March 6, 2018

Ministry of the Environment
70 Foster Drive, Suite 110
Sault Ste. Marie, ON P6A 6V4

ATTENTION: Safe Drinking Water Branch

RE: ELLIOT LAKE Wastewater Treatment Plant Annual Performance Report - 2017

Please find attached, the 2017 Annual Report for the Elliot Lake Wastewater Treatment Plant. This report has been prepared in accordance to the guidelines set out in Condition $10_{(5)}$ of Facility Certificate of Approval Number 5239-5GXSMK.

This report covers the period from January 1, 2017 to December 31, 2017.

Please direct any questions or concerns to the undersigned.

Yours truly,

Daryl Halloch
Manager of Environmental Services
City of Elliot Lake

Elliot Lake Wastewater Treatment Plant
2017 Annual Report

The purpose of this report is to provide performance and compliance records pertaining to the Elliot Lake wastewater treatment plant to the Ministry of the Environment. This report is prepared in accordance with Condition $10_{(5)}$ of the Certificate of Approval and covers the reporting period from January 1, 2017 to December 31, 2017.

This report contains the following information:

a) a summary and interpretation of all monitoring data and a comparison to the effluent limits outlined in Condition 7, including an overview of the success and adequacy of the *Works;*

b) a description of any operating problems encountered and corrective actions taken;

c) a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the *Works;*

d) a summary of any effluent quality assurance or control measures undertaken in the reporting period;

e) a summary of the calibration and maintenance carried out on all effluent monitoring equipment;

f) a description of efforts made and results achieved in meeting the Effluent Objectives of Condition 6;

g) a tabulation of the volume of sludge generated in the reporting period, an outline of anticipated volumes to be generated in the next reporting period and a summary of the locations to where the sludge was disposed;

h) a summary of any complaints received during the reporting period and any steps taken to address the complaints;

i) a summary of all *By-pass,* spill or abnormal discharge events;

a) - Effluent Limits – Condition 7:

Month	CBOD	Total Suspended Solids	Total Phosphorus	Total Flow	CBOD Loading	Total Suspended Solids Loading	Total Phosphorus Loading
	Monthly Average mg/l	Monthly Average mg/l	Monthly Average mg/l	Cubic Meters / month	Kilograms / day	Kilograms / day	Kilograms / day
January	4	14	0.36	159,721	20.6	72.1	1.9
February	5	15	0.28	153,893	27.5	82.4	1.5
March	6	9	0.30	229,939	44.5	66.8	2.2
April	6	11	0.28	295,746	59.1	108.4	2.8
May	5	15	0.26	219,739	35.4	106.3	1.8
June	5	12	0.33	168,834	28.1	67.5	1.9
July	4	9	0.26	180,957	23.3	52.5	1.5
August	3	8	0.24	182,885	17.7	47.2	1.4
September	9	14	0.33	139,266	41.8	65.0	1.5
October	3	13	0.38	256,273	24.8	107.5	3.1
November	6	14	0.38	249,386	49.9	116.4	3.2
December	5	13	0.31	228,697	36.9	95.9	2.3
Annual Average	**5.1**	**12.3**	**0.31**	**205,445**	**34.1**	**82.3**	**2.1**

The total flow for the facility for the 2017 operating year was 2,465,336 cubic meters

b) – Operating Problems or Issues Encountered:

Throughout the 2017 year, the wastewater plant experienced several issues when it came to both methane production and boiler system that uses the methane gas to convert into a heat source.

Operations staff through regular sampling and preventative maintenance discovered the fact that the two year old heat exchange had developed a leak on a weld line inside the unit. This caused the contamination of the source water in the closed loop heating system which eventually plugged up the coils in both boiler systems. Several man hours were spent both trouble shooting to find the problem along with the corrective actions to fix it. The Heat exchange was eventually replaced under warranty and the entire closed loop heating system was flushed out for several weeks resulting in little to no methane production at the time.

The 2017 year was also the first year the wastewater plant started receiving septic sewage from

cottage develop areas that surround the city. It may be too soon to assess, but the plant seem to experience higher nitrogen levels in its process which showed in the effluent samples which affects downstream receiving waters causing algae blooms. The operational team is taking steps to have septic sludge received further up-steam at a lift station, where it would allow better mixing and avoid shock loading to the plants process.

c) – Summary of Facility Maintenance:

Annual maintenance for the facility is scheduled in excel format and is followed up with a work order which is submitted to the department head for review and file. The Plants department is currently researching alternative methods to running its preventative maintenance program, where it can be electronically filed and accessed more easily.

Last year the City had a major retrofit to one of its main and most important lift stations. Due to several pump problems throughout the year, the Director of Infrastructure services through the emergency procurement policy, had both pumps replaced. The two new pumps totalled $166,261 which was drawn from reserve funds.

Another project completed in 2017, was the replacement of six actuator valves in the primary clarifier building with a total cost of $19,143.

d) – Quality Assurance, Quality Control Measures:

The majority of the process analysis for the facility is done in house by the Operation staff using standardized and accepted laboratory techniques. All results are recorded and compared to historical data. In the event that a deviation is detected, repeat analysis is performed to verify the results. Samples such as CBOD are sent to an accredited lab for analysis. Plant process is further monitored through the use of an on-line turbidity analyser which is monitored daily.

e) – Calibration and Maintenance of Effluent Monitoring Equipment:

The effluent turbidity analyzer and the analytical equipment used in the lab are tested and verified monthly by the Laboratory Technician. The analytical equipment in the laboratory is calibrated once annually.

f) – Effluent Objectives:

As noted in Section a) of this report, the Effluent Objectives for Suspended Solids, CBOD and for Total Phosphorus are being met by the facility.

Plant chlorination values are sent to the Medical Officer of Health with copies sent to various other stakeholders on a monthly basis. The four sample locations reported for the dechlorination project are as follows:

- Location One – Esten Lake at a point near the diversion channel;
- Location Seven – Diversion Channel taken at the point where Nordic Creek is introduced to the wastewater effluent stream;
- Location Three – Depot Lake farthest area of lake after diversion channel stream is introduced;
- Final Effluent – last accessible sample point in plant. Note that residuals at this location vary as a result of partial mixing and contact time this is due to location of chlorine injection in relation to the sample port;

Changes in the sampling procedure for Final Effluent bacteriological sample collection were developed and implemented in 2014. Total volume of the effluent line was calculated based on as built drawings to determine actual, minimum and maximum chlorine contact time for the treated and chlorinated effluent. Once representative hold times were established prior to the introduction of sodium thiosulphate in the bac-t sampling process, the coliform counts were seen to be significantly reduced and verified that the plant is meeting effluent criteria as can be seen in the table below;

AVERAGE FLOW FOR 2017 WAS 6754 m^3/Day or 4690 L/min

THE EFFLUENT PIPE IS .8 m IN DIAMETER AND IS 2400 m LONG

VOLUME OF PIPE $A = \pi r^2$ ***X length*** $A = 3.14(.4m)^2$ ***X 2400 m = 1205 m^3 or 1205 000 L***

TIME IN PIPE WITH AVERAGE FLOW $\frac{1205\ 000L}{3836\ L/min}$ ***= 257 Minutes or 4.3 hours.***

So with an average flow of 3836L/min, it would take the effluent leaving the plant 4.3 hours to get to the end of the pipe. With this in mind, operators will take a grab sample and let it sit for 4 hours on average before testing it for total chlorine residual and then adding it to the bac-t bottle for ship out to the lab.

Month	Geometric Mean - Total Coliform	Geometric Mean - E-Coli
May	317.7	0
June	54.2	4.3
July	36.1	2
August	146.6	2
September	97.3	2
October	111.6	0

Copies of the monthly reports entitled “Esten Lake Dechlorination Project” are appended to this report.

g) – Sludge

Month	Digested Sludge Hauled	Methane Produced	Methane Wasted	Aluminum Sulphate Used
	Cubic Meters	Cubic Meters	Cubic Meters	Tonnes
January	371	4,840	0	12.3
February	371	2,870	0	10.5
March	448	1,781	0	11.4
April	371	2,264	0	14
May	463	3,892	0	11.3
June	371	2,283	0	11.1
July	401	499	0	10.6
August	510	519	0	10.3
September	371	0	1,655	10.9
October	402	2,633	500	11.9
November	448	4,753	0	10.8
December	355	5,531	0	11.8
	4,882	**31,865**	**2,155**	**136.9**

All waste sludge is hauled under contract from the wastewater treatment facility to Waste Disposal Site # A560812. The current sludge haulage contractor Four Seasons is based out of Blind River, Ontario.

The City of Elliot Lake has retained the services of Pinchin Ltd in order to comply with Conditions 22 and 24 of Environmental Compliance Approval No. A560812.

The City pumped over 4,882,000 Liters of sludge at an average suspended solids rate of 32,000 mg/liter totalling 156 tonnes which is below the regulated level of 180 tonnes.

h) - Complaints:

There were no noted complaints with regard to the operation of the wastewater treatment facility in this reporting year.

i) – Bypasses, Spills, or Abnormal Discharge Events:

There were no noted bypasses, spills or abnormal discharge events with regard to the wastewater treatment facility in this reporting year.