Long Sault Wastewater Treatment System
2018 Annual Performance Report

Certificate of Approval No. 3-0918-93-979 (June 1997)
Works No. 120000131

Completed by
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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 from January to December.

This Annual Report provides:

- an overview of the wastewater treatment plant performance;
- a summary and interpretation of all monitoring data and analytical results collected, 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;
- 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 1,485 m^3/d (55% of the average daily design flow of 2,700m^3/d). The plant is rated at 11,500m^3/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 outlines the treatment efficiencies of the treatment process within the facility.

Table 2.2: System Treatment Performance

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 (mg/L)	154	1.64	25	2.54	67.5	99
SS (mg/L)	250	5.80	25	8.98	67.5	96
TP (mg/L)	5.76	0.61	1	0.90	2.7	86
NH3+NH4	19.64	0.46	15	0.71	40.5	97
E. Coli (cnts/100ml)		2 (geometric mean)	200			

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).

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 $CBOD_5$.

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, pH, and $CBOD_5$.

Grab samples of Total Coliform, Fecal Coliform/E. Coli, Fecal Streptococcus are also collected weekly.

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.

Effluent Quality

In accordance with the C of A:

In Compliance

- Non-compliance with respect to concentrations of $CBOD_5$ 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.

In Compliance

- 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.

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 $CBOD_5$ 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.

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 October 17, 2018 by Can-Am Instruments.

4.1 Operational Problems

A logbook of operational activities and problems is maintained at the treatment facility.

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:

4.3 Completed Modifications

- There were no completed modifications in 2018.

4.4 Planned Modifications

- There are no planned modifications for 2019.

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 2018.

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 Third High Farms Limited (Iroquois, ON) 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 Third High Farms 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 2018 was **622 m^3**. 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) †	POTASSIUM LOADING (KG/HA) ††
November 15, 2018	Bruining - 22351	Edwards Road A, Lot 34 and 35 Con. 5	Long Sault	622	79	67	11

† Phosphorus as P2O5
†† Potassium as K2O

Based on recent historical (2013 - 2018) annual volumes of biosolids transferred from the facility, the volume of biosolids generated by the Long Sault STP in 2019 is anticipated to be approximately 1,000 m^3. It is anticipated there will be a greater quantity to land apply in 2019 since land application activities were only partially completed due to weather conditions in fall 2018.

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 20% 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. A figure illustrating the approved field locations and summarizing their current land application status is enclosed with this letter.

*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
Dixon Rd., Segment South of Creek	Hartle - 22349	22	**Available -** 1 more application of Long Sault material at a maximum rate of 75 m^3/ha.
Dixon Rd., Segment North of Creek	Hartle - 22349	16	**Available -** 1 more application of Ingleside material at a maximum rate of 50 m^3/ha OR 2 applications of Long Sault material 12 months apart.
Moak Rd., Segments C + E	Hartle - 22349	10	Unavailable – Maximum five year Phosphorous loading reached.
Moak Rd., Segements A + B + D	Hartle - 22349	16	**Available -** Field has not received material under this NASM plan.
Anderson North	Bruining - 22351	28	**Available** - Field has not received material under this NASM plan.
Edwards Road A	Bruining - 22351	6.2	**Available** – more application for Ingleside OR more application for Long Sault material
Edwards Road B	Bruining - 22351	13.2	**Available** - Field has not received material under this NASM plan.
Gallingertown	**Bruining - 22351**	**18**	Unavailable – Maximum five year Phosphorous loading reached.
Home Farm North	**Bruining - 22351**	**9**	Unavailable – Maximum five year Phosphorous loading reached.
Home Farm South	**Bruining - 22351**	**16**	Unavailable – Maximum five year Phosphorous loading reached.
Mary's Rd. South	Bruining - 22351	36	**Available** - more application for Ingleside OR a few applications for Long Sault material
Solar Farm	Bruining - 22351	8	**Available** - Field has not received material under this NASM plan.
Black River Rd	Esdale – 22350	34	**Available** – A few applications for Long Sault material or 1 application for Ingleside at a low application rate
Cornwall Centre	Esdale – 22350	30	Field no longer available as of spring 2018.
Speer Rd	Esdale – 22350	19	**Available** – Steep slopes limit application rates and area for material.
Rombough North	Rombough – 23325	9	Unavailable – Maximum five year Phosphorous loading reached.
Rombough South	Rombough - 23325	27	Unavailable – Maximum five year Phosphorous loading reached.

FIELD	NASN PLAN OWNER/ID	AREA AVAILABLE FOR NASM (HA)	COMMENT
Hollister Rd.	Rombough - 23325	16	**Available** - Field has not received material under this NASM plan.
Neville Rd.- Home	Rombough - 23325	13	**Available** - Field has not received material under this NASM plan.
Neville Rd. - South East	Rombough - 23325	3	**Available** - Field has not received material under this NASM plan.
Neville Rd. - South West	Rombough - 23325	2	**Available** - Field has not received material under this NASM plan.

Fields have been identified for spring 2019 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