ONTARIO CLEAN WATER AGENCY
AGENCE ONTARIENNE DES EAUX

March 28, 2024

Ministry of the Environment, Conservation and Parks
3rd floor, 101 17th Street East
Owen Sound, Ontario
N4K 0A5

**RE: 2023 Tobermory Sewage Treatment Facility Annual Sewage Performance Report (CofA #3-0046-93-006) – Municipality of Northern Bruce Peninsula**

Please see attached for the 2023 Annual Sewage Performance Report prepared by the Ontario Clean Water Agency on behalf of the Municipality of Northern Bruce Peninsula for the:

- Tobermory Sewage Treatment Facility

This report was completed in accordance with the requirements set out in CofA 3-0046-93-006, issued November 23, 2017, *Condition 15*. Your receipt of this report by or before March 31, satisfies the regulatory requirements:

- CofA #3-0046-93-006 that "The Owner shall prepare and submit a performance report to the District Officer on an annual basis, and the submission shall be made no later than 90 days following the end of each calendar year."

Should you require further clarification on the information found within the Annual Sewage Performance Report, please feel free to contact me.

Sincerely,

Leo-Paul Frigault
Senior Operations Manager
OCWA, Georgian Highlands Region

ONTARIO CLEAN WATER AGENCY
AGENCE ONTARIENNE DES EAUX

# TOBERMORY
# SEWAGE TREATMENT FACILITY

## ANNUAL PERFORMANCE REPORT

**For the period of**
**JANUARY 1, 2023 TO DECEMBER 31, 2023**

Prepared by the Ontario Clean Water Agency
For the Municipality of Northern Bruce Peninsula

## 1. System Description

The Tobermory Sewage Works System in the Municipality of Northern Bruce Peninsula (former 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 a 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 cells each with a capacity of of 10,800 $m^3$. 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 317 $m^3$/day, and each cell has approximately 13,750 $m^2$ of surface area. There is one (1) back-up exfiltration cell with a minimum rated capacity of 625 $m^3$/d and approximately 21,875 $m^2$ 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 (Little Tub Harbour Pumping Station), is located near the harbor and has two submersible pumps each rated at 18.3 L/sec capacity at 50.5 m TDH. The wet well has a normal operating volume of 5.7 $m^3$. Due to its location near the harbour, the sewage pumping station wet well is provided with an odour control activated carbon adsorption unit with a capacity of 188.8 L/sec, for adsorbing hydrogen sulphide gas emissions from the wet well. The pumping station is also equipped with a 150-kW diesel generator set for providing emergency power for the sewage pumps. An overview of Tobermory Sewage Treatment System can be found in Table 1 and a summary of the monitoring program can be found in Table 2.

**Table 1**. Tobermory Sewage Treatment System Overview

| | |
|---|---|
| **Facility Name** | Tobermory Sewage Treatment System |
| **Facility Type** | Lagoon |
| **Plant Classification** | II WWT and II WWC |
| **Works Number** | 120001577 |
| **Design Capacity** | 625 $m^3$/day |
| **Receiving Water** | None |
| **Certificate of Approval** | 3-0046-93-006 (Sewage Treatment System) |
| | 3-0310-82-917 (Groundwater Monitoring) |
| | 8-1063-94-006 (Air) |

**Table 2**.Tobermory Sewage Treatment System Monitoring Program

| Source | Parameter | Minimum Frequency | Method |
|---|---|---|---|
| Influent | Flow ($m^3$) | Daily | Flowmeter |
| Secondary Aeration Cell Effluent | $BOD_5$, SS, TP, TKN, NH3+NH4(N), Nitrate, Nitrite | Monthly – March, June, July, August and October | External analysis |
| Aeration Cells | pH, Dissolved Oxygen | Weekly (from May – September) | In-House |
| Groundwater Wells | Alkalinity, Conductivity, Free Ammonia, Phenols, pH, Chloride, Sulphate, Nitrite, Magnesium, Iron, Nitrate, Calcium, Hardness, Sodium, DOC, Organic Nitrogen, TKN, Dissolved Reactive Phosphorous[2a], Total P[2] | Semi-Annual in May and October (for all 30 wells)<br><br>Annual in August (for 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 3 years in October | External Analysis |

[2a]*Shallow Wells Only*

## 2. Monitoring and Compliance Reports

As per Section 15(a) of C of A 3-0046-96-006, *a summary of all monitoring and compliance reports submitted in the reporting period, including an overview of the success and adequacy of the sewage treatment program* is required.

During the reporting period, the following reports were submitted:

- Discharge Data Report (Ministry of Environment, Conservation and Parks, MECP)

### 2.1 Discharge Data Report (MECP)

The Ontario Clean Water Agency (OCWA) has an agreement with the MECP to submit quarterly discharge data for all OCWA operated municipal sewage treatment facilities 45 days at the end of each quarter. Monitoring data is submitted via the Ministry of Environment Wastewater System (MEWS). The MECP has these reports stored in a shared location where MECP Inspectors can obtain and review them. There are no limits/objectives for discharge for the quarterly Discharge Data Report.

### 2.2 Adequacy of the Sewage Treatment Program

The current sewage treatment program provided effluent that was within the effluent objectives set out in the C of A for Suspended Solids and $BOD_5$ 84% of the time. Based on this evaluation, effluent recirculation flow from lagoon cell 2 to lagoon cell 1 will have to be monitored during the summer months for performance and reliability to meet our effluent objectives 100% of the time.

## 3. Monitoring and Analytical Data

As per Section 15(b) of C of A 3-0046-96-006, *a comprehensive interpretation of all monitoring data and analytical data collected relative to the Tobermory Sewage Treatment System during the reporting period* is required.

All laboratory samples are analyzed by SGS Canada Inc., which is an ISO 17025 accredited laboratory. In-house readings (pH, DO, Temperature) are conducted for monitoring purposes by licensed operators using standardized methods. Calibrations and preventative maintenance are performed on facility equipment and monitoring equipment, see Section 10 for more details.

### 3.1 Sampling Frequency

Both groundwater and secondary aeration cell effluent are sampled on a regular basis. The sampling types and frequencies are summarized in Table 3, Table 4, Table 5 and Table 6.

All sampling frequencies either meet or exceed the requirements set out in Section 15 of C of A 3-0046-93-006.

**Table 3.** Complete Groundwater Monitoring Program– Sampling Frequencies for all 30 Observation Wells

| Parameter | Minimum Frequency |
|---|---|
| Alkalinity | Semi-annually in May and October |
| Conductivity | Semi-annually in May and October |
| Free Ammonia | Semi-annually in May and October |
| Phenols | Semi-annually in May and October |
| pH | Semi-annually in May and October |
| Chloride | Semi-annually in May and October |
| Sulphate | Semi-annually in May and October |
| Nitrite | Semi-annually in May and October |
| Magnesium | Semi-annually in May and October |
| Iron | Semi-annually in May and October |
| Nitrate | Semi-annually in May and October |
| Calcium | Semi-annually in May and October |
| Hardness | Semi-annually in May and October |
| Sodium | Semi-annually in May and October |
| Dissolved Organic Carbon | Semi-annually in May and October |
| Organic Nitrogen | Semi-annually in May and October |
| Total Kjeldahl Nitrogen | Semi-annually in May and October |
| Phosphorous-Dissolved Reactive[3a] | Semi-annually in May and October |
| Total Phosphorous[3a] | Semi-annually in May and October |
| Aluminum | Every 36 Months in October |
| Barium | Every 36 Months in October |
| Cadmium | Every 36 Months in October |
| Chromium | Every 36 Months in October |

| Parameter | Minimum Frequency |
|---|---|
| Copper | Every 36 Months in October |
| Lead | Every 36 Months in October |
| Manganese | Every 36 Months in October |
| Zinc | Every 36 Months in October |

*[3a]Shallow Wells only*

**Table 4**. Limited Groundwater Monitoring Program– Sampling Frequencies for Wells 6S, 6I, 6D, 7S, 9S, 9I, 9D, 10S, 11S, 12S

| Parameter | Minimum Frequency |
|---|---|
| Alkalinity | Annually in August |
| Conductivity | Annually in August |
| Free Ammonia | Annually in August |
| Phenols | Annually in August |
| pH | Annually in August |
| Chloride | Annually in August |
| Sulphate | Annually in August |
| Nitrite | Annually in August |
| Magnesium | Annually in August |
| Iron | Annually in August |
| Nitrate | Annually in August |
| Calcium | Annually in August |
| Hardness | Annually in August |
| Sodium | Annually in August |
| Dissolved Organic Carbon | Annually in August |
| Organic Nitrogen | Annually in August |
| Total Kjeldahl Nitrogen | Annually in August |
| Phosphorous-Dissolved Reactive[4a] | Annually in August |
| Total Phosphorous[4a] | Annually in August |

*[3a]Shallow Wells only*

**Table 5.** Effluent (Secondary Aeration Cell) Sample Monitoring – Sampling Frequencies

| Parameters | Minimum Frequency |
|---|---|
| $BOD_5$ | Monthly, during March, June, July, August and October |
| Total Solids | Monthly, during March, June, July, August and October |
| Total Phosphorous | Monthly, during March, June, July, August and October |
| Total Kjeldahl Nitrogen | Monthly, during March, June, July, August and October |
| Ammonia Nitrogen | Monthly, during March, June, July, August and October |
| Nitrite | Monthly, during March, June, July, August and October |
| Nitrate | Monthly, during March, June, July, August and October |
| pH | In-house, weekly from May to September |
| Dissolved Oxygen | In-house, weekly from May to September |

**Table 6.** Sludge Haulage Sample Monitoring – Sampling Frequencies

| Parameters | Minimum Frequency |
|---|---|
| Total Solids | April, where sludge haulage is expected |
| Total Phosphorus | April, where sludge haulage is expected |
| Arsenic | April, where sludge haulage is expected |
| Cadmium | April, where sludge haulage is expected |
| Cobalt | April, where sludge haulage is expected |
| Chromium | April, where sludge haulage is expected |
| Copper | April, where sludge haulage is expected |
| Zinc | April, where sludge haulage is expected |
| Free Ammonia | April, where sludge haulage is expected |
| Nitrate – N | April, where sludge haulage is expected |
| Mercury | April, where sludge haulage is expected |
| Molybdenum | April, where sludge haulage is expected |
| Nickel | April, where sludge haulage is expected |
| Selenium | April, where sludge haulage is expected |
| Lead | April, where sludge haulage is expected |

### 3.2 Effluent Limits & Effluent Objectives

There are no effluent limits specified in C of A 3-0046-93-006 for the Tobermory Sewage Treatment System. The effluent objectives as per Section 10 of C of A 3-0046-93-006 for the Tobermory Sewage Treatment System are:

**Table 7.** Effluent (Secondary Aeration Cell) Objectives for Tobermory Sewage Treatment System

| Effluent Parameter | Average Monthly Concentration (mg/L) |
|---|---|
| $BOD_5$ | 50 |
| Suspended Solids | 50 |

### 3.3 Comparison of Data to Effluent Objectives

Analytical and monitoring data for the Tobermory Sewage Treatment System is housed in OCWA's data management system (WISKI). A comparison of the analytical results compared to the effluent objectives can be found in Table 8.

**Table 8.** Comparison of Effluent Objectives to Sampled Effluent (Secondary Aeration Cell)

| | **$BOD_5$** | | **Suspended Solids** | |
|---|---|---|---|---|
| | Monthly Average Concentration (mg/L) | Within Objectives? (50.0 mg/L) | Monthly Average Concentration (mg/L) | Within Objectives? (50.0 mg/L) |
| **March** | 12 | Yes | 23 | Yes |
| **June** | 9 | Yes | 92 | No |
| **July** | 51 | No | 62 | No |
| **August** | 82 | No | 12 | Yes |
| **October** | 16 | Yes | 18 | Yes |

### 3.4 Additional Monitoring Parameters

The following parameters do not have effluent limits or objectives but are monitored on a regular basis (see Section 3.1 for sampling frequency) as required by C of A 3-0046-93-006. Table 9, Table 10 and Table 11 summarizes the monitoring data for the reporting period.

#### 3.4.1 Flows

The Tobermory Sewage Treatment Facility was designed to treat an average summer day flow of 625 $m^3$/d. The total raw sewage flow including hauled septage volumes for 2022 was 57,627 $m^3$ with an annual average daily flow of 177 $m^3$/day which is 28.3% of the design capacity of the system. Total and average daily flows for 2023 have increased in comparison with 2022. A summary of the average daily flows on a monthly basis can be found in Table 9. For more detailed information regarding flows, refer to Appendix A.

**Table 9**. Summary of Average Day Flow by Month

| Month | Average Day Flow ($m^3$) |
|---|---|
| January | 89 |
| February | 81 |
| March | 92 |
| April | 132 |
| May | 178 |
| June | 167 |
| July | 266 |
| August | 292 |
| September | 210 |
| October | 167 |
| November | 115 |
| December | 82 |

Hauled septage volumes were added to the Sewage Pump Station total flow. According to item 11(b) of C of A 3-0046-93-006, “For the purposes of this Certificate and Subsection 107 (3) of the Ontario Water Resources Act, the introduction of sewage flows in excess of 625 $m^3$/d for any consecutive period of time greater than one year is not approved under this Certificate”. The sewage flows for 2023 were less than 625 $m^3$/d.

#### 3.4.2 Aeration Cell Effluent

In addition to the parameters which have effluent objectives, Total Phosphorous, Total Kjeldahl Nitrogen (TKN), Ammonia-Nitrogen, Nitrite, Nitrate, pH and DO are monitored. Please refer to Table 10 and 11 for monitoring and analytical results.

**Table 10.** Average Monthly Aeration Cell Effluent Monitoring Laboratory Analysis Results

| | Total Phosphorus (mg/L) | Total Kjeldahl Nitrogen (as N mg/L) | Ammonia+Ammonium (N) (mg/L) | Nitrite (mg/L as N) | Nitrate (mg/L as N) |
|---|---|---|---|---|---|
| **March** | 6.07 | 7.0 | 5.4 | 0.04 | 2.51 |
| **June** | 8.31 | 8.9 | 7.6 | 0.06 | 0.06 |
| **July** | 7.98 | 33.2 | 32.8 | 0.14 | 0.06 |
| **August** | 6.18 | 44.3 | 44.3 | 9.94 | 3.81 |
| **October** | 6.24 | 3.2 | 2.3 | 0.54 | 4.99 |

**Table 11.** Aeration Cell In-House Monitoring - Average Monthly pH and DO

| | pH | | | | Dissolved Oxygen (mg/L) | | | |
|---|---|---|---|---|---|---|---|---|
| | Cell #1 | | Cell #2 | | Cell #1 | | Cell #2 | |
| | Min | Max | Min | Max | Min | Max | Min | Max |
| **May** | 6.98 | 7.66 | 7.20 | 8.07 | 3.82 | 6.98 | 1.96 | 11.09 |
| **June** | 7.15 | 7.21 | 7.35 | 7.39 | 0.80 | 1.43 | 0.54 | 2.71 |
| **July** | 6.73 | 6.99 | 7.01 | 7.26 | 0.37 | 1.74 | 0.23 | 2.43 |
| **August** | 6.27 | 6.84 | 6.88 | 7.12 | 1.03 | 1.51 | 0.57 | 1.94 |
| **September** | 6.00 | 6.73 | 6.59 | 7.29 | 3.12 | 3.77 | 2.49 | 3.09 |

For sewage, it is optimal if the effluent is between pH 6.0 and 9.5. The pH of Cell#1 and Cell#2 remained within the optimal range for 100% of the time. The DO range for Cell #1 and Cell #2 was between 0.23 and 11.09 mg/L in 2022 in comparison to 0.15 to 8.64 mg/L in 2022. Overall, the average DO in 2023 (2.37 mg/L) is lower than the average DO in 2022 (3.40 mg/L).

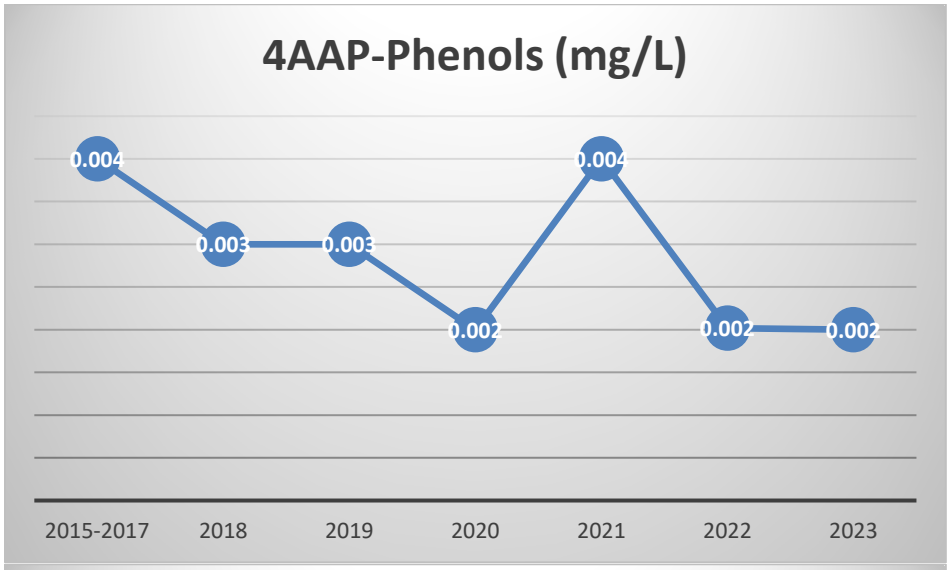
### 3.4.3 Groundwater Sampling Program

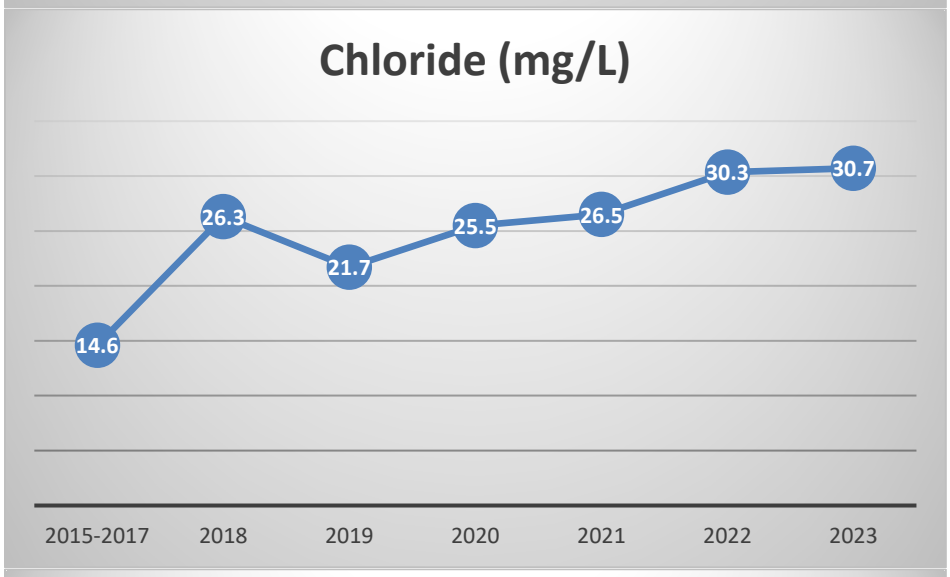
The complete and limited groundwater sampling of all on-site observation wells was completed in the Spring (May), Summer (August) and Fall (October) of 2023.

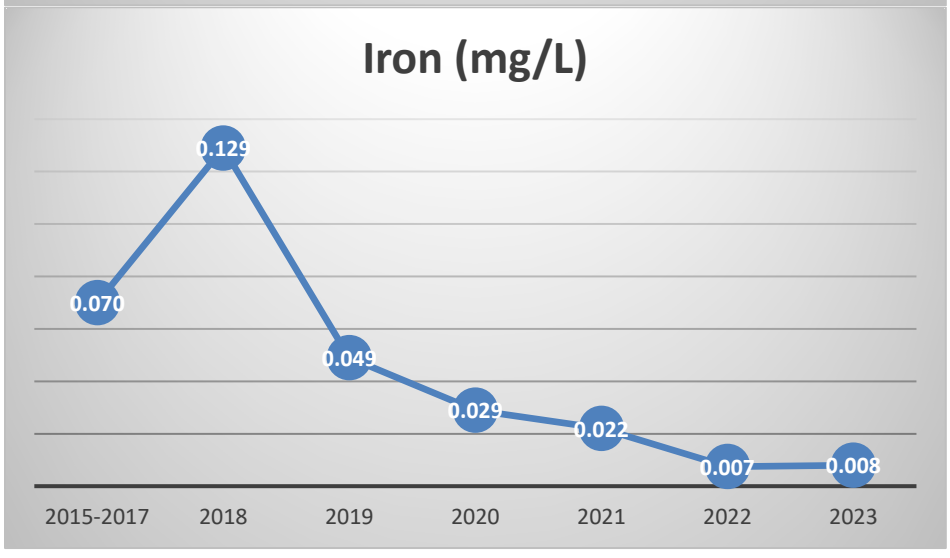
**Table 12.** Ground Water Sampling Program

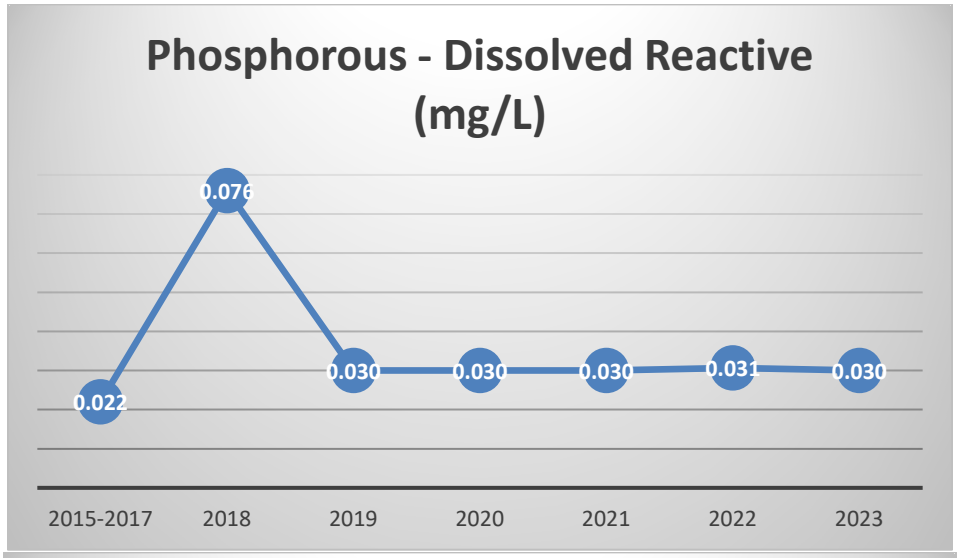
| | Average | | | | | | Minimum | | Maximum | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **2023** | **2022** | **2021** | **2020** | **2019** | **2018** | **2023** | **2022** | **2023** | **2022** |
| **4AAP-Phenols (mg/L)** | 0.002 | 0.002 | 0.004 | 0.002 | 0.003 | 0.003 | 0.002 | 0.002 | 0.002 | 0.003 |
| **Alkalinity (mg/L as CaCO3)** | 287 | 296 | 296 | 289 | 283 | 291 | 204 | 202 | 482 | 484 |
| **Calcium (mg/L)** | 86 | 79 | 81 | 79 | 76 | 88 | 54 | 50 | 160 | 144 |
| **Chloride (mg/L)** | 30.7 | 30.3 | 26.5 | 25.5 | 21.7 | 26.3 | 1.0 | 1.0 | 180.0 | 150.0 |
| **Conductivity (uS/cm)** | 610 | 618 | 626 | 597 | 586 | 582 | 339 | 342 | 1110 | 997 |
| **Dissolved Organic Carbon (mg/L)** | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.7 | 1.0 | 1.0 | 4.0 | 5.0 |
| **Iron (mg/L)** | 0.008 | 0.007 | 0.022 | 0.029 | 0.049 | 0.129 | 0.007 | 0.007 | 0.038 | 0.022 |
| **Phosphorous - Dissolved Reactive (mg/L)** | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.08 | 0.03 | 0.03 | 0.03 | 0.04 |
| **Magnesium (mg/L)** | 24.4 | 24.6 | 23.5 | 23.4 | 23.2 | 24.7 | 14.9 | 15.1 | 35.6 | 35.4 |
| **Nitrate + Nitrite (mg/L)** | 0.28 | 0.43 | 0.29 | 0.28 | 0.26 | 0.24 | 0.06 | 0.06 | 1.53 | 2.25 |
| **Nitrite (mg/L)** | 0.03 | 0.04 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.13 | 0.19 |
| **Nitrate (mg/L)** | 0.28 | 0.42 | 0.28 | 0.30 | 0.25 | 0.23 | 0.06 | 0.06 | 1.49 | 2.25 |
| **Organic Nitrogen (mg/L)** | 0.52 | 0.52 | 0.51 | 0.50 | 0.18 | 0.19 | 0.50 | 0.50 | 0.90 | 1.20 |
| **Sodium (mg/L)** | 17.9 | 19.0 | 16.8 | 16.0 | 15.5 | 18 | 0.54 | 0.52 | 80.1 | 78.8 |
| **Sulphate (mg/L)** | 16.4 | 17.0 | 13.0 | 13.0 | 11.2 | 11.7 | 2.0 | 2.0 | 42.0 | 49.0 |
| **Total Ammonia (mg/L)** | 0.17 | 0.18 | 0.30 | 0.10 | 0.22 | 0.12 | 0.10 | 0.10 | 2.80 | 1.10 |
| **Total Kjeldahl Nitrogen (mg/L)** | 0.59 | 0.58 | 0.64 | 0.50 | 0.51 | 0.52 | 0.50 | 0.50 | 3.40 | 2.40 |
| **Total Phosphorous (mg/L)** | 0.16 | 0.21 | 0.06 | 0.19 | 0.22 | 0.12 | 0.03 | 0.03 | 1.18 | 0.94 |
| **Hardness (dissolved) (mg/L as CaCO3)** | 314 | 299 | 298 | 293 | 285 | 322 | 215 | 205 | 547 | 506 |
| **Unionized Ammonia (mg/L)** | 0.004 | 0.005 | 0.012 | 0.003 | 0.004 | 0.003 | 0.001 | 0.001 | 0.059 | 0.039 |
| **pH** | 7.91 | 7.94 | 8.07 | 7.88 | 7.95 | 7.99 | 7.36 | 7.24 | 8.21 | 8.27 |

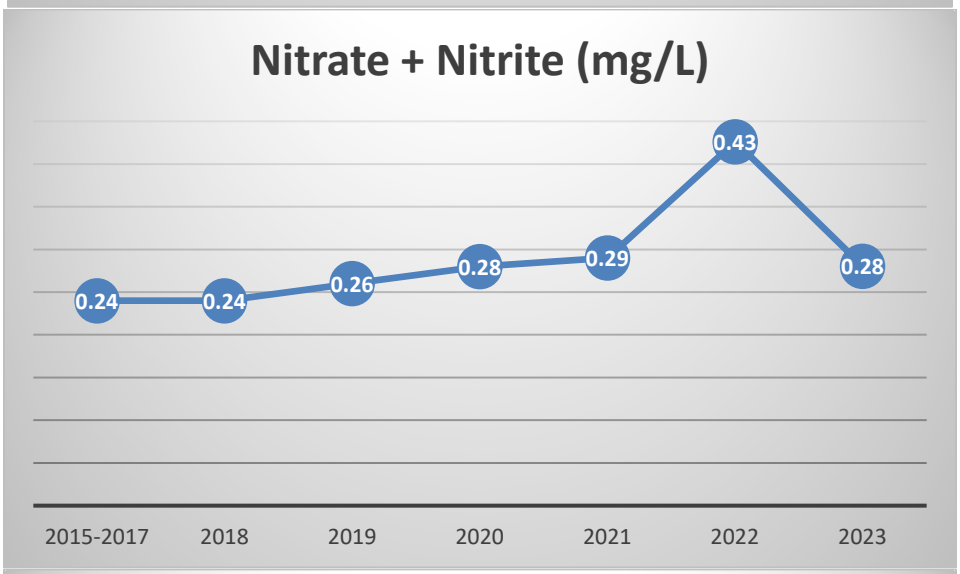
Ground Water Sampling graphs were made for every parameter that the average changed +/- 10% please see below. Further comprehensive interpretation of groundwater monitoring data is required in order to determine proximity of sites that produced parameter changes and if relation exists with other monitoring sites.

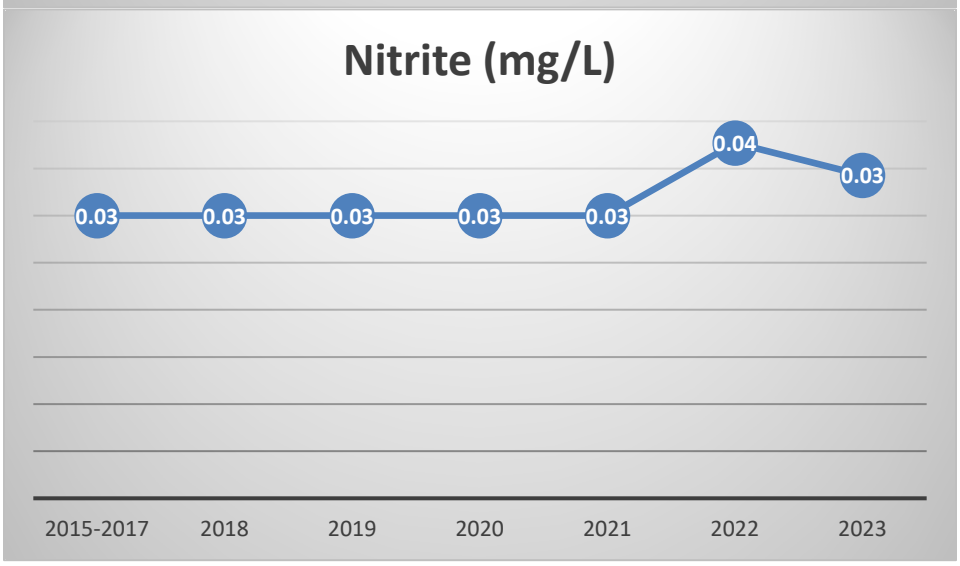

4AAP-Phenols (mg/L)
0.004
0.003
0.003
0.002
0.004
0.002
0.002
2015-2017
2018
2019
2020
2021
2022
2023

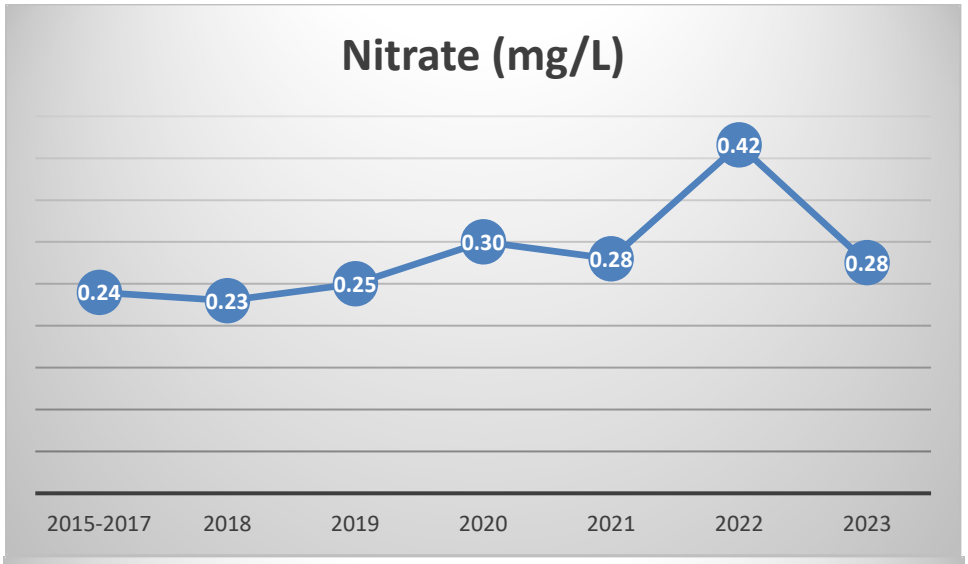

Chloride (mg/L)
14.6
26.3
21.7
25.5
26.5
30.3
30.7
2015-2017
2018
2019
2020
2021
2022
2023

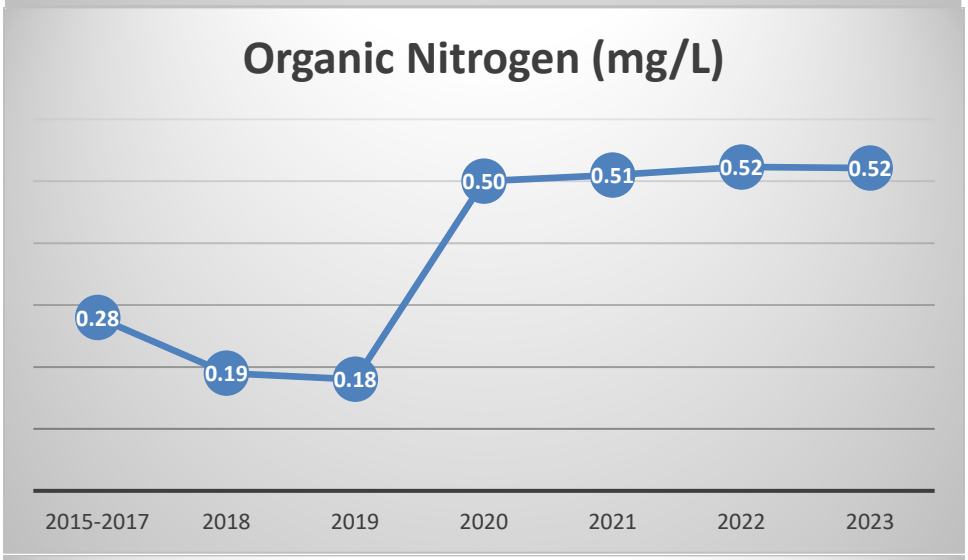

Iron (mg/L)
0.070
0.129
0.049
0.029
0.022
0.007
0.008
2015-2017
2018
2019
2020
2021
2022
2023

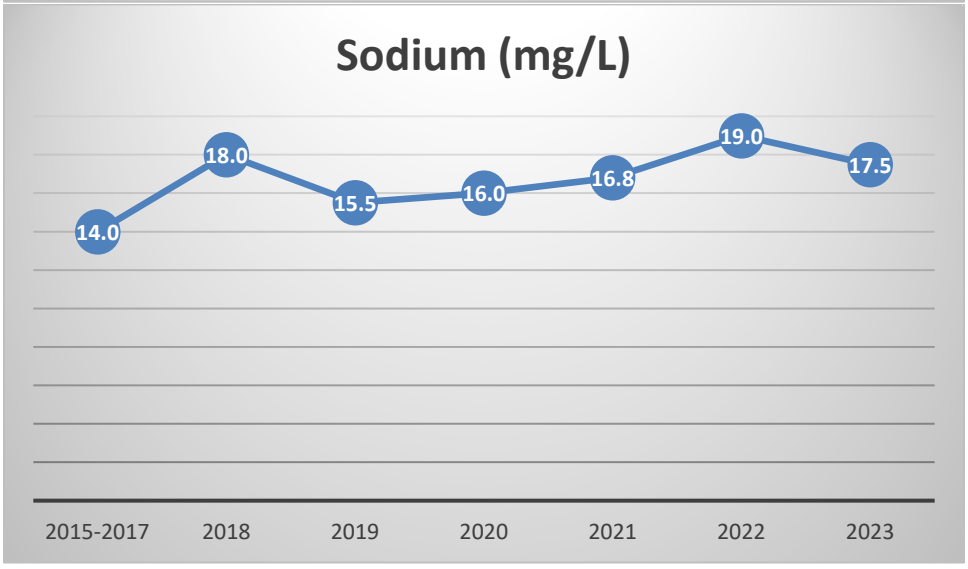

Phosphorous - Dissolved Reactive (mg/L)
0.022
0.076
0.030
0.030
0.030
0.031
0.030
2015-2017
2018
2019
2020
2021
2022
2023

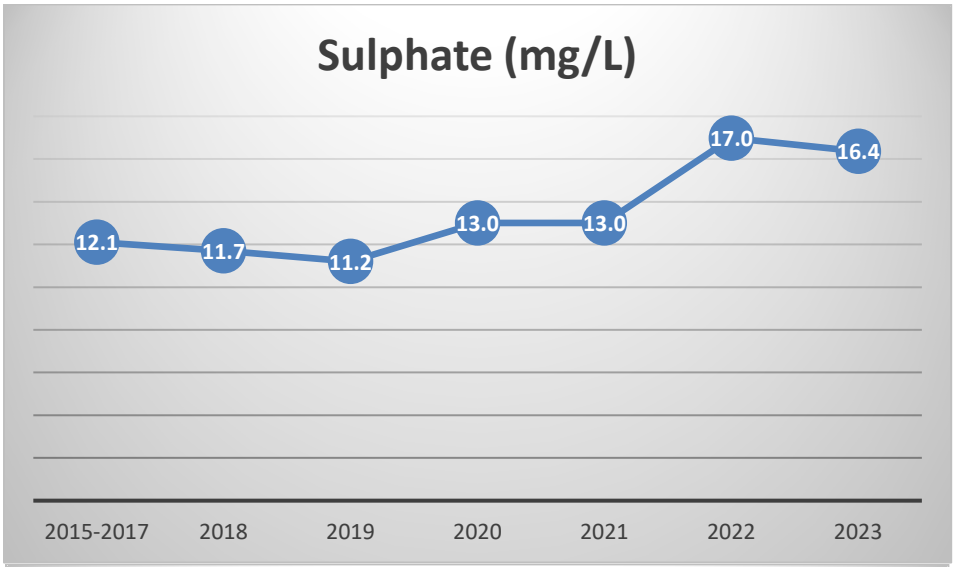

Nitrate + Nitrite (mg/L)
0.24
0.24
0.26
0.28
0.29
0.43
0.28
2015-2017
2018
2019
2020
2021
2022
2023

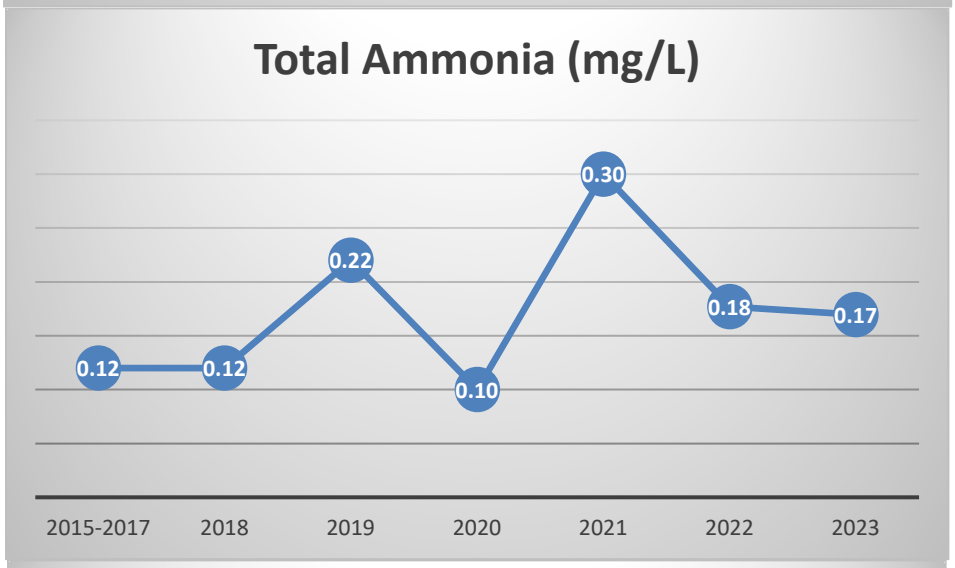

Nitrite (mg/L)
0.03
0.03
0.03
0.03
0.03
0.04
0.03
2015-2017
2018
2019
2020
2021
2022
2023

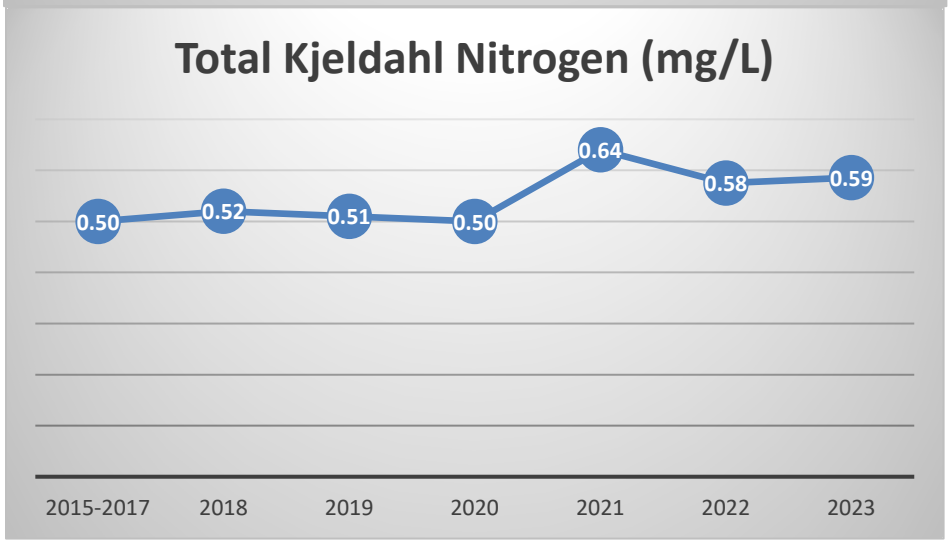

Nitrate (mg/L)
0.24
0.23
0.25
0.30
0.28
0.42
0.28
2015-2017
2018
2019
2020
2021
2022
2023

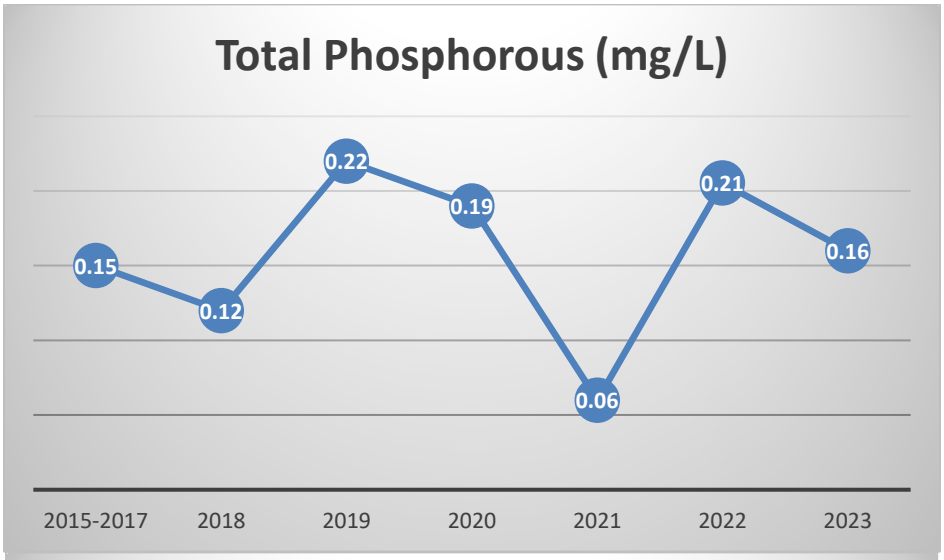

Organic Nitrogen (mg/L)
0.28
0.19
0.18
0.50
0.51
0.52
0.52
2015-2017
2018
2019
2020
2021
2022
2023


Sodium (mg/L)
14.0
18.0
15.5
16.0
16.8
19.0
17.5
2015-2017
2018
2019
2020
2021
2022
2023


Sulphate (mg/L)
12.1
11.7
11.2
13.0
13.0
17.0
16.4
2015-2017
2018
2019
2020
2021
2022
2023


Total Ammonia (mg/L)
0.12
0.12
0.22
0.10
0.30
0.18
0.17
2015-2017
2018
2019
2020
2021
2022
2023


Total Kjeldahl Nitrogen (mg/L)
0.50
0.52
0.51
0.50
0.64
0.58
0.59
2015-2017
2018
2019
2020
2021
2022
2023



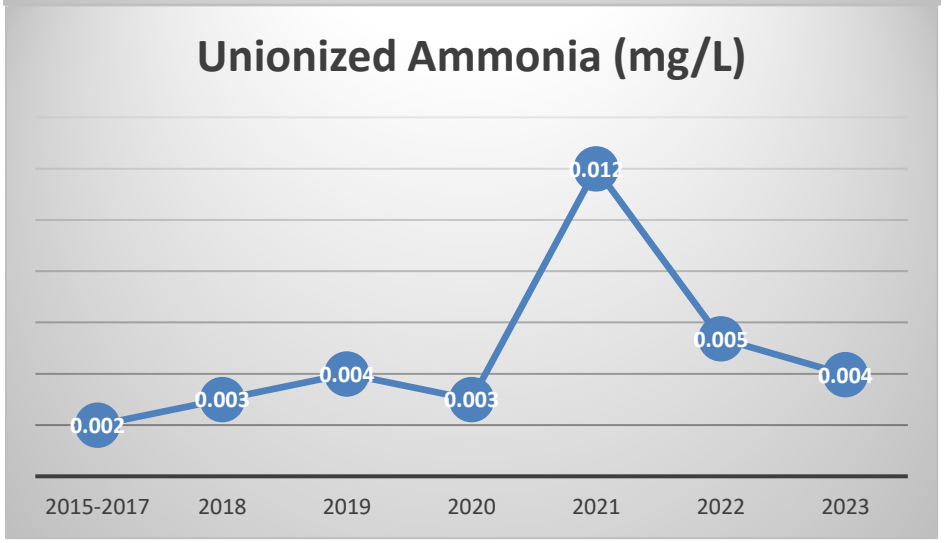




**Table 13.** Ground Water Sampling Program – 36 Month Sampling (October 2021)

| | Minimum | Average | Maximum |
|---|---|---|---|
| **Aluminum** | 0.001 | 0.001 | 0.004 |
| **Barium** | 0.007 | 0.017 | 0.042 |
| **Cadmium** | 0.000003 | 0.000009 | 0.000084 |
| **Chromium** | 0.00008 | 0.00011 | 0.00053 |
| **Copper** | 0.0002 | 0.0016 | 0.0162 |
| **Lead** | 0.00009 | 0.00009 | 0.00009 |
| **Manganese** | 0.00004 | 0.0870 | 0.843 |
| **Zinc** | 0.002 | 0.005 | 0.048 |

Refer to Appendix B for the laboratory analysis results for the groundwater sampling program.

## 4. Major Maintenance Activities

As per Section 15(c) of C of A 3-0046-96-006, *a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanisms or thing forming part of the facility* is required.

During 2023, the following major maintenance activities were conducted:

- Sewage pump station pump rebuild
- Recirculation pump repaired

## 5. Operating Challenges

As per Section 15(d) of C of A 3-0046-96-006, *a description of any operating problems encountered and corrective actions taken during the reporting period* are to be identified.

There were no bypasses of raw sewage or spills at the Tobermory Sewage Treatment System or any associated pumping stations during the reporting period.

## 6. Proposed Alterations, Extensions or Replacements

As per Section 15(e) of C of A 3-0046-96-006, *a summary of any proposed alteration, extension or replacement in the process or operations of the sewage treatment plant to be completed over the next reporting period which may require approval under the Ontario Water Resources Act* (OWRA) is required.

The following alterations, extensions/replacements are proposed for 2023, some of which may not require approval under OWRA:

- Sampling reduction request
- Lagoon cell sludge removal
- Generator annual inspection

## 7. Sludge Generation

As per Section 15(f) of C of A 3-0046-96-006, *a tabulation of the volume of sludge generated in the reporting period and an outline of anticipated volumes to be generated over the next reporting period* is required.

Since the facility is a sewage lagoon system, accumulated sludge is currently being stored in lagoon cell #1. The lagoons have been de-sludged once since the existing facility was constructed and approximately 800 $m^3$ of dewatered sludge was removed in October 2004.

A volume modeling and distribution survey was performed on July 23 & 24, 2020 of both Cells 1 and 2. The biosolids levels were recorded to be 10.62 inches for Cell 1 and 6.25 inches for Cell 2. The biosolids volumes were recorded to be 519.63 $m^3$ for Cell 1 and 391.84 $m^3$ for Cell 2. See Appendix E for the detailed reports.

As the 20 year mark has not been reached since the last lagoon cells cleanout, it was suggested to postpone the lagoon cleanout exercise for at least two more years. Meanwhile, it is recommended to have the entire sewer collection system flushed and video inspected in order to locate possible inflow or infiltration.

## 8. Sludge Handling

As per Section 15(g) of C of A 3-0046-96-006, an *outline of the sludge handing methods and disposal areas to be utilized over the next reporting period* are to be specified.

Since the facility is a sewage lagoon system, sludge levels in the lagoons are monitored regularly and disposal is arranged when sludge storage has reached its limit. No disposal areas are expected to be utilized over the next reporting period.

## 9. Septage Receiving Works

In 2023, approximately 6,913 $m^3$ (1,520,700 imperial gallons) of septage was received by the Tobermory Sewage Treatment. The septage was received from various sources including:

- Bruce Peninsula Septic Service
- Scott Septic Pumping

The total monthly volume of septage received can be found in Table 14. Detailed haulage volumes can be found in Appendix C.

**Table 14.** Total Volume of Septage Received in 2023

| Month | Total Volume of Septage Received ($m^3$) |
|---|---|
| January | 15.2 |
| February | 0.23 |
| March | 23.0 |
| April | 75.7 |
| May | 1338.8 |
| June | 875.1 |
| July | 1318.4 |
| August | 1656.1 |
| September | 862.8 |
| October | 541.0 |
| November | 159.1 |
| December | 47.7 |
| **Annual Total** | **6,913** |

## 10. Calibration and Maintenance Procedures

As per Section 15(h) of C of A 3-0046-96-006, *an evaluation of the calibration and maintenance procedures conducted on all monitoring equipment* is required.

All in-house monitoring equipment is calibrated as per manufacturer's recommendations. Monitoring and metering equipment is also calibrated by a third party on an annual basis. On June 21, 2023 Indus Controls successfully calibrated the flow meter at the Tobermory Pump Station and no issues were identified. In addition to sample analysis, preventative maintenance is scheduled for all equipment at the sewage treatment plant and pumping stations on at least a monthly basis. Maintenance activities were scheduled within the work management system (WMS), upon completion, operators record their

time and close off the work order. All records for calibrations/ verifications can be found in Appendix D.

## 11. Modifications for Performance and Reliability

As per Section 15(j) of C of A 3-0046-96-006an *evaluation for the need for modifications to the Tobermory Sewage Treatment Facility to improve performance and reliability and to minimize upsets and bypasses* is required.

During the reporting period the Tobermory Sewage Treatment Facility met the effluent objectives 84% of the time. Based on this evaluation, effluent recirculation flow from lagoon cell 2 to lagoon cell 1 will have to be monitored during the summer months for performance and reliability to meet our effluent objectives 100% of the time.

Ontario Clean Water Agency
Agence Ontarienne Des Eaux

# Appendix A

Performance Assessment Report

Ontario Clean Water Agency
Agence Ontarienne Des Eaux

# Performance Assessment Report

From 1/1/2023 to 12/31/2023 11:59:59 PM



## 1132 TOBERMORY WASTEWATER TREATMENT FACILITY 120001577

| | 1 / 2023 | 2/ 2023 | 3/ 2023 | 4/ 2023 | 5/ 2023 | 6/ 2023 | 7/ 2023 | 8/ 2023 | 9/ 2023 | 10/ 2023 | 11/ 2023 | 12/ 2023 | <--Total--> | <--Avg--> | <--Max--> | <-Criteria-> |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Flows** | | | | | | | | | | | | | | | | |
| Raw Flow: Total - Sewage Pumping Station m³/d | 2,761.00 | 2,258.70 | 2,855.00 | 3,955.00 | 5,512.00 | 5,011.21 | 8,251.33 | 9,044.00 | 6,307.50 | 5,163.50 | 3,441.00 | 2,314.00 | 56,874.24 | | | 0.00 |
| Raw Flow: Avg - Sewage Pumping Station m³/d | 89.06 | 80.67 | 92.10 | 131.83 | 177.81 | 167.04 | 266.17 | 291.74 | 210.25 | 166.56 | 114.70 | 82.64 | | 157.55 | | 625.00 |
| Raw Flow: Max - Sewage Pumping Station m³/d | 135.00 | 134.00 | 143.67 | 216.00 | 409.50 | 248.67 | 495.50 | 351.50 | 294.00 | 231.00 | 208.00 | 121.00 | | | 495.50 | 0.00 |
| Raw Flow: Count - Sewage Pumping Station m³/d | 31.00 | 28.00 | 30.00 | 30.00 | 31.00 | 30.00 | 31.00 | 31.00 | 30.00 | 31.00 | 30.00 | 28.00 | 361.00 | | | 0.00 |
| **Biochemical Oxygen Demand: BOD5** | | | | | | | | | | | | | | | | |
| Raw: Avg BOD5 - Sewage Pumping Station mg/L | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 278.00 | 71.00 | 98.00 | 0.00 | 42.00 | 0.00 | 0.00 | | 122.25 | 278.00 | 0.00 |
| Percent Removal: BOD5 - Sewage Pumping Station % | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 |
| **Total Suspended Solids: TSS** | | | | | | | | | | | | | | | | |
| Raw: Avg TSS - Sewage Pumping Station mg/L | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 182.00 | 114.00 | 65.00 | 0.00 | 40.00 | 0.00 | 0.00 | | 100.25 | 182.00 | 0.00 |
| Percent Removal: TSS - Sewage Pumping Station % | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 |
| **Total Phosphorus: TP** | | | | | | | | | | | | | | | | |
| Raw: Avg TP - Sewage Pumping Station mg/L | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.89 | 3.03 | 5.14 | 0.00 | 11.00 | 0.00 | 0.00 | | 6.52 | 11.00 | 0.00 |
| Percent Removal: TP - Sewage Pumping Station % | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | | 0.00 |
| **Nitrogen Series** | | | | | | | | | | | | | | | | |
| Raw: Avg TKN - Sewage Pumping Station mg/L | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 29.70 | 60.60 | 67.60 | 0.00 | 10.00 | 0.00 | 0.00 | | 41.98 | 67.60 | 0.00 |

Ontario Clean Water Agency
Agence Ontarienne Des Eaux

# Appendix B

Groundwater Sampling Program Laboratory Analysis Results

Ontario Clean Water Agency - Request for Laboratory Services and CHAIN OF CUSTODY - GROUNDWATER (MAY&OCTOBER, EXTENDED)



| | | | |
|---|---|---|---|
| Waterworks/Project # | 120001577 | C of C LIMS No: | MAY 15718 |
| Facility Name | Tobermory Sewage Treatment Plant | Laboratory Section | Sample condition upon receipt |
| Org. # | 1132 | Date Rec'd: MAY 1 9 2023 | Time Rec'd |
| Quote # | | | Initials |
| Attached Parameter List | No | Yes | Temperature Upon Receipt 11° x 3 °C |

Identification of Regulation under which the sample(s) fail: No Requirement to Report Sample Results Under Any Regulation for Wastewater Treatment

Requested Turnaround Time: b App. 24-48 h [ ] 5-7d [X] 7-10d [ ] Other [ ] Specify:

| | Report to: Process & Compliance Tech (PCT) | Data Transfer Contact: PCT | Invoice To: Ontario Clean Water Agency | Laboratory: SGS Lakefield Research Ltd |
|---|---|---|---|---|
| Address: | 18 Caroline Street<br>Southampton, ON<br>N0H 2L0 | 18 Caroline Street<br>Southampton, ON<br>N0H 2L0 | 18 Caroline Street<br>Southampton, ON<br>N0H 2L0 | 185 Concession St.<br>Lakefield, ON<br>K0L 2H0 |
| Telephone: | 519-374-5782 | 519-374-5782 | 519-797-2561 | 705-652-2000 |
| Fax: | (519) 797-3080 | (519) 797-3080 | (519) 797-3080 | 705-652-6365 |
| Email: | kyoung@ocwa.com | kyoung@ocwa.com | apwesthighlands@ocwa.com | carrie.greenlaw@sgs.com |

| Sample | | | | | Type | | Parameters | | | | | | | | | | | | | | | | Comments | Upload to OCWA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Station Acronym | Station Number (Short Name) | | Sample Location Name | Date & Time Collected | Bottles | Alkalinity | Conductivity | Free Ammonia | Phenols | pH | Chloride | Sulphates | Nitrite | Magnesium | Iron | Nitrate | Calcium | Hardness | Sodium | DOC | Organic Nitrogen | TKN | Dissolved Reactive Phosphorus | Total Phosphorous | |
| Well | 5S | - | | 14:35 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | Yes X No |
| Well | 5I | - | | 14:30 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes X No |
| Well | 5D | - | | 14:25 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes X No |
| Well | 9D | - | | 10:40 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes X No |
| Well | 9I | - | | 10:30 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes X No |
| Well | 9S | - | | 10:50 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | Yes X No |
| Well | 8I | - | | 11:10 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes X No |
| Well | 8D | - | | 11:20 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes X No |
| Well | 10S | - | | 1355 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | Yes X No |
| Well | 11S | - | | 13:40 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | Yes X No |
| Well | 12S | - | | 13:25 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | Yes X No |
| Well | 1D | - | | 13:15 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes X No |
| Well | 1I | - | | 13:20 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes X No |
| Well | 6S | - | | 13:10 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | Yes X No |
| Well | 6D | - | | 13:05 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes X No |
| Well | 6I | - | | 1255 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes X No |
| Well | 57 | - | | 1245 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes X No |
| Well | 56 | - | | 1235 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes X No |
| Well | 2S | - | | 12:30 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | Yes X No |
| Well | 2I | - | | 12:20 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes X No |
| Well | 2D | - | | 12:10 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes X No |
| Well | 55 | - | | 11:45 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes X No |
| Well | 7S | - | | 11:30 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | Yes X No |
| Well | 60 | - | | 14:20 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes X No |
| Well | 61 | - | | 14:10 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes X No |
| Well | 8S | - | | ~~11:30~~ 11:25 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | DRY | Yes X No |

Sampler Name: Billy Shearer

Sampler Signature: Billy



607780083988 9:30
608487599037
608487598773, Rtn

**SGS Canada Inc.**
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

**Works #:** 120001577
**Project :** PO#017018

18-May-2023

**OCWA-Grey Bruce (Tobermory Sewage Plant)**
Attn : Karla Young

**Date Rec. :** 10 May 2023
**LR Report:** **CA15718-MAY23**

P.O. Box 760
Southampton, ON
N0H 2L0, Canada

**Copy:** #1

Phone: 519-797-2561
Fax:pdf

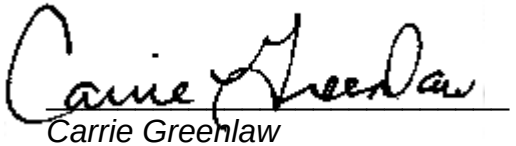
# CERTIFICATE OF ANALYSIS
## Final Report

| Analysis | 1: Analysis Start Date | 2: Analysis Start Time | 3: Analysis Completed Date | 4: Analysis Completed Time | 5: Well 5S | 6: Well 5I | 7: Well 5D | 8: Well 9D | 9: Well 9I | 10: Well 9S | 11: Well 8I |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date & Time | | | | | 09-May-23 14:35 | 09-May-23 14:30 | 09-May-23 14:25 | 09-May-23 10:40 | 09-May-23 10:30 | 09-May-23 10:50 | 09-May-23 11:10 |
| Temperature Upon Receipt [°C] | --- | --- | --- | --- | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 |
| Alkalinity [mg/L as CaCO3] | 10-May-23 | 13:58 | 12-May-23 | 11:22 | 395 | 241 | 236 | 226 | 243 | 229 | 251 |
| Conductivity [uS/cm] | 10-May-23 | 13:58 | 12-May-23 | 11:22 | 726 | 915 | 934 | 451 | 498 | 434 | 502 |
| pH [No unit] | 10-May-23 | 13:58 | 12-May-23 | 11:22 | 8.08 | 8.08 | 8.11 | 8.15 | 8.14 | 8.11 | 8.16 |
| Temperature @ pH [°C] | 10-May-23 | 13:58 | 12-May-23 | 11:22 | 22.0 | 22.5 | 21.7 | 22.4 | 22.6 | 22.2 | 22.4 |
| Organic Nitrogen [mg/L] | 10-May-23 | 16:41 | 12-May-23 | 13:52 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| Total Kjeldahl Nitrogen [as N mg/L] | 10-May-23 | 16:41 | 12-May-23 | 13:52 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| Unionized Ammonia [mg/L as N] | 10-May-23 | 16:44 | 12-May-23 | 13:54 | <0.003 | 0.003 | 0.002 | <0.004 | <0.003 | <0.003 | <0.004 |
| Ammonia+Ammonium (N) [as N mg/L] | 10-May-23 | 16:44 | 11-May-23 | 10:09 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| 4AAP-Phenolics [mg/L] | 11-May-23 | 06:42 | 12-May-23 | 13:40 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 |
| Dissolved Organic Carbon [mg/L] | 11-May-23 | 19:10 | 12-May-23 | 13:25 | 3 | 4 | 4 | < 1 | < 1 | 2 | 2 |
| Phosphorus (total) [mg/L] | 11-May-23 | 14:33 | 15-May-23 | 11:28 | 0.08 | --- | --- | --- | --- | < 0.03 | --- |
| Phosphorus (dissolved reactive) [mg/L] | 12-May-23 | 14:31 | 15-May-23 | 13:05 | < 0.03 | --- | --- | --- | --- | < 0.03 | --- |
| Chloride [mg/L] | 16-May-23 | 08:01 | 18-May-23 | 13:36 | < 1 | 180 | 170 | 1 | 4 | 7 | 8 |
| Sulphate [mg/L] | 16-May-23 | 07:59 | 16-May-23 | 15:35 | 6 | 42 | 42 | 21 | 23 | 6 | 15 |
| Nitrite (as N) [mg/L] | 12-May-23 | 18:21 | 17-May-23 | 15:50 | < 0.03 | 0.13 | 0.06 | < 0.03 | < 0.03 | < 0.03 | < 0.03 |
| Nitrate (as N) [mg/L] | 12-May-23 | 18:21 | 17-May-23 | 15:50 | 0.14 | 0.42 | < 0.06 | < 0.06 | < 0.06 | < 0.06 | 0.10 |
| Nitrate + Nitrite (as N) [mg/L] | 12-May-23 | 18:21 | 17-May-23 | 15:50 | 0.14 | 0.55 | < 0.06 | < 0.06 | < 0.06 | < 0.06 | 0.10 |
| Hardness (dissolved) [mg/L as CaCO3] | 14-May-23 | 13:35 | 15-May-23 | 15:20 | 417 | 300 | 309 | 254 | 264 | 255 | 290 |
| Magnesium (dissolved) [mg/L] | 14-May-23 | 13:35 | 15-May-23 | 15:20 | 23.4 | 19.5 | 20.3 | 24.2 | 25.7 | 20.5 | 26.4 |
| Calcium (dissolved) [mg/L] | 14-May-23 | 13:35 | 15-May-23 | 15:20 | 128 | 88.1 | 90.2 | 61.8 | 63.3 | 68.1 | 72.4 |
| Iron (dissolved) [mg/L] | 14-May-23 | 13:35 | 15-May-23 | 15:20 | < 0.007 | < 0.007 | < 0.007 | < 0.007 | < 0.007 | < 0.007 | < 0.007 |
| Sodium (dissolved) [mg/L] | 14-May-23 | 13:35 | 15-May-23 | 15:20 | 1.26 | 77.3 | 80.1 | 3.75 | 6.21 | 0.86 | 2.18 |
| Phosphorus (dissolved) [mg/L] | 14-May-23 | 13:35 | 15-May-23 | 15:20 | 0.004 | 0.017 | 0.010 | 0.003 | 0.004 | < 0.003 | < 0.003 |

**SGS Canada Inc.**
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

**Works #:** 120001577
**Project :** PO#017018
**LR Report :** **CA15718-MAY23**

Note: Provincial unionized ammonia calculated using lab results for pH and temperature.



*Carrie Greenlaw*
*Project Specialist,*
*Environment, Health & Safety*

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**Copy:** #1

Phone: 519-797-2561
Fax:pdf

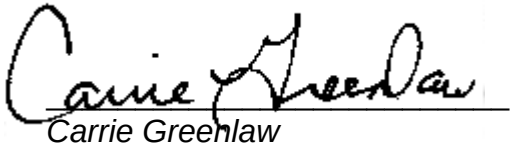
# CERTIFICATE OF ANALYSIS
## Final Report

| Analysis | 1: Analysis Start Date | 2: Analysis Start Time | 3: Analysis Completed Date | 4: Analysis Completed Time | 12: Well 8D | 13: Well 10S | 14: Well 11S | 15: Well 12S | 16: Well 1D | 17: Well 1I |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date & Time | | | | | 09-May-23 11:20 | 09-May-23 13:55 | 09-May-23 13:40 | 09-May-23 13:25 | 09-May-23 13:15 | 09-May-23 13:20 |
| Temperature Upon Receipt [°C] | --- | --- | --- | --- | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 |
| Alkalinity [mg/L as CaCO3] | 10-May-23 | 13:58 | 12-May-23 | 11:22 | 265 | 204 | 335 | 252 | 274 | 378 |
| Conductivity [uS/cm] | 10-May-23 | 13:58 | 12-May-23 | 11:22 | 530 | 409 | 638 | 888 | 518 | 686 |
| pH [No unit] | 10-May-23 | 13:58 | 12-May-23 | 11:22 | 8.15 | 8.16 | 8.09 | 8.04 | 8.21 | 8.03 |
| Temperature @ pH [°C] | 10-May-23 | 13:58 | 12-May-23 | 11:22 | 21.5 | 23.4 | 22.9 | 23.0 | 22.9 | 23.5 |
| Organic Nitrogen [mg/L] | 10-May-23 | 16:41 | 12-May-23 | 13:52 | 0.6 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | 0.5 |
| Total Kjeldahl Nitrogen [as N mg/L] | 10-May-23 | 16:41 | 12-May-23 | 13:52 | 0.6 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | 0.5 |
| Unionized Ammonia [mg/L as N] | 10-May-23 | 16:44 | 12-May-23 | 13:54 | <0.003 | <0.004 | <0.003 | <0.003 | 0.004 | <0.003 |
| Ammonia+Ammonium (N) [as N mg/L] | 10-May-23 | 16:44 | 11-May-23 | 10:09 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| 4AAP-Phenolics [mg/L] | 11-May-23 | 06:42 | 12-May-23 | 13:40 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 |
| Dissolved Organic Carbon [mg/L] | 11-May-23 | 19:10 | 12-May-23 | 13:25 | 3 | 2 | 2 | 3 | 1 | 2 |
| Phosphorus (total) [mg/L] | 11-May-23 | 14:33 | 15-May-23 | 11:28 | --- | 0.16 | < 0.03 | < 0.03 | --- | --- |
| Phosphorus (dissolved reactive) [mg/L] | 12-May-23 | 14:31 | 15-May-23 | 13:05 | --- | < 0.03 | < 0.03 | < 0.03 | --- | --- |
| Chloride [mg/L] | 16-May-23 | 08:01 | 18-May-23 | 13:36 | 9 | < 1 | 2 | 170 | 2 | 5 |
| Sulphate [mg/L] | 16-May-23 | 07:59 | 16-May-23 | 15:35 | 18 | 23 | 15 | 34 | 12 | 6 |
| Nitrite (as N) [mg/L] | 12-May-23 | 18:21 | 17-May-23 | 15:50 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | < 0.03 |
| Nitrate (as N) [mg/L] | 12-May-23 | 18:21 | 17-May-23 | 15:50 | < 0.06 | < 0.06 | 1.38 | 0.87 | < 0.06 | 0.10 |
| Nitrate + Nitrite (as N) [mg/L] | 12-May-23 | 18:21 | 17-May-23 | 15:50 | < 0.06 | < 0.06 | 1.38 | 0.87 | < 0.06 | 0.10 |
| Hardness (dissolved) [mg/L as CaCO3] | 14-May-23 | 13:35 | 15-May-23 | 15:20 | 308 | 229 | 374 | 302 | 245 | 382 |
| Magnesium (dissolved) [mg/L] | 14-May-23 | 13:35 | 15-May-23 | 15:20 | 26.9 | 19.3 | 29.7 | 17.8 | 21.9 | 28.7 |
| Calcium (dissolved) [mg/L] | 14-May-23 | 13:35 | 15-May-23 | 15:20 | 79.0 | 60.0 | 101 | 91.5 | 62.2 | 106 |
| Iron (dissolved) [mg/L] | 14-May-23 | 13:35 | 15-May-23 | 15:20 | < 0.007 | < 0.007 | < 0.007 | < 0.007 | < 0.007 | < 0.007 |
| Sodium (dissolved) [mg/L] | 14-May-23 | 13:35 | 15-May-23 | 15:20 | 2.02 | 2.64 | 1.85 | 63.2 | 22.8 | 7.40 |
| Phosphorus (dissolved) [mg/L] | 14-May-23 | 13:35 | 15-May-23 | 15:20 | < 0.003 | < 0.003 | 0.005 | 0.006 | 0.032 | 1.12 |

**SGS Canada Inc.**
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

**Works #:** 120001577
**Project :** PO#017018
**LR Report :** **CA15718-MAY23**

Note: Provincial unionized ammonia calculated using lab results for pH and temperature.



*Carrie Greenlaw*
*Project Specialist,*
*Environment, Health & Safety*

**SGS Canada Inc.**
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

**Works #:** 120001577
**Project :** PO#017018

18-May-2023

**OCWA-Grey Bruce (Tobermory Sewage Plant)**
Attn : Karla Young

**Date Rec. :** 10 May 2023
**LR Report:** **CA15718-MAY23**

P.O. Box 760
Southampton, ON
N0H 2L0, Canada

**Copy:** #1

Phone: 519-797-2561
Fax:pdf

# CERTIFICATE OF ANALYSIS
## Final Report

| Analysis | 1: Analysis Start Date | 2: Analysis Start Time | 3: Analysis Completed Date | 4: Analysis Completed Time | 18: Well 6S | 19: Well 6D | 20: Well 6I | 21: Well 57 | 22: Well 56 | 23: Well 2S |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date & Time | | | | | 09-May-23 13:10 | 09-May-23 13:05 | 09-May-23 12:55 | 09-May-23 12:45 | 09-May-23 12:35 | 09-May-23 12:30 |
| Temperature Upon Receipt [°C] | --- | --- | --- | --- | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 |
| Alkalinity [mg/L as CaCO3] | 10-May-23 | 13:58 | 12-May-23 | 11:22 | 252 | 257 | 348 | 473 | 258 | 316 |
| Conductivity [uS/cm] | 10-May-23 | 13:58 | 12-May-23 | 11:22 | 459 | 490 | 616 | 846 | 478 | 519 |
| pH [No unit] | 10-May-23 | 13:58 | 12-May-23 | 11:22 | 8.10 | 8.14 | 8.06 | 8.02 | 8.02 | 8.12 |
| Temperature @ pH [°C] | 10-May-23 | 13:58 | 12-May-23 | 11:22 | 23.2 | 22.8 | 22.5 | 22.7 | 22.8 | 19.7 |
| Organic Nitrogen [mg/L] | 10-May-23 | 16:41 | 12-May-23 | 13:52 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| Total Kjeldahl Nitrogen [as N mg/L] | 10-May-23 | 16:41 | 12-May-23 | 13:52 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| Unionized Ammonia [mg/L as N] | 10-May-23 | 16:44 | 12-May-23 | 13:54 | <0.003 | 0.009 | 0.003 | <0.003 | <0.003 | <0.003 |
| Ammonia+Ammonium (N) [as N mg/L] | 10-May-23 | 16:44 | 11-May-23 | 10:09 | < 0.1 | 0.2 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| 4AAP-Phenolics [mg/L] | 11-May-23 | 06:42 | 12-May-23 | 13:40 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 |
| Dissolved Organic Carbon [mg/L] | 11-May-23 | 19:10 | 12-May-23 | 13:25 | 3 | 1 | 2 | 3 | 2 | 2 |
| Phosphorus (total) [mg/L] | 11-May-23 | 14:33 | 15-May-23 | 11:28 | < 0.03 | --- | --- | --- | --- | 0.05 |
| Phosphorus (dissolved reactive) [mg/L] | 12-May-23 | 14:31 | 15-May-23 | 13:05 | < 0.03 | --- | --- | --- | --- | < 0.03 |
| Chloride [mg/L] | 16-May-23 | 08:01 | 18-May-23 | 13:36 | 1 | 2 | 5 | < 1 | < 1 | < 1 |
| Sulphate [mg/L] | 16-May-23 | 07:59 | 16-May-23 | 15:35 | < 2 | 6 | 12 | 8 | 2 | < 2 |
| Nitrite (as N) [mg/L] | 12-May-23 | 18:21 | 17-May-23 | 15:50 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | < 0.03 |
| Nitrate (as N) [mg/L] | 12-May-23 | 18:21 | 17-May-23 | 15:50 | < 0.06 | < 0.06 | < 0.06 | 0.67 | < 0.06 | < 0.06 |
| Nitrate + Nitrite (as N) [mg/L] | 12-May-23 | 18:21 | 17-May-23 | 15:50 | < 0.06 | < 0.06 | < 0.06 | 0.67 | < 0.06 | < 0.06 |
| Hardness (dissolved) [mg/L as CaCO3] | 14-May-23 | 13:35 | 15-May-23 | 15:20 | 268 | 272 | 346 | 519 | 277 | 334 |
| Magnesium (dissolved) [mg/L] | 14-May-23 | 13:35 | 15-May-23 | 15:20 | 29.4 | 25.0 | 32.2 | 35.3 | 18.1 | 19.1 |
| Calcium (dissolved) [mg/L] | 14-May-23 | 13:35 | 15-May-23 | 15:20 | 58.9 | 67.6 | 85.8 | 150 | 81.3 | 102 |
| Iron (dissolved) [mg/L] | 14-May-23 | 13:35 | 15-May-23 | 15:20 | < 0.007 | < 0.007 | < 0.007 | < 0.007 | < 0.007 | < 0.007 |
| Sodium (dissolved) [mg/L] | 14-May-23 | 13:35 | 15-May-23 | 15:20 | 0.54 | 6.34 | 4.81 | 0.93 | 0.63 | 1.28 |
| Phosphorus (dissolved) [mg/L] | 14-May-23 | 13:35 | 15-May-23 | 15:20 | 0.004 | 0.005 | 0.032 | 0.004 | 0.003 | < 0.003 |

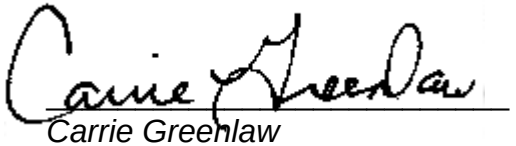
OnLine LIMS

00033376 96

**SGS Canada Inc.**
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

**Works #:** 120001577
**Project :** PO#017018
**LR Report :** **CA15718-MAY23**

Note: Provincial unionized ammonia calculated using lab results for pH and temperature.



*Carrie Greenlaw*
*Project Specialist,*
*Environment, Health & Safety*

**SGS Canada Inc.**
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

**Works #:** 120001577
**Project :** PO#017018

18-May-2023

**OCWA-Grey Bruce (Tobermory Sewage Plant)**
Attn : Karla Young

P.O. Box 760
Southampton, ON
N0H 2L0, Canada

Phone: 519-797-2561
Fax:pdf

**Date Rec. :** 10 May 2023
**LR Report:** **CA15718-MAY23**

**Copy:** #1

# CERTIFICATE OF ANALYSIS
## Final Report

| Analysis | 1: Analysis Start Date | 2: Analysis Start Time | 3: Analysis Completed Date | 4: Analysis Completed Time | 24: Well 2I | 25: Well 2D | 26: Well 55 | 27: Well 7S | 28: Well 60 | 29: Well 61 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date & Time | | | | | 09-May-23 12:20 | 09-May-23 12:10 | 09-May-23 11:45 | 09-May-23 11:30 | 09-May-23 14:20 | 09-May-23 14:10 |
| Temperature Upon Receipt [°C] | --- | --- | --- | --- | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 |
| Alkalinity [mg/L as CaCO3] | 10-May-23 | 13:58 | 12-May-23 | 11:22 | 363 | 263 | 224 | 238 | 286 | 301 |
| Conductivity [uS/cm] | 10-May-23 | 13:58 | 12-May-23 | 11:22 | 606 | 487 | 753 | 347 | 828 | 777 |
| pH [No unit] | 10-May-23 | 13:58 | 12-May-23 | 11:22 | 8.08 | 8.01 | 7.84 | 8.05 | 7.66 | 8.01 |
| Temperature @ pH [°C] | 10-May-23 | 13:58 | 12-May-23 | 11:22 | 19.9 | 19.2 | 18.1 | 19.0 | 17.4 | 19.9 |
| Organic Nitrogen [mg/L] | 10-May-23 | 16:41 | 12-May-23 | 13:52 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| Total Kjeldahl Nitrogen [as N mg/L] | 10-May-23 | 16:41 | 12-May-23 | 13:52 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| Unionized Ammonia [mg/L as N] | 10-May-23 | 16:44 | 12-May-23 | 13:54 | 0.002 | 0.001 | < 0.001 | 0.002 | < 0.001 | 0.002 |
| Ammonia+Ammonium (N) [as N mg/L] | 10-May-23 | 16:44 | 11-May-23 | 10:09 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| 4AAP-Phenolics [mg/L] | 11-May-23 | 06:42 | 12-May-23 | 13:40 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 |
| Dissolved Organic Carbon [mg/L] | 11-May-23 | 19:10 | 12-May-23 | 13:25 | 2 | 2 | 3 | 2 | 2 | 2 |
| Phosphorus (total) [mg/L] | 11-May-23 | 14:33 | 15-May-23 | 11:28 | --- | --- | --- | 0.04 | --- | --- |
| Phosphorus (dissolved reactive) [mg/L] | 12-May-23 | 14:31 | 15-May-23 | 13:05 | --- | --- | --- | < 0.03 | --- | --- |
| Chloride [mg/L] | 16-May-23 | 08:01 | 18-May-23 | 13:36 | 5 | 2 | 84 | < 1 | 130 | 53 |
| Sulphate [mg/L] | 16-May-23 | 07:59 | 16-May-23 | 15:35 | 6 | 22 | 38 | 5 | 40 | 23 |
| Nitrite (as N) [mg/L] | 12-May-23 | 18:21 | 17-May-23 | 15:50 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | < 0.03 |
| Nitrate (as N) [mg/L] | 12-May-23 | 18:21 | 17-May-23 | 15:50 | < 0.06 | < 0.06 | 0.81 | < 0.06 | 1.46 | 0.10 |
| Nitrate + Nitrite (as N) [mg/L] | 12-May-23 | 18:21 | 17-May-23 | 15:50 | < 0.06 | < 0.06 | 0.81 | < 0.06 | 1.46 | 0.10 |
| Hardness (dissolved) [mg/L as CaCO3] | 14-May-23 | 13:35 | 15-May-23 | 15:20 | 397 | 254 | 263 | 243 | 355 | 312 |
| Magnesium (dissolved) [mg/L] | 14-May-23 | 13:35 | 15-May-23 | 15:20 | 30.8 | 22.7 | 16.6 | 18.6 | 22.4 | 23.9 |
| Calcium (dissolved) [mg/L] | 14-May-23 | 13:35 | 15-May-23 | 15:20 | 108 | 64.2 | 77.8 | 66.7 | 105 | 85.6 |
| Iron (dissolved) [mg/L] | 14-May-23 | 13:35 | 15-May-23 | 15:20 | < 0.007 | < 0.007 | < 0.007 | < 0.007 | < 0.007 | < 0.007 |
| Sodium (dissolved) [mg/L] | 14-May-23 | 13:35 | 15-May-23 | 15:20 | 2.51 | 16.7 | 65.6 | 0.66 | 59.1 | 26.4 |
| Phosphorus (dissolved) [mg/L] | 14-May-23 | 13:35 | 15-May-23 | 15:20 | 0.126 | 0.003 | 0.013 | 0.003 | 0.059 | 0.009 |

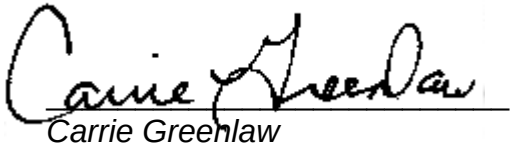
OnLine LIMS

0003337700

**SGS Canada Inc.**
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

**Works #:** 120001577
**Project :** PO#017018
**LR Report :** **CA15718-MAY23**

Note: Provincial unionized ammonia calculated using lab results for pH and temperature.



*Carrie Greenlaw*
*Project Specialist,*
*Environment, Health & Safety*

Ontario Clean Water Agency - Request for Laboratory Services and CHAIN OF CUSTODY - GROUNDWATER (SUMMER (AUGUST) LIMITED)



| | | | |
|---|---|---|---|
| Waterworks/Project # | **120001577** | C of C LIMS No: | Avg - 12474 |
| Facility Name | **Tobermory Sewage Treatment Plant** | Laboratory Section | Date Rec'd: ~~08/11/23~~ 08/12/23 Time Rec'd |
| Org. # | **1132** | Sample condition upon receipt | |
| Quote # | | Initials | 01 |
| Attached Parameter List | ☐ No ☐ Yes | Temperature Upon Receipt | 1.9 x 3 °C |

Identification of Regulation under which the sample(s) fall: No Requirement to Report Sample Results Under Any Regulation for Wastewater Treatment

Requested Turnaround Time: b App. 24-48 h ☐ 5-7d ☒ 7-10d ☐ ☐ Other Specify:

| | Report to: Process & Compliance Technician (PCT) | Data Transfer Contact: PCT | Invoice To: Ontario Clean Water Agency | Laboratory: SGS Lakefield |
|---|---|---|---|---|
| Address: | 18 Caroline Street<br>Southampton, ON<br>N0H 2L0 | 18 Caroline Street<br>Southampton, ON<br>N0H 2L0 | 18 Caroline Street<br>Southampton, ON<br>N0H 2L0 | 185 Concession St.<br>Lakefield, ON<br>K0L 2H0 |
| Telephone: | 519-374-5782 | 519-374-5782 | (519) 797-2561 | 705-652-2000 |
| Fax: | (519) 797-3080 | (519) 797-3080 | (519) 797-3080 | 705-652-6365 |
| Email: | kyoung@ocwa.com | kyoung@ocwa.com | apwesthighlands@ocwa.com | carrie.greenlaw@sgs.com |

| Sample | | | | | Type | | Parameters | | | | | | | | | | | | | | | | Comments | Upload to OCWA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Station Acronym | Station Number (Short Name) | | Sample Location Name | Date & Time Collected AUG 09 2023 | Bottles | Alkalinity | Conductivity | Free Ammonia | Phenols | pH | Chloride | Sulphates | Nitrite | Magnesium | Iron | Nitrate | Calcium | Hardness | Sodium | DOC | Organic Nitrogen | TKN | Dissolved Reactive Phosphorus | Total Phosphorous | | |
| Well | 6S | - | | 12:00 | Kit | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | Yes ☒ No ☐ |
| Well | 6I | - | | 12:05 | Kit | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | Yes ☒ No ☐ |
| Well | 6D | - | | 12:10 | Kit | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | Yes ☒ No ☐ |
| Well | 7S | - | | 10:55 | Kit | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | DRY | Yes ☒ No ☐ |
| Well | 9S | - | | 10:25 | Kit | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | Yes ☒ No ☐ |
| Well | 9I | - | | 10:30 | Kit | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | Yes ☒ No ☐ |
| Well | 9D | - | | 10:35 | Kit | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | Yes ☒ No ☐ |
| Well | 10S | - | | 12:40 | Kit | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | Yes ☒ No ☐ |
| Well | 11S | - | | 12:30 | Kit | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | Yes ☒ No ☐ |
| Well | 12S | - | | 11:40 | Kit | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | Yes ☒ No ☐ |

Sampler Name: Sampler Signature:



HC RTN

608487598765

**SGS Canada Inc.**
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

**Works #:** 120001577
**Project :** PO#017018

21-August-2023

**OCWA-Grey Bruce (Tobermory Sewage Plant)**
Attn : Karla Young

P.O. Box 760
Southampton, ON
N0H 2L0, Canada

Phone: 519-797-2561
Fax:pdf

**Date Rec. :** 12 August 2023
**LR Report:** **CA12474-AUG23**

**Copy:** #1

# CERTIFICATE OF ANALYSIS

## Final Report

| Analysis | 1: Analysis Start Date | 2: Analysis Start Time | 3: Analysis Completed Date | 4: Analysis Completed Time | 10: Well 9D | 11: Well 10S | 12: Well 11S | 13: Well 12S |
|---|---|---|---|---|---|---|---|---|
| Sample Date & Time | | | | | 09-Aug-23 10:35 | 09-Aug-23 12:40 | 09-Aug-23 12:30 | 09-Aug-23 11:40 |
| Temperature Upon Receipt [°C] | --- | --- | --- | --- | 19.0 | 19.0 | 19.0 | 19.0 |
| Alkalinity [mg/L as CaCO3] | 15-Aug-23 | 08:04 | 16-Aug-23 | 10:13 | 223 | 205 | 357 | 271 |
| Conductivity [uS/cm] | 15-Aug-23 | 08:04 | 16-Aug-23 | 10:13 | 419 | 339 | 609 | 824 |
| pH [No unit] | 15-Aug-23 | 08:04 | 16-Aug-23 | 10:13 | 7.54 | 7.67 | 7.58 | 7.54 |
| Temperature @ pH [°C] | 15-Aug-23 | 08:04 | 16-Aug-23 | 10:13 | 16.7 | 17.9 | 17.0 | 16.8 |
| Organic Nitrogen [mg/L] | 15-Aug-23 | 16:39 | 17-Aug-23 | 08:58 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| Total Kjeldahl Nitrogen [as N mg/L] | 15-Aug-23 | 16:39 | 16-Aug-23 | 15:00 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| Unionized Ammonia [mg/L as N] | 14-Aug-23 | 19:21 | 16-Aug-23 | 15:00 | < 0.001 | 0.002 | < 0.001 | < 0.001 |
| Ammonia+Ammonium (N) [as N mg/L] | 14-Aug-23 | 19:21 | 15-Aug-23 | 11:21 | < 0.1 | 0.1 | < 0.1 | < 0.1 |
| 4AAP-Phenolics [mg/L] | 14-Aug-23 | 20:29 | 15-Aug-23 | 13:08 | < 0.002 | < 0.002 | < 0.002 | < 0.002 |
| Dissolved Organic Carbon [mg/L] | 16-Aug-23 | 13:27 | 17-Aug-23 | 08:58 | 2 | 2 | 2 | 3 |
| Phosphorus (total) [mg/L] | 18-Aug-23 | 19:55 | 21-Aug-23 | 08:48 | --- | 0.87 | < 0.03 | < 0.03 |
| Phosphorus (dissolved reactive) [mg/L] | 15-Aug-23 | 15:00 | 16-Aug-23 | 08:24 | --- | < 0.03 | < 0.03 | < 0.03 |
| Chloride [mg/L] | 16-Aug-23 | 15:48 | 16-Aug-23 | 20:14 | < 1 | < 1 | 2 | 120 |
| Sulphate [mg/L] | 16-Aug-23 | 15:46 | 16-Aug-23 | 20:14 | 17 | 21 | 14 | 31 |
| Nitrite (as N) [mg/L] | 14-Aug-23 | 18:18 | 16-Aug-23 | 10:44 | < 0.03 | < 0.03 | < 0.03 | < 0.03 |
| Nitrate (as N) [mg/L] | 14-Aug-23 | 18:18 | 16-Aug-23 | 10:44 | < 0.06 | < 0.06 | 1.33 | 0.95 |
| Nitrate + Nitrite (as N) [mg/L] | 14-Aug-23 | 18:18 | 16-Aug-23 | 10:44 | < 0.06 | < 0.06 | 1.33 | 0.95 |
| Hardness (dissolved) [mg/L as CaCO3] | 17-Aug-23 | 17:04 | 18-Aug-23 | 13:50 | 238 | 215 | 318 | 280 |
| Magnesium (dissolved) [mg/L] | 17-Aug-23 | 17:04 | 18-Aug-23 | 13:50 | 23.2 | 19.7 | 27.0 | 17.8 |
| Calcium (dissolved) [mg/L] | 17-Aug-23 | 17:04 | 18-Aug-23 | 13:50 | 56.9 | 53.7 | 83.0 | 82.5 |

**SGS Canada Inc.**
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

**Works #:** 120001577
**Project :** PO#017018
**LR Report :** **CA12474-AUG23**

| Analysis | 1: Analysis Start Date | 2: Analysis Start Time | 3: Analysis Completed Date | 4: Analysis Completed Time | 10: Well 9D | 11: Well 10S | 12: Well 11S | 13: Well 12S |
|---|---|---|---|---|---|---|---|---|
| Iron (dissolved) [mg/L] | 17-Aug-23 | 17:04 | 18-Aug-23 | 13:50 | < 0.007 | 0.038 | < 0.007 | < 0.007 |
| Sodium (dissolved) [mg/L] | 17-Aug-23 | 17:04 | 18-Aug-23 | 13:50 | 3.43 | 2.83 | 1.17 | 57.9 |
| Phosphorus (dissolved) [mg/L] | 17-Aug-23 | 17:04 | 18-Aug-23 | 13:50 | 0.005 | 0.005 | < 0.003 | 0.004 |

Note: Provincial unionized ammonia calculated using lab results for pH and temperature.

*Carrie Greenlaw*
*Project Specialist,*
*Environment, Health & Safety*

OnLine LIMS

0003438717

**SGS Canada Inc.**
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

**Works #:** 120001577
**Project :** PO#017018

21-August-2023

**OCWA-Grey Bruce (Tobermory Sewage Plant)**
Attn : Karla Young

P.O. Box 760
Southampton, ON
N0H 2L0, Canada

Phone: 519-797-2561
Fax:pdf

**Date Rec. :** 12 August 2023
**LR Report:** **CA12474-AUG23**

**Copy:** #1

# CERTIFICATE OF ANALYSIS
## Final Report

| Analysis | 1: Analysis Start Date | 2: Analysis Start Time | 3: Analysis Completed Date | 4: Analysis Completed Time | 5: Well 6S | 6: Well 6I | 7: Well 6D | 8: Well 9S | 9: Well 9I |
|---|---|---|---|---|---|---|---|---|---|
| Sample Date & Time | | | | | 09-Aug-23 12:00 | 09-Aug-23 12:05 | 09-Aug-23 12:10 | 09-Aug-23 10:25 | 09-Aug-23 10:30 |
| Temperature Upon Receipt [°C] | --- | --- | --- | --- | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 |
| Alkalinity [mg/L as CaCO3] | 15-Aug-23 | 08:04 | 16-Aug-23 | 10:13 | 267 | 323 | 259 | 260 | 252 |
| Conductivity [uS/cm] | 15-Aug-23 | 08:04 | 16-Aug-23 | 10:13 | 464 | 596 | 467 | 453 | 462 |
| pH [No unit] | 15-Aug-23 | 08:04 | 16-Aug-23 | 10:13 | 7.46 | 7.61 | 7.74 | 7.50 | 7.68 |
| Temperature @ pH [°C] | 15-Aug-23 | 08:04 | 16-Aug-23 | 10:13 | 18.6 | 17.4 | 17.0 | 17.2 | 17.1 |
| Organic Nitrogen [mg/L] | 15-Aug-23 | 16:39 | 17-Aug-23 | 08:58 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| Total Kjeldahl Nitrogen [as N mg/L] | 15-Aug-23 | 16:39 | 16-Aug-23 | 15:00 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| Unionized Ammonia [mg/L as N] | 14-Aug-23 | 19:21 | 16-Aug-23 | 15:00 | < 0.001 | 0.003 | 0.003 | < 0.001 | < 0.001 |
| Ammonia+Ammonium (N) [as N mg/L] | 14-Aug-23 | 19:21 | 15-Aug-23 | 11:21 | < 0.1 | 0.2 | 0.2 | < 0.1 | < 0.1 |
| 4AAP-Phenolics [mg/L] | 14-Aug-23 | 20:29 | 15-Aug-23 | 13:08 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 |
| Dissolved Organic Carbon [mg/L] | 16-Aug-23 | 13:27 | 17-Aug-23 | 08:58 | 3 | 2 | 2 | 2 | 1 |
| Phosphorus (total) [mg/L] | 18-Aug-23 | 19:55 | 21-Aug-23 | 08:48 | < 0.03 | --- | 0.04 | 0.06 | --- |
| Phosphorus (dissolved reactive) [mg/L] | 15-Aug-23 | 15:00 | 16-Aug-23 | 08:24 | < 0.03 | --- | < 0.03 | < 0.03 | --- |
| Chloride [mg/L] | 16-Aug-23 | 15:48 | 16-Aug-23 | 20:14 | < 1 | 3 | 2 | 1 | 2 |
| Sulphate [mg/L] | 16-Aug-23 | 15:46 | 16-Aug-23 | 20:14 | < 2 | 10 | 6 | 5 | 21 |
| Nitrite (as N) [mg/L] | 14-Aug-23 | 18:18 | 16-Aug-23 | 10:44 | < 0.03 | 0.06 | < 0.03 | < 0.03 | < 0.03 |
| Nitrate (as N) [mg/L] | 14-Aug-23 | 18:18 | 16-Aug-23 | 10:44 | < 0.06 | < 0.06 | < 0.06 | < 0.06 | < 0.06 |
| Nitrate + Nitrite (as N) [mg/L] | 14-Aug-23 | 18:18 | 16-Aug-23 | 10:44 | < 0.06 | < 0.06 | < 0.06 | < 0.06 | < 0.06 |
| Hardness (dissolved) [mg/L as CaCO3] | 17-Aug-23 | 17:04 | 18-Aug-23 | 13:50 | 268 | 327 | 247 | 254 | 253 |
| Magnesium (dissolved) [mg/L] | 17-Aug-23 | 17:04 | 18-Aug-23 | 13:50 | 29.4 | 31.0 | 23.7 | 21.3 | 24.4 |
| Calcium (dissolved) [mg/L] | 17-Aug-23 | 17:04 | 18-Aug-23 | 13:50 | 58.9 | 79.9 | 59.8 | 66.5 | 61.0 |

**SGS Canada Inc.**
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Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

**Works #:** 120001577
**Project :** PO#017018
**LR Report :** **CA12474-AUG23**

| Analysis | 1: Analysis Start Date | 2: Analysis Start Time | 3: Analysis Completed Date | 4: Analysis Completed Time | 5: Well 6S | 6: Well 6I | 7: Well 6D | 8: Well 9S | 9: Well 9I |
|---|---|---|---|---|---|---|---|---|---|
| Iron (dissolved) [mg/L] | 17-Aug-23 | 17:04 | 18-Aug-23 | 13:50 | < 0.007 | < 0.007 | < 0.007 | < 0.007 | < 0.007 |
| Sodium (dissolved) [mg/L] | 17-Aug-23 | 17:04 | 18-Aug-23 | 13:50 | 1.31 | 3.18 | 5.95 | 0.95 | 5.46 |
| Phosphorus (dissolved) [mg/L] | 17-Aug-23 | 17:04 | 18-Aug-23 | 13:50 | 0.004 | 0.006 | 0.005 | 0.028 | < 0.003 |

Note: Provincial unionized ammonia calculated using lab results for pH and temperature.

*Carrie Greenlaw*
*Project Specialist,*
*Environment, Health & Safety*

OnLine LIMS

000343871 3

Ontario Clean Water Agency - Request for Laboratory Services and CHAIN OF CUSTODY - GROUNDWATER (MAY&OCTOBER, EXTENDED)



Waterworks/Project # **120001577**

Facility Name **Tobermory Sewage Treatment Plant** NK

Org. # **1132**

Quote #

Attached Parameter List [ ] No [ ] Yes

C of C LIMS No: OCA-12216

Laboratory Section OCT 05 2023

Date Rec'd: _____ Time Rec'd _____

Sample condition upon receipt _____

Temperature Upon Receipt 16x3 °C

Initials _____

Identification of Regulation under which the sample(s) fall: No Requirement to Report Sample Results Under Any Regulation for Wastewater Treatment

Requested Turnaround Time: b App. 24-48 h [ ] 5-7d [X] 7-10d [ ] [ ] Other Specify: _____

| | Report to: Process & Compliance Tech (PCT) | Data Transfer Contact: PCT | Invoice To: Ontario Clean Water Agency | Laboratory: SGS Lakefield Research Ltd |
|---|---|---|---|---|
| Address: | 18 Caroline Street<br>Southampton, ON<br>N0H 2L0 | 18 Caroline Street<br>Southampton, ON<br>N0H 2L0 | 18 Caroline Street<br>Southampton, ON<br>N0H 2L0 | 185 Concession St.<br>Lakefield, ON<br>K0L 2H0 |
| Telephone: | 519-374-5782 | 519-374-5782 | 519-797-2561 | 705-652-2000 |
| Fax: | (519) 797-3080 | (519) 797-3080 | (519) 797-3080 | 705-652-6365 |
| Email: | kyoung@ocwa.com | kyoung@ocwa.com | apwesthighlands@ocwa.com | carrie.greenlaw@sgs.com |

| Sample | | | | | | Type | | Parameters | | | | | | | | | | | | | | | | | | Comments | Upload to OCWA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Station Acronym | Station Number (Short Name) | | Sample Location Name | Date & Time Collected OCT 04 2023 | Bottles | Alkalinity | Conductivity | Free Ammonia | Phenols | pH | Chloride | Sulphates | Nitrite | Magnesium | Iron | Nitrate | Calcium | Hardness | Sodium | DOC | Organic Nitrogen | TKN | Dissolved Reactive Phosphorus | Total Phosphorous | | |
| Well | 5S | - | | 11:45 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | Yes [X] No [ ] |
| Well | 5I | - | | 11:35 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes [X] No [ ] |
| Well | 5D | - | | 11:30 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes [X] No [ ] |
| Well | 9D | - | 09:10 | 09:10 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes [X] No [ ] |
| Well | 9I | - | 0900 | 09:00 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes [X] No [ ] |
| Well | 9S | - | 0850 | 08:50 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | Yes [X] No [ ] |
| Well | 8I | - | | 09:20 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes [X] No [ ] |
| Well | 8D | - | | 09:25 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes [X] No [ ] |
| Well | 10S | - | | 11:00 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | Yes [X] No [ ] |
| Well | 11S | - | | 10:50 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | Yes [X] No [ ] |
| Well | 12S | - | | 10:45 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | Yes [X] No [ ] |
| Well | 1D | - | | 10:35 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes [X] No [ ] |
| Well | 1I | - | | 10:30 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes [X] No [ ] |
| Well | 6S | - | Dry | 10:15 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | Yes [X] No [ ] |
| Well | 6D | - | | 10:20 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes [X] No [ ] |
| Well | 6I | - | | 10:25 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes [X] No [ ] |
| Well | 57 | - | | 10:10 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes [X] No [ ] |
| Well | 56 | - | | 11:20 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes [X] No [ ] |
| Well | 2S | - | DRY | 09:35 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | Yes [X] No [ ] |
| Well | 2I | - | | 09:40 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes [X] No [ ] |
| Well | 2D | - | | 10:05 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes [X] No [ ] |
| Well | 55 | - | | 10:00 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes [X] No [ ] |
| Well | 7S | - | DRY | 09:30 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | Yes [X] No [ ] |
| Well | 60 | - | | 11:05 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes [X] No [ ] |
| Well | 61 | - | | 11:10 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | Yes [X] No [ ] |
| Well | 8S | - | DRY | 09:15 | Kit | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | Yes [X] No [ ] |

Sampler Name: Billy Shearer

Sampler Signature: Billy



6084875987571 + 6084875989060 01

HCRlm 10:30

**SGS Canada Inc.**
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

**Works #:** 120001577
**Project :** PO#017018

20-October-2023

**OCWA-Grey Bruce (Tobermory Sewage Plant)**
Attn : Karla Young

**Date Rec. :** 05 October 2023
**LR Report:** **CA12210-OCT23**

P.O. Box 760
Southampton, ON
N0H 2L0, Canada

**Copy:** #1

Phone: 519-797-2561
Fax:pdf

# CERTIFICATE OF ANALYSIS

## Final Report

| Analysis | 1: Analysis Start Date | 2: Analysis Start Time | 3: Analysis Completed Date | 4: Analysis Completed Time | 20: Well 6I-OW6-I (Well 3) | 21: Well 57-OW57 (Well 13) | 22: Well 56-OW56 (Well 12) | 24: Well 2I-OW2-I (Well 8) | 25: Well 2D-OW2-D (Well 9) | 26: Well 55-OW55 (Well 11) | 28: Well 60-OW60 (Well 14) | 29: Well 61-OW61 (Well 15) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date & Time | | | | | 04-Oct-23 10:25 | 04-Oct-23 10:10 | 04-Oct-23 11:20 | 04-Oct-23 09:40 | 04-Oct-23 10:05 | 04-Oct-23 10:00 | 04-Oct-23 11:05 | 04-Oct-23 11:10 |
| Temperature Upon Receipt [°C] | --- | --- | --- | --- | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 |
| Alkalinity [mg/L as CaCO3] | 06-Oct-23 | 08:01 | 11-Oct-23 | 10:30 | 313 | 482 | 382 | 371 | 255 | 425 | 333 | 243 |
| Conductivity [uS/cm] | 06-Oct-23 | 08:01 | 11-Oct-23 | 10:30 | 590 | 857 | 686 | 671 | 499 | 727 | 1110 | 621 |
| pH [No unit] | 06-Oct-23 | 08:01 | 11-Oct-23 | 10:30 | 7.77 | 7.91 | 7.95 | 8.11 | 7.87 | 7.36 | 7.76 | 7.73 |
| Temperature @ pH [°C] | 06-Oct-23 | 08:01 | 11-Oct-23 | 10:30 | 18.8 | 20.0 | 20.6 | 20.1 | 18.8 | 16.5 | 19.3 | 17.9 |
| Organic Nitrogen [mg/L] | 12-Oct-23 | 15:18 | 16-Oct-23 | 11:22 | 0.9 | 0.6 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | 0.6 | < 0.5 |
| Total Kjeldahl Nitrogen [as N mg/L] | 12-Oct-23 | 15:18 | 13-Oct-23 | 16:00 | 0.9 | 0.6 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | 3.4 | < 0.5 |
| Unionized Ammonia [mg/L as N] | 11-Oct-23 | 21:45 | 16-Oct-23 | 11:22 | 0.002 | <0.002 | 0.002 | 0.003 | 0.002 | < 0.001 | 0.059 | < 0.001 |
| Ammonia+Ammonium (N) [as N mg/L] | 11-Oct-23 | 21:45 | 16-Oct-23 | 11:21 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | 2.8 | < 0.1 |
| 4AAP-Phenolics [mg/L] | 06-Oct-23 | 17:17 | 10-Oct-23 | 10:27 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 |
| Dissolved Organic Carbon [mg/L] | 06-Oct-23 | 17:16 | 11-Oct-23 | 09:45 | 1 | 2 | 2 | 1 | 1 | 2 | 3 | 1 |
| Phosphorus (total) [mg/L] | 12-Oct-23 | 16:29 | 18-Oct-23 | 13:01 | --- | --- | --- | --- | --- | --- | --- | --- |
| Phosphorus (dissolved reactive) [mg/L] | 06-Oct-23 | 12:14 | 11-Oct-23 | 09:30 | --- | --- | --- | --- | --- | --- | --- | --- |
| Chloride [mg/L] | 20-Oct-23 | 10:29 | 20-Oct-23 | 12:52 | 3 | < 1 | < 1 | 1 | < 1 | < 1 | 180 | 48 |
| Sulphate [mg/L] | 20-Oct-23 | 10:27 | 20-Oct-23 | 12:52 | 10 | 6 | 3 | 6 | 19 | < 2 | 40 | 18 |
| Nitrite (as N) [mg/L] | 10-Oct-23 | 13:31 | 11-Oct-23 | 13:08 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | 0.04 | < 0.03 |
| Nitrate (as N) [mg/L] | 10-Oct-23 | 13:31 | 11-Oct-23 | 13:08 | < 0.06 | 0.71 | < 0.06 | < 0.06 | < 0.06 | 0.12 | 1.49 | 0.18 |
| Nitrate + Nitrite (as N) [mg/L] | 10-Oct-23 | 13:31 | 11-Oct-23 | 13:08 | < 0.06 | 0.71 | < 0.06 | < 0.06 | < 0.06 | 0.12 | 1.53 | 0.18 |
| Hardness (dissolved) [mg/L as CaCO3] | 10-Oct-23 | 07:30 | 11-Oct-23 | 11:09 | 363 | 547 | 435 | 413 | 262 | 461 | 418 | 305 |
| Magnesium (dissolved) [mg/L] | 10-Oct-23 | 07:30 | 11-Oct-23 | 11:09 | 32.6 | 35.6 | 26.1 | 31.7 | 23.3 | 23.5 | 27.5 | 22.6 |
| Calcium (dissolved) [mg/L] | 10-Oct-23 | 07:30 | 11-Oct-23 | 11:09 | 91.4 | 160 | 131 | 113 | 66.4 | 146 | 122 | 85.1 |
| Iron (dissolved) [mg/L] | 10-Oct-23 | 07:30 | 11-Oct-23 | 11:09 | < 0.007 | < 0.007 | < 0.007 | < 0.007 | < 0.007 | < 0.007 | 0.027 | < 0.007 |
| Sodium (dissolved) [mg/L] | 10-Oct-23 | 07:30 | 11-Oct-23 | 11:09 | 2.80 | 0.94 | 0.94 | 3.47 | 21.9 | 1.20 | 78.8 | 23.8 |
| Phosphorus (dissolved) [mg/L] | 10-Oct-23 | 07:30 | 11-Oct-23 | 11:09 | 0.004 | 0.004 | < 0.003 | 0.050 | 0.005 | < 0.003 | 0.038 | 0.011 |

OnLine LIMS

0003507114

**SGS Canada Inc.**
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

**Works #:** 120001577
**Project :** PO#017018
**LR Report :** **CA12210-OCT23**

Note: Provincial unionized ammonia calculated using lab results for pH and temperature.

*Carrie Greenlaw*
*Project Specialist,*
*Environment, Health & Safety*

**SGS Canada Inc.**
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Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

**Works #:** 120001577
**Project :** PO#017018

20-October-2023

**OCWA-Grey Bruce (Tobermory Sewage Plant)**
Attn : Karla Young

P.O. Box 760
Southampton, ON
N0H 2L0, Canada

Phone: 519-797-2561
Fax:pdf

**Date Rec. :** 05 October 2023
**LR Report:** **CA12210-OCT23**

**Copy:** #1

# CERTIFICATE OF ANALYSIS

## Final Report

| Analysis | 1: Analysis Start Date | 2: Analysis Start Time | 3: Analysis Completed Date | 4: Analysis Completed Time | 12: Well 8D-OW8-D (Well 17) | 13: Well 10S-OW10-S (Well 23) | 14: Well 11S-OW11-S (Well 24) | 15: Well 12S-OW12-S (Well 10) | 16: Well 1D-OW1-D (Well 22) | 17: Well 1I-OW1-I (Well 21) | 19: Well 6D-OW6-D (Well 2) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date & Time | | | | | 04-Oct-23 09:25 | 04-Oct-23 11:00 | 04-Oct-23 10:50 | 04-Oct-23 10:45 | 04-Oct-23 10:35 | 04-Oct-23 10:30 | 04-Oct-23 10:20 |
| Temperature Upon Receipt [°C] | --- | --- | --- | --- | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 |
| Alkalinity [mg/L as CaCO3] | 06-Oct-23 | 08:01 | 11-Oct-23 | 10:30 | 274 | 205 | 327 | 348 | 274 | 367 | 259 |
| Conductivity [uS/cm] | 06-Oct-23 | 08:01 | 11-Oct-23 | 10:30 | 525 | 344 | 616 | 950 | 502 | 648 | 484 |
| pH [No unit] | 06-Oct-23 | 08:01 | 11-Oct-23 | 10:30 | 7.83 | 7.95 | 8.12 | 7.73 | 7.93 | 7.46 | 7.95 |
| Temperature @ pH [°C] | 06-Oct-23 | 08:01 | 11-Oct-23 | 10:30 | 19.0 | 18.9 | 19.9 | 18.8 | 18.3 | 16.7 | 19.0 |
| Organic Nitrogen [mg/L] | 12-Oct-23 | 15:18 | 16-Oct-23 | 11:22 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| Total Kjeldahl Nitrogen [as N mg/L] | 12-Oct-23 | 15:18 | 13-Oct-23 | 16:00 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| Unionized Ammonia [mg/L as N] | 11-Oct-23 | 21:45 | 16-Oct-23 | 11:22 | < 0.001 | 0.002 | <0.003 | 0.003 | 0.002 | < 0.001 | 0.002 |
| Ammonia+Ammonium (N) [as N mg/L] | 11-Oct-23 | 21:45 | 16-Oct-23 | 11:21 | < 0.1 | < 0.1 | < 0.1 | 0.2 | < 0.1 | < 0.1 | < 0.1 |
| 4AAP-Phenolics [mg/L] | 06-Oct-23 | 17:17 | 10-Oct-23 | 10:27 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 |
| Dissolved Organic Carbon [mg/L] | 06-Oct-23 | 17:16 | 11-Oct-23 | 09:45 | < 1 | 2 | 2 | 2 | 1 | 1 | 1 |
| Phosphorus (total) [mg/L] | 12-Oct-23 | 16:29 | 18-Oct-23 | 13:01 | --- | 1.18 | < 0.03 | 0.07 | --- | --- | --- |
| Phosphorus (dissolved reactive) [mg/L] | 06-Oct-23 | 12:14 | 11-Oct-23 | 09:30 | --- | < 0.03 | < 0.03 | < 0.03 | --- | --- | --- |
| Chloride [mg/L] | 20-Oct-23 | 10:29 | 20-Oct-23 | 12:52 | 5 | < 1 | 1 | 88 | 2 | 1 | 1 |
| Sulphate [mg/L] | 20-Oct-23 | 10:27 | 20-Oct-23 | 12:52 | 16 | 23 | 13 | 31 | 11 | 4 | 7 |
| Nitrite (as N) [mg/L] | 10-Oct-23 | 13:31 | 11-Oct-23 | 13:08 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | < 0.03 |
| Nitrate (as N) [mg/L] | 10-Oct-23 | 13:31 | 11-Oct-23 | 13:08 | 0.08 | < 0.06 | 1.00 | 0.62 | < 0.06 | 0.07 | < 0.06 |
| Nitrate + Nitrite (as N) [mg/L] | 10-Oct-23 | 13:31 | 11-Oct-23 | 13:08 | 0.08 | < 0.06 | 1.00 | 0.62 | < 0.06 | 0.07 | < 0.06 |
| Hardness (dissolved) [mg/L as CaCO3] | 10-Oct-23 | 07:30 | 11-Oct-23 | 11:09 | 325 | 237 | 376 | 371 | 263 | 408 | 281 |
| Magnesium (dissolved) [mg/L] | 10-Oct-23 | 07:30 | 11-Oct-23 | 11:09 | 27.5 | 20.1 | 29.0 | 21.8 | 23.1 | 29.3 | 24.5 |
| Calcium (dissolved) [mg/L] | 10-Oct-23 | 07:30 | 11-Oct-23 | 11:09 | 84.8 | 61.9 | 103 | 113 | 67.4 | 115 | 72.2 |
| Iron (dissolved) [mg/L] | 10-Oct-23 | 07:30 | 11-Oct-23 | 11:09 | 0.011 | < 0.007 | < 0.007 | < 0.007 | < 0.007 | < 0.007 | < 0.007 |
| Sodium (dissolved) [mg/L] | 10-Oct-23 | 07:30 | 11-Oct-23 | 11:09 | 1.63 | 2.93 | 1.36 | 68.3 | 23.7 | 2.89 | 5.65 |
| Phosphorus (dissolved) [mg/L] | 10-Oct-23 | 07:30 | 11-Oct-23 | 11:09 | 0.004 | 0.004 | < 0.003 | < 0.003 | 0.025 | 0.294 | 0.010 |

**SGS Canada Inc.**
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

**Works #:** 120001577
**Project :** PO#017018
**LR Report :** **CA12210-OCT23**

Note: Provincial unionized ammonia calculated using lab results for pH and temperature.

*Carrie Greenlaw*
*Project Specialist,*
*Environment, Health & Safety*

**SGS Canada Inc.**
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

**Works #:** 120001577
**Project :** PO#017018

20-October-2023

**OCWA-Grey Bruce (Tobermory Sewage Plant)**
Attn : Karla Young

**Date Rec. :** 05 October 2023
**LR Report:** **CA12210-OCT23**

P.O. Box 760
Southampton, ON
N0H 2L0, Canada

**Copy:** #1

Phone: 519-797-2561
Fax:pdf

# CERTIFICATE OF ANALYSIS
## Final Report

| Analysis | 1: Analysis Start Date | 2: Analysis Start Time | 3: Analysis Completed Date | 4: Analysis Completed Time | 5: Well 5S-OW5-S (Well 4) | 6: Well 5I-OW5-I (Well 5) | 7: Well 5D-OW5-D (Well 6) | 8: Well 9D-OW9-D (Well 20) | 9: Well 9I-OW9-I (Well 19) | 10: Well 9S-OW9-S (Well 18) | 11: Well 8I-OW8-I (Well 16) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date & Time | | | | | 04-Oct-23 11:45 | 04-Oct-23 11:35 | 04-Oct-23 11:30 | 04-Oct-23 09:10 | 04-Oct-23 09:00 | 04-Oct-23 08:50 | 04-Oct-23 09:20 |
| Temperature Upon Receipt [°C] | --- | --- | --- | --- | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 |
| Alkalinity [mg/L as CaCO3] | 06-Oct-23 | 08:01 | 11-Oct-23 | 10:30 | 211 | 215 | 226 | 223 | 246 | 305 | 246 |
| Conductivity [uS/cm] | 06-Oct-23 | 08:01 | 11-Oct-23 | 10:30 | 647 | 858 | 884 | 439 | 501 | 548 | 483 |
| pH [No unit] | 06-Oct-23 | 08:01 | 11-Oct-23 | 10:30 | 8.01 | 7.93 | 7.94 | 8.01 | 8.02 | 7.71 | 7.96 |
| Temperature @ pH [°C] | 06-Oct-23 | 08:01 | 11-Oct-23 | 10:30 | 21.3 | 21.4 | 21.5 | 21.4 | 21.7 | 18.4 | 18.6 |
| Organic Nitrogen [mg/L] | 12-Oct-23 | 15:18 | 16-Oct-23 | 11:22 | 0.9 | 0.6 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| Total Kjeldahl Nitrogen [as N mg/L] | 12-Oct-23 | 15:18 | 13-Oct-23 | 16:00 | 1.0 | 1.3 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| Unionized Ammonia [mg/L as N] | 11-Oct-23 | 21:45 | 16-Oct-23 | 11:22 | 0.003 | 0.028 | 0.007 | <0.003 | <0.003 | < 0.001 | <0.002 |
| Ammonia+Ammonium (N) [as N mg/L] | 11-Oct-23 | 21:45 | 16-Oct-23 | 11:21 | < 0.1 | 0.8 | 0.2 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| 4AAP-Phenolics [mg/L] | 06-Oct-23 | 17:17 | 10-Oct-23 | 10:27 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 |
| Dissolved Organic Carbon [mg/L] | 06-Oct-23 | 17:16 | 11-Oct-23 | 09:45 | 3 | 4 | 3 | < 1 | < 1 | 1 | < 1 |
| Phosphorus (total) [mg/L] | 12-Oct-23 | 16:29 | 18-Oct-23 | 13:01 | 0.20 | --- | --- | --- | --- | 0.05 | --- |
| Phosphorus (dissolved reactive) [mg/L] | 06-Oct-23 | 12:14 | 11-Oct-23 | 09:30 | < 0.03 | --- | --- | --- | --- | < 0.03 | --- |
| Chloride [mg/L] | 20-Oct-23 | 10:29 | 20-Oct-23 | 12:52 | 65 | 150 | 180 | < 1 | 2 | 2 | 6 |
| Sulphate [mg/L] | 20-Oct-23 | 10:27 | 20-Oct-23 | 12:52 | 22 | 37 | 38 | 16 | 21 | 5 | 12 |
| Nitrite (as N) [mg/L] | 10-Oct-23 | 13:31 | 11-Oct-23 | 13:08 | < 0.03 | 0.10 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | < 0.03 |
| Nitrate (as N) [mg/L] | 10-Oct-23 | 13:31 | 11-Oct-23 | 13:08 | 0.28 | 0.43 | 0.11 | < 0.06 | < 0.06 | < 0.06 | 0.08 |
| Nitrate + Nitrite (as N) [mg/L] | 10-Oct-23 | 13:31 | 11-Oct-23 | 13:08 | 0.28 | 0.53 | 0.11 | < 0.06 | < 0.06 | < 0.06 | 0.08 |
| Hardness (dissolved) [mg/L as CaCO3] | 10-Oct-23 | 07:30 | 11-Oct-23 | 11:09 | 246 | 264 | 269 | 250 | 279 | 347 | 295 |
| Magnesium (dissolved) [mg/L] | 10-Oct-23 | 07:30 | 11-Oct-23 | 11:09 | 14.9 | 17.4 | 18.1 | 23.4 | 25.0 | 27.0 | 26.9 |
| Calcium (dissolved) [mg/L] | 10-Oct-23 | 07:30 | 11-Oct-23 | 11:09 | 74.0 | 77.2 | 77.9 | 61.6 | 70.6 | 94.3 | 73.9 |
| Iron (dissolved) [mg/L] | 10-Oct-23 | 07:30 | 11-Oct-23 | 11:09 | < 0.007 | 0.010 | < 0.007 | < 0.007 | < 0.007 | < 0.007 | < 0.007 |
| Sodium (dissolved) [mg/L] | 10-Oct-23 | 07:30 | 11-Oct-23 | 11:09 | 41.9 | 72.9 | 73.2 | 3.34 | 5.39 | 1.05 | 2.05 |
| Phosphorus (dissolved) [mg/L] | 10-Oct-23 | 07:30 | 11-Oct-23 | 11:09 | 0.046 | 0.081 | 0.009 | < 0.003 | < 0.003 | < 0.003 | 0.004 |

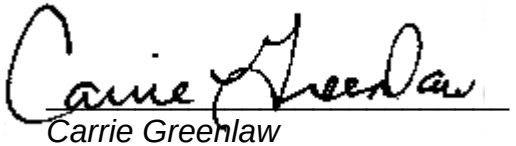
OnLine LIMS

0003507103

**SGS Canada Inc.**
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

**Works #:** 120001577
**Project :** PO#017018
**LR Report :** **CA12210-OCT23**

Note: Provincial unionized ammonia calculated using lab results for pH and temperature.



*Carrie Greenlaw*
*Project Specialist,*
*Environment, Health & Safety*

Ontario Clean Water Agency
Agence Ontarienne Des Eaux

# Appendix C

Sludge Haulage Volumes

## 2023 - Parks Canada Hauled Sewage

| | | January | February | March | April | May | June | July | August | September | October | November | December | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scott Septic Pumping | Cyprus Lake Park | | | | | 136,500 | 192,500 | 287,000 | 357,000 | 189,000 | 119,000 | 35,000 | 10,500 | **1,326,500** |
| Bruce Peninsula Septic Service | Cyprus Lake | 3,300 | | 5,000 | 16,600 | 158,000 | | 2,000 | 6,300 | | | | | **191,200** |
| | 120 Chi sin tib dek Road | 50 | 50 | 50 | 50 | | | 1,000 | 1,000 | 800 | | | | **3,000** |
| | **Total** | **3,350** | **50** | **5,050** | **16,650** | **294,500** | **192,500** | **290,000** | **364,300** | **189,800** | **119,000** | **35,000** | **10,500** | 1,520,700 |

*amounts in gallons

Ontario Clean Water Agency
Agence Ontarienne Des Eaux

# Appendix D
Calibration Reports

# VeriMaster - Flow Meter Verification Report

## Customer Information

| | |
|---|---|
| **Customer** | Tobermory Lit statio |
| **Verification Download** | Jun-21-23 |

## Meter Information

| | |
|---|---|
| **Meter Owner** | Tobermory |
| **Meter Type** | WaterMaster |
| **Sensor Size** | DN150 |
| **Pipe Status** | Fluid Present |
| **Sensor Type** | Fullbore |
| **Sensor Serial No** | 3K620000270131 |
| **Transmitter Serial No** | 3K620000270131 |
| **Tag** | |
| **Location** | ? |

## Overall Status: Pass

**The flowmeter has passed its internal continuous verification and automatic self calibration. It is working within +/ -1% of its original factory calibration**

## Summary of Results

| | |
|---|---|
| **Coil Group** | Passed |
| **Electrode Group** | Passed |
| **Sensor Group** | Passed |
| **Transmitter Signal** | Passed |
| **Transmitter Driver** | Passed |
| **Output Group** | Passed |
| **Configuration** | Passed |

## Verification History

| | |
|---|---|
| **OIML Accuracy Alarms** | 0 |

## Totaliser Information

| | |
|---|---|
| **Forward** | 371778.00 m3 |
| **Reverse** | 447.00 m3 |
| **Net** | 371331.00 m3 |

## Sensor Information

| | |
|---|---|
| **Q3** | 175.00 l/s |
| **Calibration Accuracy** | OIML Class 2 |
| **Sensor Calibration Factors** | 140.3%; -4.30 mm/s; 11 |
| **Date of Manufacture** | 18 Apr 2018 |
| **Run Hours** | 889days 6hrs -27980mins |

## Sensor Data

| | |
|---|---|
| **Coil Current** | 179.9 mA |
| **Coil Inductance** | 154.0 mH |
| **Coil Inductance Shift** | 0.0% |
| **Coil / Loop Resistance** | 35.7 ohm |

## Transmitter Information

| | |
|---|---|
| **Application Version** | V01.07.00 03/02/17 |
| **MSP Version** | 01.00.00 |
| **Date of Manufacture** | 18 Apr 2018 |
| **Run Hours** | 1780days 1hrs 7936mins |

## Transmitter Data

| | |
|---|---|
| **Tx Gain - Adjustment** | 0.1% |

## VeriMaster Information

| | |
|---|---|
| **Version** | 01.00.03 |
| Limit Version | 01.00.01 |

## Current Output

| | |
|---|---|
| **4mA Value** | Pass : 4.000 mA ; 0.00% |
| **12mA Value** | Pass : 12.000 mA ; 0.00% |
| **20mA Value** | Pass : 20.000 mA ; 0.00% |

## Pulse Output

| | |
|---|---|
| **Output 1: 1200.0Hz** | Pass : 1200.000 Hz ; 0.00% |
| **Output 1: 600.0Hz** | Pass : 600.000 Hz ; 0.00% |
| **Output 2: 1200.0Hz** | Not tested |
| **Output 2: 600.0Hz** | Not tested |

**Installation Comments / Equipment used:**

## Configuration Settings

| | |
|---|---|
| **Mains Frequency** | 60 Hz |
| **Qmax** | 25.00 l/s |
| **Pulses/Unit** | 30.000000 |
| **Pulses Limit Frequency** | 1200.0 Hz |
| **Sensor User Span/Zero** | 100.0%; 0.00 mm/s |
| **User Flow Cutoff/Hysterisis** | 1.00%; 20% |
| **Meter Mode** | Normal operation |

Date Jun-21-23 Operator Signature Print

**ABB Instrumentation World Flow Technology**

**ABB Limited**
**Oldends Lane, Stonehouse**
**Gloucestershire, GL10 3TA UK**
**Tel: +44(0) 1453 826661**
**Fax: +44(0) 1453 821121**
**instrumentation@gb.abb.com**

**ABB Automation Inc.**
**125 East County Line Road**
**Warminster, PA 18974 USA**
**Tel: +1 215 674 6000**
**Fax: +1 215 674 6394**
**instrumentation@gb.abb.com**

**ABB Australia Pty Ltd.**
**Bapaune Rd**
**Moorebank, NSW 2170**
**Tel: +61-2-982 1-0111**
**Fax: +61-2-9821-0950**

**ABB Automation GmbH**
**Dransfelder Str.2**
**37079 Gottingen, GERMANY**
**Tel: +49 (0) 551 905212**
**Fax: +1 (215) 674 6394**

Ontario Clean Water Agency
Agence Ontarienne Des Eaux

# Appendix E

Biosolids Volume Modeling and Distribution Surveys for Lagoon Cells 1 & 2

PW MAKAR
Inspection Services Ltd.

481 Murray Dr.
Corunna, ON., N0N 1G0
Servicing the Industrial, Municipal & Commercial Sectors

# Ontario Clean Water Agency

Municipality of Northern Bruce Peninsula
County of Bruce
Tobermory, Ontario

## Tobermory Wastewater
## Biosolids Primary Retention - Cell #1.

Hydrographic Acoustic Sonar
Biosolids Volume Modeling and Distribution Survey

Date; July 23, 2020.

**Tobermory Wastewater Biosolids Primary Retention - Cell #1.**

Prepared For: Mr. Leo-Paul Frigault
Operations Manager
Ontario Clean Water Agency
West Highlands Hub
Wiarton, On

Prepared By: Paul Makar
PW MAKAR INSPECTION SERVICES LTD.

# TABLE OF CONTENT

## 1.0 INTRODUCTION

1.1 The Ontario Clean Water Agency contracted PW MAKAR INSPECTION SERVICES LTD. to conduct a Hydrographic Acoustic Sonar Biosolids Volume Modeling and Distribution Survey of the Tobermory primary retention wastewater-biosolids Cell #1.

1.2 The intent of this survey was to determine biosolids sludge volumes, identify biosolids sludge distribution patterns and loading areas within the Tobermory primary retention wastewater-biosolids Cell #1.

1.3 The Tobermory primary biosolids Cell #1 has an aeration mixing system, which was turned off for a period of 6 days prior to the hydrographic survey. This was to allow the suspended sludge particulate matter to settle and to dissipate any air pockets trapped within the biosolids sludge.

1.4 The survey was performed using a multi-frequency (200, 50 and a 12 kHz) acoustic profiling system in the shallow wastewater of the Tobermory Biosolids Cell #1. “Generally”, PW MAKAR has a two person survey crew conducting the multi patterns of survey lines. A manned vessel motor operator and safety advisor and a sonar technician, taking sludge samples, calibrating, setting the transduce frequencies and monitoring the raw data streaming from the remote controlled survey vessels onboard computer system to the Toughbook computer system in the manned vessel. The remote controlled survey vessel is attached to the manned vessel as a precaution on wastewater biosolids lagoons/cells due to plant growth and debris on the surface.

1.4.1 The Tobermory Biosolids Cell #1 had an extensive amount of debris both on the surface and below the surface so much so it impacted the outboard motor of the manned vessel. To complete the hydrographic survey, PW MAKAR’s sonar technician had to manually row the remote controlled survey vessel and manned vessel. Our vessel motor operator and safety advisor was on shore monitoring the events.

1.4.1.1 

Figure #1. Remote controlled, unmanned survey vessel, attached to manned vessel, in the Tobermory primary retention wastewater-biosolids Cells.

1.5 The precision navigation was provided by the survey vessels on-board GPS system and is incorporated with the acoustic profiling system. Processing of the acoustic data

provides both an indication of the present fluid depth and an image of the extent of biosolids between the fluid bottom (upper biosolids surface contour bathymetric) and the liner/clay bottom (sub-bottom liner/clay contour) of the Tobermory Biosolids Cell #1.

1.6 This Biosolids Volumes and Distribution Survey were prompted by the Ontario Clean Water Agency Tobermory, Ontario, so that further treatment alternatives could be looked at.

## 2.0 SITE DESCRIPTION

2.1 The Tobermory wastewater treatment works consists of two (2) wastewater retention – biosolids Cells, Cell #1 primary treatment and Cell #2 secondary treatment.

2.1.1 Both the Cell #1 and Cell #2 were surveyed at this time. Cell #2 hydrographic report will be a separate report and not associated with this Cell #1 hydrographic report.

2.1 The underwater area surveyed within the Tobermory primary retention wastewater-biosolids Cell #1 – survey date; July 23, 202, has an underwater **Positive Planar Area** of **1,913.49 m²** or **0.47 acres** or **0.19 Ha**.

2.1.1.1 **Please note**; the area surveyed within the Tobermory primary retention wastewater-biosolids Cell #1 is dependent on the water level at the time of the survey. Any obstruction within the lagoon i.e. dykes, aeration systems, rock outcrops above and below the water, aquodic plant life can also affect the size of the survey area.

2.1.2

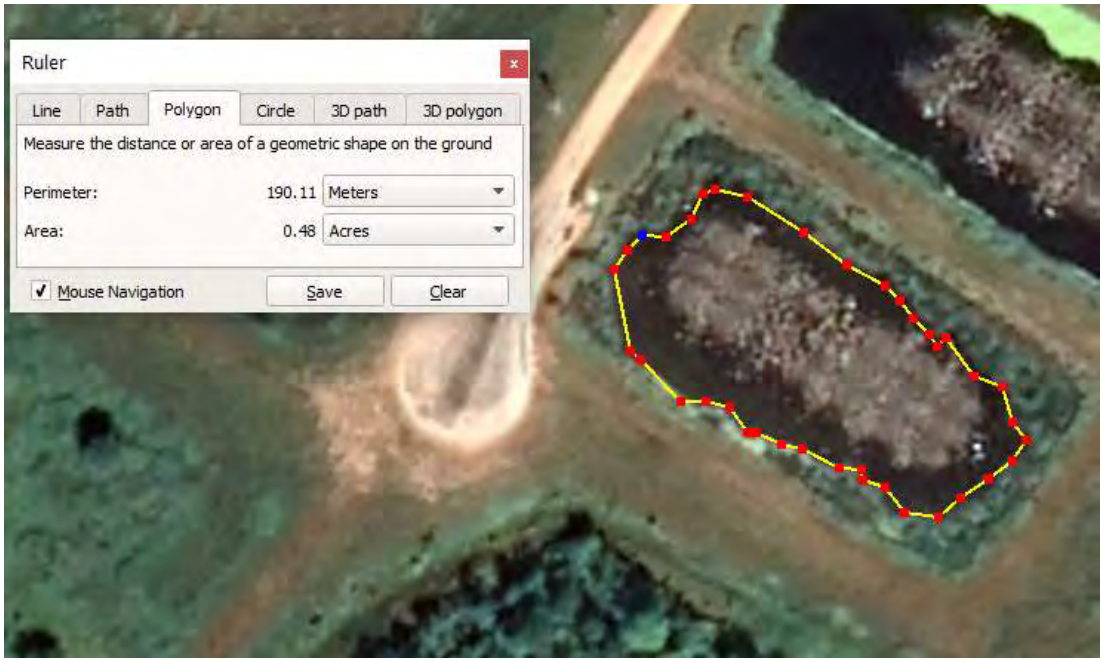


Figure #2. An area reference qualifier was conducted by a polygon measurement made in Google Earth 7/8/2019 image of the Tobermory Biosolids Cell #1 was found to be approximately 0.48 Acres.[1]

2.1.3 The Tobermory Biosolids Cell #1 property is located on the south side of Highway 6, approximately 3.5 kms from the Town of Tobermory, Ontario

## 3.0 DISCLAIMER

3.1 While PW MAKAR INSPECTION SERVICES LTD believes it has used best practice in obtaining the information contained in this report, in no event will PW MAKAR INSPECTION SERVICES LTD be liable for any commercial costs, damages, loss of profit, property damage or personal injury, including death sustained or suffered in connection with the use of data or subsequent processing of materials obtained during field efforts by PW MAKAR INSPECTION SERVICES LTD during this program, or consequential damages including, but not limited to those related to dredging, removal of biosolids, disposal of biosolids, or contamination resulting from use of data obtained from this report or efforts or conclusions drawn from this report.

3.2 PW MAKAR INSPECTION SERVICES LTD makes no warranty, either expressed or implied, regarding the suitability or fitness of any data or information contained in this report for a particular purpose or that the information will satisfy the requirement of any law, rule, specification, or contract.

3.3 The maximum liability of PW MAKAR INSPECTION SERVICES LTD. from all causes related to this work, field efforts, report or discussions about this effort is limited to the funding received by PW MAKAR INSPECTION SERVICES LTD for this work. Acceptance of this report signifies acceptance of this disclaimer.

3.4 This report shall be deemed accepted if no protest is received within 60 days of the issuance date of this report.

## 4.0 ABSTRACT

4.1 The shallow hydrographic underwater acoustic sonar survey was conducted on July 23, 2020, and this report reflects the water content and biosolids sludge levels at the time of this hydrographic survey.

4.2 The hydrographic survey was performed by PW MAKAR INSPECTION SERVICES LTD's, Sonar Technician, the survey complies with IHO (International Hydrographic Organization) Standards.

4.3 Transducer sound calibration checks were performed prior to the start of the hydrographic survey in the Tobermory Biosolids Cell #1.

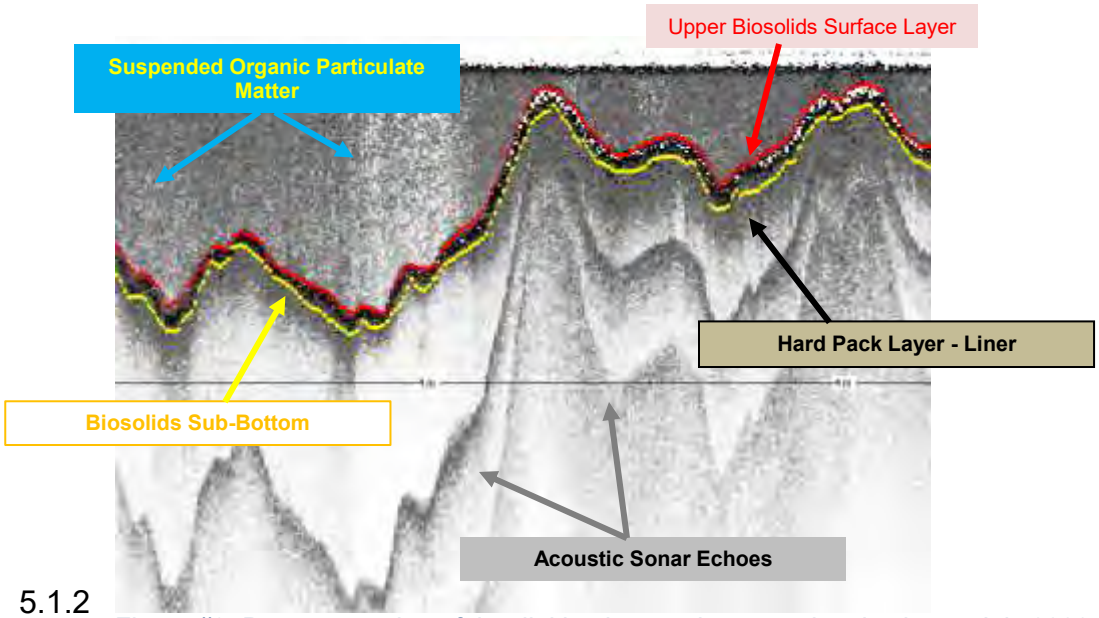
[1] Google Earth.
7/8/2019. - Most Current Google Image.

4.4 Biosolids samples were requested, they were obtain at different locations throughout from Cell #1 and put sample bottles supplied by OCWA.

## 5.0 BIOSOLIDS DEPTH EVALUATIONS

5.1 The sub-bottom contour in the Tobermory Biosolids Cell #1, has a “hard pack” sub-bottom layer i.e. clay, hard pack soil. All three of our hydrographic acoustic sonar transducers were utilized to determine the bathymetric bottom and sub-bottom in the lagoon.

5.1.1 Biosolids Isopach, volume computations were calculated from the bathymetric (upper surface) biosolids sludge layer using the 200 kHz transducer and the sub-bottom hard pack layer/liner utilizing both the 50 kHz and 12 kHz transducers.




5.1.2 Figure #3. Post processing of the digitized acoustic sonar signal echoes, July 2020, Tobermory Biosolids Cell #1.

5.2 The water level elevation was appropriate for conducting a hydrographic survey; extensive debris and aquodic plant life was present within the Tobermory Biosolids Cell #1 as well as growing within the inner berm, which have encroached upon the survey area particularly on the North, West and East sides of Cell #1.

5.2.1 There was adequate access and egress into Cell #1 at the time of the survey.

5.2.2 The total volume of biosolids surveyed on July 23, 2020 in the Tobermory Biosolids Cell #1, – is approximately **519.63 m³** or **679.65 yd³**.

5.2.2.1 To calculate a percentage of biosolids sludge, a grid volume computation was calculated from the bathymetric biosolids sludge bottom (defined as the top of the biosolids sludge) and the sub-bottom

of the biosolids sludge i.e. the top of the lagoon/cell liner. It is then divided by the grid volume computation calculated from the top of the liquid/water to the sub-bottom of the biosolids sludge of the lagoon/cell liner. The two number sets are then times (x) by 100 to determine a percentage of the biosolids.

**Please note**; the percentages of biosolids volumes will change/increase if water levels in the lagoon/cell fluctuate. In addition, if aluminum sulfate is added to the water and the suspended organic particles settles to the bottom this will add to the amount of biosolids sludge.
**As well**; the aeration mixing system was turned off for a period of 6 days prior to the hydrographic survey, there was still suspended organic matter in the water column of Cell #1 which would increase in the total amount of sludge if the suspended organic matter were to completely settle.

5.2.2.1.1 Therefore, on this date the percentage of biosolids buildup in the Tobermory Biosolids Cell #1 is approximately **12.68%.**

5.2.3 PW MAKAR Inspection Services Ltd. collected **24,362** digitized data value points in the Tobermory Biosolids Cell #1. The digitized data value points represent both the bathymetric bottom and sub-bottom biosolids values with GPS navigational values.

5.2.3.1 Each individual data value point consists of an XYZ value. X value is an Easting coordinate; Y value is a Northing coordinate and Z consists of a biosolids/sludge elevation processed in meters.

5.2.3.2 The average depth of biosolids sludge throughout the Tobermory Biosolids Cell #1 on this date was approximately **0.27 m or 270 mm or 10.62 in.**

## 6.0 GENERAL SITE EVALUATIONS

6.1 There is a heavy amount of short vegetation growing around the top of the beam of the wastewater lagoons, which should be monitored and cut back as required if not being allocated already.

6.2 There is extensive debris and aquodic plant life was present within the Tobermory Biosolids Cell #1 as well as growing within the inner berm, which have encroached upon the survey area particularly on the North, West and East sides of Cell #1.

6.3 There were no apparent berm erosion issues identified at this time.

6.4 Lagoon warning signage appeared appropriate.

Reported by: Paul Makar
Paul Makar
PW MAKAR COATINGS INSPECTION LTD. NACE CERTIFIED COATINGS INSPECTOR #137.

# Grid Volume Computations

## Bathymetric (Upper) Biosolids Surface and Sub-Bottom (Lower) – Liner Surface.

## Tobermory primary retention wastewater-biosolids Cell #1.

Fri Jul 31 08:49:42 2020

### Upper Surface

| | |
|---|---|
| Grid File Name: | C:- PROJECTS\OCWA - Tobermory Lagoon Surveys\Tobermory Cell 1 Tobermory - A Layer Blanked out x2.grd |
| Grid Size: | 88 rows x 100 columns |
| X Minimum: | 448977.51 |
| X Maximum: | 449047.65 |
| X Spacing: | 0.70848484848499 |
| Y Minimum: | 5008992.64 |
| Y Maximum: | 5009052.52 |
| Y Spacing: | 0.68827586206768 |
| Z Minimum: | -3.5706332640788 |
| Z Maximum: | -0.29154967337266 |

### Lower Surface

| | |
|---|---|
| Grid File Name: | C:- PROJECTS\OCWA - Tobermory Lagoon Surveys\Tobermory Cell 1 - Tobermory - B- Layer BLANKEDout.grd |
| Grid Size: | 88 rows x 100 columns |
| X Minimum: | 448977.9 |
| X Maximum: | 449047.72 |
| X Spacing: | 0.70525252525201 |
| Y Minimum: | 5008991.57 |

| | |
|---|---|
| Y Maximum: | 5009052.97 |
| Y Spacing: | 0.70574712643036 |
| Z Minimum: | -3.7645280032213 |
| Z Maximum: | -0.29552466459216 |

## Volumes

| | |
|---|---|
| Z Scale Factor: | 1 |

**Total Volumes by:**

| | |
|---|---|
| Trapezoidal Rule: | 509.75092006387 |
| Simpson's Rule: | 510.92281152889 |
| Simpson's 3/8 Rule: | 510.48660577901 |

**Cut & Fill Volumes**

| | |
|---|---|
| **Positive Volume [Cut]:** | **519.63367514349 m³ or 679.65 yd³.** |
| Negative Volume [Fill]: | 9.8827550796175 |
| Net Volume [Cut-Fill]: | 509.75092006387 |

## Areas

**Planar Areas**

| | |
|---|---|
| **Positive Planar Area [Cut]:** | **1913.4980118853 m² or 0.47 acres or 0.19 Ha.** |
| Negative Planar Area [Fill]: | 82.647924934744 |
| No Data Planar Area: | 2290.8020631378 |
| Total Planar Area: | 4286.9479999578 |

**Surface Areas**

| | |
|---|---|
| Positive Surface Area [Cut]: | 1955.2692877998 |
| Negative Surface Area [Fill]: | 89.279421974063 |

PW MAKAR
Inspection
Services
Ltd.

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# Appended Figures and Maps

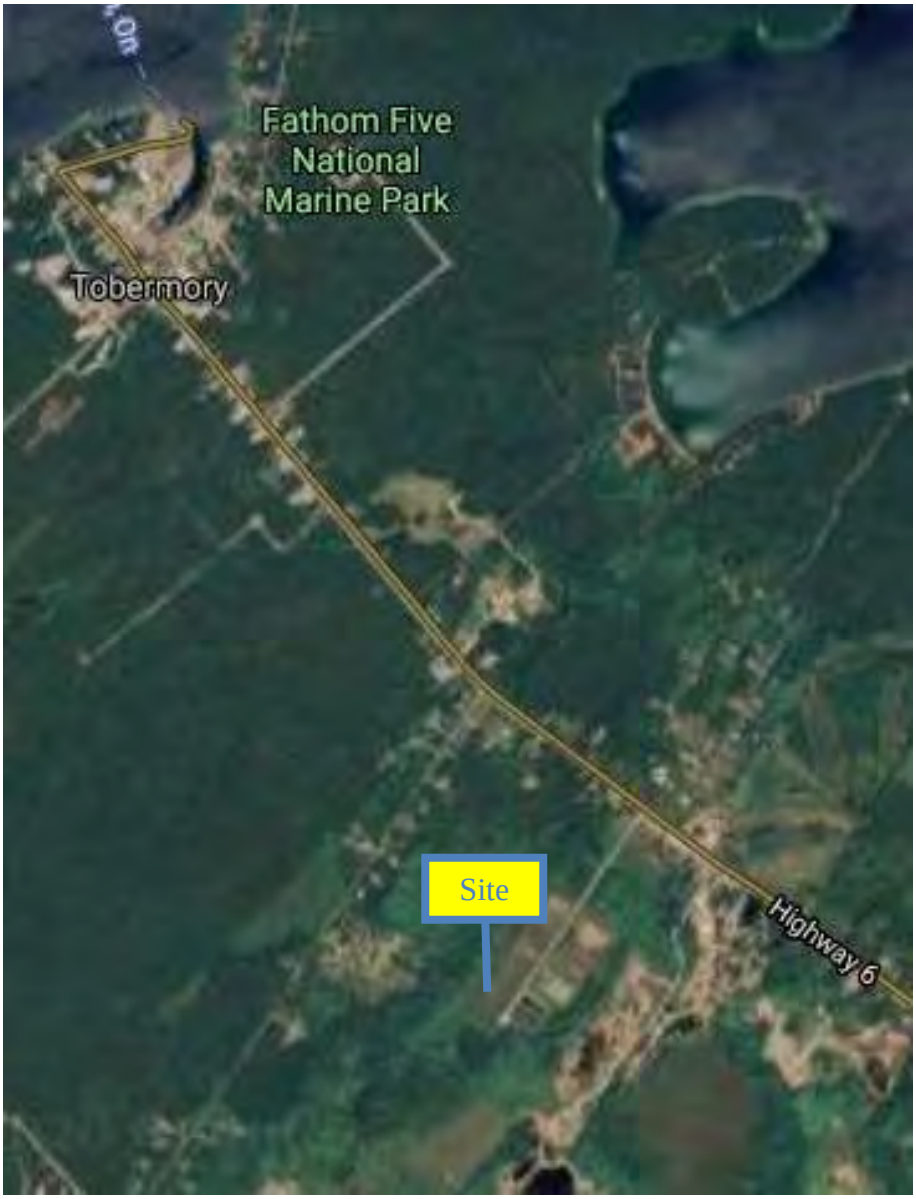



DATE; July 23, 2020

## SITE MAP LOCATION

Ontario Clean Water Agency
Tobermory, On
Tobermory Primary
Wastewater Biosolids Cell #1.

**FIGURE No.4**

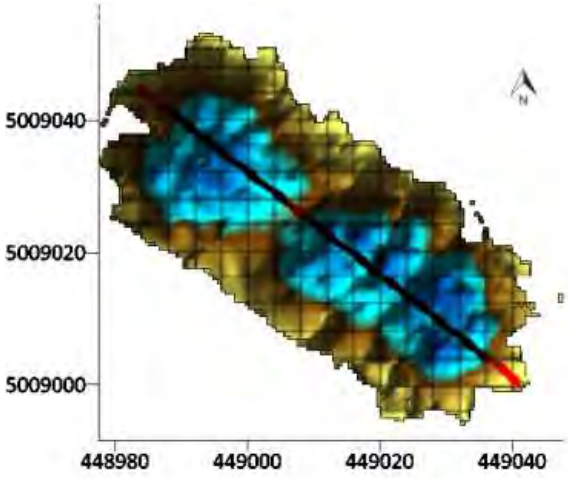



| | |
|---|---|
| PW MAKAR INSPECTION SERVICES LTD. HAS A LICENCSING AGREEMENT WITH GOOGLE INC. TO REPRODUCE AND PUBLISH THE FOLLOWING IMAGE.NO FURTHER REPRODUCTION OR PUBLISHING OF THIS IMAGE IS PERMITTED UNLESS WRITEN CONSENT FROM PW MAKAR INSPECTION SERVICES LTD. | SITE AERIAL AP LOCATION<br>Ontario Clean Water Agency<br>Tobermory, On<br>Tobermory Primary<br>Wastewater Biosolids Cell #1. |
| DATE; July 23, 2020 | **FIGURE No.5** |

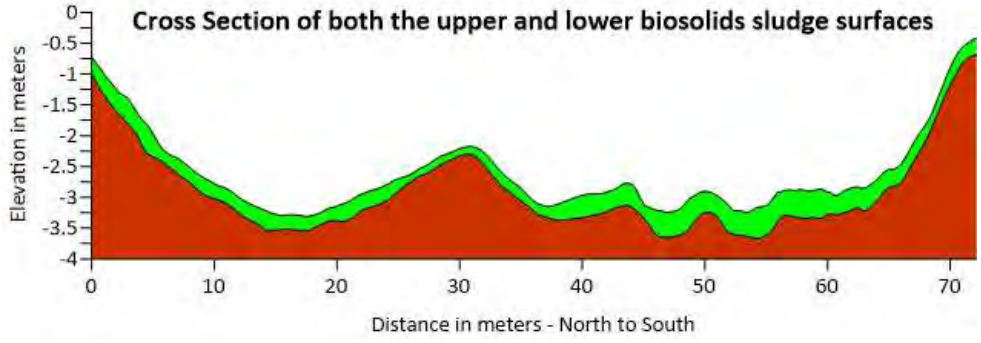
Municipality of Northern Bruce Peninsula
County of Bruce
Tobermory, Ontario

**Tobermory Wastewater**
**Biosolids Primary Retention - Cell #1.**

Visual Representation of the Biosolids Sludge Layers
Sliced from North to South




**The average depth of Biosolids Sludge in the Tobermory Cell #1 is 0.27 m or 270 mm or 10.62 in.**




**Georeferencing Image and Hydrographic Survey Vessel Tracking Lines**

**Ontario Clean Water Agency**
**Tobermory, Ontario**
**Tobermory WWTP**

Survey Date: July 23, 2020.

**FIGURE No.6**

**Ontario Clean Water Agency**
Municipality of Northern Bruce Peninsula
County of Bruce
Tobermory, Ontario

**Tobermory Wastewater**
**Biosolids Primary Retention - Cell #1.**

## Georeferencing Image and Hydrographic Survey Vessel Tracking Lines


**Georeferencing Image and Hydrographic Survey Vessel Tracking Lines**

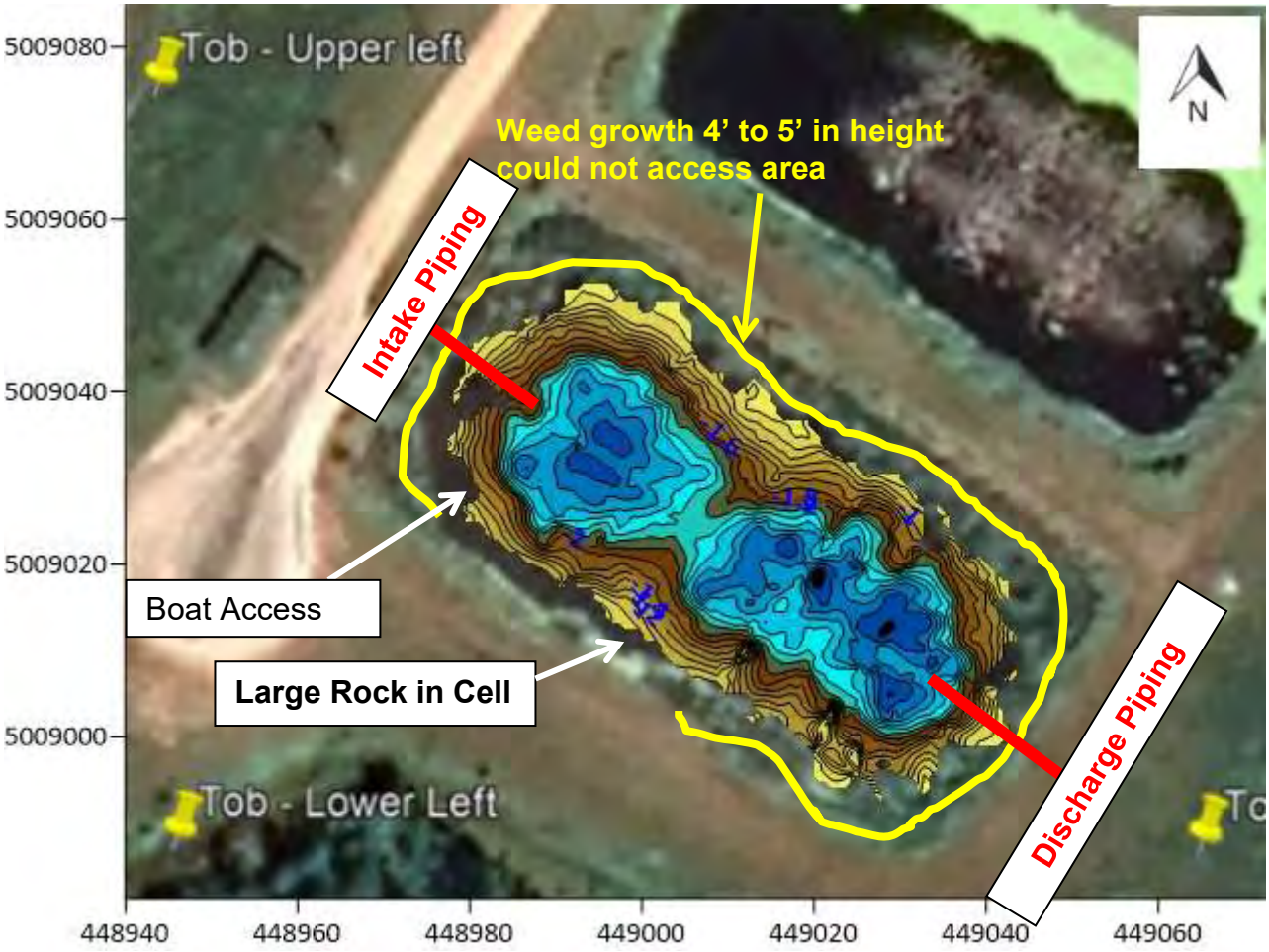
**Ontario Clean Water Agency**
**Tobermory, Ontario**
**Tobermory WWTP**

**Plot #1**

Survey Date: July 23, 2020.

**Ontario Clean Water Agency**
Municipality of Northern Bruce Peninsula
County of Bruce
Tobermory, Ontario

## Tobermory Wastewater
## Biosolids Primary Retention - Cell #1.
## Georeferencing Image – Site Description




**Georeferencing Image and Hydrographic Survey**
**Vessel Tracking Lines**

**Ontario Clean Water Agency**
**Tobermory, Ontario**
**Tobermory WWTP**

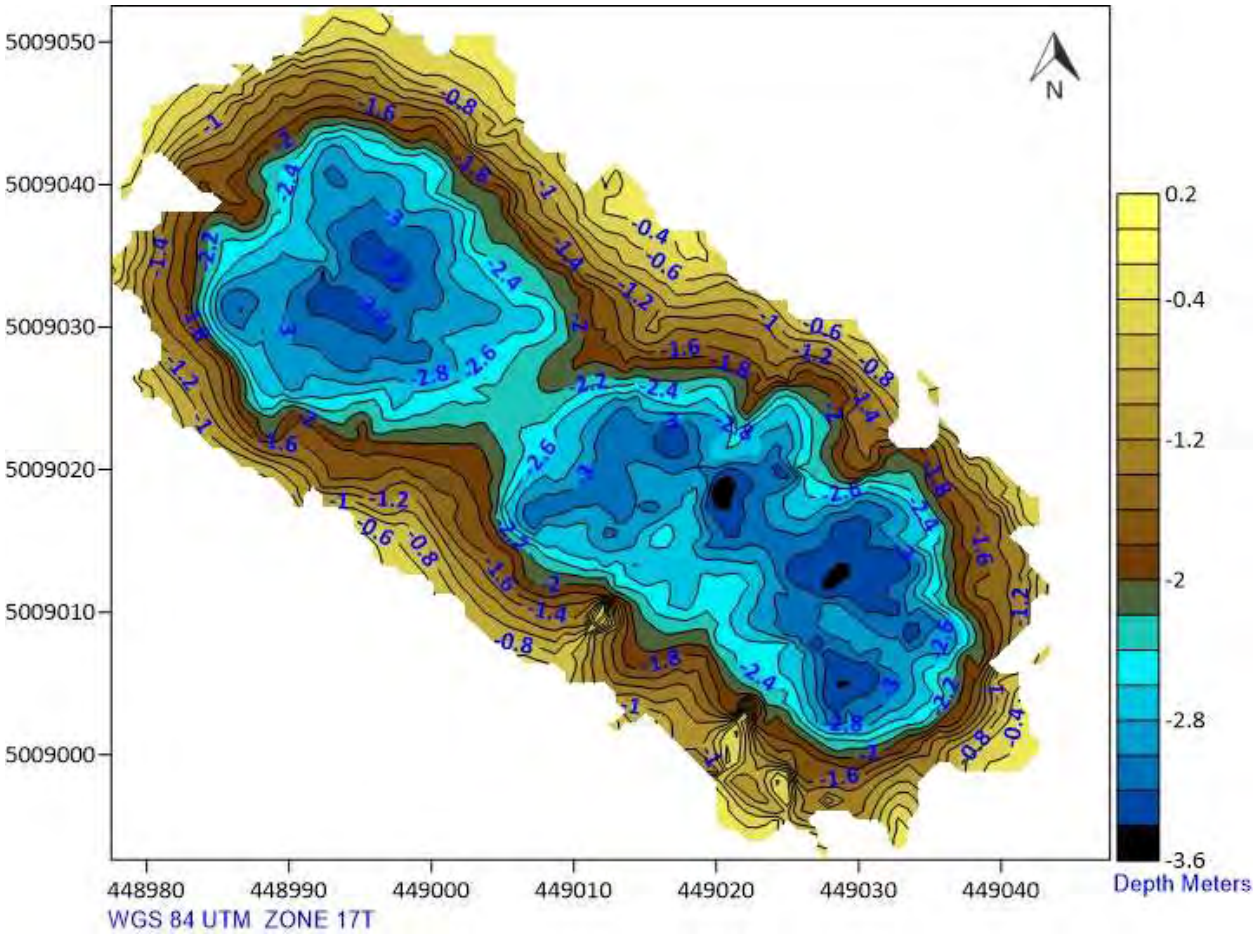
**Plot #2**

Survey Date: July 23, 2020.

**Ontario Clean Water Agency**
Municipality of Northern Bruce Peninsula
County of Bruce
Tobermory, Ontario

**Tobermory Wastewater**
**Biosolids Primary Retention - Cell #1.**

## Bathymetric Upper Biosolids Sludge Surface – Contour Map




Bathymetric (Upper Surface) Biosolids Distribution – Contour Map

Ontario Clean Water Agency
Tobermory, On
Tobermory Primary
Wastewater Biosolids Cell #1.

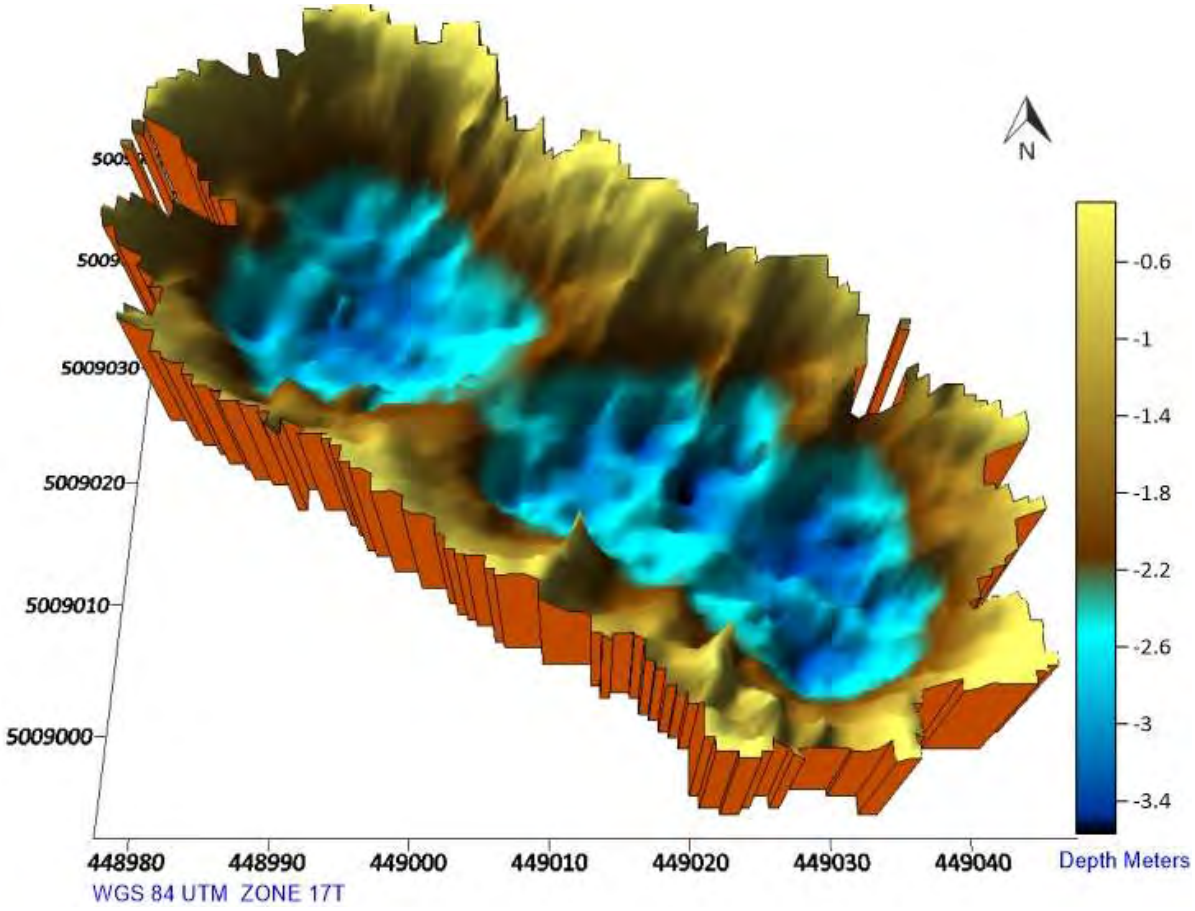
**Plot #3**

DATE: July 23, 2020

**Ontario Clean Water Agency**
Municipality of Northern Bruce Peninsula
County of Bruce
Tobermory, Ontario

**Tobermory Wastewater**
**Biosolids Primary Retention - Cell #1.**

## Bathymetric Upper Biosolids Sludge Surface – 3D Contour Map




Bathymetric (Upper Surface) Biosolids Distribution – 3D Contour Map

Ontario Clean Water Agency
Tobermory, On
Tobermory Primary
Wastewater Biosolids Cell #1.

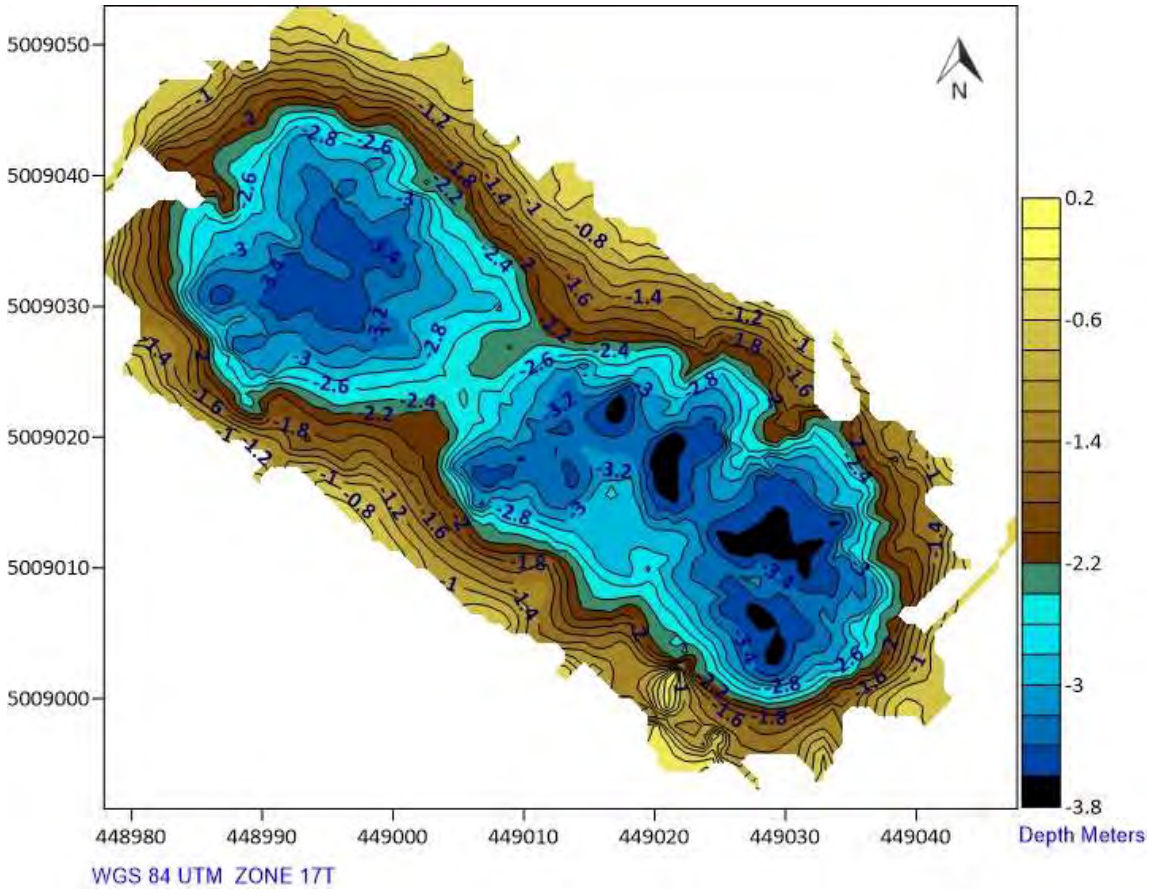
**Plot #4**

DATE; July 23, 2020

**Ontario Clean Water Agency**
Municipality of Northern Bruce Peninsula
County of Bruce
Tobermory, Ontario

**Tobermory Wastewater**
**Biosolids Primary Retention - Cell #1.**

## Lower Sub-Bottom Liner Surface – Contour Map




Lower Sub-Bottom (Liner/Clay/Hard Packed Soil) – Contour Map

Ontario Clean Water Agency
Tobermory, On
Tobermory Primary
Wastewater Biosolids Cell #1.

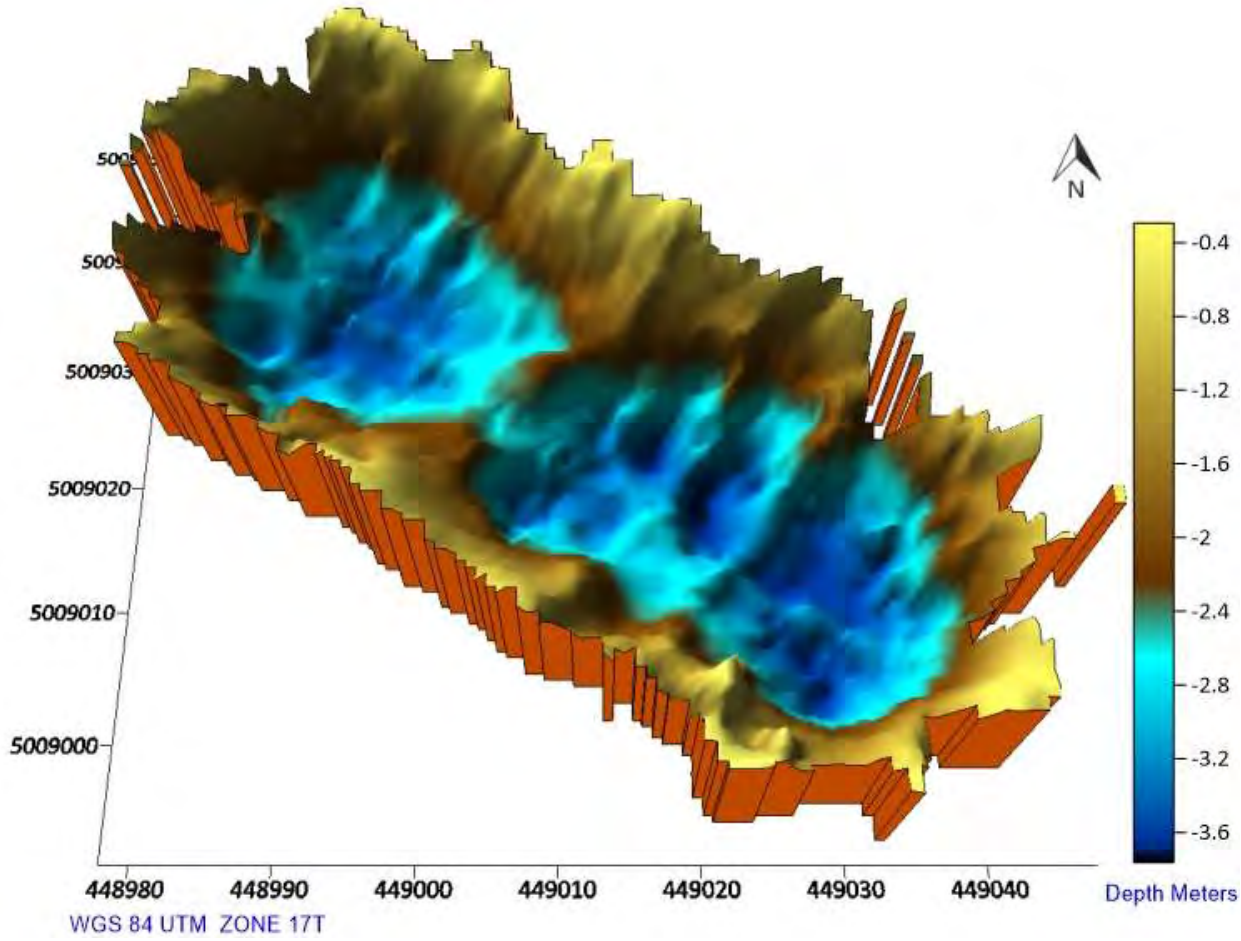
**Plot #5**

DATE; July 23, 2020

**Ontario Clean Water Agency**
Municipality of Northern Bruce Peninsula
County of Bruce
Tobermory, Ontario

**Tobermory Wastewater**
**Biosolids Primary Retention - Cell #1.**

## Lower Sub-Bottom Liner Surface – 3D Contour Map




Lower Sub-Bottom (Liner/Clay/Hard Packed Soil) – 3D Contour Map

Ontario Clean Water Agency
Tobermory, On
Tobermory Primary
Wastewater Biosolids Cell #1.

**Plot #6**

DATE; July 23, 2020

## Ontario Clean Water Agency
Municipality of Northern Bruce Peninsula
County of Bruce
Tobermory, Ontario

## Tobermory Wastewater
## Biosolids Primary Retention - Cell #1.

Hydrographic Acoustic Sonar
Biosolids Volume Modeling and Distribution Survey

Date; July 23, 2020
PICTORIAL REPORT

**Digital image #1 – Tobermory Cell #1. –** Three biosolids sludge samples were taken within Cell #1.


**Digital image #2 – Tobermory Cell #1. –** Three biosolids sludge samples were taken within Cell #1.

**Digital image #3 – Tobermory Cell #1. – R**emote controlled survey vessel and manned vessel.

**Digital image #4 – Tobermory Cell #1. –** Aquodic plant life on the surface of Cell#1.

**SAFETY PARTNERSHIP TASC**

| | |
|---|---|
| Company: PW MAKAR | Date: July 21 2020 |
| Employee: JOEL WILLOCK | Emergency # 911 |
| Foreman: JOEL WILLOCK | Wind Direction: SW |
| Job Location: TOBERMORY LAGOON | Emergency assembly location: TRUCK |

Do you require a permit for your work today? Yes / (No) Permit #_____
Special requirements?
COVID TEST, PPE

Did you sign into the unit? N/A
Will weather conditions affect your work today? NO
Is there a heat/cold stress issue today? (Yes) No Humidex 35
Where is the nearest eye wash station? TRUCK
Did you inspect your tools and equipment? (Yes) No
Could your activities impact you or others? Yes (No)
o tiered work o overhead lifting o hot work o other _____
Who is your site rep for emergency reporting? LEO-PAUL FRIGAULT
Did you sign off the permit today? Yes / No
Are you mentally/ physically prepared to complete this job? (Yes) No

Workers Names:
JOEL WILLOCK
GREG CHALMERS

**KEY STEPS**

1. **Complete card at the job site**
2. If in a crew, **complete together.**
3. Keep the card with the crew at all times.
4. If conditions change, the card must be reviewed with the whole crew.
5. **Identify Job steps, hazards in your work area,** and controls on the back of the card.
6. When job is complete return card to the supervisor.
7. If you have questions, "ASK".

**It only takes a *minute* to prevent a *lifetime* of pain**

PW MAKAR Inspection Services Ltd.

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Servicing the Industrial, Municipal & Commercial Sectors

| Describe your task today: SUNAR CELL 1 & 2 | Did you visually inspect job-site BEFORE STARTING WORK?: (Yes) No<br>Any issues? DEBRIS, ACCESS | |
|---|---|---|
| **Job Steps** | **Hazards** | **Controls** |
| | | |
| ACCESS LAGOON | WILD LIFE | WATCH STEPS and DRIVING |
| | | |
| PUT VESSEL / BOAT IN CELL | SLIP, TRIP, FALL | USE Ropes, Rely on Partner |
| | | |
| SUNAR CELL | DEBRIS, UNSANITARY WATER | WEAR PPE, TAKE TIME |
| | | |
| | | |
| | | |

**MEMORY JOGGER** (EXAMPLES to help complete above section)

| Job Steps | Hazards | Controls |
|---|---|---|
| **Describe steps to reveal hazards** | **Each step could have many hazards** | **Control or Eliminate all Hazards** |
| o scan job site<br>o get required tools/equipment<br>o perform/ complete task<br>o dismantle equipment<br>o clean up job site | o unfamiliar process system<br>o spill/release<br>o cords, cables, tools<br>o dropping tools<br>o thermal burns | o lockout/ tagout<br>o tie- off<br>o lines drained/purged<br>o shoring<br>o fire extinguisher |
| Is housekeeping complete? (Yes) No<br>Is permit signed off? (Yes) No | Supervisors Signature:<br>Feedback: | |

## SAFETY PARTNERSHIP TASC

| | |
|---|---|
| Company: PW MAKAR | Date: JULY 22 2020 |
| Employee: JOEL WILLOCK | Emergency # 911 |
| Foreman: JOEL WILLOCK | Wind Direction: NW |
| Job Location: TOBERMORY LAGOONS | Emergency assembly location: TRUCK |

Do you require a permit for your work today? Yes / (No) Permit #
Special requirements?
COVID TEST, PPE

Did you sign into the unit? N/A
Will weather conditions affect your work today? YES - RAIN
Is there a heat/cold stress issue today? Yes (No) Humidex
Where is the nearest eye wash station? TRUCK
Did you inspect your tools and equipment? (Yes) No
Could your activities impact you or others? Yes / (No)
o tiered work o overhead lifting o hot work o other
Who is your site rep for emergency reporting? LEO - PAUL FRIGAULT
Did you sign off the permit today? Yes / No
Are you mentally/ physically prepared to complete this job? (Yes) No

Workers Names:
JOEL WILLOCK
GREG CHALMERS

### KEY STEPS

1. **Complete card at the job site**
2. If in a crew, **complete together.**
3. Keep the card with the crew at all times.
4. If conditions change, the card must be reviewed with the whole crew.
5. **Identify Job steps, hazards in your work area,** and controls on the back of the card.
6. When job is complete return card to the supervisor.
7. If you have questions, "ASK".

**It only takes a *minute* to prevent a *lifetime* of pain**

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Inspection Services Ltd.

481 Murray Dr.
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Servicing the Industrial, Municipal & Commercial Sectors

| Describe your task today: SONAR CELL 1 and 2 | Did you visually inspect job-site BEFORE STARTING WORK?: (Yes) No<br>Any issues? DEBRIS, ACCESS | |
|---|---|---|
| **Job Steps** | **Hazards** | **Controls** |
| | | |
| Put Vessel in water | Slips, Trips, Falls | Watch Step, Use pushpole |
| Sonar Layout | Debris, Unsanitary Water | Watch splashes, clean propeller. |
| Remove Vessel | Injury, Falls | Watch Rocks, Use Ropes to Remove equipment, |

**MEMORY JOGGER** (EXAMPLES to help complete above section)

| Job Steps | Hazards | Controls |
|---|---|---|
| **Describe steps to reveal hazards** | **Each step could have many hazards** | **Control or Eliminate all Hazards** |
| o scan job site<br>o get required tools/equipment<br>o perform/ complete task<br>o dismantle equipment<br>o clean up job site | o unfamiliar process system<br>o spill/release<br>o cords, cables, tools<br>o dropping tools<br>o thermal burns | o lockout/ tagout<br>o tie- off<br>o lines drained/purged<br>o shoring<br>o fire extinguisher |

| Is housekeeping complete? (Yes) / No | Supervisors Signature: |
|---|---|
| Is permit signed off? (Yes) / No | Feedback: |

## SAFETY PARTNERSHIP TASC

| Company: PW MAKAR | Date: July 23 2020 |
|---|---|
| Employee: JOEL WILLOCK | Emergency #: 911 |
| Foreman: JOEL WILLOCK | Wind Direction: SW |
| Job Location: TOBERMORY LAGOON | Emergency assembly location: TRUCK |

Do you require a permit for your work today? Yes / (No) Permit #:
Special requirements?
COVID TEST, PPE

Did you sign into the unit? N/A
Will weather conditions affect your work today? NO
Is there a heat/cold stress issue today? (Yes) No Humidex 36
Where is the nearest eye wash station? TRUCK
Did you inspect your tools and equipment? (Yes) No
Could your activities impact you or others? Yes / (No)
o tiered work o overhead lifting o hot work o other N/A
Who is your site rep for emergency reporting? Leo-Paul Frigault
Did you sign off the permit today? Yes / No
Are you mentally/ physically prepared to complete this job? (Yes) No

**KEY STEPS**

1. **Complete card at the job site**
2. If in a crew, **complete together.**
3. Keep the card with the crew at all times.
4. If conditions change, the card must be reviewed with the whole crew.
5. **Identify Job steps, hazards in your work area,** and controls on the back of the card.
6. When job is complete return card to the supervisor.
7. If you have questions, "ASK".

**It only takes a *minute* to prevent a *lifetime* of pain**

Workers Names:
JOEL WILLOCK
GREG CHALMERS

PW MAKAR
Inspection Services Ltd.

481 Murray Dr.
Corunna, ON., N0N 1G0
Servicing the Industrial, Municipal & Commercial Sectors

| **Describe your task today:** SUNAR CELL 1 ad 2 | Did you visually inspect job-site BEFORE STARTING WORK?: (Yes) No<br>Any issues? DEBRIS, ACCESS | |
|---|---|---|
| Job Steps | Hazards | Controls |
| | | |
| Insert Vessel into Cell | TRIPS, Slips, Falls | TAKE TIME, Communicate |
| Move Vessel / BOAT to Cell 2 | Falls | watch Step, Communicate |
| Survey Cells | Debris, Unsanitary Debris | PPE, TAKE TIME |
| | | |
| Remove Vessel / BOAT. | TRIP, Muscle Pulls. | Use Ropes, Truck, Rely on Partners. |
| | | |
| | | |
| | | |

**MEMORY JOGGER** (EXAMPLES to help complete above section)

| **Job Steps** | **Hazards** | **Controls** |
|---|---|---|
| **Describe steps to reveal hazards** | **Each step could have many hazards** | **Control or Eliminate all Hazards** |
| o scan job site<br>o get required tools/equipment<br>o perform/ complete task<br>o dismantle equipment<br>o clean up job site | o unfamiliar process system<br>o spill/release<br>o cords, cables, tools<br>o dropping tools<br>o thermal burns | o lockout/ tagout<br>o tie- off<br>o lines drained/purged<br>o shoring<br>o fire extinguisher |
| Is housekeeping complete? (Yes) No<br><br>Is permit signed off? (Yes) No | Supervisors Signature:<br>Feedback: | |

PW MAKAR Inspection Services Ltd.
481 Murray Dr.
Corunna, ON., N0N 1G0
Servicing the Industrial, Municipal & Commercial Sectors

# Ontario Clean Water Agency
Municipality of Northern Bruce Peninsula
County of Bruce
Tobermory, Ontario

## Tobermory Wastewater
## Biosolids Secondary Retention - Cell #2.

Hydrographic Acoustic Sonar
Biosolids Volume Modeling and Distribution Survey

Date; July 24, 2020.

**Tobermory Wastewater Biosolids Secondary Retention - Cell #2**

Prepared For: Mr. Leo-Paul Frigault
Operations Manager
Ontario Clean Water Agency
West Highlands Hub
Wiarton, On

Prepared By: Paul Makar
PW MAKAR INSPECTION SERVICES LTD.

# TABLE OF CONTENT

## 1.0 INTRODUCTION

1.1 The Ontario Clean Water Agency contracted PW MAKAR INSPECTION SERVICES LTD. to conduct a Hydrographic Acoustic Sonar Biosolids Volume Modeling and Distribution Survey of the Tobermory secondary retention wastewater-biosolids Cell #2.

1.2 The Tobermory secondary biosolids Cell #2 has an aeration mixing system, which was turned off for a period of 7 days prior to the hydrographic survey. This was to allow the suspended sludge particulate matter to settle and to dissipate any air pockets trapped within the biosolids sludge.

1.3 The survey was performed using a multi-frequency (200, 50 and a 12 kHz) acoustic profiling system in the shallow wastewater of the Tobermory Biosolids Cell #2. “Generally”, PW MAKAR has a two person survey crew conducting the multi patterns of survey lines. A manned vessel motor operator and safety advisor and a sonar technician, taking sludge samples, calibrating, setting the transduce frequencies and monitoring the raw data streaming from the remote controlled survey vessels onboard computer system to the Toughbook computer system in the manned vessel. The remote controlled survey vessel is attached to the manned vessel as a precaution on wastewater biosolids lagoons/cells due to plant growth and debris on the surface.

1.3.1 The Tobermory Biosolids Cell #2 had an extensive amount of aquatic plant life both on the surface and below the surface so much so it impacted the outboard motor of the manned vessel. To complete the hydrographic survey, PW MAKAR’s sonar technician had to manually row the remote controlled survey vessel and manned vessel. Our vessel motor operator and safety advisor was on shore monitoring the events.

1.3.1.1

Figure #1. Remote controlled, unmanned survey vessel, attached to manned vessel, in the Tobermory wastewater-biosolids Cells.

1.4 The precision navigation was provided by the survey vessels on-board GPS system and is incorporated with the acoustic profiling system. Processing of the acoustic data provides both an indication of the present fluid depth and an image of the extent of

biosolids between the fluid bottom (upper biosolids surface contour bathymetric) and the liner/clay bottom (sub-bottom liner/clay contour) of the Tobermory Biosolids Cell #2.

## 2.0 SITE DESCRIPTION

2.1 The Tobermory wastewater treatment works consists of two (2) wastewater retention – biosolids Cells, Cell #1 primary treatment and Cell #2 secondary treatment.

2.1.1 Both the Cell #1 and Cell #2 were surveyed at this time. Both Cells will have their own hydrographic reports.

2.1 The underwater area surveyed within the Tobermory secondary retention wastewater-biosolids Cell #2 – survey date; July 24, 2020, has an underwater **Positive Planar Area** of **2458.08 m²** or **0.60 acres** or **0.25 Ha**.

2.1.1.1 **Please note**; the area surveyed within the Tobermory secondary retention wastewater-biosolids Cell #2 is dependent on the water level at the time of the survey. Any obstruction within the lagoon i.e. dykes, aeration systems, rock outcrops above and below the water, aquodic plant life can also affect the size of the survey area.

2.1.2

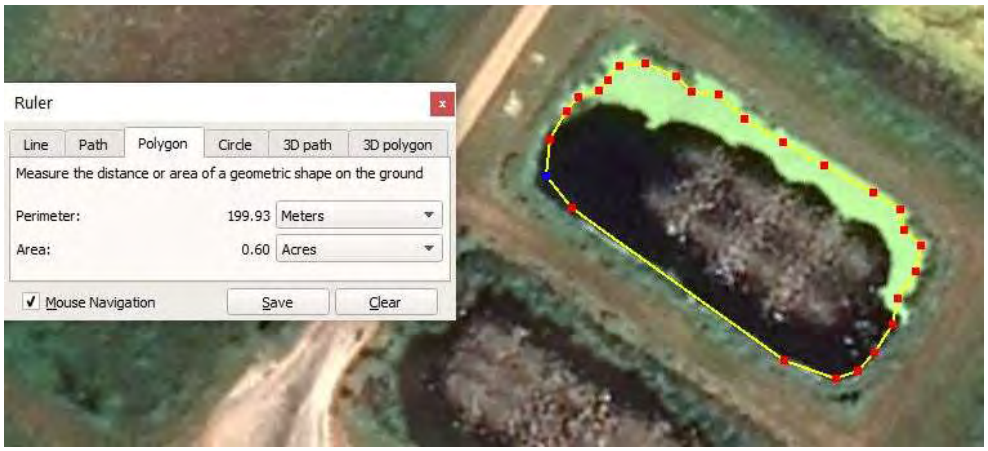



Figure #2. An area reference qualifier was conducted by a polygon measurement made in Google Earth 7/8/2019 image of the Tobermory Biosolids Cell #2 was found to be approximately 0.60 Acres.[1]

2.1.3 The Tobermory Biosolids Cell #2 property is located on the south side of Highway 6, approximately 3.5 kms from the Town of Tobermory, Ontario

## 3.0 DISCLAIMER

3.1 While PW MAKAR INSPECTION SERVICES LTD believes it has used best practice in obtaining the information contained in this report, in no event will PW MAKAR

[1] Google Earth.
7/8/2019. - Most Current Google Image.

INSPECTION SERVICES LTD be liable for any commercial costs, damages, loss of profit, property damage or personal injury, including death sustained or suffered in connection with the use of data or subsequent processing of materials obtained during field efforts by PW MAKAR INSPECTION SERVICES LTD during this program, or consequential damages including, but not limited to those related to dredging, removal of biosolids, disposal of biosolids, or contamination resulting from use of data obtained from this report or efforts or conclusions drawn from this report.

3.2 PW MAKAR INSPECTION SERVICES LTD makes no warranty, either expressed or implied, regarding the suitability or fitness of any data or information contained in this report for a particular purpose or that the information will satisfy the requirement of any law, rule, specification, or contract.

3.3 The maximum liability of PW MAKAR INSPECTION SERVICES LTD. from all causes related to this work, field efforts, report or discussions about this effort is limited to the funding received by PW MAKAR INSPECTION SERVICES LTD for this work. Acceptance of this report signifies acceptance of this disclaimer.

3.4 This report shall be deemed accepted if no protest is received within 60 days of the issuance date of this report.

## 4.0 ABSTRACT

4.1 The shallow hydrographic underwater acoustic sonar survey was conducted on July 24, 2020, and this report reflects the water content and biosolids sludge levels at the time of this hydrographic survey.

4.2 The hydrographic survey was performed by PW MAKAR INSPECTION SERVICES LTD's, Sonar Technician, the survey complies with IHO (International Hydrographic Organization) Standards.

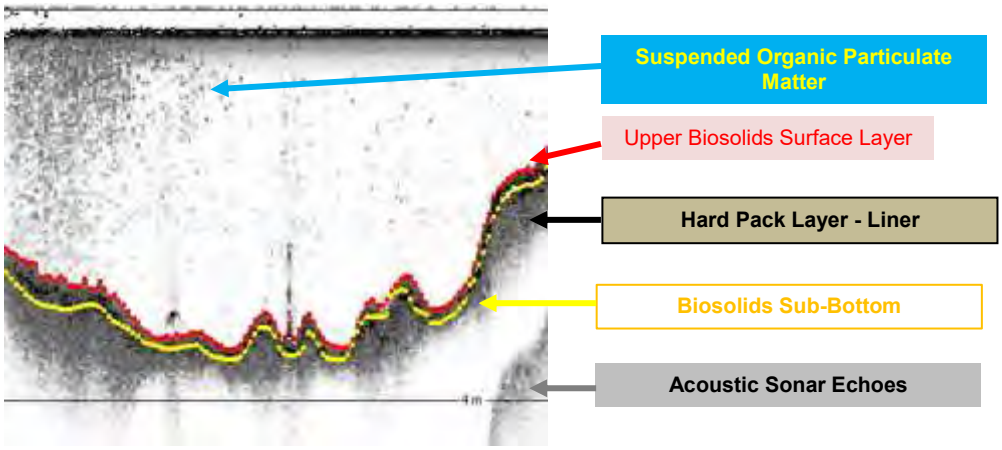
4.3 Transducer sound calibration checks were performed prior to the start of the hydrographic survey in the Tobermory Biosolids Cell #2.

4.4 Biosolids samples were requested, they were obtain at different locations throughout from Cell #2 and put sample bottles supplied by OCWA.

## 5.0 BIOSOLIDS DEPTH EVALUATIONS

5.1 The sub-bottom contour in the Tobermory Biosolids Cell #2, has a "hard pack" sub-bottom layer i.e. clay, hard pack soil. All three of our hydrographic acoustic sonar transducers were utilized to determine the bathymetric bottom and sub-bottom in the lagoon.

5.1.1 Biosolids Isopach, volume computations were calculated from the bathymetric (upper surface) biosolids sludge layer using the 200 kHz transducer and the sub-bottom hard pack layer/liner utilizing both the 50 kHz and 12 kHz transducers.




5.1.2 Figure #3. Post processing of the digitized acoustic sonar signal echoes, July 2020, Tobermory Biosolids Cell #2.

5.2 The water level elevation was appropriate for conducting a hydrographic survey; extensive aquodic plant life was present within the Tobermory Biosolids Cell #2.

5.2.1 There was adequate access and egress into Cell #2 at the time of the survey.

5.2.2 The total volume of biosolids surveyed on July 24, 2020 in the Tobermory Biosolids Cell #2, – is approximately **391.84 m³** or **512.50 yd³**.

5.2.2.1 To calculate a percentage of biosolids sludge, a grid volume computation was calculated from the bathymetric biosolids sludge bottom (defined as the top of the biosolids sludge) and the sub-bottom of the biosolids sludge i.e. the top of the lagoon/cell liner. It is then divided by the grid volume computation calculated from the top of the liquid/water to the sub-bottom of the biosolids sludge of the lagoon/cell liner. The two number sets are then times (x) by 100 to determine a percentage of the biosolids.

**Please note**; the percentages of biosolids volumes will change/increase if water levels in the lagoon/cell fluctuate. In addition, if aluminum sulfate is added to the water and the suspended organic particles settles to the bottom this will add to the amount of biosolids sludge.
**As well**; the aeration mixing system was turned off for a period of 6 days prior to the hydrographic survey, there was still suspended organic matter in the water column of Cell #2 which would increase in the total amount of sludge if the suspended organic matter were to completely settle.

5.2.2.1.1 Therefore, on this date the percentage of biosolids buildup in the Tobermory Biosolids Cell #2 is approximately **6.55%.**

5.2.3 PW MAKAR Inspection Services Ltd. collected **22,570** digitized data value points in the Tobermory Biosolids Cell #2. The digitized data value points represent both the bathymetric bottom and sub-bottom biosolids values with GPS navigational values.

5.2.3.1 Each individual data value point consists of an XYZ value. X value is an Easting coordinate; Y value is a Northing coordinate and Z consists of a biosolids/sludge elevation processed in meters.

5.2.3.2 The average depth of biosolids sludge throughout the Tobermory Biosolids Cell #2 on this date was approximately **0.159 m or 159 mm or 6.25 in.**

## 6.0 GENERAL SITE EVALUATIONS

6.1 There is a heavy amount of short vegetation growing around the top of the beam of the wastewater lagoons, which should be monitored and cut back as required if not being allocated already.

6.2 There is extensive aquodic plant life was present within the Tobermory Biosolids Cell #2.

6.3 There were no apparent berm erosion issues identified at this time.

6.4 Lagoon warning signage appeared appropriate.

Reported by: Paul Makar

Paul Makar

PW MAKAR COATINGS INSPECTION LTD. NACE CERTIFIED COATINGS INSPECTOR #137.

# Grid Volume Computations

## Bathymetric (Upper) Biosolids Surface and Sub-Bottom (Lower) – Liner Surface.

## Tobermory secondary retention wastewater-biosolids Cell #2.

Tue Aug 4 15:28:28 2020

### Upper Surface

| | |
|---|---|
| Grid File Name: | C:\A Layer Mapping\CELL 2 A LAYER BLANKED out.grd |
| Grid Size: | 87 rows x 100 columns |
| X Minimum: | 449002.78 |
| X Maximum: | 449077.63 |
| X Spacing: | 0.75606060606037 |
| Y Minimum: | 5009033.35 |
| Y Maximum: | 5009098.31 |
| Y Spacing: | 0.75534883720887 |
| Z Minimum: | -3.6466769116936 |
| Z Maximum: | -0.33875893332183 |

### Lower Surface

| | |
|---|---|
| Grid File Name: | C:\ B Layer Mapping\CELL 2 - B LAYER BLANKED out.grd |
| Grid Size: | 87 rows x 100 columns |
| X Minimum: | 449002.78 |
| X Maximum: | 449077.63 |
| X Spacing: | 0.75606060606037 |
| Y Minimum: | 5009033.35 |
| Y Maximum: | 5009098.31 |
| Y Spacing: | 0.75534883720887 |
| Z Minimum: | -3.6988725333469 |
| Z Maximum: | -0.39013566397471 |

### Volumes

Z Scale Factor: 1

**Total Volumes by:**

Trapezoidal Rule: 391.63094297646
Simpson's Rule: 392.01246675622
Simpson's 3/8 Rule: 392.02655423716

**Cut & Fill Volumes**

**Positive Volume [Cut]: 391.84174219581 m³ or 512.50 yd³.**
Negative Volume [Fill]: 0.21079921935185
Net Volume [Cut-Fill]: 391.63094297646

# Areas

**Planar Areas**

**Positive Planar Area [Cut]: 2458.0876401037 m² or 0.60 acres or 0.25 Ha.**
Negative Planar Area [Fill]: 9.0189983719641
No Data Planar Area: 2395.1493615201
Total Planar Area: 4862.2559999957

**Surface Areas**

Positive Surface Area [Cut]: 2475.0869017594
Negative Surface Area [Fill]: 9.2495263915813

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# Appended Figures and Maps

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Servicing the Industrial, Municipal & Commercial Sectors


| | |
|---|---|
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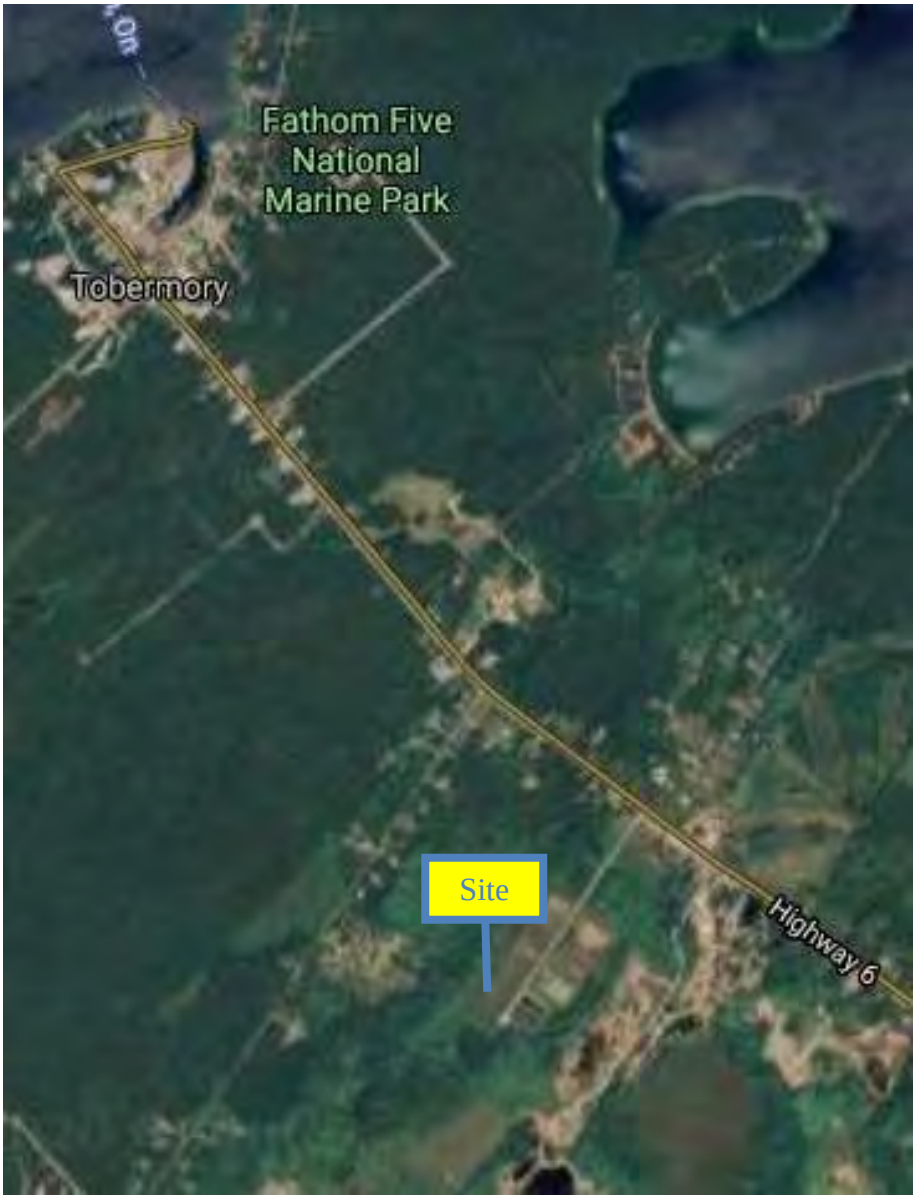
| DATE; July 24, 2020 | **FIGURE No.4** |

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DATE; July 24, 2020

SITE AERIAL AP LOCATION

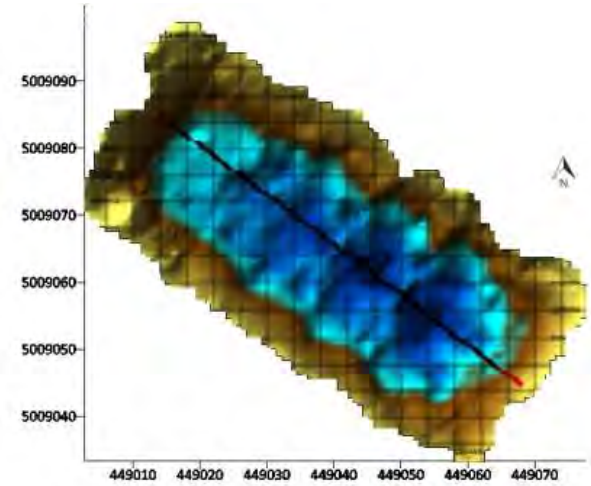
Ontario Clean Water Agency
Tobermory, On
Tobermory Secondary
Wastewater Biosolids Cell #2.

**FIGURE No.5**

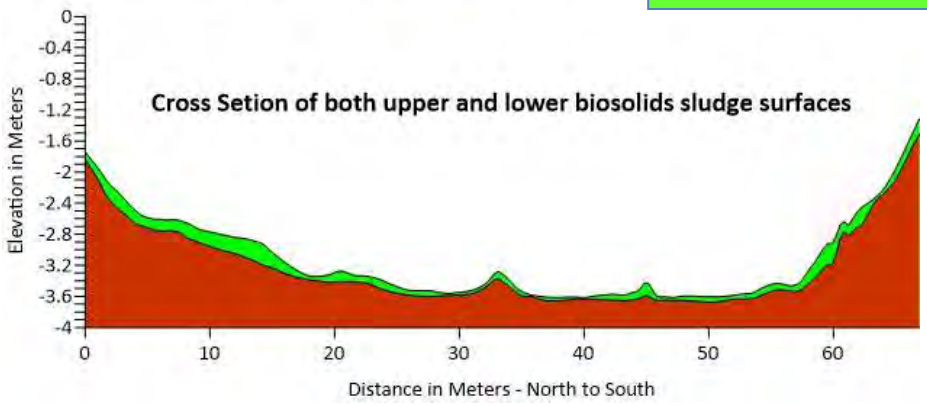
**Ontario Clean Water Agency**
Municipality of Northern Bruce Peninsula
County of Bruce
Tobermory, Ontario

**Tobermory Wastewater**
**Biosolids Secondary Retention - Cell #2.**

Visual Representation of the Biosolids Sludge Layers
Sliced from North to South




**The average depth of Biosolids Sludge in the Tobermory Cell #2 is 0.159 m or 159 mm or 6.25 in.**




**Visual Representation of the Biosolids Sludge Layers Sliced from North to South**

**Ontario Clean Water Agency**
**Tobermory, Ontario**
**Tobermory WWTP**

Survey Date: July 24, 2020.

**FIGURE No.6**

**Ontario Clean Water Agency**
Municipality of Northern Bruce Peninsula
County of Bruce
Tobermory, Ontario

**Tobermory Wastewater**
**Biosolids Secondary Retention - Cell #2.**

## Georeferencing Image and Hydrographic Survey Vessel Tracking Lines


**Georeferencing Image and Hydrographic Survey Vessel Tracking Lines**

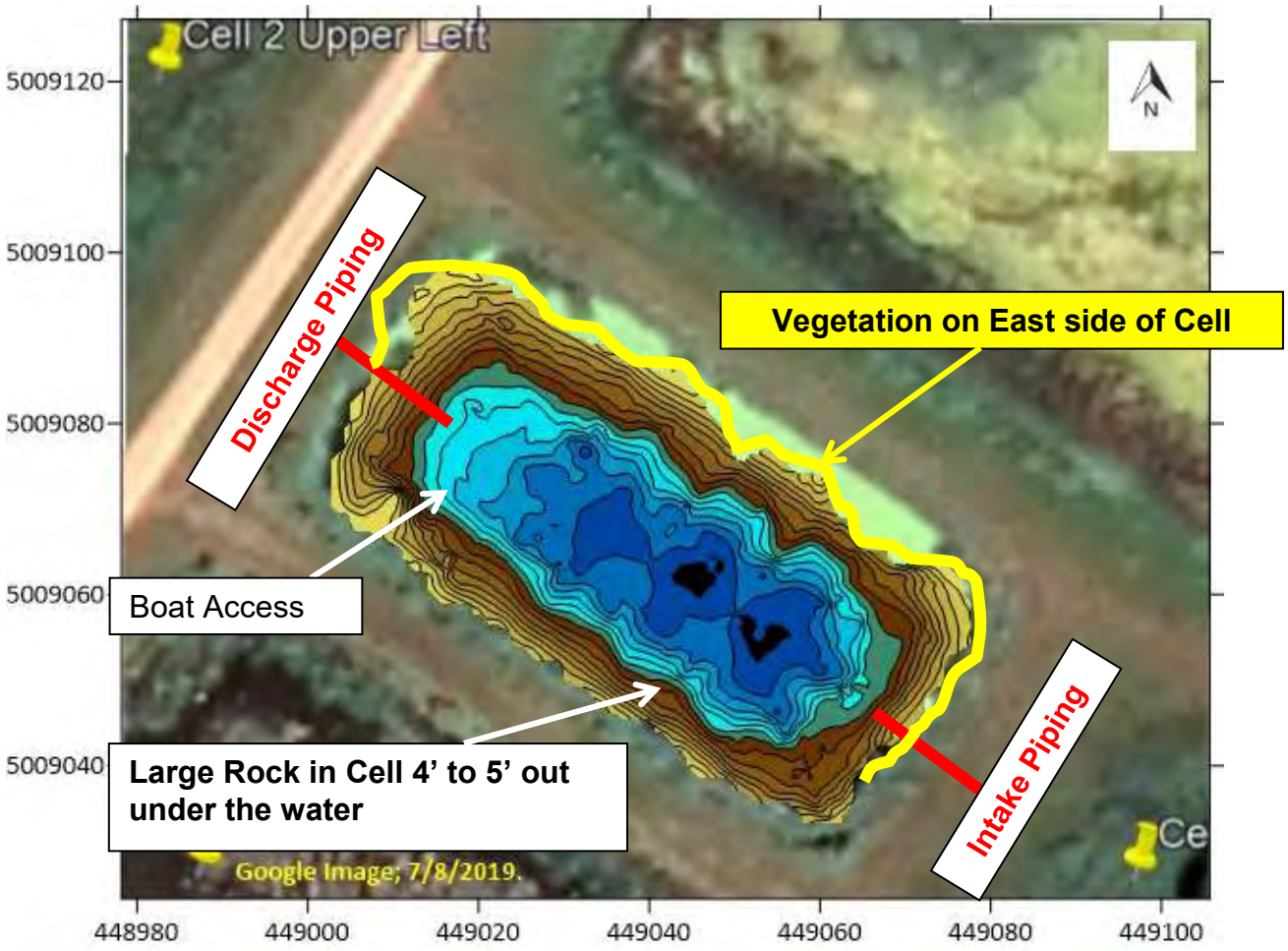
**Ontario Clean Water Agency**
**Tobermory, Ontario**
**Tobermory WWTP**

**Plot #1**

Survey Date: July 23, 2020.

**Ontario Clean Water Agency**
Municipality of Northern Bruce Peninsula
County of Bruce
Tobermory, Ontario

**Tobermory Wastewater**
**Biosolids Secondary Retention - Cell #2.**
**Georeferencing Image – Site Description**




**Georeferencing Image – Site Description**

**Ontario Clean Water Agency**
**Tobermory, Ontario**
**Tobermory WWTP**

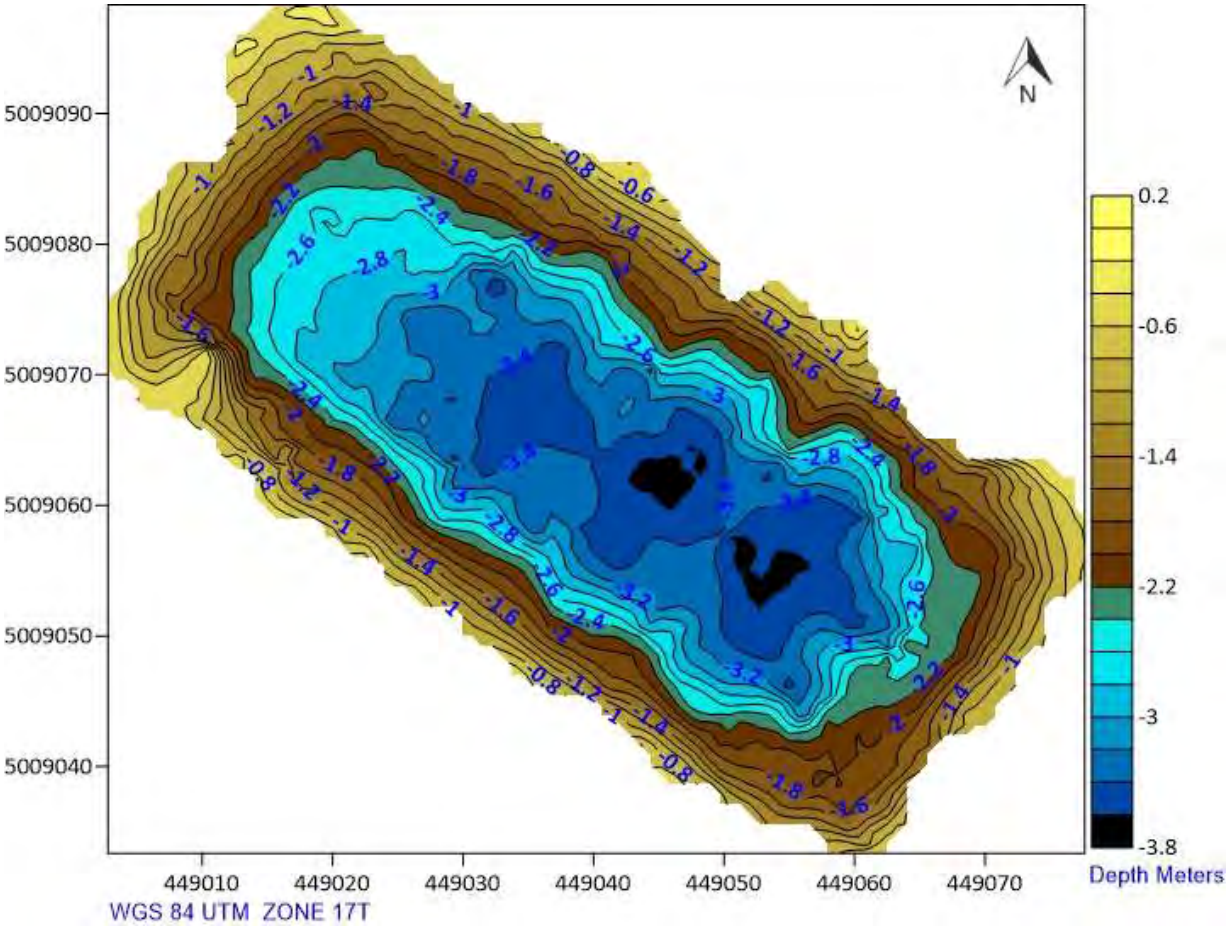
**Plot #2**

Survey Date: July 23, 2020.

**Ontario Clean Water Agency**
Municipality of Northern Bruce Peninsula
County of Bruce
Tobermory, Ontario

**Tobermory Wastewater**
**Biosolids Secondary Retention - Cell #2.**

## Bathymetric Upper Biosolids Sludge Surface – Contour Map




Bathymetric (Upper Surface) Biosolids Distribution – Contour Map

Ontario Clean Water Agency
Tobermory, On
Tobermory Secondary
Wastewater Biosolids Cell #2.

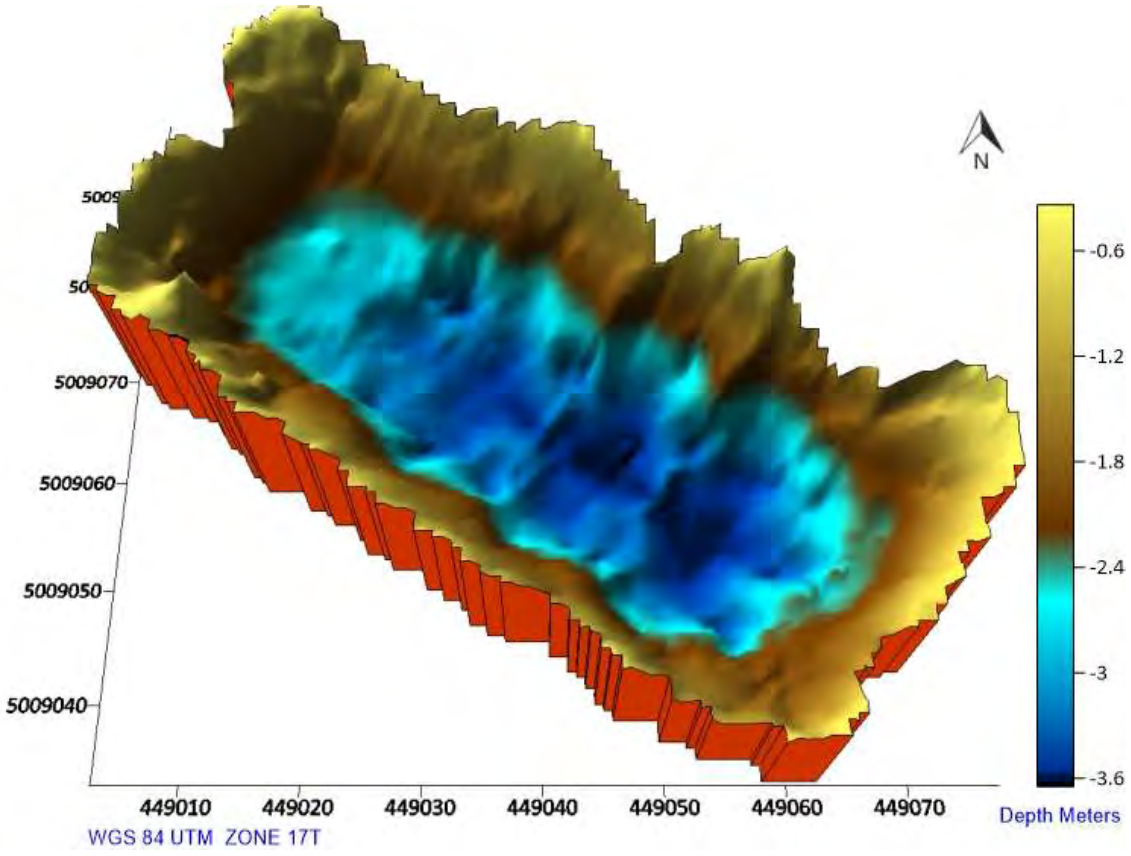
**Plot #3**

DATE: July 23, 2020

**Ontario Clean Water Agency**
Municipality of Northern Bruce Peninsula
County of Bruce
Tobermory, Ontario

**Tobermory Wastewater**
**Biosolids Secondary Retention - Cell #2.**

## Bathymetric Upper Biosolids Sludge Surface – 3D Contour Map




Bathymetric (Upper Surface) Biosolids Distribution – 3D Contour Map

Ontario Clean Water Agency
Tobermory, On
Tobermory Secondary
Wastewater Biosolids Cell #2.

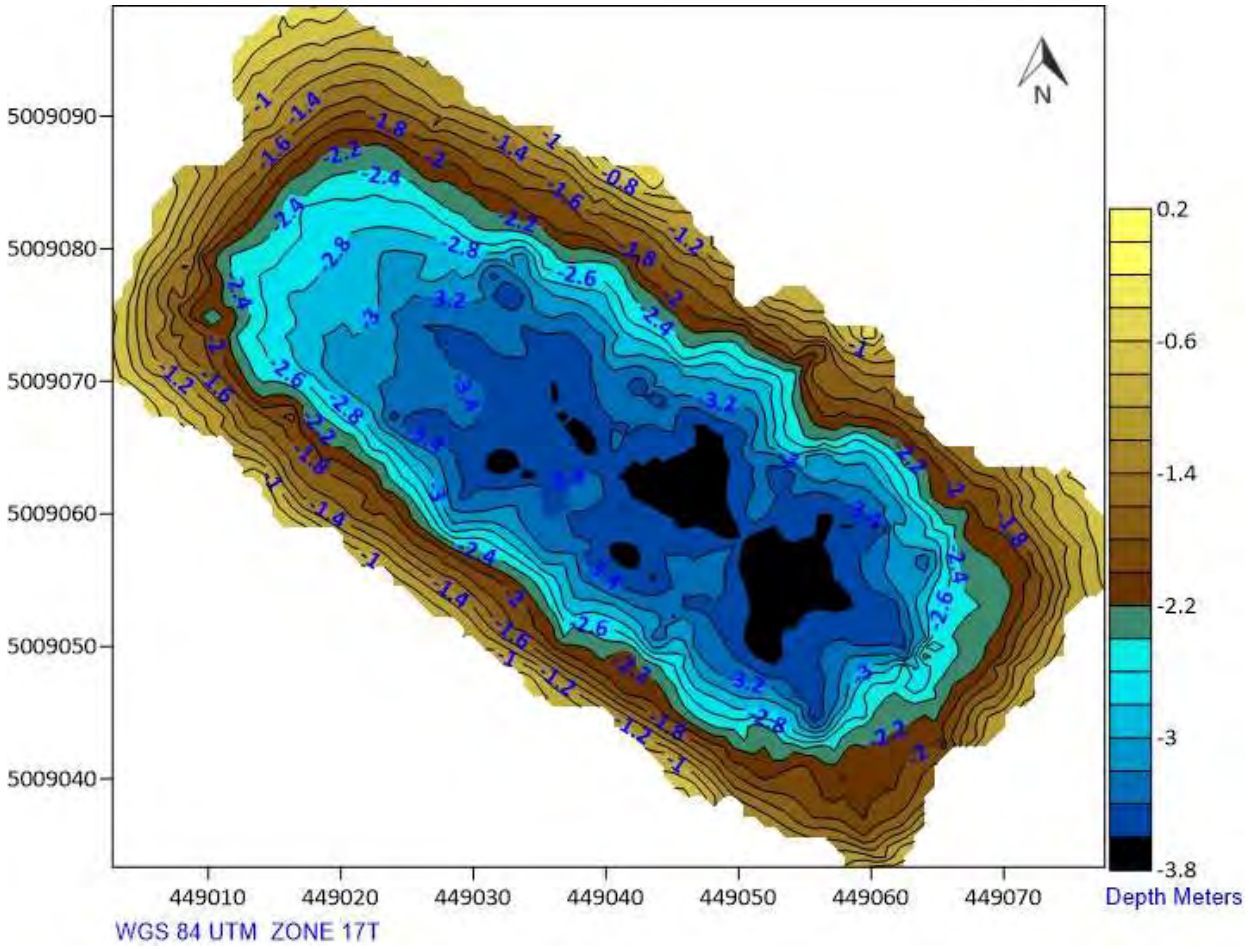
**Plot #4**

DATE; July 23, 2020

**Ontario Clean Water Agency**
Municipality of Northern Bruce Peninsula
County of Bruce
Tobermory, Ontario

**Tobermory Wastewater**
**Biosolids Secondary Retention - Cell #2.**

## Lower Sub-Bottom Liner Surface – Contour Map




Lower Sub-Bottom (Liner/Clay/Hard Packed Soil) – Contour Map

Ontario Clean Water Agency
Tobermory, On
Tobermory Secondary
Wastewater Biosolids Cell #2.

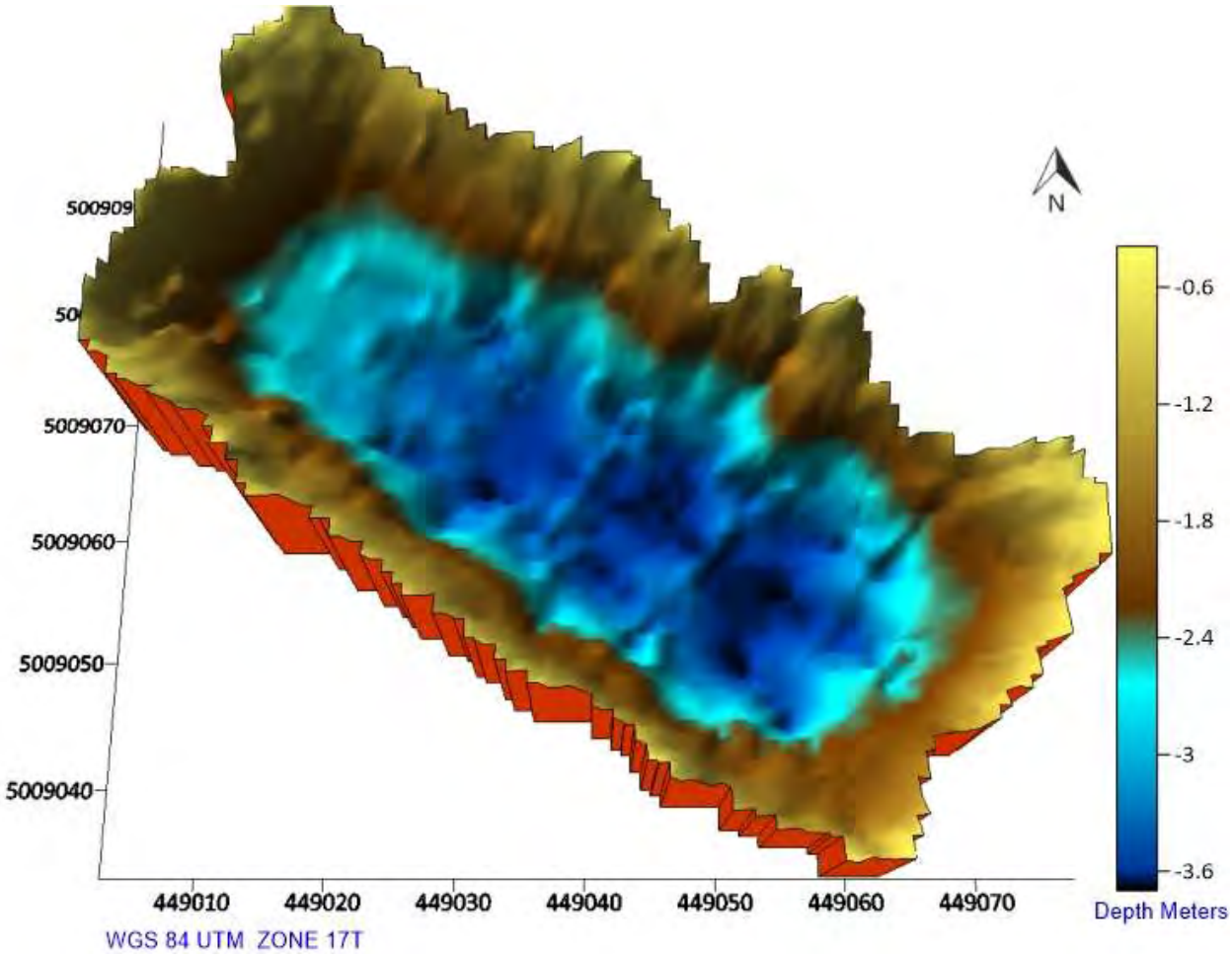
**Plot #5**

DATE; July 23, 2020

**Ontario Clean Water Agency**
Municipality of Northern Bruce Peninsula
County of Bruce
Tobermory, Ontario

**Tobermory Wastewater**
**Biosolids Secondary Retention - Cell #2.**

## Lower Sub-Bottom Liner Surface – 3D Contour Map




Lower Sub-Bottom (Liner/Clay/Hard Packed Soil) – 3D Contour Map

Ontario Clean Water Agency
Tobermory, On
Tobermory Secondary
Wastewater Biosolids Cell #2.

**Plot #6**

DATE; July 23, 2020

## Ontario Clean Water Agency
Municipality of Northern Bruce Peninsula
County of Bruce
Tobermory, Ontario

## Tobermory Wastewater
## Biosolids Secondary Retention - Cell #2.

Hydrographic Acoustic Sonar
Biosolids Volume Modeling and Distribution Survey

Date; July 24, 2020
PICTORIAL REPORT

**Digital image #1 – Tobermory Cell #2. –** Aquatic plant life on the surface of Cell 2.

**Digital image #2 – Tobermory Cell #2. –** Aquatic plant life on the surface of Cell 2.

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## SAFETY PARTNERSHIP TASC

| | |
|---|---|
| Company: PW MAKAR | Date: July 21 2020 |
| Employee: JOEL WILLOCK | Emergency # 911 |
| Foreman: JOEL WILLOCK | Wind Direction: SW |
| Job Location: TOBERMORY LAGOON | Emergency assembly location: TRUCK |

Do you require a permit for your work today? Yes (No) Permit #

Special requirements?

COVID TEST, PPE

Did you sign into the unit? N/A

Will weather conditions affect your work today? NO

Is there a heat/cold stress issue today? (Yes) No Humidex 35

Where is the nearest eye wash station? TRUCK

Did you inspect your tools and equipment? (Yes) No

Could your activities impact you or others? Yes (No)

o tiered work o overhead lifting o hot work o other

Who is your site rep for emergency reporting? LEO- PAUL FRIGAULT

Did you sign off the permit today? Yes / No

Are you mentally/ physically prepared to complete this job? (Yes) No

Workers Names:

JOEL WILLOCK

GREG CHALMERS

### KEY STEPS

1. **Complete card at the job site**
2. If in a crew, **complete together.**
3. Keep the card with the crew at all times.
4. If conditions change, the card must be reviewed with the whole crew.
5. **Identify Job steps, hazards in your work area,** and controls on the back of the card.
6. When job is complete return card to the supervisor.
7. If you have questions, "ASK".

**It only takes a *minute* to prevent a *lifetime* of pain**

**Describe your task today:** SONAR CELL 1 & 2

Did you visually inspect job-site BEFORE STARTING WORK?: (Yes) No

Any issues? DEBRIS, ACCESS

| Job Steps | Hazards | Controls |
|---|---|---|
| ACCESS LAGOON | WILDLIFE | WATCH STEPS and DRIVING |
| PUT VESSEL / BOAT IN CELL | SLIP, TRIP, FALLS | USE ROPES, Rely on Partner |
| SONAR CELL | DEBRIS, UNSANITARY CONDITIONS | WEAR PPE, TAKE TIME |

### MEMORY JOGGER (EXAMPLES to help complete above section)

| Job Steps | Hazards | Controls |
|---|---|---|
| **Describe steps to reveal hazards** | **Each step could have many hazards** | **Control or Eliminate all Hazards** |
| o scan job site | o unfamiliar process system | o lockout/ tagout |
| o get required tools/equipment | o spill/release | o tie- off |
| o perform/ complete task | o cords, cables, tools | o lines drained/purged |
| o dismantle equipment | o dropping tools | o shoring |
| o clean up job site | o thermal burns | o fire extinguisher |

Is housekeeping complete? (Yes) No

Is permit signed off? (Yes) No

Supervisors Signature:

Feedback:

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## SAFETY PARTNERSHIP TASC

| | |
|---|---|
| Company: PW MAKAR | Date: JULY 23 2020 |
| Employee: JOEL WILLOCK | Emergency # 911 |
| Foreman: JOEL WILLOCK | Wind Direction: NW |
| Job Location: TOBERMORY LAGOONS | Emergency assembly location: TRUCK |

Do you require a permit for your work today? Yes / (No) Permit #

Special requirements?

COVID TEST, PPE

Did you sign into the unit? N/A

Will weather conditions affect your work today? YES - RAIN

Is there a heat/cold stress issue today? Yes (No) Humidex

Where is the nearest eye wash station? TRUCK

Did you inspect your tools and equipment? (Yes) No

Could your activities impact you or others? Yes / (No)

o tiered work o overhead lifting o hot work o other

Who is your site rep for emergency reporting? LEO - PAUL FRIGAULT

Did you sign off the permit today? Yes / No

Are you mentally/ physically prepared to complete this job? (Yes) No

### KEY STEPS

1. **Complete card at the job site**
2. If in a crew, **complete together.**
3. Keep the card with the crew at all times.
4. If conditions change, the card must be reviewed with the whole crew.
5. **Identify Job steps, hazards in your work area,** and controls on the back of the card.
6. When job is complete return card to the supervisor.
7. If you have questions, "ASK".

**It only takes a *minute to* prevent a *lifetime* of pain**

Workers Names:

JOEL WILLOCK

GREG CHALMERS

**Describe your task today:** SONAR CELL 1 of 2

Did you visually inspect job-site BEFORE STARTING WORK: (Yes) No

Any issues? DEBRIS, ACCESS

| Job Steps | Hazards | Controls |
|---|---|---|
| Put Vessel in water | Slips, Trips, Falls | Watch Step, Use Pontoon |
| Sonar Lagoon | Debry, Unsanitary Water | Watch splashes, clean Propeller. |
| Remove Vessel | Injury, Falls | Watch Rocks, Use Rope To Remove equipment. |

### MEMORY JOGGER (EXAMPLES to help complete above section)

| Job Steps | Hazards | Controls |
|---|---|---|
| **Describe steps to reveal hazards** | **Each step could have many hazards** | **Control or Eliminate all Hazards** |
| o scan job site | o unfamiliar process system | o lockout/ tagout |
| o get required tools/equipment | o spill/release | o tie- off |
| o perform/ complete task | o cords, cables, tools | o lines drained/purged |
| o dismantle equipment | o dropping tools | o shoring |
| o clean up job site | o thermal burns | o fire extinguisher |

Is housekeeping complete? (Yes) / No

Is permit signed off? (Yes) / No

Supervisors Signature:

Feedback:

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## SAFETY PARTNERSHIP TASC

| | |
|---|---|
| Company: PW MAKAR | Date: July 23 2020 |
| Employee: JOEL WILLOCK | Emergency # 911 |
| Foreman: JOEL WILLOCK | Wind Direction: SW |
| Job Location: TOBERMORY LAGOON | Emergency assembly location: TRUCK |

Do you require a permit for your work today? Yes / (No) Permit #

Special requirements?

COVID TEST, PPE

Did you sign into the unit? N/A

Will weather conditions affect your work today? NO

Is there a heat/cold stress issue today? (Yes) No Humidex 36

Where is the nearest eye wash station? TRUCK

Did you inspect your tools and equipment? (Yes) No

Could your activities impact you or others? Yes / (No)

o tiered work o overhead lifting o hot work o other N/A

Who is your site rep for emergency reporting? Leo-Paul Frigault

Did you sign off the permit today? Yes / No

Are you mentally/ physically prepared to complete this job? (Yes) No

### KEY STEPS

1. **Complete card at the job site**
2. If in a crew, **complete together.**
3. Keep the card with the crew at all times.
4. If conditions change, the card must be reviewed with the whole crew.
5. **Identify Job steps, hazards in your work area**, and controls on the back of the card.
6. When job is complete return card to the supervisor.
7. If you have questions, "ASK".

**It only takes a *minute* to prevent a *lifetime* of pain**

Workers Names:

JOEL WILLOCK

GREG CHALMERS

PW MAKAR
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| **Describe your task today:** SUNAR CELL 1 ad 2 | Did you visually inspect job-site BEFORE STARTING WORK?: (Yes) No<br>Any issues? DEBRIS, ACCESS | |
|---|---|---|
| Job Steps | Hazards | Controls |
| | | |
| Insert Vessel into Cell | TRIPS, Slips, Falls | TAKE TIME, Communicate |
| Move Vessel / BOAT to Cell 2 | Falls | watch Step, Communicate |
| Survey Cells | Debris, Unsanitary Debris | PPE, TAKE TIME |
| | | |
| Remove Vessel / BOAT. | TRIP, Muscle Pulls. | Use Ropes, Truck, Rely on Partners. |
| | | |
| | | |
| | | |

**MEMORY JOGGER** (EXAMPLES to help complete above section)

| **Job Steps** | **Hazards** | **Controls** |
|---|---|---|
| **Describe steps to reveal hazards** | **Each step could have many hazards** | **Control or Eliminate all Hazards** |
| o scan job site<br>o get required tools/equipment<br>o perform/ complete task<br>o dismantle equipment<br>o clean up job site | o unfamiliar process system<br>o spill/release<br>o cords, cables, tools<br>o dropping tools<br>o thermal burns | o lockout/ tagout<br>o tie- off<br>o lines drained/purged<br>o shoring<br>o fire extinguisher |
| Is housekeeping complete? (Yes) No<br><br>Is permit signed off? (Yes) No | Supervisors Signature:<br>Feedback: | |