

# 2023 Annual Report

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## Hudson Communal Sewage System



**Prepared for:** The Ministry of the Environment, Conservation and Parks  
**Prepared by:** Northern Waterworks Inc. on behalf of the Municipality of Sioux Lookout  
**Date:** March 28, 2024

# Contents

<b>1</b>	<b>Introduction</b> .....	<b>3</b>
	1.1 Annual Reporting Requirements .....	3
	1.2 System Description .....	4
<b>2</b>	<b>Water Quality</b> .....	<b>5</b>
<b>3</b>	<b>Flow Monitoring</b> .....	<b>6</b>
<b>4</b>	<b>Maintenance &amp; Modifications</b> .....	<b>7</b>
<b>5</b>	<b>Operating Problems</b> .....	<b>8</b>
<b>6</b>	<b>Conclusion</b> .....	<b>8</b>

# 1 Introduction

## 1.1 Annual Reporting Requirements

The Hudson Communal Sewage System is regulated by the terms and conditions provided within amended Certificate of Approval No. 5852-5X8KRJ (the Certificate) issued to the Corporation of the Municipality of Sioux Lookout on November 15, 2004. This Report summarizes the system's performance over the previous calendar year (January 1 to December 31, 2023) and is intended 1) to provide a performance record for future references, 2) to ensure that the Ministry is made aware of problems as they arise and 3) to provide a compliance record for the terms and conditions outlined in the Certificate.

This Annual Report has been prepared in accordance with Condition 8(2) of the Certificate and must contain, but shall not be limited to, the following information:

- A summary and interpretation of all monitoring data and a comparison to the effluent objectives outlined in Condition 6 of the Certificate, including an overview of the success and adequacy of the Works (refer to sections 2 & 6);
- A tabulation of the daily volumes of effluent disposed through the subsurface disposal system during the reporting period (refer to section 3);
- A summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the Works (refer to section 4); and,
- A description of any operating problems encountered and corrective actions taken (refer to section 5).

## 1.2 System Description

The Hudson Communal Sewage System serves the Hudson Water Treatment Plant and a limited number of households within the community. With a rated capacity of 15,300 L/day, the system consists of six (6) septic tanks, a pump chamber and force-main, and seven (7) Ecoflo Biofilters with a subsurface disposal system. The system was installed in October 2003.

The septic tanks collect wastewater and direct it to the pump chamber, which includes an ejector pump, controls and alarms. Wastewater is then transferred from the pump chamber by force-main to the flow distribution box ahead of the Ecoflo Biofilters. Following treatment through the filters, effluent is discharged to a disbursement field.

The Hudson Communal Sewage System consists of the following components:

- One (1) 4,500 L capacity septic tank on Lot #21 complete with integral effluent filter, one (1) 3,600 L capacity septic tank on Lot #68 complete with integral effluent filter, one (1) 4,500 L capacity septic tank on Lot #73 complete with integral effluent filter to serve the Hudson WTP, and three (3) 3,600 L capacity dual compartment septic tanks on Lots #22, #67, and #66, each complete with integral effluent filter;
- One (1) 1,136 L capacity pump chamber located on the north side of the street, receiving sewage effluent from the septic tanks, equipped with an ejector pump, controls, alarms and 30 mm diameter force-main connecting the pump chamber and discharging to the flow distribution box ahead of the:
- Seven (7) Ecoflo Biofilters (ST-650 or equivalent, each capable of handling 2,200 L of domestic strength sewage) located on Lot #74. Water is distributed over the entire surface of the filtering media using an internal tipping bucket that equally doses the water onto the peat medium by specifically designed distribution plates that include channels and orifices to ensure even distribution. Wastewater trickles down through the filter media where its organic content is consumed by fixed bacteria.

Treated Ecoflo Biofilter effluent infiltrates the ground directly underneath each of the seven (7) open bottom units. The filters are installed in a parallel configuration covering an area of 360 square meters with a 300 mm deep sand base, with a 200 mm deep crushed stone sub-base and a 15 m wide local sandy material mantle extending towards the direction of surface drainage flow.

## 2 Water Quality

Samples are collected by licensed operators and submitted to an accredited laboratory for analysis in accordance with the final effluent monitoring requirements provided in Condition 5(2) (Monitoring and Recording) of the Certificate. Notably, where Conditions 5(1) and 5(2) require the collection and analysis of effluent samples, there is no method to sample the effluent discharged directly into the ground beneath each of the Ecoflo Biofilter units. Samples are instead collected from the pumping chamber upstream of the filter units, and results are representative of the loadings being introduced to the filters. The sampling results included in this report are not necessarily indicative of effluent water quality.

Notably, Condition 5(3) of the Certificate required the establishment of a groundwater monitoring well approximately 30 meters down-gradient of the subsurface disposal system, such that samples were to be collected on a monthly basis and analyzed for total phosphorus, nitrate, and nitrite. Condition 5(4) of the Certificate required that such groundwater monitoring be undertaken for a period of at least three (3) years following the commencement of the Works. The Ministry subsequently granted relief from the groundwater monitoring requirements on June 10, 2014.

In accordance with Condition 8(2)(a) of the Certificate, this report must provide a summary and interpretation of all monitoring data and a comparison to the effluent objectives prescribed in the Certificate. **Table 1** summarizes all monitoring results and provides a comparison with the effluent objectives for the parameters carbonaceous biochemical oxygen demand and total suspended solids. Objectives are summarized in Condition 6 (Effluent Objectives) of the Certificate and best efforts must be used to design, construct, and operate the sewage works such that the concentrations of parameters do not exceed the objectives in the effluent being discharged to the subsurface disposal system.

There were no instances where the effluent monitoring results exceeded the objective limits from the ECA.

Sample Date	CBOD5 (mg/L)	TSS (mg/L)	Total P (mg/L)	TAN (mg/L)
Objective	10	10	n/a	n/a
23-May-2023	10.7	6.1	0.519	4.47
July 2023	---	---	---	---
15-Aug-2023	4.7	<3.0	0.442	3.29
Oct 2023	---	---	---	---

1. CBOD = carbonaceous biochemical oxygen demand; TSS = total suspended solids; Total P = total phosphorus; TAN = total ammonia nitrogen.  
2. Samples were not collected in July or October

### 3 Flow Monitoring

Condition 5(6) of the Certificate requires the measurement and recording of the daily volume of effluent being discharged to the subsurface disposal system. The Owner is expected to use best efforts to ensure that the average daily flow of effluent discharged does not exceed 15.3 m<sup>3</sup>/day over the course of a calendar year.

In accordance with Condition 8(2)(b) of the Certificate, this report must provide a tabulation of the daily volumes of effluent disposed through the subsurface disposal system during the reporting period. Flow monitoring results are summarized in **Table 2**. In 2023, approximately 2,176 m<sup>3</sup> of effluent was discharged to the subsurface disposal system. On an average day 6.0 m<sup>3</sup> (6,000 L) of effluent was discharged, representing 39% of the rated capacity.

Table 2: Flow monitoring results summary - 2023				
Month	Total Volume (m <sup>3</sup> )	Average Daily Flow (m <sup>3</sup> /day)	Capacity Assessment <sup>1</sup> (%)	Maximum Daily Flow (m <sup>3</sup> /day)
Jan	172.1	5.6	36%	17.3
Feb	187.0	6.7	44%	11.5
Mar	212.9	6.9	45%	13.8
Apr	208.5	7.0	45%	11.3
May	275.5	8.9	58%	27.5
Jun	201.0	6.7	44%	21.7
Jul	199.7	6.4	42%	8.5
Aug	209.8	6.8	44%	9.4
Sep	118.8	4.0	26%	5.0
Oct	124.3	4.0	26%	5.6
Nov	113.7	3.8	25%	5.1
Dec	153.0	4.9	32%	6.8
Total	2,176	---	---	---
Average	181	6.0	39%	---

1. Capacity assessments compare average daily effluent flows to the rated capacity of the Hudson Communal Sewage System (15.3 m<sup>3</sup>/day).

#### 4 Maintenance & Modifications

In accordance with Condition 8(2)(c) of the Certificate, this report must include a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the sewage works. A planned maintenance program is employed that ensures that the sewage works and related equipment that are installed or used to achieve compliance are properly operated and maintained.

Additional significant maintenance activities and minor repairs and modifications that occurred during the reporting period are summarized in **Table 3**.

Table 3: Summary of maintenance activities, minor repairs and modifications - 2023	
Date	Task
June through September	Vegetation control to ensure access to the system was conducted throughout the summer.
Aug 2023	Peat moss replaced in four of the seven Eco-flo units; the other three units will have the peat moss replaced in 2024.
11-Sep-2023	Calibration verification for the flow measuring device was conducted by a representative from Synergy Controls Corporation. The flow measuring device passed calibration verification.

## 5 Operating Problems

In accordance with Condition 8(2)(d) of the Certificate, this Report must provide a description of any operating problems encountered and corrective actions taken during the reporting period. For the purposes of this report, operating problems may be indicated by 1) significant equipment and infrastructure failures, 2) by-passes, overflows, spills and abnormal discharge events and 3) rated capacity and objective exceedances.

There were no operating problems during the reporting period.

## 6 Conclusion

In accordance with Condition 8(2)(a) of the Certificate, this report must include an overview of the success and adequacy of the sewage treatment program. While the annual average daily flow from the sewage works was within the system's rated capacity, it is difficult to evaluate system performance in the absence of a method to sample effluent water quality. Results associated with samples collected from the pump chamber upstream of the filter units suggest that objectives are being consistently achieved.