



**Ontario Clean Water Agency
Agence Ontarienne Des Eaux**

**TOBERMORY
SEWAGE LAGOON**

Annual Report
January 1 to December 31, 2012

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West Highlands Hub

March 31, 2013

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

Attention: Rick Chappell; District Manager

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 2012 Report for the above referenced facility summarizes the performance and related activities from January 1st 2012 through December 31st 2012 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:	114.2 m ³ (2012)	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)
BOD ₅	50
Suspended Solids	50

Table 3: Aeration Cell Effluent Lab Results

Month	BOD	SS	Total P	NH ₃ + NH ₄ (N)	TKN	Nitrite	Nitrate
March	13	18	4.05	< 0.5	0.8	0.32	5.32
May	12	21	2.40	1.7	0.3	0.06	0.69
June	4	5	6.00	9.7	9.6	0.26	0.28
July	8	8	7.40	20.7	19.5	0.51	0.53
August	22	44	8.71	42.4	46.6	0.12	<0.05
	49	54	8.26	52.7	52.5	0.15	<0.05
October	84	9	4.61	42.0	45.3	3.23	0.27

The Tobermory Sewage Works in August 2012 exceeded the Cell #2 effluent objective of 50 mg/L for Total Suspended Solids (TSS) and in October 2012 exceeded the effluent objective of 50 mg/L for BOD5. A review of the Tobermory Sewage Works has identified several factors which when combined may have influenced these elevated results. In August 2012 the operating authority conducted maintenance activities which included the flushing and cleaning of the collection mains, wet wells #1 and #2 and the lagoon cell effluent chambers. Also noted was an increase of hauled sewage to the treatment lagoons by approved haulers in comparison to volumes hauled in 2011. Overall an increase of 1000 m3 of hauled sewage was recorded for the months of August through October 2012 compared to the same time period in 2011. These conditions combined with warm weather and sunshine throughout the summer and early fall contributed to lower than normal dissolved oxygen levels in the aeration cells resulting in higher than normal TSS and BOD5 results. The operating authority will monitor the sewage works in 2013 in order to make the process adjustments required to consistently bring the sewage works within the operating objectives.

From January-December 2012, 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	7.64	9.06	3.45	8.08	7.64	8.76	3.19	7.76
June	7.65	7.88	3.33	5.91	7.69	7.83	3.81	4.32
July	7.74	8.33	2.69	16.32	7.82	7.93	2.79	3.25
August	7.77	8.23	2.91	15.59	7.54	7.84	0.89	1.91
September	7.53	8.08	1.12	11.87	7.46	7.89	0.68	2.97
October	7.78	7.78	2.83	4.55	7.76	7.78	2.28	4.37

Detailed analytical data is summarized in Appendix A.

Flows

Table 2: 2012 Daily Raw Flow Data

Month	Average Day Flow (m ³)
January	60.75
February	39.24
March	71.0
April	56.77
May	198.23
June	146.4
July	220.45
August	243.94
September	126.1
October	90.39
November	47.13
December	62.9
Average	114.23

Detailed Flow data is summarized in Appendix A.

The total flow treated for January 1st through December 31st 2012 was 41,807 m³. The average daily flow of 114.2m³ per day was 18.27 % of the design capacity. The maximum average daily flow for this time period was 243.94 m³ which was recorded in August 2012.

In addition a total of 2,737.7 m³ of hauled sewage/septage was treated by the plant in 2012. Detailed hauled sewage/septage data is summarized in Appendix A.

Raw Sewage

Raw sewage characterization sampling was performed in 2012. The results are shown in the table below:

Summary of Raw Sewage Monitoring 2012

Month	BOD	TSS	TP	TKN
May 22	472	422	10.0	82.0
June 18	375	250	8.78	74.2

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 2012. There were no spring or fall sampling results for monitoring well OW8-S, OW2-S and OW-75, as well as monitoring wells OW6-S and OW7-S for the summer sampling as the groundwater wells were dry at the time of sampling.

In October 2012 testing was performed for additional parameters Aluminum, Barium, Cadmium, Chromium, Copper, Lead, Manganese and Zinc as per condition 15.2 of the Certificate of Approval.

See Appendix B for Summary of groundwater sampling.

Sludge Management

There was no sludge removed from the facility in 2012.

Bypassing and Abnormal Conditions

There were no bypasses in 2012.

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 2012 included:

- Flushing and cleaning of wet wells and collection mains.
- Cleaning of the lagoon inlet chamber.
- Purchase of new Hach pH and DO meter.

The flow metering device located in the sewage lift station was calibrated by Flowmetrix on June 28, 2012 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 2012. The average daily flow from January 1st to December 31st 2012 was 114.23 m³ per day, or approximately 18.27 % of the plant's rated design capacity average summer flow of 625m³ per day.

APPENDIX A

Plant Performance Summary Report

2012



Ontario Clean Water Agency Performance Assessment Report Wastewater/Lagoon

From 01/01/2012 to 12/31/2012

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

Flow:	01/2012	02/2012	03/2012	04/2012	05/2012	06/2012	07/2012	08/2012	09/2012	10/2012	11/2012	12/2012	Total	Avg	Max	Criteria
Rawr. Total Flow 1000 m3	1 883	1 138	2 201	1 703	6 145	4 392	6 834	7 562	3 783	2 802	1 414	1 95	41 807			
Rawr. Avg. Day Flow 1000 m3/day	0 061	0 039	0 071	0 057	0 198	0 146	0 22	0 244	0 126	0 09	0 047	0 063				
Rawr. Max. Day Flow 1000 m3/day	0 061	0 039	0 071	0 057	0 198	0 146	0 22	0 244	0 126	0 09	0 047	0 063		0 114		0 214

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 PDC - 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 Unfilt. Reac.; Total Phosphorus - Phosphorus, Unfiltered Total
TKN - Nitrogen, Total Kjeldahl Unf. Tot. Nitrate as N - Nitrate, Unfiltered Reactive; Nitrite as N - Nitrite, Unfiltered Reactive; E coli - Escherichia Coli MF

Legend:

Tsg group

Raw-Raw Sewage

2012 - Hauled Sewage

	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
Bruce Peninsula Septic Service	4,200	200	1,675	150		900	1,350	3,100	1,070	14,285	2,380	3,110	32,420
Scott Septic Pumping	200		3,050	11,600	28,000	42,000	180,000	196,000	44,000	9,500		600	514,950
Mountain Trout Camp						2,400	2,400	4,800	2,400	5,300			17,300
Total	4,400	200	4,725	11,750	28,000	45,300	183,750	203,900	85,000	29,085	2,380	3,710	602,200

*amounts in gallons

APPENDIX B

Summary of Groundwater Sampling

2012

Observation Well Ground Water Sampling Program in Summer (August)

Well #	DOC mg/L	Phenolics mg/L	Alkalinity mg/L as CaCO3	Conductivity uS/cm	pH	Chloride mg/L	Sulphate mg/L	TKN mg/L	Organic Nitrogen mg/L	NH3 + NH4 mg/L	Diss. Reactive Phos. 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	Well #
OW6-S	<1	0.002	249	507	7.96	2.1	7.7	<0.5	<0.05	<0.1	<0.03	<0.06	<0.05	<0.06	279	26.6	67.8	0.866	5.7	0.02	OW6-S
OW6-D	1.4	<0.002	292	594	7.83	3.1	11	<0.5	<0.05	0.1	<0.03	<0.06	<0.05	<0.06	389	37.7	93.4	1.97	5.99	0.085	OW6-D
OW7-S																					OW7-S
OW9-S	1.1	0.003	258	507	7.96	2.5	5.4	<0.5	0.25	<0.1	<0.03	<0.06	<0.05	<0.06	366	36.7	93.9	1.71	0.91	0.116	OW9-S
OW9-I	<1	0.004	227	490	7.99	2	21	<0.5	<0.05	<0.1	<0.03	<0.06	0.12	0.12	251	24.8	59.8	0.133	5.82	<0.009	OW9-I
OW9-D	<1	0.004	211	445	8.1	1	15	<0.5	0.11	0.2	0.04	<0.06	<0.05	<0.06	243	24.5	57.1	0.3	2.93	0.014	OW9-D
OW10-S	3.3	<0.002	199	413	8.12	1	14	<0.5	<0.05	0.4	<0.03	<0.06	<0.05	<0.06	1200	90.7	331	11.7	3.46	1.97	OW10-S
OW11-S	1.4	0.008	277	562	7.92	1.4	14	0.5	0.51	<0.1	<0.03	<0.06	1.62	1.62	364	34.5	96.6	0.644	1.05	0.043	OW11-S
OW12-S	1.5	0.006	285	726	7.86	54	21	<0.5	<0.05	0.2	<0.03	<0.06	0.55	0.55	357	26.7	98.9	0.879	35.6	0.084	OW12-S

Parameters Required Every 3 Years for Observation Well Ground Water Sampling Program in October										
Well #	Aluminum	Barium	Cadmium	Chromium	Copper	Lead	Manganese (dissolved)	Zinc (dissolved)	Well #	Well #
OW5-S	0.014	0.0185	< 0.000003	0.0005	0.0057	< 0.00002	0.0479	< 0.001	OW5-S	OW5-S
OW5-I	0.0017	0.0173	< 0.000003	0.0005	0.009	< 0.00002	0.0563	0.001	OW5-I	OW5-I
OW5-D	0.0929	0.0245	< 0.000003	0.0008	0.0071	0.00015	0.0568	0.002	OW5-D	OW5-D
OW9-D	0.1	0.0336	0.000012	< 0.0005	< 0.0005	0.00011	0.00614	0.002	OW9-D	OW9-D
OW9-I	0.632	0.0291	0.000094	< 0.0005	0.0011	0.00239	0.00309	0.008	OW9-I	OW9-I
OW9-S	0.0567	0.00643	0.000007	< 0.0005	0.0006	0.00004	0.00066	0.001	OW9-S	OW9-S
OW8-I	0.0419	0.00907	0.000006	< 0.0005	< 0.0005	0.00005	0.00033	0.003	OW8-I	OW8-I
OW8-D	0.739	0.0189	0.000023	0.0007	0.0007	0.00041	0.083	0.005	OW8-D	OW8-D
OW10-S	0.378	0.0447	0.000013	0.0007	0.0013	0.00017	0.0119	0.005	OW10-S	OW10-S
OW11-S	0.0358	0.00627	< 0.00003	< 0.0005	0.0008	< 0.00002	0.00088	0.003	OW11-S	OW11-S
OW12-S	0.105	0.0147	0.000003	< 0.0005	0.0048	0.00007	0.00352	0.002	OW12-S	OW12-S
OW1-D	0.036	0.0195	< 0.000003	< 0.0005	0.0006	0.00002	0.00106	0.004	OW1-D	OW1-D
OW1-I	0.0028	0.00683	0.000003	< 0.0005	0.001	< 0.00002	0.00342	0.004	OW1-I	OW1-I
OW6S	0.0064	0.00588	0.000012	< 0.0005	0.001	< 0.00002	0.00088	0.001	OW6S	OW6S
OW6D	0.0022	0.0234	0.000006	< 0.0005	< 0.0005	< 0.00002	0.00215	0.001	OW6D	OW6D
OW6I	0.274	0.0538	0.000015	< 0.0005	0.0009	0.00044	0.00836	0.004	OW6I	OW6I
OW57	0.0007	0.0104	0.000006	< 0.0005	0.0008	< 0.00002	0.0099	0.003	OW57	OW57
OW56	0.0008	0.00524	0.000011	< 0.0005	0.001	< 0.00002	0.0511	0.001	OW56	OW56
OW2S									OW2S	OW2S
OW2I	0.0387	0.0182	0.000006	< 0.0005	< 0.0005	0.00015	0.00866	0.003	OW2I	OW2I
OW2D	0.64	0.0235	0.000018	< 0.0005	0.0011	0.0002	0.00141	0.003	OW2D	OW2D
OW55	0.0015	0.011	0.000006	< 0.0005	< 0.0005	0.00006	0.128	0.001	OW55	OW55
OW75									OW75	OW75
OW60	0.0007	0.027	< 0.000003	0.0006	0.0038	< 0.00002	0.59	0.002	OW60	OW60
OW61	0.0172	0.0141	0.000012	0.0006	0.0019	0.00004	0.0308	0.006	OW61	OW61
OW8S									OW8S	OW8S

APPENDIX C

Calibration Reports

2012

F&P (ABB) Mag-Meter

Verification/ Calibration Report



Customer OCWA - West Highlands
Contact Leo Paul Frigault
 Cluster Manager
 519-534-1610

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 Wacker Road
 Wooler, Ontario
 K0K 3M0
 t: 416-778-1458
 f: 813-398-0294
 e: curts@flowmetrix.ca

www.flowmetrix.ca

Test Performed By: Jeff Brooks
 Field Representative

AS FOUND CERTIFICATION

Plant ID	Tobermory	Date of Verification	28-Jun-12
Meter ID	Sewage Lift Station	Calibration Frequency	Annual
FIT ID	n/a	Date of Next Verification	June-13
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 725931 m3
As Left 725939 m3
Difference 8 m3

Programming Parameters

Diameter (DN) mm 150
Full-Scale Flow ips 25

Verification Instruments

F&P Flow Tube Simulator
 Fluka 787 Process Meter 84080355
 Stop Watch 1/100 th second

Test Criteria

Forward Flow Direction Test Yes
Allowable % Error 5
Display Accuracy Verified Yes
Current Output Verified Yes
Totalizer Accuracy Verified Yes

Max. Flow @ 10.0 m/s 169 ips

	0	25	50	75	100	% F.S. Flow
AS FOUND 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	ips
MUT (As Found)	0.180	6.375	12.600	18.790	24.990	ips
MUT (Error)**	n/a	2.00	0.80	0.21	-0.04	%
Current O/P	4.000	8.000	12.000	16.000	20.000	mA
MUT (As Found)	4.099	8.060	12.040	16.008	19.974	mA
MUT (Error)**	2.48	0.75	0.33	0.05	-0.13	%
Totalizer					25.00	ips
Test Volume					2	m3
Time					80.40	Seconds
Calc. Flowrate					24.88	ips
% Error					-0.50	%

* 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	0.74	PASS
Current O/P	0.25	PASS
Totalizer	-0.50	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.

