

2020 ANNUAL PERFORMANCE REPORT CAINSVILLE LAGOONS

Amy Shaw
District Manager
Guelph District Office
Ministry of the Environment, Conservation and Parks
4th Floor, One Stone Road West
Guelph, ON N1G 4Y2
GuelphWasteWater@ontario.ca

March 26, 2021

Re: 2020 Annual Performance Report for the Cainsville Lagoon System

Attached is the 2020 Annual Performance Report for the Cainsville Lagoon System located at 30 Shaver Rd. in the County of Brant. This report has been completed in accordance with:

- Condition No. 10(6)(a)-(k) cited in Environmental Compliance Approval #0176-7LSQYG dated September 8, 2009 and issued to the Corporation of the County of Brant.

This report was prepared by the Ontario Clean Water Agency on behalf of the County of Brant based on the information we have in our records. The report covers the period from January 1, 2020 to December 31, 2020.

Sincerely,



Sam Sianas
Senior Operations Manager
Ontario Clean Water Agency

Cc.

Matthew D'Hondt – Solid Waste/Wastewater Operations Manager – County of Brant
Allison McGuckin – PCT - OCWA
Todd Paylor – Water Inspector – MECP
Zafar Bhatti – Water Supervisor – MECP

2020 ANNUAL PERFORMANCE REPORT

CAINSVILLE LAGOON SYSTEM

30 SHAVER STREET, CAINSVILLE

MECP ENVIRONMENTAL COMPLIANCE APPROVAL #0176-7LSQYG

PREPARED BY: ONTARIO CLEAN WATER AGENCY

PREPARED FOR: MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS

ON BEHALF OF: THE COUNTY OF BRANT

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INTRODUCTION

The Cainsville Lagoon System (Lagoons) is located at 30 Shaver Street in Cainsville, Ontario. The Lagoons consist of two primary sewage stabilization treatment lagoon cells. Stabilization Lagoon Cell #1 has a maximum holding capacity of 7,050 m³ and stabilization lagoon cell #2 has a maximum holding capacity is 6,772m³. Raw sewage enters the site through a manhole containing a Palmer Bowlus Flume with flow recording and a continuous chemical addition system and then flows to a distribution manhole. Flows can be subdivided to feed cell# 1, cell# 2 or both. Two (2) 5horsepower subsurface aerator units were installed with one unit per primary cell. Flow entering the either primary cell progressively fills and overflows into the effluent polishing lagoon cell # 3. Final effluent is discharge semi-annually (Spring Discharge March 15 to April 30) (Fall Discharge October 15 to December 15) to Fairchild Creek through an effluent outfall consisting of a concrete sewer pipe and a parshall flume equipped with flow measurement device.

PLANT FACTS

Environmental Compliance Approval
 0176-7LSQYG (Dated September 8, 2009)
 Notice No. 1 issued November 15, 2013
 Rated Capacity 250m³/day
 Receiving Water Fairchild Creek (semi-annually)

The Lagoon System is operated in accordance with provincial regulations following a detailed sampling schedule as required in the Environmental Compliance Approval (ECA) #0176-7LSQYG dated September 8, 2009. The following report is presented such that it corresponds with ECA #0176-7LSQYG Section 10(6)(a) through (k).

SECTION A - MONITORING DATA

As outlined in the ECA #0176-7LSQYG Section 10(6)(a) the following is a summary and interpretation of all monitoring data and a comparison to the effluent limits and objectives outlined in Table 1 and 2 of this report respectively, including an overview of the success and adequacy of the Cainsville Lagoons.

(I) EFFLUENT LIMITS/OBJECTIVES

TABLE 1 – EFFLUENT LIMITS

Final Effluent Parameter	Maximum Concentration (mg/l)	Maximum Waste Loading* (kg/d)
CBOD ₅	30.0	<u>Spring</u> : 152.1kg/day (March 15-April 30) <u>Fall</u> :12.3kg/day (Oct 15-Nov 30)
Total Suspended Solids	40.0	-
Total Phosphorus	0.80	-

*Maximum waste loading includes loading from the contingency discharge as well

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TABLE 2 – EFFLUENT OBJECTIVES

Effluent Objectives	
Effluent Parameter	Concentration Objective (mg/L)
CBOD ₅	25.0
Suspended Solids	30.0
Total Phosphorus	0.50
Unionized Ammonia (UA)	0.10
Acute Toxicity (AT)	Non-lethal to rainbow trout and daphnia magna

In Section 8A. Special Operations – Seasonal Discharge it states that the fall discharge will not commence earlier than October 15 and terminate no later than December 15. Spring discharge however, incorporates a contingency measure if discharge cannot be completed within the normal discharge window. Additional monitoring and sampling is required should this contingency be utilized as per Table 5 below.

(II) LAGOON SAMPLING PROCEDURES

Samples are collected from the Lagoons according to the tables outlined below utilizing a grab sampling procedure and a flume reading when required. Analysis for these parameters is conducted at SGS Lakefield Analytical in Lakefield, Ontario. Lakefield Analytical is a member of the Canadian Association for Laboratory Accreditation Incorporated, certificate # 1999.

TABLE 3 – INFLUENT SAMPLING REQUIREMENTS (FROM THE INLET MANHOLE)

Parameters	Sample Type	Frequency
BOD ₅	Grab	Monthly
Total Suspended Solids	Grab	Monthly
Total Phosphorus	Grab	Monthly
Total Kjeldahl Nitrogen	Grab	Monthly
pH	Grab	Monthly
Temperature	Grab	Monthly

TABLE 4 - EFFLUENT SAMPLING REQUIREMENTS (PRIOR TO THE RECEIVING STREAM)

Parameters	Sample Type	Frequency
Flow Rate	Flume	Daily during discharge
CBOD ₅	Grab	5 times during discharge
Total Suspended Solids	Grab	5 times during discharge
Total Phosphorus	Grab	5 times during discharge
Total Ammonia Nitrogen	Grab	5 times during discharge
Hydrogen Sulphide	Grab	Once prior to per-discharge
E-coli	Grab	5 times during discharge
Dissolved Oxygen	Grab	5 times during discharge
pH	Grab	5 times during discharge
Temperature	Grab	5 times during discharge

-Samples of final effluent from the Lagoon are collected from the outlet at least 5 times during each seasonal discharge

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TABLE 5- ADDITIONAL EFFLUENT MONITORING FOR CONTINGENCY (EXTENDED SPRING) DISCHARGES

Parameters	Sample Type	Frequency
Flow Rate	Flume	Daily During Discharge
CBOD ₅	(Grab)	(2 times per week)
Total Suspended Solids	(Grab)	(2 times per week)
Total Ammonia Nitrogen	(Grab)	(2 times per week)
Total Phosphorus	(Grab)	(2 times per week)
Acute Toxicity (AT)	(Grab)	(1 times per week)
Hydrogen Sulphide	(Grab)	(2 times/week, prior to discharge)
E.Coli	(Grab)	(2 times/week, prior to discharge)

(III) PLANT PERFORMANCE

Table 6 summarizes the raw influent monthly average concentrations for 2020.

TABLE 6 –INFLUENT MONTHLY CONCENTRATIONS

Month	CBOD ₅ (mg/l)	BOD ₅ (mg/l)	Total Suspended Solids (mg/l)	Total Phosphorus (mg/l)	Total Kjeldahl Nitrogen (mg/l)	Field pH	Field Temp (°C)
January	329	296	359	6.40	57.0	7.73	11.7
February	279	299	258	7.40	39.2	8.52	12.8
March	93	103	146	1.20	14.5	7.82	9.7
April	237	229	175	2.25	29.7	8.74	12.6
May	35	54	49	1.29	20.0	7.51	13.2
June	161	230	364	3.50	25.8	7.08	16.7
July	188	250	1140	4.40	38.6	7.52	21.0
August	105	139	172	4.00	36.9	6.56	22.4
September	1140	1180	2860	27.0	145.0	6.94	21.3
October	641	583	768	9.80	77.4	7.04	19.8
November	354	343	556	6.80	45.0	6.96	17.7
December	302	258	289	3.42	42.8	6.85	14.9
Average	322	330	595	6.46	47.6	7.44	16.2

-The sampling program at the lagoons requires a grab sample therefore the sample collected is only representative of what is entering the facility at that moment.

A. SPRING DISCHARGE

ECA # 0176-7LSQYG states that the spring discharge of the Lagoons is to commence no earlier than March 15th and terminating no later than April 30th. The Spring discharge event was started on March 16, 2020 with an estimated 42,000m³ total volume in the 3 cells. The extended spring discharge clause in the ECA, was utilized with permission from the MECP, to reduce the liquid levels in the lagoons as much as possible to relive pressure on the bank of the polishing lagoon in order for repairs to be completed to the north slope of Cell 1/3. The discharge continued until May 15, 2020. Additional information on the discharge event can be found below under subsection **(IV) Interpretation of all Monitored Data**. A final summary report of the Spring discharge event was submitted to the MECP following the event.

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The tables below show the data collected from the 2020 spring discharge event. There were no ECA limit or objective exceedances during the event however, there were some Provincial Water Quality Objective overages for the creek and effluent sampling as identified in *Section G – Effluent Objectives*

TABLE 7 –SPRING 2020 PRE-DISCHARGE RESULTS

	Date	CBOD ₅ (mg/l)	TSS (mg/l)	TP (mg/l)	H ₂ S (mg/l)	TAN (mg/l)	EColi (cfu/100mL)	pH	Temp (°C)	DO (mg/l)
Cell#1	05-Mar-20	25	15	0.08	9.1	<0.02	32	7.39	8.4	9.38
Cell#2	05-Mar-20	25	13	0.08	7.4	<0.02	540	6.89	6.1	9.60
Cell#3	05-Mar-20	8	13	0.08	1.4	<0.02	<2	7.92	5.2	13.48

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TABLE 8 –SPRING 2020 DISCHARGE RESULTS

%	Date	Flow	Volume Remaining	CBOD ₅	CBOD ₅	TSS	TSS	TP	TP	TAN	TAN	E.Coli
Draw-down		(m ³ /d)	(m ³)	(mg/l)	(kg/d)	(mg/l)	(kg/d)	(mg/l)	(kg/d)	(mg/l)	(kg/d)	100ml/cfu
Discharge Limits				30		40		0.8				
Discharge Objectives				25		30		0.5				
Start Discharge	16-Mar-20	1810.08	42000	8.0	14.48	11	19.91	<0.03	0.054	3.6	6.52	<2
Sample #2 (11.9%)	19-Mar-20	1653.696	37005	5.0	8.27	7	11.58	0.04	0.066	3.7	6.12	2
Sample #3 (29.0%)	24-Mar-20	1245.024	29825	5.0	6.23	6	7.47	0.04	0.05	4.0	4.98	<2
Sample #4 (39.9%)	27-Mar-20	1537.92	25245	6.0	9.23	6	9.23	0.04	0.062	4.1	6.31	<2
Sample #5 (51.0%)	31-Mar-20	1490.4	20574	4.0	5.96	3	4.47	<0.03	0.045	4.0	5.96	<2
Sample #6 (63.6%)	06-Apr-20	348.192	15269	4.0	1.39	2	0.7	<0.03	0.01	4.4	1.53	2
Sample #7(72.2%)	14-Apr-20	386.208	11657	<4.0	1.54	5	1.93	0.04	0.015	3.8	1.47	<2
Sample #8 (79.5%)	22-Apr-20	355.104	8618	<4.0	1.42	13	4.62	0.04	0.014	3.4	1.21	<2
Extended #1 (86.0%)	30-Apr-20	329.184	5897	3.0	0.99	4	1.32	0.05	0.016	3.0	0.99	4
Extended #2 (90.1%)	05-May-20	355.104	4176	5.0	1.78	4	1.42	<0.03	0.011	2.4	0.85	2
Extended #3 (91.8%)	07-May-20	366.336	3444	3.0	1.10	4	1.47	0.03	0.011	2.0	0.73	<2
**Extended #4 (103.8%)	12-May-20	1613.09	-1594	3.0	4.84	11	17.74	0.05	0.081	1.4	2.26	<2
**End Discharge (116.5%)	15-May-20	1742.69	-6915	4.0	6.97	3	5.23	0.05	0.087	0.9	1.57	<2

**NOTE: Volume remaining is calculated based on the initial estimate of volume in the 3 cells of the Lagoon prior to discharge. A negative volume as seen on May 12, 2020 and May 15, 2020 is because the initial volume estimate was surpassed by 1594m³ and 6915m³ respectively.

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TABLE 9 –SPRING 2020 DISCHARGE RESULTS (CONTINUED)

%	Date	pH	Dissolved Oxygen (mg/l)	Temp (°C)	Unionized Ammonia (mg/l)
Draw-down					
Discharge Limits		6.0-9.5			
Discharge Objectives		6.0-8.5			0.1
Start Discharge	16-Mar-20	7.89	11.35	6.5	0.039
Sample #2 (11.9%)	19-Mar-20	7.62	11.15	7.6	0.024
Sample #3 (29.0%)	24-Mar-20	7.46	10.99	7.2	0.017
Sample #4 (39.9%)	27-Mar-20	7.54	11.02	10.4	0.027
Sample #5 (51.0%)	31-Mar-20	7.66	9.63	10.1	0.034
Sample #6 (63.6%)	06-Apr-20	7.71	9.97	13.7	0.055
Sample #7(72.2%)	14-Apr-20	7.52	9.25	10.9	0.025
Sample #8 (79.5%)	22-Apr-20	7.46	10.23	7.6	0.015
Extended #1 (86.0%)	30-Apr-20	7.70	9.15	11.7	0.032
Extended #2 (90.1%)	05-May-20	7.52	10.16	14.6	0.021
Extended #3 (91.8%)	07-May-20	7.92	10.51	14.3	0.042
Extended #4 (103.8%)	12-May-20	7.75	11.11	10.5	0.033
End Discharge (116.5%)	15-May-20	8.37	11.97	8.3	0.015

TABLE 10 - SPRING 2020 PRE-EXTENDED DISCHARGE RESULTS

	Date	H ₂ S (mg/l)	EColi (cfu/100mL)	pH	Temp (°C)	Dissolved Oxygen (mg/l)
Sample #1	20-Apr-20	--	<2	--	--	--
Sample #2	22-Apr-20	<0.02	<2	7.46	7.6	10.23
Sample #3	23-Apr-20	<0.02	<2	7.69	8.1	10.9
Sample #4	27-Apr-20	<0.02	<2	7.77	12.6	10.23
Sample #5	29-Apr-20	<0.02	<2	7.56	13	10.67

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TABLE 11- SPRING 2020 ACUTE TOXICITY SAMPLING

	Date	% Immobility	% Mortality
Sample #1	30-Apr-20	0	0
Sample #2	07-May-20	0	0
Sample #3	14-May-20	0	0

B. FALL DISCHARGE

The 2020 Fall discharge event was started on October 16, 2020 with an estimated 35,000m³ total volume in the 3 cells. The discharge continued until December 14, 2020.

Table 1 and 2 below show the data collected from the 2020 fall discharge event. There was one ECA limit exceedance during the event on the final sample collected on December 14, 2020. Communication with the MECP is included in *Appendix A*.

There were 2 occasions where the discharge needed to be halted during this event:

- The first was due to the power supply to the flow meter failing. The discharge event was stopped on October 30, 2020 until the issue could be corrected and a sample could be collected after re-starting the lagoon on November 2, 2020.
- The second was due to an extreme wind storm on November 21, 2020 that caused the lagoons to be stirred up. The discharge was stopped in an effort to maintain effluent quality. Due to the significant wind action, solids were increasing in the effluent and the lagoon discharge was stopped to permit enough time for the wind to subside and solids to settle back down. Samples were completed on November 23, 2020 when the lagoon was started back up again.

TABLE 12 – FALL 2020 PRE DISCHARGE

	Date	CBOD ₅ (mg/l)	TSS (mg/l)	TP (mg/l)	TAN (mg/l)	H ₂ S (mg/l)	EColi (cfu/100mL)	pH	Temp (°C)
Cell #1	07-Oct-20	25	35	0.07	9.9	0.05	5300	7.28	16.2
Cell #2	07-Oct-20	5	17	0.07	1.3	<0.02	880	7.30	15.1
Cell #3	07-Oct-20	<4	8	0.04	1.4	<0.02	64	7.46	17.1

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TABLE 13 – FALL 2020 DISCHARGE RESULTS

%	Date	Flow (m ³ /d)	CBOD ₅ (mg/l)	CBOD ₅ (kg/d)	TSS (mg/l)	TSS (kg/d)	TP (mg/l)	TP (kg/d)	TAN (mg/l)	EColi (100mL/cfu)
Draw-down										
Discharge Limits			30	152.1	40		0.8			
Discharge Objectives			25		30		0.5			
Start Discharge	16-Oct-20	465.70	4.0	1.86	11	5.12	<0.03	0.01	1.8	26
Sample #2 (9.5%)	22-Oct-20	636.77	<2.0	1.27	<2	1.27	0.03	0.02	1.2	62
Sample #3 (19.1%)	29-Oct-20	590.11	2.0	1.18	<2	1.18	0.05	0.03	0.3	22
Sample #4 (20.9%)	02-Nov-20	579.74	3.0	1.74	4	2.32	0.04	0.02	0.1	22
Sample #5 (37.3%)	09-Nov-20	905.47	7.0	6.34	3	2.72	<0.03	0.03	1.3	28
Sample #6 (49.0%)	16-Nov-20	177.12	<4.0	0.71	8	1.42	0.03	0.01	1.0	156
Sample #7(51.3%)	23-Nov-20	211.68	<2.0	0.42	27	5.72	0.06	0.01	0.5	<2
Sample #8 (63.1%)	02-Dec-20	482.11	2.0	0.96	20	9.64	0.06	0.03	2.7	6
Sample #9 (72.4%)	14-Dec-20	213.41	11.0	2.35	82	17.50	0.13	0.03	3.3	150

TABLE 14 – FALL 2020 DISCHARGE RESULTS (CONTINUED)

%	Date	pH	Dissolved Oxygen (mg/l)	Temp (°C)	Unionized Ammonia (mg/l)
Draw-down					
Discharge Limits		6.0-9.5			
Discharge Objectives		6.0-8.5			0.1
Start Discharge	16-Oct-20	7.23	8.20	14.4	0.008
Sample #2 (9.5%)	22-Oct-20	7.25	9.82	12.4	0.005
Sample #3 (19.1%)	29-Oct-20	7.03	11.04	11.0	0.001
Sample #4 (20.9%)	02-Nov-20	7.56	12.12	7.1	0.001
Sample #5 (37.3%)	09-Nov-20	7.62	12.78	12.4	0.012
Sample #6 (49.0%)	16-Nov-20	7.39	9.41	7.5	0.004
Sample #7(51.3%)	23-Nov-20	7.26	5.12	9.0	0.002
Sample #8 (63.1%)	02-Dec-20	7.69	11.06	5.7	0.017
Sample #9 (72.4%)	14-Dec-20	7.73	8.31	5.7	0.023

IV) INTERPRETATION OF ALL MONITORED DATA

Influent - The influent parameters that are analyzed on monthly basis show great variability. The influent sampling program at the lagoons requires a monthly grab sample therefore the sample collected is only representative of what is entering the facility at that moment. Results are within typical municipal characteristics. The table below shows the comparison of the influent data from 2019-2020.

TABLE 7 –COMPARISON OF INFLUENT DATA 2019 TO 2020

Parameter	2019	2020	% difference
CBOD ₅	232	322	+39%
BOD ₅	242	330	+36%
Total Suspended Solids	212	595	+181%
Total Phosphorus	3.62	6.46	+78%
Total Kjeldahl Nitrogen	31.2	47.6	+53%

Spring Discharge – The Spring discharge event was started on March 16, 2020 with an estimated 42,000m³ total volume in the 3 cells. The spring discharge clause in the ECA, was utilized due to slope instability concerns and prior approval from the MECP. The discharge continued until May 15, 2020. A total of 52,261m³ was discharged from the Lagoon during this time period. As the lagoon continued to receive influent during the event, it is estimated that at the end of the discharge event on May 15, 2020, there was approximately 9000m³ remaining in the 3 cells of the lagoon. With a total available capacity of 50,977m³ there is enough capacity for 168days in the lagoon cells (assuming peak design capacity of 250m³/day of influent and not accounting for summer evaporation). There are 153days from May 16, 2020 to the next discharge event scheduled to start on October 15, 2020.

Fall Discharge – The 2020 Fall discharge event was started on October 16, 2020 with an estimated 35,000m³ total volume in the 3 cells. The discharge continued until December 14, 2020. A total of 25,977m³ was discharged from the Lagoon during this time period. As the lagoon continued to receive influent during the event, it is estimated that at the end of the discharge event on December 14, 2020, there was approximately 14,000m³ remaining in the 3 cells of the lagoon. With a total available capacity of 50,977m³ there is enough capacity for 148days in the lagoon cells (assuming peak design capacity of 250m³/day of influent. There are 93-109 days from December 14, 2020 to the next discharge event scheduled to start between March 15 and April 1, 2021 (weather dependent).

SECTION B – FAIRCHILD CREEK MONITORING

Fairchild Creek Monitoring was completed due to the extended spring discharge event. Requirements found in ECA #0176-7LSQYG Section 8(a). Fairchild creek monitoring was conducted and the results are below.

TABLE 16 - SPRING 2020 UPSTREAM CREEK SAMPLES

	Date	CBOD₅ (mg/l)	TSS (mg/l)	TP (mg/l)	TAN (mg/l)	TKN (mg/l)	pH	Temp (°C)	DO (mg/l)
Sample #1	30-Apr-20	<4	32	0.06	<0.1	0.9	7.96	11.7	9.15
Sample #2	05-May-20	<4	23	<0.03	<0.1	0.6	7.84	11.7	9.97
Sample #3	07-May-20	<4	26	0.05	0.3	1.4	8.01	11.8	9.78
Sample #4	12-May-20	<4	8	0.06	<0.1	<0.5	8.41	8.0	12.1
Sample #5	15-May-20	<4	22	0.06	<0.1	0.9	8.01	13.4	9.79

< Represents a “less than” value

TABLE 17 - SPRING 2020 DOWNSTREAM CREEK SAMPLES

	Date	CBOD₅ (mg/l)	TSS (mg/l)	TP (mg/l)	TAN (mg/l)	TKN (mg/l)	pH	Temp (°C)	DO (mg/l)
Sample #1	30-Apr-20	<4	34	0.06	<0.1	0.6	7.96	11.7	9.34
Sample #2	05-May-20	<4	24	<0.03	<0.1	0.6	7.91	11.8	9.92
Sample #3	07-May-20	<4	29	0.05	0.2	1.3	8.05	11.0	9.99
Sample #4	12-May-20	4	15	0.06	<0.1	<0.5	8.07	7.8	11.78
Sample #5	15-May-20	<4	26	0.06	<0.1	1.0	7.95	13.2	9.67

< Represents a “less than” value

SECTION C - OPERATING PROBLEMS ENCOUNTERED

It was noted during the first quarter of 2020 that a portion of the slope of the polishing lagoon was unstable. Due to the slope repair required, permission had been granted by the MECP to extend the spring 2020 discharge event into May utilizing the Extended Discharge clause as per section 8(a) Special Operations-Seasonal Discharge of ECA #0176-7LSQYG. The slope repair was completed in June 2020.

There was one ECA exceedance for Total Suspended Solids during the fall discharge event in 2020. More information on this exceedance can be found in the communication with the MECP in *Appendix A*.

SECTION D - MAINTENANCE

(I) UPGRADES

The slope repair on the polishing lagoon was completed in June 2020.

There was no additional major maintenance, equipment breakdowns or capital repairs required at the Cainsville Lagoon System in 2020.

(II) ALARMS

The following table shows the after hour alarms that were responded to at the Lagoons in 2020.

TABLE 18– ALARMS

Date	Alarm	Issue/Actions Taken
21-Feb-20	Phone line fault	Checked system and equipment. No problems found with chemical pump and treatment system.
24-Mar-20	Chemical pump fail	Brief power outage, restarted chemical pump and aerators
22-Apr-20	Chemical pump fail	Brief power outage, restarted chemical pump and aerators
15-May-20	Chemical pump fail	Brief power outage, restarted chemical pump and aerators
24-May-20	Chemical pump fail	Brief power outage, restarted chemical pump and aerators
08-Jul-20	Chemical pump fail	Brief power outage, restarted chemical pump and aerators
08-Aug-20	Chemical pump fail	Brief power outage, restarted chemical pump and aerators
16-Dec-20	Chemical pump fail	Brief power outage, restarted chemical pump and aerators

SECTION E - EFFLUENT QUALITY

Three (3) control measures have been incorporated at the Cainsville Lagoon System in order to assist with the effluent quality for the discharge events. These control measures are discussed below.

(I) IN HOUSE TESTING

In House laboratory testing is conducted to determine the effluent quality during the discharge seasons.

(II) CHEMICAL DOSING SYSTEM

A continuous chemical/alum dosing system is utilized at the lagoon to assist with settling in Cell's 1 and 2 and promote a cleaner effluent from Cell 3. The system was installed in a building that includes 2 chemical storage tanks, chemical delivery pump and associated piping and appurtenances. Alum is dosed to the manhole immediately upstream of the metering chamber and the distribution manhole. The chemical injection is flow paced based on feedback from the lagoon's influent flow meter.

(III) SUBSURFACE AERATOR SYSTEM

Two (2) 5horsepower Subsurface Aerator Units were installed in 2015, one in each of the primary cells. 3 phase power was installed onsite to meet the power demands of the aerator system. The system was commissioned on July 30, 2015 historically the lagoon cells would require batch dosing of Alum to increase settling and in turn, decrease CBOD₅. Since the aerators have been functional, it is evident that the CBOD₅ concentrations were decreased and the lagoon system has not required batch dosing prior to the spring or fall discharge events since they were installed.

SECTION F - CALIBRATIONS

Bi-Annual calibrations of the influent and effluent flow meters are required at the Cainsville Lagoons. Calibrations are scheduled prior to each discharge event. The 2020 calibrations occurred on March 13, 2020 and October 13, 2020. Calibration data can be found in *Appendix B*.

(I) FLOW DATA

Section 8 (2) of ECA #0176-7LSQYG states that the owner shall ensure that the average daily sewage flow into the sewage treatment plant does not exceed 250m³/day for any period of time greater than one (1) calendar year. The average flow for 2020 was 202m³/day which is 80.9% of the approved annual day flow.

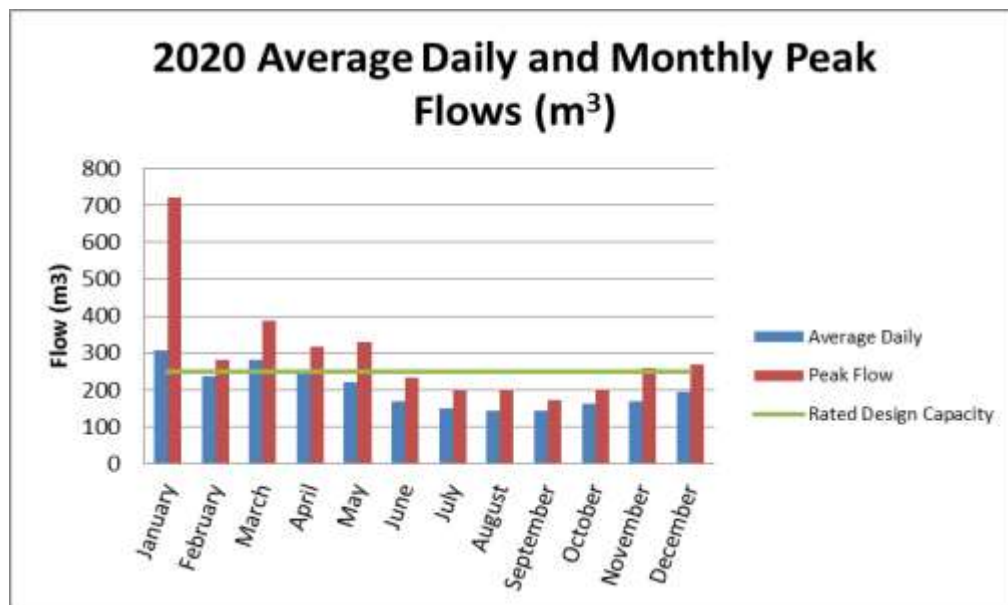
The following Table 16 shows the average daily flow, the maximum daily flow and the total flow for 2020, Graph 1 shows the average daily and maximum monthly flow in comparison to the annual design capacity and Graph 2 shows a comparison of the 2019 and 2020 total monthly flows.

2020 ANNUAL PERFORMANCE REPORT CAINSVILLE LAGOONS

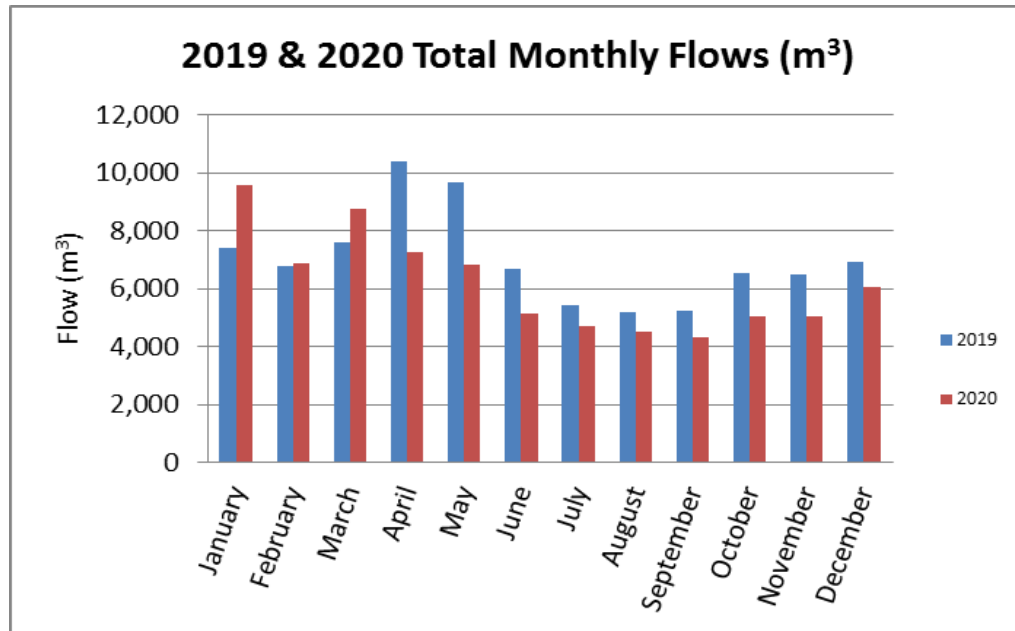
TABLE 19– INFLUENT FLOW DATA

	Average Daily Flow (m ³ /d)	Peak Monthly Flow (m ³ /d)	Total Month Flow (m ³)
January	309	721	9,575
February	236	281	6,853
March	282	388	8,742
April	242	317	7,264
May	220	330	6,818
June	170	235	5,114
July	151	198	4,679
August	145	199	4,493
September	144	174	4,308
October	163	201	5,050
November	169	258	5,056
December	195	268	6,059
TOTAL			64,436
Average	202		

GRAPH 1 – 2020 AVERAGE DAILY FLOW AND MAXIMUM FLOW



GRAPH 2 – 2019 AND 2020 TOTAL MONTHLY FLOWS



SECTION G - EFFLUENT OBJECTIVES

The 2020 fall discharge event was successful at meeting all compliance limits and objectives in the ECA except the final sample TSS exceedance with a result of 82mg/l on December 14, 2020 as discussed in *Section C – Operating Problems Encountered*. This result exceeds the TSS objective of 30mg/l and limit of 40mg/l.

The 2020 spring discharge event was successful at meeting all compliance limits and objectives in the ECA. Below is a comparison of the creek and final effluent sampling to the Applicable Provincial Water Quality Objectives as required as part of the Extended Spring Discharge Event.

Comparison to Applicable Provincial Water Quality Objectives:

1. Dissolved Oxygen

The Dissolved Oxygen objective for the PWQO is >4-7mg/l. Every sample collected for the purpose of the extended discharge event (effluent, upstream of discharge and downstream of discharge) was outside the objective range. The sample results range from 9.15-13.48mg/l

2. pH

The PWQO requirement for pH is 6.5-8.5. All Final Effluent samples and the Fairchild Creek Upstream and Downstream sample results were all within the objective range. The sample results range from 7.46-8.37

3. Total Phosphorus

The final effluent discharge location was successful in meeting the total phosphorus (TP) limits in Environmental Compliance Approval # 0176-7LSQYG of 0.80mg/l. However, the following Sample results were above the PWQO objective of 0.03mg/l.

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TABLE 20 - SPRING 2020 PHOSPHORUS SAMPLES ABOVE PWQO OBJECTIVE

Sample #	Sample Date	Total Phosphorus Result (mg/l)
Final Effluent		
Sample #2	19-Mar-20	0.04
Sample #3	24-Mar-20	0.04
Sample #4	27-Mar-20	0.04
Sample #7	14-Apr-20	0.04
Sample #8	22-Apr-20	0.04
Extended #1	30-Apr-20	0.05
Extended #4	12-May-20	0.05
End Discharge	15-May-20	0.05
Fairchild Creek Upstream		
Sample #1	30-Apr-20	0.06
Sample #3	07-May-20	0.05
Sample #4	15-May-20	0.06
Sample #5	15-May-20	0.06
Fairchild Creek Downstream		
Sample #1	30-Apr-20	0.06
Sample #3	07-May-20	0.05
Sample #4	15-May-20	0.06
Sample #5	15-May-20	0.06

SECTION H – VOLUME OF SLUDGE GENERATED

No Lagoon cells were cleaned out in 2020. Cell #1 was dredged in 2012 and Cell#2 was dredged in November 2017 as per ECA #1076-7LSQYG Section 8(4)(f). The next clean out will be required in 2022.

SECTION I - SUMMARY OF COMPLAINTS RECEIVED

The Lagoons did not receive any complaints in 2020

SECTION J - SUMMARY OF BY-PASS EVENTS

The Lagoons were not involved in any by-pass events in 2020

SECTION K – OTHER INFORMATION

There is no additional information to report for the Cainsville Lagoon System for 2020.

APPENDIX A

MECP COMMUNICATION – TSS EXCEEDANCE

2020 ANNUAL PERFORMANCE REPORT CAINSVILLE LAGOONS



120 Race St.
Paris, Ontario
N3T 3X2

Mr. Todd Paylor
Ministry of the Environment, Conservation and Parks
1 Stone Road West, 4th Floor
Guelph, Ontario
N1G 4Y2

December 23, 2020

Dear Mr. Paylor,

RE: Cainsville Lagoon- 2020 Fall Discharge Total Suspended Solids Exceedance
Environmental Compliance Approval #0176-7LSQYG

This is a notification of non-compliance with an effluent limit for the Cainsville Lagoon submitted in accordance with terms and conditions of Environmental Compliance Approval 0176-7LSQYG, and provisions of the *Ontario Water Resources Act* and *Environmental Protection Act*. This written notice confirms the verbal notification provided on December 22, 2020.

The following effluent limit was exceeded:

Parameter	Date of Non-Compliance (yyyy-mm-dd)	Type of Limit	Type of Sample	Result (Specify Units)	ECA Effluent Limit
Total Suspended Solids	2020-12-14	Daily Concentration	Discharge, Effluent, Grab	82mg/L	40 mg/L

Samples are collected at approximately 10% drawdown increments with a minimum of five samples collected during the discharge period. The level in the lagoon was approaching 75% drawdown level at the time of the exceedance. In house results on the days prior to this sample were below the total suspended solids limit, however, when the in house sample was collected on December 14th, the results had drastically changed. Based on the in house results it was determined to shutdown the discharge and collect the final sample for the season. There will be sufficient storage in the lagoon until the spring discharge. The complete results of this sample as well as the entire discharge event are included in the below table below.

2020 ANNUAL PERFORMANCE REPORT CAINSVILLE LAGOONS



Ontario Clean Water Agency
Agence Ontarienne Des Eaux

120 Race St.
Paris, Ontario
N3T 3X2

%	Date	CBOD ₅ (mg/l)	CBOD ₅ (kg/d)	TSS (mg/l)	TSS (kg/d)	TP (mg/l)	TP (kg/d)	TAN (mg/l)	TAN (kg/d)	E.Coli (100ml/cfu)
Draw-down										
Discharge Limits		30	152.1	40		0.8				
Discharge Objectives		25		30		0.5				
Start Discharge	16-Oct-20	4.0	1.86	11	5.12	0.03	0.01	1.8	0.84	26
Sample #2 (9.5%)	22-Oct-20	2.0	1.27	2	1.27	0.03	0.02	1.2	0.76	62
Sample #3 (19.1%)	29-Oct-20	2.0	1.18	2	1.18	0.05	0.03	0.3	0.18	22
Sample #4 (20.9%)	02-Nov-20	3.0	1.74	4	2.32	0.04	0.02	0.1	0.06	22
Sample #5 (37.3%)	09-Nov-20	7.0	6.34	3	2.72	0.03	0.03	1.3	1.18	28
Sample #6 (49.0%)	16-Nov-20	4.0	0.71	8	1.42	0.03	0.01	1	0.18	156
Sample #7(51.3%)	23-Nov-20	2.0	0.42	27	5.72	0.06	0.01	0.5	0.11	2
Sample #8 (63.1%)	02-Dec-20	2.0	0.96	20	9.64	0.06	0.03	2.7	1.30	6
Sample #9 (72.4%)	14-Dec-20	11.0	2.35	82	17.50	0.13	0.03	3.3	0.70	150

Should you have any questions or concerns please do not hesitate to contact me.

Sincerely,

Allison McGuckin
Ontario Clean Water Agency
Process Compliance Technician
Southwest Region
Paris Cluster
C-226-387-1292

Cc/ Matthew D'Hondt – County of Brant
Sam Sianas – Senior Operations Manager, OCWA
Cindy Sigurdson- Safety, Process, and Compliance Manager, OCWA

2020 ANNUAL PERFORMANCE REPORT CAINSVILLE LAGOONS



SGS Canada Inc.
 P.O. Box 4300 - 185 Concession St.
 Lakefield - Ontario - K0L 2H0
 Phone: 705-652-2000 FAX: 705-652-6365

Works #: 120004716
Project : PO#017018

22-December-2020

OCWA-Brantford (Cainsville Lagoon)
Attn : Allison McGuckin

Date Rec. : 15 December 2020
LR Report: CA12604-DEC20

120 Race St.
 Paris, ON
 N3L 3X2, Canada

Copy: #1

Phone: 226-387-1292
 Fax:

CERTIFICATE OF ANALYSIS Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: Client Limit	6: QC - Blank	7: QC - DUP % RPD	8: RL	9: EFF - Sample #9
Sample Date & Time									14-Dec-20 12:26
Temperature Upon Receipt [°C]	—	—	—	—	—	—	—	—	1.0
Field pH [no unit]	—	—	—	—	—	—	—	—	7.73
Field Temperature [celsius]	—	—	—	—	—	—	—	—	5.7
Field Dissolved O2 [mg/L]	—	—	—	—	—	—	—	—	8.30
Carbonaceous Biochemical Oxygen Demand [(CBO05) mg/L]	15-Dec-20	16:19	21-Dec-20	16:48		< 2	18%	2	11
Total Suspended Solids [mg/L]	15-Dec-20	14:49	17-Dec-20	14:13		< 2	2%	2	82
pH [No unit]	15-Dec-20	14:50	16-Dec-20	10:55		NA	0%	0.05	7.85
Phosphorus (total) [mg/L]	15-Dec-20	16:13	17-Dec-20	14:28		< 0.03	0%	0.03	0.13
Ammonia+Ammonium (N) [as N mg/L]	16-Dec-20	16:53	17-Dec-20	11:54		< 0.1	ND	0.1	3.3
E. Coli [cfu/100ml]	15-Dec-20	16:17	17-Dec-20	21:18	200	ACCEPTED	ACCEPTED	0	150


 Carrie Greenlaw
 Project Specialist,
 Environment, Health & Safety

APPENDIX B

CALIBRATION RECORDS



951 Matheson Blvd. East
Mississauga, ON L4W 2R7
Ph: 905-275-2717 Fax: 905-275-2724
www.itsinstruments.com

Certificate No: 31497-001

Certificate Of Calibration

Customer:
Ontario Clean Water Agency
120 Race Street, Paris, ON N3L 3X2
Phone: (519) 442-3255
Fax: (519) 442-2616

Instrument Identification:
Description: Flow Indicator/Transmitter
Manufacturer: Milltronics
Model No: OCMIII
Serial No: N/Av
Range: 0 to 50 l/s
Tolerance: ± 2% FS
Tag No: N/Av
Location: Cainsville Lagoon - Effluent Discharge

Cal. Date: October 13, 2020
Due Date: April, 2021

Program Parameters

PAR	Entry	SETTING Description	PAR	Entry	SETTING Description
P0	0	English	P27	10	mA - Damping (Seconds)
P1	0	Centimetres	P28	0	Don't track Emulator
P2	0	Celsius	P29	60	Fail Safe Time (Seconds)
P3	0	Exponential Device	P30	0	Hold Last Value
P4	1	Ratiometric	P32	4	Totalizer Value (x10)
P5	0	liters/second	P33	2	4 Decimal Places
P6	50	Flow@Max Head (l/s)	P34	0	Never Print
P7	27.63999	Maximum Head (cm)	P36	0	1 Sec Measurement Interval
U0	1.58	Parshall Flume	P37	5	Baud 9600
P13	0	Off	P38	0	Site Number (None)
P14	0	Display Lighting (On)	P39	2	15 min - Data Logging rate
P15	0	Relay 1 (Not in service)	P42	0	Head Determine (by OCM III)
P18	0	Relay 2 (Not in service)	P45	0	Low Flow Cut Off (cm)
P21	0	Relay 3 (Not in service)	P46	69.36129	Range at Zero Head (cm)
P24	0	mA Assignment (Flow rate)	P47	39.86	Blanking Distance (cm)
P26	0	mA Span (4 to 20)			

Test Report:

Reference cm	AS FOUND		Reference cm	AS LEFT	
	Instrument cm	Error %FS		Instrument cm	Error %FS
0.0	0.11	0.2	0.0	0.11	0.2

Standards Used:

Asset No	Manufacturer	Calibration Date	Due Date
RUL002	Starrett	June 18, 2020	June 18, 2021

	Yes	No		Yes	No
Passed:	✓		As found in tolerance:	✓	
Failed:			As left in tolerance:	✓	
Calibration Sticker applied?	✓		Repair performed:		✓
Restricted Use:			Adjustment performed:		✓

Comments: None.

Performed By: A. Shah Technician
 Reviewed By ITS: C. Ramnarine Service Manager
 Reviewed By Customer: _____
 Issue Date: October 15, 2020 Date: October 15, 2020

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951 Matheson Blvd. East
Mississauga, ON L4W 2R7
Ph: 905-275-2717 Fax: 905-275-2724
www.itsinstruments.com

Certificate No: 31497-002

Certificate of Calibration

Customer:
Ontario Clean Water Agency
120 Race Street, Paris, ON N3L 3X2
Phone: (519) 442-3255
Fax: (519) 442-2616

Instrument Identification:
Description: Flow Indicator/Transmitter
Manufacturer: Milltronics
Model No: OCMIII
Serial No: PBD/WD040352
Range: 0 to 30.08119 m³/Hr
Tolerance: ± 2% FS
Tag No: N/Av CMMS # 62122
Location: Cainsville Lagoon - Raw Influent

Cal. Date: October 13, 2020
Due Date: April, 2021

Program Parameters

PAR	Entry	SETTING Description	PAR	Entry	SETTING Description
P0	0	English	P27	10	mA - Damping (Seconds)
P1	0	Centimeters	P28	0	mA Option (No Tracking)
P2	0	Celsius	P29	60	Fail Safe Time (Seconds)
P3	10	Palmer Bowlus Flowmeter	P30	0	FS Mode (Hold Last Value)
P4	1	Ratiometric	P32	6	Totalizer Multiplier (x1000)
P5	6	m ³ /hr	P33	4	Flow Display (4 Decimal Places)
P6	30.0811	Flow@Max Head (m ³ /hr)	P34	0	Print Mode (Never print)
P7	10.668	Height@Max Head (cm)	P36	0	1 Sec Measurement Interval
U0	15.000	H_Max	P37	5	Baud 9600
P13	0	Display Damping (Off)	P38	0	Site Number (None)
P14	0	Display Lighting (On)	P39	5	5 min - Data Logging rate
P15	0	Relay 1 (Not in service)	P42	0	Head Determine (by OCM III)
P18	0	Relay 2 (Not in service)	P45	0	Low Flow Cut Off (cm)
P21	0	Relay 3 (Not in service)	P46	63.7099	Range at Zero Head (cm)
P24	0	mA Assignment (Flow rate)	P47	45	Blanking Distance (cm)
P26	0	mA Span (4 to 20)			

Test Report:

Reference cm	AS FOUND		Reference cm	AS LEFT	
	Instrument cm	Error %FS		Instrument cm	Error %FS
7.2	7.02	-0.3	7.2	7.02	-0.3

Standards Used:

Asset No	Manufacturer	Calibration Date	Due Date
RUL002	Starrett	June 18, 2020	June 18, 2021

Passed:	Yes	No	As found in tolerance:	Yes	No
Failed:	✓		As left in tolerance:	✓	
Calibration Sticker applied?	✓		Repair performed:		✓
Restricted Use:			Adjustment performed:		✓

Comments: Flow cannot be controlled. Calibrated at operating conditions.

Performed By: A. Shah Technician
 Reviewed By ITS: C. Ramnarine Service Manager
 Reviewed By Customer: _____
 Issue Date: October 15, 2020 Date: October 15, 2020

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951 Matheson Blvd. East
Mississauga, ON L4W 2R7
Ph: 905-275-2717 Fax: 905-275-2724
www.itsinstruments.com

Certificate No: 30746-001

Certificate Of Calibration

Customer:
Ontario Clean Water Agency
120 Race Street, Paris, ON N3L 3X2
Phone: (519) 442-3255
Fax: (519) 442-2616

Instrument Identification:
Description: Flow Indicator/Transmitter
Manufacturer: Milltronics
Model No: OCMIII
Serial No: N/Av
Range: 0 to 50 l/s
Tolerance: ± 2% FS
Tag No: N/Av
Location: Cainsville Lagoon - Effluent Discharge

Cal. Date: March 13, 2020
Due Date: September 13, 2020

Program Parameters

PAR	Entry	SETTING Description	PAR	Entry	SETTING Description
P0	0	English	P27	10	mA - Damping (Seconds)
P1	0	Centimetres	P28	0	Don't track Emulator
P2	0	Celsius	P29	60	Fall Safe Time (Seconds)
P3	0	Exponential Device	P30	0	Hold Last Value
P4	1	Ratiometric	P32	4	Totalizer Value (x10)
P5	0	liters/second	P33	2	4 Decimal Places
P6	50	Flow@Max Head (l/s)	P34	0	Never Print
P7	27.63999	Maximum Head (cm)	P36	0	1 Sec Measurement Interval
U0	1.58	Parshall Flume	P37	5	Baud 9600
P13	0	Off	P38	0	Site Number (None)
P14	0	Display Lighting (On)	P39	2	15 min - Data Logging rate
P15	0	Relay 1 (Not in service)	P42	0	Head Determine (by OCM III)
P18	0	Relay 2 (Not in service)	P45	0	Low Flow Cut Off (cm)
P21	0	Relay 3 (Not in service)	P46	69.36129	Range at Zero Head (cm)
P24	0	mA Assignment (Flow rate)	P47	39.86	Blanking Distance (cm)
P26	0	mA Span (4 to 20)			

Test Report:

AS FOUND			AS LEFT		
Reference	Instrument	Error	Reference	Instrument	Error
cm	cm	%FS	cm	cm	%FS
0.0	0.2	0.3	0.0	0.2	0.3

Standards Used:

Asset No	Manufacturer	Calibration Date	Due Date
RUL002	Starrett	June 13, 2019	June 13, 2020

Passed:	Yes No	As found in tolerance:	Yes No
Failed:	✓	As left in tolerance:	✓
Calibration Sticker applied?	✓	Repair performed:	✓
Restricted Use:		Adjustment performed:	✓

Comments: None.

Performed By: Y. Motiwala Technician
 Reviewed By ITS: R. Ramdial General Manager
 Issue Date: March 13, 2020 Date: March 13, 2020
 Reviewed By Customer: _____

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Certificate No: 30746-002

Certificate Of Calibration

Customer:
Ontario Clean Water Agency
120 Race Street, Paris, ON N3L 3X2
Phone: (519) 442-3255
Fax: (519) 442-2616

Instrument Identification:
Description: Flow Indicator/Transmitter
Manufacturer: Milltronics
Model No: OCMIII
Serial No: PBD/WD040352
Range: 0 to 30.08119 m³/Hr
Tolerance: ± 2% FS
Tag No: N/Av CMMS # 62122
Location: Cainsville Lagoon - Raw Influent

Cal. Date: March 13, 2020
Due Date: September 13, 2020

Program Parameters

PAR	Entry	SETTING Description	PAR	Entry	SETTING Description
P0	0	English	P27	10	mA - Damping (Seconds)
P1	0	Centimeters	P28	0	mA Option (No Tracking)
P2	0	Celsius	P29	60	Fail Safe Time (Seconds)
P3	10	Palmer Bowlus Flowmeter	P30	0	FS Mode (Hold Last Value)
P4	1	Ratiometric	P32	6	Totalizer Multiplier (x1000)
P5	6	m ³ /hr	P33	4	Flow Display (4 Decimal Places)
P6	30.0811	Flow@Max Head (m ² /hr)	P34	0	Print Mode (Never print)
P7	10.668	Height@Max Head (cm)	P36	0	1 Sec Measurement Interval
U0	15.000	H_Max	P37	5	Baud 9600
P13	0	Display Damping (Off)	P38	0	Site Number (None)
P14	0	Display Lighting (On)	P39	5	5 min - Data Logging rate
P15	0	Relay 1 (Not in service)	P42	0	Head Determine (by OCM III)
P18	0	Relay 2 (Not in service)	P45	0	Low Flow Cut Off (cm)
P21	0	Relay 3 (Not in service)	P46	63.7099	Range at Zero Head (cm)
P24	0	mA Assignment (Flow rate)	P47	45	Blanking Distance (cm)
P26	0	mA Span (4 to 20)			

Test Report:

Reference cm	AS FOUND		Reference cm	AS LEFT	
	Instrument cm	Error %FS		Instrument cm	Error %FS
6	6.45	0.7	6	6.45	0.7

Standards Used:

Asset No	Manufacturer	Calibration Date	Due Date	Yes	No
RUL002	Starrett	June 13, 2019	June 13, 2020	✓	✓
Passed:				✓	✓
Failed:				✓	✓
Calibration Sticker applied?				✓	✓
Restricted Use:				✓	✓

Comments: Flow cannot be controlled. Calibrated at operating conditions.

Performed By: Y. Mctiwala
Technician

Reviewed By ITS: R. Ramdial
General Manager

Reviewed By Customer: _____

Issue Date: March 13, 2020 **Date:** March 13, 2020

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