

**Chesley Wastewater Treatment Plant
13-028**

**2022 Operation and Maintenance
Annual Report
March 2023**



**Prepared for:
Municipality of Arran-Elderslie
PO Box 70, 1925 Bruce Road 10
Chesley, ON N0G 1L0**

**Prepared By:
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1.0 INTRODUCTION

The Chesley Wastewater System is comprised of a wastewater treatment plant and the four (4) pumping stations: Riverside Park, North End, Arena East and South End. The wastewater generated within Chesley is collected into the sewer system and pumped to the wastewater treatment plant, which is comprised of three (3) aerated lagoons, Parshall flume for flow monitoring and an alum dosing system for phosphorus removal. The treated effluent from the aerated lagoons is continuously discharged into the Saugeen River.

The Municipality of Arran-Elderslie retains GSS Engineering Consultants Ltd., to prepare the Annual Compliance Report for the Chesley Sewage Works, Refer to **Appendix A** for the Environmental Compliance Approval (ECA) #8610-B4 SPMR, Jan 10, 2019. The plant has a rated capacity of 2136 m³/d.

The annual report addresses the following requirements:

- Summary of all monitoring data and a comparison to the effluent limits.
- Summary of improvements and maintenance carried out.
- Summary of all by-pass, spill or abnormal discharge events.

The annual report also includes recommendations that the Municipality shall undertake in order to continue to meet the regulatory requirements.

During the reporting period of this Annual Report (January 1, 2021 to December 31, 2021), the Chesley Sewage Works was operated by the Municipality of Arran-Elderslie namely:

Scott McLeod, Public Works Manager and Backup Overall Responsible Operator	WWT II WWC II
Ben Overeem	WWT OIT WWC OIT
Trevor Sweiger	WWT I
Chris Legge, Water/Sewers Foreman, Operator in Charge & Backup Overall Responsible Operator	WWT I WWC I
Chase Mcewen	WWT OIT WWC OIT
Shane Ryall	WWT I WWC I
Rakesh Sharma, P. Eng., Overall Responsible Operator	WWC IV WWT IV

This report is prepared based on the information provided by the Municipality of Arran-Elderslie.

2.0 DESCRIPTION OF FACILITIES

2.1 Wastewater Treatment Plant

The wastewater treatment plant consists of three (3) aerated lagoons. Cell 1 has a volume of 34,430 m³, Cell 2 has a volume of 33,070 m³ and Cell 3 has a volume of 35,910 m³. All three (3) lagoons are equipped with a fine bubble diffused aeration system; however, the air flow into the lagoons is maximum for Cell 1 and minimum for Cell 3. The air is supplied by way of three (3) (2+1) positive displacement air blowers: two (2) new blowers each with a capacity of 368 L/sec and one standby blower with a capacity of 368 L/sec. The plant was provided with new aeration system by way of floating air laterals and fine bubble diffusers suspended from it, in 2018.

The incoming wastewater flow is measured by way of a Parshall flume, complete with an ultrasonic transducer and remote readout. Alum is added to the incoming wastewater for phosphorous removal. There are two (2) alum pumps – one (1) duty, one (1) standby. The alum pump injects the required flow-paced amount of alum into the wastewater at the Parshall Flume chamber.

2.2 Riverside Park Pumping Station

This pumping station is the main sewage pumping station and is located near the bridge on Bruce County Road #10 in Chesley. The facility consists of an aboveground building that houses a 65 kW standby power diesel generating set along with electrical controls. A new wet well pumping station was constructed and placed into service in 2010. The wet well was constructed by utilizing a 3.6 m diameter precast concrete pipe. The wet well has two (2) submersible sewage pumps in the wet well, each with a rated capacity of 61.1 L/sec., to pump the wastewater collected in the wet well to the sewage treatment plant. The wet well is equipped with an overflow into the North Saugeen River.

2.3 North End Pumping Station

The North End Pumping Station is located on the west side of 1st Avenue North in Chesley. The pumping station consists of a 2.4 m diameter wet well, completed with two (2) pumps, each with a capacity of 6.7 L/sec at 16.8 m TDH. The pumps are submersible raw sewage pumps.

The standby power has been provided by way of a 30 kW standby diesel generator, located in a control building next to the wet well.

2.4 Arena East Pumping Station

This pumping station is comprised of a wet well approximately 2.4 m in diameter and 6 m in depth, complete with benching, access ladder and intermediate platform. The wet well is provided with two (2) submersible sewage pumps, each rated at 10.35 L/sec at 18 m TDH. The wastewater enters the wet well by way of 200 mm diameter sewer pipe. The wet well is also provided with 200 mm diameter emergency flow pipe that discharges into an existing 900 mm diameter storm sewer which ultimately discharges into the north branch of the Saugeen River.

2.5 South End (Garner Street) Pumping Station

The South End Pumping Station is located on the north side of Garner Street and includes a wet well equipped with two (2) submersible sewage pumps, each capable of pumping 18.2 L/sec at 13.1 m TDH. Emergency standby power has been provided by way of a 100 kW standby diesel generator set, which is located in the control building next to the pumping station wet well.

3.0 SUMMARY OF WASTEWATER FLOWS

The plant operator recorded the incoming wastewater flow into the lagoon every day at approximately the same time. The 2022 total monthly flow, monthly average and maximum daily flow has been provided in **Table 1** and includes estimated 32,850 m³ leachate flow that entered lagoon #1 directly through a submerged inlet pipe. The maximum day flow occurred on March 23, 2022 and was 3,868 m³ indicating potential extraneous flows into the wastewater collection system.

The annual average daily raw flow was 1,259 m³/day as compared to design rated capacity of 2,136 m³/day and effluent flow was 1,334 m³/day. Therefore, the plant operated at approximately 62.5% of the design capacity.

The calibration of the flow meter was checked in April 2022. See **Appendix B**.

Meeting ECA requirements, an effluent flow meter was installed in August 2020. The total effluent monthly volume and average daily flow recordings from this meter have been summarized in **Table 1A**. Monthly average volume leaving the plant was 40,031 m³ with the average daily effluent flow being 1,334 m³/day.

The enclosed **Table 1B** provides a comparative summary of treatment plant capacity utilization since 2012. The table is self-explanatory.

3.1 Pump Hours

The 2022 pump hours for each of the four (4) pumping station have been provided in **Table 2**.

The pump running hours in 2022 are slightly higher for all pumping stations when compared with the 2021 data. This is as expected considering the 2021 average daily flow was 1,334 m³/day compared to the 1,224 m³/day in 2021.

TABLE 1
Summary of Raw Wastewater Flows - 2022
Chesley Sewage Works
Municipality of Arran-Elderslie

March, 2023

13-028

Month	Total Flow (m ³)	Average Daily Flow (m ³ /day)	Maximum Daily Flow (m ³ /day)	Max Day Occurred On
January	33,194	1106	1539	2 nd
February	41,520	1384	2463	24 th
March	70,344	2345	3868	23 rd
April	61,011	2034	2854	1 st
May	32,946	1098	1735	1 st
June	42,739	1425	2673	9 th
July	23,926	798	1147	29 th
August	28,490	950	1509	4 th
September	23,415	781	1685	29 th
October	38,410	1280	1769	23 rd
November	31,984	1066	2056	30 th
December	52,393	1746	2455	7 th
Total	480,372			
Average	40,031.0	1,334		
Maximum			3,868	

TABLE 1A

Summary of Effluent Wastewater Flows - 2022

Chesley Sewage Works

Municipality of Arran-Elderslie

March, 2023

13-028

Month	Total Flow (m³)	Average Daily Flow (m³/day)
January	26,105	842
February	37,046	1,323
March	70,641	2,279
April	58,565	1,952
May	31,288	1,009
June	39,195	1,307
July	24,060	776
August	26,753	863
September	27,029	901
October	35,982	1,161
November	36,769	1,226
December	45,540	1,469
Total	458,973	
Average	38,248	1,259

TABLE 1B
Comparative Summary of Flows to Lagoons - 2022
Chesley Sewage Works
Municipality of Arran-Elderslie

March, 2023

13-028

Year	Average Day (m ³ /day)		Capacity Utilization (%)		Maximum Daily Flow (m ³ /day)
2022	1,334		62.5%		3,868
2021	1,224		57.3%		2899
2020	1,184		55.4%		7313
2019	1306		61.1%		6546
2018	1182		55.3%		8520
Rated Capacity	2,136				
	Jan 1 to April 15	April 16 to Dec 31	Jan 1 to April 15	April 16 to Dec 31	
2017	2,142.0	1,055.0	92.8%	72.2%	5,818
2016	2,374.0	819.0	103.0%	56.1%	7,333
2015	1,270.9	1,032.0	52.4%	70.6%	3,798
2014	1,909.0	1,231.0	82.7%	84.3%	9,387
2013	2,024.0	1,320.0	87.7%	90.3%	7,924
2012	1,494.0	845.0	64.8%	57.9%	5,114
Rated Capacity	2,307.0	1,461.0			

Note: Effluent flow meter was installed in August 2020. Previously average effluent flow was estimated from the raw influent flow.

TABLE 2
Summary and Comparison of Pump Hours - 2022
Chesley Sewage Works
Municipality of Arran-Elderslie

March, 2023

13-028

Pumping Station	2022			2021			2020			2019		
	Pump #1	Pump #2	Total	Pump #1	Pump #2	Total	Pump #1	Pump #2	Total	Pump #1	Pump #2	Total
North End	685.4	818.3	1503.7	573.7	730.4	1304.1	589.6	679.5	1269.1	598.5	661	1259.5
Riverside Park	722.6	801.7	1,524.3	725.7	662.8	1,388.5	593.4	765.0	1,358.4	712.4	913.2	1625.6
Arena East	198.3	199.1	397.4	167.4	208.4	375.8	173.2	187.7	360.9	191.9	224.6	416.5
South End	289.9	204.6	494.5	283.1	162.7	445.8	238.4	172.8	411.2	251.6	213.3	464.9

Pumping Station	2018			2017			2016		
	Pump #1	Pump #2	Total	Pump #1	Pump #2	Total	Pump #1	Pump #2	Total
North End	446	547.5	993.5	533.7	584.2	1117.9	404	460.5	864.5
Riverside Park	706	757.6	1463.6	633	1100.6	1733.6	649.5	886.5	1536
Arena East	231.5	197.7	429.2	208.8	210.7	419.5	158.6	185.4	344
South End	246.3	205.2	451.5	330.5	228.4	558.9	316.9	189	505.9

4.0 SUMMARY OF EFFLUENT QUALITY MONITORING AND COMPLIANCE

Weekly composite samples of incoming wastewater and effluent samples were collected for analysis by SGS Laboratories in Lakefield and London, Ontario. **Table 3** provides a summary of effluent quality relating to CBOD₅, Total Suspended Solids (TSS), Total Phosphorus, Total Ammonia Nitrogen (TAN), TKN, pH and Hydrogen Sulphide.

ECA provides effluent objective and effluent limits for CBOD₅, Total Suspended Solids, and Total Phosphorous. A review of **Table 3** confirms that both effluent objectives and effluent limits were met for these parameters in 2022. Regarding Total Ammonia Nitrogen (TAN), effluent concentration exceeded in the months of June only. The monthly TAN loadings also exceeded the ECA limits. It may also be noted that the plant is not designed to provide nitrification of sewage. Ammonia reduction occurs by natural processes.

The ECA states that the effluent pH should be maintained at a range of 6.0 to 9.5, inclusive. The annual average as 7.57.

The annual average concentration for Sulphide parameter in the Chesley Wastewater Treatment Plant was 0.02 mg/L in 2022. This parameter is not being regulated by MECP at Chesley Plant.

Table 4 provides a summary of E. Coli results obtained through weekly monitoring of plant effluent. The data has been provided as the geometric mean for each month. The annual average geometric mean for E. Coli results was 152 cfu/100 ml. Highest E. Coli geometric mean of 570 occurred in February. The criteria of 200 cfu/100 ml was exceeded in the months of February and March. It may be noted that the plant does not have any disinfection treatment, therefore, plant operator is unable to exercise any control.

TABLE 3
Summary of Effluent Monitoring Data - 2022
Chesley Sewage Works
Municipality of Arran-Elderslie

March, 2023

13-028

Month	BOD ₅	CBOD ₅	Total Suspended Solids		Total Ammonia	Effluent Limits as per ECA Total Ammonia (mg/L)	Total Effluent Ammonia Nitrogen Loading (kg/day)	Total Ammonia Loading Criteria as per ECA (kg/day)	Estimated Unionized Ammonia (mg/L)	Estimated Unionized Ammonia Loading (kg/day)	TKN		Total Phosphorous		pH	Sulphide
	Raw	Effluent	Raw	Effluent	Effluent						Raw	Effluent	Raw	Effluent	Effluent	Effluent
	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)						(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Effluent Limits (mg/L)		25		25		2 to 14								0.8	6 to 9.5	
Effluent Objectives (mg/L)		20		20										0.7	6.5 to 8.5	
January	125	10	71	9	2.70	11	2.99	30.5	0.047	0.05	24.83	3.55	2.45	0.29	8.22	0.02
February	81	7	86	9	6.86	14	9.49	38.8	0.091	0.13	22.70	7.56	2.39	0.60	7.87	0.02
March	54	13	30	20	7.75	14	18.17	38.8	0.075	0.18	10.48	8.70	1.00	0.51	7.98	0.02
April	93	13	115	21	1.75	5	3.56	11.3	0.049	0.10	15.80	2.55	1.91	0.07	8.23	0.02
May	94	7	76	6	1.93	3	2.12	5.3	0.016	0.02	24.22	3.32	2.65	0.34	7.22	0.02
June	64	7	44	11	3.23	2	4.60	3.5	0.03	0.04	20.70	4.63	1.75	0.61	7.23	0.02
July	119	14	93	17	2.62	3	2.09	5.3	0.029	0.02	28.20	3.84	2.94	0.84	7.30	0.02
August	176	11	161	14	0.98	2	0.93	3.5	0.011	0.01	32.10	2.10	3.71	0.71	7.18	0.034
September	225	8	128	13	1.35	3	1.05	5.3	0.006	0.00	29.83	2.03	3.14	0.49	7.05	0.02
October	87	7	59	7	1.50	3	1.92	5.3	0.007	0.01	23.82	2.20	2.41	0.24	7.31	0.02
November	92	6	68	6	1.38	6	1.47	10.5	0.012	0.01	25.23	2.30	2.40	0.40	7.68	0.02
December	65	3	62	8	2.83	9	4.93	15.8	0.011	0.02	19.28	3.55	1.92	0.45	7.53	0.02
Annual Average	106	9	83	12	2.91		4.44		0.032	0.05	23.10	3.86	2.39	0.46	7.57	0.02
Compliance ?		Yes		Yes	No		Yes							Yes	Yes	

TABLE 4
Summary of Effluent E. Coli Monitoring Results - 2022
Chesley Sewage Works
Municipality of Arran-Elderslie

March, 2023

13-028

Month	E. Coli Geometric Mean (cfu/100ml)
Provincial Objective	200
January	144
February	570
March	496
April	18
May	16
June	11
July	56
August	69
September	197
October	87
November	50
December	114
Annual Average	152

5.0 SUMMARY OF 2021 OPERATION AND MAINTENANCE

Chesley Sewage Plant

January 3:

- Replaced tubing on raw sewage sampler, at the pumping station

February 4, 8, 19, 28:

- Changed oil on front gear box for blower #3
- Changed oil filter on diesel generator located at NE pumping station
- Changed oil filter on diesel generator located at NE pumping station
- Renovated dissolved oxygen probe by replacing membrane, o-ring and electrolyte

April 5:

- Calibrated Riverside Flow Meter as well as raw and effluent flow meters at sewage lagoons

July 5, 19, 25:

- Installed new pumps at Arena East Pumping Station
- Increased alum feed rate on pump #2 from 40% to 50%. Also increased alum feed rate on Pump #1 from 32% to 40%
- Received delivery of 18,150L of alum

August:

- Construction of new sanitary sewer and laterals on 3rd St. W. (between 4th Ave SW and 5th Ave SW)
- Construction of new sanitary sewer, laterals and manholes installed on 4th Ave SW (4th St. to 7th St SW)

September 22:

- Changed oil on Blower #1 and #3. Also replaced air filter gasket seal on Blower #1, #2, #3

November 15, 22:

- Inspected flat roof on blower room
- Changed oil in blower #2

6.0 SUMMARY OF COMPLAINTS RECEIVED

No complaints were received.

7.0 SEWAGE BYPASS/OVERFLOW

There was one (1) sewage bypass on June 7, 2022. Approximately 2.9 m³ of sewage overflowed to Saugeen River. Operator informed SAC, Heather Lovely of MECP, SVCA and Health Unit. The sewage sample was taken for lab analysis. The results were as follows:

BOD	30 ppm
TSS	141 ppm
Total Phosphorous	0.56 ppm
TKN	2.1 ppm
E. Coli	2000 count

8.0 MINISTRY OF THE ENVIRONMENT INSPECTION

MECP did not conduct an inspection of the Chesley Wastewater System in 2022.

9.0 LAND APPLICATION OF SLUDGE

No sludge was removed from Chesley lagoon in 2022.


10.0 RECOMMENDATIONS

The following recommendations are presented for continued compliance with ECA:

1. The air filters on the blower intake should be checked for dust accumulation twice a year and the filters should be replaced as required.
2. The plant operators are advised to continue to inform GSS Engineering Consultants Ltd. and MECP immediately when the ECA limits are exceeded.
3. Operators require 40 hours of training per year in accordance with Regulation 435/93. Records must be kept.
4. The revised contingency plan for sewage bypasses which was prepared by Oweson Water Services (A Division of WSP Inc.) in February 2010, should continue to be followed in the event of sewage bypasses. It is recommended that the capacity of the pumps at Riverside Park Sewage Pumping Station is checked before spring melt and early fall to ensure that pumps are reliable.
5. ECA requires the recording of leachate flow into Lagoon #1. Since no flow recording devices exists or can be installed cost effectively, operators are advised to undertake a few pumping tests at different liquid depths in the manhole and develop a calibration chart. Once the chart is developed, a dip stick can be used to estimate the leachate flow.

Respectfully submitted:

GSS Engineering Consultants Ltd.



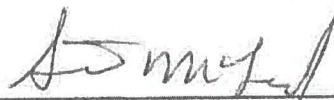
Rakesh Sharma, P. Eng., M.A.Sc.
Class IV License, WWC and WWT

Municipality of Arran-Elderslie



Chris Legge, Water & Sewer Foreman
Class I WWT & Class I WWC, Backup ORO

Municipality of Arran-Elderslie



Scott McLeod, Public Works Manager
Class II WWT & Class II WWC, Backup ORO

Appendix A

Environmental Compliance Approval

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL

 NUMBER 8610-B4SPMR
 Issue Date: January 10, 2019

The Corporation of the Municipality of Arran-Elderslie
 1925 Bruce County Road 10
 Post Office Box, No. 70
 Chesley, Ontario
 N0G 1L0

Site Location: Chesley Sewage Works
 230 4th Street Southwest
 Chesley, Bruce County, N0G 1L0

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:

replacement, alteration, usage and operation of existing municipal sewage works, for the treatment of sanitary sewage and disposal of effluent to the North Branch of the Saugeen River via a Sewage Treatment Plant (Chesley Sewage Works) continuous discharge lagoon and Final Effluent disposal facilities as follows:

Classification of Collection System: Partially Separated Sewer System

Classification of Sewage Treatment Plant: Secondary Equivalent

Design Capacity of Sewage Treatment Plant

Design Capacity with All Treatment Trains in Operation	Prior to Completion of Construction of All Proposed Works	Upon Completion of Construction of All Proposed Works
Rated Capacity	2,136 m ³ /d	2,136 m ³ /d

Influent

Receiving Location	Types
In Collection System	Sanitary Sewage
At Sewage Treatment Plant	Sanitary Sewage/ Leachate (from the closed Chesley Landfill)

Proposed Works:

Chesley Sewage Works

Secondary Equivalent Treatment System

- replacement of one (1) existing blower (standby) with one (1) new blower, rated at 368 L/s at 42 kPa;

Final Effluent Flow Measurement and Sampling Point

- flow measurement device and V-notch weir at the Cell 3 effluent structure;

Existing Works:

Chesley Sewage Works

Influent Sewers

- a 600 mm diameter inlet sewer from the Parshall flume to the influent chamber;
- a 100 mm diameter pipe conveying leachate by gravity from the closed Chesley Landfill discharging to Cell 1 near the southeast corner;

Influent Flow Measurement and Sampling Point

- flow measurement device at the Parshall flume;
- automatic composite sampler at the Parshall flume chamber;
- influent chamber including sluice gates to direct flow to Cell 1 of the aerated waste stabilization pond under normal conditions, and to other cells under other emergency and maintenance situations;

Secondary Equivalent Treatment System

- a continuous discharge, aerated waste stabilization pond with three (3) cells operated in series, with the approximate operating volumes in Cell 1 of 34,430 m³, Cell 2 of 33,070 m³, and Cell of 35,910 m³ and a total water surface area of approximately 7 hectares, equipped with a fine bubble aeration system consisting of seven (7) laterals in Cell 1, three (3) laterals in Cell 2, and one (1) lateral in Cell 3, with a total of one-hundred (100) diffuser assemblies in Cell 1, fifteen (15) diffuser assemblies in Cell 2, and three (3) diffuser assemblies in Cell 3, each diffuser assembly comprising two (2) diffuser tubes with lengths of 1219 mm at a spacing of approximately 500 mm, suspended close to the bottom of the cell;
- raw sewage discharge from the influent chamber to the east end of Cell 1;
- interconnecting structure no. 1 at the west end of Cell 1 for transfer of sewage to Cell 2 for continuation of treatment;
- outlet structure no. 2 at the east end of Cell 2 connecting to a 450 mm diameter sewer to the influent discharge structure at the east end of Cell 3 for effluent storage and polishing;
- three (3) blowers, with two (2) duty blowers, rated at 368 L/s at 42 kPa, and one (1) standby blower rated at 110 L/s at 48 kPa (to be replaced);

Supplementary Treatment System

- Phosphorus Removal
 - one (1) 22,500 L chemical storage tank;
 - two (2) chemical feed pumps (one standby), each rated at 30 L/h feeding chemical to the Parshall flume channel;

Final Effluent Flow Measurement and Sampling Point

- automatic composite sampler at Effluent Structure 3 at the Cell 3 outlet to the North Branch of the Saugeen River;

Final Effluent Disposal Facilities

- effluent structures including sluice gates and weirs at the west end of Cell 3 and a 450 mm diameter effluent outfall pipe to the North Branch of the Saugeen River;

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 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 year, calculated and reported as per the methodology specified in Schedule F;
2. "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;
3. "Approval" means this environmental compliance approval and any schedules attached to it, and the application;
4. "BOD5" (also known as TBOD5) means five day biochemical oxygen demand measured in an unfiltered sample and includes carbonaceous and nitrogenous oxygen demands;
5. "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;
6. "CBOD5" means five day carbonaceous (nitrification inhibited) biochemical oxygen demand measured in an unfiltered sample;
7. "Combined Sewers" means pipes that collect and convey both wastewater from residential, commercial, institutional and industrial buildings and facilities (including infiltration and inflow) and stormwater runoff through a single-pipe system;
8. "Combined Sewer Overflow" (CSO) means a discharge to the environment from a Combined Sewer System that usually occurs as a result of a precipitation event when the capacity of the Combined Sewer is exceeded. An intervening time of twelve hours or greater separating a CSO from the last prior CSO at the same location is considered to separate one overflow event from another;
9. "Combined Sewer Systems" means collection systems that contains Combined Sewers and includes Combined Sewer Overflow structures if any, and also includes Partially Separated Sewer Systems in which roof leaders or foundation drains still contribute stormwater inflow to the sewer system conveying sanitary flows;

10. "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;
11. "District Manager" means the District Manager of the appropriate local district office of the Ministry where the Works is geographically located;
12. "*E. coli* " refers to the thermally tolerant forms of Escherichia that can survive at 44.5 degrees Celsius;
13. "EPA" means the *Environmental Protection Act* , R.S.O. 1990, c.E.19, as amended;
14. "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;
15. "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;
16. "Existing Works" means those portions of the Works included in the Approval that have been constructed previously;
17. "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);
18. "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;
19. "Influent" means flows to the Sewage Treatment Plant from the collection system and Imported Sewage but excluding process return flows;
20. "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;
21. "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;
22. "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;

23. "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;
24. "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;
25. "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;
26. "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;
27. "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;
28. "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;
29. "Owner" means The Corporation of the Municipality of Arran-Elderslie and its successors and assignees;
30. "OWRA" means the *Ontario Water Resources Act* , R.S.O. 1990, c. O.40, as amended;
31. "Partially Separated Sewer Systems" means wastewater collection systems that originally had Combined Sewers and where either only a portion of a system was retrofitted to separate sewers, or in which roof leaders or foundation drains still contribute stormwater inflow to the separated sewer conveying sanitary sewage, and/or a new development area served by separate sewers was added to an area served by Combined Sewers;
32. "Processed Organic Waste" means organic waste within the meaning of R.R.O. 1990, Regulation 347: General – Waste Management, as amended, that is hauled to the Sewage Treatment Plant of the types and quantities approved for co-processing in the sludge management system;
33. "Professional Engineer" means a person entitled to practice as a Professional Engineer in the Province of Ontario under a licence issued under the Professional Engineers Act;
34. "Proposed Works" means those portions of the Works included in the Approval that are under construction or to be constructed;
35. "Rated Capacity" means the Annual Average Daily Influent Flow for which the Sewage Treatment Plant is designed to handle;

36. "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;
37. "Secondary Treatment System" means all facilities in the Sewage Treatment Plant associated with biological treatment, secondary sedimentation and phosphorus removal unit processes;
38. "Sewage Treatment Plant" means all the facilities related to sewage treatment within the sewage treatment plant site excluding the Final Effluent disposal facilities;
39. "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;
40. "Works" means the approved sewage works, and includes Proposed Works, Existing Works and modifications made under Limited Operational Flexibility. "Annual 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 year, calculated and reported as per the methodology specified in Schedule F;

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, except for *E. coli*, toxicity to Rainbow Trout and *Daphnia magna*, total residual chlorine / bisulphite residual, dissolved oxygen, pH, temperature and unionized ammonia, following the same protocol specified in the Monitoring and Recording condition as for the regular samples. The sample(s) shall be in addition to the regular Final Effluent samples required under the monitoring and recording condition, except when the Event occurs on a scheduled monitoring day.
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, and total ammonia nitrogen, 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.

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 maintain the operations manual for the 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 follow-up 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. 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.
 - c. definitions and preparation requirements for each sample type are included in document referenced in Paragraph 3.b.
 - d. definitions for frequency:
 - i. Weekly means once every week;
 - ii. Monthly means once every month; and,
 - iii. Quarterly means once every three months.

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, by means of the specified sample type and analyzed for each parameter listed in the tables under the monitoring program included in Schedule D, except for *E. coli*, toxicity to Rainbow Trout and *Daphnia magna*, total residual chlorine / bisulphite residual, dissolved oxygen, pH, temperature and unionized ammonia.
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:
 - a. Influent flow to the Sewage Treatment Plant by continuous flow measuring devices and instrumentations calibrated to an accuracy within plus or minus 15 per cent (+/- 15%) of the actual flowrate;
 - b. Final Effluent discharged from the Sewage Treatment Plant by continuous flow measuring devices and instrumentations calibrated to an accuracy within plus or minus 15 per cent (+/- 15%) of the actual flowrate; and,
 - c. Leachate flow to the Sewage Treatment Plant from the closed Chesley Landfill by flow measuring devices or estimation.
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 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 involves 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 involves addition of or change in technology of a treatment process or that may involve reassessment of the treatment train process design;
 - d. Modifications that requires 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 and leachate inflow 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 any deviation from the monitoring schedule and reasons for the current reporting year and a schedule for the next reporting year;
 - d. a summary of all operating issues encountered and corrective actions taken;
 - e. 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;
 - f. a summary of any effluent quality assurance or control measures undertaken;
 - g. a summary of the calibration and maintenance carried out on all Influent monitoring equipment to ensure that the accuracy is within the tolerance of that equipment as required in this Approval or recommended by the manufacturer;
 - h. 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;
 - i. an estimate of the sludge volumes in the lagoon cells. Sludge volume is to be measured every five (5) years, but may be estimated in the interim years. A summary of disposal locations and volumes of sludge disposed of must also be provided if sludge was disposed of during the reporting period;
 - j. a summary of any complaints received and any steps taken to address the complaints;
 - k. 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;

- l. 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.
- m. 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.
- n. 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.

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/record drawings 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 that prior to the commencement of construction of the portion of the Works that are approved in principle only, the Director will have the opportunity to review detailed design drawings, specifications and an engineer's report containing detailed design calculations for that portion of the Works, to determine capability to comply with the Ministry's requirements stipulated in the terms and conditions of the Approval, 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 Scott McLeod, Manager of Public Works of the Corporation of the Municipality of Arran-Elderslie received on November 16, 2017 for the proposed upgrade of the Chesley Wastewater Treatment Plant, including design report, final plans and specifications.

Schedule B
Final Effluent Design Objectives

Concentration Objectives

Final Effluent Parameter	Averaging Calculator	Objective (milligrams per litre unless otherwise indicated)
CBOD5	Annual Average Effluent Concentration	20.0 mg/L
Total Suspended Solids	Annual Average Effluent Concentration	20.0 mg/L
Total Phosphorus	Annual Average Effluent Concentration	0.7 mg/L
pH	Single Sample Result	6.5 - 8.5 inclusive

Schedule C

Final Effluent Compliance Limits

Concentration Limits

Final Effluent Parameter	Averaging Calculator	Limit (maximum unless otherwise indicated)
CBOD5	Annual Average Effluent Concentration	25.0 mg/L
Total Suspended Solids	Annual Average Effluent Concentration	25.0 mg/L
Total Phosphorus	Annual Average Effluent Concentration	0.80 mg/L
Total Ammonia Nitrogen	Monthly Average Effluent Concentration	Jan. - 11.0 mg/L Feb. - 14.0 mg/L Mar. - 14.0 mg/L Apr. - 5.0 mg/L May - 3.0 mg/L Jun. - 2.0 mg/L Jul. - 3.0 mg/L Aug. - 2.0 mg/L Sep. - 3.0 mg/L Oct. - 3.0 mg/L Nov. - 6.0 mg/L Dec. - 9.0 mg/L
pH	Single Sample Result	between 6.0 - 9.5 inclusive

Loading Limits

Final Effluent Parameter	Averaging Calculator	Limit (maximum unless otherwise indicated)
Total Ammonia Nitrogen	Monthly Average Daily Effluent Loading	Jan. - 30.5 kg/d Feb. - 38.8 kg/d Mar. - 38.8 kg/d Apr. - 11.3 kg/d May - 5.3 kg/d Jun. - 3.5 kg/d Jul. - 5.3 kg/d Aug. - 3.5 kg/d Sep. - 5.3 kg/d Oct. - 5.3 kg/d Nov. - 10.5 kg/d Dec. - 15.8 kg/d

Schedule D

Monitoring Program

Influent - Influent sampling point

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

Leachate - Leachate Discharge Pipe from the Closed Chesley Landfill

Parameters	Sample Type	Minimum Frequency
BOD5	Grab	Monthly
Total Suspended Solids	Grab	Monthly
Total Phosphorus	Grab	Monthly
Total Kjeldahl Nitrogen	Grab	Monthly

Final Effluent - Final Effluent sampling point

Parameters	Sample Type	Minimum Frequency
CBOD5	24 hour composite	Weekly
Total Suspended Solids	24 hour composite	Weekly
Total Phosphorus	24 hour composite	Weekly
Total Ammonia Nitrogen	24 hour composite	Weekly
Total Kjeldahl Nitrogen	24 hour composite	Weekly
Nitrate as Nitrogen	24 hour composite	Weekly
Nitrite as Nitrogen	24 hour composite	Weekly
Hydrogen Sulphide	Grab	Weekly
<i>E. coli</i>	Grab	Weekly
pH*	Grab	Weekly
Temperature*	Grab	Weekly
Un-ionized Ammonia**	As Calculated	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.

Leachate Related - Final Effluent sampling point

Parameters	Sample Type	Minimum Frequency
Boron	Grab	Quarterly
Cobalt	Grab	Quarterly
Magnesium	Grab	Quarterly
Manganese	Grab	Quarterly
Potassium	Grab	Quarterly
Strontium	Grab	Quarterly
Bis (2-ethylhexyl) Phthalate	Grab	Quarterly

Schedule E

Limited Operational Flexibility

Protocol for Pre-Authorized Modification 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) 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

a. Sewers and appurtenances

1. 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.

b. Flow Distribution Chambers/Splitters

1. 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.

c. Imported Sewage Receiving Facility

1. Replacement, relocation or installation of loading bays, connect/disconnect hook-up systems and unloading/transferring systems;
2. Replacement, relocation or installation of screens, grit removal units and compactors;
3. Replacement, relocation or installation of pumps, such as dosing pumps and transfer pumps, valves, piping and appurtenances;
4. Replacement, relocation or installation of storage tanks/chambers and spill containment systems;
5. Replacement, relocation or installation of flow measurement and sampling equipment;
6. 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.

d. Preliminary Treatment System

1. 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.

2. Replacement or installation of channel aeration systems, including air blowers, air supply main, air headers, air laterals, air distribution grids and diffusers.
- e. Primary Treatment System
1. Replacement of existing sludge removal mechanism, including sludge chamber;
 2. Replacement or installation of scum removal mechanism, including scum chamber;
 3. 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.
- f. 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.

g. Post-secondary Treatment System

1. 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.

h. 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.

i. 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.

j. 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.

k. 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.

l. 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.

m. Lagoons

- 1. installing baffles in lagoon provided that the operating capacity of the lagoon system is not reduced;
- 2. raise top elevation of lagoon berms to increase free-board;
- 3. replace or install interconnecting pipes and chambers between cells, provided that the process design operating sequence is not changed;
- 4. replace or install mechanical aerators, or replace mechanical aerators with diffused aeration system provided that the mixing and aeration capacity are not reduced;
- 5. removal of accumulated sludge and disposal to an approved location offsite.

3. Final Effluent Disposal Facilities

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.



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		
<i>(Insert the ECA's owner, number and issuance date and notice number, which should start with "01" and consecutive numbers thereafter)</i>		
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
<i>(Attach a detailed description of the sewage works)</i>
<p>Description shall include:</p> <ol style="list-style-type: none"> 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	
<p>I hereby declare that I have verified the scope and technical aspects of this modification and confirm that the design:</p> <ol style="list-style-type: none"> 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. <p>I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate</p>	
Name (Print)	PEO License Number
Signature	Date (mm/dd/yy)
Name of Employer	

Part 4 – Declaration by Owner	
<p>I hereby declare that:</p> <ol style="list-style-type: none"> 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 <i>Environmental Assessment Act</i>. <p>I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate</p>	
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:

$$\frac{[(\text{Monthly Average NBPD Effluent Concentration} \times \text{Total Monthly NBPD Flow}) + (\text{Monthly Average BPD Effluent Concentration} \times \text{Total Monthly BPD Flow})]}{(\text{Total Monthly NBPD Flow} + \text{Total Monthly BPD Flow})}$$

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:

$$\frac{[(\text{Annual Average NBPD Effluent Concentration} \times \text{Total Monthly NBPD Flow}) + (\text{Monthly Average BPD Effluent Concentration} \times \text{Total Annual BPD Flow})]}{(\text{Total Annual NBPD Flow} + \text{Total Annual BPD Flow})}$$

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	<i>E.coli</i> 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.)



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 1-888-793-2588.

[A] SYSTEM PROFILE INFORMATION

Wastewater System Number (if assigned)		<input type="checkbox"/> New Profile <input type="checkbox"/> Update Existing Profile	
Name of System		Level of Treatment (select one*)	
Name of Municipality or Local Services Board		<input type="checkbox"/> Primary <input type="checkbox"/> Secondary <input type="checkbox"/> Tertiary <input type="checkbox"/> Secondary Equivalent <input type="checkbox"/> Other (specify): <i>*See Terms and Concepts on page 4</i>	
Population Served	Population (Design)	Type of System	
		<input type="checkbox"/> Treatment & Collection System <input type="checkbox"/> 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 %)			
<input type="checkbox"/> Sanitary Sewer		<input type="checkbox"/> Combined Sewer	
<input type="checkbox"/> Nominally Separated Sewer		<input type="checkbox"/> Partially Separated Sewer	
<i>*See Terms and Concepts on page 4</i>			

[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	
<input type="checkbox"/> Dr <input type="checkbox"/> Miss <input type="checkbox"/> Mr <input type="checkbox"/> Mrs <input type="checkbox"/> Ms	Owner Contact First Name	Owner Contact Last Name	Owner Contact Job Title	
Tel. No. () - ext.	Fax Number () -	Email address		

[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	
<input type="checkbox"/> Dr <input type="checkbox"/> Miss <input type="checkbox"/> Mr <input type="checkbox"/> Mrs <input type="checkbox"/> Ms	Operator Contact First Name	Operator Contact Last Name	Operator Contact Job Title	
Tel. No. () - ext.	Fax Number () -	Email address		

[D] 24/7 CONTACT

<input type="checkbox"/> Dr <input checked="" type="checkbox"/> Mr <input type="checkbox"/> Ms	<input type="checkbox"/> Miss <input type="checkbox"/> Mrs	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
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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
<input type="checkbox"/> Screening <input type="checkbox"/> Shredding/ grinding <input type="checkbox"/> Grit Removal <input type="checkbox"/> Other(specify):	<input type="checkbox"/> Settling/sedimentation/ clarification <input type="checkbox"/> Scum Removal <input type="checkbox"/> Polymer Addition <input type="checkbox"/> Other(specify):	<input type="checkbox"/> Conventional Activated Sludge (CAS) <input type="checkbox"/> Extended Aeration <input type="checkbox"/> Membrane Bioreactor (MBR) <input type="checkbox"/> Sequencing Batch Reactor (SBR) <input type="checkbox"/> Rotating Biological Contactor (RBC) <input type="checkbox"/> Trickling Filter (TF) <input type="checkbox"/> Biological Aerated Filter (BAF) <input type="checkbox"/> Other(specify):	<input type="checkbox"/> Aerated Lagoon <input type="checkbox"/> Facultative Lagoon <input type="checkbox"/> Anaerobic Lagoon <input type="checkbox"/> Aerobic Lagoon <input type="checkbox"/> Other(specify):	<input type="checkbox"/> Filtration <input type="checkbox"/> Clarification <input type="checkbox"/> Intermittent Sand Filter (after lagoons) <input type="checkbox"/> Polishing Wetlands <input type="checkbox"/> Polishing Lagoons <input type="checkbox"/> Other(specify):	<input type="checkbox"/> Phosphorous Removal <input type="checkbox"/> Biological <input type="checkbox"/> Chemical If chemical is used, specify: <input type="checkbox"/> Nitrification <input type="checkbox"/> Denitrification <input type="checkbox"/> Other(specify):

[G] DISINFECTION

Method of Disinfection	Disinfection Period
<input type="checkbox"/> Chlorination If you chlorinate, do you practice de-chlorination? <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Continuous <input type="checkbox"/> Seasonal
<input type="checkbox"/> Ultraviolet Irradiation	<input type="checkbox"/> Continuous <input type="checkbox"/> Seasonal
<input type="checkbox"/> Other (specify):	<input type="checkbox"/> Continuous <input type="checkbox"/> Seasonal

[H] SLUDGE

Sludge Stabilization Process	Method of Sludge Disposal/Utilization
<input type="checkbox"/> Aerobic Digestion	<input type="checkbox"/> Agricultural
<input type="checkbox"/> Anaerobic Digestion	<input type="checkbox"/> Landfill
<input type="checkbox"/> Drying & Pelletization	<input type="checkbox"/> Incineration
<input type="checkbox"/> Lime Treatment	<input type="checkbox"/> Other (specify):
<input type="checkbox"/> Composting	
<input type="checkbox"/> Other (specify):	

Available Sludge Storage Capacity (m³):

[I] EFFLUENT

Effluent Disposal Method	Effluent Discharge Frequency
<input type="checkbox"/> Surface Water Receiving Water Body Name:	<input type="checkbox"/> Continuous <input type="checkbox"/> Seasonal
<input type="checkbox"/> Subsurface	<input type="checkbox"/> Continuous <input type="checkbox"/> Seasonal
<input type="checkbox"/> Other (specify):	<input type="checkbox"/> Continuous <input type="checkbox"/> 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 m³):
- Septage (approximate annual volume in m³):
- Industrial input (approximate annual volume in m³):
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 CBOD₅ (carbonaceous biochemical oxygen demand) (BOD₅ – 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 BOD₅ 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 CBOD₅ 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 CBOD₅ 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 CBOD₅ 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).
4717-AAFL4A issued on October 31, 2016**

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

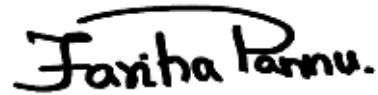
AND

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 10th day of January, 2019



Fariha Pannu, P.Eng.

Director

appointed for the purposes of Part II.1 of the
Environmental Protection Act

JW/

c: District Manager, DWECD, MECP Owen Sound District Office
Rekha Chetlur, Registration and Compliance Section, MECP Drinking Water Programs Branch – IMBS
Rakesh Sharma, P.Eng., Designated Consulting Engineer, GSS Engineering Consultants Ltd.

Appendix B

Flow Meter Calibration Report

Tower Electronics Canada Inc. Calibration Certificate

Customer:

Municipality of Arran-Elderslie
 Mark O'Leary
 Water Foreman
Water@arran-elderslie.ca

Meter Information

Date of Test: 2022-04-05
 Location: Chesley Lagoon
 Meter Under Test: Influent Meter
 Client Tag: N/A
 Manufacturer: Miltronics
 Model: OCMIII
 Serial Number: PBD/X6010243
 Totalizer As Found: 5916768M3
 Totalizer As Left: 5916827M3
 Acceptable Error: 15%

Calibration by:

Dan Matchett

Standards:

Fluke 289 S/N 96220182 NIST Cal Due March 2023

Programming Parameters:

Max Flow 10000M3/Day
 Max Head 0.470M
 Primary Device 6" Parshall Flume

Instrument Type

Open Channel

Calibration Due:

Apr-23

Method of verification

Head Simulation

Units:

CMD

Zero:

0.00

Span:

10000.00

Totalizer:

M3 **Flow Test**

Head Applied	Sim Flow	Meter Display	Current Output	Disp Error%	mA Error %	
0.140	1474.170	1579.800	6.530	1.056	2.694	
0.200	2589.970	2793.000	8.488	2.030	4.225	
0.300	4914.940	5143.720	12.227	2.288	3.061	
0.400	7743.220	8028.700	16.838	2.855	2.739	
0.450	9327.010	9606.000	19.379	2.790	2.409	
				Average Error%	2.20	3.03
				Result:	PASS	PASS

Totalizer Test

Sim Flow Rate	9327.010	CMD
Start Totalizer	5916809.000	M3
End Totalizer	5916825.000	M3
Volume Simulated	16.000	M3
Time(Seconds)	143.860	
Calculated Totalizer(MUT)	15.530	
Error%	3.027	
Result:	PASS	

Comments:

Unit passes verification.

Tower Electronics Canada Inc. Calibration Certificate

Customer:

Municipality of Arran-Elderslie
 Mark O'Leary
 Water Foreman
Water@arran-elderslie.ca

Meter Information

Date of Test: 2022-04-05
 Location: Chesley Lagoon
 Meter Under Test: Lagoon Effluent Meter
 Client Tag: N/A
 Manufacturer: Greyline
 Model: SLT-5.0
 Serial Number: 79635
 Totalizer As Found: 803440M3
 Totalizer As Left: 803448M3
 Acceptable Error: 15%

Calibration by:

Dan Matchett

Standards:

Fluke 289 S/N 96220182 NIST Cal Due March 2023

Instrument Type

Open Channel

Programming Parameters:

Max Flow: 114.5LPS
 Max Head: 0.460M
 Primary Device: 60 Degree Weir

Calibration Due:

Apr-23

Method of verification

Head Simulation

Units:

LPS

Zero:

0.00

Span:

114.50

Totalizer:

M3 **Flow Test**

Head Applied	Sim Flow	Meter Display	Current Output	Disp Error%	mA Error %
0.000	0.000	0.000	4.000	0.000	0.000
0.090	3.490	1.000	4.360	2.175	2.845
0.108	5.131	3.000	4.480	1.861	5.024
0.132	8.584	4.000	4.750	4.003	8.645
0.260	25.650	23.000	7.500	2.314	1.111
Average Error%				2.07	3.53
Result:				PASS	PASS

Totalizer Test

Sim Flow Rate	23.000	LPS
Start Totalizer	803446.000	M3
End Totalizer	803448.000	M3
Volume Simulated	2.000	M3
Time(Seconds)	90.880	
Calculated Totalizer(MUT)	2.090	
Error%	-4.317	
Result:	PASS	

Comments:

Unit passes verification.

Tower Electronics Canada Inc. Calibration Certificate

Customer:

Municipality of Arran-Elderslie
 Mark O'Leary
 Water Foreman
Water@arran-elderslie.ca

Meter Information

Date of Test: 2022-04-05
 Location: Chesley Riverside Lift Station
 Meter Under Test: Station Flow
 Client Tag: n/a
 Manufacturer: Endress Hauser
 Model: Promag 53W
 Serial Number: E2015116000
 Totalizer As Found: 3000570M3
 Totalizer As Left: 3000597M3

Calibration by:

Dan Matchett

Standards:

Endress and Hauser Field Check S/N:0000551303 Cal Due March 2023

Programming Parameters:

DN Size: DN200
 Cal Factor: 1.0313
 Zero: 22

Instrument Type

Magnetic Flow Meter

Calibration Due: Apr-22

Method of verification

EnH Field Check Verification/Calibration

Units: LPS

Zero: 0.00

Span: 100.00

Totalizer: M3 **Flow Test**

Sim Setting	Sim Flow LPS	Meter Display	Current Output	Disp Error%	mA Error %	
0.000	0.000	0.000	4.007	0.000	0.175	
25.000	25.000	25.006	8.003	0.006	0.038	
50.000	50.000	49.905	11.994	0.095	0.050	
75.000	75.000	75.017	16.009	0.017	0.056	
100.000	100.000	99.969	20.008	0.031	0.040	
				Average Error%	0.03	0.07
				Result:	PASS	PASS

Totalizer Test

Sim Flow Rate	100.000	LPS
Start Totalizer	3000589.000	M3
End Totalizer	3000596.000	M3
Volume Simulated	7.000	M3
Time(Seconds)	71.620	
Calculated Totalizer(MUT)	7.162	
Error%	-2.262	
Result:	PASS	

Comments:

Unit passes verification.