

2018 Townsend Sewage Lagoons Annual Report

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- **Background**

The Townsend sewage lagoons and pumping station are owned by Haldimand County and operated by Veolia Water. The lagoons operated under the Amended Environmental Compliance Approval (ECA) # 1628-A2LRAY up until October 31, 2017, from that point on the lagoon operate under ECA # 1799-ARBJGR. The lagoons have a nominal design flow of 2,095 m³/d with a total storage volume of 355,500 m³ (3 of 4 cells).

The lagoons can be discharged in the spring after the liquid surface in the lagoon has become approximately 50% free of ice cover and terminating not later than May 15, continuing for not less than 14 discharge days and using reasonable efforts to maximize the discharge rate to coincide with the spring freshet and elevated flows in the receiver and in the fall not earlier than October 15 and terminating not later than November 30, and continuing for not less than 14 discharge days. The effluent is discharged into Nanticoke Creek.

The fourth cell in Townsend is used as a biosolids storage facility, and receives biosolids from the facilities in Haldimand and Norfolk Counties. The biosolids facility operated under C of A #6132-4M6GRK up until October 31, 2017 and is now joined with the sewage lagoons under ECA #1799-ARBJGR .

- **Per Capita Flows and Loadings**

Table 1 summarizes the 2018 Townsend per capita flows and loadings and compares to typical results

Table 1 – Townsend Per Capita Flows and Loadings			
Parameter	2017	2018	
Population	924	924	
Average Daily Influent Flow (m ³ /d)	272	276	
Peak Daily Influent Flow (m ³ /d)	1140	1,521	
Average Influent BOD ₅ (mg/L)	179	189	
Average Influent TSS (mg/L)	88	92	
Average Influent TKN (mg/L)	46	50	
Average Influent TP (mg/L)	5.5	5.7	
Per Capita Flows and Loadings			
Parameter	2017	2018	Typical
Per Capita Wastewater Flow (L/person/day)	294	299	350 – 500* 332**
Per Capita BOD ₅ Loading (g/person/day)	53	57	80*
Per Capita TSS Loading (g/person/day)	24	28	90*
Per Capita TKN Loading (g/person/day)	14	15	13*

Ratios			
Peak Day / Annual Average Flow	4.2	5.5	2.0 – 3.0
Influent TSS/BOD ₅	0.5	0.5	0.8 – 1.2
Influent TKN/BOD ₅	0.3	0.3	0.1 – 0.2
Notes:			
* Results are for typical residential wastewater and are identified in Metcalf and Eddy, Wastewater Treatment and Reuse (4 th Edition).			
**Grand River Conservation Authority, "2017 Watershed Overview of Wastewater Treatment Plant Performance", July, 2018			

Loading Observations

- 2018 average day flow of 276 m³/d are very similar to the 2017 flow of 272 m³/d;
- Per capita wastewater flow of 299 L/person/d is lower than the typical range and GRCA watershed treatment plants;
- Per capita BOD₅ and TSS loading are below typical;
- Per capita TKN loading is within typical;
- Peak to annual average flow ratio is above typical, this could be a result of severe instantaneous wet weather events;
- Ratio for TSS/BOD₅ within typical;
- Ratio for TKN/BOD₅ is slightly above typical.

Performance

Table 2 is a summary of the discharge quality compared to the ECA objectives and limits for the spring and fall discharge periods. Please note there was no spring discharge in 2018.

Table 2 – Summary of Discharge Quality Compared to ECA Objectives and Limits							
Spring Discharge							
Parameter	Avg. (mg/L)	Objective (mg/L)	Limit (mg/L)	Max Value (mg/L)	Individual Sample Limit (mg/L)	Avg. Loading (kg/d)	Loading Limits (kg/d)
cBOD ₅	N/A	25	25	N/A	40.0	N/A	52.4
TSS	N/A	25	30	N/A	40.0	N/A	62.9
Total Phosphorous	N/A	0.8	1.0	N/A	N/A	N/A	2.1
Total Ammonia Nitrogen	N/A	4.5	N/A	N/A	5.5	N/A	N/A
Hydrogen Sulphide	N/A	N/A	N/A	N/A	0.3	N/A	N/A
pH	N/A	6.5 – 8.5	6.0 – 9.5		6.0 – 9.5		
Un-ionized Ammonia	0.0002	0.02	N/A	N/A	N/A	N/A	N/A
Fall Discharge							
Parameter	Avg. (mg/L)	Objective (mg/L)	Limit (mg/L)	Max Value (mg/L)	Individual Sample Limit (mg/L)	Avg. Loading (kg/d)	Loading Limits (kg/d)
cBOD ₅	3.6	25	25	4.0	40.0	19.5/1.4	52.4
TSS	9.6	25	30	19	40.0	51.9/3.6	62.9
Total Phosphorous	0.09	0.8	1.0	0.16	N/A	0.47/0.03	2.1
Total Ammonia Nitrogen	0.3	4.5	N/A	0.73	5.5	N/A	N/A
Hydrogen Sulphide	N/A	N/A	N/A	0.04	0.3	N/A	N/A
pH	7.23 – 8.22	6.5 – 8.5	6.0 – 9.5		6.0 – 9.5		
Un-ionized Ammonia	0.0025	0.02	N/A	N/A	N/A	N/A	N/A
Notes:							

Discharge compliance is based on the following:

- The average concentration of all samples taken (for each parameter) must meet the compliance objectives and limits.
- The maximum concentration for each parameter must meet the maximum concentration limit
- The average loading for each parameter must meet the average loading limit
- The un-ionized portion of ammonia is calculated using the temperature and pH of final effluent and compared to the provincial water quality objective

Table 3 is a summary of the number of days discharged and the total volume discharged. Please note there was no spring discharge in 2018.

Table 3 – Summary of Discharge Period				
Spring Discharge				
Parameter	Start Date	End Date	Days	Requirement
Spring	N/A	N/A	N/A	50% free of ice cover – May 15 >14 Days
Volume Discharged	No Spring discharge			
Fall Discharge				
Parameter	Start Date	End Date	Days	Requirement
Fall	Oct. 31	Nov. 23	24	Oct. 15 – Nov. 30 >14 Days
Volume Discharged	129,835 m ³			
Notes:				
<ul style="list-style-type: none"> • Spring discharge can commence after the liquid surface in the lagoon has become approximately 50% free of ice cover, terminating within 45 days thereafter for not less than fourteen (14) discharge days • Fall discharge can commence October 15 and terminate not later than November 30, and continue for not less than 14 discharge days 				

- **Effluent Observations**
 - There was no spring discharge in 2018;
 - All compliance objectives and limits were met for 2018.
- **Operational Issues**
 - No operational issues were encountered.
- **Sludge Volume**

In July 2010, County staff profiled the depth of sludge over a cross-section of the three (3) lagoon cells. The results of the study are summarized in Table 4.

Table 4 – Summary of Lagoon Sludge Volumes and Depths		
Lagoon Cell	Total Sludge Volume (m3)	Average Sludge Depth (mm)
Cell #1	8,060	95
Cell #2	6,842	88
Cell #3	12,215	144

- **Facility Activities in 2018**
 - Completed groundwater monitoring sampling;

- Developed draft agreement for Norfolk County’s use of Townsend Biosolids Management Facility;
- Pump station diesel fuel tank replacements;
- Upgrades to Townsend biosolids lagoon:
 - Residual solids removed,
 - Construction of new internal berms to divide into 3 cells,
 - Road access surfaces constructed,
 - Decant piping and valving for new Biosolids Cell,
 - Installation of new automatic card swipe gate and fence.
- **Planned Activities for 2019**
 - Continue ground water monitoring program for the biosolids interim storage lagoon;
 - Finalize agreement with Norfolk County for use of Townsend Biosolids Management Facility;
 - Complete upgrades to biosolids lagoon:
 - Completion of internal berms and road access,
 - Completion of new automatic card swipe gate and fence,
 - Completion of electrical supply for the site.
 - Concrete rehabilitation of the lagoon influent distribution chamber.
- **Bypasses, Overflows and Spills**
 - There were no bypasses, overflows or spills.
- **Summary of Discharge Data**
 - Discharge Data is listed at the end of this report;
 - Table 7 contains all spring discharge data;
 - Table 8 contains all fall discharge data.
- **Calibration Reports**
 - See attached
- **Maintenance Activities**

Routine preventative maintenance was performed on the lagoons and pumping station equipment during the reporting period. This includes tasks such as:

- vegetation control and inspection of lagoon cell berms;
- the removal, inspection and servicing of submersible pumps;
- the inspection, testing and servicing of the back-up generator system;
- see attached for complete annual maintenance report.

Townsend Biosolids Summary

1. Biosolids Sludge Removal

Table 5 is a summary of the biosolids removed from Townsend Lagoon Cell #4 and land application sites.

Table 5– Monthly Summary of Biosolids Removed From Cell 4				
Date (2017)	Biosolids Storage Lagoon Volume Out (m³)	Concentration (% solids)	Biosolids Removed (Dry Tonnes)	Biosolids Haulage Destination
July 19	1,221.1	4.85	59.22	HN1331
July 20	1,367.16	5.1	69.73	HN1331
July 23	1,400.6	5.25	73.53	HN1331
September 28	1,488.72	6.1	90.07	HN1184
October 5	1,761.79	6.1	107.47	HN1184
October 9	1,033.07	8.1	83.68	HN1187
October 10	579.56	11.0	63.75	HN1334
October 11	370.85	10.9	40.42	HN1331
Total	9,222.0	-	587.87	

Table 6 is a summary of the other treatment plants which store biosolids in the Townsend Lagoon Cell #4 For 2018.

Table 6 – Biosolids Transferred to Townsend Biosolids Lagoon Cell#4 in 2018			
Plant	Volume (m³)	Average Concentration (%)	Mass (tonnes)
Caledonia WWTP	7,243.7	2.33	170.34
Cayuga WWTP	90.0	2.63	2.37
Hagersville WWTP	135.5	2.50	3.39
Dunnville WWTP	4,180	2.66	116.37
Nanticoke WTP	1,764.8	5.8	102.94
Haldimand Subtotal	13,413.9	-	395.41
Port Dover WWTP	834.6	4.3	35.89
Port Rowan WWTP	1,936	2.75	52.56
Simcoe WWTP	5,825	3.14	192.46
Delhi WWTP	951.2	2.61	23.82
Subtotal Norfolk	10,086.8	-	304.73
Total	23,500.7	-	700.14

2. Ground Water Sampling

The 2018 Monitoring Program for the Townsend Lagoons as required by ECA # 1799-ARBJGR indicated no adverse groundwater impacts from the Townsend lagoons and met all compliance limits for 2018. See Attached WSP sampling results.

3. Sampling Site Plan

- Please see attached document for identification of monitoring well locations.

4. Biosolids Maintenance Activities

- Vegetation management of Cell #4 Facility including routine berm inspection.

5. Biosolids Operational Issues

- No operational issues for 2018.

Date	Discharge Flow m ³ /d	CBOD (mg/l)	TSS (mg/l)	Phosphorous (mg/l)	pH (SU)	Ammonia (mg/l)	Unionized Ammonia (mg/l)	Ecoli (No/100ml)	H ₂ S (mg/l)

Table 7 - Summary of Spring Discharge Data – No Spring Discharge for 2018

Table 8 - Summary of Fall Discharge Data

Date	Discharge Flow m³/d	CBOD (mg/l)	TSS (mg/l)	Phosphorous (mg/l)	pH (SU)	Ammonia (mg/l)	Unionized Ammonia (mg/l)	Ecoli (No/100ml)	H₂S (mg/l)
1-Nov	4,982.9								
2-Nov	5,025.3								
3-Nov	5,010.1								
4-Nov	4,999.4								
5-Nov	5,047.5				7.75				
6-Nov	5,006.8								
7-Nov	4,790.4	4	2	0.05	7.86	0.06	0.00100	58	0.04
8-Nov	4,535.7								
9-Nov	4,522.8				8.06				
10-Nov	4,530.8								
11-Nov	4,540.5								
12-Nov	4,538.3				8.20				
13-Nov	4,545.1								
14-Nov	5,522.9	4	10	0.08	8.22	0.34	0.00730	11	0.04
15-Nov	6,313.2								
16-Nov	6,325.4				8.14				
17-Nov	6,318.7								
18-Nov	6,337.3								
19-Nov	7,593.6	4	19	0.1	8.04	0.73	0.01000	730	0.04
20-Nov	8,198.7								
21-Nov	8,214.9				8.16				
22-Nov	8,208.2								
23-Nov	2,742.4	4	12	0.16	7.38	0.29	0.00090	1	0.04