried out on all effluent monitoring equipment;

Calibration of the influent flow meter located at River Street Sanitary Sewage Pumping Station was conducted on June 16 and November 24, 2022.

All monitoring and laboratory equipment is calibrated and maintained according to manufacturer's specifications at Lake Simcoe WPCP.

f) Estimate of sludge settling capacity of the lagoons and its annual depletion;

The annual depletion of the sludge settling capacity is negligible. Approximately 540 dry tonnes of sludge was removed from the facultative lagoon.

g) Efforts made and results achieved in meeting the effluent objectives;

The Region strives to achieve the best effluent quality at all times consistently remaining well below ECA limits:

- The maximum pH objective of 8.0 was exceeded in 5 of 14 samples (35.7%)
- The maximum pH limit of 9.5 was exceeded in 1 of 14 samples (7.1%) during an approved planned bypass from the Maintenance Lagoon. For future approved planned bypasses, staff will closely monitor the pH before drainage and if necessary, perform pH adjustment on the lagoon prior to discharge.

Best efforts will continue to be applied to maintain results below objectives.

h) Summary of any complaints received during the reporting period and any steps taken to address the complaints;

All complaints received from the public are administered and tracked through a central database. No complaints were received in 2022.

i) Summary of all By-pass, Spill or Abnormal Discharge;

Approved Planned Bypass from the Maintenance Lagoon – August 2022

The Region requested and received permission from the MECP in July to conduct a controlled drain of stormwater in the nonoperational Sunderland Maintenance Lagoon (Lagoon).

Stormwater in the form of snowmelt and precipitation partially filled the previously empty, lined Lagoon. The contents were tested before a controlled drain process was initiated. The volume removed was estimated to be 11,816 cubic metres (m³). The conditions in the marsh and river were monitored and no adverse environmental effects were observed as a result of the drainage event.

j) Status Update of the Initial Effluent Characterization;

The initial effluent characterization report was submitted to Ministry of the Environment, Conservation and Parks (MECP) in April 2016.



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k) Information Required by MECP District Manager;

No additional information was requested.

MECP Inspection

The plant was inspected by the MECP on June 12, 2018.



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Table 1 Raw Influent Flows

Month	Total Flow to Plant* cubic metre (m ³)	Average Daily Flow cubic metre per day (m ³ /d)	Maximum Daily Flow m ³ /d
January	12,490	403	451
February	11,532	412	631
March	14,810	478	573
April	13,793	460	492
May	13,037	421	472
June	13,596	453	568
July	10,512	339	368
August	9,189	296	328
September	9,057	302	384
October	9,150	295	364
November	8,900	297	364
December	11,396	368	474
Total	137,462		
Annual Average	11,455	377	
Minimum	8,900		
Maximum	14,810		631
ECA Limit		632**	
Met Compliance		Yes	

*Metered at River Street Pumping Station

**Annual average



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Table 2 Raw Influent Analyses

Month	Carbonaceous Biochemical Oxygen Demand average (avg.) concentration (conc.) milligrams per litre (mg/L)	Biochemical Oxygen Demand avg. conc. mg/L	Total Suspended Solids avg. conc. mg/L	Total Phosphorous avg. conc. mg/L
January	160	199	219	6.3
February	138	164	211	5.5
March	117	137	198	4.7
April	124	145	199	4.8
May	137	183	250	5.8
June	115	140	166	4.3
July	219	282	461	7.3
August	175	217	274	7.1
September	138	179	214	6.0
October	193	240	273	6.9
November	169	273	335	6.4
December	135	223	185	5.5
Average	152	199	249	5.9
Minimum	115	137	166	4.3
Maximum	219	282	461	7.3
Sampling Frequency Requirement Met	Yes	Yes	Yes	Yes



Table 2 Raw Influent Analyses continued

Month	Total Ammonia Nitrogen average (avg.) concentration milligrams per litre	pH minimum	pH maximum	Temperature Degree Celsius avg.
January	37.6	7.7	8.3	7.9
February	32.2	8.2	8.3	8.1
March	26.9	8.1	8.3	8.6
April	25.9	8.1	8.3	9.7
May	30.9	8.1	8.3	11.8
June	25.8	7.9	8.2	13.9
July	36.2	7.9	8.3	15.7
August	44.5	8.2	8.4	17.5
September	39.9	8.1	8.3	16.4
October	41.9	8.3	8.5	15.7
November	34.9	8.2	8.4	13.8
December	33.9	8.1	8.5	11.8
Average	34.2			12.6
Minimum	25.8	7.7		7.9
Maximum	44.5		8.5	17.5
Sampling Frequency Requirement Met	Yes	Yes	Yes	Yes



Table 3 Calculated Effluent Flows

Month	Effluent Flow cubic metres
January	
February	
March	
April	
May	73,275
June	
July	
August	11,816
September	
October	
November	77,427
December	
Total	162,518
Annual Average	54,173
Minimum	11,816
Maximum	77,427



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Table 4 Final Effluent Analyses

Month	Carbonaceous Biochemical Oxygen Demand average (avg.) concentration (conc.) milligrams per litre (mg/L)	Biochemical Oxygen Demand avg. conc. mg/L	Total Suspended Solids avg. conc. mg/L	Total Phosphorous (TP) avg. conc. mg/L	TP loading kilogram per month
January					
February					
March					
April					
May	2.7	3.7	5.7	0.18	13
June					
July					
August	1.0	1.0	1.3	0.03	0
September					
October					
November	1.0	1.5	5.7	0.05	4
December					
Annual Loading					17**
Average	1.6	2.1	4.2	0.09	5
Minimum	1.0	1.0	1.3	0.03	0
Maximum	2.7	3.7	5.7	0.18	13
ECA Limit	10*		15*	0.3*	69**
ECA Objective	10		15	0.5	
Lake Simcoe Phosphorus Reduction Strategy				0.25*	58**
Within Compliance	Yes		Yes	Yes	Yes
Sampling Frequency Requirement Met	Yes		Yes	Yes	

*Annual Average Concentration

**Total Annual Loading, kg/year



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Table 4 Final Effluent Analyses continued

Month	Total Ammonia Nitrogen average (avg.) concentration (conc.) milligrams per litre (mg/L)	Unionized ammonia avg. conc. mg/L	pH minimum	pH maximum	Temperature Degree Celsius avg.
January					
February					
March					
April					
May	14.58	0.40	7.9	8.1	15.2
June					
July					
August	0.03	0.00	9.5	9.6	23.1
September					
October					
November	5.92	0.10	7.5	8.4	6.1
December					
Average	6.84	0.17			14.8
Minimum	0.03	0.00	7.5		6.1
Maximum	14.58	0.40		9.6	23.1
ECA Limit			6.0	9.5	
ECA Objective			6.5	8.0	
Within Compliance			Yes	No	
Sampling Frequency Requirement Met	Yes	Yes	Yes	Yes	Yes