Bruce Energy Centre Lagoon System

2022 Annual Report

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Section

1.0 Introduction

The Bruce Energy Centre Lagoon System treats wastewater from the Bruce Energy Centre Industrial Park, and the collection systems in Tiverton and Inverhuron. All the treatment and collection works are owned and operated by the Municipality of Kincardine.

The Bruce Energy Centre (BEC) Lagoon System operated under Environmental Compliance Approval #2362-BXVTJS located in Appendix A. Section 11(4) of the Approval requires a Performance Report to be submitted annually to the Ministry of the Environment, Conservation and Parks. The Tiverton Collection System Certificate of Approval #3-2417-89-906 also has annual reporting requirements. This Annual Report includes information for both the Bruce Energy Centre Lagoon System and the Tiverton Collection System and is intended to satisfy the reporting requirements for both these systems.

The BEC Lagoon System is classified as a WWT2 facility. Both the Tiverton Collection System and the Inverhuron Collection System are classified as WWC2 facilities.

The BEC Lagoon System is an aerated four-cell lagoon system with year-round disinfection using UV Treatment with continuous discharge of the effluent to Lake Huron.

The Tiverton Collection System consists of a gravity flow collection system and two raw sewage pump stations. The wastewater collected at the King Street lift station is pumped to the Maple Street pumping station. From there the wastewater is pumped via a force main to the Bruce Energy Centre Lagoon System for treatment.

Wastewater from the Inverhuron Provincial Park is pumped from a sewage pumping station located inside the provincial park, and some residential areas of Inverhuron are pumped from the Lake Street Pumping station to the Bruce Energy Centre Lagoon via forcemains that connect to the main forcemain coming from Tiverton.

Wastewater from the Bruce Energy Centre Industrial Park flows by gravity to the BEC Lagoon System.

2.0 Sampling and Monitoring

The raw influent samples collected at the lagoon are 24-hour composite samples. The final effluent samples are grab samples. Samples of the influent and effluent were collected biweekly.

The Tiverton and Inverhuron Collection Systems do not require routine sampling of the raw wastewater.

The coarse bubble diffuser system and the addition of the coagulant aluminum sulphate, work together to meet the effluent objectives outlined in the Environmental Compliance Approval. Effluent objectives were met for CBOD5, TSS, Total Phosphorus, Total Ammonia Nitrogen and E. coli. The effluent pH ranged from 6.71 to 9.30 which met the effluent limit (6.0 to 9.5) but was outside the effluent objective of 6.5 to 8.5. There was a total of 32 days the pH was above the objective limit of 8.5.

The monthly average loadings have been calculated and are shown in Table 1, below, and compared with the effluent objectives. All loading objectives were met in 2022.

Table 1 Monthly Average Loading

Monthly Average Loading kg/day					
	CBOD5	**TSS**	**TP**	**Ammonia freezing**	**Ammonia non-freezing**
Effluent Objective	**55**	**55**	**1.8**	**26.4**	**11**
January	4	3	0.10	4.15	--
February	2	3	0.21	8.06	--
March	4	9	0.49	10.76	--
April	6	16	0.26	--	4.71
May	4	9	0.12	--	0.57
June	2	4	0.08	--	0.19
July	1	1	0.02	--	0.08
August	1	2	0.02	--	0.06
September	1	1	0.04	--	0.11
October	2	3	0.06	--	0.11
November	2	2	0.12	--	1
December	2	3	0.14	4.61	--
Averages	3	5	0.14	6.89	0.85

Aluminum sulphate is added to the transfer pipe between Cell 2 and 3 to aid in coagulation and for phosphorous removal. A total of 6190 kg of alum was added in 2022 and the average dosage was 45.35 mg/L. When comparing the influent and effluent sample results, we determined that there was 91% removal of Total Suspended Solids and 93% removal of Total Phosphorous.

The effluent was continuously disinfected by UV resulting in an E. coli annual geometric mean density of 2 organisms per 100 mL with most samples being below the method detection limit of the Lab. The effluent objective is 150 organisms per 100 mL.

The Bruce Energy Centre Environmental Compliance Approval sets out non-compliance limits for effluent parameters based on both an average monthly concentration and a daily concentration.

Table 2 on the following page summarizes the effluent sample results compared to their non-compliance limits. There were no exceedances of non-compliance limits. An additional spreadsheet showing both influent and effluent monthly averages can be found in Appendix B.

No leachate from the Kincardine Waste Management Centre was hauled to the Bruce Energy Centre Lagoon in 2022. A total of 289.04 m3 of septage was received from Bruce Power, January through December as part of the ongoing MCR Project. A separate event for 285.7m3 of septage hauled from Bruce Power's lagoons took place on March 4 and 5 and also 600.08 m3 from April 4-8 due to an upset of the lagoons at their site. A total of 1174.82 m^3 was hauled from Bruce Power in 2022. The septage was sampled at the start of the events and a copy of the results are in Appendix C.

There were no deviations from the monitoring schedule for 2022. A copy of the schedules for 2022 and 2023 are included in Appendix D

Table 2 Sample Results Compared to Non-Compliance Limits

	CBOD5 (mg/L)		Total Suspended Solids (mg/L)		Total Phosphor-ous (mg/L)		Total Ammonia (mg/L)			
							Freezing		Non-freezing	
	Monthly Average	Max Daily Conc.	Monthly Average	Max Daily Conc.	Monthly Average	Max Daily Conc.	Monthly Average	Max Daily Conc.	Monthly Average	Max Daily Conc.
Non-compliance Limits	**30**	**45**	**30**	**45**	**1.0**	**1.5**	**15**	**20**	**7.5**	**10**
January	5.00	7.00	4.00	4.00	0.14	0.15	5.65	6.20	--	--
February	2.00	2.00	2.50	3.00	0.21	0.26	7.95	8.60	--	--
March	3.50	4.00	7.50	9.00	0.41	0.46	8.85	9.40	--	--
April	6.00	6.00	16.00	23.00	0.27	0.27	--	--	4.80	7.20
May	7.00	11.00	15.00	26.00	0.21	0.28	--	--	0.97	1.80
June	5.00	7.00	9.00	13.00	0.16	0.22	--	--	0.40	0.40
July	2.00	2.00	3.00	3.00	0.06	0.06	--	--	0.30	0.30
August	2.00	2.00	4.00	5.00	0.05	0.06	--	--	0.15	0.20
September	2.00	2.00	2.50	3.00	0.07	0.07	--	--	0.20	0.20
October	3.00	4.00	3.50	4.00	0.09	0.09	--	--	0.15	0.20
November	2.67	4.00	3.67	4.00	0.19	0.20	--	--	1.57	2.80
December	2.00	2.00	3.50	4.00	0.18	0.18	5.65	6.60	--	--

3.0 Flow Data

The BEC Lagoon System average daily design flow is 2200 m^3/day with a maximum peak flow of 6160 m^3/d allowed. Table 3 summarizes the Influent and Effluent Flows at the lagoon as well as the contributing collection systems flows.

Table 3 Bruce Energy Centre Lagoon and Collection Systems Flows

	Average Flow (m^3/d)	**Maximum Flow (m^3/d)**	**Total Flow (m^3)**
Tiverton Collection System	333.8	1,165	121,550
Inverhuron Collection System	--	--	--
Inverhuron Provincial Park	--	--	6288
BEC Industrial Park	--	--	75,834
Leachate from KWMC	--	--	0
BEC Influent Flow	565	1,749	206,073
BEC Effluent Flow	733	1,779	255,056

BEC Industrial Park flow data is a sum of the wastewater flows from two businesses within the park that are metered. Not all businesses are equipped with flow meters as they have low flows. The Inverhuron Collection system now only records pump hours and does not totalize flows.

In 2022, flow into the treatment works was within the design specifications. The average daily influent flow was approximately 26% of the design capacity. The Tiverton Collection System average daily flow for 2022 was 333.8 m^3/d; the permitted average day flow stated in the facility Certificate of Approval is 700 m^3/d. Discharge from the lagoons was stopped July 6 to 24 to raise the cell level. Appendix E contains additional 2022 flow data for the lagoon system and the following table compares the flows at the lagoons over the past 5 years.

Table 4 BEC Flows

	2018	2019	2020	2021	2022
Total Influent Flow (m3)	465,079	284,900	252,809	261,202	206,073
Overall Percentage of Influent Design Capacity	58%	36%	31%	33%	26%
Design Capacity Exceedances (days)	15	1	0	0	0
Total Effluent Flow (m3)	256,240	300,122	254,770	262,283	255,056

Inflow and infiltration continue as evidenced through the increased flows at the Tiverton pump stations and, in the wastewater pumped to the BEC lagoon during times of heavy precipitation. Maple Street in Tiverton was reconstructed in 2021 and footing drain tie in connections to sanitary were removed. This has relieved some of the infiltration issues on the system. Table 5 compares the volume of water produced by the Tiverton Drinking Water System, the annual precipitation and the volume pumped from the Maple Street SPS.

Table 5 Tiverton Volume Comparisons

	2018	2019	2020	2021	2022
Tiverton Drinking Water Produced (m^3)	83,713	84,573	80,719	77,311	79,340
Tiverton Collection System Flow (m^3)	118,280	126,022	119,349	128,745	121,550
% Increase	29%	33%	32%	40%	35%
Annual Precipitation (mm)	670	709	444	375	582

4.0 Maintenance and Calibration of Equipment

Preventative maintenance was completed on the blowers at the lagoon and repairs to the airlines at the cells was completed as required. The bar screens at the influent chamber and vegetation and debris from the Cell 4 discharge pipe were cleared on an as needed basis.

Routine maintenance and repairs were performed throughout the year on the UV units. Plywood and snow were used to insulate the UV chamber to prevent freezing during winter months.

The influent composite sampler at the BEC Lagoons was repaired multiple times and the hose was replaced in February 2022.

The valves for cells 3 and 4 were repaired so they could be operated to control the flows.

Preventative maintenance was completed on the diesel generators at the Tiverton Pumping Stations and the lagoons. The battery for the BEC lagoons genset was replaced in July.

A new section of 75mm forcemain was installed on Bruce Rd 15 but will not be commissioned until future upgrades are completed.

A new sewage pump #1 was installed at Maple Street PS in March. It had been out of service since 2021. A new sewage pump #1 was installed at the Inverhuron Park PS on October 13, it had been out of service since July 2022.

Annual sludge depths of all 4 cells were completed in September.

There were no major upgrades to treatment components or processes in 2022.

Flow measuring equipment was calibrated annually. Copies of the calibration reports are included in Appendix F. The influent flow meter failed the calibration in 2020, and it was recommended that it be replaced so it was not calibrated in 2021 or 2022. A replacement meter has been budgeted for in 2023.

5.0 Volume of Sludge Generated

Sludge depths were taken in each cell in 2022 using a sludge judge. The average volume of sludge in each cell was estimated and is shown in the table below. From the estimated volumes of sludge there appears to be a slight decrease in sludge across the four cells since last year. This variance could be caused by samples being taken in different locations in each cell from the previous year.

Table 6 Estimated Sludge Volumes

Estimated Sludge Volume (m^3)					
	2018	**2019**	**2020**	**2021**	**2022**
Cell #1	5,686	4,501	4,501	4,620	3,435
Cell #2	3,435	3,435	2,822	4,294	2,822
Cell #3	5,109	6,046	3,481	4,580	4,214
Cell #4	3,707	1,783	3,121	3,478	2,675

6.0 By-pass, Spill or Abnormal Discharge Events

There was one by-pass in 2022 at the BEC WW Treatment due to the UV level sensor freezing and shutting down in February. A copy of the Annual By-pass Log can be viewed in Appendix G.

There were no abnormal discharge events, plant upsets or major process and equipment failures in 2022 at the lagoon system or in any of the collection systems.

7.0 Efforts to achieve conformance with Procedure F-5-1

A flow study was completed for the Maple Street pumping station to see if pump upgrades were required to keep up with high flows during wet weather events. The pumping station would historically have one or two bypass events annually. The maple street subdivision underwent construction in 2021 and had storm sewer and sanitary sewer upgrades. During the road reconstruction any footing drain and sump pump connections discovered were disconnected from the sanitary sewer system alleviating some flows to the Maple Street pumping station. A total of $31,370.07 was spent in 2022 on the flow study and engineering for future upgrades. It was determined that since flows were now reduced during wet weather events, the upgrades could be scheduled in 2025 or 2026.

8.0 Summary

Overall, there were no major operational problems encountered in 2022. Discharge of effluent was stopped for 18 days in July to raise the cell levels and extend the retention time. The lagoon system was effective at treating the wastewater and the effluent CBOD, Total Suspended Solids and Phosphorous did not exceed the non-compliance limits.

There was one complaint recorded for the system in 2022 for a sewer backup but the issue ended up being the homeowner's grinder pump was not working.

There are no future projects or upgrades planned at this time that would result in future bypass or overflow elimination. As streets are reconstructed on the system any areas of infiltration will be addressed to alleviate high flows during wet weather events.

There were no Notice of Modifications to Sewage Works submitted in 2022.

The Proposed Landfill Leachate and Septage Receiving Station was not installed in 2022, nor were there any Notice of Modifications submitted to the Ministry of the Environment, Conservation and Parks.

APPENDIX A

Environmental Compliance Approval

Ontario

Ministry of the Environment, Conservation and Parks
Ministère de l'Environnement, de la Protection de la nature et des Parcs

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER 2362-BXVTJS
Issue Date: February 26, 2021

The Corporation of the Municipality of Kincardine
1475 Concession 5
Rural Route 5
Kincardine, Ontario
N2Z 2X6

Site Location: Bruce Energy Centre Sewage Treatment Plant
Part 5, Plan 3R-7015
Lot Lake Range, 11 and 12, Concession 3
Municipality of Kincardine, County of Bruce

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

upgrade, usage and operation of existing municipal sewage works, for the treatment of sanitary sewage and disposal of effluent through the cooling water channel of Bruce "B" Nuclear Power Generation Station to Lake Huron via a continuous discharge lagoon (Bruce Energy Centre Lagoon Treatment Plant) and Final Effluent disposal facilities as follows:

Classification of Collection System: Separate Sanitary Sewer System

Classification of Sewage Treatment Plant: Secondary Equivalent

Design Capacity of Sewage Treatment Plant

Design Capacity with All Treatment Trains in Operation	Existing Works
Rated Capacity	2,200 m^3/d

Influent and Imported Sewage

Receiving Location	Types
In Collection System	Sanitary Sewage
At Sewage Treatment Plant	Septage/Leachate

Proposed Works:

Bruce Energy Centre Lagoon Treatment Plant

Disinfection System

- one (1) open channel equipped with UV disinfection system consisting of two (2) banks of UV lamps (one duty, one standby) arranged in series, each with a Peak Hourly Flow Rate of 256.67 m^3 /h;

Decommissioning and Removal

- decommissioning and removal of the existing disinfection system identified in the Existing Works;

Existing Works:

Bruce Energy Centre Lagoon Treatment Plant

Influent Chamber

- one (1) reinforced concrete inlet chamber with approximate dimensions of 3 m x 2 m x 2.85 SWD;
- emergency overflow pipe with Parshall flume discharging to the effluent outfall manhole;

Imported Sewage Receiving Facilities

- one (1) landfill leachate and septage receiving station (MH2A) to receive a maximum of 46 m^3/d of landfill leachate and a maximum of 200 m^3/d of septage, consisting of the following:
    - one (1) 3.0 m wide x 4.0 m long spill containment pad consisting of a compacted-clay liner with 2% horizontal slope towards a collection sump discharging through one (1) 100 mm diameter pipe to an existing manhole (MH2A);
    - one (1) leachate and septage unloading and transferring system consisting of one (1) 100 mm diameter HDPE pipe equipped with a waste haul tanker quick connect/disconnect hook-up system to unload leachate and septage into the sewer manhole for treatment;

- one (1) perimeter security fence equipped with standard access gate;
- controls and associated appurtenances;

Influent Flow Sampling Point

- automatic composite sampler at the inlet chamber;

Aerated Lagoon

- one (1) aerated lagoon with a minimum total liquid retention capacity of forty-five (45) days at the Rated Capacity of 2,200 m^3/d having the following minimum basin volume and depth:
  - Cell No. 1 with a minimum retention volume of 28,600 m^3 and a liquid depth of 3 m;
  - Cell No. 2 with a minimum retention volume of 28,600 m^3 and a liquid depth of 3 m;
  - Cell No 3 with a minimum retention volume of 21,900 m^3 and a liquid depth of 3 m;
  - Cell No 4 with a minimum retention volume of 21,900 m^3 and a liquid depth of 3 m;
- interconnecting piping to allow the operation of the lagoons is series or parallel mode of operation;

Aeration System

- Two (2) multi-stage centrifugal blowers (one duty, one standby), each rated at 802 L/s at 100 kPa (1,700 scfm at 14.7 psia) and driven by 75 kW (100 hp) motors;
- blower accessories and air piping;
- coarse bubble diffuser system;

Supplementary Treatment Systems

- Phosphorus Removal
  - two (2) alum metering pumps (one duty, one standby), each rated at 167 L/d;
  - one (1) 9,000 L heavy duty polyethylene tank for storage of liquid alum;

Disinfection System

- two (2) sodium hypochlorite metering pumps (one duty, one standby), each rated at 167 L/d;

- one (1) 450 L polyethylene tank for the storage of sodium hypochlorite;

Final Effluent Flow Measurement and Sampling Point

- one (1) reinforced concrete outlet chamber with approximately dimensions of 3 m x 2.5 m x 3.1 SWD;

- V-notch weir plate and flow monitoring equipment;

Control Building

- one (1) control building to house blowers, chemical storage tanks, metering pumps and portable water tank, including all controls and associated appurtenance;

Final Effluent Disposal Facilities

- one (1) effluent outfall trunk sewer discharging through the condenser cooling water channel of Bruce "B" Nuclear Power Generation Station to Lake Huron;

including all other mechanical system, electrical system, instrumentation and control system, standby power system, piping, pumps, valves and appurtenances essential for the proper, safe and reliable operation of the Works in accordance with this Approval, in the context of process performance and general principles of wastewater engineering only;

all in accordance with the submitted supporting documents listed in Schedule A.

For the purpose of this environmental compliance approval, the following definitions apply:

1. "Annual Average Daily Influent Flow" means the cumulative total sewage flow of Influent to the Sewage Treatment Plant during a calendar year divided by the number of days during which sewage was flowing to the Sewage Treatment Plant that year;

2. "Approval" means this environmental compliance approval and any schedules attached to it, and the application;

3. "BOD5" (also known as TBOD5) means five day biochemical oxygen demand measured in an unfiltered sample and includes carbonaceous and nitrogenous oxygen demands;

4. "Bypass" means diversion of sewage around one or more treatment processes, excluding Preliminary Treatment System, within the Sewage Treatment Plant with the diverted sewage flows being returned to the Sewage Treatment Plant treatment train upstream of the Final Effluent sampling point(s) and discharged via the approved effluent disposal facilities;

5. "CBOD5" means five day carbonaceous (nitrification inhibited) biochemical oxygen demand measured in an unfiltered sample;

6. "Director" means a person appointed by the Minister pursuant to section 5 of the EPA for the purposes of Part II.1 of the EPA;

7. "District Manager" means the District Manager of the appropriate local district office of the Ministry where the Works is geographically located;

8. "*E. coli* " refers to coliform bacteria that possess the enzyme beta-glucuronidase and are capable of cleaving a fluorogenic or chromogenic substrate with the corresponding release of a fluorogen or chromogen, that produces fluorescence under long wavelength (366 nm) UV light, or color development, respectively. Enumeration methods include tube, membrane filter, or multi-well procedures. Depending on the method selected, incubation temperatures include 35.5 $\pm$ 0.5 °C or 44.5 $\pm$ 0.2 °C (to enumerate thermotolerant species). Depending on the procedure used, data are reported as either colony forming units (CFU) per 100 mL (for membrane filtration methods) or as most probable number (MPN) per 100 mL (for tube or multi-well methods);

9. "EPA" means the *Environmental Protection Act* , R.S.O. 1990, c.E.19, as amended;

10. "Equivalent Equipment" means alternate piece(s) of equipment that meets the design requirements and performance specifications of the piece(s) of equipment to be substituted;

11. "Event" means an action or occurrence, at a given location within the Works that causes a Bypass or Overflow. An Event ends when there is no recurrence of Bypass or Overflow in the 12-hour period following the last Bypass or Overflow. Overflows and Bypasses are separate Events even when they occur concurrently;

12. "Existing Works" means those portions of the Works included in the Approval that have been constructed previously;

13. "Final Effluent" means effluent that is discharged to the environment through the approved effluent disposal facilities, including all Bypasses, that are required to meet the compliance limits stipulated in the Approval for the Sewage Treatment Plant at the Final Effluent sampling point(s);

14. "Imported Sewage" means sewage hauled to the Sewage Treatment Plant by licensed waste management system operators of the types and quantities approved for co-treatment in the Sewage Treatment Plant, including hauled sewage and leachate within the meaning of R.R.O. 1990, Regulation 347: General – Waste Management, as amended;

15. "Influent" means flows to the Sewage Treatment Plant from the collection system and Imported Sewage;

16. "Limited Operational Flexibility" (LOF) means the conditions that the Owner shall follow in order to undertake any modification that is pre-authorized as part of this Approval;

17. "Ministry" means the ministry of the government of Ontario responsible for the EPA and OWRA and includes all officials, employees or other persons acting on its behalf;

18. "Monthly Average Effluent Concentration" is the mean of all Single Sample Results of the concentration

of a contaminant in the Final Effluent sampled or measured during a calendar month, calculated and reported as per the methodology specified in Schedule F;

19. "Monthly Average Daily Effluent Flow" means the cumulative total Final Effluent discharged during a calendar month divided by the number of days during which Final Effluent was discharged that month;

20. "Monthly Average Daily Effluent Loading" means the value obtained by multiplying the Monthly Average Effluent Concentration of a contaminant by the Monthly Average Daily Effluent Flow over the same calendar month;

21. "Monthly Geometric Mean Density" is the mean of all Single Sample Results of *E. coli* measurement in the samples taken during a calendar month, calculated and reported as per the methodology specified in Schedule F;

22. "Normal Operating Condition" means the condition when all unit process(es), excluding Preliminary Treatment System, in a treatment train is operating within its design capacity;

23. "Operating Agency" means the Owner or the entity that is authorized by the Owner for the management, operation, maintenance, or alteration of the Works in accordance with this Approval;

24. "Overflow" means a discharge to the environment from the Works at designed location(s) other than the approved effluent disposal facilities or via the effluent disposal facilities downstream of the Final Effluent sampling point;

25. "Owner" means The Corporation of the Municipality of Kincardine and its successors and assignees;

26. "OWRA" means the *Ontario Water Resources Act* , R.S.O. 1990, c. O.40, as amended;

27. "Peak Hourly Flow Rate" (also referred to as maximum hourly flow or maximum hour flow) means the largest volume of flow to be received during a one-hour period for which the sewage treatment process unit or equipment is designed to handle;

28. "Professional Engineer" means a person entitled to practice as a Professional Engineer in the Province of Ontario under a license issued under the Professional Engineers Act;

29. "Proposed Works" means those portions of the Works included in the Approval that are under construction or to be constructed;

30. "Rated Capacity" means the Annual Average Daily Influent Flow for which the Sewage Treatment Plant is designed to handle;

31. "Sanitary Sewers" means pipes that collect and convey wastewater from residential, commercial, institutional and industrial buildings, and some infiltration and inflow from extraneous sources such as groundwater and surface runoff through means other than stormwater catch basins;

32. "Separate Sewer Systems" means wastewater collection systems that comprised of Sanitary Sewers while

runoff from precipitation and snowmelt are separately collected in Storm Sewers;

33. "Sewage Treatment Plant" means all the facilities related to sewage treatment within the sewage treatment plant site excluding the Final Effluent disposal facilities;

34. "Single Sample Result" means the test result of a parameter in the effluent discharged on any day, as measured by a probe, analyzer or in a composite or grab sample, as required;

35. "Storm Sewers" means pipes that collect and convey runoff resulting from precipitation and snowmelt (including infiltration and inflow);

36. "Works" means the approved sewage works, and includes Proposed Works, Existing Works and modifications made under Limited Operational Flexibility.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL PROVISIONS

1. The Owner shall ensure that any person authorized to carry out work on or operate any aspect of the Works is notified of this Approval and the terms and conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

2. The Owner shall design, construct, operate and maintain the Works in accordance with the conditions of this Approval.

3. Where there is a conflict between a provision of any document referred to in this Approval and the conditions of this Approval, the conditions in this Approval shall take precedence.

2. CHANGE OF OWNER AND OPERATING AGENCY

1. The Owner shall, within thirty (30) calendar days of issuance of this Approval, prepare/update and submit to the District Manager the Municipal and Local Services Board Wastewater System Profile Information Form, as amended (Schedule G) under any of the following situations:

    a. the form has not been previously submitted for the Works;

    b. this Approval is issued for extension, re-rating or process treatment upgrade of the Works;

    c. when a notification is provided to the District Manager in compliance with requirements of change of Owner or Operating Agency under this condition.

2. The Owner shall notify the District Manager and the Director, in writing, of any of the following

changes within thirty (30) days of the change occurring:

a. change of address of Owner;

b. change of Owner, including address of new owner;

c. change of partners where the Owner is or at any time becomes a partnership, and a copy of the most recent declaration filed under the *Business Names Act, R.S.O. 1990, c. B.17* , as amended, shall be included in the notification;

d. change of name of the corporation where the Owner is or at any time becomes a corporation, and a copy of the most current information filed under the *Corporations Information Act, R.S.O. 1990, c. C.39* , as amended, shall be included in the notification.

3. The Owner shall notify the District Manager, in writing, of any of the following changes within thirty (30) days of the change occurring:

   a. change of address of Operating Agency;

   b. change of Operating Agency, including address of new Operating Agency.

4. In the event of any change in ownership of the Works, the Owner shall notify the succeeding owner in writing, of the existence of this Approval, and forward a copy of the notice to the District Manager.

5. The Owner shall ensure that all communications made pursuant to this condition refer to the environmental compliance approval number.

3. CONSTRUCTION OF PROPOSED WORKS

1. All Proposed Works in this Approval shall be constructed and installed and must commence operation within five (5) years of issuance of this Approval, after which time the Approval ceases to apply in respect of any portions of the Works not in operation. In the event that the construction, installation and/or operation of any portion of the Proposed Works is anticipated to be delayed beyond the time period stipulated, the Owner shall submit to the Director an application to amend the Approval to extend this time period, at least six (6) months prior to the end of the period. The amendment application shall include the reason(s) for the delay and whether there is any design change(s).

2. Within thirty (30) days of commencement of construction, the Owner shall prepare and submit to the District Manager a schedule for the completion of construction and commissioning operation of the Proposed Works. The Owner shall notify the District Manager within thirty (30) days of the commissioning operation of any Proposed Works. Upon completion of construction of the Proposed Works, the Owner shall prepare and submit a statement to the District Manager, certified by a Professional Engineer, that the Proposed Works is constructed in accordance with this Approval.

3. Within one (1) year of completion of construction of the Proposed Works, a set of record drawings of the Works shall be prepared or updated. These drawings shall be kept up to date through revisions

undertaken from time to time and a copy shall be readily accessible for reference at the Works.

4. BYPASSES

1. Any Bypass is prohibited, except:

   a. an emergency Bypass when a structural, mechanical or electrical failure causes a temporary reduction in the capacity of a treatment process or when an unforeseen flow condition exceeds the design capacity of a treatment process that is likely to result in personal injury, loss of life, health hazard, basement flooding, severe property damage, equipment damage or treatment process upset, if a portion of the flow is not bypassed;

   b. a planned Bypass that is a direct and unavoidable result of a planned repair and maintenance procedure or other circumstance(s), the Owner having notified the District Manager in writing at least fifteen (15) days prior to the occurrence of Bypass, including an estimated quantity and duration of the Bypass, an assessment of the impact on the quality of the Final Effluent and the mitigation measures if necessary, and the District Manager has given written consent of the Bypass;

2. Notwithstanding the exceptions given in Paragraph 1, the Operating Agency shall undertake everything practicable to maximize the flow through the downstream treatment process(es) prior to bypassing.

3. At the beginning of a Bypass Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

   a. the type of the Bypass as indicated in Paragraph 1 and the reason(s) for the Bypass;

   b. the date and time of the beginning of the Bypass;

   c. the treatment process(es) gone through prior to the Bypass and the treatment process(es) bypassed;

   d. the effort(s) done to maximize the flow through the downstream treatment process(es) and the reason(s) why the Bypass was not avoided.

4. Upon confirmation of the end of a Bypass Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

   a. the date and time of the end of the Bypass;

   b. the estimated or measured volume of Bypass.

5. For any Bypass Event, the Owner shall collect daily sample(s) of the Final Effluent, inclusive of the Event and analyze for all effluent parameters outlined in Compliance Limits condition that require composite samples, following the same protocol specified in the Monitoring and Recording condition for the regular samples. The sample(s) shall be in addition to the regular Final Effluent samples required

under the monitoring and recording condition. If the Event occurs on a scheduled monitoring day, the regular sampling requirements prevail. If representative sample for the effluent parameter(s) that require grab sample cannot be obtained, they shall be collected after the Event at the earliest time when situation returns to normal.

6. The Owner shall submit a summary report of the Bypass Event(s) to the District Manager on a quarterly basis, no later than each of the following dates for each calendar year: February 15, May 15, August 15, and November 15. The summary reports shall contain, at a minimum, the types of information set out in Paragraphs (3), (4) and (5) and either a statement of compliance or a summary of the non-compliance notifications submitted as required under Paragraph 1 of Condition 11. If there is no Bypass Event during a quarter, a statement of no occurrence of Bypass is deemed sufficient.

7. The Owner shall develop a notification procedure in consultation with the District Manager and SAC and notify the public and downstream water users that may be adversely impacted by any Bypass Event.

5. OVERFLOWS

1. Any Overflow is prohibited, except:

   a. an emergency Overflow in an emergency situation when a structural, mechanical or electrical failure causes a temporary reduction in the capacity of the Works or when an unforeseen flow condition exceeds the design capacity of the Works that is likely to result in personal injury, loss of life, health hazard, basement flooding, severe property damage, equipment damage or treatment process upset, if a portion of the flow is not overflowed;

   b. a planned Overflow that is a direct and unavoidable result of a planned repair and maintenance procedure or other circumstance(s), the Owner having notified the District Manager in writing at least fifteen (15) days prior to the occurrence of Overflow, including an estimated quantity and duration of the Overflow, an assessment of the impact on the environment and the mitigation measures if necessary, and the District Manager has given written consent of the Overflow;

2. Notwithstanding the exceptions given in Paragraph 1, the Operating Agency shall undertake everything practicable to maximize the flow through the downstream treatment process(es) and Bypass(es) prior to overflowing.

3. At the beginning of an Overflow Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

   a. the type of the Overflow as indicated in Paragraph 1 and the reason(s) for the Overflow;

   b. the date and time of the beginning of the Overflow;

   c. the point of the Overflow from the Works, the treatment process(es) gone through prior to the Overflow, the disinfection status of the Overflow and whether the Overflow is discharged through

the effluent disposal facilities or an alternate location;

d. the effort(s) done to maximize the flow through the downstream treatment process(es) and Bypass(es) and the reason(s) why the Overflow was not avoided.

4. Upon confirmation of the end of an Overflow Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

   a. the date and time of the end of the Overflow;

   b. the estimated or measured volume of the Overflow.

5. For any Overflow Event

   a. in the Sewage Treatment Plant, the Owner shall collect grab sample(s) of the Overflow, one near the beginning of the Event and one every eight (8) hours for the duration of the Event, and have them analyzed at least for CBOD5, total suspended solids, total phosphorus, total ammonia nitrogen, nitrate as N, nitrite as N, total Kjeldahl nitrogen, *E. coli.* except that raw sewage and primary treated effluent Overflow shall be analyzed for BOD5, total suspended solids, total phosphorus and total Kjeldahl nitrogen only.

6. The Owner shall submit a summary report of the Overflow Event(s) to the District Manager on a quarterly basis, no later than each of the following dates for each calendar year: February 15, May 15, August 15, and November 15. The summary report shall contain, at a minimum, the types of information set out in Paragraphs (3), (4) and (5). If there is no Overflow Event during a quarter, a statement of no occurrence of Overflow is deemed sufficient.

7. The Owner shall develop a notification procedure in consultation with the District Manager and SAC and notify the public and downstream water users that may be adversely impacted by any Overflow Event.

6. DESIGN OBJECTIVES

1. The Owner shall design and undertake everything practicable to operate the Sewage Treatment Plant in accordance with the following objectives:

   a. Final Effluent parameters design objectives listed in the table(s) included in Schedule B.

   b. Final Effluent is essentially free of floating and settleable solids and does not contain oil or any other substance in amounts sufficient to create a visible film or sheen or foam or discolouration on the receiving waters.

   c. Annual Average Daily Influent Flow is within the Rated Capacity of the Sewage Treatment Plant.

7. COMPLIANCE LIMITS

1. The Owner shall operate and maintain the Sewage Treatment Plant such that compliance limits for the Final Effluent parameters listed in the table(s) included in Schedule C are met.

2. The Owner shall operate and maintain the Sewage Treatment Plant such that the Final Effluent is disinfected continuously year-round.

8. OPERATION AND MAINTENANCE

1. The Owner shall ensure that, at all times, the Works and the related equipment and appurtenances used to achieve compliance with this Approval are properly operated and maintained. Proper operation and maintenance shall include effective performance, adequate funding, adequate staffing and training, including training in all procedures and other requirements of this Approval and the OWRA and regulations, adequate laboratory facilities, process controls and alarms and the use of process chemicals and other substances used in the Works.

2. The Owner shall update the operations manual for the Works within six (6) months of completion of construction of the Proposed Works, that includes, but not necessarily limited to, the following information:

   a. operating procedures for the Works under Normal Operating Conditions;

   b. inspection programs, including frequency of inspection, for the Works and the methods or tests employed to detect when maintenance is necessary;

   c. repair and maintenance programs, including the frequency of repair and maintenance for the Works;

   d. procedures for the inspection and calibration of monitoring equipment;

   e. operating procedures for the Works to handle situations outside Normal Operating Conditions and emergency situations such as a structural, mechanical or electrical failure, or an unforeseen flow condition, including procedures to minimize Bypasses and Overflows;

   f. a spill prevention and contingency plan, consisting of procedures and contingency plans, including notification to the District Manager, to reduce the risk of spills of pollutants and prevent, eliminate or ameliorate any adverse effects that result or may result from spills of pollutants;

   g. procedures for receiving, responding and recording public complaints, including recording any followup actions taken.

3. The Owner shall maintain the operations manual up-to-date and make the manual readily accessible for reference at the Works.

4. The Owner shall ensure that the Operating Agency fulfills the requirements under O. Reg. 129/04, as amended for the Works, including the classification of facilities, licensing of operators and operating

standards.

9. MONITORING AND RECORDING

1. The Owner shall, upon commencement of operation of the Works, carry out a scheduled monitoring program of collecting samples at the required sampling points, at the frequency specified or higher, by means of the specified sample type and analyzed for each parameter listed in the tables under the monitoring program included in Schedule D and record all results, as follows:

    a. all samples and measurements are to be taken at a time and in a location characteristic of the quality and quantity of the sewage stream over the time period being monitored.

    b. definitions and preparation requirements for each sample type are included in document referenced in Paragraph 3.b.

    c. definitions for frequency:

        i. Bi-weekly means once every two weeks.

    d. a schedule of the day of the week/month for the scheduled sampling shall be created. The sampling schedule shall be revised and updated every year through rotation of the day of the week/month for the scheduled sampling program, except when the actual scheduled monitoring frequency is three (3) or more times per week.

2. In addition to the scheduled monitoring program required in Paragraph 1, the Owner shall collect daily sample(s) of the Final Effluent, on any day when there is any situation outside Normal Operating Conditions, and analyze for all effluent parameters outlined in Compliance Limits condition that require composite samples, following the same protocol specified in this condition for the regular samples. If the Event occurs on a scheduled monitoring day, the regular sampling requirements prevail. If representative sample for the effluent parameter(s) that require grab sample cannot be obtained, they shall be collected after the Event at the earliest time when situation returns to normal.

3. The methods and protocols for sampling, analysis and recording shall conform, in order of precedence, to the methods and protocols specified in the following documents and all analysis shall be conducted by a laboratory accredited to the ISO/IEC:17025 standard or as directed by the District Manager:

    a. the Ministry's Procedure F-10-1, “Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only), as amended;

    b. the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater Version 2.0" (January 2016), PIBS 2724e02, as amended;

    c. the publication "Standard Methods for the Examination of Water and Wastewater", as amended.

4. The Owner shall monitor and record the flow rate and daily quantity using flow measuring devices or other methods of measurement as approved below calibrated to an accuracy within plus or minus 15 per

cent (+/- 15%) of the actual flowrate of the following:

a. Influent flow to the Sewage Treatment Plant by continuous flow measuring devices and instrumentations, or in lieu of an actual installation of equipment, adopt the flow measurements of the Final Effluent for the purpose of estimating Influent flows if the Influent and Final Effluent streams are considered not significantly different in flow rates and quantities;

b. Final Effluent discharged from the Sewage Treatment Plant by continuous flow measuring devices and instrumentations, or in lieu of an actual installation of equipment, adopt the flow measurements of the Influent for the purpose of estimating Final Effluent flows if the Influent and Final Effluent streams are considered not significantly different in flow rates and quantities;

c. each type of Imported Sewage received for co-treatment at the Sewage Treatment Plant by flow measuring devices/pumping rates/haul truck manifests;

5. The Owner shall retain for a minimum of five (5) years from the date of their creation, all records and information related to or resulting from the monitoring activities required by this Approval.

10. LIMITED OPERATIONAL FLEXIBILITY

1. The Owner may make pre-authorized modifications to the sewage pumping stations and Sewage Treatment Plant in Works in accordance with the document "Limited Operational Flexibility - Protocol for Pre-Authorized Modifications to Municipal Sewage Works" (Schedule E), as amended, subject to the following:

   a. the modifications will not involve the addition of any new treatment process or the removal of an existing treatment process, including chemical systems, from the liquid or solids treatment trains as originally designed and approved.

   b. the scope and technical aspects of the modifications are in line with those delineated in Schedule E and conform with the Ministry's publication "Design Guidelines for Sewage Works 2008", as amended, Ministry's regulations, policies, guidelines, and industry engineering standards;

   c. the modifications shall not negatively impact on the performance of any process or equipment in the Works or result in deterioration in the Final Effluent quality;

   d. where the pre-authorized modification requires notification, a "Notice of Modifications to Sewage Works" (Schedule E), as amended shall be completed with declarations from a Professional Engineer and the Owner and retained on-site prior to the scheduled implementation date. All supporting information including technical memorandum, engineering plans and specifications, as applicable and appropriate to support the declarations that the modifications conform with LOF shall remain on-site for future inspection.

2. The following modifications are not pre-authorized under Limited Operational Flexibility:

a. Modifications that involve addition or extension of process structures, tankages or channels;

b. Modifications that involve relocation of the Final Effluent outfall or any other discharge location or that may require reassessment of the impact to the receiver or environment;

c. Modifications that involve addition of or change in technology of a treatment process or that may involve reassessment of the treatment train process design;

d. Modifications that require changes to be made to the emergency response, spill prevention and contingency plan; or

e. Modifications that are required pursuant to an order issued by the Ministry.

11. REPORTING

1. The Owner shall report to the District Manager orally as soon as possible any non-compliance with the compliance limits, and in writing within seven (7) days of non-compliance.

2. The Owner shall, within fifteen (15) days of occurrence of a spill within the meaning of Part X of the EPA, submit a full written report of the occurrence to the District Manager describing the cause and discovery of the spill, clean-up and recovery measures taken, preventative measures to be taken and schedule of implementation, in addition to fulfilling the requirements under the EPA and O. Reg. 675/98 "Classification and Exemption of Spills and Reporting of Discharges".

3. The Owner shall, upon request, make all manuals, plans, records, data, procedures and supporting documentation available to Ministry staff.

4. The Owner shall prepare performance reports on a calendar year basis and submit to the District Manager by March 31 of the calendar year following the period being reported upon. The reports shall contain, but shall not be limited to, the following information pertaining to the reporting period:

   a. a summary and interpretation of all Influent, Imported Sewage monitoring data, and a review of the historical trend of the sewage characteristics and flow rates;

   b. a summary and interpretation of all Final Effluent monitoring data, including concentration, flow rates, loading and a comparison to the design objectives and compliance limits in this Approval, including an overview of the success and adequacy of the Works;

   c. a summary of all operating issues encountered and corrective actions taken;

   d. a summary of all normal and emergency repairs and maintenance activities carried out on any major structure, equipment, apparatus or mechanism forming part of the Works;

   e. a summary of any effluent quality assurance or control measures undertaken;

   f. a summary of the calibration and maintenance carried out on all Influent, Imported Sewage and

Final Effluent monitoring equipment to ensure that the accuracy is within the tolerance of that equipment as required in this Approval or recommended by the manufacturer;

g. a summary of efforts made to achieve the design objectives in this Approval, including an assessment of the issues and recommendations for pro-active actions if any are required under the following situations:

   i. when any of the design objectives is not achieved more than 50% of the time in a year, or there is an increasing trend in deterioration of Final Effluent quality;

   ii. when the Annual Average Daily Influent Flow reaches 80% of the Rated Capacity;

h. a tabulation of the measured volume of sludge accumulated in the lagoon cells in five year intervals and the estimated volume in the interim years and when sludge was disposed of during the reporting period, a summary of disposal locations and volumes of sludge disposed at each location;

i. a summary of any complaints received and any steps taken to address the complaints;

j. a summary of all Bypasses, Overflows, other situations outside Normal Operating Conditions and spills within the meaning of Part X of EPA and abnormal discharge events;

k. a summary of all Notice of Modifications to Sewage Works completed under Paragraph 1.d. of Condition 10, including a report on status of implementation of all modification.

l. a summary of efforts made to achieve conformance with Procedure F-5-1 including but not limited to projects undertaken and completed in the sanitary sewer system that result in overall Bypass/Overflow elimination including expenditures and proposed projects to eliminate Bypass/Overflows with estimated budget forecast for the year following that for which the report is submitted.

m. any changes or updates to the schedule for the completion of construction and commissioning operation of major process(es) / equipment groups in the Proposed Works.

n. a summary of any deviation from the monitoring schedule and reasons for the current reporting year and a schedule for the next reporting year.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 regarding general provisions is imposed to ensure that the Works are constructed and operated in the manner in which they were described and upon which approval was granted.

2. Condition 2 regarding change of Owner and Operating Agency is included to ensure that the Ministry records are kept accurate and current with respect to ownership and Operating Agency of the Works and to ensure that subsequent owners of the Works are made aware of the Approval and continue to operate the Works in compliance with it.

3. Condition 3 regarding construction of Proposed Works is included to ensure that the Works are constructed in a timely manner so that standards applicable at the time of Approval of the Works are still applicable at the time of construction to ensure the ongoing protection of the environment, and also ensure that the Works are constructed in accordance with the Approval and that record drawings of the Works "as constructed" are updated and maintained for future references.

4. Condition 4 regarding Bypasses is included to indicate that Bypass is prohibited, except in circumstances where the failure to Bypass could result in greater damage to the environment than the Bypass itself. The notification and documentation requirements allow the Ministry to take action in an informed manner and will ensure the Owner is aware of the extent and frequency of Bypass Events.

5. Condition 5 regarding Overflows is included to indicate that Overflow of untreated or partially treated sewage to the receiver is prohibited, except in circumstances where the failure to Overflow could result in greater damage to the environment than the Overflow itself. The notification and documentation requirements allow the Ministry to take action in an informed manner and will ensure the Owner is aware of the extent and frequency of Overflow Events.

6. Condition 6 regarding design objectives is imposed to establish non-enforceable design objectives to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs.

7. Condition 7 regarding compliance limits is imposed to ensure that the Final Effluent discharged from the Works to the environment meets the Ministry's effluent quality requirements.

8. Condition 8 regarding operation and maintenance is included to require that the Works be properly operated, maintained, funded, staffed and equipped such that the environment is protected and deterioration, loss, injury or damage to any person or property is prevented. As well, the inclusion of a comprehensive operations manual governing all significant areas of operation, maintenance and repair is prepared, implemented and kept up-to-date by the Owner. Such a manual is an integral part of the operation of the Works. Its compilation and use should assist the Owner in staff training, in proper plant operation and in identifying and planning for contingencies during possible abnormal conditions. The manual will also act as a benchmark for Ministry staff when reviewing the Owner's operation of the Works.

9. Condition 9 regarding monitoring and recording is included to enable the Owner to evaluate and

demonstrate the performance of the Works, on a continual basis, so that the Works are properly operated and maintained at a level which is consistent with the design objectives and compliance limits.

10. Condition 10 regarding Limited Operational Flexibility is included to ensure that the Works are constructed, maintained and operated in accordance with the Approval, and that any pre-approved modification will not negatively impact on the performance of the Works.

11. Condition 11 regarding reporting is included to provide a performance record for future references, to ensure that the Ministry is made aware of problems as they arise, and to provide a compliance record for this Approval.

Schedule A

1. Application for Environmental Compliance Approval submitted by The Corporation of the Municipality of Kincardine received on July 3, 2020 for the proposed UV disinfection system upgrade, including design notes and calculations, plans and specifications prepared by B.M. Ross & Associates Limited.

Schedule B

Final Effluent Design Objectives

Concentration Objectives prior to completion of construction of all Proposed Works

Final Effluent Parameter	**Averaging Calculator**	**Objective** (milligrams per litre unless otherwise indicated)
CBOD5	Monthly Average Effluent Concentration	25 mg/L
Total Suspended Solids	Monthly Average Effluent Concentration	25 mg/L
Total Phosphorus	Monthly Average Effluent Concentration	0.8 mg/L
Total Ammonia Nitrogen	Monthly Average Effluent Concentration	5 mg/L (Non-Freezing Period: T $\geq$ 5°C - April 15 - December 15) 12 mg/L (Freezing Period: T < 5 °C)
E. coli	Monthly Geometric Mean Density	*150 CFU/100 mL
pH	Single Sample Result	6.5 - 8.5 inclusive
Total Residual Chlorine**	Single Sample Result	Non-detectable

*If the MPN method is utilized for *E. coli* analysis the objective shall be 150 MPN/100 mL

**Total Residual Chlorine shall be non-detectable as measured by a method with a sensitivity of at least 0.02 mg/L

Concentration Objectives upon completion of construction of all Proposed Works

Final Effluent Parameter	**Averaging Calculator**	**Objective**
CBOD5	Monthly Average Effluent Concentration	25 mg/L
Total Suspended Solids	Monthly Average Effluent Concentration	25 mg/L
Total Phosphorus	Monthly Average Effluent Concentration	0.8 mg/L
Total Ammonia Nitrogen	Monthly Average Effluent Concentration	5 mg/L (Non-Freezing Period: T $\geq$ 5°C - April 15 - December 15) 12 mg/L (Freezing Period: T < 5 °C)
E. coli	Monthly Geometric Mean Density	*150 CFU/100 mL
pH	Single Sample Result	6.5 - 8.5 inclusive

*If the MPN method is utilized for *E. coli* analysis the objective shall be 150 MPN/100 mL

Loading Objectives

Final Effluent Parameter	**Averaging Calculator**	**Objective** (maximum unless otherwise indicated)
CBOD5	Monthly Average Daily Effluent Loading	55 kg/d
Total Suspended Solids	Monthly Average Daily Effluent Loading	55 kg/d
Total Phosphorus	Monthly Average Daily Effluent Loading	1.8 kg/d
Total Ammonia Nitrogen	Monthly Average Daily Effluent Loading	11 kg/d (Non-Freezing Period: T ≥ 5°C - April 15 - December 15) 26.4 kg/d (Freezing Period: T < 5 °C)

Schedule C

Final Effluent Compliance Limits prior to completion of construction of all Proposed Works

Concentration Limits - Monthly Average

Final Effluent Parameter	Averaging Calculator	Limit (maximum unless otherwise indicated)
CBOD5	Monthly Average Effluent Concentration	30 mg/L
Total Suspended Solids	Monthly Average Effluent Concentration	30 mg/L
Total Phosphorus	Monthly Average Effluent Concentration	1.0 mg/L
Total Ammonia Nitrogen	Monthly Average Effluent Concentration	7.5 mg/L (Non-Freezing Period: T ≥ 5°C - April 15 - December 15) 15 mg/L (Freezing Period: T < 5 °C)
E. coli	Monthly Geometric Mean Density	*200 CFU/100 mL

*If the MPN method is utilized for *E. coli* analysis the limit shall be 200 MPN/100 mL

Concentration Limits - Single Sample Result

Final Effluent Parameter	Averaging Calculator	Limit (maximum unless otherwise indicated)
CBOD5	Single Sample Result	45 mg/L
Total Suspended Solids	Single Sample Result	45 mg/L
Total Phosphorus	Single Sample Result	1.5 mg/L
Total Ammonia Nitrogen	Single Sample Result	10 mg/L (Non-Freezing Period: T ≥ 5°C - April 15 - December 15) 20 mg/L (Freezing Period: T < 5 °C)
pH	Single Sample Result	between 6.0 - 9.5 inclusive
Total Residual Chlorine	Single Sample Result	0.02 mg/L**

**If continuous analyzer is used for monitoring of Total Residual Chlorine, reading shall be recorded at a minimum frequency of every 5 minutes and any record is not to exceed 0.1 mg/L and any two-hour moving average is not to exceed 0.02 mg/L

Final Effluent Compliance Limits upon completion of construction of all Proposed Works

Concentration Limits - Monthly Average

Final Effluent Parameter	Averaging Calculator	Limit (maximum unless otherwise indicated)
CBOD5	Monthly Average Effluent Concentration	30 mg/L
Total Suspended Solids	Monthly Average Effluent Concentration	30 mg/L
Total Phosphorus	Monthly Average Effluent Concentration	1.0 mg/L
Total Ammonia Nitrogen	Monthly Average Effluent Concentration	7.5 mg/L (Non-Freezing Period: T $\geq$ 5°C - April 15 - December 15) 15 mg/L (Freezing Period: T < 5 °C)
E. coli	Monthly Geometric Mean Density	*200 CFU/100 mL
pH	Single Sample Result	between 6.0 - 9.5 inclusive

*If the MPN method is utilized for *E. coli* analysis the limit shall be 200 MPN/100 mL

Concentration Limits - Single Sample Result

Final Effluent Parameter	Averaging Calculator	Limit (maximum unless otherwise indicated)
CBOD5	Single Sample Result	45 mg/L
Total Suspended Solids	Single Sample Result	45 mg/L
Total Phosphorus	Single Sample Result	1.5 mg/L
Total Ammonia Nitrogen	Single Sample Result	10 mg/L (Non-Freezing Period: T $\geq$ 5°C - April 15 - December 15) 20 mg/L (Freezing Period: T < 5 °C)
E. coli	Monthly Geometric Mean Density	*200 CFU/100 mL
pH	Single Sample Result	between 6.0 - 9.5 inclusive

*If the MPN method is utilized for *E. coli* analysis the limit shall be 200 MPN/100 mL

Schedule D

Monitoring Program

Influent - Influent sampling point

Parameters	Sample Type	Minimum Frequency
BOD5	24 hour composite	Bi-Weekly
Total Suspended Solids	24 hour composite	Bi-Weekly
Total Phosphorus	24 hour composite	Bi-Weekly
Total Kjeldahl Nitrogen	24 hour composite	Bi-Weekly

Septage - when Septage is being off-loaded into the Imported Sewage Receiving Station (MH2A)

Parameters	Sample Type	Minimum Frequency
BOD5	Grab	during each event
Total Suspended Solids	Grab	during each event
Total Phosphorus	Grab	during each event
Total Kjeldahl Nitrogen	Grab	during each event
pH	Grab	during each event
Temperature	Grab	during each event
Oil and Grease	Grab	during each event

Landfill Leachate - when Landfill Leachate is being off-loaded into the Imported Sewage Receiving Station (MH2A)

Parameters	Sample Type	Minimum Frequency
BOD5	Grab	Bi-Weekly
Total Suspended Solids	Grab	Bi-Weekly
Total Phosphorus	Grab	Bi-Weekly
Total Kjeldahl Nitrogen	Grab	Bi-Weekly
pH	Grab	Bi-Weekly
Temperature	Grab	Bi-Weekly
Boron	Grab	Bi-Weekly
Iron (Total)	Grab	Bi-Weekly
Zinc (Total)	Grab	Bi-Weekly

Final Effluent - Final Effluent sampling point (**prior to completion of construction of all the Proposed Works)**

Parameters	Sample Type	Minimum Frequency
CBOD5	Grab	Bi-Weekly
Total Suspended Solids	Grab	Bi-Weekly
Total Phosphorus	Grab	Bi-Weekly
Total Ammonia Nitrogen	Grab	Bi-Weekly
Total Kjeldahl Nitrogen	Grab	Bi-Weekly
Nitrate as Nitrogen	Grab	Bi-Weekly
Nitrite as Nitrogen	Grab	Bi-Weekly
Alkalinity	Grab	Bi-Weekly
E. coli	Grab	Bi-Weekly
Total Residual Chlorine	Grab/Analyzer	Bi-Weekly
pH*	Grab/Probe/Analyzer	Bi-Weekly
Temperature*	Grab/Probe/Analyzer	Bi-Weekly
Un-ionized Ammonia**	As Calculated	Bi-Weekly

*pH and temperature of the Final Effluent shall be determined in the field at the time of sampling for Total Ammonia Nitrogen.

**The concentration of un-ionized ammonia shall be calculated using the total ammonia concentration, pH and temperature using the methodology stipulated in "Ontario's Provincial Water Quality Objectives" dated July 1994, as amended.

Final Effluent - Final Effluent sampling point (**upon completion of construction of all the Proposed Works)**

Parameters	Sample Type	Minimum Frequency
CBOD5	Grab	Bi-Weekly
Total Suspended Solids	Grab	Bi-Weekly
Total Phosphorus	Grab	Bi-Weekly
Total Ammonia Nitrogen	Grab	Bi-Weekly
Total Kjeldahl Nitrogen	Grab	Bi-Weekly
Nitrate as Nitrogen	Grab	Bi-Weekly
Nitrite as Nitrogen	Grab	Bi-Weekly
Alkalinity	Grab	Bi-Weekly
E. coli	Grab	Bi-Weekly
pH*	Grab/Probe/Analyzer	Bi-Weekly
Temperature*	Grab/Probe/Analyzer	Bi-Weekly
Un-ionized Ammonia**	As Calculated	Bi-Weekly

*pH and temperature of the Final Effluent shall be determined in the field at the time of sampling for Total Ammonia Nitrogen.

**The concentration of un-ionized ammonia shall be calculated using the total ammonia concentration, pH and temperature using the methodology stipulated in "Ontario's Provincial Water Quality Objectives" dated July 1994, as amended.

Schedule E

Limited Operational Flexibility

Protocol for Pre-Authorized Modifications to Municipal Sewage Works

1. General

1. Pre-authorized modifications are permitted only where Limited Operational Flexibility has already been granted in the Approval and only permitted to be made at the pumping stations and sewage treatment plant in the Works, subject to the conditions of the Approval.

2. Where there is a conflict between the types and scope of pre-authorized modifications listed in this document, and the Approval where Limited Operational Flexibility has been granted, the Approval shall take precedence.

3. The Owner shall consult the District Manager on any proposed modifications that may fall within the scope and intention of the Limited Operational Flexibility but is not listed explicitly or included as an example in this document.

4. The Owner shall ensure that any pre-authorized modifications will not:

    a. adversely affect the hydraulic profile of the Sewage Treatment Plant or the performance of any upstream or downstream processes, both in terms of hydraulics and treatment performance;

    b. result in new Overflow or Bypass locations, or any potential increase in frequency or quantity of Overflow(s) or Bypass(es).

    c. result in a reduction in the required Peak Flow Rate of the treatment process or equipment as originally designed.

2. Modifications that do not require pre-authorization:

1. Sewage works that are exempt from Ministry approval requirements;

2. Modifications to the electrical system, instrumentation and control system.

3. Pre-authorized modifications that do not require preparation of "Notice of Modification to Sewage Works"

1. Normal or emergency maintenance activities, such as repairs, renovations, refurbishments and replacements with Equivalent Equipment, or other improvements to an existing approved piece of equipment of a treatment process do not require pre-authorization. Examples of these activities are:

    a. Repairing a piece of equipment and putting it back into operation, including replacement of minor

components such as belts, gear boxes, seals, bearings;

b. Repairing a piece of equipment by replacing a major component of the equipment such as motor, with the same make and model or another with the same or very close power rating but the capacity of the pump or blower will still be essentially the same as originally designed and approved;

c. Replacing the entire piece of equipment with Equivalent Equipment.

2. Improvements to equipment efficiency or treatment process control do not require pre-authorization. Examples of these activities are:

a. Adding variable frequency drive to pumps;

b. Adding on-line analyzer, dissolved oxygen probe, ORP probe, flow measurement or other process control device.

4. Pre-Authorized Modifications that require preparation of "Notice of Modification to Sewage Works"

1. Pumping Stations

a. Replacement, realignment of existing sewers including manholes, valves, gates, weirs and associated appurtenances provided that the modifications will not add new influent source(s) or result in an increase in flow from existing sources as originally approved.

b. Extension or partition of wetwell to increase retention time for emergency response and improve station maintenance and pump operation;

c. Replacement or installation of inlet screens to the wetwell;

d. Replacement or installation of flowmeters, construction of station bypass;

e. Replacement, reconfiguration or addition of pumps and modifications to pump suctions and discharge pipings including valve, gates, motors, variable frequency drives and associated appurtenances to maintain firm pumping capacity or modulate the pump rate provided that the modifications will not result in a reduction in the firm pumping capacity or discharge head or an increase in the peak pumping rate of the pumping station as originally designed;

f. Replacement, realignment of existing forcemain(s) including valves, gates, and associated appurtenances provided that the modifications will not reduce the flow capacity or increase the total dynamic head and transient in the forcemain.

2. Sewage Treatment Plant

1. Sewers and appurtenances

a. Replacement, realignment of existing sewers (including pipes and channels) or construction of new

sewers, including manholes, valves, gates, weirs and associated appurtenances within the a sewage treatment plant, provided that the modifications will not add new influent source(s) or result in an increase in flow from existing sources as originally approved and that the modifications will remove hydraulic bottlenecks or improve the conveyance of sewage into and through the Works.

2. Flow Distribution Chambers/Splitters

    a. Replacement or modification of existing flow distribution chamber/splitters or construction of new flow distribution chamber/splitters, including replacements or installation of sluice gates, weirs, valves for distribution of flows to the downstream process trains, provided that the modifications will not result in a change in flow distribution ratio to the downstream process trains as originally designed.

3. Imported Sewage Receiving Facility

    a. Replacement, relocation or installation of loading bays, connect/disconnect hook-up systems and unloading/transferring systems;

    b. Replacement, relocation or installation of screens, grit removal units and compactors;

    c. Replacement, relocation or installation of pumps, such as dosing pumps and transfer pumps, valves, piping and appurtenances;

    d. Replacement, relocation or installation of storage tanks/chambers and spill containment systems;

    e. Replacement, relocation or installation of flow measurement and sampling equipment;

    f. Changes to the source(s) or quantity from each source, provided that changes will not result in an increase in the total quantity and waste loading of each type of Imported Sewage already approved for co-treatment.

4. Preliminary Treatment System

    a. Replacement of existing screens and grit removal units with equipment of the same or higher process performance technology, including where necessary replacement or upgrading of existing screenings dewatering washing compactors, hydrocyclones, grit classifiers, grit pumps, air blowers conveyor system, disposal bins and other ancillary equipment to the screening and grit removal processes.

    b. Replacement or installation of channel aeration systems, including air blowers, air supply main, air headers, air laterals, air distribution grids and diffusers.

5. Primary Treatment System

    a. Replacement of existing sludge removal mechanism, including sludge chamber;

    b. Replacement or installation of scum removal mechanism, including scum chamber;

    c. Replacement or installation of primary sludge pumps, scum pumps, provided that:the modifications will not result in a reduction in the firm pumping capacity or discharge head that the primary sludge pump(s) and scum pump(s) are originally designed to handle.

6. Secondary Treatment System

    1. Biological Treatment

        a. Conversion of complete mix aeration tank to plug-flow multi-pass aeration tank, including modifications to internal structural configuration;

        b. Addition of inlet gates in multi-pass aeration tank for step-feed operation mode;

        c. Partitioning of an anoxic/flip zone in the inlet of the aeration tank, including installation of submersible mixer(s);

        d. Replacement of aeration system including air blowers, air supply main, air headers, air laterals, air distribution grids and diffusers, provided that the modifications will not result in a reduction in the firm capacity or discharge pressure that the blowers are originally designed to supply or in the net oxygen transferred to the wastewater required for biological treatment as originally required.

    2. Secondary Sedimentation

        a. Replacement of sludge removal mechanism, including sludge chamber;

        b. Replacement or installation of scum removal mechanism, including scum chamber;

        c. Replacement or installation of return activated sludge pump(s), waste activated sludge pump(s), scum pump(s), provided that the modifications will not result in a reduction in the firm pumping capacity or discharge head that the activated sludge pump(s) and scum pump(s) are originally designed to handle.

7. Post-Secondary Treatment System

    a. Replacement of filtration system with equipment of the same filtration technology, including feed pumps, backwash pumps, filter reject pumps, filtrate extract pumps, holding tanks associated with the pumping system, provided that the modifications will not result in a reduction in the capacity of the filtration system as originally designed.

8. Disinfection System

    1. UV Irradiation

        a. Replacement of UV irradiation system, provided that the modifications will not result in a reduction in the design capacity of the disinfection system or the radiation level as originally designed.

    2. Chlorination/Dechlorination and Ozonation Systems

        a. Extension and reconfiguration of contact tank to increase retention time for effective disinfection and reduce dead zones and minimize short-circuiting;

        b. Replacement or installation of chemical storage tanks, provided that the tanks are provided with effective spill containment.

9. Supplementary Treatment Systems

    1. Chemical systems

        a. Replacement, relocation or installation of chemical storage tanks for existing chemical systems only, provided that the tanks are sited with effective spill containment;

        b. Replacement or installation of chemical dosing pumps provided that the modifications will not result in a reduction in the firm capacity that the dosing pumps are originally designed to handle.

        c. Relocation and addition of chemical dosing point(s) including chemical feed pipes and valves and controls, to improve phosphorus removal efficiency;

        d. Use of an alternate chemical provided that it is a non-proprietary product and is a commonly used alternative to the chemical approved in the Works, provided that the chemical storage tanks, chemical dosing pumps, feed pipes and controls are also upgraded, as necessary..

10. Sludge Management System

    1. Sludge Holding and Thickening

        a. Replacement or installation of sludge holding tanks, sludge handling pumps, such as transfer pumps, feed pumps, recirculation pumps, provided that modifications will not result in reduction in the solids storage or handling capacities;

    2. Sludge Digestion

        a. Replacement or installation of digesters, sludge handling pumps, such as transfer pumps, feed pumps, recirculation pumps, provided that modifications will not result in reduction in the solids

storage or handling capacities;

b. replacement of sludge digester covers.

3. Sludge Dewatering and Disposal

a. Replacement of sludge dewatering equipment, sludge handling pumps, such as transfer pumps, feed pumps, cake pumps, loading pumps, provided that modifications will not result in reduction in solids storage or handling capacities.

4. Processed Organic Waste

a. Changes to the source(s) or quantity from each source, provided that changes will not result in an increase in the total quantity already approved for co-processing.

11. Standby Power System

1. Replacement or installation of standby power system, including feed from alternate power grid, emergency power generator, fuel supply and storage systems, provided that the existing standby power generation capacity is not reduced.

12. Pilot Study

1. Small side-stream pilot study for existing or new technologies, alternative treatment process or chemical, provided:

a. all effluent from the pilot system is hauled off-site for proper disposal or returned back to the sewage treatment plant for at a point no further than immediately downstream of the location from where the side-stream is drawn;

b. no proprietary treatment process or propriety chemical is involved in the pilot study;

c. the effluent from the pilot system returned to the sewage treatment plant does not significantly alter the composition/concentration of or add any new contaminant/inhibiting substances to the sewage to be treated in the downstream process;

d. the pilot study will not have any negative impacts on the operation of the sewage treatment plant or cause a deterioration of effluent quality;

e. the pilot study does not exceed a maximum of two years and a notification of completion shall be submitted to the District Manager within one month of completion of the pilot project.

13. Lagoons

a. installing baffles in lagoon provided that the operating capacity of the lagoon system is not reduced;

b. raise top elevation of lagoon berms to increase free-board;

c. replace or install interconnecting pipes and chambers between cells, provided that the process design operating sequence is not changed;

d. replace or install mechanical aerators, or replace mechanical aerators with diffused aeration system provided that the mixing and aeration capacity are not reduced;

e. removal of accumulated sludge and disposal to an approved location offsite.

3. Final Effluent Disposal Facilities

a. Replacement or realignment of the Final Effluent channel, sewer or forcemain, including manholes, valves and appurtenances from the end of the treatment train to the discharge outfall section, provided that the sewer conveys only effluent discharged from the Sewage Treatment Plant and that the replacement or re-aligned sewer has similar dimensions and performance criteria and is in the same or approximately the same location and that the hydraulic capacity will not be reduced.

This page contains an image of the form entitled "Notice of Modification to Sewage Works". A digital copy can be obtained from the District Manager.

Ontario

Ministry of the Environment, Conservation and Parks

Notice of Modification to Sewage Works

RETAIN COPY OF COMPLETED FORM AS PART OF THE ECA ON-SITE PRIOR TO THE SCHEDULED IMPLEMENTATION DATE.

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 Number	Issuance Date (mm/dd/yy)	Notice number (if applicable)

ECA Owner	Municipality

Part 2: Description of the modifications as part of the Limited Operational Flexibility

(Attach a detailed description of the sewage works)

Description shall include:
1. A detail description 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. Confirmation that the anticipated environmental effects are negligible.
3. List of updated versions of, or amendments to, all relevant technical documents that are affected by the modifications as applicable, i.e. submission of documentation is not required, but the listing of updated documents is (design brief, drawings, emergency 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

Signature	Date (mm/dd/yy)

Name of Employer

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)

Owner Representative's Signature	Date (mm/dd/yy)

Schedule F

Methodology for Calculating and Reporting Monthly Average Effluent Concentration, Annual Average Effluent Concentration and Monthly Geometric Mean Density

1. Monthly Average Effluent Concentration

Step 1: Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar month and proceed as follows depending on the result of the calculation:

a. If the arithmetic mean does not exceed the compliance limit for the contaminant, then report and use this arithmetic mean as the Monthly Average Effluent Concentration for this parameter where applicable in this Approval;

b. If the arithmetic mean exceeds the compliance limit for the contaminant and there was no Bypass Event during the calendar month, then report and use this arithmetic mean as the Monthly Average Effluent Concentration for this parameter where applicable in this Approval;

c. If the arithmetic mean exceeds the compliance limit for the contaminant and there was Bypass Event(s) during the calendar month, then proceed to Step 2;

d. If the arithmetic mean does not exceed the compliance limit for the contaminant and there was Bypass Event(s) during the calendar month, the Owner may still elect to proceed to Step 2 calculation of the flow-weighted arithmetic mean.

Step 2: Calculate the flow-weighted arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar month and proceed depending on the result of the calculation:

a. Group No Bypass Days (**NBPD**) data and Bypass Days (**BPD**) data during a calendar month separately;

b. Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured on all NBPD during a calendar month and record it as **Monthly Average NBPD Effluent Concentration**;

c. Obtain the "**Total Monthly NBPD Flow**" which is the total amount of Final Effluent discharged on all NBPD during the calendar month;

d. Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured on all BPD during a calendar month and record it as **Monthly Average BPD Effluent Concentration**;

e. Obtain the "**Total Monthly BPD Flow**" which is the total amount of Final Effluent discharged on all BPD during the calendar month;

f. Calculate the flow-weighted arithmetic mean using the following formula:

[(Monthly Average NBPD Effluent Concentration × Total Monthly NBPD Flow) + (Monthly Average BPD Effluent Concentration × Total Monthly BPD Flow)] ÷ (Total Monthly NBPD Flow + Total Monthly BPD Flow)

It should be noted that in this method, if there are no Bypass Event for the month, the calculated result would be the same as the non-flow-weighted arithmetic mean method;

g. Report and use the lesser of the flow-weighted arithmetic mean obtained in Step 2 and the arithmetic mean obtained in Step 1 as the Monthly Average Effluent Concentration for this parameter where applicable in this Approval.

2. Annual Average Effluent Concentration

Step 1: Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar year and proceed as follows depending on the result of the calculation:

a. If the arithmetic mean does not exceed the compliance limit for the contaminant, then report and use this arithmetic mean as the Annual Average Effluent Concentration for this parameter where applicable in this Approval;

b. If the arithmetic mean exceeds the compliance limit for the contaminant and there was no Bypass Event during the calendar year, then report and use this arithmetic mean as the Annual Average Effluent Concentration for this parameter where applicable in this Approval;

c. If the arithmetic mean exceeds the compliance limit for the contaminant and there was Bypass Event(s) during the calendar year, then proceed to Step 2;

d. If the arithmetic mean does not exceed the compliance limit for the contaminant and there was Bypass Event(s) during the calendar year, the Owner may still elect to proceed to Step 2 calculation of the flow-weighted arithmetic mean.

Step 2: Calculate the flow-weighted arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar year and proceed depending on the result of the calculation:

a. Group No Bypass Days (**NBPD**) data and Bypass Days (**BPD**) data during a calendar year separately;

b. Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured on all NBPD during a calendar year

and record it as **Annual Average NBPD Effluent Concentration**;

c. Obtain the "**Total Annual NBPD Flow**" which is the total amount of Final Effluent discharged on all NBPD during the calendar year;

d. Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured on all BPD during a calendar year and record it as **Annual Average BPD Effluent Concentration**;

e. Obtain the "**Total Annual BPD Flow**" which is the total amount of Final Effluent discharged on all BPD during the calendar year;

f. Calculate the flow-weighted arithmetic mean using the following formula:

[(Annual Average NBPD Effluent Concentration × Total Annual NBPD Flow) + (Annual Average BPD Effluent Concentration × Total Annual BPD Flow)] ÷ (Total Annual NBPD Flow + Total Annual BPD Flow)

It should be noted that in this method, if there are no Bypass Event for the calendar year, the calculated result would be the same as the non-flow-weighted arithmetic mean method;

g. Report and use the lesser of the flow-weighted arithmetic mean obtained in Step 2 and the arithmetic mean obtained in Step 1 as the Annual Average Effluent Concentration for this parameter where applicable in this Approval.

3. Monthly Geometric Mean Density

Geometric mean is defined as the n^{th} root of the product of n numbers. In the context of calculating Monthly Geometric Mean Density for *E. coli*, the following formula shall be used:

$$\sqrt[n]{x_1 x_2 x_3 \cdots x_n}$$

in which,

"n" is the number of samples collected during the calendar month; and

"x" is the value of each Single Sample Result.

For example, four weekly grab samples were collected and tested for *E. coli* during the calendar month. The *E. coli* densities in the Final Effluent were found below:

Sample Number	*E. coli* Densities* (CFU/100 mL)
1	10
2	100
3	300
4	50

The Geometric Mean Density for these data:

$$\sqrt[4]{10 \times 100 \times 300 \times 50} = 62$$

*If a particular result is zero (0), then a value of one (1) will be substituted into the calculation of the Monthly Geometric Mean Density. If the MPN method is utilized for E. coli analysis, values in the table shall be MPN/100 mL.

Schedule G

Municipal and Local Services Board Wastewater System
Profile Information Form

(For reference only, images of the form are attached on the next four pages. A digital copy can be obtained from the District Manger.)

Ontario

Ministry of the Environment, Conservation and Parks

Municipal and Local Services Board Wastewater System Profile Information Form

The information in this form is necessary to administer the Ministry's approvals, compliance and enforcement programs with respect to wastewater treatment and collection systems owned by municipalities and local services boards. These programs are authorized under the *Ontario Water Resources Act*, the *Environmental Protection Act*, the *Nutrient Management Act* and their respective regulations.

Email the completed form to: waterforms@ontario.ca
For any questions call 1-866-793-2588.

[A] SYSTEM PROFILE INFORMATION

Wastewater System Number *(if assigned)*

☐ New Profile
☐ Update Existing Profile

Name of System

Name of Municipality or Local Services Board

Level of Treatment (select one*)
☐ Primary
☐ Secondary
☐ Tertiary
☐ Secondary Equivalent
☐ Other (specify):
*See Terms and Concepts on page 4

Population Served	Population (Design)	Type of System
		☐ Treatment & Collection System ☐ Collection System Only

Design Rated Capacity (m^3/day)	Peak Flow Rate (m^3/day)	Current Environmental Compliance Approval (ECA) Number	Current ECA Issue Date (yyyy/mm/dd):

The treatment plant receives sewage from: (Check all that applies.* If you have checked more than one option below, indicate the approximate %)

☐ Sanitary Sewer ☐ Combined Sewer
☐ Nominally Separated Sewer ☐ Partially Separated Sewer
*See Terms and Concepts on page 4

[B] OWNER INFORMATION

Legal Name of Municipality or Local Services Board

Unit No	Street No.	Street Name.	Street Type (St, Rd, etc)	Street Direction (N,S,E,W)

PO Box	City/Town	Postal Code

☐ Dr ☐ Miss ☐ Mr ☐ Mrs ☐ Ms	Owner Contact First Name	Owner Contact Last Name	Owner Contact Job Title

Tel. No.	Fax Number	Email address
( ) - ext.	( ) -	

[C] OPERATING AUTHORITY ☐ Check if same as owner

Legal Name of Operator

Unit No	Street No.	Street Name.	Street Type (St, Rd, etc)	Street Direction (N,S,E,W)

PO Box	City/Town	Postal Code

☐ Dr ☐ Miss ☐ Mr ☐ Mrs ☐ Ms	Operator Contact First Name	Operator Contact Last Name	Operator Contact Job Title

Tel. No.	Fax Number	Email address
( ) - ext.	( ) -	

[D] 24/7 CONTACT

☐ Dr ☐ Miss ☒ Mr ☐ Mrs ☐ Ms	First Name	Last Name	Job Title

Tel. No. ( ) - ext.	Fax Number ( ) -	Email address

[E] SYSTEM CIVIC LOCATION ADDRESS (I.E. ADDRESS OF TREATMENT PLANT)

Unit No	Street No.	Street Name.	Street Type (St, Rd, etc)	Street Direction (N,S,E,W)

PO Box	City/Town	Postal Code

If the Wastewater System has no street address

Geographical Township	Lot	Concession

Geographical Referencing (if known, enter the Geographical Reference Information for this Wastewater System)

Map Datum	Geo-Referencing Method	Accuracy Estimate	Location Reference	
Latitude	**Longitude**	**Zone**	**Easting**	**Northing**

[F] TREATMENT PROCESS

Preliminary	Primary	Secondary	Secondary Equivalent	Post-Secondary	Additional Treatment
☐ Screening	☐ Settling/sedimentation/ clarification	☐ Conventional Activated Sludge (CAS)	☐ Aerated Lagoon	☐ Filtration	☐ Phosphorous Removal ☐ Biological ☐ Chemical
☐ Shredding/ grinding	☐ Scum Removal	☐ Extended Aeration	☐ Facultative Lagoon	☐ Clarification	If chemical is used, specify:
☐ Grit Removal	☐ Polymer Addition	☐ Membrane Bioreactor (MBR)	☐ Anaerobic Lagoon	☐ Intermittent Sand Filter (after lagoons)	☐ Nitrification
☐ Other(specify):	☐ Other(specify):	☐ Sequencing Batch Reactor (SBR)	☐ Aerobic Lagoon	☐ Polishing Wetlands	☐ Denitrification
		☐ Rotating Biological Contactor (RBC)	☐ Other(specify):	☐ Polishing Lagoons	☐ Other(specify):
		☐ Trickling Filter (TF)		☐ Other(specify):	
		☐ Biological Aerated Filter (BAF)			
		☐ Other(specify):			

[G] DISINFECTION

Method of Disinfection	Disinfection Period
☐ Chlorination If you chlorinate, do you practice de-chlorination? ☐ Yes ☐ No	☐ Continuous ☐ Seasonal
☐ Ultraviolet Irradiation	☐ Continuous ☐ Seasonal
☐ Other (specify):	☐ Continuous ☐ Seasonal

[H] SLUDGE	
Sludge Stabilization Process	Method of Sludge Disposal/Utilization
☐ Aerobic Digestion	☐ Agricultural
☐ Anaerobic Digestion	☐ Landfill
☐ Drying & Pelletization	☐ Incineration
☐ Lime Treatment	☐ Other (specify):
☐ Composting	
☐ Other (specify):	

Available Sludge Storage Capacity (m^3):

[I] EFFLUENT	
Effluent Disposal Method	Effluent Discharge Frequency
☐ Surface Water Receiving Water Body Name:	☐ Continuous ☐ Seasonal
☐ Subsurface	☐ Continuous ☐ Seasonal
☐ Other (specify):	☐ Continuous ☐ Seasonal

Is the effluent discharged in a vulnerable area identified in the local source protection assessment report approved under the Clean Water Act, 2006?
☐ Yes ☐ No

[J] INFLUENT

Does the plant receive sewage from another municipality or local services board either through an interconnected collection system or hauled sewage?
☐ Yes ☐ No
(if yes, name(s) of other municipality or local services board):

Plant receives:
☐ Leachate (approximate annual volume in m^3):
☐ Septage (approximate annual volume in m^3):
☐ Industrial input (approximate annual volume in m^3):
or (approximate volume in %):

Terms and Concepts

The following Terms and Concepts are provided to assist you when completing Wastewater System Profile Information Form.

In order to determine the level of treatment that applies to the wastewater system, the effluent quality objectives that the wastewater treatment plant was designed to meet must be considered. The process based approach often used in the past has led to confusion and is open to interpretation due to recent developments and practices in the wastewater treatment industry. For example, a plant with a high rate filter (often referred to as a tertiary filter) after its secondary treatment was considered a tertiary treatment in the past since the filter was designed and operated to produce a tertiary quality effluent. However, secondary plants are now being constructed with these filters as a safeguard against any potential secondary clarifier performance degradation and not for the purpose of ensuring tertiary treatment performance. Also, new technologies have evolved that can produce tertiary quality effluent without having these high rate filters (e.g., membrane bioreactors). Lagoons were considered in the past as being capable of providing only secondary equivalent treatment. However, with add-on treatment after the lagoons (e.g. intermittent sand filters), many lagoon treatment systems are capable of producing secondary or tertiary quality effluent.

During the establishment of sewage works, site-specific effluent limits (including averaging periods) are provided by the Ministry's Regional Technical Support Section, considering the assimilative capacity of the receivers and the minimum treatment requirements provided in Procedure F-5-1. The designer of the sewage works then selects objective values that are acceptable to the Ministry and are less (i.e. more stringent) than the effluent limits , in order to provide an adequate safety factor based on the designer's confidence/experience with the technology chosen and other site-specific conditions. The sewage works are then designed (and operated) to meet these design objectives in a reliable and consistent manner. Therefore, the values that are to be used in the determination of the level of treatment that applies to the sewage works must be based on the design objectives, and not the effluent limits.

Two common parameters used in almost all sewage works designs and performance evaluations are $CBOD_5$ (carbonaceous biochemical oxygen demand) (BOD_5 – biochemical oxygen demand - for primary sewage works) and total suspended solids (TSS). Therefore, it is logical that the **objective values** of these two parameters are used to determine the level of treatment at the sewage works.

Level of Treatment:

Primary:
Wastewater treatment plants that have only settling/sedimentation (with or without chemical addition) and providing 30% and 50% or better reduction of BOD_5 and TSS respectively are considered primary plants (MOE Procedures F-5-1 and F-5-5).

Secondary:
Wastewater treatment plants that have biological processes (e.g. activated sludge process and its variations, fixed film processes) or physical-chemical processes producing an effluent quality of $CBOD_5$ and TSS of 15 mg/L or better are considered secondary plants (MOE Design Guidelines for Sewage Works, 2008).

Secondary Equivalent:
Wastewater treatment plants producing an effluent quality of $CBOD_5$ of 25 mg/L and TSS of 30 mg/L or better are considered as secondary equivalent plants.

Note: Wastewater treatment plants that provide only primary settling of solids and the addition of chemicals to improve the removal of TSS (and phosphorus) are not considered as secondary treatment plants or secondary equivalent plants (MOE Design Guidelines for Sewage Works, 2008).

Tertiary:
Wastewater treatment plants that have biological processes (e.g. activated sludge process and its variations, fixed film processes) and/or physical-chemical processes producing an effluent quality of $CBOD_5$ and TSS of 5 mg/L or better are considered tertiary plants.

Note: Biological processes such as nitrification, denitrification and enhanced biological phosphorus removal can be part of either a secondary or tertiary treatment plant. They may be described as secondary treatment plant with nitrification, secondary treatment plant with enhanced biological phosphorus removal, tertiary treatment plant with nitrification etc.

Sewer System Type:

Sanitary Sewers:
Pipes that convey sanitary sewage flows made up of wastewater discharges from residential, commercial, institutional and industrial establishments plus extraneous flow components from such sources as groundwater and surface run off.

Combined Sewers:
Pipes that convey both sanitary sewage and stormwater runoff through a single-pipe system.

Partially Separated Sewers:
Exist when either a portion of the combined sewer area was retrofitted to separate (sanitary and storm) sewers and/or a service area with combined sewers has had a new development area with separate sewers added to the service area; whatever the case may be, the final flows will be combined sewage.

Nominally Separated Sewers:
These sewers are constructed as separate sewers, but the sanitary sewers accept stormwater from roof and foundation drains (i.e., these are separated sewers in name only).

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). 8894-9QDPS7 issued on November 25, 2014.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

a. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 26th day of February, 2021

A. Ahmed

Aziz Ahmed, P.Eng.
Director
appointed for the purposes of Part II.1 of the

LW/

c: District Manager, DWECD, MECP Owen Sound
Andrew Garland, P.Eng., B.M. Ross & Associates Limited

APPENDIX B

Average Monthly Analytical Results

AVERAGE MONTHLY ANALYTICAL RESULTS

Bruce Energy Centre Lagoons

2022	INFLUENT FLOWS			RAW INFLUENT Monthly Average				FINAL EFFLUENT Monthly Average											
Month	Total Flow m3	Max Flow m3/day	Avg. Flows m3/Day	BOD5 mg/L	TSS mg/L	TKN mg/L	Total P mg/L	CBOD5 mg/L	TSS mg/L	TKN mg/L	Total P mg/L	Alkalinity CaCO3 mg/L	Nitrite NO2 mg/L	Nitrate NO3 mg/L	Ammonia+ Ammonium NH3+NH4 mg/L	E-Coli /100 mL (Geomean)	pH	Temper-ature C	Unionized Ammonia mg/L
January	21087	1028	680	119	121	18.0	3.91	5.0	4.0	5.9	0.14	214	0.03	2.42	5.7	2	8.15	2.8	0.082
February	18543	1024	662	114	75	10.6	1.98	2.0	2.5	8.1	0.21	237	0.03	1.60	8.0	2	8.10	5.0	0.123
March	18096	934	584	52	60	8.9	1.59	3.5	7.5	9.1	0.41	221	0.03	0.82	8.9	2	8.00	4.7	0.111
April	14073	738	469	45	48	11.4	1.53	6.0	16.0	5.4	0.27	173	0.13	0.83	4.8	2	8.75	11.0	0.412
May	22249	1397	718	66	61	13.4	2.88	7.0	15.0	2.0	0.21	155	0.22	0.63	1.0	2	8.40	19.8	0.066
June	18925	1150	631	90	67	38.0	4.55	5.0	9.0	1.4	0.16	146	0.03	0.10	0.4	2	8.15	21.1	0.042
July	10897	726	352	115	130	30.5	5.04	2.0	3.0	1.0	0.06	108	0.03	0.18	0.3	2	7.80	24.0	0.008
August	7778	680	251	96	126	33.2	5.92	2.0	4.0	0.8	0.05	113	0.03	0.51	0.2	2	7.30	24.1	0.003
September	16308	924	544	157	141	43.4	5.78	2.0	2.5	1.0	0.07	129	0.03	0.51	0.2	2	7.70	21.4	0.004
October	16403	1449	529	108	168	22.7	3.89	3.0	3.5	0.8	0.09	129	0.03	1.02	0.2	2	7.55	13.2	0.001
November	18025	870	601	79	78	13.5	2.54	2.7	3.7	2.9	0.19	142	0.18	3.08	1.6	2	8.03	9.2	0.029
December	23689	1749	764	76	49	10.0	2.02	2.0	3.5	5.9	0.18	159	0.12	3.98	5.7	2	7.90	4.2	0.053
Annual	206073	1749	565	93	94	21.1	3.47	3.5	6.2	3.7	0.17	160	0.07	1.31	3.1	2	7.99	13.3	0.932

refers to <

APPENDIX C

Septage Monitoring Results

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

29-July-2020

Mun of Kincardine (Bruce Energy Centre Lagoons)
Attn : Donna Hardman

155 Durham St.
Kincardine, ON
N2Z 1A4, Canada

Phone: 519-396-4660
Fax:

Date Rec. : 22 July 2020
LR Report: **CA12887-JUL20**

Copy: #1

CERTIFICATE OF ANALYSIS

Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	9: Bruce Power Wastewater
Sample Date & Time					20-Jul-20 11:45
Temperature Upon Receipt [°C]	---	---	---	---	12.0
Field pH [no unit]	---	---	---	---	7.74
Field Temperature [celcius]	---	---	---	---	24.3
Biochemical Oxygen Demand (BOD5) [mg/L]	22-Jul-20	17:28	27-Jul-20	14:42	196
Total Suspended Solids [mg/L]	23-Jul-20	10:46	24-Jul-20	08:51	800
Phosphorus (total) [mg/L]	24-Jul-20	08:16	29-Jul-20	10:48	24.6
Total Kjeldahl Nitrogen [as N mg/L]	24-Jul-20	08:16	28-Jul-20	15:53	202
Oil & Grease (total) [mg/L]	23-Jul-20	08:40	24-Jul-20	09:44	96

Patti Stark
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0002200721

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

15-March-2022

Mun of Kincardine (Bruce Energy Centre Lagoons)
Attn : Lisa Crimmings

155 Durham St.
Kincardine, ON
N2Z 1A4, Canada

Phone: 519-396-4660
Fax:

Date Rec. : 08 March 2022
LR Report: **CA13349-MAR22**

Copy: #1

CERTIFICATE OF ANALYSIS

Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	9: Bruce Power Wastewater
Sample Date & Time					06-Mar-22 08:30
Temperature Upon Receipt [°C]	---	---	---	---	8.0
Field pH [no unit]	---	---	---	---	8.0
Field Temperature [celcius]	---	---	---	---	10.8
Biochemical Oxygen Demand (BOD5) [mg/L]	09-Mar-22	17:10	14-Mar-22	15:42	54
Total Suspended Solids [mg/L]	08-Mar-22	18:18	10-Mar-22	14:09	46
Phosphorus (total) [mg/L]	08-Mar-22	18:19	09-Mar-22	12:28	2.90
Total Kjeldahl Nitrogen [as N mg/L]	08-Mar-22	21:00	09-Mar-22	12:07	30.1
Oil & Grease (total) [mg/L]	08-Mar-22	22:26	10-Mar-22	12:17	4

Note: No glass bottle was received for Oil & Grease analysis. A PET bottle was used for this analysis with the client's approval.

Hawley Anderson, Hon.B.Sc
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0002829883

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

12-April-2022

Mun of Kincardine (Bruce Energy Centre Lagoons)
Attn : Lisa Crimmings

155 Durham St.
Kincardine, ON
N2Z 1A4, Canada

Phone: 519-396-4660
Fax:

Date Rec. : 06 April 2022
LR Report: **CA12248-APR22**

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	9: Bruce Power Wastewater
Sample Date & Time					05-Apr-22 10:15
Temperature Upon Receipt [°C]	---	---	---	---	8.0
Field pH [no unit]	---	---	---	---	7.5
Field Temperature [celcius]	---	---	---	---	9.9
Biochemical Oxygen Demand (BOD5) [mg/L]	07-Apr-22	16:58	12-Apr-22	12:17	91
Total Suspended Solids [mg/L]	08-Apr-22	08:24	12-Apr-22	10:38	48
Phosphorus (total) [mg/L]	07-Apr-22	18:03	11-Apr-22	19:50	2.74
Total Kjeldahl Nitrogen [as N mg/L]	07-Apr-22	16:16	11-Apr-22	19:22	33.6
Oil & Grease (total) [mg/L]	07-Apr-22	13:18	11-Apr-22	10:50	10

Hawley Anderson, Hon.B.Sc
Project Specialist,
Environment, Health & Safety

OnLine LIMS

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APPENDIX D
Sampling Requirements

Wastewater Sampling Requirements

		Bi-weekly	Monthly	Quarterly	Semi-annual	Annual
Kincardine WWTP	Raw	**Grab Samples:** **3 - 500 mL chemical bottles** BOD5 Total Suspended Solids Total Phosphorous Total Kjeldahl Nitrogen Alkalinity				
	Final Effluent	**Grab Samples:** **5 - 500 mL chemical bottles** CBOD5 Total Suspended Solids Total Phosphorous Total Kjeldahl Nitrogen Total Ammonia Nitrogen as N Provincial Unionized Ammonia NO2/NO3 Alkalinity **1 - bacti bottle for:** E. coli **Field Tests:** pH Temperature			Chloride COD DOC Hardness Phenols ICP 24 metal scan US EPA 624 parameters VOC **Field Tests:** pH Conductivity Temperature	Acute Lethality Testing (WSER)
Bruce Energy Centre Lagoons	Raw	**24-hour composite samples:** **3 - 500 mL chemical bottles** BOD5 Total Suspended Solids Total Phosphorous Total Kjeldahl Nitrogen				
	Final Effluent	**Grab samples:** **4 - 500 mL chemical bottles** CBOD5 Total Suspended Solids Total Phosphorous Total Kjeldahl Nitrogen Total Ammonia Nitrogen NO2/NO3 Alkalinity **1 - bacti bottle for:** E. coli **Field Tests:** pH Temperature **Calculate:** Provincial Un-ionized Ammonia				
Valentine Ave. Landfill	Groundwater Collection System				**CRA Sampling As per GWCS C of A:** BOD5 Suspended Solids Total Phosphorous TKN Ammonia Heavy metals	
	Leachate Collection System			**As per LCS C of A:** BOD5 Total Phosphorous Suspended Solids NO2/NO3 Ammonia TKN VOCs COD DOC Alkalinity Chloride Hardness Phenols Metals **Field Tests:** pH Conductivity Temperature	**As per WWTP C of A:** BOD5 Chloride COD DOC Hardness Alkalinity NO2/NO3 TKN Ammonia ICP 24 metal scan US EPA 624 parameters VOC **Field Tests:** pH Conductivity Temperature	
Kincardine Waste Management Centre Leachate Treatment Facility	Influent		**Grab Samples:** **3 - 500 mL chemical bottles** BOD5 Total Suspended Solids Total Phosphorous Total Kjeldahl Nitrogen			
	Effluent	**Grab samples:** **4 - 500 mL chemical bottles** CBOD5 Total Suspended Solids Total Phosphorous Total Ammonia Nitrogen Nitrate Nitrogen **1 - bacti bottle for:** E. coli **Field Tests:** pH Temperature **Calculate:** Provincial Un-ionized Ammonia				**Spring sampling:** **Grab samples** BOD5 COD DOC Phenol VOCs Inorganics
	SW4 (Surface Water 4)	**Grab samples:** **1 - 500 mL chemical bottles** Nitrate Nitrogen				
Kincardine Waste Management Centre	Leachate Hauled to BEC	BOD5 Total Phosphorous Total Suspended Solids TKN Boron Zinc Iron Field Tests: pH Temperature				

Wastewater Sampling Requirements 2023

		Bi-weekly	Monthly	Quarterly	Semi-annual	Annual
Kincardine WWTP	Raw	**Grab Samples:** **3 - 500 mL chemical bottles** BOD5 Total Suspended Solids Total Phosphorous Total Kjeldahl Nitrogen Alkalinity				
	Final Effluent	**Grab Samples:** **5 - 500 mL chemical bottles** CBOD5 Total Suspended Solids Total Phosphorous Total Ammonia Nitrogen as N Total Kjeldahl Nitrogen NO2/NO3 Alkalinity Provincial Unionized Ammonia **1 - bacti bottle for:** E. coli **Field Tests:** pH Temperature			As per ECA Chloride COD DOC Hardness Phenols ICP 24 metal scan US EPA 624 parameters VOC **Field Tests:** pH Conductivity Temperature (April and October)	Acute Lethality Testing (WSER) November
Bruce Energy Centre Lagoons	Raw	**24-hour composite samples:** **3 - 500 mL chemical bottles** BOD5 Total Suspended Solids Total Phosphorous Total Kjeldahl Nitrogen				
	Final Effluent	**Grab samples:** **4 - 500 mL chemical bottles** CBOD5 Total Suspended Solids Total Phosphorous Total Kjeldahl Nitrogen Total Ammonia Nitrogen NO2/NO3 Alkalinity **1 - bacti bottle for:** E. coli **Field Tests:** pH Temperature **Calculate:** Provincial Un-ionized Ammonia				
	Septage	BOD5 Total Phosphorous Total Suspended Solids TKN Oil and Grease Field Tests: pH Temperature **(During Each event-Grab sample)**				
	Leachate Hauled to BEC	BOD5 Total Phosphorous Total Suspended Solids TKN Boron Zinc Iron Field Tests: pH Temperature **(Only as required if LTF is out of service)**				
Valentine Ave. Landfill	Groundwater Collection System				**Sampling As per GWCS C of A:** BOD5 Suspended Solids Total Phosphorous TKN Ammonia Heavy metals **(GHD Samples)**	
	Leachate Collection System			**As per LCS C of A:** BOD5 Total Phosphorous Suspended Solids NO2/NO3 Ammonia TKN VOCs COD DOC Alkalinity Chloride Hardness Phenols Metals **Field Tests:** pH Conductivity Temperature **(GHD samples May and November)**	**As per WWTP ECA:** Alkalinity BOD5 Chloride COD DOC Hardness NO2/NO3 TKN Ammonia ICP 24 metal scan US EPA 624 parameters VOC **Field Tests:** pH Conductivity Temperature (January and July-covers quarterly samples for this time frame too) **MOK Samples**	
Kincardine Waste Management Centre Leachate Treatment Facility	Influent		**Grab Samples:** **3 - 500 mL chemical bottles** BOD5 Total Suspended Solids Total Phosphorous Total Kjeldahl Nitrogen			
	Effluent (Clarifier Discharge)	**Grab samples:** **4 - 500 mL chemical bottles** CBOD5 Total Suspended Solids Total Phosphorous Total Ammonia Nitrogen Nitrate Nitrogen **1 - bacti bottle for:** E. coli **Field Tests:** pH Temperature **Calculate:** Provincial Un-ionized Ammonia				**Spring sampling:** **Grab samples** BOD5 COD DOC Phenol VOCs Inorganics (Table 6 of ECA) (Due April)
	SW4 (Surface Water 4)	Grab samples: 1-500mL chemical bottles Nitrate Nitrogen				

Revision 2023-01 November 30, 2022

APPENDIX E

Flow Summary

Bruce Energy Centre Lagoon System
Flow Summary
2022

Month		Influent Flow	Effluent Flow
January	Total (m3)	21,087	22,787
	Average (m3/d)	680	735
	Maximum (m3/d)	1,028	831
February	Total (m3)	18,543	28,404
	Average (m3/d)	662	1,014
	Maximum (m3/d)	1,024	1,730
March	Total (m3)	18,096	37,682
	Average (m3/d)	584	1,216
	Maximum (m3/d)	934	1,440
April	Total (m3)	14,073	29,426
	Average (m3/d)	469	981
	Maximum (m3/d)	738	1,217
May	Total (m3)	22,249	18,173
	Average (m3/d)	718	586
	Maximum (m3/d)	1,397	808
June	Total (m3)	18,925	14,590
	Average (m3/d)	631	486
	Maximum (m3/d)	1,150	726
July	Total (m3)	10,897	7,936
	Average (m3/d)	352	256
	Maximum (m3/d)	726	1,283
August	Total (m3)	7,778	12,201
	Average (m3/d)	251	394
	Maximum (m3/d)	680	1,591
September	Total (m3)	16,308	17,151
	Average (m3/d)	544	572
	Maximum (m3/d)	924	1,369
October	Total (m3)	16,403	22,216
	Average (m3/d)	529	717
	Maximum (m3/d)	1,449	1,779
November	Total (m3)	18,025	19,192
	Average (m3/d)	601	640
	Maximum (m3/d)	870	970
December	Total (m3)	23,689	25,299
	Average (m3/d)	764	816
	Maximum (m3/d)	1,749	1,061
2022	**Total (m3)**	**206,073**	**255,056**
	Average (m3/d)	**565**	**733**
	Maximum (m3/d)	**1,749**	**1,779**

APPENDIX F
Calibration Reports

IndusControl Inc
3170 Ridgeway Drive, Unit 11
Mississauga, ON, L5L 5R4

VERIFICATION REPORT - OCM III
OPEN CHANNEL MEASUREMENT

Customer Name:	Municipality of Kincardine	Site/Plant Address:	Bruce Energy Lagoon System
Plant Name:	Bruce Energy Centre		Tiverton , ON

Device Information	
Make:	Milltronics
Model:	OCM II
Order Code:	N/A
Serial No.:	120888
Tag:	BEC Lagoon-Effluent
Asset ID:	0000071766

Service Information	
Date:	June 7, 2022
Report No:	CO1337-2206-27
Job No:	CO1337-2206

Flow Details	
Unit:	L/S
Flow Range:	0 - 60 L/S
Current Output:	4-20 mA
4 mA Set Point	0
20 mA Set Point	60

Inst. Reading	AS FOUND	AS LEFT
TOTALIZER (m3)	918304	918308
FLOW (L/S)	7.01	6.90

Maintenance Checklist			Remarks
Visual Inspection:	☑ OK	☑ NOT OK	
Electrical Inspection:	☑ OK	☐ NOT OK	
Sensor Installation:	☑ OK	☐ NOT OK	
Transmitter Installation:	☑ OK	☐ NOT OK	

Instrument Test Information and Results

Input (%)	Calculated Flow (L/S)	Calculated O/P (mA)	UUT Display (L/S)	UUT Measured Output (mA)	Deviation (L/S)
0	0.00	4.00	0.00	4.00	0.00
25	15.00	8.00	14.30	7.93	0.70
50	30.00	12.00	29.70	11.95	0.30
75	45.00	16.00	44.90	15.97	0.10
100	60.00	20.00	59.00	19.93	1.00

Information of Tools used for Verification of the Instruments

Details	Tool/Kit 1	Tool/Kit 2	Tool/Kit 3
Device Description:	Multifunction process calibrator	Electrical Multimeter	N/A
Manufacturer:	Extech	Fluke	N/A
Model No:	PRC30	179	N/A

* Refer Calibration Tools Certificates submittal for more Information

Verification Test Result:	☑ Passed	☐ Fail	☐ Not Verified

Overall Remarks:	Very Old model obsolete. Need to be Replaced in near future. Limited Verification Performed

Service Technician :	Sanket Trada	Stamp/Signature	
Printed Date:	June 7, 2022		

End of Report

Version: 19-12

IndusControl Inc
3170 Ridgeway Drive, Unit 11
Mississauga, ON, L5L 5R4

VERIFICATION REPORT- PARSHALL FLUME
OPEN CHANNEL FLOW MEASUREMENT

Customer Name:	Municipality of Kincardine	Site/Plant Address:	Bruce energy Lagoon System
Plant Name:	Bruce Energy Centre		Tiverton, ON

Device Information	
Make:	Milltronics
Model:	Multiranger Plus
Order Code:	N/A
Serial No.:	1010680203-18
Tag:	Effluent Discharge-Commercial Alcohol
Job Location:	Lagoon

Service Information	
Date:	June 7, 2022
Report No:	CO1337-2206-28
Job No:	CO1337-2206

Flow Details	
Unit:	m3/day
Flow Range:	0-1600 m3/day
Current Output:	4-20 mA
4 mA Set Point	0 m3/day
20 mA Set Point	1600 m3/day

Inst. Reading	AS FOUND	AS LEFT
TOTALIZER (m3)	NA	NA
FLOW (m3/day)	0	0

Maintenance Checklist				Remarks
Visual Inspection:	☑	OK	☐ NOT OK	
Electrical Inspection:	☑	OK	☐ NOT OK	

Programming Parameter of Instrument

Parameter	Discription	Value	Parameter	Discription	Value
F0	Access Code	2.71828	P40	Parshall Flume	2.00
P1	Dimension Unit (cm)	2.000	P41	flow rate (per hr)	4.00
P2	Mode	5	P42	OCM exponent	1.55
P3	Empty Distance	67.00	P43	Flume dimension	20.3
P4	Span	14.80	P45	Maximum head	14.80
P5	near blanking	30	P46	Maximum flow rate	1600.00

Instrument Test Information and Results

Input (%)	Calculated Flow(m3/day)	Calculated Input (mA)	UUT Display (m3/day)	UUT Measured Output (mA)	Deviation (m3/day)
0	0.00	4.00	0.00	4.00	0.00
25	400.00	8.00	399.00	7.93	-1.00
50	800.00	12.00	798.00	11.91	-2.00
75	1200.00	16.00	1199.00	15.97	-1.00
100	1600.00	20.00	1599.00	19.95	-1.00

Information of Tools used for Verification of the Instruments

Device Description:	Manufacturer	Model
Electrical Multimeter	Fluke	179

* Refer Calibration Tools Certificates submittal for more Information

Verification Test Result:	☑ Passed	☐ Fail	☐ Not Verified

Overall Remarks:	Program parameters verified, Limited Verification Performed. Measurement works as per specificaiton

Service Technician :	Sanket Trada	Stamp/Signature	
Printed Date:	June 7, 2022		

End of Report

Version: 19-12

IndusControl Inc
3170 Ridgeway Drive, Unit 11
Mississauga, ON, L5L 5R4

VERIFICATION REPORT- **SINTRANS LUT 400** OPEN CHANNEL FLOW MEASUREMENT

Customer Name:	Municipality of Kincardine	Site/Plant Address	Bruce energy Lagoon System
Plant Name:	7Acres		Tiverton, ON

Device Information	
Make:	Siemens
Model:	SINTRANS LUT440
Order Code:	7ML50500CA111DA0
Serial No.:	PBD/K9200125

Service Information	
Date:	June 7, 2022
Report No:	CO1337-2206-29
Job No:	CO1337-2206

Inst. Reading	AS FOUND	AS LEFT
TOTALIZER (L)	157912.62	157914.22
FLOW (m3/day)	240.00	198.83

Flow Details	
Unit:	m3/day
Flow Range:	0-1688.2
Current Output:	4-20 mA
4 mA Set Point	0
20 mA Set Point	1688.2

Maintenance Checklist				Remarks
Visual Inspection:	☑	OK	☐ NOT OK	
Electrical Inspection:	☑	OK	☐ NOT OK	

Programming Parameter of Instrument

Parameter	Value	Parameter	Value
Sensor Mode	Flow	4 mA Set Point	0.00
Transducer	XRS-5	20 mA Set Point	1688.2
Unit	cm	Flowrate Unit	m3/day
Low Calibration Point	55.2 cm	Method of Flow calculation	Ratio Metric
High Calibration Point	33 cm	Low Flow Cutoff	0 cm
Sensor Offset	(-2) cm	Zero Head Offset	0.14 cm
Maximum Head	15.2 cm	Flow Exponent	0.00

Instrument Test Information and Results

Input (%)	Calculated Flow(m3/day)	Calculated Input (mA)	UUT Display (m3/day)	UUT Measured Output (mA)	Deviation (m3/day)
0	0.00	4.00	0.00	3.99	0.00
25	422.00	8.00	421.23	7.99	-0.77
50	844.00	12.00	841.79	12.00	-2.21
75	1266.00	16.00	1263.89	15.96	-2.11
100	1688.00	20.00	1687.03	19.99	-0.97

Information of Tools used for Verification of the Instruments

Device Description:	Manufacturer	Model
Electrical Multimeter	Fluke	179

* Refer Calibration Tools Certificates submittal for more Information

Verification Test Result:	☑ Passed	☐ Fail	☐ Not Verified
Overall Remarks:	Program parameters verified. Limited Verification Performed. Measurement works as per specification		

Service Technician :	Sanket Trada	Stamp/Signature	
Printed Date:	June 7, 2022		

End of Report

Version: 19-12

APPENDIX G
Bypasses, Overflows and Spills

Municipality of Kincardine
Quarterly Report of Wastewater Bypasses and Overflows
Bruce Energy Centre Lagoon System
2022

Date	Start Time	End Time	Location	Bypass/Overflow	Planned/Emergency	Reason	Duration (minutes)	Quantity (m3)	Estimated or Measured Volume	Treatment Processes Gone Through	Efforts Made to Maximize Flow through Treatment Process	Samples Collected	Grab or Composite	CBOD mg/L	TSS mg/L	TP mg/L	Total Ammonia N mg/L	pH	E. coli per 100 mL
February 14, 2022	0609	0753	BEC Lagoons	Bypass	Emergency	UV level sensor froze and shut down	104	275	estimated	all except UV	Put UV system back into service	Yes	Grab	3	2	0.19	7.9	8.1	<2