MUNICIPALITY OF
BRIGHTON

2024 WASTEWATER POLLUTION CONTROL PLANT AND LIFTSTATION ANNUAL REPORT

Environmental Compliance Approval
7701-CDNKQA
A-500-1122249878
February 28, 2025

TABLE OF CONTENTS

List of Tables

List of Appendices

1.0 INTRODUCTION

The Municipality of Brighton is pleased to present its Annual Performance Report for the Brighton Water Pollution Control Plant (WPCP) governed by ECA 7701-CDNKQA issued on April 21, 2022, and theHarbour Street Sewage Pumping Station governed by ECA number A-500-1122249878 issued on August 25, 2021, for the operating period of January 1 to December 31, 2024.

Brighton's Water Pollution Control Plant (WPCP) services a population of approximately 7,000, as well as Presqu'ile Provincial Park. The Wastewater Collection System (WWCS) is designated as Class II subsystem; the Water Pollution Control Plant (WPCP) is designated as Class I subsystem.

This report has been prepared in accordance with Condition 11(4) of the WPCP ECA, and Condition 8(3) of the Harbour Street Sewage Pumping Station. Each of the ECA's includes Limited Operational Flexibility (LOF) provisions to allow expedited changes to the treatment operation, subject to final MECP approvals and conditions.

The WPCP is located at 100 County Road 64, and the Harbour Street Sewage Pumping Station is located at 7 Harbour Street. Wastewater collected from the serviced area of the Municipality passes through the Sewage Pumping Station, with Forcemains delivering raw sewage to the Lagoon system. A second gravity feed also discharges to the Brighton WPCP. The Lagoon system is comprised of four treatment components in the order listed below:

1) A 0.7-hectare aerated cell (Lagoon #1) with two mechanical surface aerators (15hp), and five aspirating aerators (three 10hp, and two 25hp).
2) A chemical mixing chamber where ferric chloride is added.
3) A 5.44-hectare waste stabilization pond (Lagoon #2) with three baffles.
4) A two-celled constructed wetland having a total surface area of 6.2 hectares.

The effluent from the constructed wetland is discharged continuously into a provincially significant natural wetland that borders Presqu'ile Bay, which is located off the northeast shore of Lake Ontario.

2.0 WASTEWATER FLOWS AND RAW SEWAGE QUALITY

The WPCP has a Rated Capacity of 4,600 m^3/day. For purposes of monitoring and reporting Raw Influent flows, the Aeration Pond Effluent flow meter is referenced in Table I below. The Annual Average Daily Flow is calculated at 2,899 m^3/day, accounting for an average 63% of the Rated Capacity. Throughout the Reporting Period, the highest daily flow recorded was in April at 10,587 m^3/day. The lowest daily flow occurred in November at 1163 m^3/day.

Table I summarizes Aeration Pond Effluent flows in 2024.

Table I
Monthly Wastewater Flows to Stabilization Pond in 2024

Month	Total Flow (m^3)	Average Daily Flow (m^3/day)	Percent of the rated capacity (%)
January	120,228	3,878	84%
February	90,008	3,104	67%
March	100,195	3,232	70%
April	143,374	4,779	104%
May	92,551	2,986	65%
June	78,066	2,602	57%
July	98,767	3,186	69%
August	90,450	2,918	63%
September	63,744	2,125	46%
October	57,875	1,867	41%
November	52,796	1,760	38%
December	73,003	2,355	51%
Annual	**1,061,057**	**2,899**	**63%**

2.1 FLOW INTERPRETATION

The variations in the flow of wastewater received at the WPCP are likely caused by infiltration and inflow (possible sump pumps and rain events) to the collection system, because of local precipitation events, fluctuations in groundwater elevations and snowmelt. Flow values identified above are from the Aeration Pond Effluent. This meter would capture gravity and force main influent flows.
The Municipality is committed to continuing to make efforts to identify and eliminate sources of inflow and infiltration in the collection system.

2.2 RAW SEWAGE QUALITY

As per the ECA, raw sewage samples are to be collected and analyzed for select parameters normally once per month. However, for 2024, raw sewage samples were collected weekly to better determine treatment requirements of the WPCP.

Table II as follows summarizes raw wastewater quality for 2024. Weekly raw sewage samples provides better data for managing operation of the aerated cell. Results for all samples collected within a month were averaged to determine raw sewage quality values provided in **Table II**.

Raw sewage samples are collected just upstream of the WCPC in the sanitary sewer collection system. Samples of the combined, pumped sewage from the Harbour Street sewage pumping station (SPS) and the gravity drainage portion of the sanitary sewer system are collected at the manhole just before the flows enter the aeration lagoon.

TABLE II
Monthly Raw Sewage Quality In 2024

2024	CBOD5 (mg/L)	TSS (mg/L)	Total Phosphorus (mg/L)	TKN (mg/L)	Ammonia Nitrogen (mg/L)
January	105.6	105.4	2.57	27.2	21.7
February	116.3	105.0	2.45	25.3	21.6
March	234.5	156.3	3.54	31.2	26.3
April	109.6	121.2	2.54	25.1	20.6
May	189.3	155.0	3.20	32.4	28.9
June	179.0	196.3	4.18	38.5	34.0
July	122.6	153.4	3.81	36.0	32.7
August	193.3	204.3	4.54	37.0	33.4
September	220.8	194.5	4.60	42.2	39.4
October	243.4	222.8	4.85	47.4	45.4
November	329.5	295.3	5.85	54.4	47.5
December	191.0	142.2	3.54	32.3	28.3
Average	**186.2**	**171.0**	**3.80**	**35.7**	**31.6**

3.0 WASTEWATER EFFLUENT QUALITY

Schedule C of the ECA identifies Final Effluent Compliance Limits for sample location downstream of the Stabilization Lagoon and upstream of the Constructed Wetland. Effluent design objectives are identified in Schedule B.

Schedule D of the ECA identifies Monitoring parameters for both Influent and Final Effluent monitoring.

Table III below outlines Final Effluent flows throughout the ReportingPeriod. The facility operated at 64% of the Rated Capacity throughout the Reporting Period, with an Annual Average Daily Flow of 2,948 m^3/day.

Table III
2024 monthly Final Effluent flows to Constructed Wetland

Month	Total Flow (m^3)	Avg. Flow (m^3/day)	Peak Monthly Flow (m^3/day)	Percent of the rated capacity (%)
January	123,613	3,988	7,075	86
February	90,191	3,131	4,078	68
March	97,070	4,082	7,437	88
April	145,533	4,851	8,953	105
May	92,346	2,979	4,782	65
June	74,672	2,489	4,039	54
July	99,238	3,201	7,158	70
August	84,685	2,732	6,009	59
September	62,151	2,072	3,237	45
October	52,996	1,710	2,003	37
November	51,549	1,718	2,113	37
December	75,146	2,424	4,095	53
Annual	**1,049,190**	**2,948**	**5,082**	**64%**

4.0 OVERVIEW OF SUCCESS AND ADEQUACY OF WORKS

For the most part, the WPCP is successfully treating the effluent for all effluent parameters apart from TAN. As per Table IV, there were exceedances of TAN for five months in 2024.

For E-coli, there is no active disinfection in the treatment process and the influence of wildlife contributes to higher E-coli values.

Table IV summarizes effluent quality for the Stabilization Lagoon. Effluent Objectives and Limits are also captured in the table. For CBOD5 and TSS, compliance is based on an Annual Average Effluent Concentration, all other parameters have a Monthly Average Effluent Concentration Limit. In 2024, the effluent quality did not meet the Objectives for Total Suspended Solids (TSS) in March and September. The facility did not meet Effluent TAN Limits in March, May June, July and December.

As mentioned in previous Performance Reports, the facility is not able to consistently facilitate the nitrification process. Best efforts were made to modify operating strategies for nitrification to occur, however during cold water temperatures in the winter, heavy dilution through the spring and early summer and ammonia bleed-out from sludge deposits in the Stabilization Lagoon, Objectives and Limits were not achieved.

Note:

Blue text on **Table IV** denotes months that did not achieve Objective Limits.

Red text on **Table IV** were months that did not achieve Compliance Limits.

Table IV

Monthly Average Waste Stabilization Pond Effluent Quality – 2024

Parameter	CBOD5 (mg/L)	TSS (mg/L)	TP (mg/L)	TAN (mg/L)	TKN	E-coli (mg/L)	Temp	pH	Nitrate (mg/L)	Nitrite (mg/L)
Effluent Objectives (mg/L)	15.0	15.0	0.8	May 1-Oct 31: 10.0 Nov 1-Apr 30: 15.0	No objective	200 cfu/100mL		6.5-9.0	No objective	No objective
Effluent Limit (mg/L)	30	40	1.0	May-Oct 31:14.0 Nov 1-Apr 30: 17.0	No Limit	No Limit	No Limit	6.0-9.5	No Limit	No Limit
January	12.2	10.0	0.30	17.0	18.9	Overgrown	1.9	7.6	0.06	0.76
February	8.5	11.0	0.22	15.5	16.1	680	3.6	7.5	0.06	0.40
March	12.3	*15.3*	0.21	*17.5*	18.5	1920	6.0	7.9	0.4	0.22
April	10.4	13.4	0.17	14.1	16.3	1160	11.6	8.0	0.07	0.38
May	4.3	4.0	0.18	*18.5*	19.0	1740	19.7	7.7	0.04	0.10
June	5.0	7.3	0.20	*22.1*	23.2	48	21.9	7.8	0.08	0.11
July	4.2	5.2	0.29	*18.4*	20.3	06	24.7	7.7	0.17	0.10
August	5.5	6.3	0.26	13.6	14.6	12	21.7	7.6	0.45	0.23
September	4.8	*19.5*	0.27	10.1	10.7	14	20.0	7.8	0.49	0.39
October	4.6	7.0	0.43	13.3	14.0	68	15.0	7.7	0.10	0.07
November	5.5	6.3	0.26	16.1	16.7	800	7.9	7.6	0.31	0.69
December	14.6	9.2	0.33	*18.7*	19.8	6400	2.6	7.3	0.05	0.81
Average	**7.6**	**9.5**	**0.26**	**16.2**	**17.3**	**1168**	**13.0**	**7.7**	**0.16**	**0.35**

Table V provides Stabilization Pond effluent loading results. For CBOD5 and TSS, compliance is based on an Annual Average Daily Effluent Loading, all other parameters have a Monthly Average Loading Limit. The effluent from the Lagoon met the effluent loading limits for all required parameters.
Table V also estimates sludge generation ratesin the waste stabilization pond.

Table V
Monthly Average Waste Stabilization Pond Effluent Load – 2024

	CBOD5 (kg/d)	TSS (kg/d)	TP (kg/d)	TAN (kg/d)	Sludge Generated Approximately**
ECA Limit	138 kg/d	184 kg/d	4.6 kg/d	May-Oct 64.4 kg/d Nov-Apr 78.2 kg/d	(m^3/month) Based on Sludge Yield of 2.8 l/ m^3
January	47.3	38.8	1.2	66.1	336.6
February	26.4	34.1	0.7	46.9	252.0
March	39.6	49.3	0.7	56.5	280.5
April	49.7	64.0	0.8	67.3	401.4
May	12.7	11.9	0.5	55.1	259.1
June	13.0	18.9	0.5	57.4	218.6
July	13.4	16.6	0.9	58.7	276.5
August	16.0	18.2	0.8	39.8	253.3
September	10.1	41.4	0.6	21.4	178.5
October	8.6	13.1	0.8	24.9	162.1
November	9.7	11.0	0.5	28.4	147.8
December	34.4	21.7	0.8	44.1	204.4
Average	**23.4**	**28.3**	**0.7**	**47.2**	**247.6**

**Sludge generated is based on an estimated sludge yield of 2.8 l of sludge per cubic meter of wastewater treated. Sludge yield at 2.8 l/m^3 based on 5% total solids in sludge blanket on bottom of stabilization lagoon. The ECA does not limit sludge production rates.

Table VI
Overall Efficiency of WPCP Sewage Works System - 2024

Date	CBOD5 (%)	TSS (%)	TP (%)	Ammonia Nitrogen (%)
January	95.8	96.4	95.0	30.7
February	96.1	97.1	97.5	42.1
March	98.3	96.2	98.0	48.6
April	96.4	97.2	96.6	48.5
May	97.5	92.6	83.8	49.5
June	97.8	94.9	83.0	51.8
July	96.4	98.0	79.8	48.7
August	97.9	98.7	88.9	64.0
September	98.2	98.1	91.7	77.9
October	98.4	99.0	94.8	78.8
November	98.8	98.9	98.0	75.1
December	95.8	95.4	94.2	45.5
Average	**97.3**	**96.9**	**91.8**	**55.1**

5.0 OPERATING ISSUES AND CORRECTIVE ACTIONS

Table VII summarizes mechanical problems and corrective actions in 2024.

Table VII
Summary of Operating Issues and Corrective Actions

LOCATION	ISSUE	CORRECTIVE ACTION
Lagoon	Ammonia	Retained Engineer for new treatment plant design
Dosing System	Radar unit for Chemical Tank malfunction	Reset unit manually
Dosing System	Ferric Pump leak	Install sensor in containment to alarm when leak is detected
Liftstation	Liftstation debris/scum blanket blocking pump intake	Disassemble pump and clear debris
Aerated cell	Debris on aerators disabling operation	cleaned aerators frequently, replace worn/broken parts
Lagoon	Increased Phosphorus	Increase Dosing rate by 30%
Lagoon	Baffle Anchors failed	Replace with temporary anchors and lines until new anchors can be set

Liftstation	Pump VFD Failure	Replace VFD unit
Collection System	Inflow and Infiltration	CCTV inspections and repairs as identified, Completed Flow monitoring study
WPCP	Hoist Inspection	3 at Liftstation (one for Park)
Liftstation	Worn out channel grinder	Rebuild unit and retrofit with Electric drive motor

6.0 SUMMARY OF MAINTENANCE

Table VIII summarizes normal maintenance completed at the lagoon system and sewage pumping stations.

Table VIII
Summary of Maintenance

FREQUENCY	NAME OF EQUIPMENT MAINTAINED	ACTION
Weekly	pH meter / DO	Calibration (in-house)
Yearly	Portion of Collection System	Cleaned and inspected, Repair as required
Quarterly	Flash mixer/ Aerators/Pumps	Grease/check oil, remove rags and debris
Yearly	Sludge Depth Measured	Sludge judge
Quarterly maintenance	Watson Marlow QDos	replace heads when required (usual 3 to 4 months)
Spring (yearly)	Siemens Magmeter, LUT400	Calibration
Equipment Calibration	Flow monitoring devices at Lagoon, liftstation, Wetlands and Presqu'ile Park	Calibration
Quarterly	Liftstation debris/ scum blanket	Inspect, clean and remove if required
Spring (yearly)	Wetland levels	Water levels lowered
Spring, summer, and fall (yearly)	Aerators	Repair/replace parts or Removed debris
Summer (yearly)	Constructed wetland	Water levels Lowered
Weekly	Berm	Inspect and repair as needed
November (yearly)	Wetland levels	Water levels raised
Quarterly	Liftstation Valves	Exercise all valves
Yearly	Liftstation Valves	Grease valves

7.0 EFFLUENT QUALITY ASSURANCE AND CONTROL

Wastewater exiting the aeration pond passes through a chemical dosing chamber (also called the Cell). Ferric Chloride is the coagulant used to remove phosphorus and help with the settling of solids. It also aids in the settling of other substances and odour control. The dosing system operates twenty-four (24) hours a day, seven (7) days a week and is analyzed and adjusted to determine the correct dosing rate of ferric chloride for optimal performance. The system is checked and logged daily by a wastewater operator.

Raw sewage and effluent samples are collected by a trained wastewater operator, following the applicable MECP guidelines. All collected wastewater samples are sent weekly to an accredited laboratory for analysis. The results of the raw sewage and effluent sampling results are analyzed weekly by Brighton staff. A result showing non-compliance with the required wastewater limit, as stated in the ECA, is reported to the MECP in accordance with the ECA.

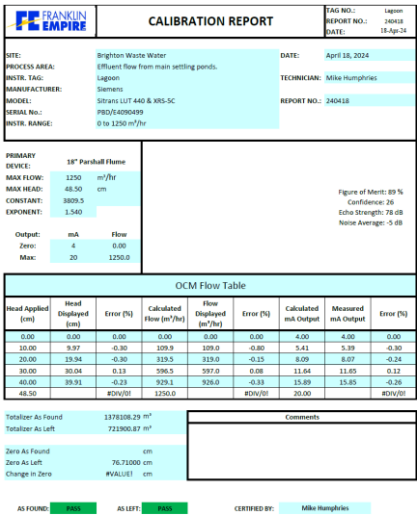
8.0 SUMMARY OF CALIBRATION AND MAINTENANCE ON MONITORING EQUIPMENT

Table IX – Equipment Calibration

DATE OF CALIBRATION Or Maintenance	EQUIPMENT CALIBRATED/Maint.	COMPANY PERFORMING CALIBRRATION/Maint.
Yearly	Flow monitors/ Mag Meters	Franklin/Siemens
Yearly	*DO meter/ DO Probes/ DR3900	Hach Technician
Weekly	*DO probe/pH meters	In-house

*DO stands for Dissolved Oxygen

8.1 Calibration reports for flow metering equipment as follows



FRANKLIN EMPIRE

CALIBRATION REPORT

TAG NO.: Lagoon
REPORT NO.: 240418
DATE: 18-Apr-24

SITE:	Brighton Waste Water	DATE:	April 18, 2024
PROCESS AREA:	Effluent flow from main settling ponds.		
INSTR. TAG:	Lagoon	TECHNICIAN:	Mike Humphries
MANUFACTURER:	Siemens		
MODEL:	Sitrans LUT 440 & XRS-5C	REPORT NO.:	240418
SERIAL No.:	PBD/E4090499		
INSTR. RANGE:	0 to 1250 m³/hr		

PRIMARY DEVICE:	18" Parshall Flume	
MAX FLOW:	1250	m³/hr
MAX HEAD:	48.50	cm
CONSTANT:	3809.5	
EXPONENT:	1.540	

Output:	mA	Flow
Zero:	4	0.00
Max:	20	1250.0

Figure of Merit: 89 %
Confidence: 26
Echo Strength: 78 dB
Noise Average: -5 dB

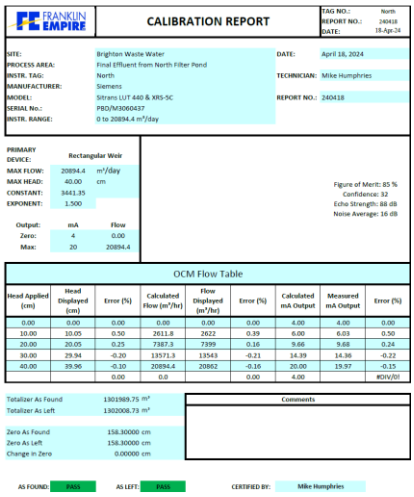
OCM Flow Table

Head Applied (cm)	Head Displayed (cm)	Error (%)	Calculated Flow (m³/hr)	Flow Displayed (m³/hr)	Error (%)	Calculated mA Output	Measured mA Output	Error (%)
0.00	0.00	0.00	0.00	0.00	0.00	4.00	4.00	0.00
10.00	9.97	-0.30	109.9	109.0	-0.80	5.41	5.39	-0.30
20.00	19.94	-0.30	319.5	319.0	-0.15	8.09	8.07	-0.24
30.00	30.04	0.13	596.5	597.0	0.08	11.64	11.65	0.12
40.00	39.91	-0.23	929.1	926.0	-0.33	15.89	15.85	-0.26
48.50		#DIV/0!	1250.0		#DIV/0!	20.00		#DIV/0!

Totalizer As Found	1378108.29	m³
Totalizer As Left	721900.87	m³
Zero As Found		cm
Zero As Left	76.71000	cm
Change in Zero	#VALUE!	cm

Comments

AS FOUND: PASS AS LEFT: PASS CERTIFIED BY: Mike Humphries



FRANKLIN EMPIRE

CALIBRATION REPORT

TAG NO.: North
REPORT NO.: 240418
DATE: 18-Apr-24

SITE:	Brighton Waste Water	DATE:	April 18, 2024
PROCESS AREA:	Final Effluent from North Filter Pond		
INSTR. TAG:	North	TECHNICIAN:	Mike Humphries
MANUFACTURER:	Siemens		
MODEL:	Sitrans LUT 440 & XRS-5C	REPORT NO.:	240418
SERIAL No.:	PBD/M3060437		
INSTR. RANGE:	0 to 20894.4 m³/day		

PRIMARY DEVICE:	Rectangular Weir	
MAX FLOW:	20894.4	m³/day
MAX HEAD:	40.00	cm
CONSTANT:	3441.35	
EXPONENT:	1.500	

Output:	mA	Flow
Zero:	4	0.00
Max:	20	20894.4

Figure of Merit: 85 %
Confidence: 32
Echo Strength: 88 dB
Noise Average: 16 dB

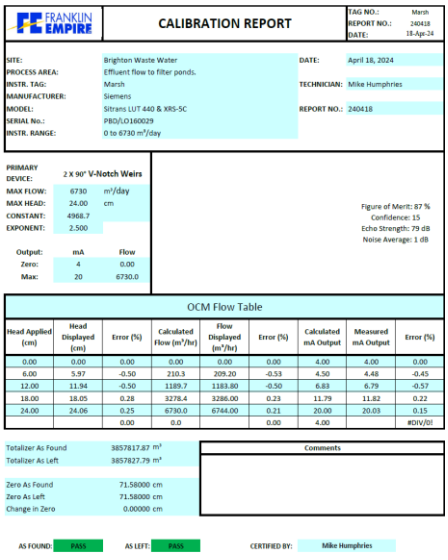
OCM Flow Table

Head Applied (cm)	Head Displayed (cm)	Error (%)	Calculated Flow (m³/hr)	Flow Displayed (m³/hr)	Error (%)	Calculated mA Output	Measured mA Output	Error (%)
0.00	0.00	0.00	0.00	0.00	0.00	4.00	4.00	0.00
10.00	10.05	0.50	2611.8	2622	0.39	6.00	6.03	0.50
20.00	20.05	0.25	7387.3	7399	0.16	9.66	9.68	0.24
30.00	29.94	-0.20	13571.3	13543	-0.21	14.39	14.36	-0.22
40.00	39.96	-0.10	20894.4	20862	-0.16	20.00	19.97	-0.15
		0.00	0.0		0.00	4.00		#DIV/0!

Totalizer As Found	1301989.75	m³
Totalizer As Left	1302008.73	m³
Zero As Found	158.30000	cm
Zero As Left	158.30000	cm
Change in Zero	0.00000	cm

Comments

AS FOUND: PASS AS LEFT: PASS CERTIFIED BY: Mike Humphries



FRANKLIN EMPIRE

CALIBRATION REPORT

TAG NO.: Marsh
REPORT NO.: 240418
DATE: 18-Apr-24

SITE:	Brighton Waste Water	DATE:	April 18, 2024
PROCESS AREA:	Effluent flow to filter ponds.		
INSTR. TAG:	Marsh	TECHNICIAN:	Mike Humphries
MANUFACTURER:	Siemens		
MODEL:	Sitrans LUT 440 & XRS-5C	REPORT NO.:	240418
SERIAL No.:	PBD/LO160029		
INSTR. RANGE:	0 to 6730 m³/day		

PRIMARY DEVICE:	2 X 90° V-Notch Weirs	
MAX FLOW:	6730	m³/day
MAX HEAD:	24.00	cm
CONSTANT:	4968.7	
EXPONENT:	2.500	

Output:	mA	Flow
Zero:	4	0.00
Max:	20	6730.0

Figure of Merit: 87 %
Confidence: 15
Echo Strength: 79 dB
Noise Average: 1 dB

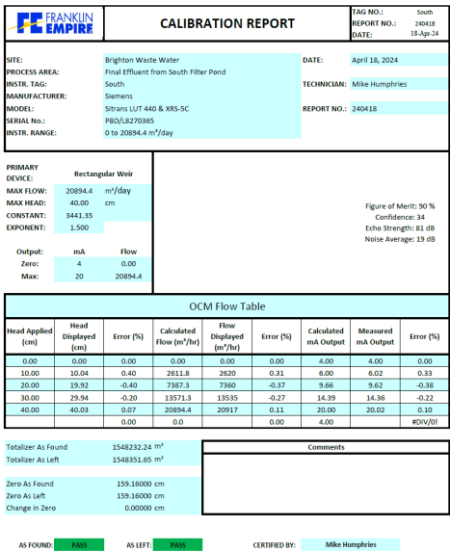
OCM Flow Table

Head Applied (cm)	Head Displayed (cm)	Error (%)	Calculated Flow (m³/hr)	Flow Displayed (m³/hr)	Error (%)	Calculated mA Output	Measured mA Output	Error (%)
0.00	0.00	0.00	0.00	0.00	0.00	4.00	4.00	0.00
6.00	5.97	-0.50	210.3	209.20	-0.53	4.50	4.48	-0.45
12.00	11.94	-0.50	1189.7	1183.80	-0.50	6.83	6.79	-0.57
18.00	18.05	0.28	3278.4	3286.00	0.23	11.79	11.82	0.22
24.00	24.06	0.25	6730.0	6744.00	0.21	20.00	20.03	0.15
		0.00	0.0		0.00	4.00		#DIV/0!

Totalizer As Found	3857817.87	m³
Totalizer As Left	3857827.79	m³
Zero As Found	71.58000	cm
Zero As Left	71.58000	cm
Change in Zero	0.00000	cm

Comments

AS FOUND: PASS AS LEFT: PASS CERTIFIED BY: Mike Humphries



FRANKLIN EMPIRE

CALIBRATION REPORT

TAG NO.: South
REPORT NO.: 240418
DATE: 18-Apr-24

SITE:	Brighton Waste Water	DATE:	April 18, 2024
PROCESS AREA:	Final Effluent from South Filter Pond		
INSTR. TAG:	South	TECHNICIAN:	Mike Humphries
MANUFACTURER:	Siemens		
MODEL:	Sitrans LUT 440 & XRS-5C	REPORT NO.:	240418
SERIAL No.:	PBD/L8270365		
INSTR. RANGE:	0 to 20894.4 m³/day		

PRIMARY DEVICE:	Rectangular Weir	
MAX FLOW:	20894.4	m³/day
MAX HEAD:	40.00	cm
CONSTANT:	3441.35	
EXPONENT:	1.500	

Output:	mA	Flow
Zero:	4	0.00
Max:	20	20894.4

Figure of Merit: 90 %
Confidence: 34
Echo Strength: 81 dB
Noise Average: 19 dB

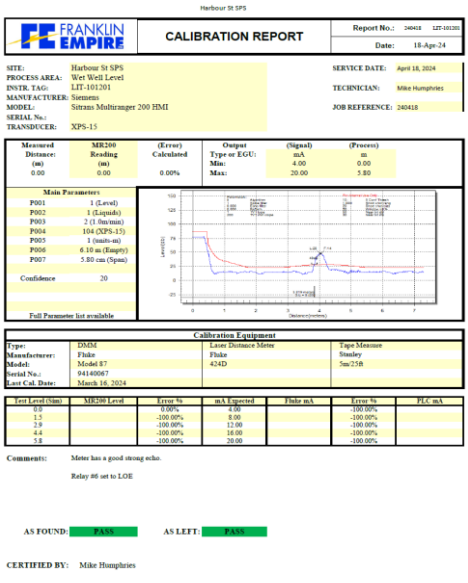
OCM Flow Table

Head Applied (cm)	Head Displayed (cm)	Error (%)	Calculated Flow (m³/hr)	Flow Displayed (m³/hr)	Error (%)	Calculated mA Output	Measured mA Output	Error (%)
0.00	0.00	0.00	0.00	0.00	0.00	4.00	4.00	0.00
10.00	10.04	0.40	2611.8	2620	0.31	6.00	6.02	0.33
20.00	19.92	-0.40	7387.3	7360	-0.37	9.66	9.62	-0.38
30.00	29.94	-0.20	13571.3	13535	-0.27	14.39	14.36	-0.22
40.00	40.03	0.07	20894.4	20917	0.11	20.00	20.02	0.10
		0.00	0.0		0.00	4.00		#DIV/0!

Totalizer As Found	1548232.24	m³
Totalizer As Left	1548351.65	m³
Zero As Found	159.16000	cm
Zero As Left	159.16000	cm
Change in Zero	0.00000	cm

Comments

AS FOUND: PASS AS LEFT: PASS CERTIFIED BY: Mike Humphries



Harbour St SPS

FRANKLIN EMPIRE

CALIBRATION REPORT

Report No.: 240418 LIT-101201
Date: 18-Apr-24

SITE:	Harbour St SPS	SERVICE DATE:	April 18, 2024
PROCESS AREA:	Wet Well Level		
INSTR. TAG:	LIT-101201	TECHNICIAN:	Mike Humphries
MANUFACTURER:	Siemens		
MODEL:	Sitrans Multiranger 200 HMI	JOB REFERENCE:	240418
SERIAL No.:			
TRANSDUCER:	XPS-15		

Measured Distance: (m)	MR200 Reading (m)	(Error) Calculated	Output Type or EGU:	(Signal) mA	(Process) m
0.00	0.00	0.00%	Min:	4.00	0.00
			Max:	20.00	5.80

Main Parameters

P001	1 (Level)
P002	1 (Liquids)
P003	2 (1 lbs/min)
P004	104 (XPS-15)
P005	1 (units-m)
P006	6.10 m (Empty)
P007	5.80 cm (Span)
Confidence	20

Full Parameter list available

Calibration Equipment

Type:	DMM	Laser Distance Meter	Tape Measure
Manufacturer:	Fluke	Fluke	Stanley
Model:	Model 87	424D	5m/25ft
Serial No.:	94140067		
Last Cal. Date:	March 16, 2024		

Test Level (Sim)	MR200 Level	Error %	mA Expected	Fluke mA	Error %	PLC mA
0.0		0.00%	4.00		-100.00%	
1.5		-100.00%	8.00		-100.00%	
2.9		-100.00%	12.00		-100.00%	
4.4		-100.00%	16.00		-100.00%	
5.8		-100.00%	20.00		-100.00%	

Comments: Meter has a good strong echo.

Relay #6 set to LOE

AS FOUND: PASS AS LEFT: PASS

CERTIFIED BY: Mike Humphries

SIEMENS MAGFLO® Verification Certificate

Customer:

Name	Brighton, Town of
Address	35 Alice Street
	Brighton, Ontario
	K0K 1H0
Phone	613-475-3453
Email	

MAGFLO® Identification:

TAG No./Name	0
Sensor Code No.	7ME652
Sensor Serial No.	122202H091
Transmitter Code No.	7ME691
Transmitter Serial No.	401730N041
Location	Presqu'ile

Results:

Verification file name or No.		Presqu'ile Flow
Transmitter		Passed
Sensor	Insulation	Passed
	Magnetic Circuit	Passed

Velocity	Current Output			Frequency Output		
Theoretical	Theoretical	Actual	Deviation	Theoretical	Actual	Deviation
0.5m/s	4.800mA	4.804mA	0.56%	0.500kHz	0.501kHz	0.23%
1.0m/s	5.600mA	5.605mA	0.32%	1.000kHz	1.002kHz	0.19%
3.0m/s	8.800mA	8.803mA	0.07%	3.000kHz	3.002kHz	0.07%
	Current Output 4-20mA			Frequency Output 0-10kHz		

Transmitter Settings:

Basic	Qmax.	2000.00 l /min
	Flow Direction	Positive
	Low flow Cut-off	3.00%
	Empty Pipe	ON
Output	Current Output	OFF
	Time Constant	N/A
	Relay Output	Error Level
	Digital Output	Pulse
	Frequency Range	N/A
	Time Constant	N/A
	Volume/pulse	0.99999953 US G/p
	Pulse width	0.066 sec.
	Pulse polarity	Positiv
Totalizer 1 value before test		119789.6171875 m³
Totalizer 1 value after test		119789.6484375 m³
Totalizer 2 value before test		4.78098059 m³
Totalizer 2 value after test		4.78098392 m³
Operating time in days		4658

Sensor Details:

Size	DN 150 6 IN
Cal. Factor	15.6641264
Correction Factor	1.0
Excitation Freq.	7.5Hz

Verificator Details (083F5061)

Serial No.	000115N060
Device No.	90529
Software Version	1.40
PC-Software Version	5.01
Cal. date	2023.11.03
ReCal. date	2024.11.03

Comments

These tests verify that the flowmeter is functioning within 2% deviation of the original test parameters.
Verification is traceable to National and International Standards.

Date and signature

2024.04.18 Mike Humphries

SIEMENS MAGFLO® Verification Certificate

Customer:

Name	Brighton, Town of
Address	35 Alice Street
	Brighton, Ontario
	K0K 1H0
Phone	613-475-3453
Email	

MAGFLO® Identification:

TAG No./Name	0
Sensor Code No.	7ME652
Sensor Serial No.	PBD-P3034515
Transmitter Code No.	7ME69202CA301AA0
Transmitter Serial No.	N1P6295123
Location	Harbour St. SPS

Results:

Verification file name or No.		FIT-101105
Transmitter		Passed
Sensor	Insulation	Passed
	Magnetic Circuit	Passed

Velocity	Current Output			Frequency Output		
Theoretical	Theoretical	Actual	Deviation	Theoretical	Actual	Deviation
0.5m/s	4.800mA	4.802mA	0.24%	0.500kHz	0.500kHz	0.07%
1.0m/s	5.600mA	5.603mA	0.17%	1.000kHz	1.001kHz	0.11%
3.0m/s	8.800mA	8.803mA	0.06%	3.000kHz	3.002kHz	0.06%
	Current Output 4-20mA			Frequency Output 0-10kHz		

Transmitter Settings:

Basic	Qmax.	300.000 l/s
	Flow Direction	Positive
	Low flow Cut-off	1.50%
	Empty Pipe	ON
Output	Current Output	ON (4-20mA)
	Time Constant	5.0 Sec.
	Relay Output	Error Level
	Digital Output	OFF
	Frequency Range	N/A
	Time Constant	N/A
	Volume/pulse	0.0 US G/p
	Pulse width	0.066 sec.
	Pulse polarity	Positiv
Totalizer 1 value before test		569814.0 m³
Totalizer 1 value after test		569814.0625 m³
Totalizer 2 value before test		42.61623001 m³
Totalizer 2 value after test		42.61687088 m³
Operating time in days		420

Sensor Details:

Size	DN 300 12 IN
Cal. Factor	62.78400421
Correction Factor	1.0
Excitation Freq.	3.75Hz

Verificator Details (083F5061)

Serial No.	000115N060
Device No.	90529
Software Version	1.40
PC-Software Version	5.01
Cal. date	2023.11.03
ReCal. date	2024.11.03

Comments

These tests verify that the flowmeter is functioning within 2% deviation of the original test parameters.
Verification is traceable to National and International Standards.

Date and signature

2024.04.18 Mike Humphries

SIEMENS MAGFLO® Verification Certificate

Customer:

Name	Brighton, Town of
Address	35 Alice Street
	Brighton, Ontario
	K0K 1H0
Phone	613-475-3453
Email	

MAGFLO® Identification:

TAG No./Name	0
Sensor Code No.	7ME652
Sensor Serial No.	122202H091
Transmitter Code No.	7ME691
Transmitter Serial No.	401730N041
Location	Presqu'ile

Results:

Verification file name or No.		Presqu'ile Flow
Transmitter		Passed
Sensor	Insulation	Passed
	Magnetic Circuit	Passed

Velocity	Current Output			Frequency Output		
Theoretical	Theoretical	Actual	Deviation	Theoretical	Actual	Deviation
0.5m/s	4.800mA	4.804mA	0.56%	0.500kHz	0.501kHz	0.23%
1.0m/s	5.600mA	5.605mA	0.32%	1.000kHz	1.002kHz	0.19%
3.0m/s	8.800mA	8.803mA	0.07%	3.000kHz	3.002kHz	0.07%
	Current Output 4-20mA			Frequency Output 0-10kHz		

Transmitter Settings:

Basic	Qmax.	2000.00 l /min
	Flow Direction	Positive
	Low flow Cut-off	3.00%
	Empty Pipe	ON
Output	Current Output	OFF
	Time Constant	N/A
	Relay Output	Error Level
	Digital Output	Pulse
	Frequency Range	N/A
	Time Constant	N/A
	Volume/pulse	0.99999953 US G/p
	Pulse width	0.066 sec.
	Pulse polarity	Positiv
Totalizer 1 value before test		119789.6171875 m³
Totalizer 1 value after test		119789.6484375 m³
Totalizer 2 value before test		4.78098059 m³
Totalizer 2 value after test		4.78098392 m³
Operating time in days		4658

Sensor Details:

Size	DN 150 6 IN
Cal. Factor	15.6641264
Correction Factor	1.0
Excitation Freq.	7.5Hz

Verificator Details (083F5061)

Serial No.	000115N060
Device No.	90529
Software Version	1.40
PC-Software Version	5.01
Cal. date	2023.11.03
ReCal. date	2024.11.03

Comments

These tests verify that the flowmeter is functioning within 2% deviation of the original test parameters.
Verification is traceable to National and International Standards.

Date and signature

2024.04.18 Mike Humphries

Certificate of Instrument Performance
Certificat de Conformité

Company Name / Nom de la Compagnie :

Account Number / No. de compte :

Certification Number / Numéro du Certificat :

Part Number / No. de pièce :
Serial Number / No. de série :
External Reference / Référence externe :

Hach Sales & Service Canada Ltd. certifies that your instrument has been serviced, calibrated, verified with standards and now meets new product specifications.

Hach Sales & Service Canada Ltd. atteste que votre instrument a été entretenu, calibré et vérifié selon les normes en vigueur. Ses spécifications actuelles sont équivalentes à celles d'un produit neuf.

Certified by / Certifié par :

Certification Date / Date de certification :

Certificate of Instrument Performance
Certificat de Conformité
Company Name / Nom de la Compagnie :
Account Number / No. de compte :
Certification Number / Numéro du Certificat :
Part Number / No. de pièce :
Serial Number / No. de série :
External Reference / Référence externe :
Hach Sales & Service Canada Ltd. certifies that your instrument has been serviced, calibrated, verified with standards and now meets new product specifications.
Hach Sales & Service Canada Ltd. atteste que votre instrument a été entretenu, calibré et vérifié selon les normes en vigueur. Ses spécifications actuelles sont équivalentes à celles d'un produit neuf.
Certified by / Certifié par :
Certification Date / Date de certification :

Certificate of Instrument Performance
Certificat de Conformité
Company Name / Nom de la Compagnie :
Account Number / No. de compte :
Certification Number / Numéro du Certificat :
Part Number / No. de pièce :
Serial Number / No. de série :
External Reference / Référence externe :
Hach Sales & Service Canada Ltd. certifies that your instrument has been serviced, calibrated, verified with standards and now meets new product specifications.
Hach Sales & Service Canada Ltd. atteste que votre instrument a été entretenu, calibré et vérifié selon les normes en vigueur. Ses spécifications actuelles sont équivalentes à celles d'un produit neuf.
Certified by / Certifié par :
Certification Date / Date de certification :

Certificate of Instrument Performance
Certificat de Conformité
Company Name / Nom de la Compagnie :
Account Number / No. de compte :
Certification Number / Numéro du Certificat :
Part Number / No. de pièce :
Serial Number / No. de série :
External Reference / Référence externe :
Hach Sales & Service Canada Ltd. certifies that your instrument has been serviced, calibrated, verified with standards and now meets new product specifications.
Hach Sales & Service Canada Ltd. atteste que votre instrument a été entretenu, calibré et vérifié selon les normes en vigueur. Ses spécifications actuelles sont équivalentes à celles d'un produit neuf.
Certified by / Certifié par :
Certification Date / Date de certification :

9.0 EFFORTS AND RESULTS TO MEET EFFLUENT OBJECTIVES

Despite best efforts to reduce ammonia concentrations in the system, the lagoon-based treatment has continued to produce results above the limits stated in ECA. The municipality, in conjunction with an engineering firm has developed a comprehensive plan to build a conventional type, extended aeration treatment plant, commencing in 2025 to ensure all compliance limits are not only met, but exceeded.

The Municipality of Brighton has implemented several interim efforts under the Limited Operational Flexibility (LOF) process of the ECA to improve performance of the lagoon treatment system.

Since 2015, five aerators have been added to the aerated cell. Total aeration power now provided is 110 Horsepower (approx. 83 Kilowatts). Of the five new aerators, three of the new aerators (10 hp each) were added to the aerated cell in late June 2020.

For several years, on/off aerator operation combined with manual "**decanting**" of the surface layer of effluent from the aerated cell when the aerators were off has been practiced. This would assumedly retain solids within the aerated cell and allow Volatile Suspended Solids (VSS) to build to levels that would support nitrification.

A Notice of Modification (Notification Number 7) for trial decanting, combined with on/off aeration, was submitted to MECP in August 2017. A renewal of the decanting process was again requested in 2019 (Notification Number 8). Notification Number 8 is included in **Appendix A.**

Notification Number 8 was subsequently approved by the MECP under the LOF conditions of the current ECA. Decanting was completed again in 2024 by the following manual decanting method.

<u>Decanting Method</u>

Based on preliminary evaluations, the simplest method to achieve manual decanting was to:

- Manually turn off all aerators at approximately 7 am.
- Wait one half to one hour to allow settling of solids in the aerated cell.
- Manually lift the first 6-inch stop log to release the first "batch" of clear decant.
- After approximately 1 additional hour, manually remove the 2nd stop log to release a second batch of clear decant.
- Overall, such draining of decant lowered water levels in the aeration cell by approximately 12 inches (300 mm).
- At approximately 2 pm, reinstall both stop logs and then turn on all aerators. The aerated cell would slowly refill.
- Allow aerators to run from 2 pm to approximately 7 am. Then repeat the decant process for daily decanting.

The operators completed regular measurements of dissolved oxygen in the aerated cell. Generally, the 4 hour decant period depending on dissolved oxygen (8 am to 12 pm) resulted in falling dissolved oxygen levels in the aerated cell, but oxygen levels do not normally fall below 1 mg/l. Once the aerators were restarted, there was sometimes a temporary, further sag in oxygen levels before oxygen levels rebounded to above 3 mg/l.

The surface area of the aerated cell is approximately 6,000 m^2. Therefore, the volume contained in the top 0.3 m of the cell is approximately 1,800 m^3. Therefore, given a fill time of 17 hours (2 pm to 7 am), the stop logs would not normally start overflowing before 7 am of the next day if incoming sewage flows were less than 106 m^3/hour (or 2,500 m^3/day).

Normally, once the aerated cell was decanted for 4 hours or shorter, the remaining storage depth of approximately 12 inches (300 mm) was sufficient to store the incoming sewage flow until the next morning, without overtopping the stop logs. At some points we go 24/7 aeration due to depleted DO levels.

Results – Retention of VSS and Removal of Ammonia

Decanting was completed on a sporadic basis during 2024 but generally full-time aeration (and normal overflow of the aeration cell to the lagoon) was practiced during the summer of 2024.

Other Results

Other than TAN, decanting beginning in January 2024 appeared to improve, or at least maintain, the high quality of effluent being discharged from the downstream Stabilization Lagoon. Values of CBOD, TSS and TP were below all respective compliance limits.

Summary

The decanting process, combined with on/off operation of the aerators, appears capable of building relatively high levels of VSS (but not as necessary as we originally thought) in the aeration cell. The addition of 3 aerators in June 2020 demonstrated that this additional mixing energy was sufficient to suspend high levels of VSS (greater than 400 mg/l) in the aeration cell.

These higher levels of VSS were coinciding with very good ammonia removal rates but in 2024 even with low levels of VSS the system still responded. However, the ability of the extra mixing energy to maintain high levels of VSS appeared to diminish in late fall (December) when water temperatures in the aerated cell declined below 10 C. Added aeration also tends to lower the temperature of the aeration pond quicker than it use to. Lower levels of VSS in December were not coinciding with lower levels of ammonia removal. It is recommended that continued experimentation with various combinations of on/off aerator operation (either manually or by timers) coupled with decanting, be continued during 2025.

At this time, it is our assumption that the reason the 110 hp total combined aerator energy did not keep VSS levels above 400 mg/l in the late fall due to the increased viscosity of water under cold conditions. Therefore, additional aerators for late fall and winter use could provide the additional mixing energy required to keep enough VSS in suspension to achieve a VSS concentration of at least 400 mg/l and preferably higher (500 to 600 mg/l).

However, additional aerators would likely increase the rate of heat loss from the aerated cell and therefore drive down effluent temperatures.

10.0 TOTAL AMMONIUM NITROGEN

Removal of TAN nitrogen has been a long-standing issue for the Brighton WPCP. LOF provisions under previously issued Notices were undertaken largely to improve removal of ammonia nitrogen in the lagoon system.

Since 2018, efforts to improve TAN removal focused on operation of the aerators on timers in conjunction with manual decanting of the aerated cell. These measures were intended to build levels of VSS and increase sludge age in the aerated cell to promote development of nitrifying bacteria. In 2024 we continued with decanting and fine tuning of the aeration pond. More critically, the additional 30 horsepower provided by the three additional aerators in June 2020 proved very successful in achieving higher concentrations of VSS but in 2022 also showed the system could also work with low VSS.

Throughout 2024, the Municipality has worked closely with a hired engineering firm as well as the MECP, to design for a conventional type, extended aeration treatment plant, including headworks, aeration tanks, clarifiers and disinfection. The Municipality through the design of an upgraded WWTF is committed to rectifying the long-standing issue with TAN. Currently the design process is near 100% completion and a construction tender will be issued in the Spring of 2025

10.1 Total Phosphorus

As per **Table IV**, there was no exceedance in 2024 of the TP limits of 1.0 mg/l for the lagoon.

10.2 CBOD and Suspended Solids

Levels of CBOD and suspended solids remained below the compliance limits for all months in 2024 and achieved compliance with the Annual Average Effluent Concentrations and Loadings. In February, March and April, the facility did not meet the effluent Objectives established for Total Suspended Solids but was able to meet them for all other parameters.

11.0 BIOSOLIDS MANAGEMENT

No Bio-Solids were removed in 2024

As follows is an estimate of sludge generated in the lagoon system in 2024.

The volume of sludge generated, and stored in the lagoon (stabilization pond) is estimated as follows:

- Total sewage flow in 2024 – **1,061,057**m3

- Assume starting sludge yield of 3.5 l/m^3 (as per Table 16-1 of Design Guidelines for Sewage Works – MOE, 2008)

- Above sludge yield is for conventional activated sludge plants with anaerobic treatment and with phosphorus removal. Sludge yield in Table 16-1 is based on average solids content of 4%.

- Some consolidation of sludge will occur over time in stabilization lagoon. Assume sludge thickening from 4% to 5% will occur. Therefore, sludge yield will be slightly less, or 0.8 X 3.5 l/m^3 = 2.8 l/m^3.

- Therefore, total sludge production in 2024 is estimated to be 2,970m^3.

Net sludge generated in 2024 is summarized as follows:

Total Sewage Flow in 2022	Sludge Yield	Total Sludge Generated	Average Sludge Depth in Lagoon	Sludge Removed	Net Sludge Added to Lagoon in 2024
1,061,057	2.8 l/m^3	2,970m^3	0.058 m	0 m^3	2,970m^3 *

Note – average sludge depth in lagoon above is extra sludge depth produced in lagoon in current year and based on approximate lagoon area of 54,400 m^2.

As above (*), new sludge deposited in lagoon in 2024 was approximately 2,970m^3.

12.0 SUMMARY OF COMPLAINTS

The Municipality received no complaints in 2024.

13.0 SUMMARY OF BY-PASSES, SPILLS AND ABNORMAL DISCHARGES

There was no sewage spill in 2024

14.0 SUMMARY OF SEWER WORK COMPLETED

In 2024, the Municipality of Brighton continued to identify, clean, and repair a portion of the sewer collection system to ensure reduced I&I issues and obtain efficiency in the collection system. The Municipality is committed to continue this work.

Reducing infiltration to the system reduced potential overloading's on the Lagoon and the receiving environment, this reduces run-time of pumping equipment and reduced energy usage for pumping sewage. One of the main issues is sump pumps that are illegally tied into the sanitary system which causes a surge to the pumping station and the lagoon, treating clear water is costly and takes up reserved capacity of the sanitary system.

The Municipality plans to invest further funding for sewer repairs in attempts to remove more inflow and infiltration into the sanitary system.

15.0 RAINBOW TROUT TOXICITY TESTING

Brighton has submitted quarterly samples of final effluent from the Lagoon to a toxicity laboratory in Guelph, Ontario (Aquatox Testing and Consulting Ltd.) for LC 50 testing using young rainbow trout.

All tests completed in 2024 have passed toxicity testing. Sampling and testing have been done in accordance with Environment Canada requirements.

APPENDIX A

NOTICE OF MODIFICATIONS SUBMITTED TO MECP UNDER LOF PROCESS – 2018

Ontario

Ministry of the Environment

Notice of Modification to Sewage Works

RETAIN COPY OF COMPLETED FORM AS PART OF THE ECA AND SEND A COPY TO THE WATER SUPERVISOR (FOR MUNICIPAL SYSTEMS) OR DISTRICT MANAGER (FOR INDUSTRIAL SYSTEMS)

Part 1 – Environmental Compliance Approval (ECA) with Limited Operational Flexibility
(Insert the ECA's owner, number and issuance date and notice number, which should start with "01" and consecutive numbers thereafter)

ECA Owner	ECA number	Issuance Date (mm/dd/yy)	Notice number
Municipality of Brighton	3081-9XQNZK	07/07/15	8

Part 2 – Description of the modifications as part of the Limited Operational Flexibility
(Attach a detailed description of the sewage works)

Previously, Brighton installed timers on the existing four aerators in the aerated cell of the sewage treatment works. On/off cycling of the aerators was attempted to retain biological solids in the aerated cell, to increase sludge age and promote formation and retention of nitrifiying bacteria. This notice seeks to augment aeration timers by allowing removal of existing stop logs (two, 6" tall stop logs) in the morning to "decant" clarified water from the aerated cell when the aerators are off. Once the boards are reinstalled later in the same day, all aerators would be returned to operation.

Description shall include:
1. A detail description above of the modifications and/or operations to the sewage works (e.g. sewage work component, location, size, equipment type/model, material, process name, etc.)
2. An assessment of the anticipated environmental effects
3. Updated versions of, or amendments to, all relevant technical documents required by this ECA that are affected by the modifications as applicable, e.g. site plan, design brief, drawings, emergency and spill prevention plan, etc.

Part 3 – Declaration by Professional Engineer
I hereby declare that I have verified the scope and technical aspects of this modification and confirm that the design:
1. Has been prepared or reviewed by a Professional Engineer who is licensed to practice in the Province of Ontario;
2. Has been designed in accordance with the Limited Operational Flexibility as described in the ECA;
3. Has been designed consistent with Ministry's Design Guidelines, adhering to engineering standards, industry's best management practices, and demonstrating ongoing compliance with s.53 of the Ontario Water Resources Act; and other appropriate regulations.

I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate

Name (Print)	PEO License Number
Jeff Graham, P. Eng.	90222860
Signature	Date (mm/dd/yy)
	06/21/2018

Name of Employer
GSS Engineering Consultants Ltd.

Part 4 – Declaration by Owner
I hereby declare that:
1. I am authorized by the Owner to complete this Declaration;
2. The Owner consents to the modification; and
3. This modifications to the sewage works are proposed in accordance with the Limited Operational Flexibility as described in the ECA.
4. The Owner has fulfilled all applicable requirements of the *Environmental Assessment Act*.

I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate

Name of Owner Representative (Print)	Owner representative's title (Print)
Mr. Keith Lee	Wastewater Supervisor
Owner Representative's Signature	Date (mm/dd/yy)
	06/21/2018

EAB Form August 20, 2013