

Long Sault Wastewater Treatment System

Certificate of Approval No. 3-0918-93-979 (June 1997)

Works No. 120000131

- 2021 Annual Performance Report -

Prepared by:

CANEAU WATER AND SEWAGE OPERATIONS INC.
19740 WELLINGTON ST.
WILLIAMSTOWN, ON K0C 2J0

1.0 Introduction

This Annual Performance Report is submitted to satisfy the requirements of the Certificate of Approval issued to the Long Sault WWTP. (Amended C of A No. 3-0918-93-979, June 1997).

This report corresponds with the period of January to December, 2021, and provides:

- an overview of the wastewater treatment plant performance;
- a summary and interpretation of all monitoring data and analytical results collected during the reporting period, including quality and quantity;
- a summary of the system operation, including calibration; information on operating problems encountered in the reporting period and modifications to the works to correct the problems; and
- a tabulation of the volume of sludge generated in the reporting period, an outline of anticipated volumes to be generated over the next reporting period, and an outline of the sludge handling methods and disposal areas to be utilized over the next reporting period.

2.0 Wastewater Treatment Performance

The current treatment system for Long Sault consists of a sequential batch reactor (SBR) process. Overall, the wastewater treatment facility in Long Sault has operated efficiently and has proven to provide consistent removal efficiencies for the design parameters. Appendix A contains the monthly quantity and quality values.

Please note that the data contained in Appendix A represents all the acquired data throughout the year, including laboratory results and "in-house" testing at the plant.

2.1 Raw Wastewater Characteristics

The average process wastewater flow rate was 1,435 m³/d (53% of the average daily design flow of 2,700m³/d). The plant is rated at 11,500m³/d (peak daily flow). The maximum daily flow did not exceed the plant's rated peak capacity. Appendix A contains the monthly quantity and quality values for the influent and effluent.

2.2 Treatment Performance

Table 2.2: Annual average treatment efficiencies of the treatment process within the facility for 2021.

Constituent	Raw Influent mg/L	Final effluent mg/L	Final eff. C of A mg/L	Average Loading kg/d	Loading C of A kg/d	Average Removal Efficiency (%)
CBOD	92	2.64	25	3.69	67.5	97
SS	258	3.96	25	5.88	67.5	98
TP	2.91	0.46	1	0.64	2.7	84
TAN (NH ₃ +NH ₄)	13.84	6.95	15	8.79	40.5	50
E. Coli (cnts/100ml)		1	200			

Maximum daily effluent TAN concentrations were 20.20 mg/L and occurred on June 10, 2021. Maximum daily effluent TAN loadings were 48.3 kg/day and occurred on March 11, 2021.

3.0 Effluent Monitoring

The results are based on weekly samples, which are taken from the influent channel ahead of the pretreatment equipment (raw sample) as well as in the effluent channel prior to the effluent discharge pumps.

Total sewage flows (m^3), average sewage flow (m^3/d) and peak daily flows (m^3/d) are tabulated each month.

Disinfection results (sampled weekly) are recorded in the annual monitoring and performance report which is attached (Appendix A).

Per the C of A, composite raw samples are collected and analyzed weekly for Suspended Solids, Total Phosphorous, Dissolved Reactive Phosphorous, Total Kjeldahl Nitrogen, Ammonia + Ammonium Nitrogen, Nitrite + Nitrate Nitrogen, Alkalinity, pH, and CBOD₅.

Per the C of A, composite final effluent samples are collected and analyzed weekly for Suspended Solids, Total Phosphorous, Dissolved Reactive Phosphorous, Total Kjeldahl Nitrogen, Ammonia + Ammonium Nitrogen, Nitrite + Nitrate Nitrogen, Alkalinity, and CBOD₅. Also, per the C of A, grab samples of Total Coliform, Fecal Coliform/E. Coli, Fecal Streptococcus are collected weekly in the final effluent.

Per the C of A and in addition to the routine sampling program above, on-site testing is performed on the final effluent for temperature and pH 5 times per week.

Please refer to Appendix A for the monthly quantity and quality results.

3.1 Effluent Quality

In accordance with the C of A:

In Compliance

- Non-compliance with respect to concentrations of CBOD₅ in the effluent is deemed to have occurred when the annual average concentration exceeds 25 mg/L during any twelve consecutive calendar months.

In Compliance

- Non-compliance with respect to concentrations of Suspended Solids in the effluent is deemed to have occurred when the annual average concentration exceeds 25 mg/L during any twelve consecutive calendar months.

Non-Compliant

- Non-compliance with respect to concentrations of Ammonia + Ammonium in the effluent is deemed to have occurred when the daily concentration exceeds 15 mg/L during any calendar day.
 - Effluent from the WWTP exceeded 15 mg/L on the following days:
 - February 25, 2021: 15.6 mg/L
 - May 20, 2021: 15.9 mg/L
 - May 27, 2021: 18.0 mg/L
 - June 3, 2021: 18.6 mg/L
 - June 10, 2021: 20.2 mg/L
 - June 17, 2021: 18.0 mg/L
 - June 24, 2021: 17.9 mg/L
 - June 29, 2021: 15.4 mg/L
 - July 8, 2021: 16.0 mg/L

In Compliance

- Non-compliance with respect to concentrations of Total Phosphorus in the effluent is deemed to have occurred when the monthly average concentration exceeds 1 mg/L during any calendar month.

In Compliance

- Non-compliance with respect to total loading of CBOD₅ in the effluent is deemed to have occurred when the annual average loading exceeds 67.5 kg/d during any twelve consecutive calendar months.

In Compliance

- Non-compliance with respect to total loading of Suspended Solids in the effluent is deemed to have occurred when the annual average loading exceeds 67.5 kg/d during any twelve consecutive calendar months.

In Compliance

- Non-compliance with respect to total loading of Total Phosphorus in the effluent is deemed to have occurred when the annual average loading exceeds 2.7 kg/d during any twelve consecutive calendar months.

In Compliance

- Non-compliance with respect to loading of Ammonia + Ammonium Nitrogen in the effluent is deemed to have occurred when daily concentration during any calendar day, multiplied by the average daily flow over the seasonal period the sample was taken exceeds 40.5 kg/d.

Note: on March 11, 2021, the daily effluent total ammonia nitrogen concentration was 8.76 mg/L and the flow was 5517 m³, yielding an effluent ammonia loading of 48.3 kg for that day. However, average daily flows for the month of March 2021 were 2,694 m³. Using this value as the “seasonal” average daily flow, the effluent ammonia concentration of 8.76 mg/L would instead yield a loading of 23.6 kg which is less than the C of A compliance criteria. If “seasonal” is interpreted as Winter 2020, or the period from Dec 21, 2020 through March 20, 2021, then the average daily flow is 1,500 m³ and the loading at 8.76 mg/L would be 13.1 kg which is also less than the C of A compliance criteria.

In Compliance

- Non-compliance with respect to E. coli in the effluent is deemed to have occurred when the monthly geomean exceeds 200 CFU (colony forming units).

Please refer to Appendix A for a detailed look at the analytical results.

4.0 Plant Operations

A preventative maintenance program is in effect at the Long Sault WWTP. Preventative maintenance is scheduled on a weekly basis and records are maintained of completed activities.

In 2001, Caneau had a computerized maintenance program installed to ensure that preventative maintenance is preformed on all equipment in accordance with the manufacturer’s specifications.

The last compliance inspection conducted by the MOECC was February 16, 2017.

The flow meter was calibrated on December 14, 2021, by Capital Controls.

4.1 Operational Problems

A logbook of operational activities and problems is maintained at the treatment facility. The plant encountered issues managing effluent ammonia concentrations in the first half of 2021. During the period of the challenges, the ammonia concentration exceeded 15 mg/L on nine samples between February 25 and July 8, 2021. The nitrification problem did not have an obvious initial cause and therefore no immediately apparent solution. In an effort to get the facility back into compliance, operators consulted Township engineers and the MOECC inspector. Based on operational experience and the external guidance received, Caneau operators made a number of adjustments to the process which were noted in the log book and in communications with the MOECC inspector. The following variables were adjusted, studied and tested in an effort to regain ammonia compliance:

- Wasting times
- Alum dosages
- Aeration cycle times
- Number of blowers in operation
- MLSS
- DO and ORP

Ultimately, the results improved after MLSS was increased from 1200 mg/L at a DO of 3-4 mg/L to a MLSS of 3,500-4000 mg/L at a DO of 2-3 mg/L. In July 2021, operators began to see measurable improvement in the nitrification process and the ammonia removal of the treatment process. Ammonia removal for August through December 2021 averaged 95%.

4.2 Maintenance

The following is a list of repairs, calibrations and upgrades that took place at the Long Sault WWTP in the reporting period:

- January 4 - Marleau HVAC on site for heating maintenance.
- January 7 – Marleau Mechanical on site to troubleshoot air supply unit.
- January 19 – Marleau Mechanical on site to work on air supply unit.
- January 20 – Marleau Mechanical on site to work on air supply unit.
- January 21 - Marleau Mechanical on site to work on air supply unit and replace lighting ballast in office.
- February 11 – Eastern Welding on site to inspect broken compactor screw.
- February 11 – Marleau HVAC on site to quote/estimate Engineered Air replacement unit.
- February 11 – Marleau on site to replace timers on grit chamber panel.
- February 17 – Third High Farms on site to prep for sludge removal.
- February 18 – Third High Farms on site to haul one load of sludge from long term storage.
- February 18 – Cogeco and Township on site to upgrade and configure internet.
- February 19 – Eastern Welding on site to disassemble bar screen screw compactor assembly.
- February 19 – Pyro Pro on site to inspect/service fire extinguishers at WWTP, Post Rd Pumping Station and Mille Roches Pumping Station.
- February 23 – Third High Farms on site to haul one load of sludge from long term storage.
- February 26 – Capital Controls on site to troubleshoot the grit/screw timer and add programming.
- March 4 – GFL on site to empty grit dumpster.
- March 8 – Marleau on site to replace ballast in boiler room and install wiring for grit removal PLC contacts.
- March 9 – Genrep on site to conduct semi-annual generator inspections/tests at WWTP and Post Road pumping station.
- March 10 – Genrep on site at Mille Roches pumping station to conduct semi-annual generator inspections/tests.
- March 11 - CDTEC on site to conduct calibrations on gas monitoring equipment.
- March 19 – Marleau on site to take measurements for air handling unit.
- April 5 – Marleau on site to install two receptacles.
- April 20 – Surgeson Electric on site to inspect blowers for vfd replacements.
- April 27 – Capital Controls remotely updated grit removal system cycle.
- April 30 – Marleau on site to replace AC unit in lunchroom.
- May 10 – Third High Farms on site to haul one load from long term storage.
- May 11 – Third High Farms on site to haul from long term storage.
- May 11 – Bergeron, EVB, Township, Caneau on site at Post Rd. pumping station to discuss electrical/float work.
- May 11 – EVB, Township, Caneau on site at WWTP to discuss air handling and bar screen projects.
- May 12 – Third High Farms on site to haul from long term storage.

- May 13 – Third High Farms on site to haul from long term storage.
- May 14 – Third High Farms on site with vac truck to haul from long term storage.
- May 17 – Third High Farms on site with vac truck to haul from long term storage.
- May 18 – Third High Farms on site with vac truck to haul from long term storage. Sludge hauling complete.
- May 20 – Marleau HVAC on site for spring HVAC maintenance.
- May 25 – Township on site to install new computer.
- June 10 – Marleau HVAC on site to replace bearings on air handling unit.
- June 14 – Dwyer Glass on site to install new exterior door seals and sweeps.
- June 16 – Township on site for Sophos router update.
- June 21 – Marleau HVAC on site to replace air exchanger unit and remove motor from air handling unit.
- June 23 – Marleau HVAC on site to install new motor for air handling unit.
- June 29 – EVB on site to take measurements of HVAC system.
- June 29 – Marleau HVAC on site to disconnect motor for ATAD 1.
- July 5 – Capital Controls on site to set up new SCADA computer.
- July 6 – DBC on site to empty remaining sludge in ATAD 1 in order to locate broken spiral aerator and flush line.
- July 8 – Capital Controls on site to disconnect old SCADA computer.
- July 9 – Township and Cameron Networks on site to work on cell phone signal boost project.
- July 9 – Capital Controls connected remotely to troubleshoot SCADA issue.
- July 13 – Ironbrook UV on site to service the UV system.
- July 13 – Capital Controls on site to install new Win911 licence.
- July 14 – Marleau HVAC on site to make final connection on ATAD #1 mixer motor.
- July 20 – Bergeron Electric and Hydro One on site at Post Rd PS to begin electrical/float work.
- July 27 – Bergeron Electric on site at Post Rd PS to begin Phase 2 of electrical/float work.
- July 28 – Bergeron Electric on site at Post Rd PS to continue with pumping station work.
- July 30 – Bergeron Electric on site at Post Rd PS to prepare for August 5 float replacement.
- August 5 – Bergeron Electric and DBC on site at Post Rd Pumping Station to install new floats in the wet well.
- August 10 – Hach on site to conduct annual calibrations.
- August 11 – Township on site to swap over back-up UPS on SCADA.
- August 17 – Ranguard on site at Post Rd Pumping Station to move the alarm panel.
- August 19 – MacGregor Crane on site to remove and replace effluent pump #1.
- August 19 – Marleau on site to disconnect effluent pump #1 and connect replacement pump.
- August 19 – Township on site to bring effluent pump from garage to effluent pump well and to take effluent pump #1 to Surgeson for servicing.
- August 26 – Genrep on site at Post Rd Pumping Station to replace battery.
- September 9 – CDTEC on site for annual inspection of gas monitoring system.
- September 13 – Capital Controls on site at Post Rd pumping station to install new flow meter.
- September 21 – NDT Group on site to inspect gantry and davit arm at WWTP and chainfall at Mille Roches SPS.
- September 22 – EVB on site with contractors for the HVAC job RFP site visit.
- September 28 – EVB on site with contractors for the HVAC job RFP site visit.
- September 28 – Genrep on site at Post Rd pumping station for regular generator maintenance.
- October 6 – Marleau on site to replace a section of domestic hot water line in the boiler room.
- October 6 – Cameron Networks on site to install cell signal boosters.

- October 6 – Endress & Hauser on site to conduct annual calibrations.
- October 7 – Marleau on site to check and repair plugs in biofilter room and to replace ballasts for lights in the lab.
- October 19 – Genrep on site at Mille Roches SPS to conduct annual generator maintenance.
- October 28 – R. Flaro on site to do pressure washing.
- November 3 – Veolia on site to install new bar screen compactor.
- November 4 – Township, Marleau, and EVB on site to discuss upcoming HVAC job.
- November 9 – MacGregor Crane on site to remove effluent pump #2 and install recently serviced replacement pump.
- November 9 – Marleau on site to disconnect effluent pump #2 and connect recently serviced replacement pump.
- November 10 – Surgeson on site to troubleshoot bar screen #1 overtravel alarms.
- November 11 – Surgeson on site to troubleshoot ATAD feed pump #2.
- November 18 – Marleau on site to repair leak in domestic hot water line at plant entrance.
- November 24 – Surgeson on site to disconnect ATAD feed pump #2 and troubleshoot wall outlets near alum pump.
- November 30 – Cintas on site to check and restock first aid box.
- December 9 – Marleau on site to install plug on SBR sludge pump.
- December 14 – Veolia on site to replace limit switches on bar screen #1.
- December 14 – Marleau on site to wire relays for limit switches on bar screen #1.
- December 14 – Capital Controls on site to calibrate flow meters and level sensors on WAS/thickened WAS tanks, flow meter at Post Rd pumping station and level transmitter at Mille Roches SPS.

4.3 Completed Modifications

- There were no completed modifications in 2021.

4.4 Planned Modifications

- There are no planned modifications for 2022.

5.0 Biosolids Management

WSP Canada Inc. was retained to coordinate the transfer and disposal via land application of sewage biosolids from the Long Sault Sewage Treatment Plant (STP) over the course of 2021.

The beneficial use of the sewage biosolids for the purpose of improving the growth of agricultural crops was demonstrated through laboratory analysis in accordance with O. Reg. 267/03. Material application rates were determined based on field conditions and agronomic and/or crop removal balances incorporating assessment of nutrients, metals and solids loading.

The stored biosolids were transferred by Terrapure Environmental/Third High Farms Limited (Terrapure) via tankers and hauled to Land Application Sites with active NASM Plans in accordance with ECA 0936-

574KQF. Field markers delineating the required separation distances to sensitive features were positioned by Terrapure at all land-application sites as per the setbacks shown on the appropriate NASM Plan field sketches. The material was land applied by direct injection and/or immediately incorporated to reduce odour and minimize runoff potential.

The total volume of biosolids transferred from the Long Sault STP in 2021 was **1,040 m³**. The receiving field locations and volumes applied are detailed in Table 1 below along with nutrient loadings.

Table 1: NASM Land Application Summary, Long Sault Sewage Treatment Plan

DATE	NASM PLAN OWNER / ID	FIELD / AREA	MATERIAL SOURCE	TOTAL VOLUME (M ³)	NITROGEN LOADING (KG/HA)	PHOSPHOROUS LOADING (KG/HA) †
May 15, 2021	Rombough – 23325	Neville Home Field A – Lot 21 and 22 Concession 5	Long Sault	1,040	139	75

† Phosphorus as P2O5

Based on recent historical (2016 - 2021) annual volumes of biosolids transferred from the facility, the volume of biosolids generated by the Long Sault STP in 2021 is anticipated to be approximately 1,000 m³.

Metals of concern resulting from the land application of sewage biosolids include As, Cd, Co, Cr, Cu, Hg, Mo, Ni, Pb, Se, Zn. Cumulative metal loadings for these fields range from 0% to 27% of the maximum metal loading limit for five (5) years.

Table 2 below provides a summary of the agricultural fields approved to receive Long Sault STP sewage biosolids (these fields are also approved to receive Ingleside STP material) and, based on nutrient loadings resulting from current and past applications, the remaining capacity of the field to receive material. Please note this is an estimate as nutrient and metals loadings will vary based on material quality data and application rates established at the time of application.

Table 2: Inventory of Fields Approved Under a NASM Plan to Receive Ingleside and Long Sault Biosolids.

FIELD	NASN PLAN OWNER/ID	AREA AVAILABLE FOR NASM (HA)	COMMENT
Rombough North	Rombough – 23325	9	Unavailable – Maximum five-year Phosphorous loading reached.
Rombough South	Rombough - 23325	27	Unavailable – Maximum five-year Phosphorous loading reached.
Hollister Rd.	Rombough - 23325	16	Available - Field has received material under this NASM plan but could receive another application of either Long Sault or Ingleside.
Neville Rd.- Home	Rombough - 23325	13	Available – Part of this field is available (C).

FIELD	NASN PLAN OWNER/ID	AREA AVAILABLE FOR NASM (HA)	COMMENT
Neville Rd. - South East	Rombough - 23325	3	Available - Field has received material under this NASM plan but could receive another application of Long Sault.
Neville Rd. - South West	Rombough - 23325	2	Available - Field has received material under this NASM plan but could receive another application of Long Sault.
Habers Field B + C	Habers - 23973	7.1	Unavailable – Maximum five-year Phosphorous loading reached.
Habers Field D + E	Habers - 23973	11.5	Unavailable – Maximum five-year Phosphorous loading reached.
Habers Field F	Habers - 23973	9.8	Could receive approximately 500 m ³ of Long Sault material at a low application rate.
Habers Field G + H	Habers - 23973	9	Unavailable – Maximum five-year Phosphorous loading reached.
Gallinger Edwards Rd	Gallinger - 24012	21	Available – can still receive Long Sault.
Gallinger Home Field	Gallinger - 24012	28	Unavailable – Maximum five-year Phosphorous loading reached.
Gallinger County Rd 18 & 11	Gallinger – 24012	28	Unavailable – Maximum five-year Phosphorous loading reached.
MacDonell – County Rd 18	MacDonell – 24845	26	Available – can still receive Long Sault.
MacDonell – Maloney Rd	MacDonell – 24845	16	Available – Field has not received material under this NASM.
MacDonell – Myers Rd	MacDonell – 24845	14.5	Available – Field has not received material under this NASM.

Fields have been identified for spring 2022 land application of Long Sault material and will be confirmed closer to land application dates based on field availability and weather conditions.

Appendix A Wastewater Data & Rolling Averages

Year	Month	Flow	CBOD ₅	Rolling Ave.	Exceed.	Rolling Exceed.	BOD ₅ (eff.)	Rolling Ave.	Exceed.	Rolling Exceed.	TSS (effl.)	Rolling Ave.	Exceed.	Rolling Exceed.	TSS (effl.)	Rolling Ave.	Exceed.	Rolling Exceed.	TP (effl.)	Monthly Exceed.	TP (effl.)	Rolling Ave.	Exceed.	Rolling Exceed.
units		m ³ /day	mg/l				kg/d				mg/l				kg/d				mg/l		kg/d			
2021	January	1327	1.50	1.55		0	1.99	2.18		0	4.26	2.86		0	5.65	4.21		0	0.33		0.43	0.69		0
	February	726	2.75	1.60		0	2.00	2.12		0	4.20	2.90		0	3.05	4.05		0	0.23		0.16	0.65		0
	March	2694	3.88	1.80		0	10.44	2.53		0	6.14	3.13		0	16.53	4.41		0	0.29		0.78	0.62		0
	April	1634	3.40	1.96		0	5.56	2.73		0	6.54	3.46		0	10.68	4.85		0	0.43		0.70	0.59		0
	May	1275	3.13	2.10		0	3.99	2.94		0	4.20	3.57		0	5.35	5.06		0	0.33		0.42	0.57		0
	June	776	5.60	2.44		0	4.35	3.21		0	3.58	3.62		0	2.78	5.11		0	0.47		0.36	0.55		0
	July	1174	3.50	2.60		0	4.11	3.47		0	2.98	3.66		0	3.49	5.27		0	0.64		0.76	0.58		0
	August	894	1.50	2.60		0	1.34	3.47		0	3.86	3.83		0	3.45	5.42		0	0.83		0.74	0.60		0
	September	1093	1.88	2.64		0	2.05	3.54		0	3.16	3.95		0	3.45	5.58		0	0.55		0.60	0.59		0
	October	1669	1.50	2.64		0	2.50	3.58		0	3.03	3.95		0	5.05	5.68		0	0.58		0.96	0.60		0
	November	1972	1.50	2.64		0	2.96	3.67		0	2.75	3.97		0	5.42	5.87		0	0.51		1.01	0.64		0
	December	1988	1.50	2.64		0	2.98	3.69		0	2.83	3.96		0	5.62	5.88		0	0.39		0.78	0.64		0
Exceedances in Calendar Year						0				0				0				0		0				0