

The Corporation of the Municipality of Temagami
Sisk Landfill 2023 Annual Report



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Prepared for:
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- Appendix A Environmental Compliance Approval
- Appendix B Borehole Logs
- Appendix C Laboratory Certificates of Analysis
- Appendix D Groundwater Chemistry

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1 Introduction

The Sisk Landfill (“Site”) is operated by The Corporation of the Township of Temagami (“Temagami”). This report summarizes the Site’s operations and water quality monitoring conducted in 2023, as required by Section 38. (a) to (h) of the Amendment to Provisional Certificate of Approval Waste Disposal Site No. A7134301, now referred to as an Environmental Compliance Approval (“ECA”). A copy of the ECA is provided in Appendix A.

The Site has been operated since the 1970s. The landfill was established by the Ministry of Natural Resources and Forestry (“MNR”), but the exact date of establishment is unknown. The Temagami Public Works Department (“Public Works”) has operated the landfill since 1998. An existing, but pending transfer, of Site ownership from the MNR to Temagami has not yet been finalized. Currently, the landfill serves those residents of Temagami who live along Highway 11, south of the Lake Temagami Access Road.

This document represents the Site’s twelfth annual report prepared and submitted to the Ministry of Environment, Conservation and Parks (“MECP”) by Story Environmental Inc. (“SEI”). Annual Site Reports have been prepared for each year of operation between 2008 to 2011 and 2016 to 2023 by SEI and SEI’s predecessor Story Environmental Services (“SES”). From 2012 to 2015 no monitoring or reporting were conducted. Prior to 2008, an annual report had not been prepared and the Site was only monitored in 2001.

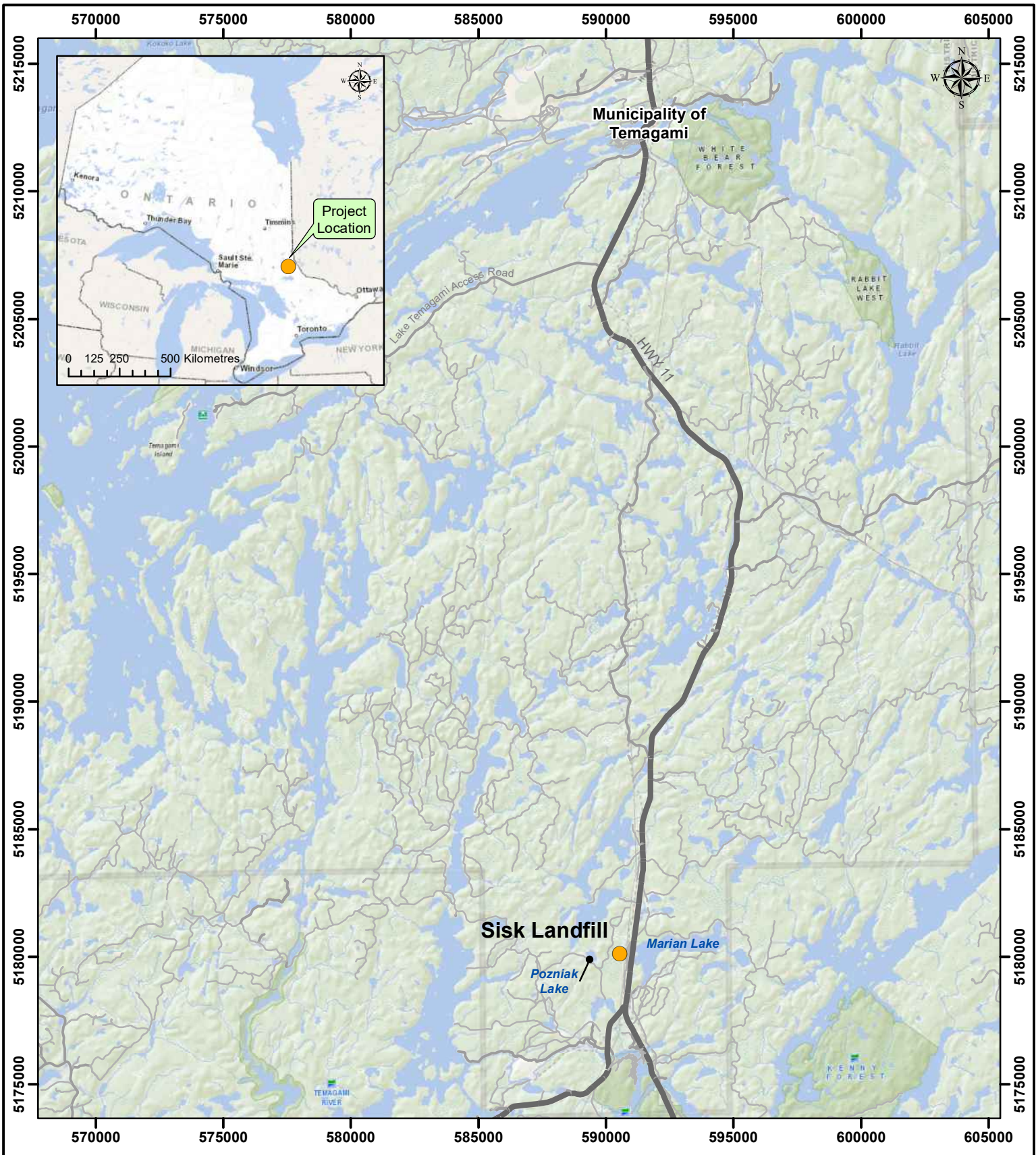
2 Landfill Site

2.1 Site Description and Recent Work

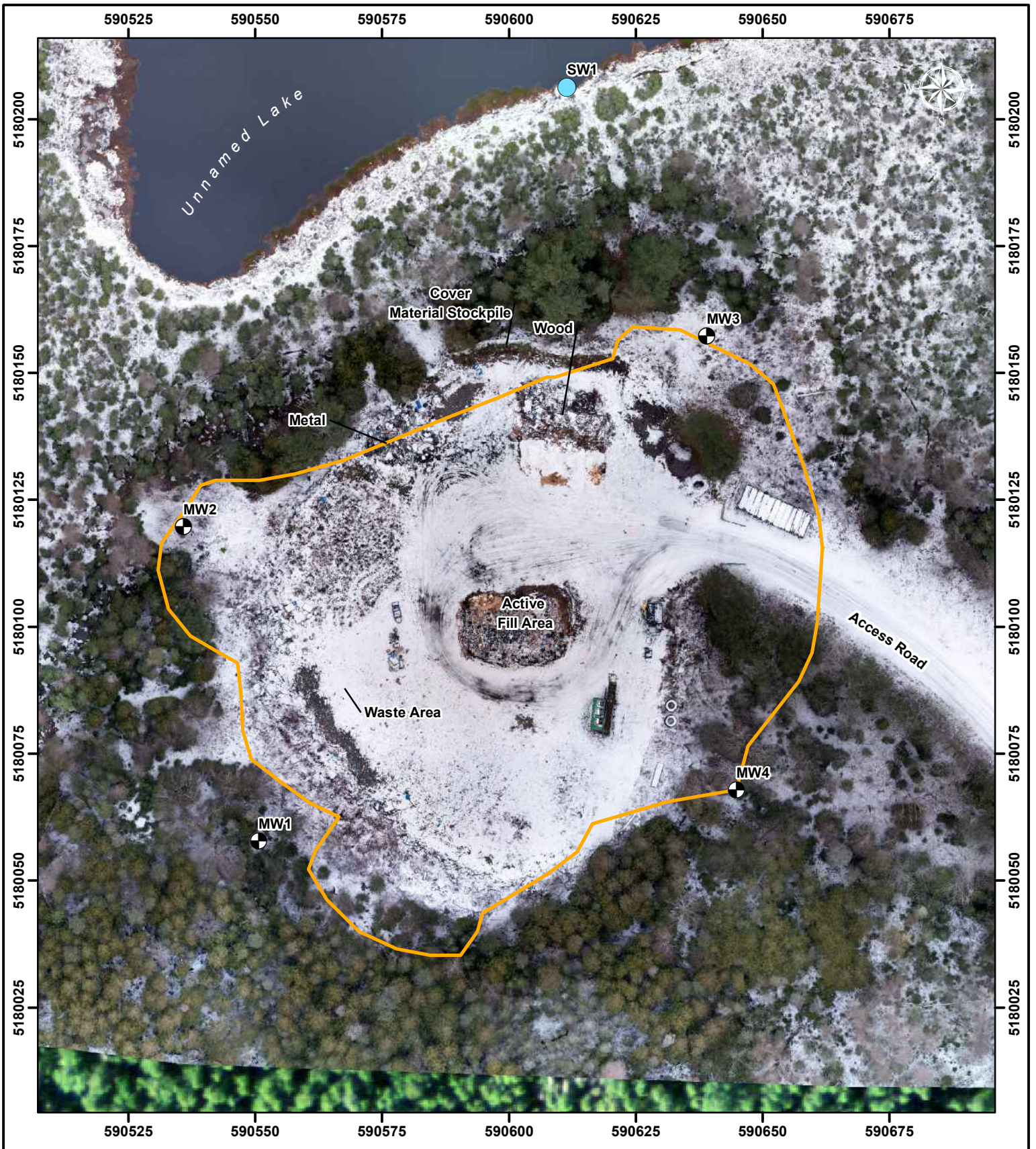
The Site is located approximately 33 kilometres (“km”) south of Temagami in the geographic Township of Sisk, as shown in Figure 2.1.1. The entrance to the Site is located 720 metres (“m”) down a gravel road west of Highway 11 and Marian Lake.

The Site occupies a total area of 12.25 hectares (“ha”). The permitted Fill Area (i.e., the portion of the Site where waste can be disposed) occupies an area of 1.02 ha, as illustrated in Figures 2.1.2 and 2.1.3. The Site has an approved capacity of 40 000 cubic metres (“m³”).

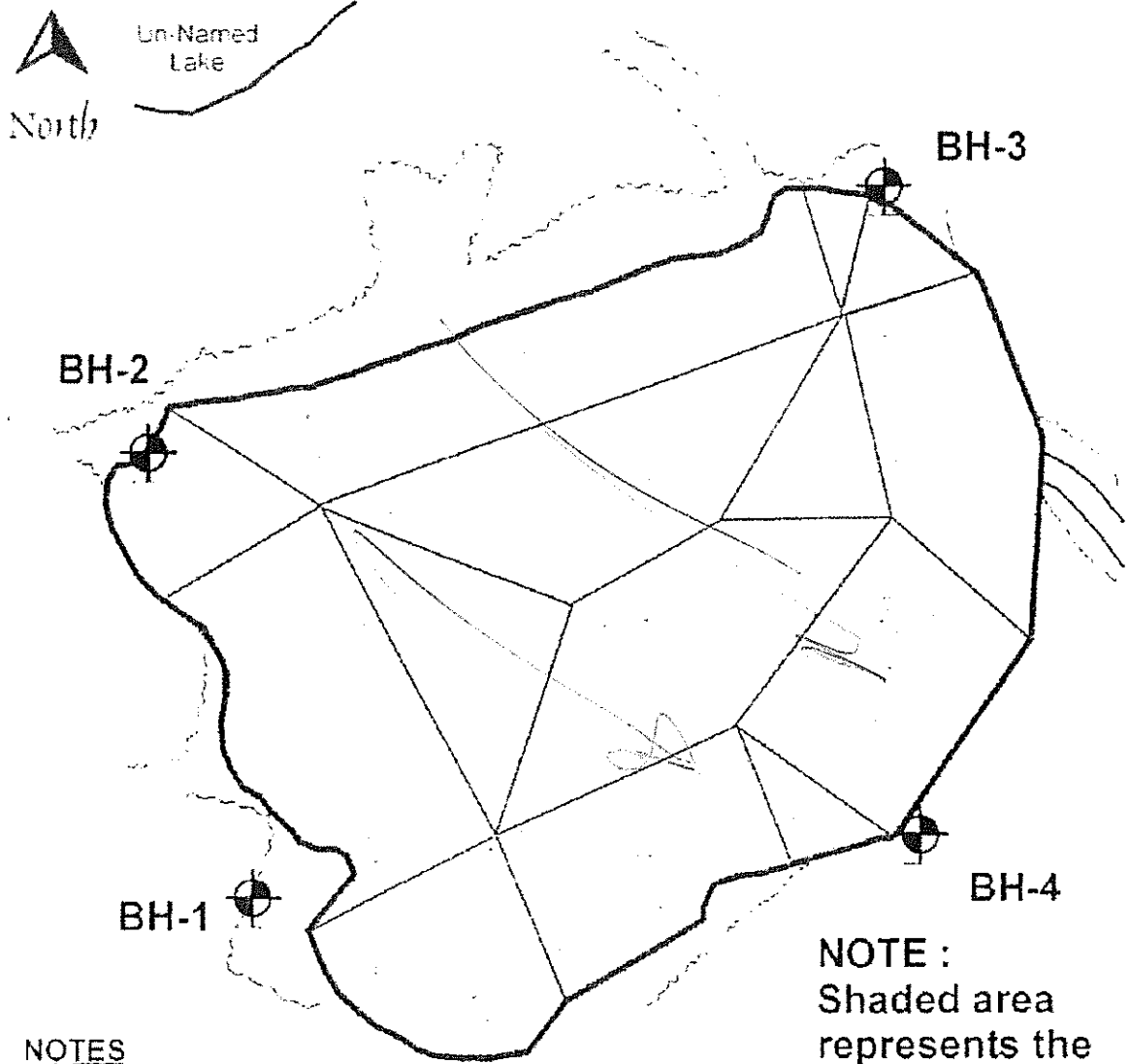
SEI conducted the required groundwater and surface water monitoring and a Remote Piloted Aircraft Survey (“RPAS”) in 2023.



Legend Road Class — Other — Highway — Local Road ● Sisk Landfill	NAD83 UTM Zone17N Kilometres 0 1 2 4				
		Corporation of the Municipality of Temagami Sisk Landfill Proj. No.: 048-02-33			Sisk Landfill Annual Report Drawing No.: SEI-048-02-33-002
Sources: Ontario Ministry of Natural Resources and Forestry; Ontario Road Segment - With Address, LIO Topographic Basemap 2023.		Date: 22-May-2024	Drwn by: SWK	Rvw'd by: MES	FIGURE 2.1.1
Sisk Landfill Site Location					



Legend Surface Water Sampling Site Monitoring Well Fill Area	NAD83 UTM Zone17N Metres 0 5 10 20 	 Corporation of the Municipality of Temagami Sisk Landfill Proj. No.: 048-02-33		 Sisk Landfill Annual Report
		Date: 21-Feb-2024 Drwn by: JALD Rvw'd by: MES		Drawing No.: SEI-048-02-33-002 FIGURE 2.1.2
Sources: Corporation of the Municipality of Temagami: Landfill Features 2022, Aerial imagery collected by Story Environmental Inc. on 14-Nov-2023; Land Information Ontario: FRI 2007-2011 Orthoimagery (used in background).		Site Plan - Site Monitoring Wells and Other Features		





NOTES

- 1) This plan was prepared from survey information provided by Sutcliffe Rody Quesnel Inc. and supplemented by field observations made by our staff.
- 2) This figure is to be read along with the accompanying report, and requires interpretation assistance from Waters Environmental Geosciences Ltd. before use by others.

NOTE :
Shaded area represents the final landfill footprint.



LEGEND

-  Borehole Location
-  Tree Line

0m 20 40m



SCALE . 1 to 1000

STORY environmental 		
Corporation of the Municipality of Temagami		Sisk Landfill Annual Report
Scale: As Shown		Drawing No.: 04805-5
Proj. No.: 048-02-33-2022	Date: 2012-09-06	Rev by: BEB Rvw'd by: ACS
Sisk Landfill Footprint		FIGURE 2.1.3

2.2 Onsite Monitoring Wells

During a Hydrogeological Assessment conducted by Waters Environmental Geosciences Ltd. (“WEG”) in 2001 (WEG, 2001), four boreholes were drilled at the Site and monitoring wells, MW1, MW2, MW3, and MW4, were installed. The locations of these monitoring wells are provided in Figures 2.1.2 and 2.1.3. Based on the groundwater data collected in 2001 and the hydraulic conductivity testing, a proposed natural attenuation zone for the Site was established. The monitoring well details are provided in Table 2.2.1 and the borehole logs for the monitoring wells are provided in Appendix B.

Table 2.2.1 Site Monitoring Well Details

Well	Year of Installation	Easting ⁵	Northing ⁵	Top of Pipe Elevation ⁵	Pipe Stickup ⁵	Grade Elevation ⁵	Well Depth ⁶	Base of Well Elevation ^{5 and 6}	Screen Length ⁶	Borehole Refusal ⁶
				masl	mag	masl	mbg	masl	m	mbg
MW1	2001	590551	5180058	295.982	0.81	295.174	3.05	292.12	2.26	291.71
MW2	2001	590536	5180120	296.972	0.60	296.376	4.59	291.79	3.00	291.25
MW3	2001	590639	5180157	298.410	0.93	297.482	4.58	292.90	3.00	292.60
MW4	2001	590645	5180068	296.249	0.91	295.340	3.05	292.29	2.25	291.84

Notes:

1. mag metres above grade
2. masl metres above sea level
3. mbg metres below grade
4. m metres
5. Obtained/calculated from 2016 survey
6. Obtained/calculated from borehole log

Source:

R:\SEM048 Temagami\02_Sisk\Work\2024\048_Sisk_Site.MW.Install_21Feb24_SED.xlsx]well details-from 2016 Survey

2.3 Local Environment

2.3.1 Site Geology

The bedrock in the region consists of felsic intrusive rock of the Proterozoic Grenville Province as well as greywacke metasediments, associated with the Archean Superior Province (ODM, 1967 and ODNA, 1971).

The overburden in the area is generally glaciofluvial in origin and consists of sandy glacial outwash plains, valley terrain deposits, and organic terrain. Bedrock knobs are also found in the region. The local topography is low undulating to rolling relief, with mixed wet and dry drainage and a suspected high-water table (OGS, 1979).

The depth to bedrock for the Site can be inferred from the borehole logs. All four of the boreholes encountered refusal during drilling. MW1 encountered refusal at 3.5 metres below grade (“mbg”), MW2 at 5.02 mbg, MW3 at 5.03 mbg, and MW4 at 3.5 mbg. It should be noted that refusal does not necessarily indicate the presence of bedrock, as refusal may result from contact with a boulder and/or dense granular material. Due to the lack of bedrock outcrops at the Site, refusal at these relatively shallow depths may not be due to bedrock. Therefore, the depth to bedrock at this Site remains unknown.

2.3.2 Site Hydrology

The Site is situated within the drainage basin of Marten River. Surface water adjacent to the Site includes a small unnamed lake and bog area located approximately 100 metres (“m”) north of the Active Fill Area (Figure 2.1.2). Additional surface waterbodies include, Pozniak Lake, located approximately 1 kilometre (“km”) to the west of the Site and Marian Lake, located approximately 0.5 km to the east (Figure 2.1.1).

The measured water level of the unnamed lake to the north (November 2023: 294.87 metres above sea level (“masl”)) indicates that the lake is hydraulically upgradient of the groundwater in the monitoring wells which all have groundwater elevations of less than 294.8 masl.

2.3.3 Site Hydrogeology

The 2001 Hydrogeological Assessment was conducted by WEG to assist with the transfer of the Site ownership from the MNRF to Temagami (WEG, 2001) and to provide background environmental information. A baseline survey was not conducted at the Site prior to its use as a landfill.

Measured groundwater elevations for the years 2001, 2008 to 2011, and 2016 to 2023, expressed as mbg, are provided in Table 2.3.1.

Table 2.3.1 Groundwater Monitoring Well Elevations (mbg)

Date	07 Jun 2001	03 Oct 2008	16 Oct 2008	14 Jul 2009	20 Oct 2009	15 Jun 2010	14 Oct 2010	22 Jun 2011	27 Oct 2011	09 Jun 2016	26 Oct 2016	12 Jul 2017	05 Oct 2017	24 Jul 2018	12 Oct 2018	19 Jun 2019	10 Oct 2019	17 Jun 2020	24 Sep 2020	10 Jun 2021	27 Sep 2021	15 Jun 2022	08 Nov 2022	26 Apr 2023	14 Nov 2023
Monitoring Well																									
MW1	0.51	0.65	0.65	0.64	0.62	0.80	0.72	0.72	0.75	0.71	0.84	0.73	0.88	1.01	0.58	0.61	0.75	0.74	0.75	0.89	0.80	0.71	0.82	0.59	0.77
MW2	1.40	1.47	1.48	1.44	1.43	1.75	1.70	1.72	1.76	1.61	1.85	1.74	1.92	2.07	1.51	1.59	1.74	1.70	1.72	1.82	1.76	1.80	1.85	1.59	1.80
MW3	2.82	3.06	3.06	3.05	3.02	3.21	3.15	3.14	3.21	3.13	3.30	3.13	3.36	3.51	2.96	3.02	3.19	3.16	3.16	3.29	3.23	2.93	3.07	2.70	2.94
MW4	0.70	0.85	0.84	0.83	0.80	0.98	0.91	0.91	0.95	0.88	1.03	0.94	1.09	1.24	0.75	0.81	0.92	0.92	0.92	1.04	0.97	0.85	0.90	0.69	0.84

Notes:

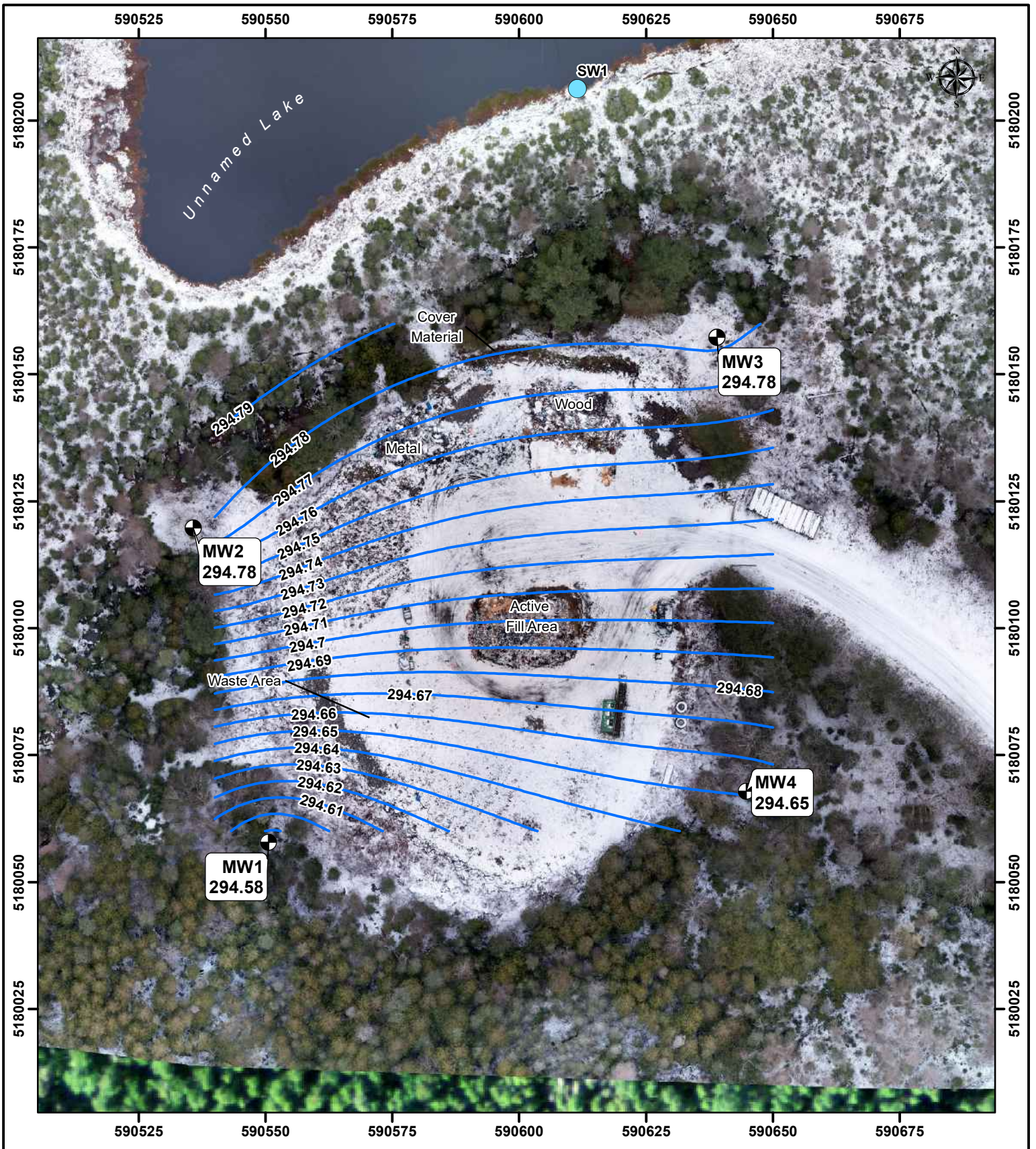
1. Elevation units are in metres below grade.

R:\SEI\048 Temagami\02_Sisk\Work\2024\[Sisk_GW_Levels_Crosstab_09Apr24_JTA.xlsx]Sisk_GW_Levels_Crosstab

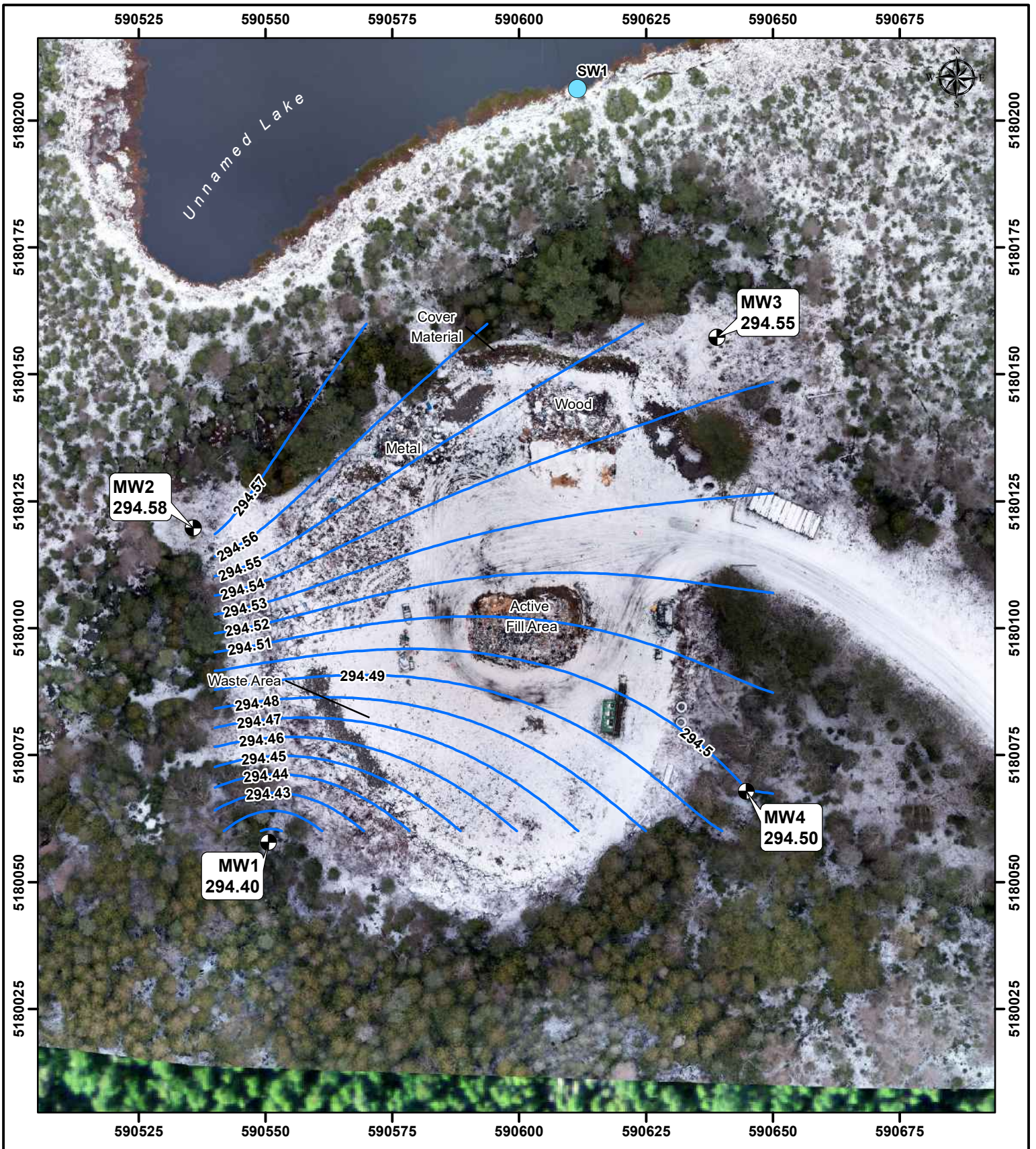
Water table contours for April and November 2023 are provided in Figures 2.3.1 and 2.3.2, respectively. These water table contours were prepared using a kriging algorithm in Golden Software's Surfer®.

In previous years, the inferred Site groundwater flow direction was towards Marian Lake and Marian Creek (located approximately 1.5 km southeast). (SEI, 2023) In 2023, monitoring well elevations were updated based on newer survey data. The groundwater contours from April and November 2023 suggest a southerly groundwater flow (Figures 2.3.1 and 2.3.2). This is slightly different from previous years. Data collection in future years will confirm whether this pattern persists. The unnamed lake and bog, situated to the north of the Site, with water at a higher elevation than the Site groundwater, likely influences the groundwater flow in the southerly or southeasterly direction. The water elevation of the nearby unnamed lake and bog is only measured once per year, during the fall monitoring event. The measured elevation of the unnamed lake was 294.87 masl in November 2023.

In 2023, the average horizontal hydraulic gradient was 0.0029 metres per metre ("m/m"). WEG (2001) recommended using a mean hydraulic conductivity of 3.2×10^{-3} cm/s for the Site. Using this data and an estimated effective porosity of 0.3, in 2023, the average linear flow velocity across the Site was approximately 9.8 m/yr.



Legend Surface Water Sampling Site Monitoring Well and Groundwater Elevation(m) Groundwater Contours (0.01m Interval)	NAD83 UTM Zone17N Metres 0 5 10 20			
		Corporation of the Municipality of Temagami Sisk Landfill Proj. No.: 048-02-33		Sisk Landfill Annual Report Drawing No.: SEI-048-02-33-003.1
Sources: Corporation of the Municipality of Temagami: Landfill Features 2022, RPAS Aerial Imagery acquired by SEI on 14-Nov-2023, Groundwater contours created in Surfer based on orthoimagery DTM; Land Information Ontario: FRI 2007-2011 Orthoimagery (used in background). Locations are approximate.		Date: 11-Apr-2024	Drwn by: JALD	Rvw'd by: MES
April 2023 Groundwater Elevation Contours				



<p>Legend</p> <ul style="list-style-type: none"> ● Surface Water Sampling Site ● Monitoring Well and Groundwater Elevation(m) — Groundwater Contours (0.01m Interval) 	<p>NAD83 UTM Zone17N</p> <p style="text-align: center;">Metres</p> <p style="text-align: center;">0 5 10 20</p>		
		<p>Corporation of the Municipality of Temagami</p>	<p>Sisk Landfill Annual Report</p>
		<p>Sisk Landfill</p>	<p>Drawing No.: SEI-048-02-33-004.1</p>
		<p>Proj. No.: 048-02-33</p>	<p>Date: 11-Apr-2024 Drwn by: JALD Rvw'd by: MES</p>
<p>Sources: Corporation of the Municipality of Temagami: Landfill Features 2022, RPAS Aerial Imagery acquired by SEI on 14-Nov-2023. Groundwater contours created in Surfer based on orthoimagery DTM; Land Information Ontario: FRI 2007-2011 Orthoimagery (used in background). Locations are approximate.</p>		<p>November 2023 Groundwater Elevation Contours</p>	

3 Site Operations

3.1 Day-to-Day Operations

Temagami's Waste Management Program includes diversion of waste from landfill disposal. Storage areas for scrap metal, white goods, and used tires are set up onsite and these materials are transferred offsite, as required. In 2015, Temagami implemented a recycling program, which provides onsite recycling facilities.

The hours of Site operation are:

- Monday: Closed
- Tuesday: Closed
- Wednesday: 1:00 pm to 4:30 pm
- Thursday: 1:00 pm to 4:30 pm
- Friday: Closed
- Saturday: 1:00 pm to 4:30 pm
- Sundays: 3:00 pm to 6:30 pm [summer hours]; 1:00 pm to 4:30 pm [winter hours]

The Site is gated to limit afterhours dumping. SEI conducted a gap analysis of best management practices and legislative requirements for the Temagami landfills in 2007. Inconsistent record keeping was one of the identified gaps. Since October of 2007, Temagami has maintained daily records at each of their landfills through completion of a daily log sheet. The data recorded includes:

- the date of waste receipt;
- the hours of operation;
- the landfill attendant;
- the type of vehicle that delivered the waste;
- an estimated volume of the total waste received in cubic metres and its category (clean wood/brush, commercial waste, construction waste, domestic, metal, refrigerators, and tires);
- any complaints received and the responding actions to address them; and
- any other comments relevant to describe the daily landfill operations.

The main operating challenge encountered in 2023 was a significant volume of windblown debris. The windblown debris resulted from the size and shape of the working face and hauling of the waste out of the Active Fill Area by bears. These items will be discussed in the Recommendations Regarding Operations section of this report.

3.2 Waste Volume and Landfill Capacity

The landfill is a trench and fill operation and uses one Active Fill Area at a time. Public Works has tracked the amount of waste accepted at the Site since October 2007. There was not any recording of the volume of waste deposited in the landfill prior to this time. Data available to estimate deposited waste volumes prior to 2008 consist of Site topographic surveys completed by Sutcliffe Rody Quesnel Inc. (“SRQ”) in 2001 and 2008. SEI had SRQ conduct cut and fill volume calculations using the survey data to determine the volume of waste deposited between 2001 and 2008. In 2009, SEI conducted test pitting to determine a topographic baseline of the landfill and calculate a reliable residual capacity for the landfill.

Landfill volumes from 2009 to 2018 were based on historical waste deposition surveys, landfill attendant tracking, and estimated annual volumes based on historical averages.

Starting in 2019, the volume deposited in the Fill Area was calculated through the application of two methods:

- 1) Temagami’s daily record keeping of the volumes deposited at the Site; and
- 2) using RPAS data to generate digital elevation models of the Fill Area once per year and calculating the volumetric change of this surface over the year.

According to 2023 data collected by Temagami, 1835 m³ of non-compacted waste were deposited in the Fill Area (Table 3.2.1). This equates to 1060 m³ of compacted waste and cover material added to the Site in 2023 (Table 3.2.2). According to the RPAS surveys, there were 526 m³ of compacted waste and cover material added to the Site in 2023. The areas surveyed by the RPAS, including contour lines, are illustrated on Figure 3.2.1.

The RPAS data are considered more accurate for estimating landfill volumes than the Public Works waste volume records. The volume of domestic waste derived from the RPAS data was 100 percent (“%”) lower than the volume recorded by Public Works. SEI will continue to use the RPAS data to determine waste deposition in the landfill. Temagami indicated that some waste compaction of the existing waste occurred in 2023. This is most likely responsible for the discrepancy between the Temagami recorded waste deposition volume and the estimated volumes obtained through the RPAS.



Legend Surface Water Sampling Site Monitoring Well Topographic Contours (1m Interval) 2023 RPAS Survey	UTM NAD83 Zone17N Metres 	 Corporation of the Municipality of Temagami		 Sisk Landfill Annual Report
		Sisk Landfill Proj. No.: 048-02-33 Date: 21-Feb-2024 Drwn by: JALD Rvw'd by: MES		
<small>Sources: Corporation of the Municipality of Temagami: Landfill Features 2022, Aerial Imagery collected by Story Environmental Inc. on 14-Nov-2023; Land Information Ontario: FRI 2007-2011 Orthoimagery (used in background).</small>		2023 Topographic Survey		

Table 3.2.1 Town Tracking: Sisk Landfill Annual Waste Volumes (non-compacted)

Waste Stream Totals per Year (Non-compacted)								
Year	Diverted From Fill Area				Deposited in Fill Area			
	Tires	Clean Wood/Brush	Refrigerators	Metal	Domestic Waste	Construction Waste	Commercial Waste	Total Waste
2008	4	99	17	89	1085	24	9	1118
2009	0	48	1	38	361	0	0	361
2010	25	231	37	153	1408	22	79	1509
2011	9	25	30	43	311	19	76	406
2012	0	29	0	50	314	18	42	374
2013	0	183	0	156	1048	0	108	1156
2014	0	186	0	127	913	22	110	1045
2015	0	172	0	158	1080	0	111	1191
2016	0	249	0	162	1136	52	51	1239
2017	0	88	0	48	295	9	8	312
2018	0	366	0	193	1269	22	88	1379
2019	0	185	16	134	1052	13	64	1129
2020	0	334	9	189	1715	26	154	1895
2021	0	187	3	187	1037	24	15	1076
2022	0	174	3	65	4391	52	39	4482
2023	0	20	0	15	1784	50	0	1835

Notes:

1. All units are in cubic metres
2. All loads are estimated in cubic metres by the landfill clerk

Source:

R:\SEI\048 Temagami\02_Sisk\Work\2024\[048_Sisk Landfill Volume Tracker 2023_20Feb24_JTA.xlsx]2023 data

Table 3.2.2 Volume Added in 2023

	Town Records (m ³)	SEI RPAS (m ³)
Waste (non-compacted)	1835	-
Waste (compacted)	1009 ¹	500 ²
Cover (estimated to be ~5%)	50	26
Total Volume (Waste + Cover)	1060	526 ³

Notes:

- 1) Calculated assuming compacted waste is 55% of the volume of non-compacted waste
- 2) Calculated from Total Volume from RPAS data
- 3) From SEI RPAS data

Source:

R:\SEI\048 Temagami\02_Sisk\Work\2024\[048_Sisk_RemainingVolume2023_20Feb24_JTA.xls]2023

Table 3.2.3 Total Landfill Volumes and Remaining Capacity

	Volume (m ³)
Total Volume of Compacted Waste + Cover Material in Landfill to End of 2022	19 434
Volume of Compacted Waste + Cover Added in 2022 (RPAS data)	526
Total Volume of Compacted Waste + Cover Material in Landfill to End of 2023	19 960
Capacity of Landfill	40 000
Remaining Capacity	20 040

Source:

R:\SEI\048 Temagami\02_Sisk\Work\2024\[048_Sisk_RemainingVolume2023_20Feb24_JTA.xls]2023

Approximately 19 960 m³ of material (compacted waste and cover material) are currently present within the landfill (Table 3.2.3). Since the approved capacity of the landfill is 40 000 m³, the remaining capacity for waste and cover material is estimated to be 20 040 m³ (Table 3.2.3).

The life expectancy for the landfill was calculated using the average volume deposited in the Fill Area (based on the RPAS survey results) over the previous five years (2019 = 802 m³, 2020 = 642 m³, 2021 = 348 m³, 2022 = 419 m³, 2023 = 526 m³). Using this data, the average annual waste deposition rate was calculated to be approximately 547 m³. Using this waste deposition rate, and an estimated remaining capacity of 20 040 m³ (Table 3.2.3), the landfill will reach its licensed capacity in approximately 37 years. This life expectancy calculation should be assessed annually through collection of updated survey data and with any changes to the geometry of the permitted Fill Area.

3.3 Recommendations Regarding Operations

Based upon the review of the 2023 operations, the following are the recommendations regarding landfill operations.

Waste in the form of plastic bags and other wind-blown debris is routinely observed outside of the Fill Area. This waste should be gathered and deposited within the Fill Area on a regular basis. As well, portable fencing and a smaller working area would help prevent windblown debris.

A portion of the debris issue is due to bears carrying waste away from the Site, creating a secondary problem of windblown debris. In the summer of 2012, Temagami purchased electric bear fencing to address this issue, however it proved to be ineffective in diverting bears from the Site, as the bears destroyed the fence shortly after installation.

The permitted Fill Area is not clearly defined and, as illustrated in Figures 2.1.2 and 2.1.3, consists of a polygon shape. To increase operational efficiency, the footprint configuration should be adjusted to a rectangle or square with clearly marked limits. Temagami plans, with the approval of the MECP, to update the shape of the Fill Area so that is more manageable from an operational perspective.

The Site should be surveyed on an annual basis. Public Works should also continue to consolidate the waste volume data on a regular basis (e.g., quarterly throughout the year) to ensure that waste volume data are being routinely and accurately collected by the landfill attendant. In 2024, SEI requests that Temagami keeps records of when they perform compaction activities at their landfills. Compaction will reduce the volume of existing and new waste, therefore this information is important to understand how much compaction is conducted.

4 Water Quality Monitoring

4.1 Methods

4.1.1 Groundwater Sampling Methods

Groundwater monitoring and sampling was conducted at the Site in 2023. The monitoring well installation details are provided in Table 2.2.1, the borehole logs are provided in Appendix B, and the location of the monitoring wells are provided on Figure 2.1.2.

Combustible vapour concentrations were measured in the monitoring wells with an RKI Eagle Combustible Gas Monitor. This was done by inserting the probe into a monitoring well and keeping the cap in place to the extent possible. The reading on the RKI was allowed to stabilize and then recorded.

Prior to sampling, the static water level in each monitoring well was measured using a Heron® oil/water Interface Probe and recorded. The probe was washed with phosphate free detergent and rinsed with deionized water between sampling locations. The static water levels were then used to calculate the volume of water required to purge the well of five casing volumes, using the following equation:

$$V_p = 5 \times \left[\frac{\pi}{4} \times d_w^2 (h_b - h_s) \times \left(\frac{1000L}{m^3} \right) \right]$$

where: V_p is the volume of groundwater to be purged (Litres);

h_b is the depth to the well bottom (m);

h_s is the depth to the water table (m); and

d_w is the well casing diameter (m).

The groundwater purging and sampling were completed using dedicated Waterra tubing and foot valves previously installed in the wells. Sampling staff wore a new pair of nitrile gloves during the sampling process at each well.

The groundwater pH, electrical conductivity, temperature, and dissolved oxygen were measured using a YSI Professional Plus multi-parameter meter (“YSI”) and the results were recorded on the SEI field sheets. These parameters were measured at least three times during the process of purging each of the wells of up to five casing volumes (approximately 12 to 50 litres (“L”). The purged water was pumped into a 15 L bucket containing the YSI and the bucket was emptied after each third of the total required purged volume was collected (or 15 L, whichever was smaller, depending on the well). These measurements are monitored to ensure that the groundwater was approaching steady-state values for the field parameters prior to sampling.

After purging each well and completing the field measurements, samples were collected in the appropriately labelled laboratory-supplied sampling bottles by pumping groundwater directly from the dedicated Waterra tubing into the sample bottles. A 0.45-micron Waterra FHT-Groundwater filter was placed on the end of the tubing to filter the dissolved metals sample bottle. All samples were placed in ice chilled coolers and shipped by overnight courier to Bureau Veritas Laboratories (“BV Labs”) in Mississauga, Ontario.

4.1.2 Surface Water Sampling Methods

Surface water samples were collected from SW1 site in 2023 (April and November). The location of the SW1 site is provided on Figure 2.1.2. Surface water samples were collected as single grab samples using a 4 L beaker, taking precautions to ensure that sediments were not disturbed. The pH, dissolved oxygen, electrical conductivity, oxidation reduction potential, and temperature were measured using the YSI and recorded.

The water surface elevation of the unnamed lake was measured using the RPAS drone imagery from the November 2023 sampling event.

4.2 Quality Assurance and Quality Control

All laboratory analytical data are supported by a Certificate of Analysis which outlines the analyses performed, the methodology utilized, the instruments used, and provides a Certificate of Quality Control and a Certificate of Analysis. The Certificate of Quality Control specifies the obtained Quality Assurance and Quality Control (“QA/QC”) data, including results of process blanks and matrix spikes, along with the performance criteria. The laboratory Certificates of Analysis for all groundwater and surface water samples collected through the 2023 monitoring events are provided in Appendix C.

As part of the QA/QC program, SEI collected a set of blind field replicate samples from one monitoring well located at Temagami’s Briggs Landfill in April 2023 and Temagami’s Sisk Landfill in November 2023. Both the Briggs and Sisk Landfills are monitored at the same time, so one QA/QC sample is collected as part of the overall monitoring program. The April and November blind field replicates samples were labelled as “Y1” for submission to the laboratory.

The blind field replicate sample results are provided in Tables 4.2.1 and 4.2.2. The Relative Percent Difference (“RPD”) is used to compare the two laboratory results. The RPD is defined as the absolute value of the difference between the two results, divided by the average of the two results, converted to a percentage. To conduct these RPD calculations, both results must exceed the laboratory’s Reportable Detection Limit (“RDL”) by at least five times (5x). There were no RPD exceedances greater than 20% in the Briggs Landfill April sampling event (Table 4.2.1) and the Sisk Landfill November sampling event (Table 4.2.2) in 2023.

Table 4.2.1 Quality Control - Groundwater Blind Field Replicates April 2023 (from 2023 Briggs Landfill monitoring)

Parameters	Units	MW1	RDL	Y1	RDL	Diff.	RPD (%)
Total Alkalinity (as CaCO ₃)	mg/L	180	1	200	1	20	11
Total Ammonia (as N)	mg/L	<0.050	0.05	<0.050	0.05	0	nc
Dissolved Arsenic	mg/L	< 0.0010	0.001	< 0.0010	0.001	0	nc
Dissolved Barium	mg/L	0.01	0.002	0.011	0.002	0.001	nc
Biological Oxygen Demand	mg/L	< 2	2	<2	2	0	nc
Dissolved Boron	mg/L	0.081	0.01	0.076	0.01	0.005	6
Dissolved Cadmium	mg/L	< 0.000090	0.00009	< 0.000090	0.00009	0	nc
Dissolved Calcium	mg/L	59	0.2	58	0.2	1	2
Chloride	mg/L	<1.0	1	<1.0	1	0	nc
Dissolved Chromium	mg/L	< 0.0050	0.005	< 0.0050	0.005	0	nc
Dissolved Copper	mg/L	0.0034	0.0009	0.0037	0.0009	0.0003	nc
Dissolved Organic Carbon	mg/L	1.8	0.4	1.8	0.4	0	nc
Hardness (as CaCO ₃)	mg/L	190	1	190	1	0	0
Dissolved Iron	mg/L	< 0.1	0.1	< 0.1	0.1	0	nc
Dissolved Lead	mg/L	< 0.00050	0.0005	< 0.00050	0.0005	0	nc
Dissolved Magnesium	mg/L	11	0.05	11	0.05	0	0
Dissolved Manganese	mg/L	0.29	0.002	0.28	0.002	0.01	4
Nitrate (as N)	mg/L	< 0.1	0.1	<0.1	0.1	0	nc
Nitrate + Nitrite (as N)	mg/L	< 0.1	0.1	<0.1	0.1	0	nc
Nitrite (as N)	mg/L	<0.010	0.01	<0.01	0.01	0	nc
Total Phosphorus	mg/L	0.18	0.004	0.18	0.004	0	0
Dissolved Potassium	mg/L	5.5	0.2	5.5	0.2	0	0
Dissolved Sodium	mg/L	5.1	0.1	5.2	0.1	0.1	2
Sulphate	mg/L	7	1	7.7	1	0.7	10
Total Dissolved Solids	mg/L	155	10	165	10	10	6
Total Kjeldahl Nitrogen	mg/L	0.17	0.1	0.2	0.1	0.03	nc
Dissolved Zinc	mg/L	< 0.0050	0.005	< 0.0050	0.005	0	nc

Notes:

Y1 = label of blind field replicates submitted to laboratory

RDL = Reportable Detection Limit

nc = not calculated. RPD is only calculated when the concentration results for both the sample and its replicate are greater than the Practical Quantitation Limit, defined as five times (5x) the RDL.

Diff. = Absolute difference between sample and its replicate. Half the RDL is used when the result is <RDL.

RPD = Relative Percent Difference between sample and its replicate, calculated as: $\text{Diff.} / ((\text{sample} + \text{replicate}) / 2) * 100$.

Shaded cells highlight results with RPD values in excess of 20% for inorganics or 30% for organics.

Source:

R:\SEN048 Temagami\01_Briggs\Work\2024\048_Briggs_RPD_10Jan24_EK.xlsx\26 Apr 23

Table 4.2.2 Quality Control - Groundwater Blind Field Replicates November 2023

Parameters	Units	MW3	RDL	Y1	RDL	Diff.	RPD (%)
Total Alkalinity (as CaCO ₃)	mg/L	130	1	150	1	20	14
Total Ammonia (as N)	mg/L	< 0.050	0.05	< 0.050	0.05	0	nc
Dissolved Arsenic	mg/L	< 0.0010	0.001	< 0.0010	0.001	0	nc
Dissolved Barium	mg/L	0.013	0.002	0.013	0.002	0	0
Biological Oxygen Demand	mg/L	< 2	2	< 2	2	0	nc
Dissolved Boron	mg/L	< 0.01	0.01	< 0.01	0.01	0	nc
Dissolved Cadmium	mg/L	< 0.000090	0.00009	< 0.000090	0.00009	0	nc
Dissolved Calcium	mg/L	46	0.2	46	0.2	0	0
Chloride	mg/L	< 1.0	1	< 1.0	1	0	nc
Dissolved Chromium	mg/L	< 0.0050	0.005	< 0.0050	0.005	0	nc
Dissolved Copper	mg/L	0.0017	0.0009	0.0025	0.0009	0.0008	nc
Dissolved Organic Carbon	mg/L	3.9	0.4	4.1	0.4	0.2	5
Hardness (as CaCO ₃)	mg/L	150	1	150	1	0	0
Dissolved Iron	mg/L	0.35	0.1	0.37	0.1	0.02	nc
Dissolved Lead	mg/L	< 0.00050	0.0005	< 0.00050	0.0005	0	nc
Dissolved Magnesium	mg/L	7.7	0.05	8	0.05	0.3	4
Dissolved Manganese	mg/L	0.014	0.002	0.014	0.002	0	0
Nitrate (as N)	mg/L	< 0.10	0.1	< 0.10	0.1	0	nc
Nitrate + Nitrite (as N)	mg/L	< 0.10	0.1	< 0.10	0.1	0	nc
Nitrite (as N)	mg/L	< 0.010	0.01	< 0.010	0.01	0	nc
Total Phosphorus	mg/L	0.025	0.004	0.023	0.004	0.002	8
Dissolved Potassium	mg/L	0.63	0.2	0.65	0.2	0.02	nc
Dissolved Sodium	mg/L	1	0.1	1.1	0.1	0.1	10
Sulphate	mg/L	2.4	1	2.3	1	0.1	nc
Total Dissolved Solids	mg/L	140	10	145	10	5	4
Total Kjeldahl Nitrogen	mg/L	0.14	0.1	0.1	0.1	0.04	nc
Dissolved Zinc	mg/L	< 0.0050	0.005	< 0.0050	0.005	0	nc

Notes:

Y1 = label of blind field replicates submitted to laboratory

RDL = Reportable Detection Limit

than the Practical Quantitation Limit, defined as five times (5x) the RDL.

Diff. = Absolute difference between sample and its replicate. Half the RDL is used when the result is <RDL.

RPD = Relative Percent Difference between sample and its replicate, calculated as: $\text{Diff.}/((\text{sample}+\text{replicate})/2)*100$.

Shaded cells highlight results with RPD values in excess of 20% for inorganics or 30% for organics.

Source:

R:\SEI\048 Temagami\02_Sisk\Work\2024\048_Sisk_RPD_10Jan24_EK.xlsx]14 Nov 2023

4.3 Groundwater Chemistry

4.3.1 Groundwater Chemistry Results

The Laboratory Certificates of Analysis for the 2023 monitoring are included in Appendix C. The analytical data from the 2023 groundwater monitoring events and the historical analytical data, are provided in Tables D.1 to Table D.4, Appendix D.

To determine the landfill leachate impacts to local groundwater quality, based on a review of historical data, eight indicator parameters were selected for the Site: alkalinity, dissolved boron, dissolved chloride, dissolved organic carbon, dissolved manganese, dissolved sodium, dissolved sulphate, and total dissolved solids. Parameter concentration versus time graphs for these indicator parameters are provided in Figure 4.3.1 to Figure 4.3.8.

At MW1, the monitoring well southwest of the fill area, the concentrations in the groundwater increased between 2012 and 2017 but now generally exhibit seasonal fluctuations but no significant decreasing or increasing trends. The exceptions to this pattern are with dissolved chloride, dissolved sodium, and dissolved sulphate which are exhibiting declining trends in recent years.

MW2, on the north-northeast side of the Fill Area, shows stable but seasonally fluctuating concentrations for all indicator parameters, as illustrated in Figures 4.3.1 to 4.3.8.

MW3, on the northern boundary of the Fill Area, shows generally low but seasonally fluctuating concentration trends for the indicator parameters, as illustrated in Figures 4.3.1 to 4.3.8.

MW4, the well to the southeast side of the Fill Area and downgradient of the Active Fill Area, shows higher concentrations than the other wells for several of the indicator parameters. Like MW1, MW4 showed increases in groundwater concentration for most indicator parameters from 2012 to 2017 with most concentrations since 2017 exhibiting seasonal fluctuations but no significant increasing or decreasing trends. The exception to this pattern is dissolved organic carbon which is showing a trend of reducing concentrations and dissolved sodium which appears to be increasing.

Figure 4.3.1 Alkalinity Time Series in Monitoring Well

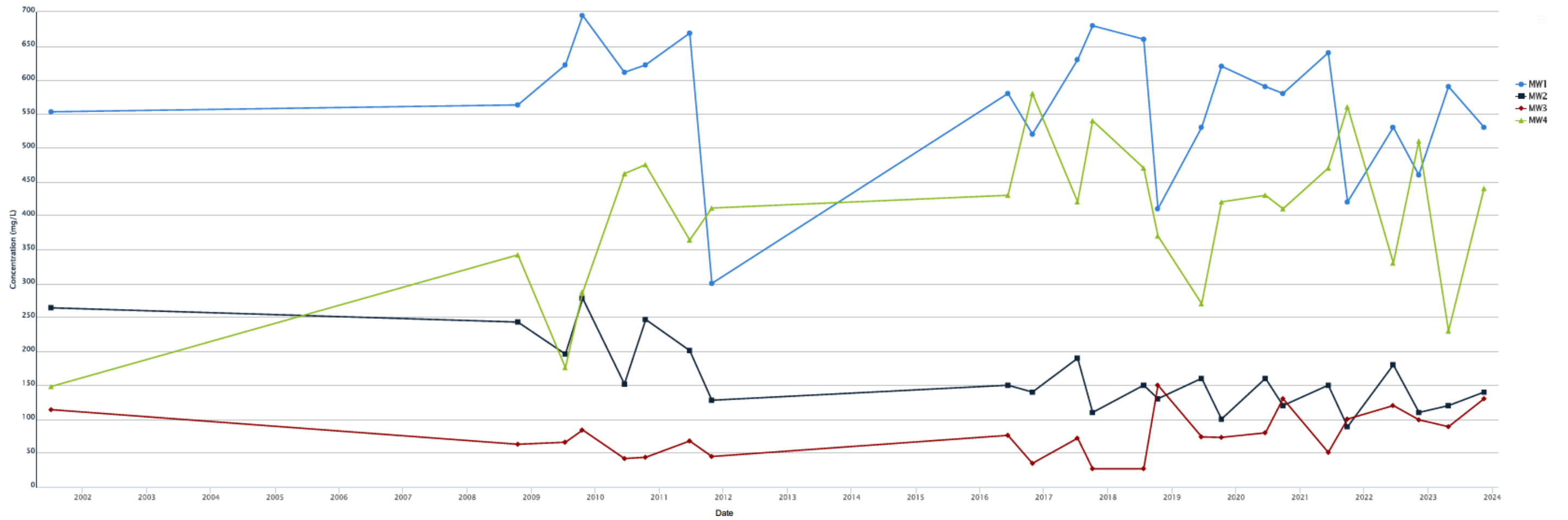


Figure 4.3.2 Dissolved Boron Time Series in Monitoring Wells

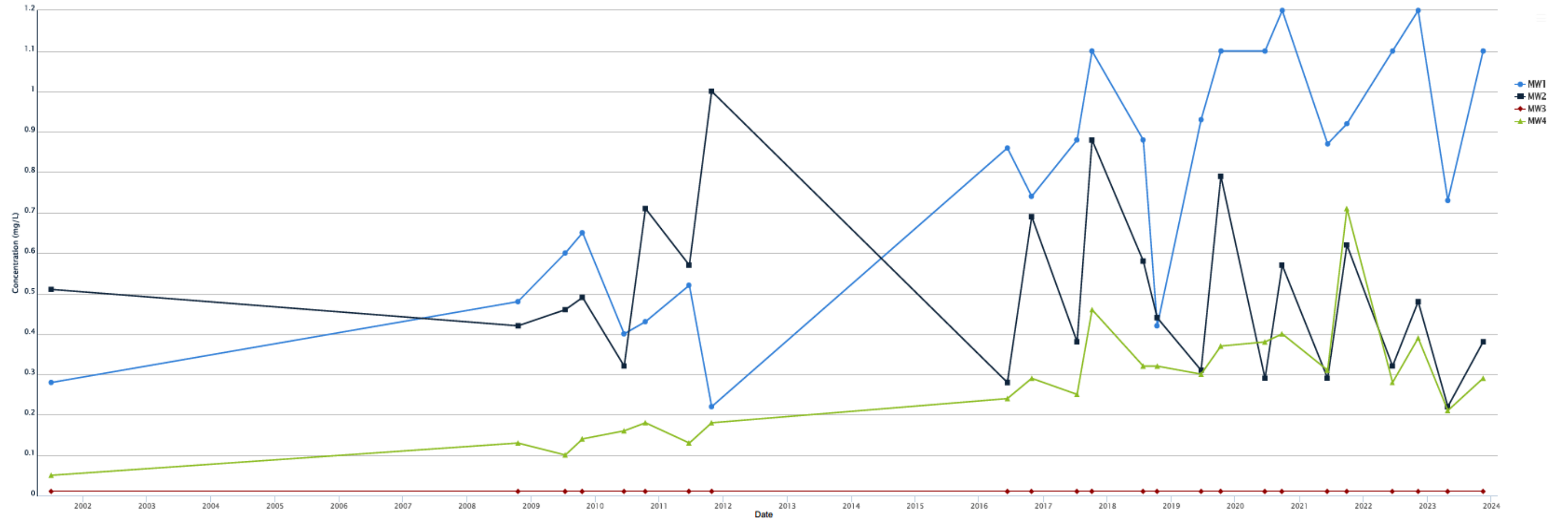


Figure 4.3.3 Dissolved Chloride Time Series in Monitoring Wells

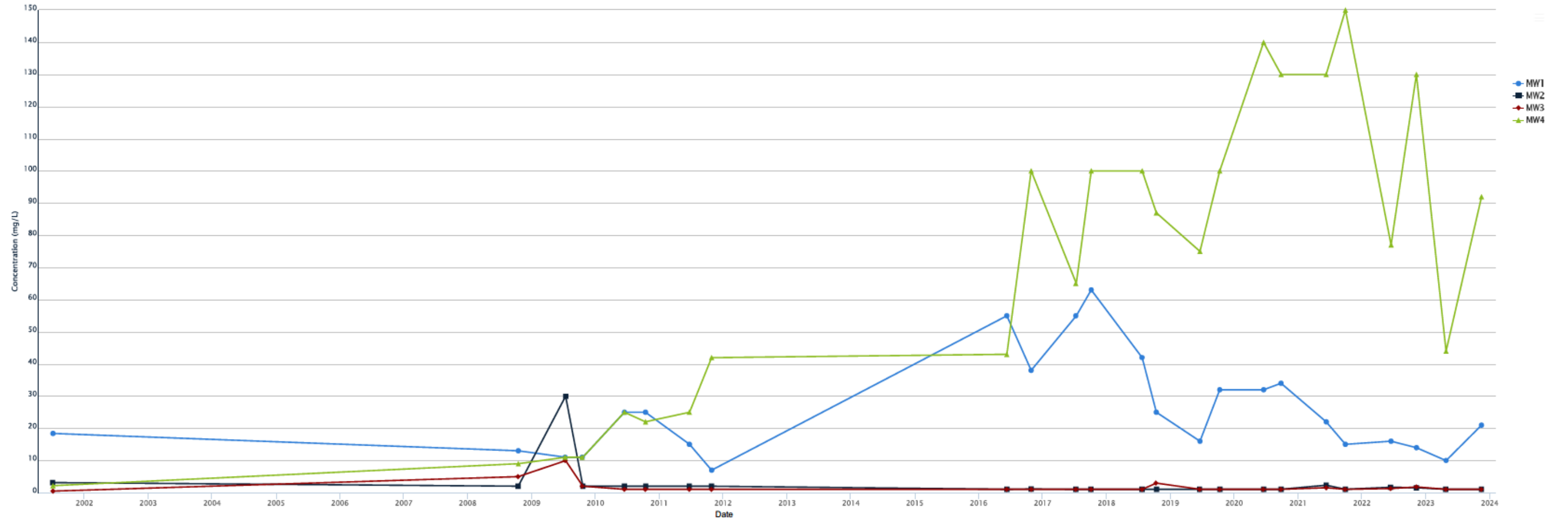


Figure 4.3.4 Dissolved Organic Carbon Time Series in Monitoring Wells

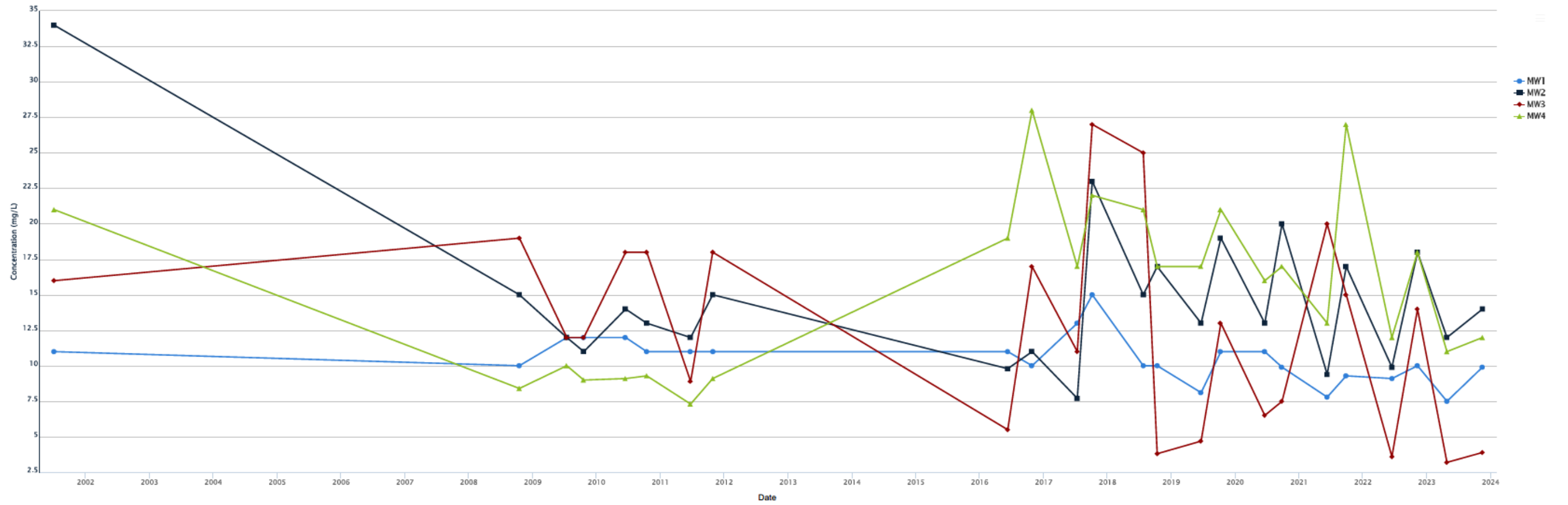


Figure 4.3.5 Dissolved Manganese Time Series in Monitoring Wells

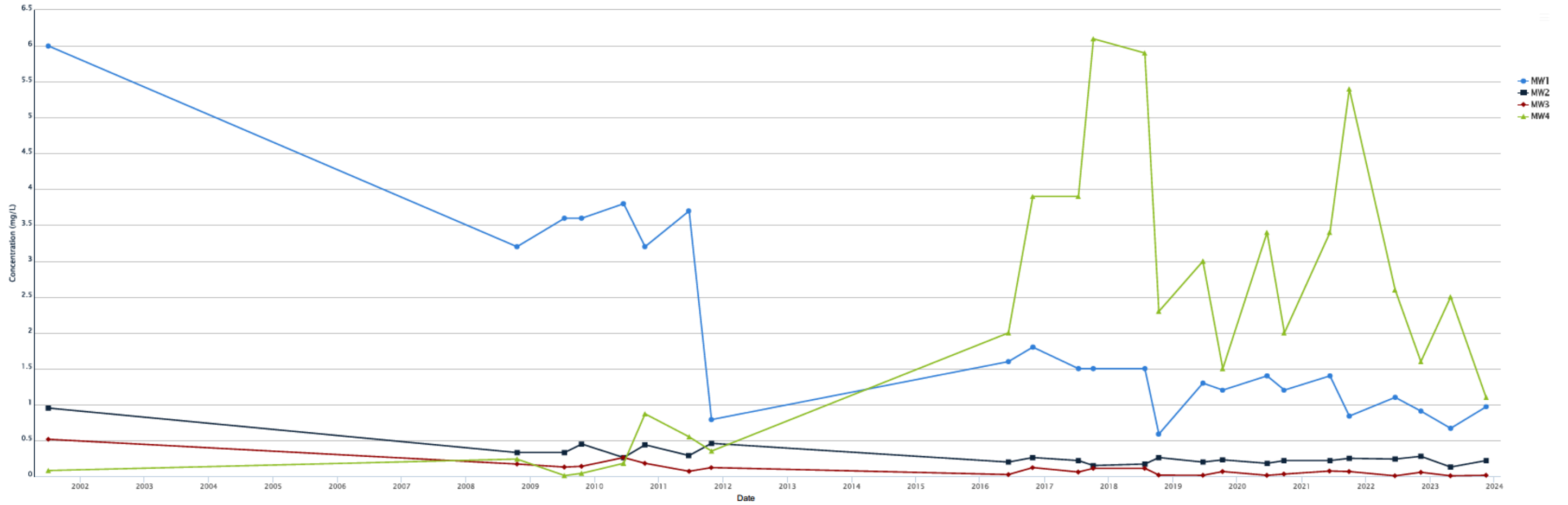


Figure 4.3.6 Dissolved Sodium Time Series in Monitoring Wells

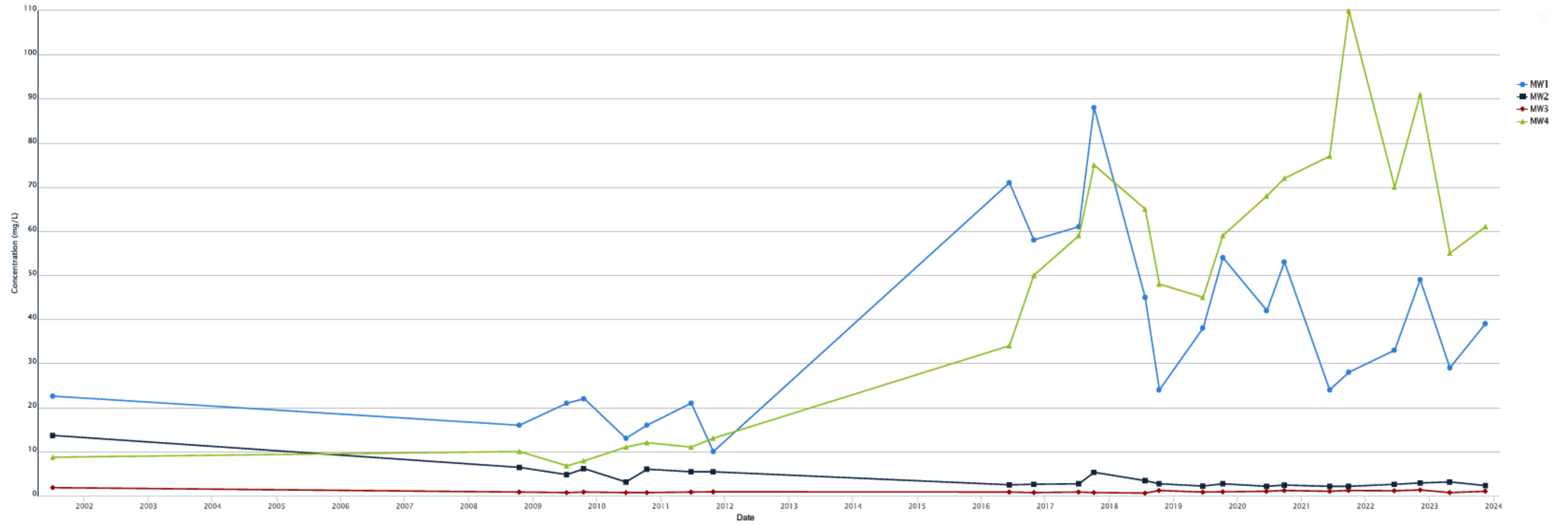


Figure 4.3.7 Dissolved Sulphate Time Series in Monitoring Wells

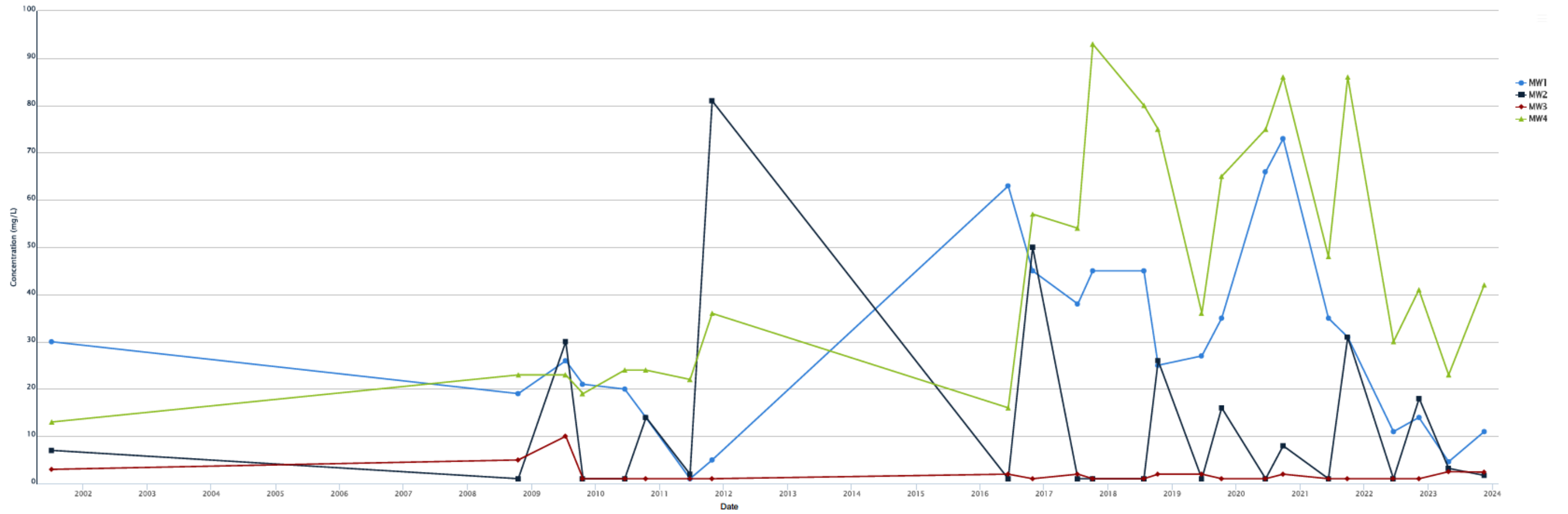
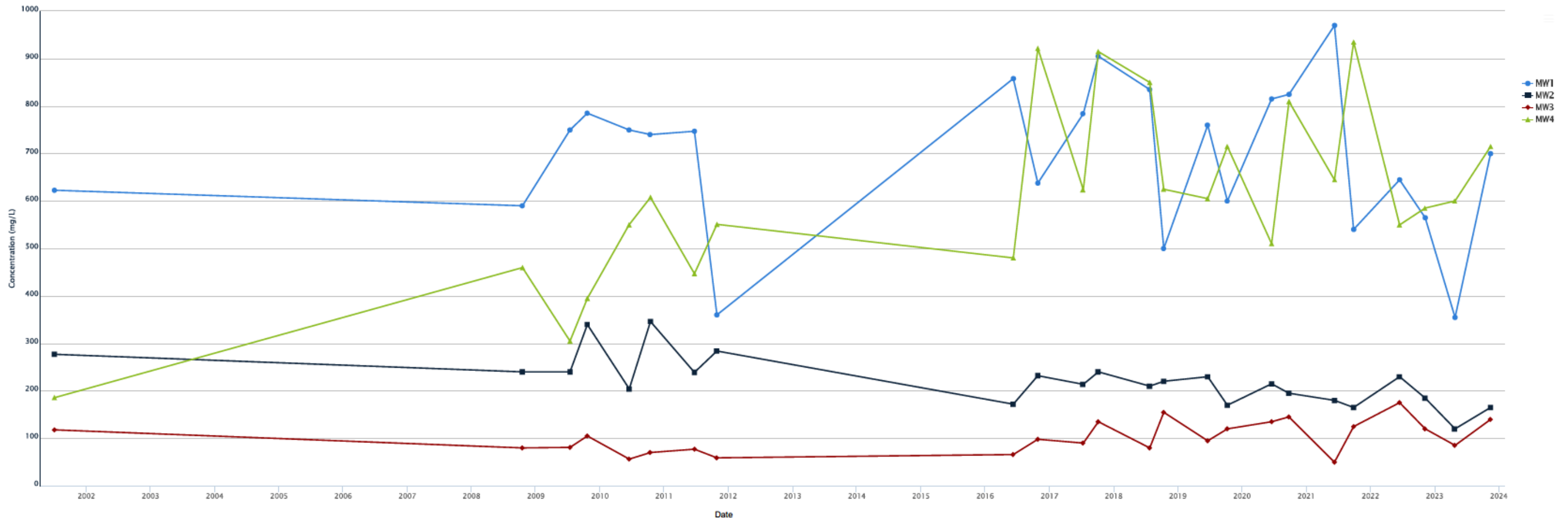


Figure 4.3.8 Total Dissolved Solids Time Series in Monitoring Wells



4.3.2 Compliance with Reasonable Use Concept

The MECP Guideline B-7 (MOE, 1986), for the Reasonable Use Concept (“RUC”) defines boundary criteria for the quality of groundwater leaving a site. A background (non-impacted) well is used to apply the RUC to a site. SEI has used the concentrations at MW3 to represent the background conditions for this Site. It should be emphasized that the RUC is only strictly applicable at the Site’s property line. Exceedances of the RUC at these groundwater monitoring locations near the Fill Area are expected and do not indicate non-compliance. Since MW1, MW2, and MW4 are within the Site near the Fill Area, the RUC is not technically applicable to these wells. The RUC was only used here to assess the degree of impact to groundwater resulting from close proximity to the Fill Area. Once the full extent of the leachate plume has been established through the installation of additional monitoring wells further away from the Active Fill Area, this evaluation should be reconducted using more appropriate monitoring wells.

The results of the RUC analysis for the 2023 spring and fall sampling events are provided in Tables 4.3.1 and 4.3.2, respectively.

As expected, concentrations of one health-related and several non-health related parameters exceeded the RUC at these monitoring locations close to the Fill Area including: dissolved arsenic, alkalinity, DOC, hardness, organic nitrogen, TDS, dissolved iron, and dissolved manganese.

Table 4.3.1 Reasonable Use Concept Results April 2023

Parameters	Units	RUC Factor	ODWQS/ ODWO ¹	Background Well	Allowable Under RUC ^{3,4}	Monitoring Wells		
				MW3 ²		MW1	MW2	MW4
Health-Related Parameters								
Arsenic (As)-Dissolved	mg/L	0.25	0.01	< 0.0010	0.003	0.0078	< 0.0010	0.0019
Barium (Ba)-Dissolved	mg/L	0.25	1	0.0077	0.26	0.16	0.037	0.099
Boron (B)-Dissolved	mg/L	0.25	5	< 0.01	1.3	0.73	0.22	0.21
Cadmium (Cd)-Dissolved	mg/L	0.25	0.005	< 0.000090	0.0013	< 0.000090	< 0.000090	< 0.000090
Chromium (Cr)-Dissolved	mg/L	0.25	0.05	< 0.0050	0.013	< 0.0050	< 0.0050	< 0.0050
Lead (Pb)-Dissolved	mg/L	0.25	0.01	< 0.00050	0.0025	< 0.00050	< 0.00050	0.00092
Nitrate (as N)	mg/L	0.25	10.0	< 0.10	2.5	< 0.10	< 0.10	0.59
Nitrite (as N)	mg/L	0.25	1.0	< 0.010	0.26	< 0.010	< 0.010	< 0.010
Non-Health Related Parameters								
Alkalinity (Total as CaCO ₃) ⁵	mg/L	0.5	500	89	295	590	120	230
Dissolved Chloride (Cl)	mg/L	0.5	250	< 1.0	125	10	< 1.0	44
Dissolved Organic Carbon	mg/L	0.5	5	3.2	4.1	7.5	12	11
Dissolved Sulphate (SO ₄)	mg/L	0.5	500	2.5	251	4.6	3.2	23
Hardness (CaCO ₃) ⁶	mg/L	0.5	100	86	93	530	120	400
Organic Nitrogen (Calculated)	mg/L	0.5	0.15	0.11	0.13	1	0.34	0.54
Total Dissolved Solids (TDS)	mg/L	0.5	500	85	293	355	120	600
Copper (Cu)-Dissolved	mg/L	0.5	1	0.0016	0.50	0.0023	0.0036	0.013
Iron (Fe)-Dissolved	mg/L	0.5	0.3	0.16	0.23	9.7	2.4	2.7
Manganese (Mn)-Dissolved	mg/L	0.5	0.05	0.0055	0.028	0.67	0.13	2.5
Sodium (na)-Dissolved	mg/L	0.5	200	0.71	100	29	3.1	55
Zinc (Zn)-Dissolved	mg/L	0.5	5	< 0.0050	2.5	< 0.0050	0.19	< 0.0050

Notes:

1. ODWQS = Ontario Drinking Water Quality Standard; ODWO= Ontario Drinking Water Quality Objectives, RUC = Reasonable Use Concept; "nc" = not calculated. Organic nitrogen not calculated if TKN and Total Ammonia are non detect or TKN<Total Ammonia
2. Background well used for Reasonable Use Concept ("RUC") calculations = MW3.
3. For health related parameters the allow able concentration = background + 25% of difference between ODWQS and background, or = background concentration if background exceeds ODWQS.
4. For non health related parameters the allow able concentration = background + 50% of difference between ODWQS and background, or = background concentration if background exceeds ODWQS. (In calculating the allow able concentrations, all background concentrations below the Reportable Detection Limit (RDL) were treated as being equal to one-half of the RDL.)
5. The ODWQS for alkalinity ranges from 30-500 mg/L, but only the upper limit is evaluated here.
6. The ODWQS for hardness ranges from 80-100 mg/L, but only the upper limit is evaluated here.
7. All parameter concentrations greater than the allow able concentration under the RUC are **bold** and underlined.

Source:

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Table 4.3.2 Reasonable Use Concept Results November 2023

Parameters	RUC Factor	ODWQS/ ODWO ¹	Background Well	Allowable Under RUC ^{3,4}	Monitoring Wells		
			MW3 ²		MW1	MW2	MW4
Health-Related Parameters							
Arsenic (As)-Dissolved	0.25	0.01	< 0.0010	0.003	0.015	< 0.0010	0.0014
Barium (Ba)-Dissolved	0.25	1	0.013	0.26	0.23	0.045	0.11
Boron (B)-Dissolved	0.25	5	< 0.01	1.3	1.1	0.38	0.29
Cadmium (Cd)-Dissolved	0.25	0.005	< 0.000090	0.0013	< 0.000090	< 0.000090	< 0.000090
Chromium (Cr)-Dissolved	0.25	0.05	< 0.0050	0.013	< 0.0050	< 0.0050	< 0.0050
Lead (Pb)-Dissolved	0.25	0.01	< 0.00050	0.0025	< 0.00050	< 0.00050	< 0.00050
Nitrate (as N)	0.25	10.0	< 0.10	2.5	< 0.10	< 0.10	0.56
Nitrite (as N)	0.25	1.0	< 0.010	0.26	< 0.010	< 0.010	< 0.010
Non-Health Related Parameters							
Alkalinity (Total as CaCO ₃) ⁵	0.5	500	130	315	530	140	440
Dissolved Chloride (Cl)	0.5	250	< 1.0	125	21	< 1.0	92
Dissolved Organic Carbon	0.5	5	3.9	4.5	9.9	14	12
Dissolved Sulphate (SO ₄)	0.5	500	2.4	251	11	1.7	42
Hardness (CaCO ₃) ⁶	0.5	100	150	150	570	140	460
Organic Nitrogen (Calculated)	0.5	0.15	0.12	0.14	0.3	0.2	0.75
Total Dissolved Solids (TDS)	0.5	500	140	320	700	165	715
Copper (Cu)-Dissolved	0.5	1	0.0017	0.50	0.0021	< 0.00090	0.012
Iron (Fe)-Dissolved	0.5	0.3	0.35	0.35	21	5.4	0.36
Manganese (Mn)-Dissolved	0.5	0.05	0.014	0.032	0.97	0.22	1.1
Sodium (na)-Dissolved	0.5	200	1	101	39	2.3	61
Zinc (Zn)-Dissolved	0.5	5	< 0.0050	2.5	< 0.0050	< 0.0050	< 0.0050

Notes:

1. ODWQS = Ontario Drinking Water Quality Standard; ODWO= Ontario Drinking Water Quality Objectives, RUC = Reasonable Use Concept; "nc" = not calculated. Organic nitrogen not calculated if TKN and Total Ammonia are non detect or TKN<Total Ammonia
2. Background well used for Reasonable Use Concept ("RUC") calculations = MW3.
3. For health related parameters the allow able concentration = background + 25% of difference between ODWQS and background, or = background concentration if background exceeds ODWQS.
4. For non health related parameters the allow able concentration = background + 50% of difference between ODWQS and background, or = background concentration if background exceeds ODWQS. (In calculating the allow able concentrations, all background concentrations below the Reportable Detection Limit (RDL) were treated as being equal to one-half of the RDL.)
5. The ODWQS for alkalinity ranges from 30-500 mg/L, but only the upper limit is evaluated here.
6. The ODWQS for hardness ranges from 80-100 mg/L, but only the upper limit is evaluated here.
7. All parameter concentrations greater than the allow able concentration under the RUC are **bold** and underlined.

Source:

R:\SE\048 Temagami\02_Sisk\Work\2024\048_Sisk_RUC_10Jan24_EK.xlsx\RUC Nov

4.3.3 Recommendations Regarding Groundwater

Monitoring of the groundwater quality at the Site should continue twice per year as required by the ECA. In 2016, after analyzing an adequate groundwater dataset, SEI eliminated mercury, fluoride, and phenols from the analyte list for this Site. From 2008 to 2010, mercury and fluoride were not detected in any of the Site groundwater samples, with a total of 20 mercury and 20 fluoride analyses completed. Phenols were only detected three times at MW2, at low concentrations. Furthermore, phenols do not appear to be an indicator parameter for landfill leachate impacts at this Site since monitoring wells MW1 and MW4 are both more impacted by landfill leachate than MW2 but neither MW1 nor MW4 have recorded detectable concentrations of phenols. Overall, the presence or absence of phenols in a particular monitoring well does not improve our understanding of the fate and transport of the indicator parameters at this Site. No additional parameters are recommended for removal from the monitoring program at this time.

The total extent of leachate impact at the Site is, presently, unknown as there are no monitoring wells located sufficiently downgradient of the Fill Area. The installation of additional downgradient monitoring wells will assist in delineating the extent of the leachate plume. It is recommended that two to three additional monitoring wells be installed further downgradient of the Fill Area over the coming years. These wells will provide a better understanding of the extent of the leachate plume downgradient from the landfill.

Reports should continue to be submitted to the MECP annually.

4.4 Surface Water Chemistry

4.4.1 Surface Water Chemistry Results

Surface water samples were collected from the unnamed lake at SW1 (illustrated in Figure 2.1.2) in 2023 (April and November).

In general, SW1 is characterized by water quality typical of a northern Ontario bog, with most water quality parameters within Provincial Water Quality Objectives (“PWQOs”) except for pH. Historically, and in 2023, the surface water at SW1 has typically been acidic with pH less than 6.5 (Table 4.4.1). In addition to pH, total copper and total phosphorus concentrations were greater than their respective PWQOs in the water sample collected in April 2023.

The unnamed lake is expected to be a source of recharge for the local groundwater near the Site. This is supported by two pieces of evidence: there is no mapped surface water outflow from the unnamed lake and the measured water level of the lake (November 2023: 294.87 masl) indicates that the lake is hydraulically up-gradient of the Site’s groundwater. Therefore, some indicator parameters within the monitoring wells could be elevated or reduced due to the SW1 surface

water quality. This unnamed lake might also be playing a role in the seasonal fluctuations of the groundwater quality in the monitoring wells.

Table 4.4.1 Surface Water Chemistry Results: SW1

Sample ID			SW1																							
Parameter	Units	Date	05 Jul 2001	14 Jul 2009	20 Oct 2009	15 Jun 2010	14 Oct 2010	22 Jun 2011	27 Oct 2011	09 Jun 2016	26 Oct 2016	12 Jul 2017	05 Oct 2017	24 Jul 2018	12 Oct 2018	19 Jun 2019	10 Oct 2019	17 Jun 2020	24 Sep 2020	10 Jun 2021	27 Sep 2021	15 Jun 2022	08 Nov 2022	26 Apr 2023	14 Nov 2023	
		PWQO ¹																								
Conductivity Field	µS/cm	-	-	13	14	15	15	12	19	15	17	14	18	15	15	19	16	17	17	22	20	19	16	22	20	
Dissolved Oxygen Field ²	mg/L	5 / 6 / 7 / 8	-	7.4	7.3	8.3	7.7	8.2	9.2	7.2	7.6	4.1	6.2	4.4	6.5	5.8	4.4	6.1	6.5	5.0	6.7	1.8	8.6	7.6	7.4	
Dissolved Oxygen Field %	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	63.5	40.7	-	66.8	53.5	65.5	20	73	51.7	57.1	
ORP Field	mV	-	-	-	-	-	-	-	-	-	238	214	-	216	237	-	68	-	105	254	140	213	265	152	183	
pH Field	s.u.	6.5-8.5	-	5.3	4.9	4.7	4.9	5.1	6.5	5.7	5.2	6.3	8.1	4.6	4.5	5	5	4.6	5.1	4.8	6	5.6	4.6	5.3	5.5	
Temperature Field	°C	-	-	22	8.6	22	11	20	7.8	15	7.5	21	15	24	10	21	12	20	16	13	15	22	8.3	0	4.3	
Alkalinity, Total (as CaCO ₃)	mg/L	-	< 1	< 1	< 1	< 1	-	< 1	< 1	< 1	1	1	< 1	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	2	< 1	< 1.0	< 1.0	
Ammonia, Total (as N)	mg/L	-	< 0.03	< 0.05	< 0.05	< 0.05	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.09	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.050	0.1	
Biological Oxygen Demand	mg/L	-	-	< 2	< 2	< 2	-	< 2	< 2	-	-	-	-	-	-	-	-	-	-	-	-	< 2	< 2	< 2	< 2	
Chloride	mg/L	-	< 0.5	< 5	1	1	-	< 1	< 1	< 1	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	
Hardness (as CaCO ₃)	mg/L	-	6.3	1	1	1	-	1	1	1.2	1.2	1	1	1	1	1.1	< 1	1	1	1.6	1	1.2	1.4	1.3	1.3	
Nitrate (as N)	mg/L	-	< 0.2	< 0.1	< 0.1	< 0.1	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.10	< 0.10	
Nitrite (as N)	mg/L	-	< 0.2	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.010	< 0.010	
Organic Nitrogen (Calculated)	mg/L	-	-	0.48	0.38	0.38	-	-	0.48	0.27	0.27	0.27	0.08	0.18	0.01	0.18	0.27	0.18	0.18	0.18	0.18	0.27	0.17	0.34	0.22	
Sulphate	mg/L	-	3	< 5	< 1	< 1	-	< 1	< 1	< 1	< 1	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	3.1	2.7	
Total Dissolved Solids	mg/L	-	5	10	13	< 10	-	< 1	1	54	< 10	30	75	15	35	45	35	30	10	< 10	45	15	20	15	10	
Total Kjeldahl Nitrogen	mg/L	-	-	0.5	0.4	0.4	-	-	0.5	0.3	0.3	0.3	0.1	0.2	0.1	0.2	0.3	0.2	0.2	0.2	0.2	0.3	0.19	0.36	0.32	
Arsenic - Total	mg/L	0.005	< 0.002	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.002	0.001	< 0.001	< 0.001	0.005	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.0012	< 0.0010	
Barium - Total	mg/L	-	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.0020	< 0.0020	
Boron - Total	mg/L	0.2	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.010	< 0.010	
Cadmium - Total ³	mg/L	0.0001	< 0.0001	0.001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.000090	< 0.000090	
Chromium - Total	mg/L	-	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0050	< 0.0050	
Copper - Total ⁴	mg/L	0.001	0.001	0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	0.0018	< 0.00090	
Iron - Total	mg/L	0.3	0.2	< 0.1	0.1	0.1	< 0.1	< 0.1	0.1	< 0.1	0.1	< 0.1	0.1	0.1	0.1	< 0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.15	0.15
Lead - Total ⁵	mg/L	0.001	0.0007	< 0.0005	0.0006	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.00050	0.00052	
Phosphorus - Total	mg/L	0.03	0.07	< 0.1	< 0.1	-	-	-	0.014	0.023	< 0.1	0.023	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.018	0.01	0.022	0.01	0.031	0.019	
Zinc - Total	mg/L	0.02	0.021	< 0.005	0.007	< 0.005	< 0.005	0.006	0.006	< 0.005	< 0.005	< 0.005	< 0.005	0.009	< 0.005	< 0.005	0.007	< 0.005	< 0.005	< 0.005	0.006	< 0.005	0.005	0.0089	< 0.0050	

Notes:

1. PWQO = "Provincial Water Quality Objective". If both a PWQO and an Interim PWQO exist, the Interim PWQO was used for comparison purposes.
2. Dissolved Oxygen PWQO (Warm Water Biota): 7 mg/L with temperature < 5°C, 6 mg/L with temperature 5°C - 10°C, 5 mg/L with temperature 10°C - 15°C, 4 mg/L with temperature > 20°C
3. Cadmium interim PWQO: 0.0001 mg/L with hardness 0 to 100 mg/L; 0.0005 with hardness > 100 mg/L.
4. Copper interim PWQO: 0.001 mg/L with hardness 0 to 20 mg/L; 0.005 with hardness > 20 mg/L.
5. Lead interim PWQO: 0.001 mg/L with hardness < 30 mg/L; 0.003 mg/L with hardness 30 to 80 mg/L; and 0.005 mg/L with hardness > 80 mg/L.
6. Concentrations that did not meet the PWQO are shaded.

Source:

R:\SE\048 Temagami\02_Sisk\Work\2024\048_Sisk_SW Quality_Crosstab_10Jan24_EK.xlsx\SW1

4.4.2 Recommendations Regarding Surface Water

Surface water monitoring should continue at SW1 twice per year as required by the ECA. This will provide additional information to determine the potential role this small unnamed lake is having regarding the Site's groundwater chemistry. The acidic nature of the unnamed lake is characteristic of northern bogs and pH values below the PWQO are not of concern.

Due to the role of this lake in the local groundwater recharge and therefore its potential impact on the Site groundwater chemistry, the water elevation of the unnamed lake should be surveyed annually during the fall monitoring event.

4.5 Combustible Vapours in Monitoring Wells

During the field sampling, combustible vapour concentrations were measured in the monitoring wells with an RKI Eagle Combustible Gas Monitor. All of the concentrations of combustible gas in the monitoring wells were low and did not approach combustible concentrations.

5 Conclusions and Recommendations

At the end of 2023, the estimated total volume of waste and cover material deposited at the Site was approximately 19 960 m³. Therefore, the remaining capacity is approximately 20 040 m³ which corresponds to an estimated life expectancy of approximately 37 years. SEI proposes to conduct annual topographic surveys of the Site using an RPAS to gather topographic information in an efficient manner. Annual RPAS data will provide reliable estimates of the waste volume and cover material deposited at the Site.

The windblown debris at the landfill should be controlled by implementing a smaller working face in the Fill Area and maintaining temporary fencing around this area. To facilitate more efficient operation of the landfill, the configuration of the footprint should be altered, with MECP approval, into a rectangular or square shape. Once approved, the new configuration of the footprint should be clearly flagged with large visible posts to mark each corner.

During the April and November 2023 sampling campaigns, concentrations of one health-related and several non-health related parameters greater than the respective RUC were observed at MW1, MW2, and MW4. However, exceedances of the RUC at these groundwater monitoring wells in close proximity to the Fill Area are expected and the RUC is not technically applicable to these wells since they are close to the Fill Area and not at the property boundaries. This suggests that three of the four wells on the Site (MW1, MW2, and MW4), are impacted by landfill leachate. However, the total extent of leachate impact at the Site cannot be established based on the limited number of monitoring wells, especially downgradient of the landfill.

It is recommended that two to three additional monitoring wells be installed further downgradient of the Fill Area over the next few years. These additional wells will provide a better understanding of the extent of the leachate plume downgradient from the landfill.

Finally, considering the findings obtained through the completion of 12 annual reports for this landfill, the landfill monitoring and chemical sampling of surface water and groundwater should continue on a semi-annual basis, one event in the spring and one event in the fall, with a report submitted to the MECP annually. However, in the situation that an amendment is made to the current ECA, it is SEI's view that the reporting could be changed so that reports are submitted to the MECP every two years with continued semi-annual water quality monitoring.

6 References

- ODM, 1967. *Ontario Department of Mines Preliminary Geological Map No. P. 394 Tomiko Sheet District of Nipissing.*
- ODNA, 1971. *Ontario Department of Northern Affairs Preliminary Map P. 678, Geological Series Tomiko Area (West Half) District of Nipissing.*
- OGS, 1979. *Northern Ontario Engineering Geology Terrain Study, Data Base Map, Tomiko, Ontario Geological Survey Map 5040, NTS 31L/NW.*
- MOE, 1986. *Incorporation of the Reasonable Use Concept into MOE Groundwater Management Activities*, Ontario Ministry of the Environment Water Resources Branch, September 1986.
- WEG, 2001. *Hydrogeological Assessment Briggs Township MNR Landfill Site Temagami*, Ontario, August 1991, Waters Environmental Geosciences Ltd., Lively, Ontario, 9 pages + appendices.
- SEI, 2023. *The Corporation of the Municipality of Temagami – Sisk Landfill 2023 Annual Report*, May 2023.

7 Qualifications and Limitations

This document was prepared and reviewed by the undersigned.

Prepared by:



Janani Tamil Alagan, M.Eng.
Environmental Engineering Intern

Reviewed and
Approved by:



Maria Story, P.Eng.
President

A description of the limitations, which are inherent to these types of studies, is outlined below. This information forms an integral part of this document.

This report is intended to provide information to The Corporation of the Municipality of Temagami. SEI is not a party to the various considerations underlying The Corporation of the Municipality of Temagami's business decisions and does not make recommendations regarding such business decisions. In providing this report, SEI accepts no liability or responsibility in respect of the site described in this report or for any business decisions relating to the site. SEI accepts no liability or responsibility for any damages that may be suffered or incurred by any third party as a result of the use of, reliance on, or any decision made based on this report.

The findings, conclusions, and recommendations in this report have been developed in a manner consistent with the level of skill normally exercised by environmental professionals currently practicing under similar conditions in the area. The findings contained in this report are based, in part, upon information provided by others. If any of the information is inaccurate, modifications to the findings, conclusions, and recommendations may be necessary.

The findings, conclusions, and recommendations presented by SEI in this report reflect SEI's best judgment based on the site conditions on the date(s) set out in this report and on information available at the time of preparation of this report. They have been prepared for specific application to this site and are based, in part, upon visual observation of the site, information available from historical databases, and interviews with people whom are knowledgeable regarding the site. The findings cannot be extended to previous or future site conditions or to portions of the site, which were unavailable for direct observation.

The findings and conclusions of this report are valid only as of the date of this report. If site conditions change, new information is discovered, or unexpected site conditions are encountered in future work, SEI should be requested to re-evaluate the findings, conclusions, and/or recommendations of this report, and to provide amendments as required.

Copying of this report is not permitted without the express permission of The Corporation of the Municipality of Temagami and SEI.

Appendix A

Environmental Compliance Approval



Ministry
of the
Environment

Ministère
de
l'Environnement

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A7134301
Notice No. 1
Issue Date: March 7, 2008

Her Majesty the Queen in Right of Ontario as represented by the Ministry of Natural Resources
Box 3070
North Bay, Ontario
P1B 8K7

Site Location: Sisk Township Landfill
unsurveyed
Temagami Municipality, District of Nipissing

You are hereby notified that I have amended Provisional Certificate of Approval No. A7134301 issued on February 3, 1981 for the use and operation of a 1.02 hectare waste disposal site within a total area of 12.25 hectares , as follows:

I. Definitions

The following definitions are added:

- (a) "Certificate" means this Provisional Certificate of Approval including all Notices of Amendment;
- (b) "Director" means Director, Section 39, *Environmental Protection Act*, R.S.O. 1990, C. E-19 as amended;
- (c) "District Manager" means the District Manager, North Bay District Office, Northern Region, Ontario Ministry of the Environment;
- (d) "*EPA*" means the *Environmental Protection Act*, R.S.O. 1990, C. E-19 as amended.
- (e) "Ministry" means the Ontario Ministry of the Environment;
- (f) "*Operator*" means any person, other than the Owner's employees, authorized by the Owner as having the charge, management or control of any aspect of the site and includes its successors or assigns;
- (g) "*Owner*" means any person that is responsible for the establishment or operation of the site being approved by this *Certificate*, and includes the Ministry of the Natural Resources, its successors and assigns;
- (h) "Regional Director" means the Regional Director, Northern Region, Ontario Ministry of the Environment; and
- (i) "Regulation 347" means Ontario Regulation 347, R.R.O. 1990; as amended.

The following Conditions are hereby added:

II. GENERAL

Compliance

2. The *Owner* and *Operator* shall ensure compliance with all the conditions of this *Certificate* and shall ensure that any person authorized to carry out work on or operate any aspect of the *Site* is notified of this *Certificate* and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

3. Any person authorized to carry out work on or operate any aspect of the *Site* shall comply with the conditions of this *Certificate*.

In Accordance

4. Except as otherwise provided for in this *Certificate*, the *Site* shall be designed, developed, built, operated and maintained in accordance with the EPA, the Conditions in this *Certificate*, and the supporting documentation listed in Schedule "A".

Interpretation

5. Where there is a conflict between a provision of any document, including the application, referred to in this *Certificate*, and the conditions of this *Certificate*, the conditions in this *Certificate* shall take precedence.

6. Where there is a conflict between the application and a provision in any documents listed in Schedule "A", the application shall take precedence, unless it is clear that the purpose of the document was to amend the application and that the *Ministry* approved the amendment.

7. Where there is a conflict between any two documents listed in Schedule "A", other than the application, the document bearing the most recent date shall take precedence.

8. The conditions of this *Certificate* are severable. If any condition of this *Certificate*, or the application of any condition of this *Certificate* to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this *Certificate* shall not be affected thereby.

Other Legal Obligations

9. The issuance of, and compliance with, this *Certificate* does not:

- a. relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement; or
- b. limit in any way the authority of the *Ministry* to require certain steps be taken or to require the *Owner* and *Operator* to furnish any further information related to compliance with this *Certificate*;

Adverse Effect

10. The *Owner* and *Operator* shall take steps to minimize and ameliorate any adverse effect on the natural environment or impairment of water quality resulting from the *Site*, including such accelerated or additional monitoring as may be necessary to determine the nature and extent of the effect or impairment.

11. Despite an *Owner*, *Operator* or any other person fulfilling any obligations imposed by this certificate the person remains responsible for any contravention of any other condition of this *Certificate* or any applicable statute, regulation, or other legal requirement resulting from any act or omission that caused the adverse effect to the natural environment or impairment of water quality.

Change of Owner

12. The *Owner* shall notify the *Director*, in writing, and forward a copy of the notification to the *District Manager*, within 30 days of the occurrence of any changes in the following information:

- a. the ownership of the *Site*;
- b. the *Operator* of the *Site*;
- c. the address of the *Owner* or *Operator*;
- d. the partners, where the *Owner* or *Operator* is or at any time becomes a partnership and a copy of the most recent declaration filed under the *Business Names Act*, R. S. O. 1990, c. B.17, shall be included in the notification;

13. No portion of this *Site* shall be transferred or encumbered prior to or after closing of the *Site* unless the *Director* is notified in advance and sufficient financial assurance (if required) is deposited with the *Ministry* to ensure that these

conditions will be carried out. In the event of any change in *Ownership* of the works, other than change to a successor municipality, the *Owner* shall notify the successor of and provide the successor with a copy of this *Certificate*, and the *Owner* shall provide a copy of the notification to the *District Manager* and the *Director*.

Certificate of Prohibition

14. Unless exempt, pursuant to Section 197 of the *EPA*, no person having an interest in the *Site* shall deal in any way with the *Site* without first giving a copy of this *Certificate* to each person acquiring an interest in the *Site* as a result of the dealing.

15. Unless exempt, two (2) copies of a completed Certificate of Prohibition, containing a registerable description of the *Site*, shall be submitted to the *Director* for the *Director's* signature within 60 calendar days of the date of this *Certificate*.

16. The Certificate of Prohibition shall be registered in the appropriate land registry office on title to the *Site* by the *Owner* within 10 calendar days of receiving the Certificate of Prohibition signed by the *Director*, and a duplicate registered copy shall be submitted to the *Director*.

Inspections

17. No person shall hinder or obstruct a *Provincial Officer* from carrying out any and all inspections authorized by the *OWRA*, the *EPA*, or the *PA*, of any place to which this *Certificate* relates, and without limiting the foregoing:

- a. to enter upon the premises where the approved works are located, or the location where the records required by the conditions of this *Certificate* are kept;
- b. to have access to, inspect, and copy any records required to be kept by the conditions of this *Certificate*;
- c. to inspect the *Site*, related equipment and appurtenances;
- d. to inspect the practices, procedures, or operations required by the conditions of this *Certificate*;
- and
- e. to sample and monitor for the purposes of assessing compliance with the terms and conditions of this *Certificate* or the *EPA*, the *OWRA* or the *PA*.

Information and Record Retention

18. Any information requested, by the *Ministry*, concerning the *Site* and its operation under this *Certificate*, including but not limited to any records required to be kept by this *Certificate* shall be provided to the *Ministry*, upon request, in a timely manner. Records shall be retained for (5) five years except for as otherwise authorized in writing by the *Director*.

19. The receipt of any information by the *Ministry* or the failure of the *Ministry* to prosecute any person or to require any person to take any action, under this *Certificate* or under any statute, regulation or other legal requirement, in relation to the information, shall not be construed as:

- a. an approval, waiver, or justification by the *Ministry* of any act or omission of any person that contravenes any term or condition of this *Certificate* or any statute, regulation or other legal requirement; or
- b. acceptance by the *Ministry* of the information's completeness or accuracy.

III. SITE OPERATIONS

Operations

20. (1) The *Site* shall be developed, operated and maintained in accordance with the documents listed in Schedule "A".

(2) Any changes to the *Site's* Design and Operation Manual shall be submitted to the *District Manager* prior to

their implementation.

21. Only municipal waste as defined in the *EPA* may be landfilled at the site. No liquid industrial waste or hazardous waste shall be disposed of at the landfill.

22. The site shall have a maximum volume capacity of **40,000** cubic meters.

23 A sign shall be posted in a prominent location at the *Site* entrance clearly stating the following:

- i. *Owner's* name;
- ii. Operator's name;
- iii. Provisional Certificate of Approval No.;
- iv. Type of Waste Accepted
- v. the hours of operation;
- vi. Public access to the *Site* is prohibited during non-operational hours; and
- vii. Contact telephone number to call with complaints or in the event of an emergency.

24. (i) Only clean wood and brush shall be permitted for burning. Burning of the materials shall be completed as per the Ministry of the Environment Guideline C-7 (Burning at Landfill Sites);

(ii) the clean wood/brush area shall be clearly marked with a sign(s) that prohibits the public from approaching the area when burning operations are occurring.

(iii) The *Owner* shall ensure there is a designated area for ash material.

Limit of Landfill

25. By **June 1, 2009**, the owner shall clearly define the boundaries of the limit of waste by installing permanent markers that can be visible year-round.

Hours of Operation

26. Waste shall only be accepted at the *Site* during the following time periods:

- i. Tuesdays and Thursdays 12:30 p.m. – 4:30 p.m.; and
- ii. Saturdays 8:00 a.m. - 12:00 p.m.

27. With the prior written concurrence of the *District Manager* the time periods may be reduced or extended to accommodate seasonal or unusual quantities of waste.

28. During non-operating hours, the site entrance and exit gates shall be locked and the *Site* shall be secured against access by unauthorized persons.

Cover Material

29. Cover shall be placed over the entire working face with a minimum thickness of 150 mm of soil cover or an approved thickness of alternative cover material as a minimum follows:

- i. From April 1 to December 1, daily cover shall be placed on a monthly basis
- ii. From December 2 to March 30 daily cover shall be placed as required.

30. Intermediate Cover shall be placed in areas where landfilling has been temporarily discontinued for six (6) months or more. A minimum thickness of 300 mm of soil cover or an approved thickness of alternative cover material shall be placed.

31. Type and thickness of alternative cover must be approved by the *Director* prior to implementation.

IV. INSPECTION AND MONITORING

32. An inspection of the entire *Site* and all equipment on the *Site* shall be conducted each day the *Site* is open for operation to ensure it is being operated in compliance with this *Certificate*.

33. The *Owner* shall maintain written records at the *Site* including as a minimum the following information:

- i. date of record;
- ii. categories and approximate quantities of waste received;
- iii. record of routine *Site* inspections;
- iv. record of complaints and other communications related to operational practices at the *Site* along with actions taken to address complaints or other communications issues;

34. (1) The *Owner* shall at least three times per year (once in each of the spring, summer and fall) collect groundwater elevations from the monitoring wells located on the site. The *Owner* shall provide the elevations in meter above sea level in the Annual Report required under Condition 38.

(2) The *Owner* shall at least once per year (fall) survey the top of water elevation for the un-named lake to the north of the landfill site. The *Owner* shall provide the information on water level elevations in meters above sea level in the Annual Report required under Condition 38.

(3) In the event, the water level in the un-named lake to the north is at a lower elevation than the groundwater levels in any of the groundwater monitoring wells, the *Owner* shall notify the *District Manager* in writing within fourteen (14) days of determining that water level in the un-named lake is at a lower elevation than the groundwater elevation in the groundwater monitoring wells around the landfill site.

(4) The *Owner* shall within thirty (30) of forwarding the letter required in Condition 34(3) submit to the *Director* for approval, with copies to the *District Manager*, an groundwater and surface water monitoring program for the site. When developing the environmental monitoring plan, the owner shall consult with the *District Office* to discuss the location of the various monitoring stations. The plan shall include but not be limited to the following:

- i. a drawing showing the proposed sampling locations;
- ii. parameters that shall be analyzed;
- iii. the sampling frequency;
- iv. the groundwater measurement, flow measurement and sampling protocols;

35. The *Owner* shall ensure that all groundwater monitoring wells which form part of the monitoring program are properly capped, locked and protected from damage.

36. Where landfilling is to proceed around monitoring wells, suitable extensions shall be added to the wells, and the wells shall be properly re-secured.

37. Any groundwater monitoring wells included in the on-going monitoring program that are damaged shall be assessed, repaired, replaced or decommissioned by the *Owner*, as required.

- a. The *Owner* shall repair or replace any monitoring well which is destroyed or in any way made to be inoperable for sampling such that no more than one regular sampling event is missed.
- b. All monitoring wells which are no longer required as part of the groundwater monitoring program, and have been approved by the *Director* for abandonment, shall be decommissioned by the *Owner*, as required, in accordance with good standard practice that will prevent contamination through the abandoned well. A report on the decommissioning of the well shall be included in the

annual monitoring report for the period during which the well was decommissioned.

V. ANNUAL REPORT

38. By no later than **May 31, 2009** and then by every May 31 thereafter, the *Owner* shall submit to the *District Manager*, an annual report on the development, operation and environmental monitoring of the *Site*. The report shall include as a minimum the following:

- a. the results and an interpretive analysis of all leachate, groundwater, surface water and landfill gas monitoring; a report on the status of all monitoring wells;
- b. changes or improvements made to the *Site's* structure, features and operations;
- c. a summary of operational problems encountered at the *Site* and steps taken to resolve these problems;
- d. assessment of future monitoring needs, any recommended changes to the program,
- e. estimated calculations of the volume of waste, daily and intermediate cover and final cover deposited or placed at the *Site* during the reporting period, an estimate of the total volume of the *Site* capacity used in the reporting period;
- f. a calculation of the remaining capacity of the *Site* and an estimate of the remaining *Site* life;
- g. a summary of any complaints received and responses made; and
- h. any other information with respect to the *Site* which the Regional Director or District Manager may require from time to time.

VII. CLOSURE PLAN

39. At least two (2) years prior to the anticipated date of closure of this *Site*, the *Owner* shall submit to the *Director* for approval, with copies to the *District Manager*, a detailed Site Closure Plan pertaining to the termination of the landfilling operations at this *Site*. This plan shall include, as a minimum, a description of the work that will be done to facilitate the closure of the *Site* and the schedule for completion of that work; post closure inspection, maintenance and monitoring, and end use.

Schedule "A"

1. Application for a Certificate of Approval for a Waste Disposal Site, dated January 29, 2003 and signed by John Hodgson, the Municipality of Temagami.
2. Report entitled "Hydrogeological Assessment, Sisk Township, MNR Landfill Site, Temagami, Ontario", prepared by Waters Environmental Geosciences Ltd. and dated August 2001.
3. Report entitled "Landfill Operations Manual, Sisk Township Landfill Site, Temagami, Ontario", prepared by Waters Environmental Geosciences Ltd. and dated August 2002.
4. Letter dated August 3, 2005 addressed to the Ministry of Natural Resources from Kenneth D.N. Boal, Chief Administrative Officer, The Corporation of the Municipality of Temagami which indicates the Municipality's desire to purchase the landfill site.
5. Letter dated August 18, 2005 addressed to Mr. Don Farintosh, Ministry of Natural Resources from Kenneth D.N. Boal, Chief Administrative Officer, The Corporation of the Municipality of Temagami indicating that council resolved that the municipality proceed with the landfill acquisition.

The reasons for this amendment to the Certificate of Approval are as follows:

1. *The reason for Conditions (2), (3), (4), (5), (6), (7), (8), (9), (10), (11) is to clarify the legal rights and responsibilities of the Owner under this Certificate of Approval.*

CONTENT COPY OF ORIGINAL

2. *The reasons for Condition (12) are to ensure that the Site is operated under the corporate name which appears on the application form submitted for this approval and to ensure that the Director is informed of any changes.*
3. *The reasons for Condition (13) are to restrict potential transfer or encumbrance of the Site without the approval of the Director and to ensure that any transfer of encumbrance can be made only on the basis that it will not endanger compliance with this Certificate of Approval.*
4. *Condition (14), (15) and (16) is included, pursuant to subsection 197(1) of the EPA, to provide that any persons having an interest in the Site are aware that the land has been approved and used for the purposes of waste disposal.*
5. *The reason for Condition (17) is to ensure that appropriate Ministry staff have ready access to the Site for inspection of facilities, equipment, practices and operations required by the conditions in this Certificate of Approval. This condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the EPA and OWRA.*
6. *The reasons for Conditions (18) and (19) are to provide for the proper assessment of effectiveness and efficiency of site design and operation, their effect or relationship to any nuisance or environmental impacts, and the occurrence of any public complaints or concerns. Record keeping is necessary to determine compliance with this Certificate of Approval, the EPA and its regulations.*
7. *Condition No. 20 is included to ensure that the Site is operated in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.*
8. *Condition No. 21 is included to ensure the Owner is aware that only municipal waste is permitted for landfilling at the Site.*
9. *Condition No. 22 is included to clearly identify the Site's waste capacity.*
10. *Condition No. 23 and 24 are to ensure the landfill is operated in accordance with Ministry standards, and to ensure the long-term protection of the health and safety of the public and the environment.*
11. *Condition No. 25 is included to ensure the owner installs permanent marker to allow the operator and Ministry staff to clearly see where the limits of landfilling are located. This will allow the operator to identify where waste can be placed. This is to ensure the long-term health and safety of the public and the environment.*
12. *Conditions Nos. 26 and 27 are included to specify the normal hours of operation for the landfill Site and a mechanism for amendment of the hours of operation.*
13. *Condition No. 28 is included to ensure controlled access and integrity of the Site by preventing unauthorized access when the Site is closed and no Site attendant is on duty.*
14. *Condition No. 29, 30 and 31 are included to ensure the owner places cover (daily or interim) over the waste.*
15. *Conditions Nos. 32 and 33 are included to ensure the Site is operated, inspected and maintained in an environmentally acceptable manner and does not result in a hazard or nuisance to the natural environment or any person.*
16. *Condition No. 34 is included to require the Owner to monitor groundwater levels to ensure the groundwater flow direction is not towards the un-named lake and to ensure the Owner has an established an acceptable monitoring program for the groundwater and the surface water at the site should it be determined that groundwater flow at the site changes from the information presented in the Hydrogeological Report. This is to ensure the long-term health and safety of the public and the environment.*
17. *Conditions Nos. 35, 36, and 37 are included to ensure the integrity of the groundwater monitoring network so that accurate monitoring results are achieved and the natural environment is protected.*
18. *Condition No. 38 is included to ensure that regular review of site development , operations and monitoring data is documented and any possible improvements to site design, operations or monitoring programs are identified. An annual*

report is an important tool used in reviewing Site activities and for determining the effectiveness of Site design.

20. Condition No. 39 is included to ensure that final closure of the Site is completed in an esthetically pleasing manner and to ensure the long term protection of the natural environment.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A7134301 dated February 3, 1981

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the waste disposal site is located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., 12th Floor
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 39, *Environmental Protection Act*
Ministry of Environment and Energy
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act.

DATED AT TORONTO this 7th day of March, 2008

Tesfaye Gebrezghi, P.Eng.
Director
Section 39, *Environmental Protection Act*

DG/
c: District Manager, MOE North Bay

Appendix B

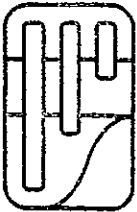
Borehole Logs



Well Construction	Depth (m)	Elevation (m) Relative to Datum	Stratigraphy	Description	Sample Type	Standard Penetration Test (counts)	Natural Moisture Content (%)		
							20	40	60
	0.0	93.76 m							
		93.46 m		Garbage and Fill , domestic refuse with topsoil					
	1.0			Sand , silty, brown, becoming wet below 1.52 m	SS1	2, 2, 3			
	2.0				SS2	1, 2, 3			
		91.47 m							
	3.0			Sand , some silt, trace gravel, brown, wet	SS3	1, 1, 1			
					SS4	1, 2, 2			
	4.0	90.26 m		Borehole terminated , in sand at a depth of 3.50 m below grade					
	5.0								
	6.0								
	7.0								

NOTE:
 1) Borehole BH-1 was advanced using 108 mm hollow stem augers.
 2) Refer to the accompanying text for well construction details and an interpretation of this information.

Borehole BH - 2	Figure 4	Waters Environmental Geosciences Ltd.	
	Sisk Twp. MNR Landfill		
Project Number 20-106c	Date Started 22/04/2001	Date Completed 22/04/2001	Drawn by : PAR Checked by : PAR



Well Construction	Depth (m)	Elevation (m) Relative to Datum	Stratigraphy	Description	Sample Type	Standard Penetration Test (counts)	Natural Moisture Content (%)		
							20	40	60
	0.0	94.82 m							
	1.0			150 mm Topsoil, over Sand, trace of gravel, brown to black	SS1	2, 2, 4			
	2.0	93.30 m		Organic Peat, black, fibrous, with some sand, becoming wet	SS2	1, 1, 1			
	3.0	91.77 m			SS3	see note (2)			
	4.0			Sand, medium to fine, grey-brown, wet	SS4	4, 5, 6			
	5.0	89.80 m			SS5	see note (2)			
	6.0			Borehole terminated, in sand at a depth of 5.02 m below grade					
	7.0								

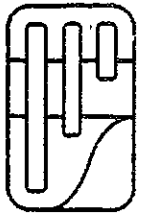
NOTE:
 1) Borehole BH-2 was advanced using 108 mm hollow stem augers.
 2) No blow counts were recorded when the split spoon fell under the weight of the drilling rods.
 2) Refer to the accompanying text for well construction details and an interpretation of this information.

NOTE : Stratigraphic boundaries are approximate, and in-situ transitions between the identified soil types may be gradual. Refer to the accompanying text for an interpretation. Samples indicated as (AS) auger sample, (SS) split spoon or (NR) no recovery. Water level on 07/06/2001 recorded as 93.42 m (relative to identified datum).

Borehole BH - 3

Figure 5

Waters Environmental Geosciences Ltd.



Sisk Twp. MNR Landfill

Project Number
20-106c

Date Started
23/04/2001

Date Completed
23/04/2001

Drawn by : PAR
Checked by : PAR

Well Construction	Depth (m)	Elevation (m) Relative to Datum	Stratigraphy	Description	Sample Type	Standard Penetration Test (counts)	Natural Moisture Content (%)		
							20	40	60
	0.0	96.18 m							
	1.0		[Pattern: Topsoil]	100 mm Topsoil, over Sand and Gravel, brown, becoming wet below 2.13 m	SS1	4, 4, 3			
	2.0				SS2	5, 6, 7			
		93.89 m							
	3.0		[Pattern: Sandy Gravel]	Sandy Gravel, grey, wet	SS3	6, 8, 8			
	4.0				SS4	5, 7, 9			
	5.0	91.15 m			SS5	3, 3, 4			
	6.0			Borehole terminated, in sandy gravel at a depth of 5.03 m below grade					
	7.0								

NOTE : Stratigraphic boundaries are approximate, and in-situ transitions between the identified soil types may be gradual. Refer to the accompanying text for an interpretation. Samples indicated as (AS) auger sample, (SS) split spoon or (NR) no recovery. Water level on 07/06/2001 recorded as 93.36 m (relative to identified datum).

**Borehole
BH - 4**

Figure 6

Waters Environmental Geosciences Ltd.

Sisk Twp. MNR Landfill

Project Number
20-106c

Date Started
22/04/2001

Date Completed
22/04/2001

Drawn by : PAR
Checked by : PAR



Well Construction	Depth (m)	Elevation (m) Relative to Datum	Stratigraphy	Description	Sample Type	Standard Penetration Test (counts)	Natural Moisture Content (%)		
							20	40	60
	0.0	93.89 m		100 mm Topsoil, over Sand and Gravel , brown, becoming wet below 0.31 m					
	1.0				SS1	4, 4, 3			
	2.0				SS2	5, 6, 9			
	3.0				SS3	4, 5, 6			
	4.0	90.39 m			SS4	6, 8, 8			
	4.0			Borehole terminated , in sand and gravel at a depth of 3.50 m below grade					
	5.0			NOTE: 1) Borehole BH-4 was advanced using 108 mm hollow stem augers. 2) Refer to the accompanying text for well construction details and an interpretation of this information.					
	6.0								
	7.0								

NOTE : Stratigraphic boundaries are approximate, and in-situ transitions between the identified soil types may be gradual. Refer to the accompanying text for an interpretation. Samples indicated as (AS) auger sample, (SS) split spoon or (NR) no recovery. Water level on 07/06/2001 recorded as 93.19 m (relative to identified datum).

Appendix C

Laboratory Certificates of Analysis



Your Project #: 048-02-33
 Site#: Sisk Landfill
 Site Location: Sisk Landfill
 Your C.O.C. #: 928793-01-01

Attention: Beata Bradley

Story Environmental Inc
 332 Main Street
 P.O. Box 716
 Haileybury, ON
 CANADA P0J 1K0

Report Date: 2024/04/09
 Report #: R8100353
 Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C3C0064

Received: 2023/04/28, 09:17

Sample Matrix: Water
 # Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	2	N/A	2023/05/03	CAM SOP-00448	SM 23 2320 B m
Alkalinity	3	N/A	2023/05/06	CAM SOP-00448	SM 23 2320 B m
Biochemical Oxygen Demand (BOD)	5	2023/04/29	2023/05/04	CAM SOP-00427	SM 23 5210B m
Chloride by Automated Colourimetry	5	N/A	2023/05/03	CAM SOP-00463	SM 23 4500-Cl E m
Dissolved Organic Carbon (DOC) (1)	2	N/A	2023/05/02	CAM SOP-00446	SM 23 5310 B m
Dissolved Organic Carbon (DOC) (1)	2	N/A	2023/05/03	CAM SOP-00446	SM 23 5310 B m
Hardness (calculated as CaCO3)	5	N/A	2023/05/03	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Metals by ICPMS	4	N/A	2023/05/03	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS	1	2023/05/01	2023/05/02	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	5	N/A	2023/05/04	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (2)	5	N/A	2023/05/02	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Sulphate by Automated Turbidimetry	5	N/A	2023/05/03	CAM SOP-00464	SM 24 4500-SO42- E m
Total Dissolved Solids	5	2023/05/02	2023/05/03	CAM SOP-00428	SM 23 2540C m
Total Kjeldahl Nitrogen in Water	5	2023/05/03	2023/05/03	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	5	2023/05/03	2023/05/03	CAM SOP-00407	SM 23 4500-P I

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.



Your Project #: 048-02-33
Site#: Sisk Landfill
Site Location: Sisk Landfill
Your C.O.C. #: 928793-01-01

Attention: Beata Bradley

Story Environmental Inc
332 Main Street
P.O. Box 716
Haileybury, ON
CANADA P0J 1K0

Report Date: 2024/04/09
Report #: R8100353
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C3C0064

Received: 2023/04/28, 09:17

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.

(2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:

Elora Di Bratto, Project Manager
Email: Elora.Di-Bratto@bureauveritas.com
Phone# (905) 817-5700

=====

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.



BUREAU
VERITAS

Bureau Veritas Job #: C3C0064
Report Date: 2024/04/09

Story Environmental Inc
Client Project #: 048-02-33
Site Location: Sisk Landfill
Sampler Initials: JW

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		VRD164		VRD165		VRD166		VRD167		
Sampling Date		2023/04/26 09:30		2023/04/26 10:05		2023/04/26 10:30		2023/04/26 11:00		
COC Number		928793-01-01		928793-01-01		928793-01-01		928793-01-01		
	UNITS	MW1	QC Batch	MW2	QC Batch	MW3	QC Batch	MW4	RDL	QC Batch
Calculated Parameters										
Hardness (CaCO3)	mg/L	530	8635122	120	8635122	86	8635122	400	1.0	8635122
Inorganics										
Total Ammonia-N	mg/L	2.9	8641475	0.18	8641475	<0.050	8641475	0.66	0.050	8641475
Total BOD	mg/L	<2	8636708	<2	8636711	<2	8636708	<2	2	8636708
Total Dissolved Solids	mg/L	355	8640116	120	8640116	85	8640088	600	10	8640116
Total Kjeldahl Nitrogen (TKN)	mg/L	3.9	8643235	0.52	8643235	0.13	8643235	1.2	0.10	8643235
Dissolved Organic Carbon	mg/L	7.5	8642184	12	8642065	3.2	8639597	11	0.40	8639597
Total Phosphorus	mg/L	0.34	8642934	0.029	8642934	0.028	8642934	0.009	0.004	8642934
Dissolved Sulphate (SO4)	mg/L	4.6	8639401	3.2	8639401	2.5	8639401	23	1.0	8639401
Alkalinity (Total as CaCO3)	mg/L	590	8639372	120	8639147	89	8639147	230	1.0	8639372
Dissolved Chloride (Cl-)	mg/L	10	8639391	<1.0	8639391	<1.0	8639391	44	1.0	8639391
Nitrite (N)	mg/L	<0.010	8639142	<0.010	8639142	<0.010	8639142	<0.010	0.010	8639142
Nitrate (N)	mg/L	<0.10	8639142	<0.10	8639142	<0.10	8639142	0.59	0.10	8639142
Nitrate + Nitrite (N)	mg/L	<0.10	8639142	<0.10	8639142	<0.10	8639142	0.59	0.10	8639142
RDL = Reportable Detection Limit QC Batch = Quality Control Batch										



RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		VRD168		
Sampling Date		2023/04/26 10:40		
COC Number		928793-01-01		
	UNITS	SW1	RDL	QC Batch
Calculated Parameters				
Hardness (CaCO3)	mg/L	1.3	1.0	8634921
Inorganics				
Total Ammonia-N	mg/L	<0.050	0.050	8641475
Total BOD	mg/L	<2	2	8636708
Total Dissolved Solids	mg/L	15	10	8640116
Total Kjeldahl Nitrogen (TKN)	mg/L	0.36	0.10	8643235
Total Phosphorus	mg/L	0.031	0.004	8642934
Dissolved Sulphate (SO4)	mg/L	3.1	1.0	8639401
Alkalinity (Total as CaCO3)	mg/L	<1.0	1.0	8639147
Dissolved Chloride (Cl-)	mg/L	<1.0	1.0	8639391
Nitrite (N)	mg/L	<0.010	0.010	8639142
Nitrate (N)	mg/L	<0.10	0.10	8639142
Nitrate + Nitrite (N)	mg/L	<0.10	0.10	8639142
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU
VERITAS

Bureau Veritas Job #: C3C0064
Report Date: 2024/04/09

Story Environmental Inc
Client Project #: 048-02-33
Site Location: Sisk Landfill
Sampler Initials: JW

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		VRD164	VRD165	VRD166	VRD167		
Sampling Date		2023/04/26 09:30	2023/04/26 10:05	2023/04/26 10:30	2023/04/26 11:00		
COC Number		928793-01-01	928793-01-01	928793-01-01	928793-01-01		
	UNITS	MW1	MW2	MW3	MW4	RDL	QC Batch
Metals							
Dissolved Arsenic (As)	ug/L	7.8	<1.0	<1.0	1.9	1.0	8641183
Dissolved Barium (Ba)	ug/L	160	37	7.7	99	2.0	8641183
Dissolved Boron (B)	ug/L	730	220	<10	210	10	8641183
Dissolved Cadmium (Cd)	ug/L	<0.090	<0.090	<0.090	<0.090	0.090	8641183
Dissolved Calcium (Ca)	ug/L	170000	43000	27000	130000	200	8641183
Dissolved Chromium (Cr)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	8641183
Dissolved Copper (Cu)	ug/L	2.3	3.6	1.6	13	0.90	8641183
Dissolved Iron (Fe)	ug/L	9700	2400	160	2700	100	8641183
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	<0.50	0.92	0.50	8641183
Dissolved Magnesium (Mg)	ug/L	23000	3900	4700	18000	50	8641183
Dissolved Manganese (Mn)	ug/L	670	130	5.5	2500	2.0	8641183
Dissolved Potassium (K)	ug/L	8000	440	430	7500	200	8641183
Dissolved Sodium (Na)	ug/L	29000	3100	710	55000	100	8641183
Dissolved Zinc (Zn)	ug/L	<5.0	190	<5.0	<5.0	5.0	8641183
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							

Bureau Veritas ID		VRD168		
Sampling Date		2023/04/26 10:40		
COC Number		928793-01-01		
	UNITS	SW1	RDL	QC Batch
Metals				
Total Arsenic (As)	mg/L	0.0012	0.0010	8639951
Total Barium (Ba)	mg/L	<0.0020	0.0020	8639951
Total Boron (B)	mg/L	<0.010	0.010	8639951
Total Cadmium (Cd)	mg/L	<0.000090	0.000090	8639951
Total Chromium (Cr)	mg/L	<0.0050	0.0050	8639951
Total Copper (Cu)	mg/L	0.0018	0.00090	8639951
Total Iron (Fe)	mg/L	0.15	0.10	8639951
Total Lead (Pb)	mg/L	<0.00050	0.00050	8639951
Total Zinc (Zn)	mg/L	0.0089	0.0050	8639951
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU
VERITAS

Bureau Veritas Job #: C3C0064
Report Date: 2024/04/09

Story Environmental Inc
Client Project #: 048-02-33
Site Location: Sisk Landfill
Sampler Initials: JW

TEST SUMMARY

Bureau Veritas ID: VRD164
Sample ID: MW1
Matrix: Water

Collected: 2023/04/26
Shipped:
Received: 2023/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8639372	N/A	2023/05/03	Kien Tran
Biochemical Oxygen Demand (BOD)	DO	8636708	2023/04/29	2023/05/04	Gurjot Kaur
Chloride by Automated Colourimetry	SKAL	8639391	N/A	2023/05/03	Alina Dobreanu
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8642184	N/A	2023/05/03	Gyulshen Idriz
Hardness (calculated as CaCO3)		8635122	N/A	2023/05/03	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	8641183	N/A	2023/05/03	Nan Raykha
Total Ammonia-N	LACH/NH4	8641475	N/A	2023/05/04	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8639142	N/A	2023/05/02	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	8639401	N/A	2023/05/03	Alina Dobreanu
Total Dissolved Solids	BAL	8640116	2023/05/02	2023/05/03	Razieh Tabesh
Total Kjeldahl Nitrogen in Water	SKAL	8643235	2023/05/03	2023/05/03	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	8642934	2023/05/03	2023/05/03	Sachi Patel

Bureau Veritas ID: VRD164 Dup
Sample ID: MW1
Matrix: Water

Collected: 2023/04/26
Shipped:
Received: 2023/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride by Automated Colourimetry	SKAL	8639391	N/A	2023/05/03	Alina Dobreanu
Sulphate by Automated Turbidimetry	SKAL	8639401	N/A	2023/05/03	Alina Dobreanu

Bureau Veritas ID: VRD165
Sample ID: MW2
Matrix: Water

Collected: 2023/04/26
Shipped:
Received: 2023/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8639147	N/A	2023/05/06	Kien Tran
Biochemical Oxygen Demand (BOD)	DO	8636711	2023/04/29	2023/05/04	Nusrat Naz
Chloride by Automated Colourimetry	SKAL	8639391	N/A	2023/05/03	Alina Dobreanu
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8642065	N/A	2023/05/03	Gyulshen Idriz
Hardness (calculated as CaCO3)		8635122	N/A	2023/05/03	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	8641183	N/A	2023/05/03	Nan Raykha
Total Ammonia-N	LACH/NH4	8641475	N/A	2023/05/04	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8639142	N/A	2023/05/02	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	8639401	N/A	2023/05/03	Alina Dobreanu
Total Dissolved Solids	BAL	8640116	2023/05/02	2023/05/03	Razieh Tabesh
Total Kjeldahl Nitrogen in Water	SKAL	8643235	2023/05/03	2023/05/03	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	8642934	2023/05/03	2023/05/03	Sachi Patel



BUREAU
VERITAS

Bureau Veritas Job #: C3C0064
Report Date: 2024/04/09

Story Environmental Inc
Client Project #: 048-02-33
Site Location: Sisk Landfill
Sampler Initials: JW

TEST SUMMARY

Bureau Veritas ID: VRD166
Sample ID: MW3
Matrix: Water

Collected: 2023/04/26
Shipped:
Received: 2023/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8639147	N/A	2023/05/06	Kien Tran
Biochemical Oxygen Demand (BOD)	DO	8636708	2023/04/29	2023/05/04	Gurjot Kaur
Chloride by Automated Colourimetry	SKAL	8639391	N/A	2023/05/03	Alina Dobreanu
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8639597	N/A	2023/05/02	Gyulshen Idriz
Hardness (calculated as CaCO3)		8635122	N/A	2023/05/03	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	8641183	N/A	2023/05/03	Nan Raykha
Total Ammonia-N	LACH/NH4	8641475	N/A	2023/05/04	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8639142	N/A	2023/05/02	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	8639401	N/A	2023/05/03	Alina Dobreanu
Total Dissolved Solids	BAL	8640088	2023/05/02	2023/05/03	Razieh Tabesh
Total Kjeldahl Nitrogen in Water	SKAL	8643235	2023/05/03	2023/05/03	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	8642934	2023/05/03	2023/05/03	Sachi Patel

Bureau Veritas ID: VRD166 Dup
Sample ID: MW3
Matrix: Water

Collected: 2023/04/26
Shipped:
Received: 2023/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Phosphorus (Colourimetric)	SKAL/P	8642934	2023/05/03	2023/05/03	Sachi Patel

Bureau Veritas ID: VRD167
Sample ID: MW4
Matrix: Water

Collected: 2023/04/26
Shipped:
Received: 2023/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8639372	N/A	2023/05/03	Kien Tran
Biochemical Oxygen Demand (BOD)	DO	8636708	2023/04/29	2023/05/04	Gurjot Kaur
Chloride by Automated Colourimetry	SKAL	8639391	N/A	2023/05/03	Alina Dobreanu
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8639597	N/A	2023/05/02	Gyulshen Idriz
Hardness (calculated as CaCO3)		8635122	N/A	2023/05/03	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	8641183	N/A	2023/05/03	Nan Raykha
Total Ammonia-N	LACH/NH4	8641475	N/A	2023/05/04	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8639142	N/A	2023/05/02	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	8639401	N/A	2023/05/03	Alina Dobreanu
Total Dissolved Solids	BAL	8640116	2023/05/02	2023/05/03	Razieh Tabesh
Total Kjeldahl Nitrogen in Water	SKAL	8643235	2023/05/03	2023/05/03	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	8642934	2023/05/03	2023/05/03	Sachi Patel

Bureau Veritas ID: VRD168
Sample ID: SW1
Matrix: Water

Collected: 2023/04/26
Shipped:
Received: 2023/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8639147	N/A	2023/05/06	Kien Tran



BUREAU
VERITAS

Bureau Veritas Job #: C3C0064
Report Date: 2024/04/09

Story Environmental Inc
Client Project #: 048-02-33
Site Location: Sisk Landfill
Sampler Initials: JW

TEST SUMMARY

Bureau Veritas ID: VRD168
Sample ID: SW1
Matrix: Water

Collected: 2023/04/26
Shipped:
Received: 2023/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Biochemical Oxygen Demand (BOD)	DO	8636708	2023/04/29	2023/05/04	Gurjot Kaur
Chloride by Automated Colourimetry	SKAL	8639391	N/A	2023/05/03	Alina Dobreanu
Hardness (calculated as CaCO3)		8634921	N/A	2023/05/03	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	8639951	2023/05/01	2023/05/02	Prempal Bhatti
Total Ammonia-N	LACH/NH4	8641475	N/A	2023/05/04	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8639142	N/A	2023/05/02	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	8639401	N/A	2023/05/03	Alina Dobreanu
Total Dissolved Solids	BAL	8640116	2023/05/02	2023/05/03	Razieh Tabesh
Total Kjeldahl Nitrogen in Water	SKAL	8643235	2023/05/03	2023/05/03	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	8642934	2023/05/03	2023/05/03	Sachi Patel



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.3°C
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Revised Report [2024/01/09]:Sample(s) ID revised as per client.
Revised Report [2024/04/09]:Sample(s) ID revised as per client.

Results relate only to the items tested.



BUREAU
VERITAS

Bureau Veritas Job #: C3C0064
Report Date: 2024/04/09

Story Environmental Inc
Client Project #: 048-02-33
Site Location: Sisk Landfill
Sampler Initials: JW

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
8636708	GUJ	QC Standard	Total BOD	2023/05/04		94	%	80 - 120
8636708	GUJ	Method Blank	Total BOD	2023/05/04	<2		mg/L	
8636708	GUJ	RPD	Total BOD	2023/05/04	NC		%	30
8636711	NNA	QC Standard	Total BOD	2023/05/04		95	%	80 - 120
8636711	NNA	Method Blank	Total BOD	2023/05/04	<2		mg/L	
8636711	NNA	RPD	Total BOD	2023/05/04	4.8		%	30
8639142	C_N	Matrix Spike	Nitrite (N)	2023/05/02		108	%	80 - 120
			Nitrate (N)	2023/05/02		92	%	80 - 120
8639142	C_N	Spiked Blank	Nitrite (N)	2023/05/02		107	%	80 - 120
			Nitrate (N)	2023/05/02		92	%	80 - 120
8639142	C_N	Method Blank	Nitrite (N)	2023/05/02	<0.010		mg/L	
			Nitrate (N)	2023/05/02	<0.10		mg/L	
8639142	C_N	RPD	Nitrate (N)	2023/05/02	NC		%	20
8639147	KIT	Spiked Blank	Alkalinity (Total as CaCO3)	2023/05/06		100	%	85 - 115
8639147	KIT	Method Blank	Alkalinity (Total as CaCO3)	2023/05/06	<1.0		mg/L	
8639147	KIT	RPD	Alkalinity (Total as CaCO3)	2023/05/06	2.3		%	20
8639372	KIT	Spiked Blank	Alkalinity (Total as CaCO3)	2023/05/03		100	%	85 - 115
8639372	KIT	Method Blank	Alkalinity (Total as CaCO3)	2023/05/03	<1.0		mg/L	
8639372	KIT	RPD	Alkalinity (Total as CaCO3)	2023/05/03	0.15		%	20
8639391	ADB	Matrix Spike [VRD164-01]	Dissolved Chloride (Cl-)	2023/05/03		99	%	80 - 120
8639391	ADB	Spiked Blank	Dissolved Chloride (Cl-)	2023/05/03		98	%	80 - 120
8639391	ADB	Method Blank	Dissolved Chloride (Cl-)	2023/05/03	<1.0		mg/L	
8639391	ADB	RPD [VRD164-01]	Dissolved Chloride (Cl-)	2023/05/03	1.6		%	20
8639401	ADB	Matrix Spike [VRD164-01]	Dissolved Sulphate (SO4)	2023/05/03		98	%	75 - 125
8639401	ADB	Spiked Blank	Dissolved Sulphate (SO4)	2023/05/03		100	%	80 - 120
8639401	ADB	Method Blank	Dissolved Sulphate (SO4)	2023/05/03	<1.0		mg/L	
8639401	ADB	RPD [VRD164-01]	Dissolved Sulphate (SO4)	2023/05/03	7.2		%	20
8639597	GID	Matrix Spike	Dissolved Organic Carbon	2023/05/02		94	%	80 - 120
8639597	GID	Spiked Blank	Dissolved Organic Carbon	2023/05/02		99	%	80 - 120
8639597	GID	Method Blank	Dissolved Organic Carbon	2023/05/02	<0.40		mg/L	
8639597	GID	RPD	Dissolved Organic Carbon	2023/05/02	1.9		%	20
8639951	PBA	Matrix Spike	Total Arsenic (As)	2023/05/02		102	%	80 - 120
			Total Barium (Ba)	2023/05/02		100	%	80 - 120
			Total Boron (B)	2023/05/02		97	%	80 - 120
			Total Cadmium (Cd)	2023/05/02		95	%	80 - 120
			Total Chromium (Cr)	2023/05/02		98	%	80 - 120
			Total Copper (Cu)	2023/05/02		100	%	80 - 120
			Total Iron (Fe)	2023/05/02		99	%	80 - 120
			Total Lead (Pb)	2023/05/02		90	%	80 - 120
			Total Zinc (Zn)	2023/05/02		94	%	80 - 120
8639951	PBA	Spiked Blank	Total Arsenic (As)	2023/05/02		96	%	80 - 120
			Total Barium (Ba)	2023/05/02		93	%	80 - 120
			Total Boron (B)	2023/05/02		93	%	80 - 120
			Total Cadmium (Cd)	2023/05/02		95	%	80 - 120
			Total Chromium (Cr)	2023/05/02		92	%	80 - 120
			Total Copper (Cu)	2023/05/02		95	%	80 - 120
			Total Iron (Fe)	2023/05/02		93	%	80 - 120
			Total Lead (Pb)	2023/05/02		93	%	80 - 120
			Total Zinc (Zn)	2023/05/02		99	%	80 - 120
8639951	PBA	Method Blank	Total Arsenic (As)	2023/05/02	<0.0010		mg/L	
			Total Barium (Ba)	2023/05/02	<0.0020		mg/L	



BUREAU
VERITAS

Bureau Veritas Job #: C3C0064
Report Date: 2024/04/09

Story Environmental Inc
Client Project #: 048-02-33
Site Location: Sisk Landfill
Sampler Initials: JW

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Boron (B)	2023/05/02	<0.010		mg/L	
			Total Cadmium (Cd)	2023/05/02	<0.000090		mg/L	
			Total Chromium (Cr)	2023/05/02	<0.0050		mg/L	
			Total Copper (Cu)	2023/05/02	<0.00090		mg/L	
			Total Iron (Fe)	2023/05/02	<0.10		mg/L	
			Total Lead (Pb)	2023/05/02	<0.00050		mg/L	
			Total Zinc (Zn)	2023/05/02	<0.0050		mg/L	
8639951	PBA	RPD	Total Cadmium (Cd)	2023/05/02	NC		%	20
			Total Chromium (Cr)	2023/05/02	NC		%	20
			Total Copper (Cu)	2023/05/02	0.88		%	20
			Total Iron (Fe)	2023/05/02	13		%	20
			Total Lead (Pb)	2023/05/02	NC		%	20
			Total Zinc (Zn)	2023/05/02	8.7		%	20
8640088	RTB	QC Standard	Total Dissolved Solids	2023/05/03		97	%	N/A
8640088	RTB	Method Blank	Total Dissolved Solids	2023/05/03	<10		mg/L	
8640088	RTB	RPD	Total Dissolved Solids	2023/05/03	3.7		%	20
8640116	RTB	QC Standard	Total Dissolved Solids	2023/05/03		95	%	N/A
8640116	RTB	Method Blank	Total Dissolved Solids	2023/05/03	<10		mg/L	
8640116	RTB	RPD	Total Dissolved Solids	2023/05/03	5.7		%	20
8641183	N_R	Matrix Spike	Dissolved Arsenic (As)	2023/05/03		100	%	80 - 120
			Dissolved Barium (Ba)	2023/05/03		104	%	80 - 120
			Dissolved Boron (B)	2023/05/03		94	%	80 - 120
			Dissolved Cadmium (Cd)	2023/05/03		103	%	80 - 120
			Dissolved Calcium (Ca)	2023/05/03		NC	%	80 - 120
			Dissolved Chromium (Cr)	2023/05/03		96	%	80 - 120
			Dissolved Copper (Cu)	2023/05/03		101	%	80 - 120
			Dissolved Iron (Fe)	2023/05/03		99	%	80 - 120
			Dissolved Lead (Pb)	2023/05/03		102	%	80 - 120
			Dissolved Magnesium (Mg)	2023/05/03		101	%	80 - 120
			Dissolved Manganese (Mn)	2023/05/03		NC	%	80 - 120
			Dissolved Potassium (K)	2023/05/03		103	%	80 - 120
			Dissolved Sodium (Na)	2023/05/03		NC	%	80 - 120
			Dissolved Zinc (Zn)	2023/05/03		98	%	80 - 120
8641183	N_R	Spiked Blank	Dissolved Arsenic (As)	2023/05/03		101	%	80 - 120
			Dissolved Barium (Ba)	2023/05/03		101	%	80 - 120
			Dissolved Boron (B)	2023/05/03		91	%	80 - 120
			Dissolved Cadmium (Cd)	2023/05/03		100	%	80 - 120
			Dissolved Calcium (Ca)	2023/05/03		95	%	80 - 120
			Dissolved Chromium (Cr)	2023/05/03		96	%	80 - 120
			Dissolved Copper (Cu)	2023/05/03		98	%	80 - 120
			Dissolved Iron (Fe)	2023/05/03		100	%	80 - 120
			Dissolved Lead (Pb)	2023/05/03		100	%	80 - 120
			Dissolved Magnesium (Mg)	2023/05/03		99	%	80 - 120
			Dissolved Manganese (Mn)	2023/05/03		98	%	80 - 120
			Dissolved Potassium (K)	2023/05/03		98	%	80 - 120
			Dissolved Sodium (Na)	2023/05/03		101	%	80 - 120
			Dissolved Zinc (Zn)	2023/05/03		100	%	80 - 120
8641183	N_R	Method Blank	Dissolved Arsenic (As)	2023/05/03	<1.0		ug/L	
			Dissolved Barium (Ba)	2023/05/03	<2.0		ug/L	
			Dissolved Boron (B)	2023/05/03	<10		ug/L	
			Dissolved Cadmium (Cd)	2023/05/03	<0.090		ug/L	



BUREAU
VERITAS

Bureau Veritas Job #: C3C0064
Report Date: 2024/04/09

Story Environmental Inc
Client Project #: 048-02-33
Site Location: Sisk Landfill
Sampler Initials: JW

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Calcium (Ca)	2023/05/03	<200		ug/L	
			Dissolved Chromium (Cr)	2023/05/03	<5.0		ug/L	
			Dissolved Copper (Cu)	2023/05/03	<0.90		ug/L	
			Dissolved Iron (Fe)	2023/05/03	<100		ug/L	
			Dissolved Lead (Pb)	2023/05/03	<0.50		ug/L	
			Dissolved Magnesium (Mg)	2023/05/03	<50		ug/L	
			Dissolved Manganese (Mn)	2023/05/03	<2.0		ug/L	
			Dissolved Potassium (K)	2023/05/03	<200		ug/L	
			Dissolved Sodium (Na)	2023/05/03	<100		ug/L	
			Dissolved Zinc (Zn)	2023/05/03	<5.0		ug/L	
8641183	N_R	RPD	Dissolved Boron (B)	2023/05/03	1.3		%	20
			Dissolved Calcium (Ca)	2023/05/03	2.8		%	20
			Dissolved Iron (Fe)	2023/05/03	NC		%	20
			Dissolved Magnesium (Mg)	2023/05/03	0.59		%	20
			Dissolved Manganese (Mn)	2023/05/03	1.4		%	20
			Dissolved Sodium (Na)	2023/05/03	1.7		%	20
8641475	KPJ	Matrix Spike	Total Ammonia-N	2023/05/04		99	%	75 - 125
8641475	KPJ	Spiked Blank	Total Ammonia-N	2023/05/04		95	%	80 - 120
8641475	KPJ	Method Blank	Total Ammonia-N	2023/05/04	<0.050		mg/L	
8641475	KPJ	RPD	Total Ammonia-N	2023/05/04	NC		%	20
8642065	GID	Matrix Spike	Dissolved Organic Carbon	2023/05/02		96	%	80 - 120
8642065	GID	Spiked Blank	Dissolved Organic Carbon	2023/05/02		102	%	80 - 120
8642065	GID	Method Blank	Dissolved Organic Carbon	2023/05/02	<0.40		mg/L	
8642065	GID	RPD	Dissolved Organic Carbon	2023/05/02	NC		%	20
8642184	GID	Matrix Spike	Dissolved Organic Carbon	2023/05/03		97	%	80 - 120
8642184	GID	Spiked Blank	Dissolved Organic Carbon	2023/05/03		102	%	80 - 120
8642184	GID	Method Blank	Dissolved Organic Carbon	2023/05/03	<0.40		mg/L	
8642184	GID	RPD	Dissolved Organic Carbon	2023/05/03	2.8		%	20
8642934	SPC	Matrix Spike [VRD166-05]	Total Phosphorus	2023/05/03		99	%	80 - 120
8642934	SPC	QC Standard	Total Phosphorus	2023/05/03		96	%	80 - 120
8642934	SPC	Spiked Blank	Total Phosphorus	2023/05/03		99	%	80 - 120
8642934	SPC	Method Blank	Total Phosphorus	2023/05/03	<0.004		mg/L	
8642934	SPC	RPD [VRD166-05]	Total Phosphorus	2023/05/03	10		%	20
8643235	RTY	Matrix Spike	Total Kjeldahl Nitrogen (TKN)	2023/05/03		107	%	80 - 120
8643235	RTY	QC Standard	Total Kjeldahl Nitrogen (TKN)	2023/05/03		100	%	80 - 120
8643235	RTY	Spiked Blank	Total Kjeldahl Nitrogen (TKN)	2023/05/03		100	%	80 - 120
8643235	RTY	Method Blank	Total Kjeldahl Nitrogen (TKN)	2023/05/03	<0.10		mg/L	
8643235	RTY	RPD	Total Kjeldahl Nitrogen (TKN)	2023/05/03	NC		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



BUREAU
VERITAS

Bureau Veritas Job #: C3C0064
Report Date: 2024/04/09

Story Environmental Inc
Client Project #: 048-02-33
Site Location: Sisk Landfill
Sampler Initials: JW

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Anastassia Hamanov, Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.



Bureau Veritas
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel: (905) 817-5700 Toll-free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

28-Apr-23 09:17

Sara Singh



C3C0064

Only:

Bottle Order #:



928793

Project Manager:

Sara Singh

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:	
Company Name: #725 Story Environmental Inc	Company Name: Beata Bradley	Quotation #: C30221	Sara Singh		
Attention: Central Accounting	Attention: Beata Bradley	P.O. #:	Bottle Order #:		
Address: 332 Main Street P.O. Box 716	Address: Haileybury ON P0J 1K0	Project: 048-02-33	C3C0064		
Tel: (705) 672-3324	Tel: (705) 672-3325	Project Name: Sisk Landfill	COC #:		
Email: accounting@storyenvironmental.com; beata.bradley@st	Email: beata.bradley@storyenvironmental.com	Site #:	C#928793-01-01		
		Sampled By:	Sara Singh		

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011) <input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Medium/Fine <input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/Other <input type="checkbox"/> For RSC <input type="checkbox"/> Table _____			Other Regulations <input type="checkbox"/> CCME <input type="checkbox"/> Sanitary Sewer Bylaw <input type="checkbox"/> Reg 558 <input type="checkbox"/> Storm Sewer Bylaw <input type="checkbox"/> MISA <input type="checkbox"/> Municipality _____ <input type="checkbox"/> PWQO <input type="checkbox"/> Reg 406 Table _____ <input type="checkbox"/> Other _____			Special Instructions		
Turnaround Time (TAT) Required: Please provide advance notice for rush projects								
Regular (Standard) TAT: (will be applied if Rush TAT is not specified): <input checked="" type="checkbox"/> Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.								
Job Specific Rush TAT (if applies to entire submission) Date Required: _____ Time Required: _____ <input type="checkbox"/> Rush Confirmation Number: _____ (call lab for #)								

Include Criteria on Certificate of Analysis (Y/N)?						ANALYSIS REQUESTED (PLEASE BE SPECIFIC)										# of Bottles	Comments			
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr / V	Sisk Landfill (048-02-33) - Surface Water	Sisk Landfill (048-2-33) - Groundwater													
1	MW01-5-23 HW01-4-23	26 Apr 23	9:30	GW	Y		X													7
2	MW02-5-23 HW02-4-23	26 Apr 23	10:05	GW	Y		X													7
3	MW03-5-23 HW03-4-23	26 Apr 23	10:30	GW	Y		X													7
4	MW04-5-23 HW04-4-23	26 Apr 23	11:00	GW	Y		X													7
5	SW01-5-23 SW01-4-23	26 Apr 23	10:40	SW	N	X														6
6																				
7																				
8																				
9																				
10																				

* RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	# jars used and not submitted	Laboratory Use Only				
Jillian Wright		27 Apr 23	9:00	M. MUSEAU		2023/04/28	09:17		Time Sensitive	Temperature (°C) on Reel	Custody Seal	Yes	No
										2/2/3	Present	/	
											Intact		

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/CHAIN-CUSTODY-FORMS-COCS.

White: Bureau Veritas Yellow: Client

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS



Your Project #: 048-02-33
 Site Location: Sisk Landfill
 Your C.O.C. #: 951691-01-01

Attention: Beata Bradley

Story Environmental Inc
 332 Main Street
 P.O. Box 716
 Haileybury, ON
 CANADA P0J 1K0

Report Date: 2024/04/09
 Report #: R8100357
 Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C3Z9611

Received: 2023/11/16, 08:58

Sample Matrix: Water
 # Samples Received: 6

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Alkalinity	4	N/A	2023/11/20	CAM SOP-00448	SM 24 2320 B m
Alkalinity	2	N/A	2023/11/22	CAM SOP-00448	SM 24 2320 B m
Biochemical Oxygen Demand (BOD)	6	2023/11/18	2023/11/23	CAM SOP-00427	SM 23 5210B m
Chloride by Automated Colourimetry	2	N/A	2023/11/20	CAM SOP-00463	SM 23 4500-Cl E m
Chloride by Automated Colourimetry	4	N/A	2023/11/21	CAM SOP-00463	SM 23 4500-Cl E m
Dissolved Organic Carbon (DOC) (1)	5	N/A	2023/11/17	CAM SOP-00446	SM 24 5310 B m
Hardness (calculated as CaCO3)	1	N/A	2023/11/22	CAM SOP 00102/00408/00447	SM 2340 B
Hardness (calculated as CaCO3)	5	N/A	2023/11/23	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Metals by ICPMS	5	N/A	2023/11/20	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS	1	2023/11/21	2023/11/21	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	6	N/A	2023/11/21	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (2)	6	N/A	2023/11/20	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Sulphate by Automated Turbidimetry	2	N/A	2023/11/20	CAM SOP-00464	SM 23 4500-SO42- E m
Sulphate by Automated Turbidimetry	4	N/A	2023/11/21	CAM SOP-00464	SM 23 4500-SO42- E m
Total Dissolved Solids	6	2023/11/20	2023/11/21	CAM SOP-00428	SM 23 2540C m
Total Kjeldahl Nitrogen in Water	6	2023/11/17	2023/11/20	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	6	2023/11/17	2023/11/18	CAM SOP-00407	SM 23 4500-P I

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or



Your Project #: 048-02-33
Site Location: Sisk Landfill
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Attention: Beata Bradley

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CANADA P0J 1K0

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CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C3Z9611

Received: 2023/11/16, 08:58

implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.

(2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:

Katherine Szozda, Project Manager
Email: Katherine.Szozda@bureauveritas.com
Phone# (613)274-0573 Ext:7063633

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Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.



BUREAU
VERITAS

Bureau Veritas Job #: C3Z9611
Report Date: 2024/04/09

Story Environmental Inc
Client Project #: 048-02-33
Site Location: Sisk Landfill
Sampler Initials: JW

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		XPS244		XPS245		XPS246		XPS247		
Sampling Date		2023/11/14 11:20		2023/11/14 11:45		2023/11/14 12:15		2023/11/14 12:50		
COC Number		951691-01-01		951691-01-01		951691-01-01		951691-01-01		
	UNITS	MW1	QC Batch	MW2	QC Batch	MW3	QC Batch	MW4	RDL	QC Batch
Calculated Parameters										
Hardness (CaCO3)	mg/L	570	9055785	140	9055785	150	9055785	460	1.0	9055785
Inorganics										
Total Ammonia-N	mg/L	4.7	9056589	0.25	9056589	<0.050	9056589	0.45	0.050	9056589
Total BOD	mg/L	3	9058055	<2	9058055	<2	9058055	<2	2	9058055
Total Dissolved Solids	mg/L	700	9059239	165	9059239	140	9059239	715	10	9059239
Total Kjeldahl Nitrogen (TKN)	mg/L	5.0	9056474	0.45	9056474	0.14	9056474	1.2	0.10	9056474
Dissolved Organic Carbon	mg/L	9.9	9056401	14	9056401	3.9	9056401	12	0.40	9056401
Total Phosphorus	mg/L	0.040	9056464	0.15	9056464	0.025	9056464	0.014	0.004	9056464
Dissolved Sulphate (SO4)	mg/L	11	9058760	1.7	9058760	2.4	9054915	42	1.0	9058760
Alkalinity (Total as CaCO3)	mg/L	530	9056543	140	9058744	130	9056543	440	1.0	9058744
Dissolved Chloride (Cl-)	mg/L	21	9058757	<1.0	9058757	<1.0	9054914	92	1.0	9058757
Nitrite (N)	mg/L	<0.010	9057794	<0.010	9057794	<0.010	9057794	<0.010	0.010	9057794
Nitrate (N)	mg/L	<0.10	9057794	<0.10	9057794	<0.10	9057794	0.56	0.10	9057794
Nitrate + Nitrite (N)	mg/L	<0.10	9057794	<0.10	9057794	<0.10	9057794	0.56	0.10	9057794
RDL = Reportable Detection Limit QC Batch = Quality Control Batch										



BUREAU
VERITAS

Bureau Veritas Job #: C3Z9611
Report Date: 2024/04/09

Story Environmental Inc
Client Project #: 048-02-33
Site Location: Sisk Landfill
Sampler Initials: JW

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		XPS248			XPS249		
Sampling Date		2023/11/14			2023/11/14		
COC Number		951691-01-01			951691-01-01		
	UNITS	SW1	RDL	QC Batch	Y1	RDL	QC Batch
Calculated Parameters							
Hardness (CaCO3)	mg/L	1.3	1.0	9055784	150	1.0	9055785
Inorganics							
Total Ammonia-N	mg/L	0.10	0.050	9056589	<0.050	0.050	9056589
Total BOD	mg/L	<2	2	9058055	<2	2	9058055
Total Dissolved Solids	mg/L	10	10	9059239	145	10	9059239
Total Kjeldahl Nitrogen (TKN)	mg/L	0.32	0.10	9056474	0.10	0.10	9056474
Dissolved Organic Carbon	mg/L				4.1	0.40	9056394
Total Phosphorus	mg/L	0.019	0.004	9056464	0.023	0.004	9056464
Dissolved Sulphate (SO4)	mg/L	2.7	1.0	9054915	2.3	1.0	9058760
Alkalinity (Total as CaCO3)	mg/L	<1.0	1.0	9056543	150	1.0	9056543
Dissolved Chloride (Cl-)	mg/L	<1.0	1.0	9054914	<1.0	1.0	9058757
Nitrite (N)	mg/L	<0.010	0.010	9057794	<0.010	0.010	9057794
Nitrate (N)	mg/L	<0.10	0.10	9057794	<0.10	0.10	9057794
Nitrate + Nitrite (N)	mg/L	<0.10	0.10	9057794	<0.10	0.10	9057794
RDL = Reportable Detection Limit QC Batch = Quality Control Batch							



BUREAU
VERITAS

Bureau Veritas Job #: C3Z9611
Report Date: 2024/04/09

Story Environmental Inc
Client Project #: 048-02-33
Site Location: Sisk Landfill
Sampler Initials: JW

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		XPS244	XPS245	XPS246	XPS247		
Sampling Date		2023/11/14 11:20	2023/11/14 11:45	2023/11/14 12:15	2023/11/14 12:50		
COC Number		951691-01-01	951691-01-01	951691-01-01	951691-01-01		
	UNITS	MW1	MW2	MW3	MW4	RDL	QC Batch
Metals							
Dissolved Arsenic (As)	ug/L	15	<1.0	<1.0	1.4	1.0	9056919
Dissolved Barium (Ba)	ug/L	230	45	13	110	2.0	9056919
Dissolved Boron (B)	ug/L	1100	380	<10	290	10	9056919
Dissolved Cadmium (Cd)	ug/L	<0.090	<0.090	<0.090	<0.090	0.090	9056919
Dissolved Calcium (Ca)	ug/L	190000	49000	46000	150000	200	9056919
Dissolved Chromium (Cr)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	9056919
Dissolved Copper (Cu)	ug/L	2.1	<0.90	1.7	12	0.90	9056919
Dissolved Iron (Fe)	ug/L	21000	5400	350	360	100	9056919
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	9056919
Dissolved Magnesium (Mg)	ug/L	22000	4100	7700	21000	50	9056919
Dissolved Manganese (Mn)	ug/L	970	220	14	1100	2.0	9056919
Dissolved Potassium (K)	ug/L	12000	400	630	11000	200	9056919
Dissolved Sodium (Na)	ug/L	39000	2300	1000	61000	100	9056919
Dissolved Zinc (Zn)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	9056919
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							



BUREAU
VERITAS

Bureau Veritas Job #: C3Z9611

Report Date: 2024/04/09

Story Environmental Inc

Client Project #: 048-02-33

Site Location: Sisk Landfill

Sampler Initials: JW

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		XPS248			XPS249		
Sampling Date		2023/11/14			2023/11/14		
COC Number		951691-01-01			951691-01-01		
	UNITS	SW1	RDL	QC Batch	Y1	RDL	QC Batch
Metals							
Dissolved Arsenic (As)	ug/L				<1.0	1.0	9056919
Total Arsenic (As)	mg/L	<0.0010	0.0010	9061628			
Dissolved Barium (Ba)	ug/L				13	2.0	9056919
Total Barium (Ba)	mg/L	<0.0020	0.0020	9061628			
Dissolved Boron (B)	ug/L				<10	10	9056919
Total Boron (B)	mg/L	<0.010	0.010	9061628			
Dissolved Cadmium (Cd)	ug/L				<0.090	0.090	9056919
Total Cadmium (Cd)	mg/L	<0.000090	0.000090	9061628			
Dissolved Calcium (Ca)	ug/L				46000	200	9056919
Dissolved Chromium (Cr)	ug/L				<5.0	5.0	9056919
Total Chromium (Cr)	mg/L	<0.0050	0.0050	9061628			
Dissolved Copper (Cu)	ug/L				2.5	0.90	9056919
Total Copper (Cu)	mg/L	<0.00090	0.00090	9061628			
Dissolved Iron (Fe)	ug/L				370	100	9056919
Total Iron (Fe)	mg/L	0.15	0.10	9061628			
Dissolved Lead (Pb)	ug/L				<0.50	0.50	9056919
Total Lead (Pb)	mg/L	0.00052	0.00050	9061628			
Dissolved Magnesium (Mg)	ug/L				8000	50	9056919
Dissolved Manganese (Mn)	ug/L				14	2.0	9056919
Dissolved Potassium (K)	ug/L				650	200	9056919
Dissolved Sodium (Na)	ug/L				1100	100	9056919
Dissolved Zinc (Zn)	ug/L				<5.0	5.0	9056919
Total Zinc (Zn)	mg/L	<0.0050	0.0050	9061628			
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							



BUREAU
VERITAS

Bureau Veritas Job #: C3Z9611
Report Date: 2024/04/09

Story Environmental Inc
Client Project #: 048-02-33
Site Location: Sisk Landfill
Sampler Initials: JW

TEST SUMMARY

Bureau Veritas ID: XPS244
Sample ID: MW1
Matrix: Water

Collected: 2023/11/14
Shipped:
Received: 2023/11/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9056543	N/A	2023/11/20	Surinder Rai
Biochemical Oxygen Demand (BOD)	DO	9058055	2023/11/18	2023/11/23	Nusrat Naz
Chloride by Automated Colourimetry	SKAL	9058757	N/A	2023/11/21	Alina Dobreanu
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9056401	N/A	2023/11/17	Gyulshen Idriz
Hardness (calculated as CaCO3)		9055785	N/A	2023/11/23	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	9056919	N/A	2023/11/20	Nan Raykha
Total Ammonia-N	LACH/NH4	9056589	N/A	2023/11/21	Shivani Shivani
Nitrate & Nitrite as Nitrogen in Water	LACH	9057794	N/A	2023/11/20	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	9058760	N/A	2023/11/21	Alina Dobreanu
Total Dissolved Solids	BAL	9059239	2023/11/20	2023/11/21	Razieh Tabesh
Total Kjeldahl Nitrogen in Water	SKAL	9056474	2023/11/17	2023/11/20	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9056464	2023/11/17	2023/11/18	Muskan

Bureau Veritas ID: XPS245
Sample ID: MW2
Matrix: Water

Collected: 2023/11/14
Shipped:
Received: 2023/11/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9058744	N/A	2023/11/22	Surinder Rai
Biochemical Oxygen Demand (BOD)	DO	9058055	2023/11/18	2023/11/23	Nusrat Naz
Chloride by Automated Colourimetry	SKAL	9058757	N/A	2023/11/21	Alina Dobreanu
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9056401	N/A	2023/11/17	Gyulshen Idriz
Hardness (calculated as CaCO3)		9055785	N/A	2023/11/23	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	9056919	N/A	2023/11/20	Nan Raykha
Total Ammonia-N	LACH/NH4	9056589	N/A	2023/11/21	Shivani Shivani
Nitrate & Nitrite as Nitrogen in Water	LACH	9057794	N/A	2023/11/20	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	9058760	N/A	2023/11/21	Alina Dobreanu
Total Dissolved Solids	BAL	9059239	2023/11/20	2023/11/21	Razieh Tabesh
Total Kjeldahl Nitrogen in Water	SKAL	9056474	2023/11/17	2023/11/20	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9056464	2023/11/17	2023/11/18	Muskan

Bureau Veritas ID: XPS246
Sample ID: MW3
Matrix: Water

Collected: 2023/11/14
Shipped:
Received: 2023/11/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9056543	N/A	2023/11/20	Surinder Rai
Biochemical Oxygen Demand (BOD)	DO	9058055	2023/11/18	2023/11/23	Nusrat Naz
Chloride by Automated Colourimetry	SKAL	9054914	N/A	2023/11/20	Massarat Jan
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9056401	N/A	2023/11/17	Gyulshen Idriz
Hardness (calculated as CaCO3)		9055785	N/A	2023/11/23	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	9056919	N/A	2023/11/20	Nan Raykha
Total Ammonia-N	LACH/NH4	9056589	N/A	2023/11/21	Shivani Shivani
Nitrate & Nitrite as Nitrogen in Water	LACH	9057794	N/A	2023/11/20	Chandra Nandlal



BUREAU
VERITAS

Bureau Veritas Job #: C3Z9611
Report Date: 2024/04/09

Story Environmental Inc
Client Project #: 048-02-33
Site Location: Sisk Landfill
Sampler Initials: JW

TEST SUMMARY

Bureau Veritas ID: XPS246
Sample ID: MW3
Matrix: Water

Collected: 2023/11/14
Shipped:
Received: 2023/11/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sulphate by Automated Turbidimetry	SKAL	9054915	N/A	2023/11/20	Massarat Jan
Total Dissolved Solids	BAL	9059239	2023/11/20	2023/11/21	Razieh Tabesh
Total Kjeldahl Nitrogen in Water	SKAL	9056474	2023/11/17	2023/11/20	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9056464	2023/11/17	2023/11/18	Muskan

Bureau Veritas ID: XPS246 Dup
Sample ID: MW3
Matrix: Water

Collected: 2023/11/14
Shipped:
Received: 2023/11/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Dissolved Solids	BAL	9059239	2023/11/20	2023/11/21	Razieh Tabesh

Bureau Veritas ID: XPS247
Sample ID: MW4
Matrix: Water

Collected: 2023/11/14
Shipped:
Received: 2023/11/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9058744	N/A	2023/11/22	Surinder Rai
Biochemical Oxygen Demand (BOD)	DO	9058055	2023/11/18	2023/11/23	Nusrat Naz
Chloride by Automated Colourimetry	SKAL	9058757	N/A	2023/11/21	Alina Dobreanu
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9056401	N/A	2023/11/17	Gyulshen Idriz
Hardness (calculated as CaCO3)		9055785	N/A	2023/11/23	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	9056919	N/A	2023/11/20	Nan Raykha
Total Ammonia-N	LACH/NH4	9056589	N/A	2023/11/21	Shivani Shivani
Nitrate & Nitrite as Nitrogen in Water	LACH	9057794	N/A	2023/11/20	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	9058760	N/A	2023/11/21	Alina Dobreanu
Total Dissolved Solids	BAL	9059239	2023/11/20	2023/11/21	Razieh Tabesh
Total Kjeldahl Nitrogen in Water	SKAL	9056474	2023/11/17	2023/11/20	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9056464	2023/11/17	2023/11/18	Muskan

Bureau Veritas ID: XPS248
Sample ID: SW1
Matrix: Water

Collected: 2023/11/14
Shipped:
Received: 2023/11/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9056543	N/A	2023/11/20	Surinder Rai
Biochemical Oxygen Demand (BOD)	DO	9058055	2023/11/18	2023/11/23	Nusrat Naz
Chloride by Automated Colourimetry	SKAL	9054914	N/A	2023/11/20	Massarat Jan
Hardness (calculated as CaCO3)		9055784	N/A	2023/11/22	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	9061628	2023/11/21	2023/11/21	Azita Fazaeli
Total Ammonia-N	LACH/NH4	9056589	N/A	2023/11/21	Shivani Shivani
Nitrate & Nitrite as Nitrogen in Water	LACH	9057794	N/A	2023/11/20	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	9054915	N/A	2023/11/20	Massarat Jan
Total Dissolved Solids	BAL	9059239	2023/11/20	2023/11/21	Razieh Tabesh



BUREAU
VERITAS

Bureau Veritas Job #: C3Z9611
Report Date: 2024/04/09

Story Environmental Inc
Client Project #: 048-02-33
Site Location: Sisk Landfill
Sampler Initials: JW

TEST SUMMARY

Bureau Veritas ID: XPS248
Sample ID: SW1
Matrix: Water

Collected: 2023/11/14
Shipped:
Received: 2023/11/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Kjeldahl Nitrogen in Water	SKAL	9056474	2023/11/17	2023/11/20	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9056464	2023/11/17	2023/11/18	Muskan

Bureau Veritas ID: XPS249
Sample ID: Y1
Matrix: Water

Collected: 2023/11/14
Shipped:
Received: 2023/11/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9056543	N/A	2023/11/20	Surinder Rai
Biochemical Oxygen Demand (BOD)	DO	9058055	2023/11/18	2023/11/23	Nusrat Naz
Chloride by Automated Colourimetry	SKAL	9058757	N/A	2023/11/21	Alina Dobreanu
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9056394	N/A	2023/11/17	Gyulshen Idriz
Hardness (calculated as CaCO3)		9055785	N/A	2023/11/23	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	9056919	N/A	2023/11/20	Nan Raykha
Total Ammonia-N	LACH/NH4	9056589	N/A	2023/11/21	Shivani Shivani
Nitrate & Nitrite as Nitrogen in Water	LACH	9057794	N/A	2023/11/20	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	9058760	N/A	2023/11/21	Alina Dobreanu
Total Dissolved Solids	BAL	9059239	2023/11/20	2023/11/21	Razieh Tabesh
Total Kjeldahl Nitrogen in Water	SKAL	9056474	2023/11/17	2023/11/20	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9056464	2023/11/17	2023/11/18	Muskan

Bureau Veritas ID: XPS249 Dup
Sample ID: Y1
Matrix: Water

Collected: 2023/11/14
Shipped:
Received: 2023/11/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Biochemical Oxygen Demand (BOD)	DO	9058055	2023/11/18	2023/11/23	Nusrat Naz



BUREAU
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Story Environmental Inc
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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.7°C
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Revised Report [2024/04/09]: Sample(s) ID revised as per client.

Results relate only to the items tested.



BUREAU
VERITAS

Bureau Veritas Job #: C3Z9611
Report Date: 2024/04/09

Story Environmental Inc
Client Project #: 048-02-33
Site Location: Sisk Landfill
Sampler Initials: JW

QUALITY ASSURANCE REPORT

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
	9054914	MJ1	Matrix Spike	Dissolved Chloride (Cl-)	2023/11/20		NC	%	80 - 120
	9054914	MJ1	Spiked Blank	Dissolved Chloride (Cl-)	2023/11/20		94	%	80 - 120
	9054914	MJ1	Method Blank	Dissolved Chloride (Cl-)	2023/11/20	<1.0		mg/L	
	9054914	MJ1	RPD	Dissolved Chloride (Cl-)	2023/11/20	0.49		%	20
	9054915	MJ1	Matrix Spike	Dissolved Sulphate (SO4)	2023/11/20		NC	%	75 - 125
	9054915	MJ1	Spiked Blank	Dissolved Sulphate (SO4)	2023/11/20		94	%	80 - 120
	9054915	MJ1	Method Blank	Dissolved Sulphate (SO4)	2023/11/20	<1.0		mg/L	
	9054915	MJ1	RPD	Dissolved Sulphate (SO4)	2023/11/20	0.75		%	20
	9056394	GID	Matrix Spike	Dissolved Organic Carbon	2023/11/17		88	%	80 - 120
	9056394	GID	Spiked Blank	Dissolved Organic Carbon	2023/11/17		92	%	80 - 120
	9056394	GID	Method Blank	Dissolved Organic Carbon	2023/11/17	<0.40		mg/L	
	9056394	GID	RPD	Dissolved Organic Carbon	2023/11/17	4.4		%	20
	9056401	GID	Matrix Spike	Dissolved Organic Carbon	2023/11/17		92	%	80 - 120
	9056401	GID	Spiked Blank	Dissolved Organic Carbon	2023/11/17		97	%	80 - 120
	9056401	GID	Method Blank	Dissolved Organic Carbon	2023/11/17	<0.40		mg/L	
	9056401	GID	RPD	Dissolved Organic Carbon	2023/11/17	3.4		%	20
	9056464	MUM	Matrix Spike	Total Phosphorus	2023/11/18		98	%	80 - 120
	9056464	MUM	QC Standard	Total Phosphorus	2023/11/18		111	%	80 - 120
	9056464	MUM	Spiked Blank	Total Phosphorus	2023/11/18		109	%	80 - 120
	9056464	MUM	Method Blank	Total Phosphorus	2023/11/18	<0.004		mg/L	
	9056464	MUM	RPD	Total Phosphorus	2023/11/18	1.6		%	20
	9056474	RTY	Matrix Spike	Total Kjeldahl Nitrogen (TKN)	2023/11/20		100	%	80 - 120
	9056474	RTY	QC Standard	Total Kjeldahl Nitrogen (TKN)	2023/11/20		99	%	80 - 120
	9056474	RTY	Spiked Blank	Total Kjeldahl Nitrogen (TKN)	2023/11/20		96	%	80 - 120
	9056474	RTY	Method Blank	Total Kjeldahl Nitrogen (TKN)	2023/11/20	<0.10		mg/L	
	9056474	RTY	RPD	Total Kjeldahl Nitrogen (TKN)	2023/11/20	NC		%	20
	9056543	SAU	Spiked Blank	Alkalinity (Total as CaCO3)	2023/11/20		97	%	85 - 115
	9056543	SAU	Method Blank	Alkalinity (Total as CaCO3)	2023/11/20	<1.0		mg/L	
	9056543	SAU	RPD	Alkalinity (Total as CaCO3)	2023/11/20	0.81		%	20
	9056589	SSV	Matrix Spike	Total Ammonia-N	2023/11/21		94	%	75 - 125
	9056589	SSV	Spiked Blank	Total Ammonia-N	2023/11/21		98	%	80 - 120
	9056589	SSV	Method Blank	Total Ammonia-N	2023/11/21	<0.050		mg/L	
	9056589	SSV	RPD	Total Ammonia-N	2023/11/21	0.71		%	20
	9056919	N_R	Matrix Spike	Dissolved Arsenic (As)	2023/11/20		101	%	80 - 120
				Dissolved Barium (Ba)	2023/11/20		NC	%	80 - 120
				Dissolved Boron (B)	2023/11/20		NC	%	80 - 120
				Dissolved Cadmium (Cd)	2023/11/20		107	%	80 - 120
				Dissolved Calcium (Ca)	2023/11/20		NC	%	80 - 120
				Dissolved Chromium (Cr)	2023/11/20		100	%	80 - 120
				Dissolved Copper (Cu)	2023/11/20		104	%	80 - 120
				Dissolved Iron (Fe)	2023/11/20		99	%	80 - 120
				Dissolved Lead (Pb)	2023/11/20		97	%	80 - 120
				Dissolved Magnesium (Mg)	2023/11/20		NC	%	80 - 120
				Dissolved Manganese (Mn)	2023/11/20		97	%	80 - 120
				Dissolved Potassium (K)	2023/11/20		106	%	80 - 120
				Dissolved Sodium (Na)	2023/11/20		NC	%	80 - 120
				Dissolved Zinc (Zn)	2023/11/20		97	%	80 - 120
	9056919	N_R	Spiked Blank	Dissolved Arsenic (As)	2023/11/20		100	%	80 - 120
				Dissolved Barium (Ba)	2023/11/20		101	%	80 - 120
				Dissolved Boron (B)	2023/11/20		102	%	80 - 120
				Dissolved Cadmium (Cd)	2023/11/20		104	%	80 - 120



BUREAU
VERITAS

Bureau Veritas Job #: C3Z9611
Report Date: 2024/04/09

Story Environmental Inc
Client Project #: 048-02-33
Site Location: Sisk Landfill
Sampler Initials: JW

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Calcium (Ca)	2023/11/20		103	%	80 - 120
			Dissolved Chromium (Cr)	2023/11/20		101	%	80 - 120
			Dissolved Copper (Cu)	2023/11/20		104	%	80 - 120
			Dissolved Iron (Fe)	2023/11/20		100	%	80 - 120
			Dissolved Lead (Pb)	2023/11/20		100	%	80 - 120
			Dissolved Magnesium (Mg)	2023/11/20		98	%	80 - 120
			Dissolved Manganese (Mn)	2023/11/20		97	%	80 - 120
			Dissolved Potassium (K)	2023/11/20		103	%	80 - 120
			Dissolved Sodium (Na)	2023/11/20		99	%	80 - 120
			Dissolved Zinc (Zn)	2023/11/20		99	%	80 - 120
9056919	N_R	Method Blank	Dissolved Arsenic (As)	2023/11/20	<1.0		ug/L	
			Dissolved Barium (Ba)	2023/11/20	<2.0		ug/L	
			Dissolved Boron (B)	2023/11/20	<10		ug/L	
			Dissolved Cadmium (Cd)	2023/11/20	<0.090		ug/L	
			Dissolved Calcium (Ca)	2023/11/20	<200		ug/L	
			Dissolved Chromium (Cr)	2023/11/20	<5.0		ug/L	
			Dissolved Copper (Cu)	2023/11/20	<0.90		ug/L	
			Dissolved Iron (Fe)	2023/11/20	<100		ug/L	
			Dissolved Lead (Pb)	2023/11/20	<0.50		ug/L	
			Dissolved Magnesium (Mg)	2023/11/20	<50		ug/L	
			Dissolved Manganese (Mn)	2023/11/20	<2.0		ug/L	
			Dissolved Potassium (K)	2023/11/20	<200		ug/L	
			Dissolved Sodium (Na)	2023/11/20	<100		ug/L	
			Dissolved Zinc (Zn)	2023/11/20	<5.0		ug/L	
9056919	N_R	RPD	Dissolved Boron (B)	2023/11/20	3.6		%	20
			Dissolved Calcium (Ca)	2023/11/20	3.0		%	20
			Dissolved Chromium (Cr)	2023/11/20	NC		%	20
			Dissolved Iron (Fe)	2023/11/20	0.41		%	20
			Dissolved Magnesium (Mg)	2023/11/20	1.9		%	20
			Dissolved Manganese (Mn)	2023/11/20	0.26		%	20
			Dissolved Potassium (K)	2023/11/20	0.35		%	20
			Dissolved Sodium (Na)	2023/11/20	0.70		%	20
			Dissolved Zinc (Zn)	2023/11/20	NC		%	20
9057794	C_N	Matrix Spike	Nitrite (N)	2023/11/20		104	%	80 - 120
			Nitrate (N)	2023/11/20		91	%	80 - 120
9057794	C_N	Spiked Blank	Nitrite (N)	2023/11/20		106	%	80 - 120
			Nitrate (N)	2023/11/20		92	%	80 - 120
9057794	C_N	Method Blank	Nitrite (N)	2023/11/20	<0.010		mg/L	
			Nitrate (N)	2023/11/20	<0.10		mg/L	
9057794	C_N	RPD	Nitrate (N)	2023/11/20	NC		%	20
9058055	NNA	QC Standard	Total BOD	2023/11/23		97	%	80 - 120
9058055	NNA	Method Blank	Total BOD	2023/11/23	<2		mg/L	
9058055	NNA	RPD [XPS249-04]	Total BOD	2023/11/23	NC		%	30
9058744	SAU	Spiked Blank	Alkalinity (Total as CaCO3)	2023/11/22		93	%	85 - 115
9058744	SAU	Method Blank	Alkalinity (Total as CaCO3)	2023/11/22	<1.0		mg/L	
9058744	SAU	RPD	Alkalinity (Total as CaCO3)	2023/11/22	2.6		%	20
9058757	ADB	Matrix Spike	Dissolved Chloride (Cl-)	2023/11/21		NC	%	80 - 120
9058757	ADB	Spiked Blank	Dissolved Chloride (Cl-)	2023/11/21		95	%	80 - 120
9058757	ADB	Method Blank	Dissolved Chloride (Cl-)	2023/11/21	<1.0		mg/L	
9058757	ADB	RPD	Dissolved Chloride (Cl-)	2023/11/21	0.094		%	20
9058760	ADB	Matrix Spike	Dissolved Sulphate (SO4)	2023/11/21		NC	%	75 - 125



BUREAU
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Story Environmental Inc
Client Project #: 048-02-33
Site Location: Sisk Landfill
Sampler Initials: JW

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9058760	ADB	Spiked Blank	Dissolved Sulphate (SO4)	2023/11/21		96	%	80 - 120
9058760	ADB	Method Blank	Dissolved Sulphate (SO4)	2023/11/21	<1.0		mg/L	
9058760	ADB	RPD	Dissolved Sulphate (SO4)	2023/11/21	0.44		%	20
9059239	RTB	Spiked Blank	Total Dissolved Solids	2023/11/21		100	%	80 - 120
9059239	RTB	Method Blank	Total Dissolved Solids	2023/11/21	<10		mg/L	
9059239	RTB	RPD [XPS246-02]	Total Dissolved Solids	2023/11/21	3.5		%	20
9061628	AFZ	Matrix Spike	Total Arsenic (As)	2023/11/21		99	%	80 - 120
			Total Barium (Ba)	2023/11/21		94	%	80 - 120
			Total Boron (B)	2023/11/21		101	%	80 - 120
			Total Cadmium (Cd)	2023/11/21		98	%	80 - 120
			Total Chromium (Cr)	2023/11/21		96	%	80 - 120
			Total Copper (Cu)	2023/11/21		95	%	80 - 120
			Total Iron (Fe)	2023/11/21		97	%	80 - 120
			Total Lead (Pb)	2023/11/21		99	%	80 - 120
			Total Zinc (Zn)	2023/11/21		101	%	80 - 120
9061628	AFZ	Spiked Blank	Total Arsenic (As)	2023/11/21		102	%	80 - 120
			Total Barium (Ba)	2023/11/21		96	%	80 - 120
			Total Boron (B)	2023/11/21		104	%	80 - 120
			Total Cadmium (Cd)	2023/11/21		100	%	80 - 120
			Total Chromium (Cr)	2023/11/21		98	%	80 - 120
			Total Copper (Cu)	2023/11/21		97	%	80 - 120
			Total Iron (Fe)	2023/11/21		100	%	80 - 120
			Total Lead (Pb)	2023/11/21		100	%	80 - 120
			Total Zinc (Zn)	2023/11/21		105	%	80 - 120
9061628	AFZ	Method Blank	Total Arsenic (As)	2023/11/21	<0.0010		mg/L	
			Total Barium (Ba)	2023/11/21	<0.0020		mg/L	
			Total Boron (B)	2023/11/21	<0.010		mg/L	
			Total Cadmium (Cd)	2023/11/21	<0.000090		mg/L	
			Total Chromium (Cr)	2023/11/21	<0.0050		mg/L	
			Total Copper (Cu)	2023/11/21	<0.00090		mg/L	
			Total Iron (Fe)	2023/11/21	<0.010		mg/L	
			Total Lead (Pb)	2023/11/21	<0.00050		mg/L	
			Total Zinc (Zn)	2023/11/21	<0.0050		mg/L	
9061628	AFZ	RPD	Total Arsenic (As)	2023/11/21	NC		%	20
			Total Barium (Ba)	2023/11/21	NC		%	20
			Total Boron (B)	2023/11/21	1.2		%	20
			Total Cadmium (Cd)	2023/11/21	NC		%	20
			Total Chromium (Cr)	2023/11/21	NC		%	20
			Total Copper (Cu)	2023/11/21	NC		%	20
			Total Iron (Fe)	2023/11/21	NC		%	20
			Total Lead (Pb)	2023/11/21	NC		%	20



BUREAU
VERITAS

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Sampler Initials: JW

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
				Total Zinc (Zn)	2023/11/21	NC		%	20
<p>Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.</p> <p>Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.</p> <p>QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.</p> <p>Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)</p> <p>NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).</p>									



BUREAU
VERITAS

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Anastassia Hamanov, Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.



CHAIN OF CUSTODY



NONT-2023-11-849

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:	
Company Name: #725 Story Environmental Inc	Attention: Central Accounting	Company Name: Beata Bradley	Attention: Beata Bradley	Quotation #: C30221	
Address: 332 Main Street P.O. Box 716	Address: Haileybury ON P0J 1K0	Address:	Address:	P.O. #: 048-02-33	
Tel: (705) 672-3325	Fax: (705) 672-3325	Tel:	Fax:	Project Name: Sisk Landfill	
Email: accounting@storyenvironmental.com;beata.bradley@st	Email: beata.bradley@storyenvironmental.com;stephanie.derui	Email:		Site #: Sisk Landfill	
				Sampled By:	



Katherine Szozda

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)		Other Regulations		Special Instructions
<input type="checkbox"/> Table 1	<input type="checkbox"/> Res/Park	<input type="checkbox"/> CCME	<input type="checkbox"/> Sanitary Sewer Bylaw	
<input type="checkbox"/> Table 2	<input type="checkbox"/> Ind/Comm	<input type="checkbox"/> Reg 558	<input type="checkbox"/> Storm Sewer Bylaw	
<input type="checkbox"/> Table 3	<input type="checkbox"/> Agri/Other	<input type="checkbox"/> MISA	Municipality _____	
<input type="checkbox"/> Table	<input type="checkbox"/> For RSC	<input type="checkbox"/> PWOO	<input type="checkbox"/> Reg 406 Table _____	
		<input type="checkbox"/> Other		

Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals Hg / Cr VI	ANALYSIS REQUESTED (PLEASE BE SPECIFIC)										# of Bottles	Comments
						Sisk Landfill (048-02-33) - Surface Water	Sisk Landfill (048-2-33) - Groundwater										
1	MW01	14 Nov 23	11:20	GW	Y		X										
2	MW02	14 Nov 23	11:45	GW	Y		X										
3	MW03	14 Nov 23	12:15	GW	Y		X										
4	MW04	14 Nov 23	12:50	GW	Y		X										
5	SW01	14 Nov 23		SW	N	X											
6	Y1	14 Nov 23		GW	Y		X										
7																	
8																	
9																	
10																	

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects.

Regular (Standard) TAT:
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests.

Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 6 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: _____ Time Required: _____
Rush Confirmation Number: _____ (call lab for it)

* RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	# jars used and not submitted	Laboratory Use Only				
Jillian Wright		15 Nov 23	14:00	RANEE RANEE KAOR BRAR		30 Nov 23	08:58		Time Sensitive	Temperature (°C) on Reel	Custody Seal Present	Yes	No
										3/6/5			

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COG-TERMS-AND-CONDITIONS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/CHAIN-CUSTODY-FORMS-COCS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

White: Bureau Veritas Yellow: Client

Appendix D

Groundwater Chemistry

Table D.1 MW1 Analytical Data 2001-2023

Parameter	Sample ID Units	MW1																							
		05 Jul 2001	16 Oct 2008	14 Jul 2009	20 Oct 2009	15 Jun 2010	14 Oct 2010	22 Jun 2011	27 Oct 2011	09 Jun 2016	26 Oct 2016	12 Jul 2017	05 Oct 2017	24 Jul 2018	12 Oct 2018	19 Jun 2019	10 Oct 2019	17 Jun 2020	24 Sep 2020	10 Jun 2021	27 Sep 2021	15 Jun 2022	08 Nov 2022	26 Apr 2023	14 Nov 2023
Conductivity Field	µS/cm	-	859	1216	1236	1167	1183	1232	505	1285	1132	1318	1448	1445	741	1022	1204	1295	1198	1242	900	1029	1020	816.7	1669
Dissolved Oxygen Field	mg/L	-	2.7	2.7	2.6	3.5	2.7	2.6	5.4	3.4	4.4	5.3	4.8	2.5	2.3	3.4	5.9	2.0	2.1	2.6	2.4	3.3	6.5	5.7	5.3
ORP Field	mV	-	-	-	-	-	-	-	-	-49	-12	-37	-62	-46	-26	-	-57	-	-23.1	-73	-56	-75	-48	-41	-39
pH Field	s.u.	-	7.1	6.8	6.9	7	6.9	7.3	7.1	6.8	6.8	6.5	6.7	7.4	6.7	6.8	6.9	6.8	7	6.8	6.5	6.8	6.8	7.0	6.8
Temperature Field	°C	-	9.7	9.9	9.6	8.3	9.8	8	9.2	7.1	9.9	9	10	9.1	9.8	7	9.7	6.5	9.9	6.7	11	7.3	8.3	3.3	8.2
Total Alkalinity (as CaCO3)	mg/L	553	563	622	695	611	622	669	300	580	520	630	680	660	410	530	620	590	580	640	420	530	460	590	530
Total Ammonia (as N)	mg/L	< 0.03	0.11	0.15	0.13	0.07	0.06	-	< 0.05	1.8	1.6	3.3	4	4.2	1.2	3.8	6	4.1	2.8	3.3	2.8	3.1	3.4	2.9	4.7
Biological Oxygen Demand	mg/L	-	< 2	4	< 2	5	5	5	< 2	-	-	-	-	-	-	-	-	-	-	-	-	< 2	3	< 2	3
Chloride	mg/L	18.4	13	11	11	25	25	15	7	55	38	55	63	42	25	16	32	32	34	22	15	16	14	10	21
Dissolved Organic Carbon	mg/L	11	10	12	12	12	11	11	11	11	10	13	15	10	10	8.1	11	11	9.9	7.8	9.3	9.1	10	7.5	9.9
Hardness (as CaCO3)	mg/L	516	500	610	670	690	650	680	330	540	480	600	640	610	340	600	580	650	590	600	440	580	530	530	570
Nitrate (as N)	mg/L	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.10	< 0.10
Nitrate + Nitrite (as N)	mg/L	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.10	< 0.10	< 0.10
Nitrite (as N)	mg/L	< 0.2	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.010	< 0.010	< 0.010
Organic Nitrogen (Calculated)	mg/L	-	1.19	1.55	0.97	1.23	1.14	-	0.9	0.6	0.7	0.9	0.5	0.8	0.2	0.6	0.6	1.2	0.5	0.2	0.5	0.6	0.50	1	0.3
Phosphorus	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.44	0.12	0.34	0.04
Sulphate	mg/L	30	19	26	21	20	14	1	5	63	45	38	45	45	25	27	35	66	73	35	31	11	14	4.6	11
Total Dissolved Solids	mg/L	623	590	750	785	750	740	747	360	858	638	784	905	835	500	760	600	815	825	970	540	645	565	355	700
Total Kjeldahl Nitrogen	mg/L	-	1.3	1.7	1.1	1.3	1.2	-	0.9	2.4	2.3	4.2	4.5	5	1.4	4.4	6.6	5.3	3.3	3.5	3.3	3.7	3.9	3.9	5
Arsenic	mg/L	-	0.002	0.004	0.004	0.005	0.005	0.005	0.004	0.004	0.011	0.012	0.03	0.002	0.005	0.009	0.021	0.011	0.015	0.011	0.017	0.014	0.025	0.0078	0.015
Dissolved Barium	mg/L	0.084	0.071	0.098	0.1	0.095	0.097	0.11	0.045	0.17	0.16	0.22	0.23	0.14	0.1	0.2	0.26	0.24	0.25	0.19	0.2	0.2	0.22	0.16	0.23
Dissolved Boron	mg/L	0.28	0.48	0.6	0.65	0.4	0.43	0.52	0.22	0.86	0.74	0.88	1.1	0.88	0.42	0.93	1.1	1.1	1.2	0.87	0.92	1.1	1.2	0.73	1.1
Dissolved Cadmium	mg/L	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00011	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.000090	< 0.000090
Dissolved Calcium	mg/L	174	170	210	230	240	230	240	120	190	170	210	220	210	120	210	200	230	210	210	150	200	180	170	190
Dissolved Chromium	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0050	< 0.0050
Dissolved Copper	mg/L	0.014	0.003	0.004	0.004	0.005	0.005	0.006	0.011	0.002	0.002	0.002	0.002	0.001	0.003	0.002	< 0.001	0.002	0.002	0.001	0.001	0.001	0.007	0.0023	0.0021
Dissolved Iron	mg/L	0.1	0.6	1	1.3	2	1.3	2	0.3	26	25	35	44	0.6	5.1	26	38	35	39	31	32	28	32	9.7	21
Dissolved Lead	mg/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.00050	< 0.00050	
Dissolved Magnesium	mg/L	20	15	18	20	22	21	21	9.5	17	14	20	20	20	12	18	20	20	18	18	13	20	18	23	22
Dissolved Manganese	mg/L	6	3.2	3.6	3.6	3.8	3.2	3.7	0.79	1.6	1.8	1.5	1.5	1.5	0.59	1.3	1.2	1.4	1.2	1.4	0.84	1.1	0.91	0.67	0.97
Dissolved Potassium	mg/L	3	5.6	6.4	6.7	7.2	5.9	6.6	3	11	10	13	15	14	3.4	11	15	14	13	12	10	11	14	8	12
Dissolved Sodium	mg/L	22.6	16	21	22	13	16	21	10	71	58	61	88	45	24	38	54	42	53	24	28	33	49	29	39
Dissolved Zinc	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0050	< 0.0050	

Notes:
1. "-" = data is not available

Source:
R:\SEI048 Temagami02_Sisk\Work\2024\048_Sisk_GW Quality_Crosstab_10Jan24_EK.xlsx\MW1

Table D.2 MW2 Analytical Data 2001-2023

Parameter	Sample ID Units	MW2																							
		05 Jul 2001	16 Oct 2008	14 Jul 2009	20 Oct 2009	15 Jun 2010	14 Oct 2010	22 Jun 2011	27 Oct 2011	09 Jun 2016	26 Oct 2016	12 Jul 2017	05 Oct 2017	24 Jul 2018	12 Oct 2018	19 Jun 2019	10 Oct 2019	17 Jun 2020	24 Sep 2020	10 Jun 2021	27 Sep 2021	15 Jun 2022	08 Nov 2022	26 Apr 2023	14 Nov 2023
Conductivity Field	µS/cm	-	493	458	613	347	544	442	480	306	369	408	236	318	331	314	261	310	274	325	251	376	273	252.9	291.3
Dissolved Oxygen Field	mg/L	-	2.2	2.7	2.9	3.0	2.6	3.1	4.0	0.4	0.3	0.4	0.5	0.3	0.2	0.2	0.4	0.3	0.4	2.0	2.4	2.0	5.7	3.6	4.1
ORP Field	mV	-	-	-	-	-	-	-	-	-19	68	-10	22	19	15	-	41	-	38	-13	99	-21	41	-13	-43
pH Field	s.u.	-	6.7	6.7	6.8	6.8	6.4	6.5	6.2	6.5	6.1	6.3	5.9	7.1	6.1	6.4	5.9	6.4	6.4	6.3	5.6	6.4	6.0	6.7	6.3
Temperature Field	°C	-	8.7	7.2	8.6	6.6	9.4	7	9	5.5	8.7	6.9	8.7	7.2	9	6.1	9	6	8.8	5.9	9.4	6.1	8	4.3	8
Total Alkalinity (as CaCO3)	mg/L	264	243	196	278	152	247	201	128	150	140	190	110	150	130	160	100	160	120	150	89	180	110	120	140
Total Ammonia (as N)	mg/L	1.89	1.4	0.83	0.84	1.1	1.4	-	1	0.51	0.68	0.46	3.5	1	0.31	0.29	1.1	0.31	0.48	0.32	0.31	0.28	0.25	0.18	0.25
Biological Oxygen Demand	mg/L	-	7	9	12	8	7	2	4	-	-	-	-	-	-	-	-	-	-	-	-	< 2	< 2	< 2	< 2
Chloride	mg/L	3.1	2	< 30	2	2	2	2	2	< 1	1.1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	2.3	< 1	1.7	1.5	< 1.0	< 1.0
Dissolved Organic Carbon	mg/L	34	15	12	11	14	13	12	15	9.8	11	7.7	23	15	17	13	19	13	20	9.4	17	9.9	18	12	14
Hardness (as CaCO3)	mg/L	224	190	170	270	160	240	200	210	140	180	180	87	140	140	160	120	150	130	150	120	190	130	120	140
Nitrate (as N)	mg/L	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.10	< 0.10	
Nitrate + Nitrite (as N)	mg/L	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.10	< 0.10	
Nitrite (as N)	mg/L	< 0.2	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.010	< 0.010	
Organic Nitrogen (Calculated)	mg/L	-	1.3	1.17	0.66	0.9	1.4	-	1.1	0.39	0.32	0.34	0.5	0.3	0.19	0.21	0.4	0.29	0.42	0.18	0.39	0.22	0.45	0.34	0.2
Phosphorus	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.054	0.18	0.029	0.15
Sulphate	mg/L	7	< 1	< 30	< 1	< 1	14	2	81	< 1	50	< 1	< 1	< 1	26	< 1	16	< 1	8	< 1	31	< 1	18	3.2	1.7
Total Dissolved Solids	mg/L	277	240	240	340	204	346	239	284	172	232	214	240	210	220	230	170	215	195	180	165	230	185	120	165
Total Kjeldahl Nitrogen	mg/L	-	2.7	2	1.5	2	2.8	-	2.1	0.9	1	0.8	4	1.3	0.5	0.5	1.5	0.6	0.9	0.5	0.7	0.5	0.7	0.52	0.45
Arsenic	mg/L	-	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.001	0.005	< 0.001	0.003	< 0.0010	< 0.0010
Dissolved Barium	mg/L	0.047	0.049	0.053	0.093	0.046	0.08	0.061	0.082	0.048	0.069	0.06	0.043	0.05	0.051	0.057	0.051	0.053	0.054	0.054	0.053	0.061	0.049	0.037	0.045
Dissolved Boron	mg/L	0.51	0.42	0.46	0.49	0.32	0.71	0.57	1	0.28	0.69	0.38	0.88	0.58	0.44	0.31	0.79	0.29	0.57	0.29	0.62	0.32	0.48	0.22	0.38
Dissolved Cadmium	mg/L	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.000090	< 0.000090
Dissolved Calcium	mg/L	60.1	56	52	85	51	77	65	68	47	62	61	24	47	49	56	40	52	46	51	40	65	45	43	49
Dissolved Chromium	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0050	< 0.0050	
Dissolved Copper	mg/L	< 0.005	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	0.001	< 0.0009	< 0.0009	0.001	0.002	0.001	0.008	0.0036	< 0.00090
Dissolved Iron	mg/L	30	19	17	23	16	19	16	20	12	6.3	22	8.4	12	12	7.4	9.8	7.4	10	2.5	12	7.3	2.4	5.4	
Dissolved Lead	mg/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0005	< 0.00050	< 0.00050	
Dissolved Magnesium	mg/L	18	12	9.2	14	7.5	11	10	10	5.2	6.4	6.7	6.5	5.3	5.1	5.2	5	5	4.7	4.8	3.9	6.2	4.4	3.9	4.1
Dissolved Manganese	mg/L	0.952	0.33	0.33	0.45	0.26	0.44	0.29	0.46	0.2	0.26	0.22	0.15	0.17	0.26	0.2	0.23	0.18	0.22	0.22	0.25	0.24	0.28	0.13	0.22
Dissolved Potassium	mg/L	5	2.5	3	3.7	3	3.6	3.3	3.6	1.2	1.6	1.3	2.9	1.2	1	0.8	1.3	0.6	1	0.6	0.7	0.6	0.8	0.44	0.4
Dissolved Sodium	mg/L	13.7	6.4	4.8	6.1	3.1	6	5.4	5.4	2.5	2.6	2.7	5.3	3.4	2.7	2.2	2.7	2.1	2.4	2.1	2.1	2.6	2.9	3.1	2.3
Dissolved Zinc	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.028	< 0.005	0.062	< 0.005	< 0.005	0.006	0.01	< 0.005	0.007	< 0.005	< 0.005	< 0.005	0.29	< 0.005	0.019	0.19	< 0.0050

Notes:
1. "-" = data is not available

Source:
R:\SEH048 Temagam\02_Sisk\Work\2024\048_Sisk_GW Quality_Crosstab_10Jan24_EK.xlsx\MW2

Table D.3 MW3 Analytical Data 2001-2023

Parameter	Sample ID Units	MW3																							
		05 Jul 2001	16 Oct 2008	14 Jul 2009	20 Oct 2009	15 Jun 2010	14 Oct 2010	22 Jun 2011	27 Oct 2011	09 Jun 2016	26 Oct 2016	12 Jul 2017	05 Oct 2017	24 Jul 2018	12 Oct 2018	19 Jun 2019	10 Oct 2019	17 Jun 2020	24 Sep 2020	10 Jun 2021	27 Sep 2021	15 Jun 2022	08 Nov 2022	26 Apr 2023	14 Nov 2023
Conductivity Field	µS/cm	-	137	134	161	92	100	131	100	137	91	150	68	90	301	143	159	158	243	115	196	252	234	173	281
Dissolved Oxygen Field	mg/L	-	3.8	3.6	4.2	3.6	4.0	4.8	6.1	6.7	6.9	5.9	6.0	7.1	6.4	7.5	7.8	5.6	6.4	5.8	6.8	8.1	9.6	11.1	9.4
ORP Field	mV	-	-	-	-	-	-	-	-	42	78	25	62	34	23	-	37	-	51	21	40	9	66	22	34
pH Field	s.u.	-	7.7	7	6.9	6.8	6.6	6.8	6.5	6.7	6.9	5.9	6	7.5	7	6.8	6.7	7	7.6	6.4	6.5	6.9	6.7	7.3	7.1
Temperature Field	°C	-	8.5	7.5	8.8	7.4	8.9	6.8	8.6	5.8	8.5	7.5	8.7	8.8	9.6	6.1	9	6.3	9.8	6.9	9.8	6.2	8	3.7	8.3
Total Alkalinity (as CaCO3)	mg/L	114	63	66	84	42	44	68	45	76	35	72	27	27	150	74	73	80	130	51	100	120	99	89	130
Total Ammonia (as N)	mg/L	0.06	0.1	0.11	0.09	0.11	0.21	-	0.16	< 0.05	0.22	0.1	0.28	0.21	0.11	< 0.05	0.17	< 0.05	0.06	0.21	0.11	< 0.05	0.12	< 0.050	< 0.050
Biological Oxygen Demand	mg/L	-	< 2	< 2	< 2	< 2	< 2	< 2	< 2	-	-	-	-	-	-	-	-	-	-	-	-	< 2	< 2	< 2	< 2
Chloride	mg/L	< 0.5	< 5	< 10	2	1	1	< 1	1	< 1	< 1	< 1	< 1	< 1	3	< 1	< 1	< 1	< 1	1.5	< 1	1.3	1.8	< 1.0	< 1.0
Dissolved Organic Carbon	mg/L	16	19	12	12	18	18	8.9	18	5.5	17	11	27	25	3.8	4.7	13	6.5	7.5	20	15	3.6	14	3.2	3.9
Hardness (as CaCO3)	mg/L	105	72	66	86	48	42	71	46	76	51	71	30	27	150	75	65	78	120	47	85	120	99	86	150
Nitrate (as N)	mg/L	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	0.2	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.10	< 0.10
Nitrate + Nitrite (as N)	mg/L	-	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	0.2	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.10	< 0.10
Nitrite (as N)	mg/L	< 0.2	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.010	< 0.010
Organic Nitrogen (Calculated)	mg/L	-	1.90	2.09	0.51	0.79	0.99	-	1.24	0.28	0.48	0.20	0.32	0.29	-0.01	0.18	0.03	0.18	0.14	0.19	0.19	0.08	0.18	0.11	0.12
Phosphorus	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.023	0.017	0.028	0.025
Sulphate	mg/L	3	< 5	< 10	< 1	< 1	< 1	< 1	< 1	2	< 1	2	< 1	< 1	2	< 1	1	2	< 1	< 1	< 1	< 1	< 1	2.5	2.4
Total Dissolved Solids	mg/L	118	80	81	105	56	70	77	59	66	98	90	135	80	155	95	120	135	145	50	125	175	120	85	140
Total Kjeldahl Nitrogen	mg/L	-	2	2.2	0.6	0.9	1.2	-	1.4	0.3	0.7	0.3	0.6	0.5	0.1	0.2	0.2	0.2	0.4	0.3	0.1	0.3	0.13	0.14	
Arsenic	mg/L	-	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.0010	< 0.0010
Dissolved Barium	mg/L	0.015	0.011	0.009	0.011	0.009	0.011	0.01	0.01	0.008	0.011	0.009	0.008	0.007	0.015	0.014	0.01	0.008	0.013	0.007	0.011	0.011	0.011	0.0077	0.013
Dissolved Boron	mg/L	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dissolved Cadmium	mg/L	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00015	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.000090	< 0.000090
Dissolved Calcium	mg/L	34.8	22	19	26	14	12	21	13	23	15	22	9	8.2	47	23	20	24	37	14	26	37	30	27	46
Dissolved Chromium	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0050	< 0.0050
Dissolved Copper	mg/L	< 0.005	0.005	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.003	0.002	0.002	0.002	0.002	0.002	0.004	0.01	0.0016	0.0017
Dissolved Iron	mg/L	0.2	2	1.2	1.4	2.8	4	1.3	3.7	0.4	3	2.1	3.5	3.6	0.7	0.5	3	0.4	0.9	2.6	2.4	0.2	2.4	0.16	0.35
Dissolved Lead	mg/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.00050	< 0.00050
Dissolved Magnesium	mg/L	4.5	4.4	4.1	5.3	3.3	2.7	4.4	3.1	4.4	3.2	4	1.9	1.6	8.4	4.1	3.7	4.3	6.5	2.7	4.7	7.2	5.6	4.7	7.7
Dissolved Manganese	mg/L	0.517	0.17	0.13	0.14	0.26	0.18	0.069	0.12	0.025	0.12	0.059	0.11	0.11	0.018	0.014	0.067	0.013	0.032	0.073	0.067	0.007	0.055	0.0055	0.014
Dissolved Potassium	mg/L	< 1	0.9	0.6	0.8	0.8	0.8	0.8	0.8	0.5	0.8	0.6	0.7	0.6	0.9	0.5	0.6	0.6	0.7	0.6	0.7	0.6	0.7	0.43	0.63
Dissolved Sodium	mg/L	1.8	0.8	0.7	0.8	0.7	0.7	0.8	0.9	0.8	0.7	0.8	0.7	0.6	1.2	0.8	0.9	1	1.2	1	1.2	1.1	1.3	0.71	1
Dissolved Zinc	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	0.007	< 0.005	< 0.005	0.014	< 0.005	0.008	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0050	< 0.0050

Notes:
1. "-" = data is not available

Source:
R:\SEI048 Temagam02_Sisk\Work\2024\048_Sisk_GW Quality_Crosstab_10Jan24_EK.xlsx\MW3

Table D.4 MW4 Analytical Data 2001-2023

Parameter	Sample ID Units	MW4																							
		05 Jul 2001	16 Oct 2008	14 Jul 2009	20 Oct 2009	15 Jun 2010	14 Oct 2010	22 Jun 2011	27 Oct 2011	09 Jun 2016	26 Oct 2016	12 Jul 2017	05 Oct 2017	24 Jul 2018	12 Oct 2018	19 Jun 2019	10 Oct 2019	17 Jun 2020	24 Sep 2020	10 Jun 2021	27 Sep 2021	15 Jun 2022	08 Nov 2022	26 Apr 2023	14 Nov 2023
Conductivity Field	µS/cm	-	668	471	588	802	940	572	968	496	1360	924	1380	1263	1002	618	1157	1011	1231	1302	1643	1026	1330	606	1085
Dissolved Oxygen Field	mg/L	-	2.9	3.8	3.8	3.7	4.3	4.1	6.7	4.3	5.6	5.3	2.8	3.0	3.3	3.7	4.6	3.2	2.7	3.9	4.1	2.7	6.1	7.4	5.4
ORP Field	mV	-	-	-	-	-	-	-	-	104	201	82	78	87	117	-	88	-	66	-13	35	2	161	102	91
pH Field	s.u.	-	6.7	6.5	6.5	6.8	6.7	6.6	6.8	6.6	6.7	6.5	6.6	7.5	6.6	6.7	6.8	7.2	6.7	6.4	6.5	6.5	6.7	6.5	6.7
Temperature Field	°C	-	8.9	10	7.9	8.6	9	8.6	8.6	7.1	8.9	8.6	9.5	8.4	9.2	7.3	9.1	6.5	9.1	6.7	9.5	7.1	7.9	3.2	7.8
Total Alkalinity (as CaCO3)	mg/L	148	342	176	287	462	475	364	411	430	580	420	540	470	370	270	420	430	410	470	560	330	510	230	440
Total Ammonia (as N)	mg/L	< 0.03	< 0.05	< 0.05	< 0.05	0.05	< 0.05	-	0.07	0.16	0.13	0.07	0.08	0.08	0.19	0.06	0.06	0.08	0.13	0.32	0.52	0.29	0.46	0.66	0.45
Biological Oxygen Demand	mg/L	-	< 2	< 2	< 2	< 2	< 2	< 2	< 2	-	-	-	-	-	-	-	-	-	-	-	-	< 2	3	< 2	< 2
Chloride	mg/L	2.2	9	11	11	25	22	25	42	43	100	65	100	100	87	75	100	140	130	130	150	77	130	44	92
Dissolved Organic Carbon	mg/L	21	8.4	10	9	9.1	9.3	7.3	9.1	19	28	17	22	21	17	17	21	16	17	13	27	12	18	11	12
Hardness (as CaCO3)	mg/L	135	340	220	320	450	470	350	510	350	590	430	600	530	400	320	500	440	530	510	580	360	510	400	460
Nitrate (as N)	mg/L	1.8	1.5	9	0.7	2.4	0.4	4.2	0.2	1.1	< 0.1	0.2	< 0.1	< 0.1	< 0.1	2.1	0.3	0.6	0.5	0.8	< 0.1	1.4	< 0.1	0.59	0.56
Nitrate + Nitrite (as N)	mg/L	-	1.5	9	0.7	2.4	0.4	4.2	0.2	1.1	< 0.1	0.2	< 0.1	< 0.1	< 0.1	2.1	0.3	0.7	0.5	0.8	< 0.1	1.5	< 0.1	0.59	0.56
Nitrite (as N)	mg/L	< 0.2	< 0.01	0.03	< 0.01	< 0.01	< 0.01	0.01	< 0.01	0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	0.02	< 0.01	0.04	0.02	< 0.01	< 0.01	0.08	< 0.01	< 0.010	< 0.010
Organic Nitrogen (Calculated)	mg/L	-	0.88	1.68	0.58	0.78	0.58	-	0.43	0.84	1.17	0.83	1.02	1.12	0.61	0.64	1.14	1.02	0.87	0.58	1.28	0.61	0.94	0.54	0.75
Phosphorus	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.046	0.018	0.009	0.014
Sulphate	mg/L	13	23	23	19	24	24	22	36	16	57	54	93	80	75	36	65	75	86	48	86	30	41	23	42
Total Dissolved Solids	mg/L	186	460	305	395	550	608	447	551	480	922	624	915	850	625	605	715	510	810	645	935	550	585	600	715
Total Kjeldahl Nitrogen	mg/L	-	0.9	1.7	0.6	0.8	0.6	-	0.5	1	1.3	0.9	1.1	1.2	0.8	0.7	1.2	1.1	1	0.9	1.8	0.9	1.4	1.2	1.2
Arsenic	mg/L	-	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	0.001	0.002	< 0.001	0.001	0.002	0.001	0.002	0.001	0.003	0.002	0.002	0.0019	0.0014
Dissolved Barium	mg/L	0.027	0.07	0.055	0.056	0.061	0.061	0.048	0.051	0.066	0.078	0.072	0.089	0.099	0.074	0.065	0.097	0.088	0.1	0.12	0.16	0.097	0.12	0.099	0.11
Dissolved Boron	mg/L	0.05	0.13	0.1	0.14	0.16	0.18	0.13	0.18	0.24	0.29	0.25	0.46	0.32	0.32	0.3	0.37	0.38	0.4	0.31	0.71	0.28	0.39	0.21	0.29
Dissolved Cadmium	mg/L	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001	0.00029	0.00012	0.00026	0.00011	0.00018	< 0.0001	0.00011	< 0.00009	< 0.00009	0.0001	0.00014	< 0.00009	< 0.00009	< 0.000090	< 0.000090
Dissolved Calcium	mg/L	42.9	110	71	100	150	150	120	170	110	190	140	200	170	130	110	160	140	170	160	190	120	170	130	150
Dissolved Chromium	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0050	< 0.0050
Dissolved Copper	mg/L	0.006	0.003	0.003	0.003	0.004	0.003	0.003	0.004	0.014	0.018	0.018	0.022	0.017	0.014	0.013	0.021	0.016	0.014	0.013	0.027	0.009	0.024	0.013	0.012
Dissolved Iron	mg/L	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	0.2	0.7	< 0.1	0.6	0.8	0.7	1.2	1.3	3.9	1.7	1.8	2.7	0.36
Dissolved Lead	mg/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00092	< 0.00050
Dissolved Magnesium	mg/L	6.7	15	10	15	21	23	15	23	17	27	21	25	24	19	15	23	20	24	24	25	17	22	18	21
Dissolved Manganese	mg/L	0.079	0.24	0.011	0.042	0.18	0.87	0.55	0.35	2	3.9	3.9	6.1	5.9	2.3	3	1.5	3.4	2	3.4	5.4	2.6	1.6	2.5	1.1
Dissolved Potassium	mg/L	3	8	7.5	7	7.6	8.5	6.4	9.6	4.5	9.1	5.1	8.1	6.2	7.1	3.7	7.3	4.2	6.8	5.8	7.5	6.4	8.8	7.5	11
Dissolved Sodium	mg/L	8.7	10	6.8	7.9	11	12	11	13	34	50	59	75	65	48	45	59	68	72	77	110	70	91	55	61
Dissolved Zinc	mg/L	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0050	< 0.0050

Notes:
1. "-" = data is not available

Source:
R:\SEI\048 Temagami\02_Sisk\Work\2024\048_Sisk_GW Quality_Crosstab_10Jan24_EK.xlsx\MMW4