



Ontario Clean Water Agency
Agence Ontarienne Des Eaux

TOBERMORY
SEWAGE LAGOON

Annual Report
January 1 to December 31, 2013

Prepared by: David Trombley
Process & Compliance Technician
Ontario Clean Water Agency
West Highlands Hub

March 31, 2014

Ministry of the Environment
Third Floor
101 17th Street East
Owen Sound, ON
N4K 0A5

Attention: John Ritchie, Water Compliance Supervisor

Subject: Tobermory Sewage Treatment System
Lot 49, Concession 1, Former township of St. Edmonds,
Municipality of Northern Bruce Peninsula, ON

Certificate of Approval (C of A) # 3-0046-93-006 dated February 24, 1993.

The Ontario Clean Water Agency entered into an operation and maintenance agreement for the Tobermory Sewage Works with the Municipality of Northern Bruce Peninsula, which took effect July 1st 2009.

The enclosed 2013 Report for the above referenced facility summarizes the performance and related activities from January 1st 2013 through December 31st 2013 in accordance with C of A # 3-0046-93-006; Condition 15 a) through i).

Table 1: Monitoring Program as per above-referenced C of A

Source	Parameter	Frequency	Method
Influent	Flow (m ³)	Daily	Flow Meter
Secondary Aeration Cell Effluent	BOD ₅ , SS, TP, TKN, NH ₃ +NH ₄ (N), Nitrate, Nitrite	Monthly – March, June, July, August and October	External Analysis
Aeration Cells	pH, Dissolved Oxygen	Weekly	In-House
Ground Water Wells	Alkalinity, Conductivity, Free Ammonia, Phenols, pH, Chloride, Sulphate, Nitrite, Magnesium, Iron, Nitrate, Calcium, Hardness, Sodium, DOC, Organic Nitrogen, TKN, Dissolved Reactive Phosphorous *, Total P * * = Shallow Wells Only	All thirty – Spring (May) & Fall (October) Limited – Summer (August) OW-6S, OW-6I, OW-6D, OW-7S, OW-9S, OW-9I, OW-9D, OW-10S, OW-11S, OW-12S	External Analysis
Ground Water Wells	Aluminum, Barium, Cadmium, Chromium, Copper, Lead, Manganese, Zinc	Every Three Years – Fall (October)	External Analysis

Project Description

The Tobermory Sewage Works System in the Municipality of Northern Bruce Peninsula (formerly Township of St. Edmunds) comprises a wastewater treatment plant and one sewage pumping station. The wastewater generated within the collection area of Tobermory is collected into the sewer system and pumped to the wastewater treatment plant by way of 150 mm forcemain. The wastewater treatment plant consists of two aerated cells, one storage cell, two exfiltration ponds and one overflow cell.

The wastewater treatment plant contains two (2) aerated lagoons. The capacity of aeration cells #1 and #2 is 10,800 m³ each. The aeration provided is tapered coarse bubble, diffused aeration. The aeration Cell #2 has a quiescent settling zone to permit effluent clarification. The effluent from the aeration Cell #2 can be recycled to aeration Cell #1 can be transferred to storage Cell #1 for winter storage, or can be transferred to the exfiltration Cells #2 or 3 during summer operations. The exfiltration cells have a combined minimum rated capacity of 317m³/day, and each cell has approximately 13,750 m² of surface area.

To provide coarse bubble diffused aeration for the two aerated cells, the plant is provided with one duty and two standby blowers, each rated with a firm capacity of 193 L/sec at approximately 38 kPa.

The sewage pumping station, which is also called Little Tub Harbour Pumping Station, is located near the harbour, and has two submersible pumps each rated at 17.0 L/sec capacity at 50.5 m TDH. The wet well has a normal operating volume of 5.7 m³. Due to its location near the harbour, the sewage pumping station wet well is provided with an odour control activated carbon adsorption unit having a capacity of 188.8 L/sec, for adsorbing hydrogen sulphide gas emissions from the wet well. The pumping station is also provided with a 150-kW diesel generator set for providing emergency power for the sewage pumps.

Plant Facts

Facility:	Sewage Treatment Lagoon	Plant Classification:	WWT II
Design Capacity:	625 m ³ /day	Works Number:	120001577
Average Daily Flow:	117.72 m ³ (2013)	Organization Code:	1132
Receiving Water:	None		
Certificates of Approval:	3-0046-93-006 8-1063-94-006 (Air)		

Plant Performance & Effluent Quality

Table 2: Aeration Cell Effluent Objectives

Effluent Objectives from Certificate of Analysis	
Parameter	Average Monthly Concentration (mg/L)
BOD₅	50
Suspended Solids	50

Table 3: Aeration Cell Effluent Lab Results

Month	BOD	SS	Total P	NH₃ + NH₄ (N)	TKN	Nitrite	Nitrate
March	9	7	4.76	5.3	8.9	0.06	5.98
May	8	16	4.72	1.6	3.8	0.06	0.38
	7	6	3.33	0.4	1.5	0.03	0.28
June	7	24	6.08	5.3	8.5	0.12	0.6
July	23	45	7.47	12.9	18.3	0.31	0.32
August	51	91	4.98	17.4	20.7	8.87	0.94
September	38	58	8.55	30.5	30.8	0.29	0.44
	12	23	6.82	27.1	29.1	0.23	0.25
October	16	18	7.8	43.8	59.1	0.25	0.7
	6	13	7.43	32.5	37.8	0.13	0.59

The Tobermory Sewage Works in August 2013 exceeded the Cell #2 effluent objective of 50 mg/L for Total Suspended Solids (TSS) and the effluent objective of 50 mg/L for BOD5. Additional sampling was conducted in September to monitor process changes at the sewage works which also produced one sample that exceeded the TSS effluent objective. The operating authority increased aeration to the aeration cell in order to bring down the BOD5 and TSS levels and will closely monitor the sewage works in 2014. The operating authority has suggested sludge level monitoring in order to determine if sludge management is required.

From January-December 2013, sample analyses were conducted by an accredited laboratory, SGS Lakefield Research. Weekly pH, Dissolved Oxygen and temperature readings in the aeration cells were conducted in-house by trained operations staff at the treatment plant using standard methods.

Table 4: Aeration Cell In-House Monitoring

Month	Cell #1 pH		Cell #1 DO		Cell #2 pH		Cell #2 DO	
	Min	Max	Min	Max	Min	Max	Min	Max
May	7.35	8.65	1.59	16.56	7.48	8.61	3.85	8.36
June	7.5	7.8	1.92	7.21	7.7	7.85	5.41	6.6
July	8.02	8.41	8.09	19.93	7.69	7.92	1.94	4.13
August	7.85	8.16	9.16	14.72	7.33	7.66	0.71	3.23
September	7.64	8.1	1.44	12.63	7.68	7.74	4.02	4.97

Detailed analytical data is summarized in Appendix A.

Flows

Table 2: 2013 Daily Raw Flow Data

Month	Average Day Flow (m ³)
January	89.35
February	65.04
March	86.61
April	128.93
May	105.61
June	153.97
July	194.61
August	245.71
September	127.00
October	86.77
November	88.53
December	36.39
Average	117.72

Detailed Flow data is summarized in Appendix A.

The total flow treated for January 1st through December 31st 2013 was 42,971 m³. The average daily flow of 117.72 m³ per day was 18.83 % of the design capacity. The maximum average daily flow for this time period was 245.71 m³ which was recorded in August 2013.

In addition a total of 3,391.8 m³ of hauled sewage/septage was treated by the plant in 2013. Detailed hauled sewage/septage data is summarized in Appendix A.

Raw Sewage

Raw sewage characterization sampling was performed in 2013. The results are shown in the table below:

Summary of Raw Sewage Monitoring 2013

Month	CBOD	BOD	TSS	TP	TKN
June 3	367		359	7.26	44.9
August 26		260	278	5.87	32.1
October 7		726 UAL	1330	19.8	141

Groundwater Sampling Program

The complete and limited groundwater sampling of all on-site observation wells was completed in the Spring (May), Summer (August) and Fall (October) of 2013. There were no spring samples for monitoring wells OW2-S and OW8-S, fall samples for monitoring well OW8-S, OW2-S and OW6-S, or summer samples for monitoring well OW6-S as the groundwater wells were dry at the time of sampling.

See Appendix B for Summary of groundwater sampling.

Sludge Management

There was no sludge removed from the facility in 2013.

Bypassing and Abnormal Conditions

There were no bypasses in 2013.

Maintenance and Calibration Activities

Regular and preventative maintenance activities are scheduled and completed on a monthly basis on all equipment at the plant and pumping station through OCWA's Workplace Management System.

Infrastructure improvements/replacements in 2013 included:

- Flushing and cleaning of wet wells and collection mains.
- Cleaning of the lagoon inlet chamber.
- Replaced starter on aeration blower.
- Replaced blown selection relay.

The flow metering device located in the sewage lift station was calibrated by Flowmetrix on June 5, 2013 as part of the Ontario Clean Water Agency, West Highlands Hub's regular, routine third party calibration schedule. The Calibration Report is located in Appendix C.

Summary

The Tobermory Sewage Lagoons provided effective wastewater treatment in 2013. The average daily flow from January 1st to December 31st 2013 was 117.72 m³ per day, or approximately 18.83 % of the plant's rated design capacity average summer flow of 625m³ per day.

APPENDIX A

Plant Performance Summary Report

2013



Performance Assessment Report Wastewater/Lagoon

Facility: [1132] - Tobermory Sewage Works System
Works: [120001577] - Tobermory Sewage Works System

From 01/01/2013 to 12/31/2013

	01/2013	02/2013	03/2013	04/2013	05/2013	06/2013	07/2013	08/2013	09/2013	10/2013	11/2013	12/2013	Total	Avg	Max	Criteria
Flow:																
Raw: Total Flow 1000 m3	2.77	1.821	2.685	3.868	3.274	4.618	6.033	7.617	3.81	2.68	2.656	1.128	42.971			
Raw: Avg. Day Flow 1000 m3/day	0.089	0.065	0.087	0.128	0.106	0.154	0.195	0.246	0.127	0.087	0.089	0.036		0.118		
Raw: Max. Day Flow 1000 m3/day	0.089	0.065	0.087	0.128	0.106	0.154	0.195	0.246	0.127	0.087	0.089	0.036			0.248	

Note 1. The Total, Average, Max and Criteria summaries are not included in the wastewater XML files submitted to the MOE
 2. The annual average concentrations are calculated by taking the arithmetic mean of the monthly average concentration in the effluent calculated for any particular calendar year.

Parameters List: OCWA POC - MEWS

CBOD5 - Carbonaceous Biochemical Oxygen Demand 5 Day; BOD5 - Biochemical Oxygen Demand, 5 Day, Total Demand; Suspended Solids - Residue, Particulate; NH3 + NH4 as N - Ammonium + Ammonia, Total Unfil; Reac ; Total Phosphorus - Phosphorus, Unfiltered Total
 TKN - Nitrogen, Total Kjeldahl N; Tot; Nitrate as N - Nitrate, Unfiltered Reactive; Nitrite as N - Nitrite, Unfiltered Reactive; E coll - Escherichia Coli MF

Legend:

Tag group:
 Raw-Raw Sewage

APPENDIX B

Summary of Groundwater Sampling

2013

Observation Well Ground Water Sampling Program in Spring (May)

Well #	Chloride mg/L	Sulphate mg/L	Nitrite as N mg/L	Nitrate as N mg/L	Nitrite + Nitrate as N mg/L	Hardness mg/L as CaCO3	Magnesium mg/L	Calcium mg/L	Iron mg/L	Sodium mg/L	Phosphorous mg/L	Alkalinity mg/L as CaCO3	Conductivity uS/cm	pH	Organic Nitrogen mg/L	TKN mg/L	NH4 + NH4 mg/L	Phenolics mg/L	DOC mg/L	Diss. Reactive Phos. mg/L	Well #
OW6-S	0.7	5	<0.03	<0.06	<0.06	250	28.6	52.8	<0.003	0.55	<0.009	223	450	8.31	0.68	0.7	<0.1	<0.002	2.2	<0.03	OW6-S
OW6-D	2.9	5.6	<0.03	<0.06	<0.06	284	24.9	64.6	0.048	7.44	<0.009	250	515	8.29	<0.05	<0.5	0.1	<0.002	<1	<0.03	OW6-D
OW6-1	3.4	9.5	<0.03	<0.06	<0.06	344	32.2	84.7	0.06	4.54	<0.009	293	604	8.19	0.06	<0.5	<0.1	<0.002	<1	<0.03	OW6-1
OW5-S	130	32	<0.03	0.41	0.41	258	18.3	73.1	0.284	51.8	0.012	226	864	8.2	0.26	<0.5	<0.1	<0.002	2.9	<0.03	OW5-S
OW5-L	110	30	<0.03	<0.06	<0.06	280	17.1	75.8	0.062	78.1	0.01	230	955	8.21	0.27	<0.5	<0.1	<0.002	3	<0.03	OW5-L
OW5-D	120	27	<0.03	<0.06	<0.06	280	19.6	79.7	0.038	75.7	<0.009	237	668	8.29	0.32	<0.5	<0.1	<0.002	2.9	<0.03	OW5-D
OW2-S	2.6	7.1	<0.03	0.41	0.41	356	31.3	90.8	0.004	3.63	0.11	333	678	8.04	<0.05	<0.5	<0.1	<0.002	<1	<0.03	OW2-S
OW2-D	1.1	19	<0.03	<0.06	<0.06	222	22.9	51	0.02	16.8	<0.009	228	504	8.31	<0.05	<0.5	<0.1	<0.002	<1	<0.03	OW2-D
OW12-S	110	26	<0.03	2.84	2.84	323	22	93	0.003	55.8	<0.009	294	892	8.19	<0.05	<0.5	<0.1	<0.002	2	<0.03	OW12-S
OW55	0.6	3.5	<0.03	0.22	0.22	409	20.1	131	0.045	0.77	<0.009	361	727	7.94	<0.05	<0.5	0.1	<0.002	2.2	<0.03	OW55
OW56	0.5	2.8	<0.03	0.11	0.11	188	14.2	51.8	<0.003	0.42	<0.009	206	421	8.23	0.15	<0.5	<0.1	<0.002	1.6	<0.03	OW56
OW57	0.9	6.8	<0.03	0.24	0.24	450	34	124	0.017	0.85	<0.009	352	696	8.25	0.31	<0.5	<0.1	<0.002	5.8	<0.03	OW57
OW60	93	25	0.12	0.76	0.88	371	24.6	108	0.214	42.1	0.029	283	934	8.18	<0.05	<0.5	<0.1	<0.002	1.9	<0.03	OW60
OW8-1	61	21	<0.03	0.12	0.12	308	25.9	80.5	0.016	25.8	<0.009	243	658	8.34	0.25	<0.5	<0.1	<0.002	<1	<0.03	OW8-1
OW8-D	4.4	13	<0.03	0.12	0.12	279	25.8	69.3	0.016	1.47	<0.009	232	510	8.22	0.23	<0.5	<0.1	<0.002	1.1	<0.03	OW8-D
OW9-S	3.8	11	<0.03	<0.06	<0.06	285	26.3	70.8	0.067	1.6	<0.009	235	508	8.26	<0.05	<0.5	<0.1	<0.002	<1	<0.03	OW9-S
OW9-1	2.7	21	<0.03	<0.06	<0.06	224	19.1	58.1	0.03	0.83	<0.009	188	408	8.26	0.07	<0.5	<0.1	<0.002	1.2	<0.03	OW9-1
OW9-D	1	15	<0.03	<0.06	<0.06	240	22.6	58.8	<0.003	8.78	<0.009	224	500	8.29	0.21	<0.5	<0.1	<0.002	<1	<0.03	OW9-D
OW1-D	1.7	7	<0.03	<0.06	<0.06	358	28.4	96.7	0.092	3.32	<0.009	204	442	8.28	<0.05	<0.5	0.2	<0.002	<1	<0.03	OW1-D
OW11-S	1.4	14	<0.03	<0.06	<0.06	276	26.3	67.1	0.09	2.58	0.035	243	631	8.18	<0.05	<0.5	<0.1	<0.002	1.8	0.62	OW11-S
OW10-S	1	14	<0.03	1.49	1.49	299	25.3	78.2	0.018	1.02	<0.009	253	506	8.28	<0.05	<0.5	<0.1	<0.002	<1	<0.03	OW10-S
OW7-S	2.6	11	<0.03	<0.06	<0.06	216	20	53.7	0.108	2.7	<0.009	189	412	8.35	0.11	<0.5	<0.1	<0.002	2.8	<0.03	OW7-S
OW8-S						229	17.1	63.7	0.029	0.72	<0.009	188	429	8.25	<0.05	<0.5	<0.1	<0.002	2	<0.03	OW8-S

DRY

DRY

Observation Well Ground Water Sampling Program in Summer (August)

Well #	Chloride mg/L	Sulphate mg/L	Nitrite as N mg/L	Nitrate as N mg/L	Nitrite + Nitrate as N mg/L	Hardness mg/L as CaCO ₃	Magnesium mg/L	Calcium mg/L	Iron mg/L	Sodium mg/L	Phosphor ous mg/L	Alkalinity mg/L as CaCO ₃	Conductivity µS/cm	pH	Organic Nitrogen mg/L	TKN mg/L	NH ₃ + NH ₄ mg/L	Phenolics mg/L	DOC mg/L	Diss. Reactive Phos. mg/L	Well #
OW6-S																					
OW6-D	3.1	6.7	< 0.03	< 0.06	< 0.06	236	22.3	57.8	0.006	11.4	< 0.009	266	515	8.14	0.23	< 0.5	< 0.1	< 0.002	< 1	< 0.03	OW6-S
OW6-I	3.9	11	< 0.03	< 0.06	< 0.06	307	28.8	75.3	0.095	4.98	< 0.009	326	623	8.02	< 0.05	< 0.5	< 0.1	< 0.002	1.5	< 0.03	OW6-D
OW7-S	2.1	11	< 0.03	< 0.06	< 0.06	278	21.2	76.5	0.29	0.79	0.019	251	481	8.23	< 0.05	< 0.5	< 0.1	< 0.002	1.5	< 0.03	OW6-I
OW8-S	4.1	8.9	< 0.03	< 0.06	< 0.06	258	21.6	67.6	0.006	0.91	< 0.009	242	472	7.98	0.21	< 0.5	< 0.1	< 0.002	1.6	< 0.03	OW7-S
OW8-I	3.2	21	< 0.03	< 0.06	< 0.06	220	21.3	53.2	0.008	9.23	< 0.009	246	490	8.08	< 0.05	< 0.5	< 0.1	< 0.002	1.3	< 0.03	OW8-S
OW9-D	1.2	14	< 0.03	< 0.06	< 0.06	219	21.7	51.9	0.005	3.01	< 0.009	217	438	8.16	< 0.05	< 0.5	< 0.1	< 0.002	< 1	< 0.03	OW9-I
OW10-S	1.3	16	< 0.03	< 0.06	< 0.06	202	18.7	50.2	0.032	2.59	< 0.009	207	407	7.99	< 0.05	< 0.5	< 0.1	< 0.002	1.1	< 0.03	OW9-D
OW11-S	1.6	14	< 0.03	1.32	1.32	308	25.7	80.9	< 0.003	1.03	< 0.009	286	557	8.07	< 0.05	< 0.5	< 0.1	< 0.002	2.9	< 0.03	OW10-S
OW12-S	64	23	< 0.03	0.95	0.95	282	18.3	83	< 0.003	30.9	< 0.009	259	687	7.9	0.48	< 0.5	< 0.1	< 0.002	1.5	< 0.03	OW11-S
																			2	< 0.03	OW12-S

DRY

APPENDIX C

Calibration Reports

2013

F&P (ABB) Mag-Meter

Verification/ Calibration Report



Customer: OCWA - West Highlands
 Contact: Leo Paul Frigault
 Cluster Manager
 519-379-2225

WESTERN OFFICE
 212 Terrence Avenue
 Dorchester, Ontario
 N0L 1G3
 t: 519-870-FLOW (3569)
 f: 519-268-3459
 e: stacey@flowmetrix.ca

EASTERN OFFICE
 1602 Old Wooler Road
 Wooler, Ontario
 K0K 3M0
 t: 416-779-1456
 f: 613-396-0294
 e: curisa@flowmetrix.ca

www.flowmetrix.ca

Test Performed By: Jeff Brooks
 Field Representative

AS FOUND CERTIFICATION

Plant ID	Tobemory	Date of Verification	05-Jun-13
Meter ID	Sewage Lift Station	Calibration Frequency	Annual
FIT ID	n/a	Date of Next Verification	June-14
Client Tag	n/a		
GPS Coordinates	N45 15.319 & W81 39.874		

FORWARD FLOW DIRECTION

Converter Details

Manufacturer: Fisher & Porter
 Model: 50XM
 Converter S/N: 9312030479
 Fuse: On board

Totalizer Information

As Found: 765924 m3
 As Left: 765938 m3
 Difference: 14 m3

Programming Parameters

Diameter (DN): mm 150
 Full-Scale Flow: lps 25

Verification Instruments

F&P Flow Tube Simulator: F&PEO-1
 Fluke 787 Process Meter: FLUEO-1
 Stop Watch: 1/100 th second

Test Criteria

Forward Flow Direction Test: Yes
 Allowable % Error: 5

Max. Flow @ 10.0 m/s 169 lps

Display Accuracy Verified: Yes
 Current Output Verified: Yes
 Totalizer Accuracy Verified: Yes

AS FOUND	0	25	50	75	100	% F.S. Flow
FLOW TUBE SIMULATION*	0.0	3.7	7.4	11.1	14.8	% Max. Flow
Display	0.00	6.25	12.50	18.75	25.00	lps
MUT (As Found)	0.000	6.392	12.590	18.790	25.010	lps
MUT (Error)**	n/a	2.27	0.72	0.21	0.04	%
Current O/P	4.000	8.000	12.000	16.000	20.000	mA
MUT (As Found)	3.987	8.074	12.027	16.007	19.987	mA
MUT (Error)**	-0.32	0.92	0.22	0.04	-0.07	%
Totalizer						
Test Volume					25.00	lps
Time					2	m3
Calc. Flowrate					80.30	Seconds
% Error					24.91	lps
					-0.37	%

* All values are for "As Found" values. If the values are not within acceptable limits an "As Left" Certificate will be issued unless otherwise noted.

Note: reading are erratic for flow

RESULTS

	Avg. % Error	PASS/FAIL
Display	0.81	PASS
Current O/P	0.28	PASS
Totalizer	-0.37	PASS

This record only validates the operational integrity and accuracy verification results of the Secondary flow converter ONLY!!! This is not a complete calibration of the entire flow meter whereby, this verification does not validate the integrity of the primary measurement device using a comparative technique or traceable standard.