



**Sunderland Water Pollution Control Plant  
2021 Annual Performance Report**





## **The Regional Municipality of Durham**

### **Sunderland Water Pollution Control Plant 2021 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) 2021 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 (m<sup>3</sup>/d) and utilizes a seasonal wastewater stabilization lagoon system. The Sunderland WPCP has a service population of approximately 1,558 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 64.7% of its rated capacity and received a maximum daily flow of 557 cubic metres per day (m<sup>3</sup>/d) on December 11, 2021. The total treated effluent discharged to the Beaver River in 2021 was calculated to be 93,307 cubic metres (m<sup>3</sup>).

**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 monitoring of groundwater level 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 2021, 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, staff will be scheduling a partial clean out of the inlet area of the Sunderland facultative lagoon in 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 acceptable range.



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

- Calibration of the influent flow meter located at River Street SSPS was conducted on May 18 and November 10.
- Temperature and pH are monitored in the field, all other routine process control tests are performed at the Lake Simcoe WPCP laboratory in Beaverton.
- 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. There was no removal of solids from the lagoons in 2021.

**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 total suspended solids objective of 15 milligrams per litre (mg/L) was exceeded in 1 of 16 samples (6.3%)

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 2021.

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

No by-passes, spills or abnormal discharges occurred during the reporting period.

**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.

**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.

**Table 1 Raw Influent Flows**

Month	Total Flow to Plant - metered at the River Street Pumping Station cubic metres (m <sup>3</sup> )	Average Daily Flow cubic metres per day (m <sup>3</sup> /d)	Maximum Daily Flow m <sup>3</sup> /d
January	12,760	412	490
February	10,522	376	412
March	14,004	452	548
April	14,210	474	546
May	14,263	460	548
June	10,925	364	394
July	12,848	414	495
August	10,556	341	370
September	11,181	373	525
October	11,997	387	429
November	11,411	380	441
December	14,506	468	557
Total	149,183		
Annual Average	12,432	409	
Minimum	10,522		
Maximum	14,506		557
ECA Limit		632*	
Met Compliance		Yes	

\*Annual average daily flow



**Sunderland Water Pollution Control Plant  
2021 Annual Performance Report**

**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	336	383	398	9.2
February	213	206	220	7.1
March	161	208	239	5.7
April	146	179	169	5.2
May	184	225	343	5.9
June	239	360	572	9.0
July	144	149	241	6.8
August	136	173	214	7.0
September	165	241	279	7.0
October	143	165	224	6.6
November	158	173	214	6.0
December	126	164	230	6.3
Average	179	219	279	6.8
Minimum	126	149	169	5.2
Maximum	336	383	572	9.2
Sampling Frequency Requirement Met	Yes	Yes	Yes	Yes



**Sunderland Water Pollution Control Plant  
2021 Annual Performance Report**

**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	39.7	8.0	8.7	20.3
February	38.8	8.1	8.3	12.0
March	33.4	8.1	8.4	8.8
April	28.4	7.8	8.0	11.2
May	28.8	7.9	8.1	12.8
June	33.5	8.1	8.2	14.8
July	36.3	7.9	8.1	16.3
August	40.9	8.1	8.2	17.2
September	42.1	7.9	8.3	17.6
October	37.7	7.8	8.3	16.7
November	35.6	7.8	8.0	12.3
December	32.8	7.3	8.1	9.7
Average	35.7			14.1
Minimum	28.4	7.3		8.8
Maximum	42.1		8.7	20.3
Sampling Frequency Requirement Met	Yes	Yes	Yes	Yes



**Table 3 Calculated Effluent Flows**

Month	Effluent Flow cubic metres
January	
February	
March	
April	
May	39,456
June	
July	
August	
September	
October	
November	53,851
December	
Total	93,307
Annual Average	46,653
Minimum	39,456
Maximum	53,851



**Sunderland Water Pollution Control Plant  
2021 Annual Performance Report**

**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	2.4	3.5	4.1	0.06	2
June					
July					
August					
September					
October					
November	1.8	1.8	5.9	0.06	3
December					
Total					6**
Average	2.1	2.7	5.0	0.06	3
Minimum	1.8	1.8	4.1	0.06	2
Maximum	2.4	3.5	5.9	0.06	3
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)



**Sunderland Water Pollution Control Plant  
2021 Annual Performance Report**

**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	15.95	0.11	6.7	7.5	19.9
June					
July					
August					
September					
October					
November	8.71	0.02	6.6	7.6	6.4
December					
Average	12.33	0.06			13.1
Minimum	8.71	0.02	6.6		6.4
Maximum	15.95	0.11		7.6	19.9
ECA Limit			6.0	9.5	
ECA Objective			6.5	8.0	
Within Compliance			Yes	Yes	
Sampling Frequency Requirement Met	Yes	Yes	Yes	Yes	Yes