Ontario Clean Water Agency
Agence Ontarienne Des Eaux

Aaron Todd
District Manager
Guelph District Office
Ministry of the Environment, Conservation and Parks
4th Floor, One Stone Road West
Guelph, ON N1G 4Y2

March 28th, 2025

Re: 2024 Annual Performance Report for the Airport Sewage Treatment System

Attached is the 2024 Annual Performance Report for the Airport Sewage Treatment System located at 38 Greens Rd. in the County of Brant. This report has been completed in accordance with:

- Condition No. 10(6)(a)-(j) cited in Environmental Compliance Approval #8181-8TXHRN dated July 23, 2012 and issued to the Corporation of the County of Brant.

This report was prepared by the Ontario Clean Water Agency on behalf of the County of Brant based on the information we have in our records. The report covers the period from January 1, 2024 to December 31, 2024.

Sincerely,

Meagan Lowden
Process and Compliance Technician
Ontario Clean Water Agency

Cc.
Andrea Bazzard – Director of Environmental Services, County of Brant
Matthew D'Hondt – Solid Waste/Wastewater Operations Manager, County of Brant
Kevin Noll – Senior Environmental Officer, MECP
Maegan Garber – Safety, Process and Compliance Manager, OCWA
Sam Sianas – Regional Hub Manager, OCWA
Ben Madill – Senior Operations Manager, OCWA

2024 ANNUAL PERFORMANCE REPORT

AIRPORT SEWAGE TREATMENT SYSTEM

38 GREENS ROAD, BRANT COUNTY

MECP ENVIRONMENTAL COMPLIANCE APPROVAL #8181-8TXHRN

BY THE OPERATING AUTHORITY: ONTARIO CLEAN WATER AGENCY

PREPARED FOR THE MINISTRY OF ENVIRONMENT, CONSERVATION AND PARKS

ON BEHALF OF: THE COUNTY OF BRANT

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INTRODUCTION

The Airport Sewage Treatment System (Airport STS) located in the County of Brant at 38 Greens Road is a large subsurface sewage disposal system, a copy of the Treatment System Site Grading and Servicing Plan is provided in *Appendix C*. The Airport STS consists of:

- an 85m^3 Equalization Tank;
- a raw wastewater pumping chamber (MH2A);
- an H2Flow ISAM Sequencing Batch Reactor Treatment System;
- a Treatment Control Building housing the ISAM Controls and cloth filter;
- an effluent pumping chamber (P.STN. 3A);
- a Disposal Control Building housing the flow meter and controls;
- a standby generator;
- conventional absorption beds (Disposal Beds 1A and 1B);
- Shallow buried trench disposal beds (Disposal Bed 1C and 1D).

The wastewater from the Brantford Airport and the adjacent industrial subdivision enters the site through MH1A (OHL01025) and then flows to pump chamber MH2A. There is an 85m^3 Equalization Tank (EQ) connected to MH2A to attenuate high flows and an overflow bypass pipe from MH2A through MH5A to Disposal Beds 1A and 1B. This is only used in the event of over-filling of the EQ Tank.

Duplex grinder pumps are installed in MH2A with a rated capacity of the 4.5 L/s each. The duplex grinder pumps ensure that the ISAM Sequencing Batch Reactor treatment system (Figure 1 below) does not receive items that could clog the mechanical equipment in the treatment system. The pumping chamber (MH2A) evenly doses raw sewage to the treatment system on a timed basis. Due to the timed pumping, during high flows, the wastewater level will rise in pumping station MH2A and back up into the EQ Tank via the common EQ fill/empty line. Over time the pumping will outpace the incoming flow and the EQ Tank will empty through the common EQ fill/empty line back into MH2A.

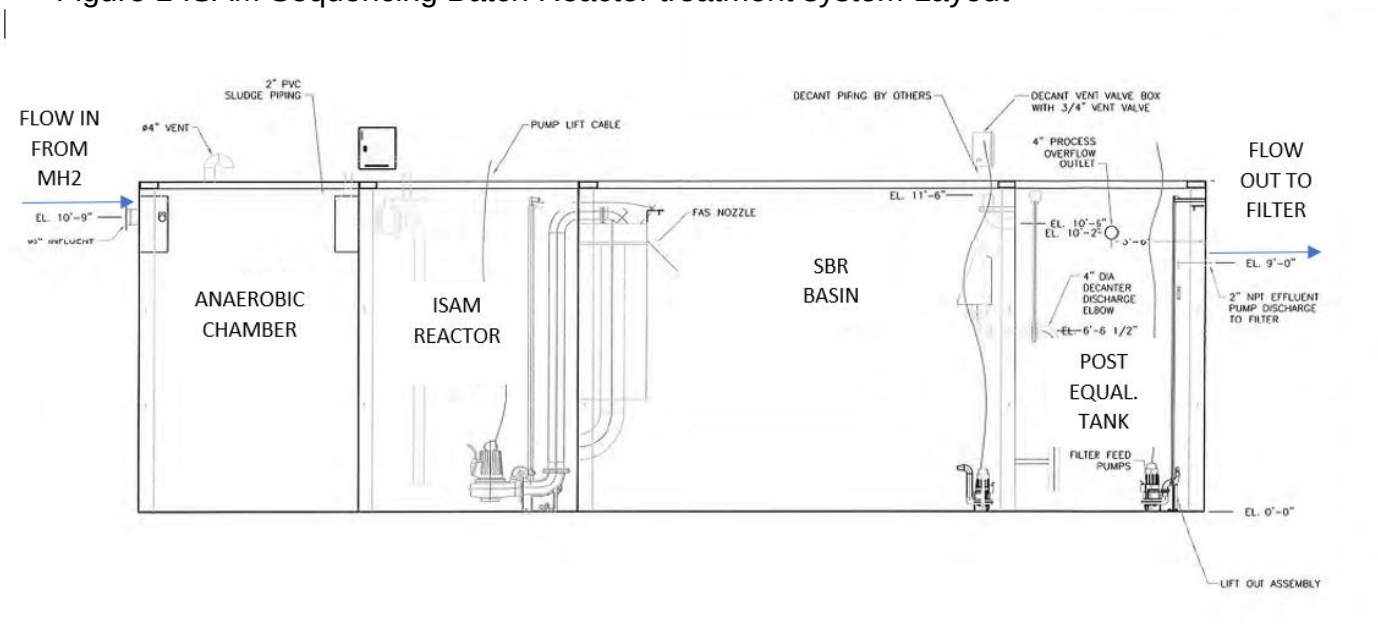
The raw sewage is pumped from MH2A through a 75 mm diameter forcemain, into the first section of the treatment system (Anaerobic Chamber) which houses a trash trap to remove any larger solids.

The sewage then enters the Integrated Surge Anoxic Mix (ISAM) Reactor by gravity where the raw sewage is mixed with nitrates recycled from the SBR (third tank) Basin for odour suppression and rapid denitrification. The SBR Basin pump is timer activated to pump from the ISAM Reactor in intervals, causing the SBR Basin to switch between aerobic and anoxic cycles at predetermined durations, until the SBR Basin reaches the Top Water Level (TWL) set point. Once TWL set point is reached a mixing pump runs for a set time to allow for chemical mixing and treatment to occur prior to being decanted. Once mixing is complete the Basin is decanted by gravity though an automated valve to the Post Equalization Tank until the Bottom Water Level (BWL) is reached in the SBR Basin.

The ISAM Sequencing Batch Reactor treatment system operates in batches with each batch size of approximately 13.3 m^3. Each batch is then pumped from the Post Equalization Tank to the cloth filter, then to pumping chamber MH3A where it is dosed to one of two conventional absorption beds or one of two shallow buried trench disposal beds in a pre-set sequence.

The system injects Alum and Micro C2000 directly into the SBR Basin to assist with treatment. Alum assists with settling and phosphorous removal while Micro C2000 assists with nitrification and denitrification as well as provides a supplemental source of food for the microorganisms.

Figure 1 ISAM Sequencing Batch Reactor treatment system Layout



ECA# 8181-8TXHRN contained the provision to install additional phases to the system within 5 years of the date of the ECA approval, which is July 23, 2012. Since the provision has lapsed an ECA amendment would be required to permit an expansion of the system.

PLANT FACTS

Environmental Compliance Approval (ECA) : 8181-8TXHRN (Dated July 23, 2012)
Rated Capacity for Phase 1: 60 m^3/day
Receiving System: Effluent discharges to onsite tile beds.

The following report is presented such that it corresponds with ECA #8181-8TXHRN Section 10(6) (a) through (j).

SECTION A – MONITORING DATA

As outlined in ECA #8181-8TXHRN Section 10(6) (a) the following is a summary and interpretation of all monitoring data and a comparison to the effluent limits outlined in Table 1 of this report, including an overview of the success and adequacy of the Airport STS.

(I) EFFLUENT LIMITS

TABLE 1 – EFFLUENT LIMITS

Effluent Parameter	Annual Concentration Limit (mg/L)
$CBOD_5$	10
Total Suspended Solids	10
Total Phosphorus	5
Total Ammonia Nitrogen + Nitrates Nitrogen	10

(II) SAMPLING PROCEDURES

As per ECA#8181-8TXHRN samples are to be collected from the Airport STS in accordance with Tables 2 and 3 below, utilizing a grab sampling procedure. Analysis for these parameters is conducted at SGS Lakefield Analytical (SGS) in Lakefield, Ontario. SGS is a member of the Canadian Association for Laboratory Accreditation Incorporated, certificate # 1999. The full annual dataset is included in *Appendix B*.

TABLE 2 – INFLUENT MONITORING

Parameters	Sample type	Frequency
BOD_5	Grab	Quarterly
Total Suspended Solids	Grab	Quarterly
Total Phosphorus	Grab	Quarterly
Total Kjeldahl Nitrogen	Grab	Quarterly
Total Petroleum Hydrocarbons	Grab	Quarterly

TABLE 3 - EFFLUENT MONITORING

Parameters	Sample type	Frequency
$CBOD_5$	Grab	Monthly
Total Suspended Solids	Grab	Monthly
Total Phosphorus	Grab	Monthly
Total Ammonia Nitrogen	Grab	Monthly
Nitrate Nitrogen	Grab	Monthly
Chloride	Grab	Monthly
pH	Grab	Monthly
Total VOCs	Grab	Annually
ICP Scan of Metals	Grab	Annually
Total Petroleum Hydrocarbons	Grab	Annually

(III) FLOW DATA

The Airport STS has a rated capacity of 60 m^3/day in Phase 1. The average daily effluent flow for 2024 was 30 m^3/day, which is 50% of the systems rated capacity. The monthly maximum daily flow recorded in 2024 was 63 m^3/day which is 105% of the systems rated capacity. When incoming flows are high, operations staff are able to divert to the equalization tank (EQ) by a reverse flow pipe. Once flows subside, the EQ will drain back into MH2A. If high flows occur for an extended period of time haulage is arranged to transport the excess flows to the Paris WPCP. Due to a high flow event in September 2024, 145m^3 were transported to the Paris WPCP . An investigation into the origin of the high flow event was completed in the sanitary collection system. The County is currently in discussions with the property owner suspected of contributing to the high flows.

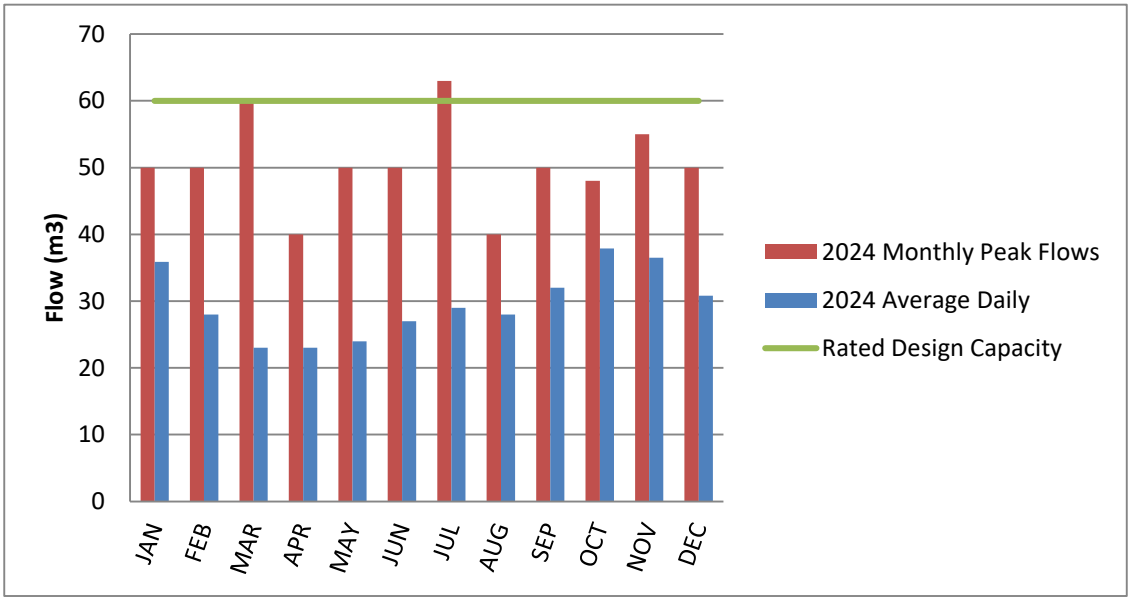
The table below shows the average effluent flow, the total effluent flow and diverted flow for each month. Graph 1 shows the average daily flow for 2023 and 2024 in comparison to the rated capacity and Graph 2 shows the total monthly flow comparison between 2023 and 2024.

TABLE 4 –EFFLUENT FLOW DATA

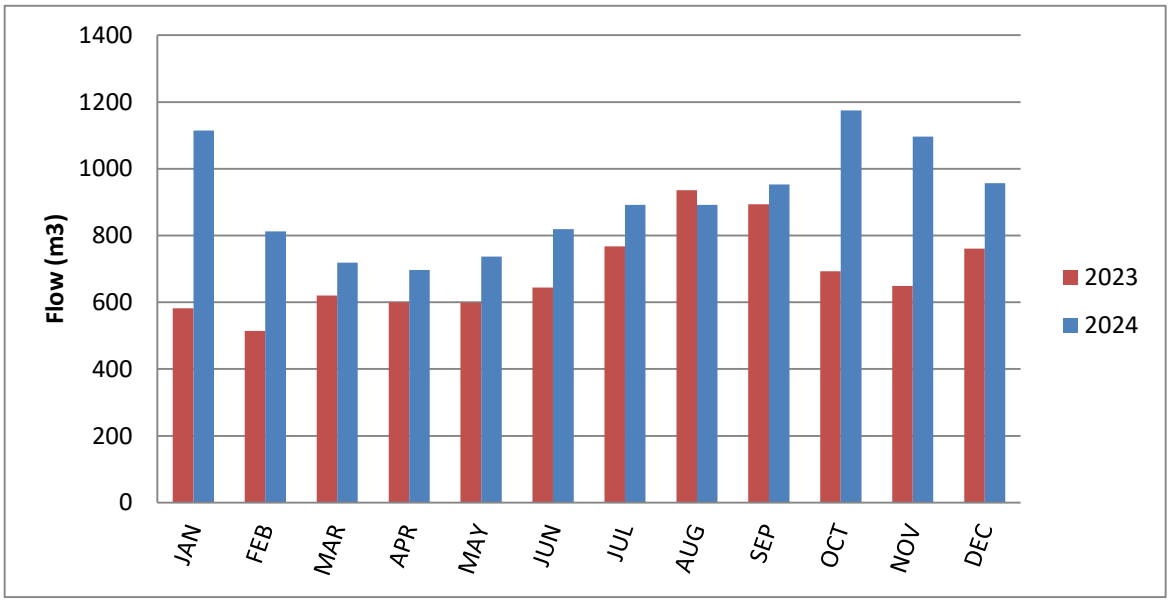
	Average Daily Flow (m^3)	Total Month Flow (m^3)	Max Day Flow (m^3)	Diverted Monthly Flow (m^3)
January	36	1114	50	0
February	28	812	50	0
March	23	719	60	0
April	23	697	40	0
May	24	737	50	0
June	27	819	50	0
July	29	892	63	0
August	28	892	40	0
September	32	953	50	145
October	38	1175	48	0
November	37	1096	55	0
December	31	957	50	0
TOTAL	**--**	**10 863**	**--**	**145**
AVERAGE	**30**	**--**	**51**	**--**

NOTE: THERE IS NO FLOW METER ON THE INFLUENT AND THUS VALUES ARE ASSUMED BASED ON EFFLUENT FLOW READINGS.

GRAPH 1 –2024 AVERAGE DAILY AND MONTHLY PEAK EFFLUENT FLOWS (m^3)



GRAPH 2 –2023 AND 2024 TOTAL MONTHLY EFFLUENT FLOW (m^3)



(IV) PLANT PERFORMANCE

Table 4 and 5 summarizes the raw influent and final effluent parameters which are required by ECA# 8181-8TXHRN to be sampled, at a minimum, on a quarterly and monthly frequency, respectively.

TABLE 5 – FINAL EFFLUENT AVERAGE MONTHLY CONCENTRATIONS

	CBOD$_5$ (mg/L)	Total Suspended Solids (mg/L)	Total Phosphorus (mg/L)	Total Ammonia Nitrogen (mg/L)	Nitrate Nitrogen (mg/L)	Total Ammonia Nitrogen +Nitrate Nitrogen (mg/L)	Chloride (mg/L)	pH
ECA Limits	**10**	**10**	**5**			**10**		
January	4.0	4.0	0.19	9.8	1.38	11.18	300	7.04
February	4.0	2.0	0.12	9.0	5.81	14.70	180	7.06
March	6.0	4.0	0.14	3.9	0.16	3.99	380	7.03
April	2.0	6.0	0.11	0.7	1.55	2.09	600	6.82
May	4.0	4.0	0.13	0.2	2.70	2.14	610	7.16
June	2.0	3.0	0.50	0.8	0.31	1.05	770	7.06
July	4.0	2.0	0.11	0.1	1.24	1.18	490	6.96
August	2.0	3.0	0.08	0.1	1.72	1.79	490	6.99
September	2.0	2.0	0.19	0.1	0.93	0.98	490	6.92
October	2.0	3.0	0.20	0.1	0.82	0.32	130	6.97
November	2.0	2.0	0.11	0.1	5.18	5.28	170	6.97
December	3.0	11.0*	0.18	0.1	3.59	3.59	210	7.16
Annual Average	**3.1**	**3.8**	**0.20**	**1.8**	**1.60**	**3.35**	**402**	**7.00**

NOTE: The Annual Average values are calculated based on all data collected for the purpose of the ECA for 2024
* TSS and TAN Objective exceedances are further discussed in Table 13

Table 5 above indicates there were no parameters that exceeded the ECA Limits during the 2024 reporting period.

Chloride concentrations have significantly increased since late 2019 and typically spike in the summer/warmer months which has resulted in the increase of chloride concentrations in the monitoring wells which surround the treatment facility. Chlorides can impact the Airport STS process by inhibiting the biological phosphorus process. This is typically observed when influent concentrations exceed1500mg/L. In 2022, the MECP directed the County to complete an Impact Assessment Report for the Airport STS to assess the treatment system for any potential impacts to offsite locations. The Impact Assessment included monitoring new groundwater wells and surface water locations offsite. The Assessment report was submitted to the MECP in October, 2024. The County has not received a reply from the MECP as of March, 2025.

TABLE 6 – RAW INFLUENT AVERAGE CONCENTRATIONS

	BOD_5 (mg/L)	TSS (mg/L)	TP (mg/L)	TKN (mg/L)	CCME F1 (C6-C10) (ug/L)	CCME F2 (C10-C16) (ug/L)	CCME F3 (C16-C34) (ug/L)	CCME F4 (C34-C50) (ug/L)	Oil& Grease (total) (mg/L)
January	88	58	2.71	20.1	--	--	--	--	--
February	86	54	1.88	18.8	<25	<100	678	<200	9
March	73	44	4.28	36.3	--	--	--	--	--
April	855	2550	20.4	102	--	--	--	--	--
May	103	142	4.08	41.4	<25	<100	275	<200	36
June	133	211	7.33	36.5	--	--	--	--	--
July	157	159	3.83	32.7	--	--	--	--	--
August	22	24	3.66	25.8	<25	<100	283	<200	<8
September	156	206	6.00	44.9	--	--	--	--	--
October	253	200	4.01	40.6	--	--	--	--	--
November	223	70	3.95	38.9	<25	<100	532	<200	11
December	60	44	2.11	18.6	--	--	--	--	--

Note: Oil & Grease and total hydrocarbons are sampled once per quarter as per ECA#8181-8TXHRN

Table 6 shows the influent sample concentrations entering the facility. For most of the reporting period, the BOD_5 and Total Suspended Solids concentrations were very low and not ideal to sustain the biomass in the facility at certain times. In an effort to counteract the low strength influent and supplement the biomass, Micro C2000 is added. If Micro C2000 addition is not sufficient, reseeding is then implemented. Airport STS was reseeded with Return Activated Sludge from the Paris WPCP on February 20, 22 and 29, 2024 in order to ensure a sufficient biomass to support the biological process and ensure effective treatment.

The influent sample collected on April 24th indicated higher concentrations of all parameters compared to other months. The cause of these elevated influent results has been attributed to a suspected release in the collection system. The elevated sample collected in April was a grab sample and only captures a snapshot of the influent coming into the system at the time of sampling. Operators returned the following day to inspect the Influent quality and samples were collected as part of the Airport Collections System sampling and those results were typical of the systems influent. The elevated parameter event had stopped based on lab results and operator observations. See Table 7 below. The final effluent from the system, following the high influent results in April, did not indicate any plant performance issues.

TABLE 7 – AIRPORT COLLECTION SYSTEM SAMPLE COLLECTED APRIL 25

	BOD_5 (mg/L)	TSS (mg/L)	pH	Temp (C)
April 25	325	357	8.18	13.3

Table 8 below are the additional parameters monitored in the treatment system for operational insight. Alkalinity is measured to ensure that the acids can be neutralized which ensures pH can be maintained within appropriate range to support the biological treatment process.. Mixed liquor and volatile suspended solids are monitored to keep track of the microorganism population within the system.

TABLE 8- ALKALINITY, VOLATILE & MIXED LIQUOR SUSPENDED SOLIDS MONITORING

Month	Alkalinity (mg/L as $CaCO_3$)	Volatile Suspended Solids (mg/L)	Mixed Liquor Suspended Solids (mg/L)
January	293	3780	3500
February	357	4700	5200
March	388	4740	5600
April	512	5020	5990
May	588	4250	4650
June	835	2970	3560
July	390	2440	2980
August	461	2360	2960
September	334	1090	1370
October	452	2550	3220
November	351	2040	2610
December	363	2650	3270

As per ECA #8181-8TXHRN, Table 9 below summarizes the annual final effluent sampling concentrations for Total VOCs, ICP Scan of Metals and Total Petroleum Hydrocarbons. This sample was collected on February 16, 2024.

TABLE 9- FINAL EFFLUENT ANNUAL TOTAL VOCS, ICP SCAN OF METALS AND TOTAL PETROLEUM HYDROCARBONS GRAB SAMPLE

ICP Scan of Metals	Concentration
Aluminum (total) [mg/L]	0.377
Antimony (total) [mg/L]	<0.0009
Arsenic (total) [mg/L]	<0.0002
Barium (total) [mg/L]	0.0612
Beryllium (total) [mg/L]	<0.000007
Bismuth (total) [mg/L]	0.00022
Boron (total) [mg/L]	0.009
Calcium (total) [mg/L]	70.4
Cadmium (total) [mg/L]	0.000183
Chromium (total) [mg/L]	0.00035
Cobalt (total) [mg/L]	0.000099
Copper (total) [mg/L]	0.003
Iron (total) [mg/L]	0.040
Potassium (total) [mg/L]	16.9
Lithium (total) [mg/L]	0.0041

Magnesium (total) [mg/L]	19.6
Manganese (total) [mg/L]	0.0158
Molybdenum (total) [mg/L]	0.0005
Nickel (total) [mg/L]	0.0011
Phosphorus (total) [mg/L]	0.410
Lead (total) [mg/L]	0.00089
Selenium (total) [mg/L]	0.00021
Silicon (total) [mg/L]	5.10
Silver (total) [mg/L]	<0.00005
Sodium (total) [mg/L]	142
Strontium (total) [mg/L]	0.362
Tellurium (total) [mg/L]	<0.0001
Thallium (total) [mg/L]	<0.000005
Thorium (total) [mg/L]	<0.0001
Tin (total) [mg/L]	<0.00006
Titanium (total) [mg/L]	0.00100
Tungstun (total) [mg/L]	<0.0002
Uranium (total) [mg/L]	0.000101
Vanadium (total) [mg/L]	0.00024
Zinc (total) [mg/L]	0.057
Zirconium (total) [mg/L]	<0.002
Total Petroleum Hydrocarbons	**Concentration**
Oil & Grease Total [ug/L]	<2
CCME F1 (C6-C10) [ug/L]	<25
CCME F2 (C10-C16) [ug/L]	<100
CCME F1-BTEX (C6-C10) [ug/L]	<25
CCME F3 (C16-C34) [ug/L]	<200
CCME F4 (C34-C50) [ug/L]	<200
VOCs	**Concentration**
Acetone [ug/L]	<30
Benzene [ug/L]	<0.5
Bromodichloromethane [ug/L]	<0.5
Bromoform [ug/L]	<0.5
Bromomethane [ug/L]	<0.5
Carbon tetrachloride [ug/L]	<0.2
Chlorobenzene [ug/L]	<0.5
Chloroethane [ug/L]	<5
Chloroform [ug/L]	<0.5
Chloromethane [ug/L]	<5
Dibromochloromethane [ug/L]	<0.5
1,2-Dichlorobenzene [ug/L]	<0.5
1,3-Dichlorobenzene [ug/L]	<0.5
1,4-Dichlorobenzene [ug/L]	<0.5
1,1-Dichloroethane [ug/L]	<0.5
1,2-Dichloroethane [ug/L]	<0.5
cis-1,2-Dichloroethene [ug/L]	<0.5
1,1-Dichloroethylene [ug/L]	<0.5
1,2-Dichloropropane [ug/L]	<0.5
trans-1,2-Dichloroethene [ug/L]	<0.5
cis-1,3-Dichloropropene [ug/L]	<0.5
trans-1,3-Dichloropropene [ug/L]	<0.5
Ethylbenzene [ug/L]	<0.5
Ethylenedibromide [ug/L]	<0.2
1,2 Dibromoethane	<0.2
Dichloromethane [ug/L]	<0.5

2-Hexanone [ug/L]	<20
Methyl-t-butyl Ether [ug/L]	<2
Methyl ethyl ketone [ug/L]	<20
Methyl Isobutyl ketone [ug/L]	<20
Styrene [ug/L]	<0.5
1,1,1,2-Tetrachloroethane [ug/L]	<0.5
1,1,2,2-Tetrachloroethane [ug/L]	<0.5
Tetrachloroethylene [ug/L]	<0.5
Toluene [ug/L]	<0.5
Trichloroethylene [ug/L]	<0.5
Vinyl Chloride [ug/L]	<0.2
Trichlorofluoromethane [ug/L]	<5
1,1,1-Trichloroethane [ug/L]	<0.5
1,1,2-Trichloroethane [ug/L]	<0.5
Xylene [ug/L]	<0.5
o-xylene [ug/L]	<0.5
m/p-xylene [ug/L]	<0.5

< represents a non-detect lab result

(V) INTERPRETATION OF MONITORED DATA

TABLE 10 – INTERPRETATION AND COMPARISON OF 2023 AND 2024 EFFLUENT SAMPLES TO EFFLUENT LIMITS

Parameter	Limit (mg/L)	2023 Average Concentration (mg/L)	2024 Average Concentration (mg/L)	% Change
$CBOD_5$	10.0	3.1	3.1	0
Total Suspended Solids (mg/L)	10.0	5.9	3.8	-35.6
Total Phosphorus (mg/L)	5.0	0.5	0.2	-60.0
TAN + Nitrate Nitrogen	10.0	2.40	3.35	+39.6

TABLE 11 – INTERPRETATION AND COMPARISON OF 2023-2024 ANNUAL SAMPLES

ICP Scan of Metals	*PWQO	**Design Parameters		2023	2024 (bold indicates PWQO exceedance)	% Change
		Activated Sludge (mg/L)	Nitrification (mg/L)			
Aluminum (total) [mg/L]	0.075	15-26		**0.117***	**0.377***	+222.2
Antimony (total) [mg/L]	0.020			<0.0009	<0.0009	--
Arsenic (total) [mg/L]	0.100	0.01		0.0002	<0.0002	--
Barium (total) [mg/L]	--			0.0569	0.0612	+7.5
Beryllium (total) [mg/L]	0.011			<0.000007	<0.000007	--
Bismuth (total) [mg/L]	--			0.00009	0.00022	+144.4
Boron (total) [mg/L]	0.200	0.05-100		0.032	0.009	-71.8
Calcium (total) [mg/L]	--	2500		64.6	70.4	+8.9
Cadmium (total) [mg/L]	0.020	10-100		0.000099	0.000183	+1748.5
Chromium (total) [mg/L]	0.001	1-10	0.25	0.00047	0.00035	-25.5
Cobalt (total) [mg/L]	0.0009			0.00007	0.000099	+41.4
Copper (total) [mg/L]	0.005	1.0		0.0025	0.003	+20
Iron (total) [mg/L]	0.300	1000	0.005-0.5	0.035	0.040	+14.3
Potassium [mg/L]	--			17.9	16.9	-5.6

Lithium (total) [mg/L]	--			0.0037	0.0041	+10.8
Magnesium (total) [mg/L]	--		50	18.4	19.6	+6.5
Manganese (total) [mg/L]	--	10		0.0228	0.0158	-30.7
Molybdenum (total) [mg/L]	0.007			0.00037	0.0005	+35.1
Nickel (total) [mg/L]	0.025	1-2.5	0.25	0.0013	0.0011	-15.3
Phosphorus (total) [mg/L]	0.030			**0.194***	**0.410***	+111.3
Lead (total) [mg/L]	0.005	0.1	0.5	0.00061	0.00089	+45.9
Selenium (total) [mg/L]	0.100			0.00010	0.00021	+110
Silicon (total) [mg/L]	--			4.12	5.10	+23.8
Silver (total) [mg/L]	0.0001	5		<0.00005	<0.00005	--
Sodium (total) [mg/L]	--			75.8	142	+87.3
Strontium (total) [mg/L]	--			0.311	0.362	+16.4
Tellurium (total) [mg/L]	--			<0.0001	<0.0001	--
Thallium (total) [mg/L]	0.0003			<0.000005	<0.000005	--
Thorium (total) [mg/L]	--			<0.0001	<0.0001	--
Tin (total) [mg/L]	--			0.00013	<0.00006	-53.8
Titanium (total) [mg/L]	--			0.00137	0.00100	-27.0
Tungstun (total) [mg/L]	0.030			0.00011	<0.0002	+81.8
Uranium (total) [mg/L]	0.005			0.000016	0.000101	+531.2
Vanadium (total) [mg/L]	0.006			0.00014	0.00024	+71.4
Zinc (total) [mg/L]	0.030	0.08-10	0.08-0.5	0.028	**0.057***	+103.6
Zirconium (total) [mg/L]	0.004			<0.002	<0.002	--

**Threshold Concentrations of Inorganic Pollutants Inhibitory to Biological Treatment Processes as per O&M Manual.

As per the above Tables, 2024 sample results did not exceed the Threshold Concentrations of inorganic pollutants inhibitory to biological treatment processes for any of the parameters tested.

Table 11 above shows the percent change in the parameters from 2023 to 2024 in the annual effluent sampling. Changes can be seen in the metal concentrations only. There is no comparison of Total Petroleum Hydrocarbons and Volatile Organic Compounds because their sampling results are non-detectable, therefore pose no concern.

To satisfy the requirement to interpret the annual final effluent sample, the metals are compared to the Provincial Water Quality Objectives for Receiving Streams as this is the most applicable guideline for this site. It should be noted that the annual samples are a grab sample and reflective of what is in the effluent only at the time of sampling. All metals identified in the PWQO Guideline were compared to the 2023 and 2024 final effluent samples. The following PWQO's for metals were exceeded for 2024: Aluminum, Phosphorus and Zinc.

<u>Aluminum:</u>
The PWQO states that at a pH greater than 6.5 but not more than 9.0, the 0.075 mg/L Aluminum objective is based on the total Aluminum measured in clay-free sample. Aluminum is recognized as potentially toxic to fish under certain pH conditions and shows no consistent, convincing evidence that it causes adverse health effects in humans. Airport STS effluent is discharged to a tile bed and not directly into a receiving stream, therefore the 0.117mg/L sample result is not a concern.

Phosphorus:
The 2024 Phosphorus sample result was 0.41mg/L. The PWQO states that current scientific evidence is insufficient to develop a firm objective for phosphorus however, excessive plant growth in rivers and streams could be eliminated if the phosphorus is kept below 0.030mg/L. Since the Airport STS effluent is discharged to a tile bed and not directly into a receiving stream, the level of phosphorus detected in the grab sample is not significantly concerning. The ECA objective and limit for Total Phosphorous in the effluent continues to be met.

Zinc:
The PWQO was exceeded for Zinc in 2024 with a result of 0.057mg/L compared to the 0.030mg/L objective. Excess zinc in the soils can decrease the vegetation diversity in the tile bed and decrease the activity of microorganisms and earthworms, slowing the breakdown of organic matter.

The 2023-2024 comparison of heavy metals analysis in Table 10 has shown increases in the following parameters ; Aluminum, Barium, Bismuth, Calcium, Cadmium, Cobalt, Copper, Iron, Potassium, Lithium, Magnesium, Molybdenum, Phosphorous, Lead, Selenium, Silicone, Sodium, Strontium, Tungsten, Uranium, Vanadium, and Zinc. Most of the above parameters can be correlated with metal fabrication and electroplating industries. In high concentrations these substances could inhibit biomass growth and nitrification processes but no impacts have been observed at the facility to date. A collection system investigation has been undertaken to trace the potential origins of the elevated parameters. The investigation consists of sampling and discussions with property owners. The investigation and discussion will continue in 2025.

(VI) EFFLUENT QUALITY

Table 5 above, shows the effluent monthly average concentrations for the parameters outlined in Table 1 of ECA #8181-8TXHRN. The system successfully met all annual compliance objectives and limits in 2024.

SECTION B - OPERATING PROBLEMS ENCOUNTERED

All parameters met both the objective and compliance limits listed in the ECA during the 2024 reporting period. Table 9 comparisons of final effluent concentrations from 2023 and 2024 illustrate an increase in TAN. Although no direct correlation was found, the following are suspected factors that could have contributed to one (1) TSS and three (3) TAN monthly samples exceeding the annual ECA effluent limits:

1. Fluctuation of daily flows to the Airport STS that occur
2. Low strength Raw Sewage resulting in inadequate food for the microorganisms
4. Elevated chloride concentrations inhibiting the biological treatment of phosphorous.
5. High inflows during rain events and snow melt can cause microorganisms to washout of the system and into the effluent resulting in a reduction of biomass.
6. Total ammonia nitrogen exceedances mainly occur due to the lack of nutrients coming into the plant. Mitigation and best efforts to address this include increased in-house ammonia testing, reseeding the SBR, increased Micro C2000 chemical dosage to reduce nitrates, monitoring flows and using the EQ tank to reduce hydraulic loading during high flows or rain events.

The following are descriptions of actions taken at the operations level to ensure compliance with effluent objectives and limits:

- Airport STS was reseeded with Return Activated Sludge from the Paris WPCP on February 20, 22 and 29, 2024 in order to provide the facility with the required biomass to be able to provide effective treatment.
- Raw pump settings were adjusted at the Airport STS when the flow trending started to indicate a constant increase. The EQ tank was utilized when the flows were inconsistent or continued to stay high for a duration of time, allowing the system to continue to work within its design capacity.
- Manual addition of Carbon (MicroC2000) to help reduce the nitrate levels

SECTION C – MAINTENANCE

(I) UPGRADES/MAINTENANCE

TABLE 12 – UPGRADES/MAINTENANCE

Date	Work Performed
24-March-24	Third party contractor completing generator inspections for fuel system compliance
17-May-24	Third party contractor completed annual flow meter calibrations
17-June-24	Inspected influent and effluent pumps. Repaired leaking coupling on discharge line from filter feed pumps. No other issues.
29-Aug-24	Cleaned SBR Feed pump B due to poor performance, found debris stuck inside pump and removed and returned to service..
16-Sept-24	Cleaned SBR Feed pump B due to poor performance, found debris stuck inside pump and removed and returned to service. .
27-Sept-24	Hole in distribution building roof fixed by third party contractor
4-Oct-24	Third party contractor completed annual lifting device inspection, no issues found
30-Oct-24	Annual ESA inspection, no deficiencies
31-Oct-24	Third party contractor completed annual generator inspection, fuel pump was not performing well, a temporary pump was installed and a new pump was installed

(II) AFTER HOUR ALARMS

TABLE 13 – AFTER HOUR ALARMS

Date	Issue/Actions Taken
09-Jan-24	Potential power dip resulted in alarm, system running OK, no other issues to note
13-Jan-24	Potential power dip resulted in alarm, system running OK, no other issues to note
14-Jan-24	Potential power dip resulted in alarm, system running OK, no other issues to note
07-Apr-24	Potential power dip resulted in alarm, system running OK, no other issues to note

08-Apr-24	Potential power dip resulted in alarm, system running OK, no other issues to note
20-Apr-24	Potential power dip resulted in alarm, system running OK, no other issues to note
14-Jul-24	Potential power dip resulted in alarm, system running OK, no other issues to note
16-Jul-24	Potential power dip resulted in alarm, system running OK, no other issues to note
02-Aug-24	Potential power dip resulted in alarm, system running OK, no other issues to note
05-Aug-24	Temperature fault in panel, reset and monitored. No other issues to note.
31-Aug-24	SBR mix pump fail to run, reset and monitored. No other issues to note
01-Sep-24	SBR mix pump fail to run, reset and monitored. No other issues to note
05-Sep-24	Equalization Tank (EQ) Tank high flows due to possible industries dumping. Hauled from EQ tank to Paris WPCP to alleviate flows on the system
06-Sep-24	EQ Tank high flows due to possible industries dumping. Hauled from EQ tank to Paris WPCP to alleviate flows on the system
12-Oct-24	PLC alarm, UPS was not on upon investigation, likely a power dip caused it to trip out and shut off. Restarted UPS and PLC came back online. Reviewed process and data. No other issues to note
03-Nov-24	PLC alarm, PLC not communicating with HMI, reset breaker and UPS, everything working fine. Checked over system, No other issues to note
06-Dec-24	PLC alarm, UPS not turning on when power to panel is shut off. UPS will need to be replaced. Checked over system, no other issues to note
07-Dec-24	Checked over system, no issues found. Likely room temperature not warm enough, increase heaters
08-Dec-24	Multiple alarms, filter feed pipe temperature below setpoint due to cold weather. Insulation and/or heat trace will be added to line. No other issues found.
12-Dec-24	Checked over system, no issues found. Potential power dip cause for alarm
14-Dec-24	Checked over system, no issues found. Potential power dip cause for alarm
26-Dec-24	PLC alarm, found PLC and UPS offline, power dip caused equipment to trip out. Restarted PLC and UPS – no further issues.

SECTION D – EFFLUENT QUALITY ASSURANCE

Effluent quality assurance is evaluated by monitoring parameters and changes throughout the plants processes. The operators monitor the aeration basin by performing weekly tests on the mixed liquor, dissolved oxygen, pH, temperature, settling tests and Mixed Liquor Suspended Solids (MLSS). As well, monitoring of the chemical dosages. Data collected from these tests provide valuable

information to the operators to make the appropriate adjustments in the treatment process and take corrective actions before the plant reaches its effluent limits.

Additional, as discussed above in Section B – Operating Problems Encountered, the following are the effluent quality control measures that have been implemented at the Airport STS:

- The equalization tanks are being utilized along with manual adjustments of the raw pump timers to control the rate of flow being fed into the Airport STS. These efforts are helping to control the varying flows entering the facility.
- Alum and Carbon (MicroC2000) are often batch dosed manually, in addition, to the programmed dosing. Alum is added to assist with total phosphorus control, while Micro C2000 is added to enhance the denitrification process. Micro C2000 is also added to supplement the low strength of wastewater entering the facility.
- Airport STS was reseeded with Return Activated Sludge from the Paris WPCP in February, 2024 in order to provide the facility with the required biomass for effective treatment.

SECTION E - CALIBRATIONS

In house meters for pH and dissolved oxygen are calibrated by OCWA operators as per manufacturer's instructions. The annual calibration of the final effluent flow meter was performed on May 17, 2024; no other maintenance was required. The calibration report can be found in *Appendix A.*

SECTION F - EFFLUENT OBJECTIVES

Table 14 below shows the effluent limits and objectives compared against the 2024 annual average results for all effluent parameters. There were no parameters that exceeded the limits or objectives in 2024.

TABLE 14–FINAL EFFLUENT CONCENTRATION AND EFFLUENT LIMITS AND OBJECTIVES

Parameter	Limit (mg/L)	Objectives (mg/L)	2024 Average Concentration (mg/L)
$CBOD_5$	10.0	5.0	3.1
Total Suspended Solids (mg/L)	10.0	7.0	3.8
Total Phosphorus (mg/L)	5.0	2.0	0.2
Total Ammonia Nitrogen + Nitrate Nitrogen	10.0	5.0	3.35

Table 15 below shows the single sample results which exceeded the objectives and the best efforts used to resolve them.

TABLE 15–FINAL EFFLUENT OBJECTIVE PARAMETER EXCEEDANCES

Parameter	Date	Result	Best Efforts
Total Ammonia Nitrogen + Nitrate Nitrogen **Objective: 5mg/L**	30-Jan-24	11.18	Best efforts included increased in-house ammonia testing, increased micro C2000 chemical dosage to reduce nitrates, monitoring flows and using the EQ tank to reduce hydraulic loading during high flow or rain events. These are discussed further in ***Section B – Operating Problems Encountered***
	29-Feb-24	14.70	
	27-Mar-24	10.12	
	29-Nov-24	5.28	
CBOD5 **Objective: 5mg/L**	27-Mar-24	6	Best efforts included additional in-house monitoring of the influent, modifying the raw pump timers to adjust raw sewage feed to the SBR in accordance with changes in flow. These are discussed further in ***Section B – Operating Problems Encountered***
TSS **Objective: 7mg/L**	20-Dec-24	11	Best efforts included changing the filters regularly, manually backwashing, reseeding the SBR due to the lack of nutrients and modifying the raw pump timers to adjust raw sewage feed to the SBR in accordance with changes in flow, as discussed further in ***Section B – Operating Problems Encountered***

SECTION G – AIRPORT STS LIQUID BIOSOLIDS

The following table below shows the amount of liquid biosolids that were removed from the Airport STS in 2024. The biosolids that were removed were sent to the Paris WPCP digester for further treatment. It is anticipated that a similar volume of sludge (110m^3) will be generated in 2025 and require removal.

TABLE 16 –LIQUID BIOSOLIDS REMOVED FOR 2024

Quarter	Quantity Removed (m^3)
January	14
February	0
March	14
April	14
May	20
June	0
July	20
August	0
September	14
October	14
November	0
December	0
Total	**110**

SECTION H - SUMMARY OF COMPLAINTS RECEIVED

The Airport STS did not receive any complaints in 2024.

SECTION I - SUMMARY OF BY-PASS, SPILL OR ABNORMAL DISCHARGE EVENTS

There were no by-pass, spills or abnormal discharge events reported for the Airport STS during the 2024 reporting period.

SECTION J – OTHER INFORMATION

No other information has been requested from the District Manager at this time.

APPENDIX A

CALIBRATION RECORDS

Industrial Technical Services

5080 Timberlea Blvd, Unit 35,
Mississauga, ON L4W 4M2
Ph: 905-275-2717 Fax: 905-275-2724
www.itsinstruments.com

Certificate No: 36445-001

Certificate of Calibration

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

Calibrated: May 17, 2024
Due Date: May 17, 2025

Instrument Identification:

Description:	Flow Indicator/Transmitter
Manufacturer:	Krohne
Model Number:	IFC100W
Serial Number:	C12504886
Range:	0.00 - 300.00 LPM / 0.00 - 300.00 LPM
Tolerance:	± 2.00% FS
Tag/Asset No:	0000077034 *Equip. No:* 0000248354
Location:	Brantford Airport, 38 Greens Road Brantford

Test Report:

In Val	In Type	Out Val	Out Type	Fnd As	Error	Lft As	Error	Pass/Fail
0.00	LPM	0.00	LPM	0.00	0.00%	0.00	0.00%	Pass
63.76	LPM	63.76	LPM	63.88	0.04%	63.88	0.04%	Pass
127.52	LPM	127.52	LPM	127.73	0.07%	127.73	0.07%	Pass
255.03	LPM	255.03	LPM	255.15	0.04%	255.15	0.04%	Pass

Standards Used:

Asset No	Manufacturer	Calibration Date	Due Date
SIM004	Krohne	January 30, 2024	January 30, 2025

Calibration Sticker Applied?	Yes	As Found In Tolerance:	Yes	Repair Performed:	No
Restricted Use:	No	As Left In Tolerance:	Yes	Adjustment Performed:	No

Comments: 2" flow tube, GKL = 7.1023.

Performed By: Atul Shah, Technician — *Issue Date:* June 07, 2024

Reviewed By ITS: Carl Ramnarine, Service Manager — *Date:* June 07, 2024

Reviewed By Customer: _____

Industrial Technical Services certifies that calibration was done using test equipment which are certified and traceable to NRC and/or NIST.
Our quality system complies with the requirements of ISO 9001:Current Version.

APPENDIX B

2024 DATA SETS

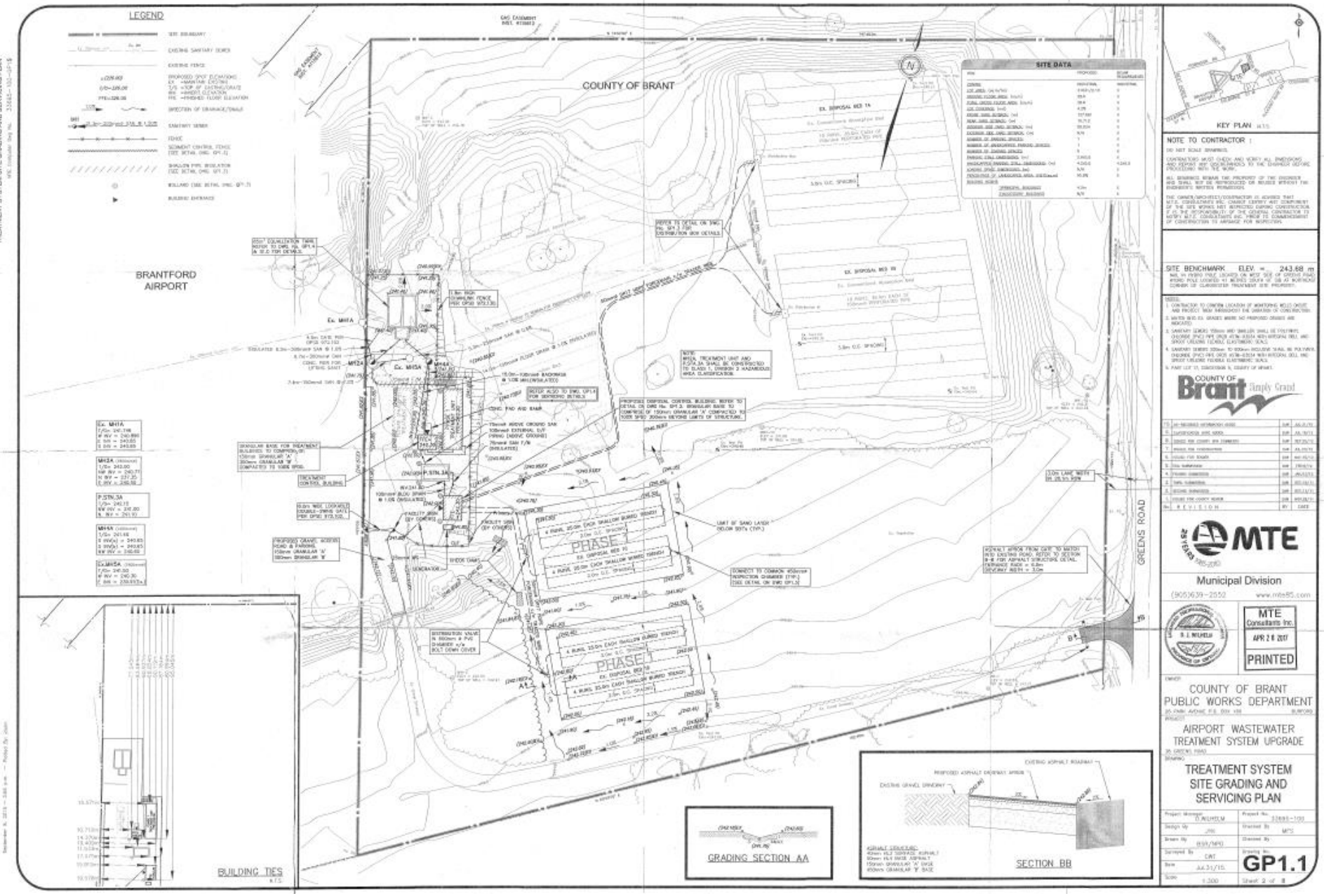
FULL DATA SET OF AIRPORT STS FINAL EFFLUENT, RAW & MIXED LIQUOR

									Final Effluent									
Date	Lab Temp (°C)	pH	field Temp (°C)		CBOD (mg/L)		BOD (mg/L)	TSS (mg/L)	TP (mG/L)	TKN (mg/L)		Ammonia + Ammonium (mg/L)	Chloride mg/L	Nitrite	Nitrate	Nitrite + Nitrate		TAN+
Objective					**5**			**7**	**2**								**5**	**5**
Limit					**10**			**10**	**5**								**10**	**10**
30-Jan	7	7.04	12.1	<	4	<	4	4	0.19	11		9.80	300	0.03	1.38	1.38		11.18
29-Feb	7	7.06	13.0	<	4	<	4	2	0.12	11.8		9.00	180	0.11	5.70	5.81		14.70
06-Mar	6	6.86	13.9							1.4		0.20		0.03	0.15	0.18		0.35
13-Mar	7	7.08	15.0							3.4		1.40		0.06	0.11	0.17		1.51
27-Mar	8	7.14	16.3		6	<	4	4	0.14	10.7		10.00	380	0.03	0.12	0.12		10.12
10-Apr	3	6.9	15.9							2.7		1.90		0.04	0.07	0.11		1.97
16-Apr	6	6.71	16.7							1.1		0.10		0.25	1.67	1.92		1.77
24-Apr	6	6.86	14.9	<	2	<	4	6	0.11	0.5		0.10	600	0.19	2.43	2.62		2.53
22-May	8	6.82	24.9							1.7		0.40		0.21	2.48	2.69		2.88
29-May	9	7.26	20.3							0.6	<	0.10		1.28	2.69	3.97		2.79
28-May	10	7.39	18.5	<	4	<	4	4	0.13	0.5	<	0.10	610	0.79	0.65	1.44		0.75
12-Jun	12	6.96	22.7							2.2		1.30		0.03	0.15	0.15		1.45
28-Jun	16	7.16	21.6	<	2		3	3	0.50	0.5		0.20	770	0.30	0.46	0.46		0.66
19-Jul	13	6.8	24.3							0.5		0.10		0.18	1.53	1.71		1.63
26-Jul-24	17	7.12	22.4		4	<	2	2	0.11	0.5		0.10	490	0.14	0.63	0.77		0.73
27-Aug-24	15	6.99	22.6	<	2	<	2	3	0.08	0.8		0.10	490	0.03	1.69	1.72		1.79
27-Sep-24	19	6.92	21.6		2	<	2	2	0.19	0.5		0.10	490	0.05	0.88	0.93		0.98
31-Oct-24	11	6.97	17.5	<	2		3	3	0.20	1.1	<	0.10	130	0.60	0.22	0.82		0.32
29-Nov-24	3	6.97	16.6	<	2	<	2	2	0.11	1.2	<	0.10	170	0.20	5.18	5.38		5.28
20-Dec-24	7	7.16	13.0		3			11	0.18	1.5	<	0.10	210	0.03	3.59	3.59		3.69

						RAW Influent									**Mixed Liquor SBR**				
Date	Temp	pH	BOD5	TSS	TP	TKN	chloride		CCME F1	CCME F2	CCME F3	CCME F4	O&G		Temp	MLSS	MLVSS	Ratio %	Alkalinity
30-Jan-24	7		88	58	2.71	20.10	160								7	3500	2780	79.4	293
16-Feb-24	7	7.97	60	18	2.03	21.10			<25	<100	678	<200	9						
29-Feb-24	7		113	90	1.74	16.50	820								7	5200	4700	90.4	357
27-Mar-24	8	7.14	73	44	4.28	36.30	230								8	5600	4740	84.6	388
24-Apr-24	6		855	2550	20.40	102.00	4900								6	5990	5020	83.8	512
21-May-24	8	7.34	29	58	1.64	6.80			<25	<100	275	<200	36						
28-May-24	10		177	225	6.51	76.00	240								10	4650	4250		588
28-Jun-24	16		133	211	7.33	36.50	350								16	3560	2970	83.4	835
26-Jul-24	17		157	159	3.83	32.70	330									2980	2440	81.9	390
13-Aug-24	15	7.55	31	32	5.41	36.20			<25	<100	283	<200	<8						
27-Aug-24	15		<12	15	1.91	15.40	130								15	2960	2360	79.7	461
27-Sep-24	19		156	206	6.00	44.90	210								19	1370	1090	79.6	334
31-Oct-24	11		253	200	4.01	40.60	77								11	3220	2550	79.2	452
07-Nov-24	13	7.59	293	23	2.01	11.20			<25	<100	532	<200	11						
29-Nov-24	3		153	117	5.90	66.60	180								3	2610	2040	78.2	351
20-Dec-24	7		60	44	2.11	18.60	74								7	3270	2650	81.0	363

APPENDIX C

SITE PLAN


LEGEND
COUNTY OF BRANT
BRANTFORD AIRPORT
GREENS ROAD
SITE DATA
PHASE 1
PHASE 2
GRADING SECTION AA
SECTION BB
BUILDING TIES
KEY PLAN
NOTE TO CONTRACTOR :
SITE BENCHMARK ELEV. = 243.68 m
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