



**2023 ANNUAL MONITORING REPORT
EAST LAKE WDS
ENVIRONMENTAL COMPLIANCE APPROVAL
NO. A361115**

Prepared for:

The Corporation of the Municipality of Hastings Highlands

P.O. Box 130
33011 Highway No. 62
Maynooth, ON K0L 2S0

Prepared by:

BluMetric Environmental Inc.

4 Cataraqui Street
The Woolen Mill, The Tower
Kingston, ON K7K 1Z7

Project Number: 230225-06

25 March 2024

**2023 ANNUAL MONITORING REPORT
EAST LAKE WASTE DISPOSAL SITE
ENVIRONMENTAL COMPLIANCE APPROVAL
NO. A361115**

Prepared for:

The Corporation of the Municipality of Hastings Highlands
33011 Highway No. 62
P.O. Box 130
Maynooth, ON K0L 2S0

Prepared by:

BluMetric Environmental Inc.
4 Cataraqui Street
The Woolen Mill, The Tower
Kingston, ON K7K 1Z7

Project Number: 230225-06

25 March 2024

Executive Summary

BluMetric Environmental Inc. (BluMetric®) is pleased to provide a summary of the 2023 environmental monitoring at the East Lake Waste Disposal Site (WDS), herein referred to as “the Site”, in Maynooth, Ontario. This summary is presented as a plain language summary to be used in addition to the final report titled “2023 Annual Monitoring Report East Lake Waste Disposal Site, Environmental Compliance Approval No. A361115” (BluMetric, 2024).

It should be noted that this summary provides an overview of the main findings of the report to which it pertains. This summary does not provide a comprehensive report, and its review should not be considered a substitute for reading the report in its entirety.

Summary Statements, Conclusions, and Recommendations

Site visits were made on May 1 and October 17, 2023. Generally, the WDS was observed to be in good condition at the time of all site visits.

Site Operations

Waste is currently transferred to the Site from three other WDSs operated by the Municipality of Hastings Highlands (Sand Bay, Wolf Creek, and North Baptiste). The East Lake WDS also receives the majority of the construction and demolition waste generated in the Municipality. The Site has segregated collection areas for scrap metal, tires, large bulky items (couches and mattresses), electronic waste recycling and a recycling transfer station (8 cubic yard bin) for household blue box recyclable containers (aluminum cans, metal cans, plastic bottles) and fibre (paper and cardboard).

In 2023, the East Lake WDS received 35.42 tonnes of recyclable material and 272.49 tonnes of waste. In addition, a total of 278.10 tonnes of waste from Sand Bay, Wolf Creek, and North Baptiste, three transfer stations within the municipality, was transferred to the East Lake WDS in 2023. In total, the East Lake WDS received 550.59 tonnes of waste in 2023.

The remaining volumetric capacity of Phase 1 at the end of 2023 is 48,838 m³, which gives an estimated volumetric life expectancy for Phase 1 of 29 years. A UAV survey was conducted on June 29, 2023, to determine the remaining Site capacity and contours.

There were no documented complaints, rejected waste, or emergency situations reported for the Site in 2023.

Groundwater

The flow direction based on the spring and fall 2023 data is north-east.

Analytical results from groundwater monitoring wells have indicated Guideline B-7 compliance along the northern property boundary and southern property boundary. Compliance with Guideline B-7 along the western property boundary is assumed. The Site is not compliant with Guideline B-7 along the eastern property boundary based on the results from EL-MW3. There appears to be sufficient natural attenuation occurring between the leachate well and the downgradient wells. Two additional wells serving as the east-northeast property boundary wells were installed in 2023 as per Phase 3 of the proposed monitoring program.

Groundwater monitoring should continue on a semi-annual basis for the parameters identified in Table 3, or Schedule B of the Amended ECA.

Trigger Mechanisms and Contingency Plan

The Groundwater Trigger Mechanism and Contingency Plan was initially submitted to the MECP in 2018 with the D&O Plan, which was approved in the amended ECA received in 2018. However, in March 2022, MECP comments were received indicating that a trigger plan for the Site had not been submitted. A copy of the plan is provided in Appendix F. The trigger plan is still considered to be in draft until MECP comments are received.

While not required, groundwater quality at the proposed trigger location (EL-MW1) has been assessed for compliance with the proposed groundwater trigger plan. The groundwater chemical results in 2023 did not trigger the Tier 1 Contingency Plan response for groundwater.

Landfill Gas

The RKI Eagle gas monitoring results for 2023 (0 to 100 ppm) indicated methane gas concentrations are well below the concentrations of concern as identified above for the subsurface, buildings and structures on-site.

Routine landfill gas monitoring within any buildings or structures should continue to be monitored voluntarily at the Site.

Table of Contents

Executive Summary	i
1 Introduction	1
1.1 Location	2
1.2 Ownership and Key Personnel	2
1.3 Description and Development of the WDS	3
1.4 Monitoring and Reporting Program and Objectives and Requirements	3
2 Physical Setting	4
2.1 Geology and Hydrogeology	4
2.1.1 Surficial Geology	4
2.1.2 Overburden Hydrogeology	5
2.1.3 Bedrock Geology	5
2.2 Surface Water Features	5
3 Description of Monitoring Program	6
3.1 Site Inspections and Operations Monitoring	6
3.2 Monitoring Locations, Frequency and Monitoring Parameters	6
3.2.1 Groundwater Monitoring	6
3.2.1.1 Groundwater Elevation and Flow Monitoring	8
3.2.1.2 Groundwater Gradients and Flow Direction	9
3.2.2 Surface Water Monitoring	9
3.2.3 Landfill Gas Monitoring	10
3.3 Monitoring Procedures and Methods	10
3.3.1 Groundwater Monitoring	10
3.3.2 Landfill Gas Monitoring	11
3.3.3 Field QA/QC Program	11
4 Monitoring Results	13
4.1 Groundwater Quality	13
4.2 Landfill Gas Monitoring	17
4.3 QA/QC Results	17

5	Assessment, Interpretation, and Discussion	18
5.1	Groundwater Assessment	18
5.2	Groundwater and Surface Water Interaction	21
5.3	Landfill Gas Assessment	21
5.4	Trigger Mechanisms and Contingency Plan	21
6	On-Site Operations	22
6.1	Site Operations	22
6.2	Annual Waste Summary	23
6.2.1	Summary of Segregated Materials Removed	24
6.3	Annual Complaints & Emergency Situations Summary	24
6.4	Capacity	24
7	Summary Statements, Conclusions, and Recommendations	26
7.1	Site Operations	26
7.2	Groundwater	27
7.3	Groundwater and Surface Water interaction	28
7.4	Landfill Gas	28
7.5	Site Capacity and Life Expectancy	29
8	Limiting Conditions	29
9	References	31

List of Tables

Table 1:	Contact Information _____	3
Table 2:	Groundwater Monitor Well Details _____	7
Table 3:	Groundwater Quality Monitoring Parameters _____	7
Table 4:	Groundwater Elevation Data _____	9
Table 5:	Groundwater Quality Field Measurements _____	13
Table 6:	Groundwater Quality Results Not Meeting ODWSOG Criteria _____	14
Table 7:	Groundwater Quality Parameters Exceeding PWQO _____	14
Table 8:	Reasonable Use Calculations _____	16
Table 9:	Groundwater Quality Results Exceeding RUV Criteria _____	16
Table 10:	2023 Landfill Gas Field Data _____	17
Table 11:	Annual Recycling and Waste Tonnages _____	23
Table 12:	2023 Groundwater Chemistry Results _____	(end of text)

List of Figures

Figure 01:	Site Location Map
Figure 02:	Site Plan and Monitoring Locations
Figure 03:	Topography as of 2017 and Surface Water Flow Direction
Figure 04:	Spring Groundwater Elevations and Contours
Figure 05:	Fall Groundwater Elevations and Contours
Figure 06:	Site Development – Phase 1 Level 1 – Surface to 417 m

Site Photographs

Chemistry Trend Graphs – Select

- Graph 1: Alkalinity in Groundwater
- Graph 2: DOC in Groundwater
- Graph 3: Dissolved Iron in Groundwater
- Graph 4: Dissolved Manganese in Groundwater
- Graph 5: Sulphate in Groundwater
- Graph 6: TDS in Groundwater
- Graph 7: Nitrate in Groundwater
- Graph 8: Boron in Groundwater

List of Appendices

(Provided On USB for Hard Copy)

- Appendix A: A-1 Environmental Compliance Approvals
 - A-2 2020 Annual Monitoring Report and Proposed Monitoring Plan Technical Review (2022)
 - A-3 Land Use Permit
- Appendix B: Monitoring and Screening Checklist (MECP/MOE)
- Appendix C: C-1 Private Well Records
 - C-2 Monitoring Well Logs
- Appendix D: D-1 Field Inspection Forms
 - D-2 Groundwater Laboratory Reports
 - D-3 QAQC Calculations
- Appendix E: E-1 Historical Groundwater Chemistry Results
 - E-2 Historical Groundwater VOCs Results
- Appendix F: Trigger Mechanisms and Contingency Plan

1 Introduction

BluMetric Environmental Inc. (BluMetric®) was retained by The Municipality of Hastings Highlands (MHHs or Municipality) to conduct the 2023 environmental monitoring and sampling program and prepare the 2023 Annual Report. This report provides a summary and analysis of environmental monitoring activities at the East Lake Waste Disposal Site (WDS), near Maynooth, Ontario. The WDS, as shown in Figure 01 is herein referred to as the “Site”.

This report is prepared in accordance with Condition 6 of the Environmental Compliance Approval (ECA) A361115 for the Site, amended on August 9, 2018, to approve the Development and Operations (D&O) Plan (BluMetric, 2018). The amended ECA is included in **Appendix A (A1)**. The report covers all work and activities carried out for the period from January 1 to December 31, 2023.

The MECP Technical Review on the 2020 Annual Monitoring Report (dated March 2021) and the Proposed Monitoring Plan (dated February 2019) was received in March 2022, and is appended as **Appendix A (A2)**. The reviewer indicated that future reports should include a discussion of groundwater-surface water interaction and potential impacts on Cardwell Lake. They also recommended the installation of the remaining proposed monitoring wells, to the east, northeast and southeast, to determine the lateral and vertical extents of the leachate impacts. Nested monitoring wells to the east were installed in 2021.

The intent of this report is to be consistent with the general requirements of the Ontario Ministry of Environment, Conservation and Parks (MECP) document titled; *Monitoring and Reporting for Waste Disposal Sites (WDS), Groundwater and Surface Water: Technical Guidance Document (MOE November 2010)*, referred to as the “WDS Technical Guidance”. The Monitoring and Screening Checklist from the WDS Technical Guidance has been completed and is included as **Appendix B** of this report. The screening checklist was completed with the Operational Status set as “open” as the Site operated through 2023.

1.1 Location

The WDS is located off Cardwell Road travelling north off East Lake Road, and it is located on land designated as Crown land in the MHHs (Figure 01). The civic address is 59 Cardwell Road, Maynooth, Ontario. The total site area is 4.05 hectares (ha), which includes a 2.3 ha landfilling area, located on Part of Lot 29, Concession 3 (formerly Wicklow Township), and now part of the MHHs. There are no buffer or other lands designated as Contaminant Attenuation Zone (CAZ), within the total site area.

The facility layout, current topography (2017), road network, and site features are shown on Figure 02.

1.2 Ownership and Key Personnel

The facility is operated by the MHHs, with the Municipal office located in Maynooth, Ontario. The property is owned by the Crown and administered by the Ministry of Natural Resources and Forestry (MNRF). The MNRF leases the property to MHHs for use as a WDS under a Land Use Permit (LUP). The current LUP for the (No. LUP1634-1004216) dated October 1, 2016, identifies the correct geographic location of the Site and is in effect until September 30, 2026. A copy of the LUP is provided in **Appendix A (A3)**.

The facility's operational representative is responsible for all activities on-site. The Site contact is David Stewart and the Competent Environmental Practitioner (CEP) for both groundwater and surface water is Mark Somers, P.Eng., of BluMetric. Mr. Somers is a Professional Engineer as designated by Professional Engineers Ontario (PEO).

Contact information is outlined in Table 1.

Table 1: Contact Information

Role	Name	Address	Phone Number	Email
Site Owner/ Contact	The Corporation of the Municipality of Hastings Highlands CAO - David Stewart	P.O. Box 130 33011 Highway No. 62 Maynooth, ON K0L 2S0	(613) 338-2811 ext. 289	dstewart@hastingshighlands.ca
CEP	Mark Somers, P.Eng., BluMetric Environmental	1682 Woodward Dr, Ottawa, ON K2C 3R8	(877) 487-8436 ext. 246	msomers@blumetric.ca

1.3 Description and Development of the WDS

The Site is approved for a 2.3 ha landfilling and transfer area within a total area of 4.05 ha. The East Lake WDS is operated in accordance with the approved D&O Plan (BluMetric, 2018). In addition to domestic waste, East Lake WDS includes recycling bins for metal, plastic, paper/cardboard products, as well as segregated areas for scrap metal, tires and brush. The Ontario Electronic Stewardship (OES) has approved the East Lake WDS for the collection of Electrical and Electronic Equipment (EEE) wastes. Regulations came into effect in 2020 with respect to this material, now referred to as EEE. The new regulation with respect to EEE falls under the Resource Recovery and Circular Economy Act, 2016, and the regulation was filed on September 21, 2020.

1.4 Monitoring and Reporting Program and Objectives and Requirements

The objectives of the monitoring and reporting program are to identify and mitigate impacts to the environment caused by the municipal solid WDS. The monitoring and reporting program are designed to adhere to the WDS Technical Guidance and the ECA for the Site. The ECA identified routine groundwater monitoring and sampling but does not identify routine monitoring for explosive methane gas; however, under standard practice, it is voluntarily conducted at all buildings or structures the Site.

2 Physical Setting

2.1 Geology and Hydrogeology

2.1.1 Surficial Geology

The surficial geology of the area is glaciofluvial outwash deposits of sand and gravel and undifferentiated till (sand and sand-silt which may contain high clay content) (MNDM, Map 2556). The immediate area of the Site is characterized by generally sandy overburden with a thickness ranging to depths over 5.5 m below ground surface (mbgs).

Well records for nine wells located within 1.0 km of the Site and along Cardwell Lake were obtained from the MECP website and are provided in **Appendix C (C1)**. The well records indicate the overburden ranges from approximately 17 mbgs to 22 mbgs and generally consists of sand and gravel with some silt and clay layers.

Monitoring wells EL-MW1 and EL-MW2 at the East Lake WDS were drilled and installed in 2005 to bottom depths of 5.33 mbgs and 5.79 mbgs, respectively, and each well was intended to screen a water-bearing medium grained sand unit, however EL-MW2 has generally not produced sufficient water for sampling since it was drilled. Monitoring wells EL-MW2R (replacement well for EL-MW2), EL-MW3 and EL-MW4 were drilled and installed in August 2019 by BluMetric. Monitoring wells EL-MW2R and EL-MW3 were drilled until sufficient groundwater was encountered, while EL-MW4 was intended to reach the bedrock surface to monitor groundwater just above the bedrock between the WDS and domestic wells southeast of the Site. Since bedrock was not encountered at a depth of 24.48 mbgs and a low permeable unit (dense fine silty sand was encountered between 5.5 and 14.5 mbgs) was present above the till, it was decided to screen the till below the lower permeable unit to monitor the impacts to the till unit which is presumably above the bedrock surface. Nested monitoring wells EL-MW5.1-21 and EL-MW5.2-21 were drilled and installed in September 2021 by BluMetric to characterize downgradient groundwater quality to the east of the WDS. Deep monitoring well EL-MW5.1-21 was drilled to 12.5 mbgs and screened in a sand and gravel unit.

Shallow monitoring well EL-MW5.2-21 was drilled to 6.1 mbgs and screened across a sand and gravel unit. Groundwater was measured in both wells.

Monitor depths range from 6.1 mbgs (EL-MW2R) to 24.38 mbgs (EL-MW4). The monitoring well logs are included in **Appendix C (C2)**.

2.1.2 Overburden Hydrogeology

On October 24, 2019, slug-bail testing was carried out on monitoring wells EL-MW3 and EL-MW4. The results of the field testing were analyzed using the Hvorslev method and resulted in 5.25×10^{-5} m/s and 6.42×10^{-5} m/s in the dense sand overburden at EL-MW3 and 5.25×10^{-5} m/s and 4.24×10^{-5} m/s in the sand till at EL-MW4.

2.1.3 Bedrock Geology

The East Lake WDS is located within the Grenville geological province, on Precambrian bedrock. Bedrock is described as Felsic igneous rocks such as tonalite, granodiorite, monzonite, granite, syenite; and derived gneisses (Map 2544, MNDM). Well records identify the bedrock as granite. Based on the geology, surface water features, and historic data, the shallow aquifer is assumed to flow northeast to east toward Cardwell Lake.

2.2 Surface Water Features

There is currently no surface water monitoring completed at the East Lake WDS as there are no surface water features located in the immediate vicinity of the Site. The nearest surface waterbody is Cardwell Lake located 250 m to the east of the WDS. Figure 03 illustrates the surface topography and drainage patterns at the Site (July 2017).

3 Description of Monitoring Program

3.1 Site Inspections and Operations Monitoring

Site visits to the East Lake WDS were made on May 1 and October 17, 2023. Generally, site conditions were found to be good. The detailed site checklists are provided in **Appendix D (D-1)**. Key items requiring attention are noted below.

The following items were noted during the spring site visit:

- Berms between cells need improvement.
- Excessive blown plastic litter to the east of the site.
- Black soil staining with sheen and strong odours present outside eastern boundary of landfill footprint. Preventative measures should be put in place to keep surface water from flowing downhill and offsite.

The following items were noted during the fall site visit:

- The active area was uncovered and not compacted.
- The scrap metal and bulk waste piles were getting large.

The MHHs addressed each item listed above in a timely fashion. Select photographs taken during the Site visits are provided at the end of the text following the tables and figures.

3.2 Monitoring Locations, Frequency and Monitoring Parameters

3.2.1 Groundwater Monitoring

There are currently six groundwater monitoring wells located at the Site. The location and descriptions of the groundwater monitoring wells, along with the coordinates are provided in Table 2, while the monitoring well logs are provided in **Appendix C (C2)**.

Table 2: Groundwater Monitor Well Details

Sample Location	Northing	Easting	Location Description
EL-MW1	5016091	270145	Located on the north limit of the 2.30 ha waste footprint, near the northeast corner
EL-MW2R	5015893	270068	Background, located off, approximately 45 m southwest of historic buried waste
EL-MW3	5016002	270232	Downgradient (leachate), located 30 m east of the 2.30 ha waste footprint
EL-MW4	5015954	270222	Downgradient, located near the southeast corner of the 2.30 ha waste footprint
EL-MW5.1-21	5016010	270380	Downgradient, located off site, approximately 175 m east of the 2.30 ha waste footprint
EL-MW5.2-21	5016010	270378	Downgradient, located off site, approximately 175 m east of the 2.30 ha waste footprint
EL-MW6.1-23	5016150	270307	Downgradient, located off site, approximately 140 m northeast of the 2.30 ha waste footprint
EL-MW6.2-23	5016153	270303	Downgradient, located off site, approximately 140 m northeast of the 2.30 ha waste footprint

Note: UTM Zone 18, NAD 83

Monitoring wells EL-MW6.1-23 and EL-MW6.2-23 were drilled in 2023 on the east-northeast property boundary, as per Phase 3 of the proposed monitoring program.

Groundwater samples were collected during the spring and fall 2023 sampling events and analyzed to characterize the groundwater quality at the Site. Table 3 lists the groundwater quality monitoring parameters that were analyzed.

Table 3: Groundwater Quality Monitoring Parameters

Category	Parameters
Organic Parameters	Biological Oxygen Demand (BOD ₅), Dissolved Organic Carbon (DOC)
Inorganic Parameters	Ammonia, Chloride, Major Ions (Alkalinity, Calcium, Magnesium, Potassium, Sodium, Sulphate), Nitrate, Total Kjeldahl Nitrogen (TKN)
Dissolved Metals	Aluminum, Barium, Boron, Iron, Manganese, *Lead

Category	Parameters
Physical/Chemical Parameters	Chemical Oxygen Demand (COD), Conductivity, pH, Total Dissolved Solids (TDS), Total Suspended Solids (TSS), *Hardness

Note:

*Lead and hardness were analyzed for the fall samples only

Lead was inadvertently omitted from the groundwater quality monitoring parameter suite from 2017 to spring 2023. Lead was analyzed at all groundwater monitoring locations beginning in fall 2023, as required by the ECA.

Volatile Organic Compounds (VOCs) are listed as a parameter in Schedule B of the ECA, however, as per MECP correspondence (March 2022), sampling of VOCs every five years is acceptable if no VOCs are detected during analysis. VOC sampling was conducted in 2019 at the leachate monitor, EL-MW3, and all results were below detectable limits. The next VOC sampling event was scheduled to occur in 2024 but based on recent MECP correspondence (March 2022), this will occur in 2025.

Field measurements of groundwater, pH, temperature, and conductivity are collected at the time of sampling.

During the spring and fall site visits, the groundwater monitoring wells were inspected and any repairs such as new locks, labels or well caps, were made as necessary. Watertight casings and seals remain in place at all wells to ensure that surface water or foreign materials cannot enter groundwater monitoring wells. All groundwater monitoring wells are fitted with a vermin-proof cap to meet the requirements of Ontario Regulation 903 and are locked to provide protection against vandalism.

3.2.1.1 Groundwater Elevation and Flow Monitoring

During each monitoring event, groundwater elevations were collected from the monitoring wells. Groundwater level measurements were collected using an electronic water level meter prior to purging/sampling activity. Groundwater elevation data are summarized in Table 4.

Table 4: Groundwater Elevation Data

Groundwater Monitor	Elevation (masl) (TPVC)	Water Level 1-May-23 (mbtpvc ¹)	Water Level 17-Oct-23 (mbtpvc)	Groundwater 1-May-23 (masl)	Groundwater 17-Oct-23 (masl)
EL-MW1	407.10	4.41	5.41	402.69	401.69
EL-MW2R	418.22	9.30	8.785	408.92	409.435
EL-MW3	404.41	3.44	4.99	400.97	399.42
EL-MW4	404.44	2.27	3.93	402.17	400.51
EL-MW5.1-21	395.98	2.42	3.66	393.56	392.32
EL-MW5.2-21	396.07	1.28	2.84	394.79	393.23
EL-MW6.1-23	396.31	N/A	5.31	N/A	391.00
EL-MW6.2-23	396.31	N/A	5.45	N/A	390.86

Notes:

¹ mbtpvc = metres below top of PVC

² Monitoring wells EL-MW6.1-23 and EL-MW6.2-23 were drilled after the May sampling event.

3.2.1.2 Groundwater Gradients and Flow Direction

The horizontal hydraulic gradient is calculated based on flow direction and groundwater elevations shown on Figure 04 and 05.

The flow direction based on the spring 2023 data in Figure 04 is north-east with a horizontal gradient of 0.043 m/m. Similarly, flow direction based on the fall 2024 data in Figure 05 is primarily northeast-east with a horizontal gradient of 0.048 m/m.

The vertical hydraulic gradient at the nested well (EL-MW5.1-21 and EL-MW5.2-21) was calculated to be 0.21 m/m in the spring and 0.13 m/m in the fall, both in a downward direction.

3.2.2 Surface Water Monitoring

Surface water monitoring is not required at the East Lake WDS.

3.2.3 Landfill Gas Monitoring

The primary gas present at landfill sites is methane. Methane cannot cause an explosion unless it accumulates to a concentration above its lower explosive limit (LEL) in an enclosed area. The LEL for methane is 5% in air. The methane concentration limits, as per Regulation 232/98, are:

- Less than 2.5% methane gas (25,000 ppm, LEL=50%) in the subsurface at the property;
- Less than 1.0% methane gas (10,000 ppm, LEL=20%) in an on-site building, or its foundation; and
- Less than 0.05 % methane gas (500 ppm, LEL=1%) in a building, or its foundation, which is located off-site.

Routine landfill gas monitoring within any buildings or structures is conducted voluntarily at the Site.

3.3 Monitoring Procedures and Methods

3.3.1 Groundwater Monitoring

Groundwater monitoring wells were purged a minimum of three well volumes or until purged dry. In the case where a well was purged dry, samples were collected after sufficient water had returned for sampling purposes. Field temperature, pH, and conductivity measurements were recorded at the time of sampling using a YSI multi-meter. The instrument was calibrated as per the manufacturer's instructions prior to the Site visit. Samples were field filtered for dissolved organic carbon (DOC) and dissolved metals. An additional bottle was filled and filtered by the laboratory for analysis of aluminum for comparison to the Provincial Water Quality Objectives (PWQO).

Samples were collected in laboratory-prepared and supplied bottles and submitted to AGAT and Bureau Veritas Laboratories in Kingston, Ontario for analysis. AGAT and Bureau Veritas are accredited members of the Canadian Association of Laboratory Accreditation (CALA). Groundwater samples were stored at approximately 4° Celsius during shipment to laboratory. Hold times for samples conformed to CCME Standards where applicable (CCME, 1993). Chain of custody forms accompanied the samples from submittal to the laboratory until the chemical results were provided to BluMetric. Laboratory reports and COC forms are compiled in **Appendix D (D-2)**.

3.3.2 Landfill Gas Monitoring

Landfill gas monitoring is not required as part of the ECA requirements for this site but was voluntarily completed. There are no sampling valves, ports, or vapour monitors on-site. Gas monitoring using a calibrated RKI Eagle gas monitor was collected from the on-site attendant's building and groundwater monitoring wells during the 2023 sampling events. Gas monitoring measurements were taken from the building by inserting the intake of the gas monitor through a small opening while the structure remained closed. Gas monitoring measurements from the groundwater monitoring wells were collected, prior to collecting groundwater levels or samples, by inserting the intake of the gas monitor in the monitoring well and creating a seal around the well opening and the gas intake.

3.3.3 Field QA/QC Program

The Quality Assurance/Quality Control (QA/QC) program for the Site included the collection of field duplicate samples to demonstrate that field sampling techniques utilized by BluMetric personnel are capable of yielding reproducible results. Field duplicates were collected concurrently with the original sample. Field duplicates were collected at a 10% frequency during the sampling program at the WDS.

Precision is a measure of the reproducibility of analytical results and can be expressed quantitatively by the relative percent difference (RPD) between the original sample(s)

and their corresponding field blind duplicate sample(s). The RPD is defined by the following equation:

$$RPD = 2 \times \frac{|(S - D)|}{(S + D)} \times 100$$

Where S = concentration in the original sample

D = Concentration in the duplicate

An RPD is calculated where the average of the measured parameter concentrations of the original (S) and duplicate (D) samples are greater than 5X the laboratory readable detection limits (RDL), which represents the RPD qualification criteria. A lower level of precision is expected where the above criteria are not met. A high level of reproducibility with respect to sample results collected at the Site is indicated by an RPD value below 10% for electrical conductivity and 20% for metals and inorganics.

These criteria are used as a general guideline and correspond to those recommended within the O. Reg. 153/04 Analytical Protocol (MOE, 2011) and by the Ontario QA/QC Interpretation Guide – Environmental Services (Maxxam, 2015). An RPD below the recommended criteria is considered acceptable, indicating that the sampling methodology is capable of producing repeatable results.

One blind field duplicate was sampled and submitted for analyses per sampling event. The field duplicate bottles are filled simultaneously to the sample location selected for duplication. The laboratory prepared bottles (identified and duplicate) for each group of chemical parameters (e.g. metals, nutrients etc.) is first filled for the identified location and then the duplicate for that same group of chemical parameters is immediately filled. This continues until the two sample bottles for each group of parameters are filled.

4 Monitoring Results

4.1 Groundwater Quality

Groundwater quality has been compared to the Ontario Drinking Water Standards and Operational Guidelines (ODWSOG), the calculate Reasonable Use Values (RUVs), and the Provincial Water Quality Objectives (PWQO).

Field Measurements

The summary of the field measurements of groundwater pH, temperature, and conductivity are presented in Table 8.

Table 5: Groundwater Quality Field Measurements

Groundwater Monitor	pH		Temperature (°C)		Conductivity (µS/cm)	
	1-May-23	17-Oct-23	1-May-23	17-Oct-23	1-May-23	17-Oct-23
EL-MW1	5.62	6.14	6.5	12.5	156	62
EL-MW2R	6.07	6.06	6.7	7.5	68	65
EL-MW3	5.78	5.76	7.3	8.5	1923	2127
EL-MW4	6.99	6.88	6.4	7.2	135	127
EL-MW5.1-21	6.68	6.12	5.6	7.0	68	66
EL-MW5.2-21	5.75	5.92	3.4	9.4	40	45
EL-MW6.1-23	N/A	8.36	N/A	6.5	N/A	121
EL-MW6.2-23	N/A	6.29	N/A	6.9	N/A	298

Note:

¹ Monitoring wells EL-MW6.1-23 and EL-MW6.2-23 were drilled after the May sampling event.

Ontario Drinking Water Standards and Operational Guidelines (ODWSOG)

A summary of the 2023 groundwater parameters exceeding the Ontario Drinking Water Standards, Objectives and Guidelines (ODWSOG) criteria is included in Table 9. The full laboratory results are presented in Table 12 at the end of the report.

Table 6: Groundwater Quality Results Not Meeting ODWSOG Criteria

Location	Parameters	2023 Sampling Event(s)
EL-MW1	Alkalinity (lower limit) pH	Spring, Fall Spring
EL-MW2R	Alkalinity (lower limit) Hardness (lower limit)	Spring, Fall *Fall
EL-MW3	Sulphate DOC TDS Hardness (upper limit) Manganese	Spring, Fall Spring, Fall Spring, Fall *Fall Spring, Fall
EL-MW4	Hardness (lower limit)	*Fall
EL-MW5.1-21	Alkalinity (lower limit) Hardness (lower limit)	Spring, Fall *Fall
EL-MW5.2-21	Alkalinity (lower limit) Hardness (lower limit) pH (lower limit)	Spring, Fall *Fall Spring
EL-MW6.1-23	Hardness (lower limit) Manganese	*Fall *Fall
EL-MW6.2-23	Manganese	*Fall

Note:

*Analyzed for the fall sampling only

PWQO

At the request of the MECP, groundwater results were compared to the PWQO criteria. The only parameters that are tested at the Site and have surface water criteria under the PWQO are alkalinity, pH, dissolved aluminum, boron, and iron.

The PWQO exceedances are summarized in Table 7 below. The full laboratory results are presented in Table 12 at the end of the report.

Table 7: Groundwater Quality Parameters Exceeding PWQO

Location	Parameters	2023 Sampling Event(s)
EL-MW1	pH (lower limit)	Spring
EL-MW2R	None	None
EL-MW3	Boron	Spring, Fall

Location	Parameters	2023 Sampling Event(s)
EL-MW4	None	None
EL-MW5.1-21	None	None
EL-MW5.2-21	pH (lower limit)	Spring
EL-MW6.1-23	None	None
EL-MW6.2-23	None	None

Groundwater alkalinity concentrations at the Site are naturally low. The average concentration at the background location using data from 2019 to 2023 is 16 mg/L. PWQO criteria states that alkalinity cannot be decreased by more than 25% of the natural concentration. Alkalinity concentrations have been observed to remain stable or increase therefore the downgradient wells do not exceed the PWQO for this parameter.

Reasonable Use Values (RUVs)

The water quality results for background groundwater monitoring well EL-MW2R from 2019 to 2023 were used to calculate Reasonable Use Values (RUV), as per the guidance offered by MECP Procedures B-7 and B-7-1 using the following equation.

$$C_m = C_b + x (C_r - C_b)$$

Where,

C_m: is the maximum allowable concentration in groundwater beneath adjacent property (Reasonable Use Value);

C_b: is the median background concentration before any effects from human activity;

C_r: is the maximum concentration that should be present based on use (ODWSOG); and

x: is the constant that reduces the contamination to a level considered by the MECP to have only a negligible effect on the use of the water (0.25 for a health-related parameter and 0.5 for an aesthetic or physical parameter).

Table 8 summarizes the data that were used to calculate Cm values (RUV), for the parameters of interest.

Table 8: Reasonable Use Calculations

Parameter	Units	ODWSOG		Historical Median	x	RUV
		Type	Cr	Cb		Cm
Alkalinity as CaCO3 (upper)	mg/L	OG	500	15	0.5	256.50
Barium	mg/L	AO	0.05	0.0042	0.25	0.02
Boron	mg/L	IMAC	5.0	0.028	0.50	2.51
Chloride	mg/L	AO	250	0.52	0.5	125.26
DOC	mg/L	AO	5	1.3	0.5	3.15
Iron	mg/L	AO	0.3	0.032	0.5	0.17
Manganese	mg/L	AO	0.05	0.006	0.5	0.03
N-NO3 (Nitrate)	mg/L	MAC	10	0.1	0.25	2.58
Sodium	mg/L	AO	200	2.59	0.5	101.30
Sulphate	mg/L	AO	500	8.92	0.5	254.46
TDS	mg/L	AO	500	48	0.5	274.00

Note: The background water quality at LSP2-03 and the regional groundwater is generally below the lower criterion for alkalinity. Therefore, there is no lower RUV for alkalinity.

A comparison of the groundwater chemistry results against the RUVs is provided in Table 12, at the end of the report. Table 9 below summarizes the parameters that exceeded the RUVs in 2023. It should be noted that the RUVs are used to assess compliance at the property boundary but have been used as an assessment tool at all monitoring wells.

Table 9: Groundwater Quality Results Exceeding RUV Criteria

Location	Parameters	2023 Sampling Event(s)
EL-MW1	None	None
EL-MW2R	None	None
EL-MW3	Sulphate DOC TDS Boron Manganese	Spring, Fall Spring, Fall Spring, Fall Spring, Fall Spring, Fall
EL-MW4	None	None
EL-MW5.1-21	None	None

Location	Parameters	2023 Sampling Event(s)
EL-MW5.2-21	None	None
EL-MW6.1-23	Manganese	*Fall
EL-MW6.2-23	Manganese	*Fall

Note:

*Analyzed for the fall sampling only

4.2 Landfill Gas Monitoring

Landfill gas readings collected during the 2023 spring and fall sampling events are presented in Table 10 below.

Table 10: 2023 Landfill Gas Field Data

Location	Description of Reading Location	Spring 2023 Reading (ppm)	Fall 2023 Reading (ppm)
Attendant’s building	Through the door	0	15
EL-MW1	Well head	0	10
EL-MW2R	Well head	0	15
EL-MW3	Well head	0	5
EL-MW4	Well head	0	0
EL-MW5.1-21	Well head	0	0
EL-MW5.2-21	Well head	0	0
EL-MW6.1-23	Well head	N/A	100
EL-MW6.2-23	Well head	N/A	1

Note:

¹ Monitoring wells EL-MW6.1-23 and EL-MW6.2-23 were drilled after the Spring 2023 sampling event.

4.3 QA/QC Results

One groundwater duplicate sample was collected during each sampling event in 2023. The consistency of the results was evaluated based on the relative percentage difference (RPD) of each field duplicate pair.

One parameter (dissolved calcium) exceeded during the spring sampling event with an RPD of 29%, and two parameters (TDS and sulphate) exceeded during the fall sampling event with an RPD of 32% and 69%, respectively. The results for the duplicate pairs are presented in **Appendix D (D-3)**.

5 Assessment, Interpretation, and Discussion

5.1 Groundwater Assessment

The groundwater chemistry results for the six monitoring wells sampled during the spring and fall monitoring events at the East Lake WDS in 2023, are presented in Table 12 at the end of the report. Parameters with concentrations that fell outside the RUVs, ODWSOG, and/or PWQO criteria are highlighted. The laboratory reports and chain of custody records are included in **Appendix D (D-2)**.

The historical groundwater quality results from the East Lake WDS are presented in **Appendix E (E-1 and E-2)**, and chemistry trend graphs for select parameters are provided following the tables, figures, and photographs, at the end of this report. Graphs demonstrate an increasing trend at monitoring well EL-MW3 for alkalinity, boron, and DOC while the other parameters at this location are observed to be generally stable or decreasing. An increasing trend in nitrate concentrations is apparent at EL-MW2R since monitoring began in 2019; however, nitrate concentrations remain well below those replaced at EL-MW2. Concentrations at EL-MW1 and EL-MW4 are stable, with fluctuations reported within their typical range. However, it is important to note there is insufficient data to properly assess trends at the monitoring wells installed in 2019. It is anticipated that at least five years of semi-annual data will be required prior to analysing trends at these newer wells. No trends were established for the two wells installed in 2021.

Monitoring well EL-MW2R is located just outside the property boundary by the southwest corner and is considered to be the background well of the site. All groundwater quality parameters met the ODWSOG criteria during both spring and fall sampling events for EL-MW2R except for alkalinity and hardness, both of which were below the lower limit of their respective ODWSOG criteria. This is consistent with historical results reported at this location. EL-MW2R represents background conditions for the Site, and low alkalinity, hardness, and pH are considered to be naturally occurring. There were no RUV exceedances reported at this location.

Monitoring well EL-MW4 is located east-northeast of the background well, near the southeast corner of the approximate buried waste, within the property boundary. There were no ODWSOG or RUV exceedances reported at this location, other than an exceedance of the lower ODWSOG limit for hardness which is considered to be naturally occurring. This well is not considered to be impacted by the landfill.

Monitoring well EL-MW3 is located east (downgradient) of the approximate buried waste within the property boundary and is intended to be used as the leachate well of the Site. The groundwater quality was compared to the RUV criteria, and several parameters exceeded during both the spring and fall sampling events (sulphate, DOC, TDS, boron, and manganese). Four of those parameters also exceeded the ODWSOG guidelines during both sampling events (sulphate, DOC, TDS, and manganese) along with a ODWSOG guidelines exceeded for hardness in the fall. One parameter also exceeded the PWQO guideline during both sampling events (boron). This well is considered to be impacted by the landfill and is representative of leachate quality.

Monitoring well EL-MW1 is located north of the approximate buried waste, within the property boundary. There were no ODWSOG exceedances other than low alkalinity, low pH and low hardness, which are considered to be naturally occurring and are consistent with historical results. Low pH also exceeds the PWQO guideline. No RUV exceedances were reported at this location. This well is not considered to be impacted by the landfill.

Nested monitoring wells EL-MW5.1-21 and EL-MW5.2-21 are located the furthest east, outside of the property boundary and downgradient of the approximate buried waste.

There were no ODWSOG exceedances other than low alkalinity and hardness reported at both wells during both sampling events, and low pH reported at EL-MW5.2-21 during the spring sampling event. These exceedances are considered to be naturally occurring and are consistent with historical results. No RUV exceedances were reported at either well. These wells are not considered to be impacted by the landfill.

Nested monitoring wells EL-MW6.1-23 and EL-MW6.2-23 were drilled after the spring sampling event and were introduced to the sampling program starting fall 2023. The wells are located northeast, outside of the property boundary and downgradient of the approximate buried waste. There were no ODWSOG exceedances other than low hardness at EL-MW6.1-23 and manganese exceedances at both wells. The exceedance of hardness is considered to be naturally occurring. These wells should continue to be monitored to determine whether they are impacted by the landfill. A minimum of two years of data is required from these wells before including them in the CAZ assessment.

Analytical results from groundwater monitoring wells have indicated Guideline B-7 compliance along the northern property boundary and southern property boundary. Former monitoring well EL-MW2 was located the western property boundary, while replacement well EL-MW2R is located approximately 20 m west of the property boundary. Based on the inferred direction of groundwater flow to the northeast-east and the groundwater quality at EL-MW2R, the western property boundary is assumed to be compliant with Guideline B-7.

The Site is not compliant with Guideline B-7 along the eastern property boundary based on the results from EL-MW3. There appears to be sufficient natural attenuation occurring between the leachate well and the nested wells installed in 2021 further east. However, the actual distance to attenuate groundwater is unknown and may be less than the distance between EL-MW3 and the nested wells (approximately 145 m). Monitoring wells EL-MW5.1-21 and EL-MW5.2-21 are located 115 m east of the property limit. Monitoring wells EL-MW6.1-23 and EL-MW6.2-23 were added to the east-northeast in 2023 as per Phase 3 of the proposed monitoring program. The required CAZ boundary will be reassessed based on the results of these new boundary

wells after a minimum of 2 years of data collection. Once the CAZ re-assessment has been approved by the MECP, the municipality should take steps to acquire the necessary CAZ lands around Site.

5.2 Groundwater and Surface Water Interaction

As per the MECP correspondence dated March 23, 2022, groundwater-surface water interaction and potential impacts on Cardwell Lake, which is located approximately 250 m east of the Site, will now be discussed. The groundwater chemistry results from all six monitoring wells were compared to the PWQO criteria. Low pH, below the PWQO range, was reported at EL-MW1 and EL-MW5.2-21, and a boron exceedance was reported at EL-MW3. While the boron PWQO exceedances at the leachate well (EL-MW3) are likely related to the WDS, there were no boron exceedances reported at the downgradient nested wells. These wells are located approximately 115 m east of the property boundary, which places them between the East Lake WDS and Cardwell Lake. There appears to be sufficient natural attenuation occurring between the leachate well (EL-MW3) and the nested wells, and therefore surface water impacts to Cardwell Lake are unlikely.

5.3 Landfill Gas Assessment

The RKI Eagle gas monitoring results for 2023 (0 to 100 ppm) indicated methane gas concentrations are well below the concentrations of concern as identified above for the subsurface, buildings and structures on-site.

5.4 Trigger Mechanisms and Contingency Plan

The Groundwater Trigger Mechanism and Contingency Plan was initially submitted to the MECP in 2018 with the D&O Plan, which was approved in the amended ECA received in 2018. However, in March 2022, MECP comments were received indicating that a trigger plan for the Site had not been submitted. A copy of the plan is provided in

Appendix F. The trigger plan is still considered to be in draft until MECP comments are received.

The proposed trigger assessment points for groundwater are EL-MW1 along the north property boundary along with newly installed wells EL-MW6.1-23 and EL-MW6.2-23 to be future trigger assessment points. The assessment criteria include alkalinity, boron, chloride, DOC, iron, manganese, and TDS. The Contingency Plan is triggered if four or more of the trigger parameters exceed the trigger limit, which is equal to the RUVs, for one assessment point for one sampling event.

While not required, groundwater quality at the proposed trigger location (EL-MW1) has been assessed for compliance with the proposed groundwater trigger plan. The groundwater chemical results in 2023 did not trigger the Tier 1 Contingency Plan response for groundwater.

6 On-Site Operations

6.1 Site Operations

Waste is currently transferred to the Site from three other WDS/WTSs operated by MHHs (Sand Bay, Wolf Creek, and North Baptiste). The East Lake WDS also receives the majority of the construction and demolition waste generated in the Municipality.

The Site has segregated collection areas for scrap metal, tires, large bulky items (couches and mattresses), electronic waste recycling and a recycling transfer station (8 cubic yard bin) for household blue box recyclable containers (aluminum cans, metal cans, plastic bottles) and fibre (paper and cardboard). The Municipality implemented a clear bag policy in October 2014 to facilitate increased waste diversion to extend the operational life of their municipal landfill sites. The clear bag policy applies to both recyclable and household waste, with non-compliant bags to be refused unless residents remove recyclables from the bag.

6.2 Annual Waste Summary

Although access to the Site is controlled via a locked security gate, residents occasionally deposit garbage at the disposal site outside of the landfill’s normal operating hours. Estimated volumes for the Site are provided below and are based on a combination of the contractors’ tonnages and estimations based on the number of vehicles and/or containers. The quantities below include recyclables (R) and waste (W) from both the residential and commercial sources within the municipality. The annual waste and recycling tonnages for 2022 and 2023 are tabulated below in Table 11. An average of 15 kg per bag, provided by the Municipality, is used in the waste calculations.

Table 11: Annual Recycling and Waste Tonnages

Q1		Q2		Q3		Q4		Total Annual	
R	W	R	W	R	W	R	W	R	W
2022									
6.26	44.99	9.32	59.7	10.16	97.32	8.77	52.04	34.51	254.04
2023									
6.65	51.81	10.49	68.52	9.95	85.53	8.33	66.63	35.42	272.49

Based on these reported quantities, the mass of recyclables collected in 2023 is 2.57% higher than what was collected in 2022, while the quantity of waste received at the Site is 6.77% higher than what was received in 2022. Based on those numbers, 13.00% of the total waste received was recycled in 2023, slightly lower than the 13.58% calculated in 2022.

A total of 278.10 tonnes of waste from Sand Bay, Wolf Creek, and North Baptiste, three transfer stations within the municipality, was transferred to the East Lake WDS in 2023. In total, the East Lake WDS received 550.59 tonnes of waste in 2023.

In addition, 497 tonnes of construction and demolition (C&D) waste was received at the East Lake WDS in 2023. The approved D&O Plan (2018) states that the clean untreated and unpainted construction and demolition waste is to be ground every two years for use as cover material at this Site. According to the ECA, a ratio of 40% soil and 60%

chipped wood is acceptable as cover material. Chipping the wood is recommended as it can substantially reduce the bulk of some wood waste. Alternatively, this material can be burned on site following the proper guidelines. A UAV topographical survey was conducted in June 2023 to assess the current landfill contours and include the actual volume of C&D waste deposited in the WDS. C&D volume has been estimates since the previous survey was done in 2017.

6.2.1 Summary of Segregated Materials Removed

Segregated materials are collected at each of the nine WDSs/WTs in Hastings Highlands. In 2023, a total of 22.05 tonnes of scrap metal, 25.25 tonnes of bulky waste, 1.88 tonnes of electrical and electronic waste, and 84 tires was collected from the Site.

Household hazardous wastes are not collected at the East Lake WDS. The Municipality however does ensure household batteries inadvertently left at the WDS are disposed of properly. The volume of household batteries collected in 2023 was 0.64 tonnes.

6.3 Annual Complaints & Emergency Situations Summary

There were no documented complaints, rejected waste, or emergency situations report at the East Lake WDS in 2023.

6.4 Capacity

The East Lake WDS has a total area of 4.05 hectares (ha), of which 2.3 ha is designated as approved landfilling area. According to the amended ECA dated August 9, 2018, the approved final volume of the WDS is 147,546 m³, including daily interim cover, intermediate cover, and final cover. The ECA states the maximum capacity for Phase 1 is 85,546 m³.

Figure 06 presents the remaining fill capacity captured during the June 29, 2023, topographical survey. According to the most recent topographical survey data from June 2023, plus the amount of waste received from June to December, the remaining capacity for Phase 1 was estimated to be 48,838 m³. As required per the D&O, approximately 8,270 m³ of the remaining capacity will be used for a 600 mm thick final cap material. The remaining volume for waste, interim and intermediate cover following the 2023 survey was therefore estimated to be 40,568 m³.

The last five annual monitoring reports for the Site have recorded annual waste generation rates of 486.45 (2019), 588.39 (2020), 604.04 (2021), 569.64 (2022) and 550.59 (2023) tonnes; resulting in an average waste generation rate of 559.82 tonnes per year. With a compaction density assumption of 500 kg/m³, this equates to 1119.64 m³ of compacted waste per year. Including 25% volume of daily interim cover, the average annual fill rate at the East Lake WDS is expected to be approximately 1399.55 m³ per year.

The remaining volumetric capacity and life expectancy for the East Lake WDS was calculated as follows:

Net fill available on June 29, 2023:	49,135 m ³
<u>Waste and cover deposited from July to Dec, 2023:</u>	<u>297 m³</u>
Remaining Capacity including final cap (2023):	48,838 m ³
<u>Final cap material volume:</u>	<u>8,270 m³</u>
Remaining Capacity including excluding final cap (2023):	40,568 m ³
<u>Average annual fill rate:</u>	<u>1,400 m³/year</u>
Life Expectancy:	29 years

Using the 2023 remaining capacity of Phase 1 and the average fill rate for the last five years, the life expectancy of Phase 1 of the WDS was calculated to be 29 years. This number is an overestimate as it does not consider intermediate soil cover, or the C&D waste deposited on Site. Assuming the average annual fill rate remains constant, the lifespan of the landfill including all phases was overestimated at 73 years, not

considering intermediate cover. The completion of Phase 2 and 3 is dependant on the approval of an updated D&O. Several factors, such as waste generation rates, waste compaction rates, closure of other municipal WDS, environmental impacts, etc. may influence the lifespan of the Site.

An updated D&O Plan is required to be submitted two years prior to the anticipated Closure of Phase 1, and a Closure Plan is required to be submitted two years prior to the anticipated closure of the Site as identified in Conditions 3.7 and 3.8 of the ECA. A UAV survey was conducted on June 29th, 2023, to determine the remaining Site capacity and contours. Topographical surveys are required every 5 years as per the ECA, Section 6.4 (b)(i).

7 Summary Statements, Conclusions, and Recommendations

The following statements are based on the results of the 2023 monitoring program:

7.1 Site Operations

- A Development and Operations (D&O) Plan for the Site was prepared and finalized in February 2018. The D&O Plan was approved under the amended ECA (August 9, 2018).
- There were no records of public concerns/complaints and emergency situations occurrences in 2023 at the East Lake WDS. Should they occur in the future, the complaint and the Municipality's response is to be documented.
- It is recommended that periodic inspections be performed and documented by the Municipality to ensure proper burning practices are being followed.
- It is recommended that waste transferred to the Site continues to be accounted for and documented by tracking the number of loads of waste and/or bags deposited at the Site. Detailed descriptions and quantities of rejected waste should continue to be documented.

- Public education with respect to waste reduction and recycling should be an ongoing effort by the Municipality.

7.2 Groundwater

- Groundwater monitoring should continue on a semi-annual basis for the parameters identified in Table 3, or Schedule B of the Amended ECA.
- VOCs were sampled in 2019 at the leachate monitor, EL-MW3, and were found to be below detectable limits. The next VOCs sampling event will occur in 2025.
- Graphs demonstrate an increasing trend at monitoring well EL-MW3 for alkalinity, boron, and DOC while the other parameters at this location are observed to be generally stable or decreasing. An increasing trend in nitrate concentrations is apparent at EL-MW2R since monitoring began in 2019. Concentrations at EL-MW1 and EL-MW4 are stable, with fluctuations reported within their typical range. There is insufficient data to properly assess trends at the monitoring wells installed in 2019, 2021 and 2023. It is anticipated that at least five years of semi-annual data will be required prior to analysing trends at these newer wells.
- Analytical results from groundwater monitoring wells have indicated Guideline B-7 compliance along the northern property boundary and southern property boundary. Compliance with Guideline B-7 along the western property boundary is assumed based on groundwater quality at EL-MW2R and the inferred direction of groundwater flow. The Site is not compliant with Guideline B-7 along the eastern property boundary based on the results from EL-MW3. There appears to be sufficient natural attenuation occurring between the leachate well and the downgradient wells. However, the actual distance to attenuate groundwater is unknown and may be less than the distance between EL-MW3 and the nested wells (EL-MW5.1-21 and EL-MW5.2-21) which is approximately 145 m east. Monitoring wells EL-MW5.1-21 and EL-MW5.2-21 are located 115 m east of the property limit.

- Two additional wells (EL-MW6.1-23 and EL-MW6.2-23) serving as the east-northeast property boundary were installed in 2023 as per Phase 3 of the proposed monitoring program. The required CAZ boundary will need be reassessed based on the results of these new boundary wells. Once the CAZ re-assessment has been approved by the MECP, the municipality should take steps to acquire the necessary CAZ lands around Site.
- While not required, groundwater quality at the proposed trigger location (EL-MW1) has been assessed for compliance with the proposed groundwater trigger plan. The groundwater chemical results in 2023 did not trigger the Tier 1 Contingency Plan response for groundwater.

7.3 Groundwater and Surface Water interaction

- There appears to be sufficient natural attenuation occurring between the leachate well EL-MW3 where a PWQO exceedance was reported and the downgradient nested wells. Surface water impacts to Cardwell Lake are unlikely.

7.4 Landfill Gas

- The RKI Eagle gas monitoring results for 2023 (0 to 100 ppm) indicated methane gas concentrations are well below the concentrations of concern as identified above for the subsurface, buildings and structures on-site.

7.5 Site Capacity and Life Expectancy

- The remaining volumetric capacity of Phase 1 at the end of 2023 is 40,568 m³, which gives an estimated volumetric life expectancy for Phase 1 of 29 years.
- The estimated life expectancy is an overestimate as it does not consider intermediate soil cover, or the construction and demolition waste deposited on Site.
- A UAV survey was conducted on June 29th, 2023, to determine the remaining Site capacity and contours.
- An updated D&O Plan is required to be submitted two years prior to the anticipated Closure of Phase 1, and a Closure Plan is required to be submitted two years prior to the anticipated closure of the Site as identified in the ECA Items 3.7 and 3.8.

8 Limiting Conditions

The conclusions presented in this report represent our professional opinion and are based upon the work described in this report and any limiting conditions in the terms of reference, scope of work, or conditions noted herein.

The findings presented in this report are based on conditions observed at the specified dates and locations, the analysis of samples for the specified parameters, and information obtained for this project. Unless otherwise stated, the findings cannot be extended to previous or future site conditions, locations that were not investigated directly, or types of analysis not performed.

BluMetric Environmental Inc. makes no warranty as to the accuracy or completeness of the information provided by others, or of conclusions and recommendations predicated on the accuracy of that information.

This report has been prepared for The Corporation of the Municipality of Hastings Highlands. Any use a third party makes of this report, any reliance on the report, or decisions based upon the report, are the responsibility of those third parties unless authorization is received from BluMetric Environmental Inc. in writing. BluMetric Environmental Inc. accepts no responsibility for any loss or damages suffered by any unauthorized third party as a result of decisions made or actions taken based on this report.

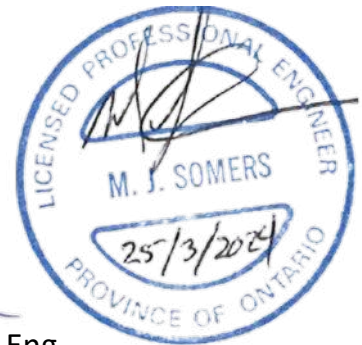
Respectfully submitted,
BluMetric Environmental Inc.



Megan Williamson, B.Sc.
Environmental Scientist



Mark Somers, M.Eng., P.Eng.
Senior Engineer Manager
Environmental Engineering & Compliance



9 References

BluMetric, 2018. Development and Operations Plan East Lake WDS – 2018. Submitted to the Corporation of the Municipality of Hastings Highlands, February 2018.

BluMetric, 2022. *East Lake WDS 2021 Annual Report*. Submitted to The Corporation of the Municipality of Hastings Highlands, March 2022.

BluMetric, 2023. *East Lake WDS 2022 Annual Report*. Submitted to The Corporation of the Municipality of Hastings Highlands, March 2023.

BluMetric, 2019. *East Lake WDS Proposed Monitoring Plan*. Submitted to The Corporation of the Municipality of Hastings Highlands, February 2019

CCME (Canadian Council of Ministers of the Environment), 2011. *Protocols Manual For Water Quality Sampling in Canada*. 186p.
http://www.ccme.ca/files/Resources/water/protocols_document_e_final_101.pdf

Groundwater Information Network, <http://gw-info.net/>, April 2015.

Ministry of the Environment (MOE). Procedure B-7-1: *Determination of Contaminant Limits and Attenuation Zones*. Ministry of Environment, Government of Ontario. 9pp.

Ministry of the Environment (MOE), *Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water-Technical Guidance Document*, November 2010.

Ministry of Northern Development and Mines (MNDM). Map 2556, Quaternary Geology of Ontario, Southern Sheet, 1991.

Ministry of Northern Development and Mines (MNDM). Map 2554, Bedrock Geology of Ontario, Southern Sheet, 1991.

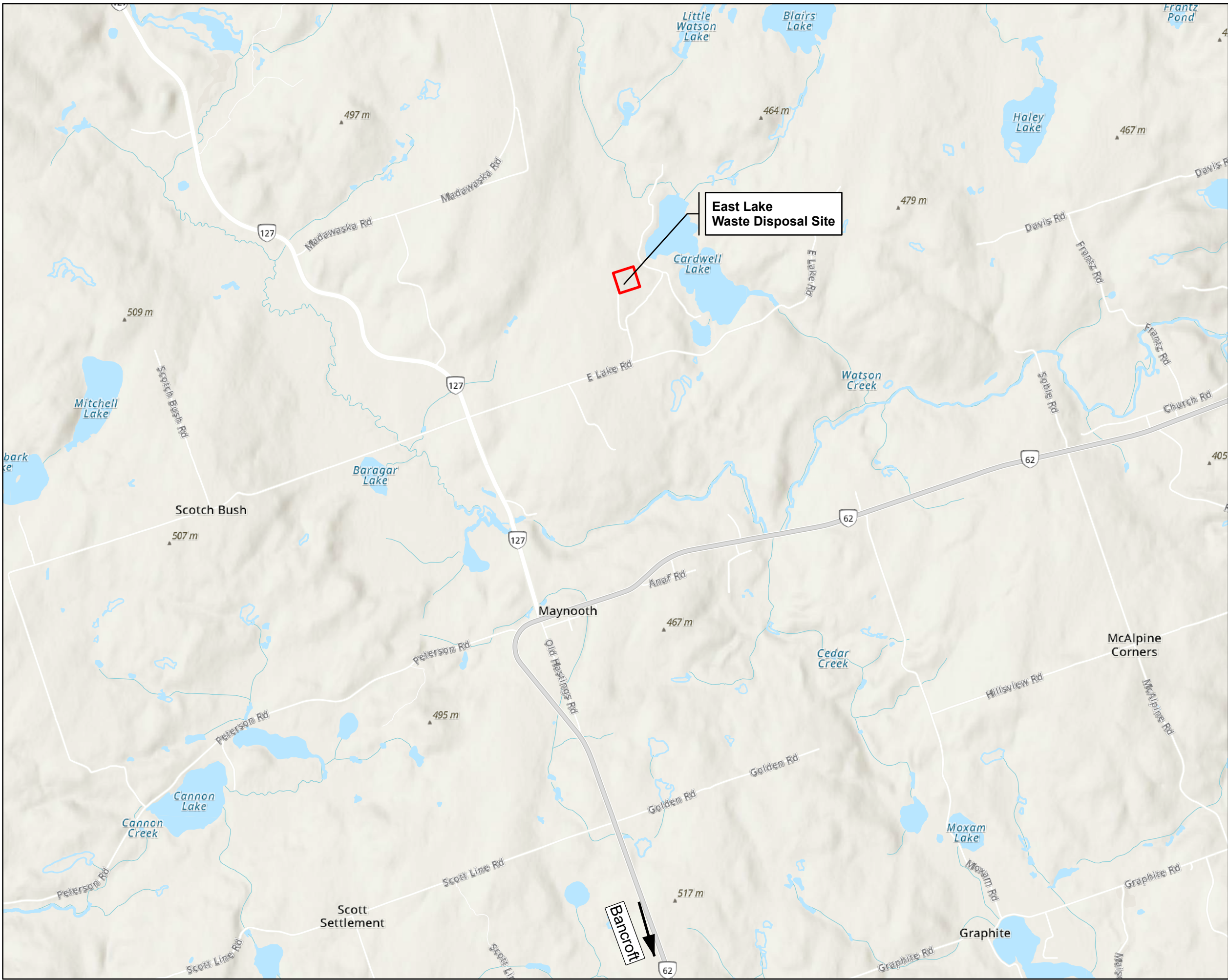
Table

Table 12: 2023 Groundwater Chemistry Results																								
Parameter	Units	RUV-EL	ODWQS	PWQO-GENERAL	PWQO-INTERIM	Location		EL-MW5.1-21	EL-MW5.1-21	EL-MW5.2-21	EL-MW5.2-21	EL-MW6.1-23	EL-MW6.1-23	EL-MW6.2-23	ELMW1	ELMW1	ELMW2R	ELMW2R	ELMW3	ELMW3	ELMW3	ELMW4	ELMW4	
						Sample ID	Sample Date	2023-May-01	2023-Oct-17	2023-May-01	2023-Oct-17	2023-Oct-17	AQC-GW1 (ELM)	EL-MW6.2	EL-MW1	EL-MW1	EL-MW2R	EL-MW2R	EL-MW3	AQC-GW1 (ELM)	EL-MW3	EL-MW3	EL-MW3	EL-MW4
Anions						Detection Limit																		
Chloride	mg/L	125.25	250	-	-	0.1	2.07	<1	1.59	3.2	<1	<1	2.1	46.9	4.9	0.64	<1	97.7	96.5	95	5.06	4.3		
Nitrate as N	mg/L	2.5675	10	-	-	0.05	0.12	0.13	0.27	<0.1	<0.10	<0.10	1.86	2.48	2.01	0.11	0.11	2.19	2.19	1.37	0.36	0.39		
Sulphate	mg/L	254.46	500	-	-	0.1	6.22	5.2	5.05	3.5	6.8	14	25	0.75	3.7	8.75	7.6	826	816	880	10	8.3		
Cations																								
Calcium (diss)	mg/L	-	-	-	-	0.05	5.88	5.1	3.46	2.9	12	12	29	44.7	3.9	5.47	5.6	356	266	400	10.7	12		
Magnesium (diss)	mg/L	-	-	-	-	0.05	1.43	1.4	0.62	0.66	3.4	3.5	5.9	11	0.87	1.23	1.1	33.9	30.2	38	4.57	4.8		
Potassium (diss)	mg/L	-	-	-	-	0.2	0.55	0.89	<0.5	0.59	2.2	2.2	2.8	1.8	0.84	0.6	0.77	8.37	9.31	7.6	1	1.3		
Sodium (diss)	mg/L	101.295	200	-	-	0.05	3.15	2.5	1.59	1.5	3.9	4	15	12.2	3.1	2.73	2.8	93.6	98.5	100	4.3	4.9		
General Chemistry																								
Alkalinity (as CaCO3)	mg/L	257.5	30 - 500	See Factsheet	-	1	14	15	<5	3.9	40	39	100	<5	7.5	18	16	180	173	210	40	40		
Ammonia as N	mg/L	-	-	-	-	0.02	<0.02	<0.05	<0.02	<0.05	0.16	0.14	0.12	<0.02	<0.05	<0.02	<0.05	0.09	0.08	0.15	<0.02	<0.05		
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	2	<2	<2		
Chemical Oxygen Demand	mg/L	-	-	-	-	4	<5	<4	<5	9.2	11	7.2	7.6	<5	4.3	<5	<4	38	41	110	<5	<4		
Dissolved Organic Carbon	mg/L	3.15	5	-	-	0.4	0.9	1	1.4	1.5	1.5	0.8	2.6	1.6	1	1.2	1.8	18.8	18.9	38	0.9	0.9		
Electrical Conductivity	uS/cm	-	-	-	-	1	58	57	32	33	120	110	270	189	60	63	57	1930	1900	2200	122	120		
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-	-	6.93	7.23	6.27	6.54	7.80	7.81	7.54	6.44	6.9	6.92	7.04	6.75	6.79	7.52	7.47	7.54		
Total Dissolved Solids	mg/L	274	500	-	-	10	46	45	40	20	145	105	190	66	65	212	55	1550	1610	1780	98	80		
Total Hardness (as CaCO3)	mg/L	-	80 - 100	-	-	1	-	18	-	10	43	45	98	-	13	-	18	-	-	1200	-	49		
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	<0.1	<0.1	0.1	0.15	0.16	0.12	<0.1	<0.1	<0.1	<0.1	<0.1	1.07	1.09	1.5	<0.1	<0.1		
Total Suspended Solids	mg/L	-	-	-	-	10	524	980	146	240	25000	30000	1400	3230	960	682	940	328	352	990	1130	2200		
Metals																								
Aluminum (diss)	mg/L	-	0.1	-	Calculated	0.004	0.014	<0.0049	0.037	0.037	0.011	0.01	<0.0049	0.008	<0.0049	0.026	<0.0049	0.013	0.013	0.0049	0.023	<0.0049		
Aluminum (diss, PWQO)	mg/L	-	-	-	Calculated	0.004	<0.004	<0.005	0.028	0.028	0.011	0.01	<0.005	<0.004	<0.005	<0.004	<0.005	<0.004	<0.004	<0.005	<0.004	<0.005		
Barium (diss)	mg/L	-	1	-	-	0.002	0.006	0.0055	0.013	0.014	0.01	0.0095	0.019	0.008	<0.002	0.005	0.0042	0.041	0.04	0.042	0.006	0.0057		
Boron (diss)	mg/L	1.25375	5	-	0.2	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.093	<0.01	<0.01	<0.01	<0.01	2.72	2.55	3.5	0.011	<0.01		
Iron (diss)	mg/L	0.1525	0.3	0.3	-	0.01	0.013	<0.1	0.031	<0.1	<0.1	<0.1	0.017	<0.1	<0.01	<0.1	<0.1	<0.01	0.04	<0.1	<0.01	<0.1		
Lead (diss)	mg/L	-	0.01	-	Calculated	0.0005	-	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.0005	-	<0.0005	-	-	<0.0005	-	<0.0005		
Manganese (diss)	mg/L	0.028	0.05	-	-	0.002	<0.002	<0.002	0.003	0.0023	0.063	0.064	0.35	0.005	<0.002	0.006	0.0038	3.06	3.1	3.8	<0.002	<0.002		

- LEGEND-
- Detection Limit DL: May vary between sample locations and events
 - DL exceeds criteria
 - Concentration exceeds RUV-EL Reasonable Use Values East Lake
 - Concentration exceeds ODWQS Ontario Drinking Water Quality Standards
 - Concentration exceeds PWQO-GENERAL Provincial Water Quality Objectives General
 - Concentration exceeds PWQO-INTERIM Provincial Water Quality Objectives Interim

1 - Aluminum (diss) refers to the field-filtered dissolved aluminum parameter (0.45 micron filter) for comparison to
2 - Dissolved Aluminum (PWQO) refers to the lab-filtered dissolved aluminum parameter (0.20 micron filter) for

Figures



LEGEND

Waste Disposal Site

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
 PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 11"x17" FORMAT DRAWINGS.

CLIENT
Municipality of Hastings Highlands

PROJECT
East Lake Waste Disposal Site





TITLE
Site Location Map

BluMetric[®] Environmental
 The Tower - The Woolen Mill,
 4 Cataraqui St.,
 Kingston, Ontario K7K 1Z7
 TEL: (613) 531-2725
 FAX: (613) 531-1852
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca

PROJECT 230225-06		DATE February 15, 2024	
DRAWN PB	CHECKED TH	FIG NO. 01	REV 0



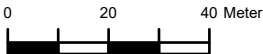
LEGEND


-  Decommissioned Groundwater Monitoring Location
-  Groundwater Monitoring Location
-  Benchmark Location
-  Total Site Area (4.05 ha) (P.A. Miller, 2013)

Note: Coordinates are displayed in UTM Nad 83 Zone 18

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 11"x17" FORMAT DRAWINGS.





CLIENT
Municipality of Hastings Highlands

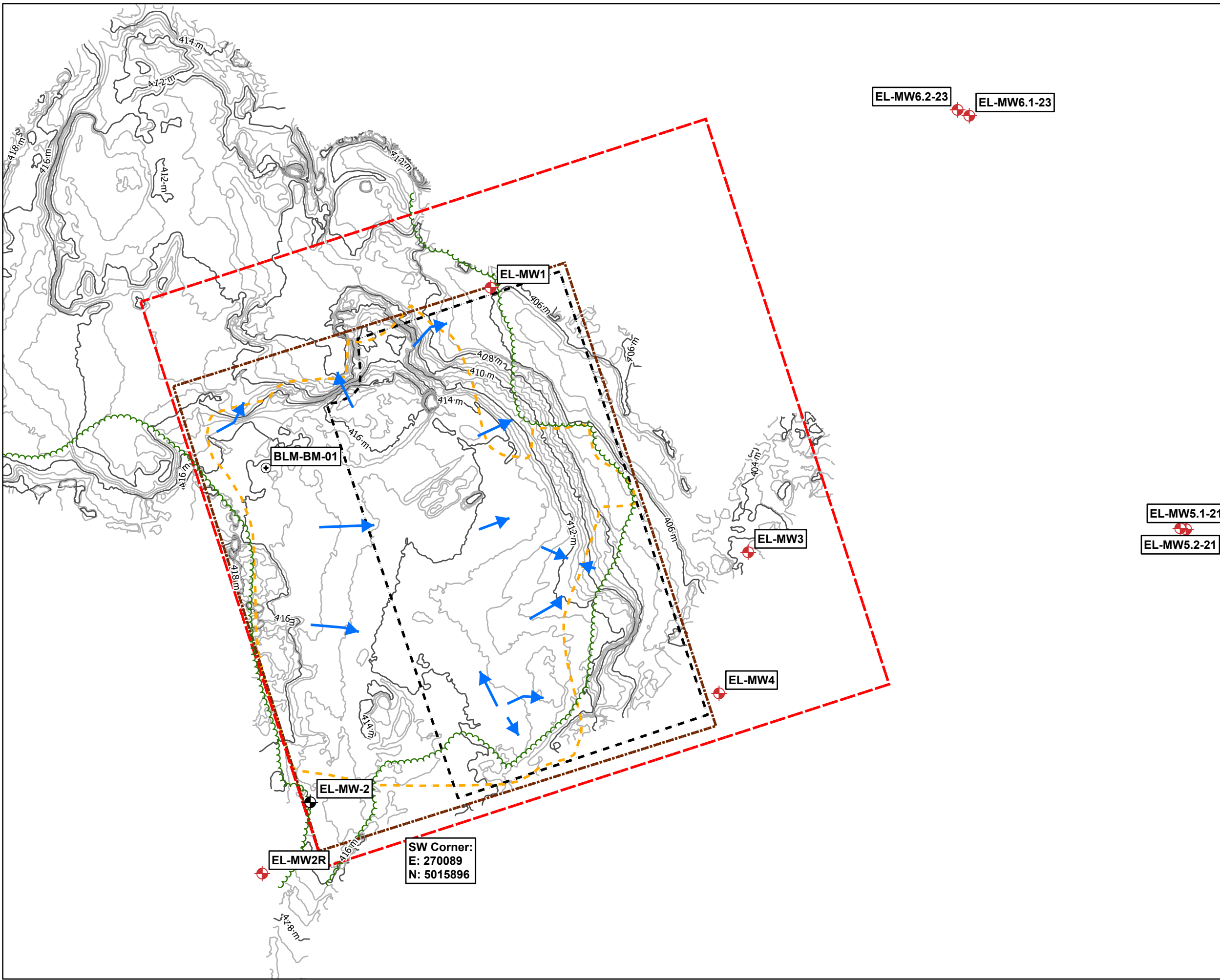
PROJECT
East Lake Waste Disposal Site

TITLE
Site Plan



The Tower - The Woolen Mill,
 4 Catarqui St.,
 Kingston, Ontario K7K 1Z7
 TEL: (613) 531-2725
 FAX: (613) 531-1852
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca

PROJECT 230225-06		DATE February 15, 2024	
DRAWN PB	CHECKED TH	FIG NO. 02	REV 0



LEGEND

- Decommissioned Groundwater Monitoring Location
- Groundwater Monitoring Location
- Benchmark Location
- Surface Water Drainage Direction
- Treeline
- Approximate Outline of Buried Waste
- Approved Waste Fill Area (2.3 ha)
- Total Site Area (4.05 ha) (P.A. Miller, 2013)
- Proposed Mound Outline

2023 Elevation

- Minor Contour (0.5 masl)
- Major Contour (2.0 masl)

Notes:
Coordinates are in UTM Nad83 CSRS Zone 18

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 11"x17" FORMAT DRAWINGS.

EL-MW5.1-21

EL-MW5.2-21

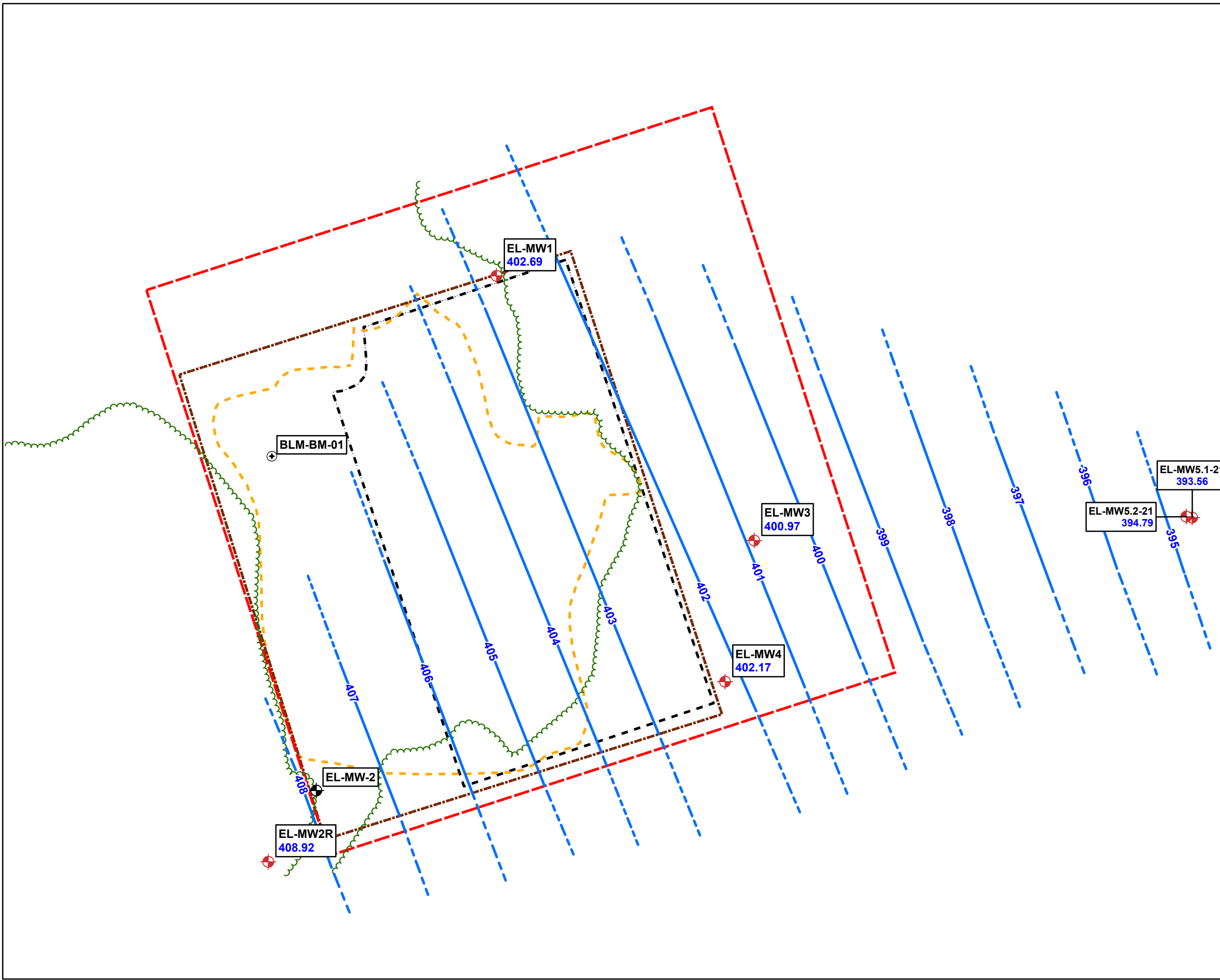
CLIENT
Municipality of Hastings Highlands

PROJECT
East Lake Waste Disposal Site

TITLE
Topography as of 2023 and Surface Water Flow Direction

The Tower - The Woolen Mill,
4 Cataraqui St.,
Kingston, Ontario K7K 1Z7
TEL: (613) 531-2725
FAX: (613) 531-1852
Email: info@blumetric.ca
Web: http://www.blumetric.ca

PROJECT 230225-06		DATE February 15, 2024	
DRAWN PB	CHECKED TH	FIG NO. 03	REV 0



LEGEND

- Decommissioned Groundwater Monitoring Location
- Benchmark Location
- Treeline
- Approximate Outline of Buried Waste
- Approved Waste Fill Area (2.3 ha)
- Total Site Area (4.05 ha) (P.A. Miller, 2013)
- Proposed Mound Outline
- Groundwater Monitoring Location
- Groundwater Contour (1 m)
- Inferred Groundwater Contour

402.79 Groundwater Elevation (masl) (Spring, 2023)

Notes:
Coordinates are in UTM Nad83 CSRS Zone 18

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 11"x17" FORMAT DRAWINGS.

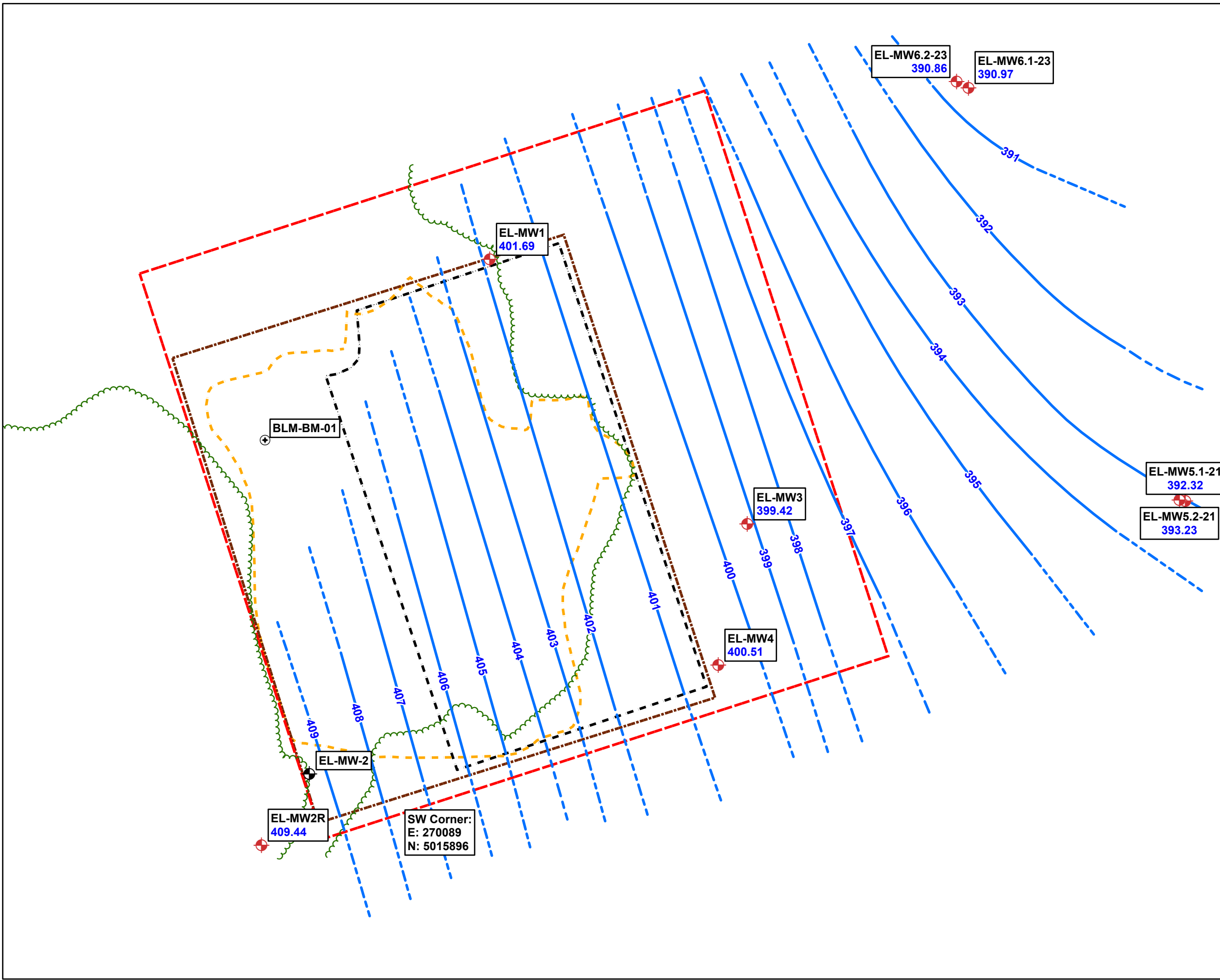
CLIENT
Municipality of Hastings Highlands

PROJECT
East Lake Waste Disposal Site

TITLE
Groundwater Elevations and Contours - Spring 2023

The Tower - The Woolen Mill,
4 Cataraqui St.,
Kingston, Ontario K7K 1Z7
TEL: (613) 531-2725
FAX: (613) 531-1852
Email: info@blumetric.ca
Web: http://www.blumetric.ca

PROJECT 230225-06		DATE February 15, 2024	
DRAWN PB	CHECKED TH	FIG NO. 04	REV 0



LEGEND

- Decommissioned Groundwater Monitoring Location
- Benchmark Location
- Treeline
- Approximate Outline of Buried Waste
- Approved Waste Fill Area (2.3 ha)
- Total Site Area (4.05 ha) (P.A. Miller, 2013)
- Proposed Mound Outline
- Groundwater Monitoring Location
- Groundwater Contour (1 m)
- Inferred Groundwater Contour
- 402.01 Groundwater Elevation (mas) (Fall, 2023)

Notes:
Coordinates are in UTM Nad83 CSRS Zone 18

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 11"x17" FORMAT DRAWINGS.

0 20 40 Meters

CLIENT
Municipality of Hastings Highlands

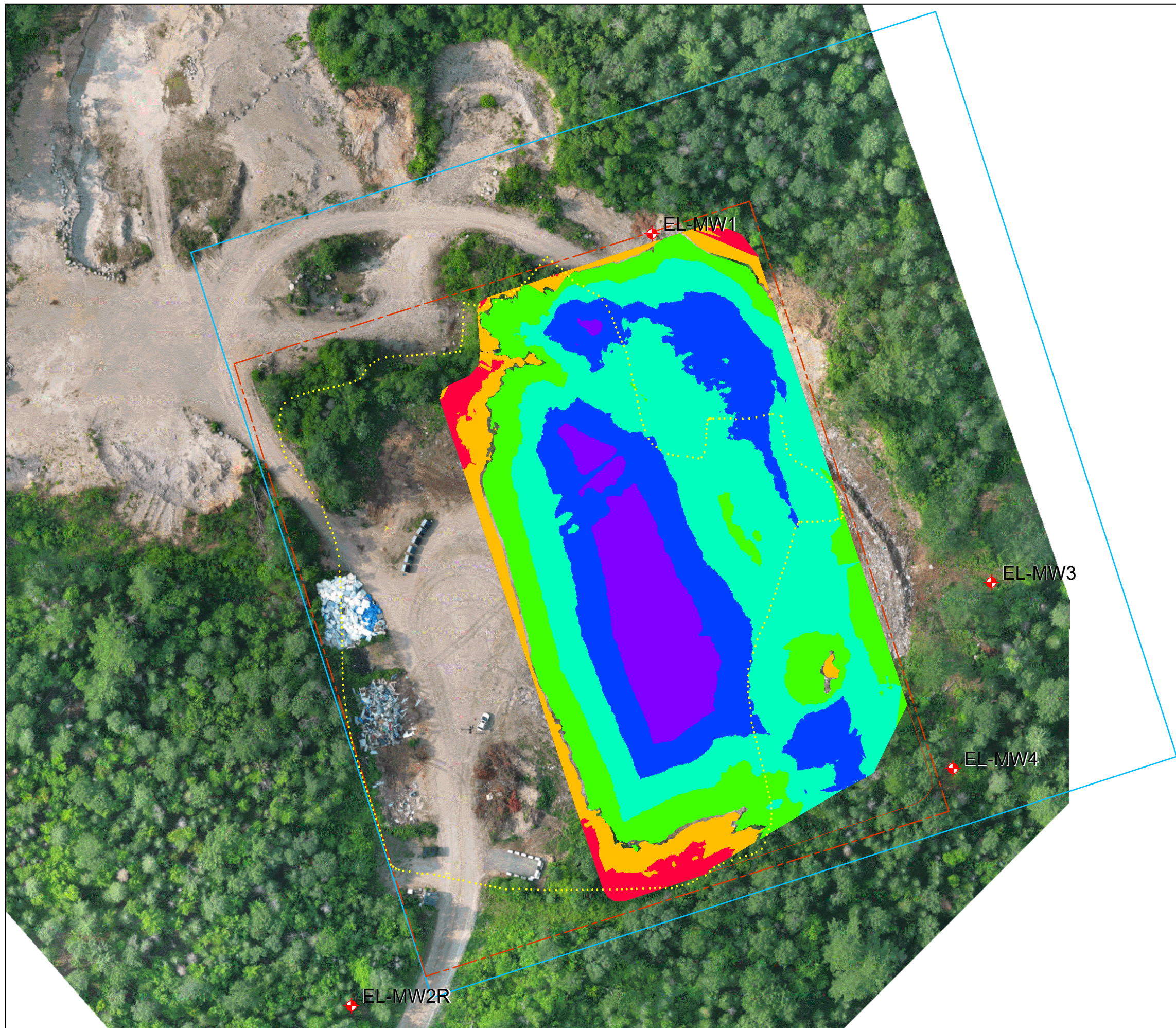
PROJECT
East Lake Waste Disposal Site

TITLE
Groundwater Elevations and Contours - Fall 2023

Blumetric
 Environmental

*The Tower - The Woolen Mill,
 4 Cataraqui St.,
 Kingston, Ontario K7K 1Z7
 TEL: (613) 531-2725
 FAX: (613) 531-1852
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca*

PROJECT 230225-06		DATE February 15, 2024	
DRAWN PB	CHECKED TH	FIG NO. 05	REV 0



LEGEND

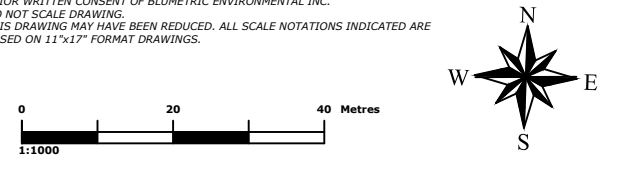
- Monitoring Well Location
- Approved Waste Fill Area (2.3 ha)
- Total Site Area (4.05 ha) (P.A. Miller, 2013)
- Approximate Outline of Buried Waste

Volumes to Table - 2023 to Phase I Design Contours	
Cut	423.00 Cu. M
Fill	49557.94 Cu. M.
Net	49134.94 Cu. M.

Elevations Table				
Number	Minimum Elevation	Maximum Elevation	Volume	Color
1	-2.59	-2.00	3	Red
2	-2.00	-0.25	280	Orange
3	0.25	2.00	19959	Yellow
4	2.00	4.00	16978	Green
5	4.00	6.00	7388	Cyan
6	6.00	8.00	2060	Blue
7	8.00	8.60	51	Purple

REV.	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
 PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC.
 DO NOT SCALE DRAWING.
 THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 11"x17" FORMAT DRAWINGS.



CLIENT
 Municipality of Hastings Highlands

PROJECT
 East Lake Waste Disposal Site

TITLE
 Remaining Fill Capacity 29 June, 2023

4 Cataraqui Street, The Tower - The Woolen Mill
 Kingston, Ontario, K7K 1Z7
 TEL: (613) 531-2725
 FAX: (613) 531-1852
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca

PROJECT # 230225-06	DATE February 21, 2024
DRAWN PB	CHECKED TH
DWG NO. 06	REV 0

Site Photographs



Photo 1: Site entrance – October 17, 2023.



Photo 2: Site hours and signage – October 17, 2023.



Photo 3: General site – October 17, 2023.



Photo 4: Waste bins and general site – October 17, 2023.



Photo 5: Styrofoam and mattresses – October 17, 2023.



Photo 6: Bulk Waste – October 17, 2023.



Photo 7: Wood/brush pile – October 17, 2023.



Photo 8: Metals pile – October 17, 2023.



Photo 9: Styrofoam and mattresses – May 1, 2023.



Photo 10: Bulk Waste – May 1, 2023.



Photo 11: Wood/brush pile – May 1, 2023.



Photo 12: Metals pile – May 1, 2023.



Photo 13: Tires Pile – May 1, 2023.



Photo 14: Refrigerators– October 17, 2023.



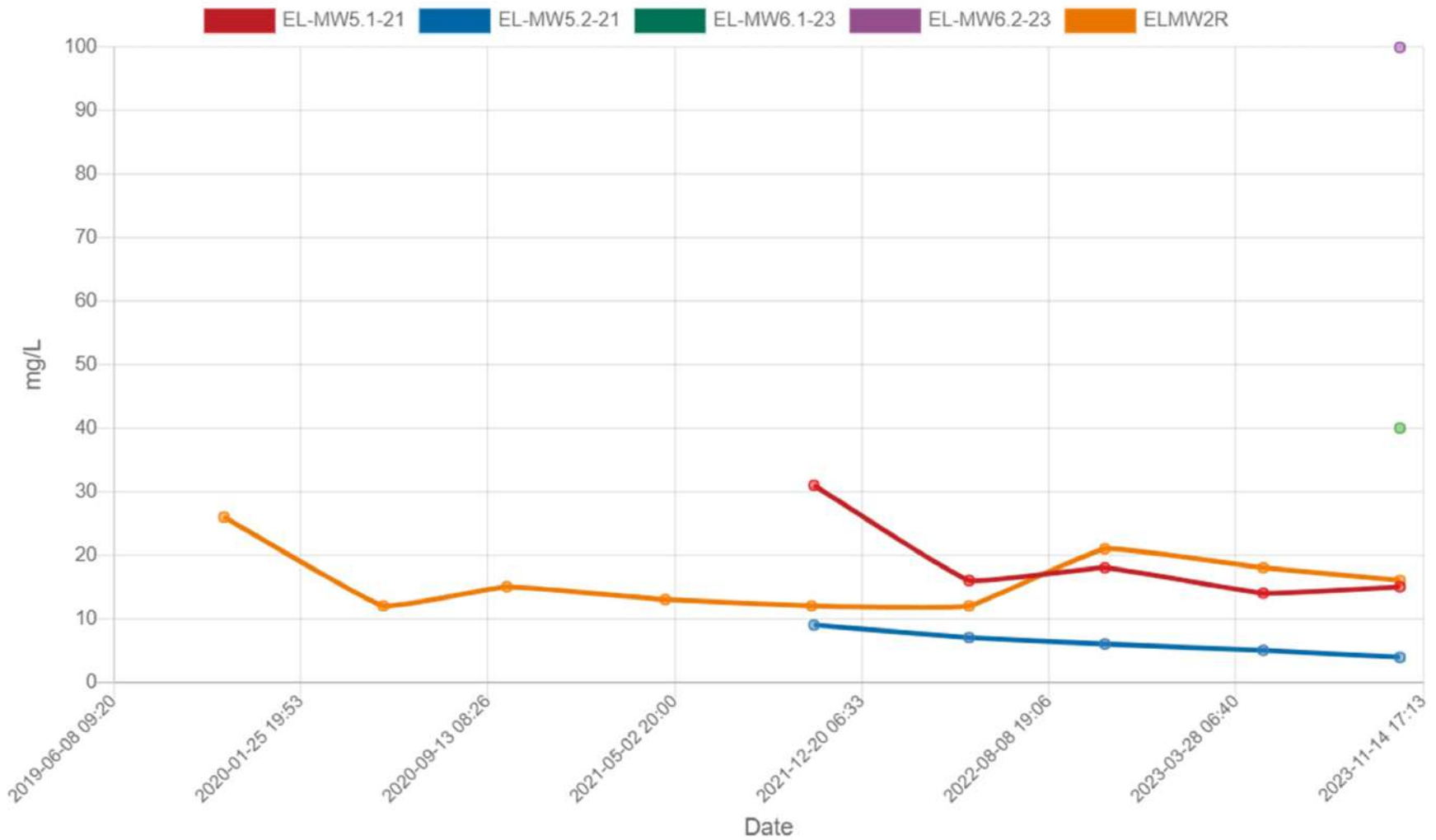
Photo 15: Debris in tree line – May 1, 2023.



Photo 16: Active landfill site – October 17, 2023.

Chemistry Trend Graphs

Alkalinity (as CaCO3)



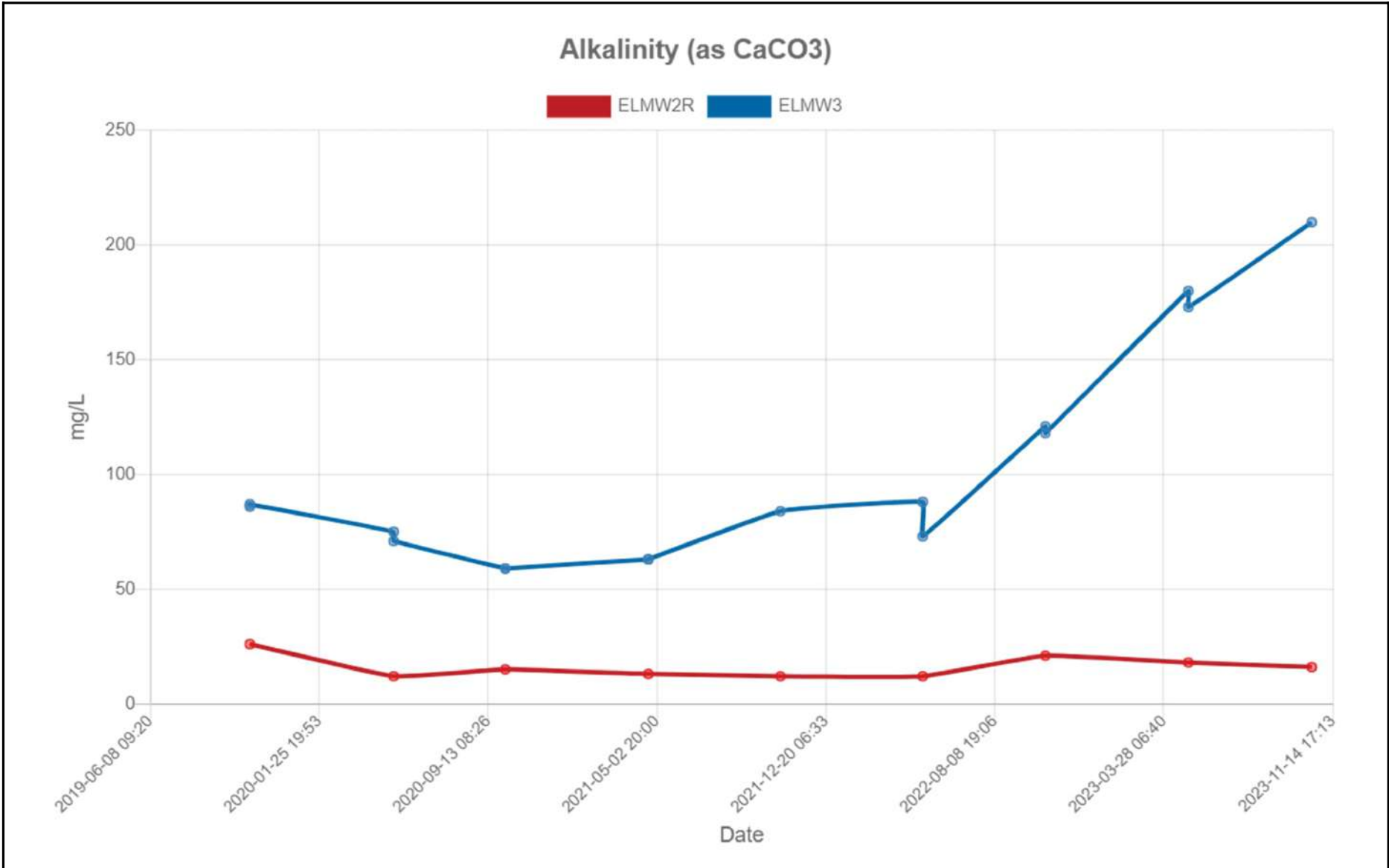
East Lake WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 230225
Date: February 15, 2024

Graph 1
Alkalinity in Groundwater – Downgradient Wells

Created by: Megan Williamson
Checked by Carolyn Miller





East Lake WDS
Municipality of Hasting's Highlands

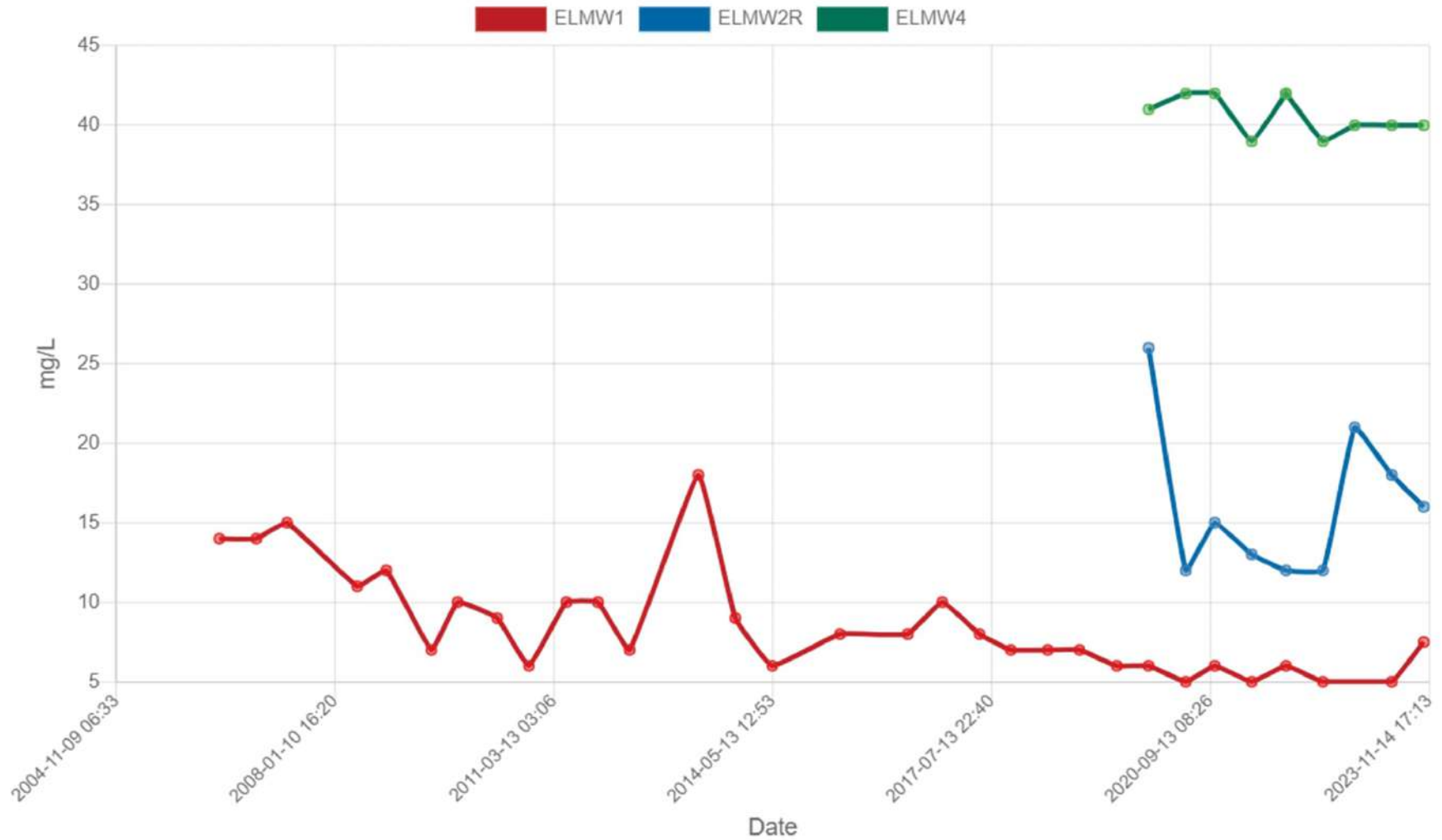
BluMetric Proj No: 230225
Date: February 15, 2024

Graph 2
Alkalinity in Groundwater – Leachate Well

Created by: Megan Williamson
Checked by Carolyn Miller



Alkalinity (as CaCO₃)



East Lake WDS
Municipality of Hasting's Highlands

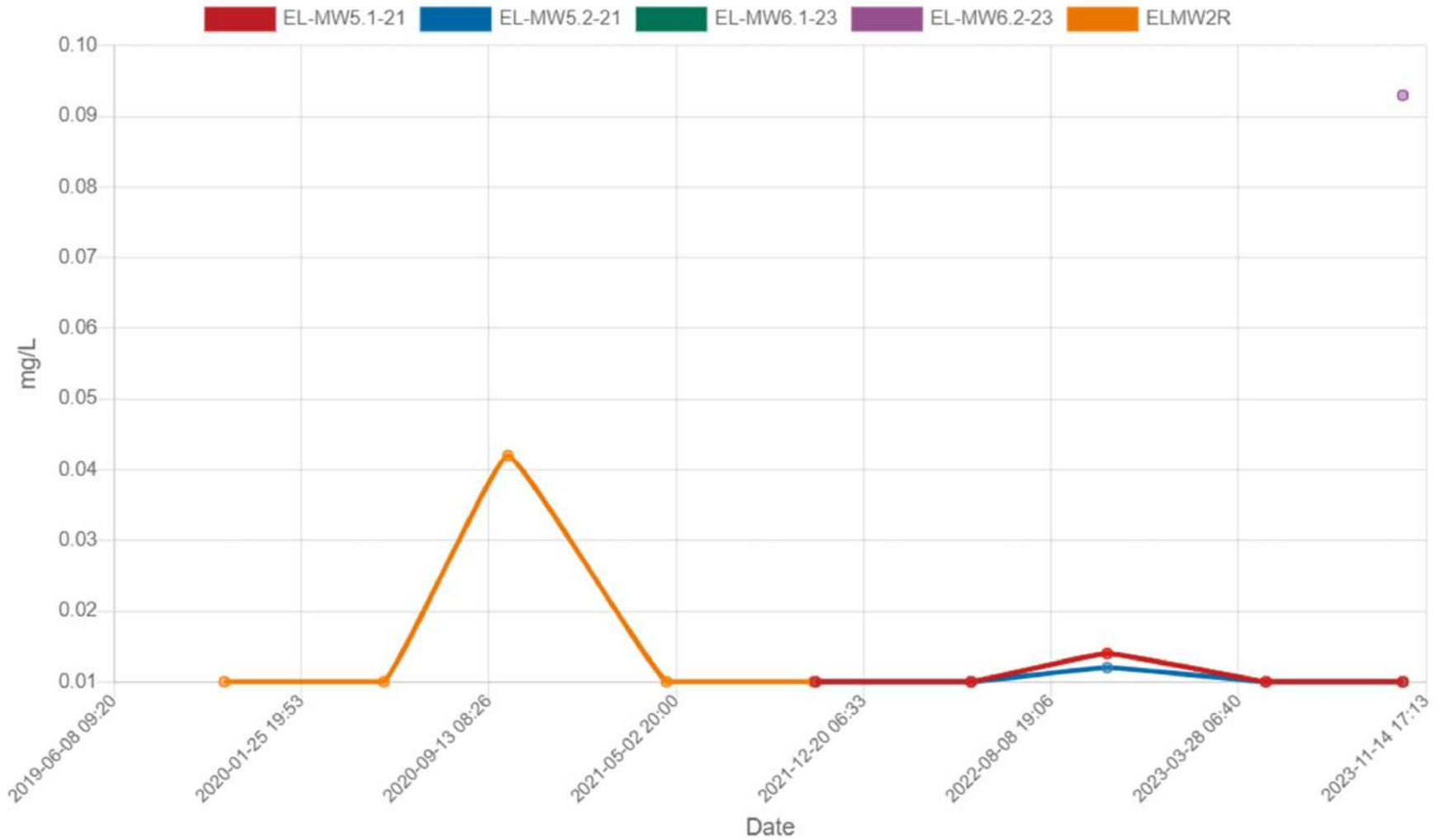
BluMetric Proj No: 230225
Date: February 15, 2024

Graph 3
Alkalinity in Groundwater – Upgradient Wells

Created by: Megan Williamson
Checked by Carolyn Miller



Boron (diss)



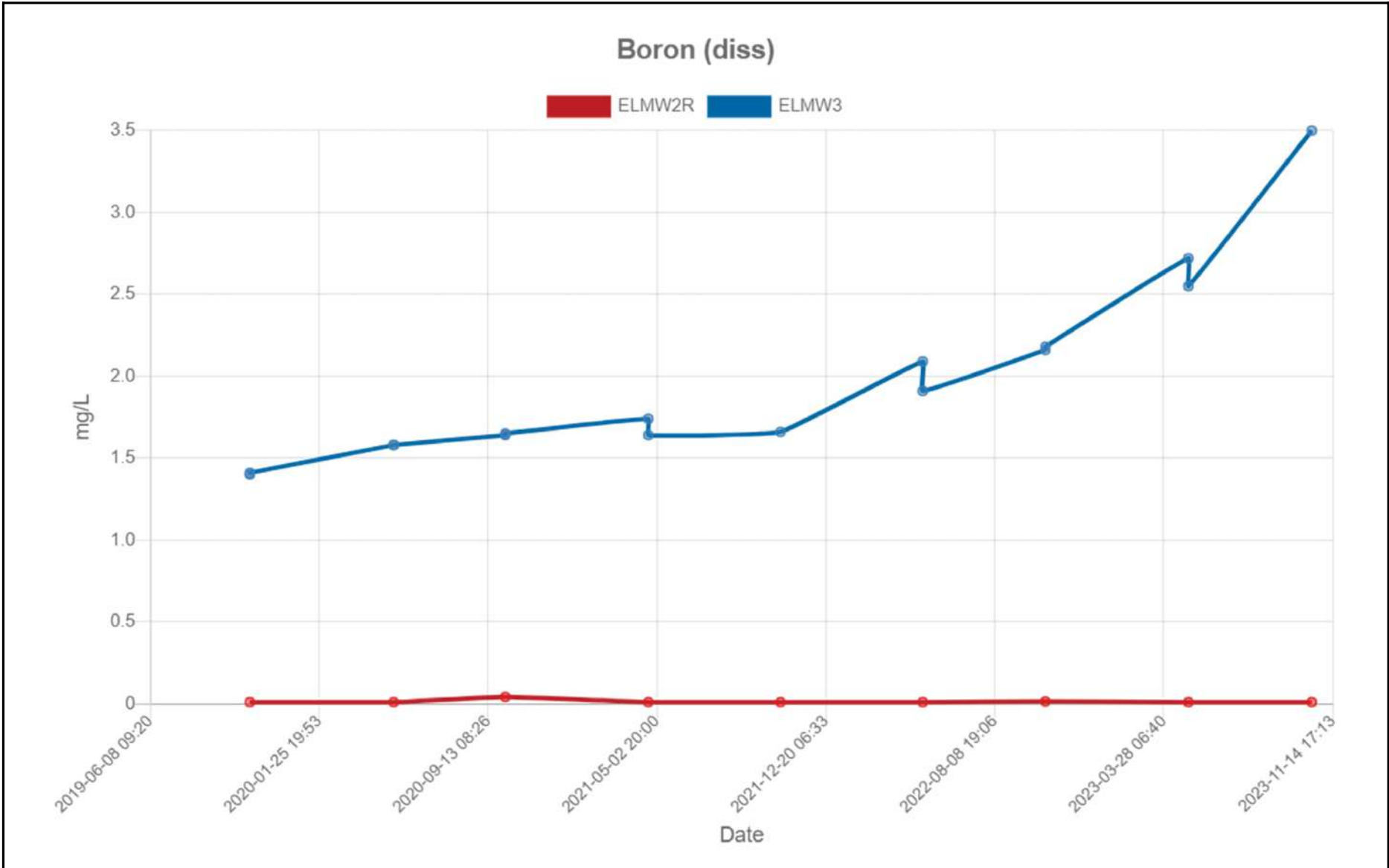
East Lake WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 230225
Date: February 15, 2024

Graph 4
Boron in Groundwater – Downgradient Wells

Created by: Megan Williamson
Checked by Carolyn Miller





East Lake WDS
Municipality of Hasting's Highlands

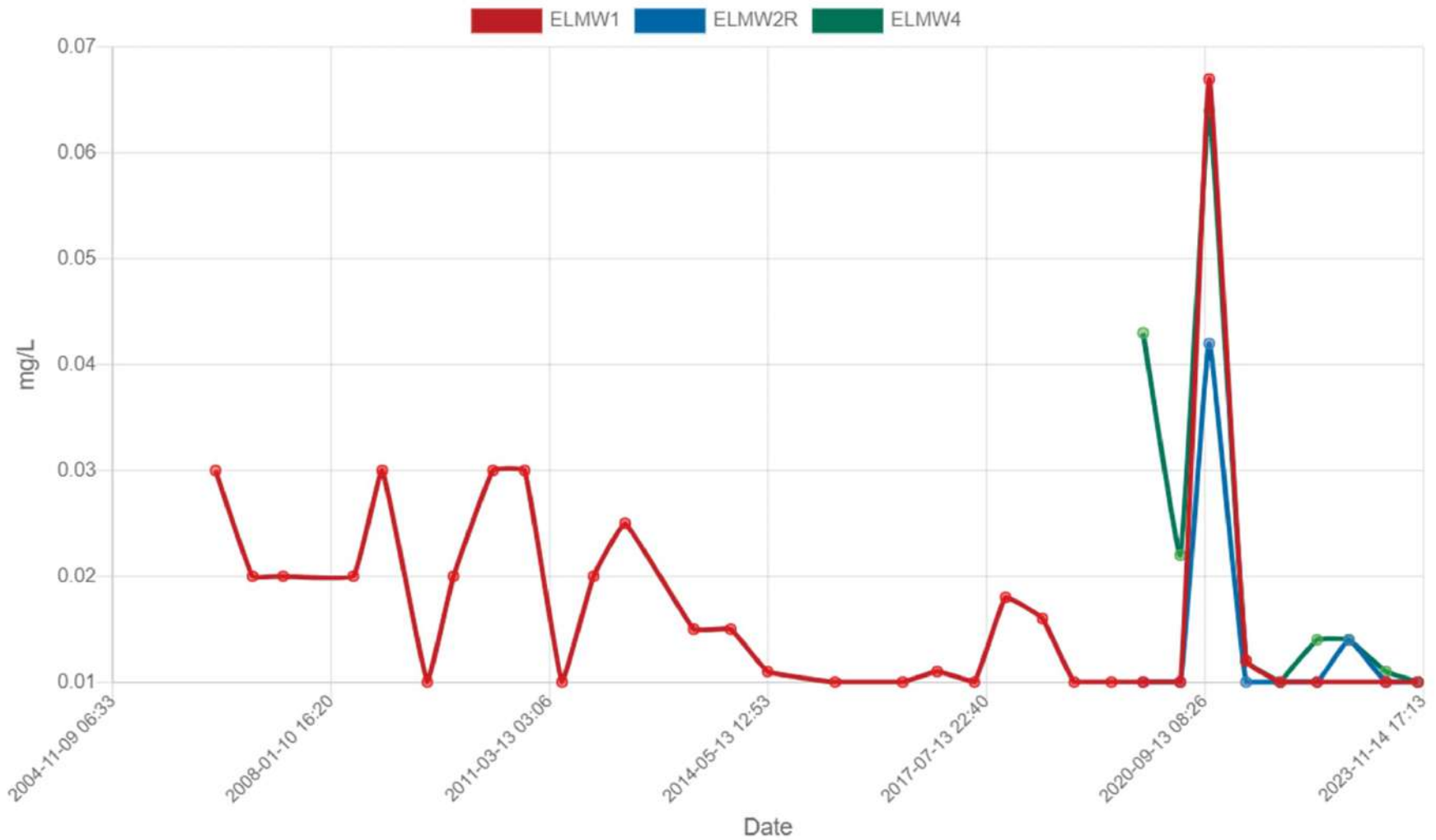
BluMetric Proj No: 230225
Date: February 15, 2024

Graph 5
Boron in Groundwater – Leachate Well

Created by: Megan Williamson
Checked by Carolyn Miller



Boron (diss)



East Lake WDS
Municipality of Hasting's Highlands

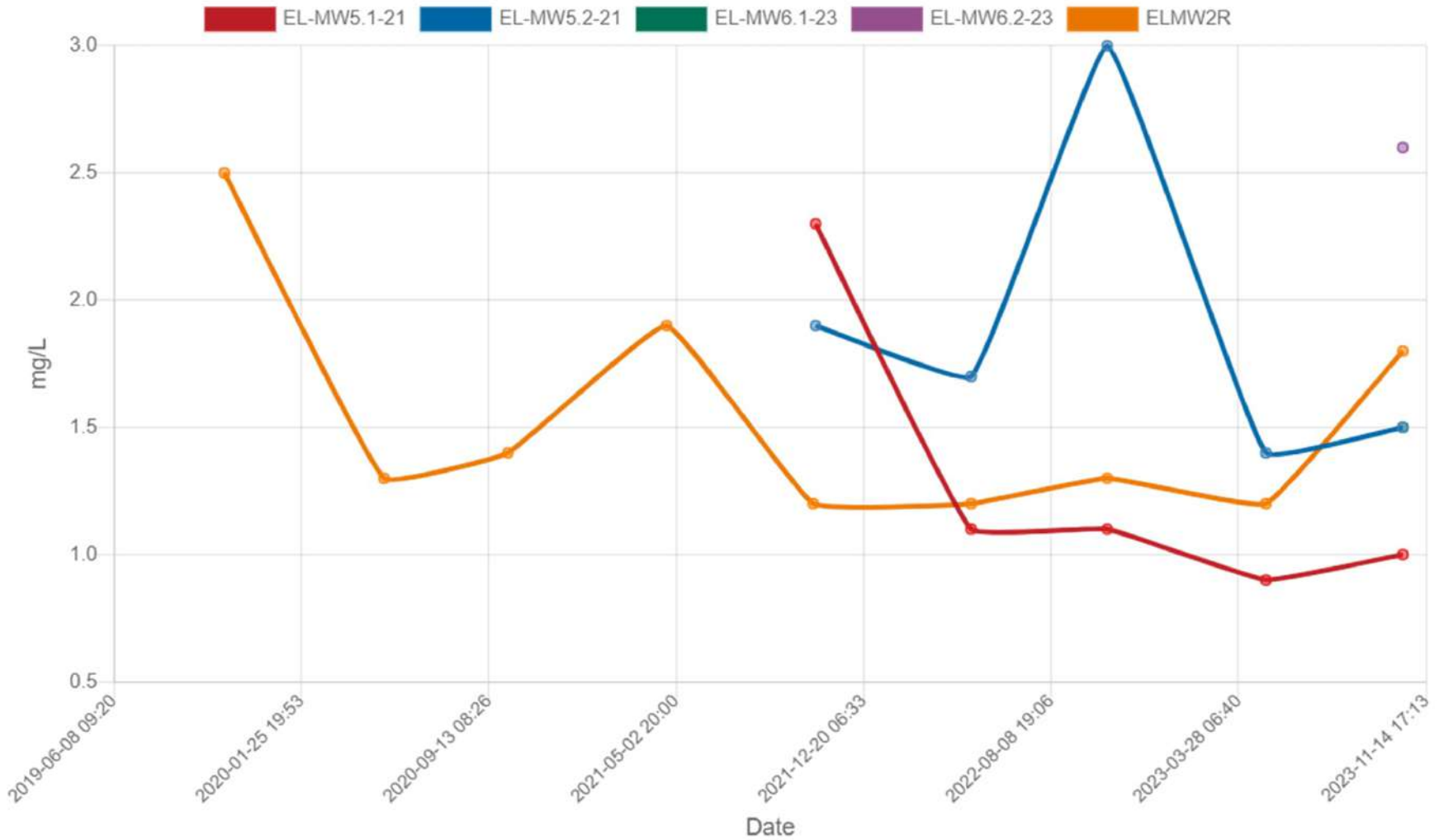
BluMetric Proj No: 230225
Date: February 15, 2024

Graph 6
Boron in Groundwater – Upgradient Wells

Created by: Megan Williamson
Checked by Carolyn Miller



Dissolved Organic Carbon



East Lake WDS
Municipality of Hasting's Highlands

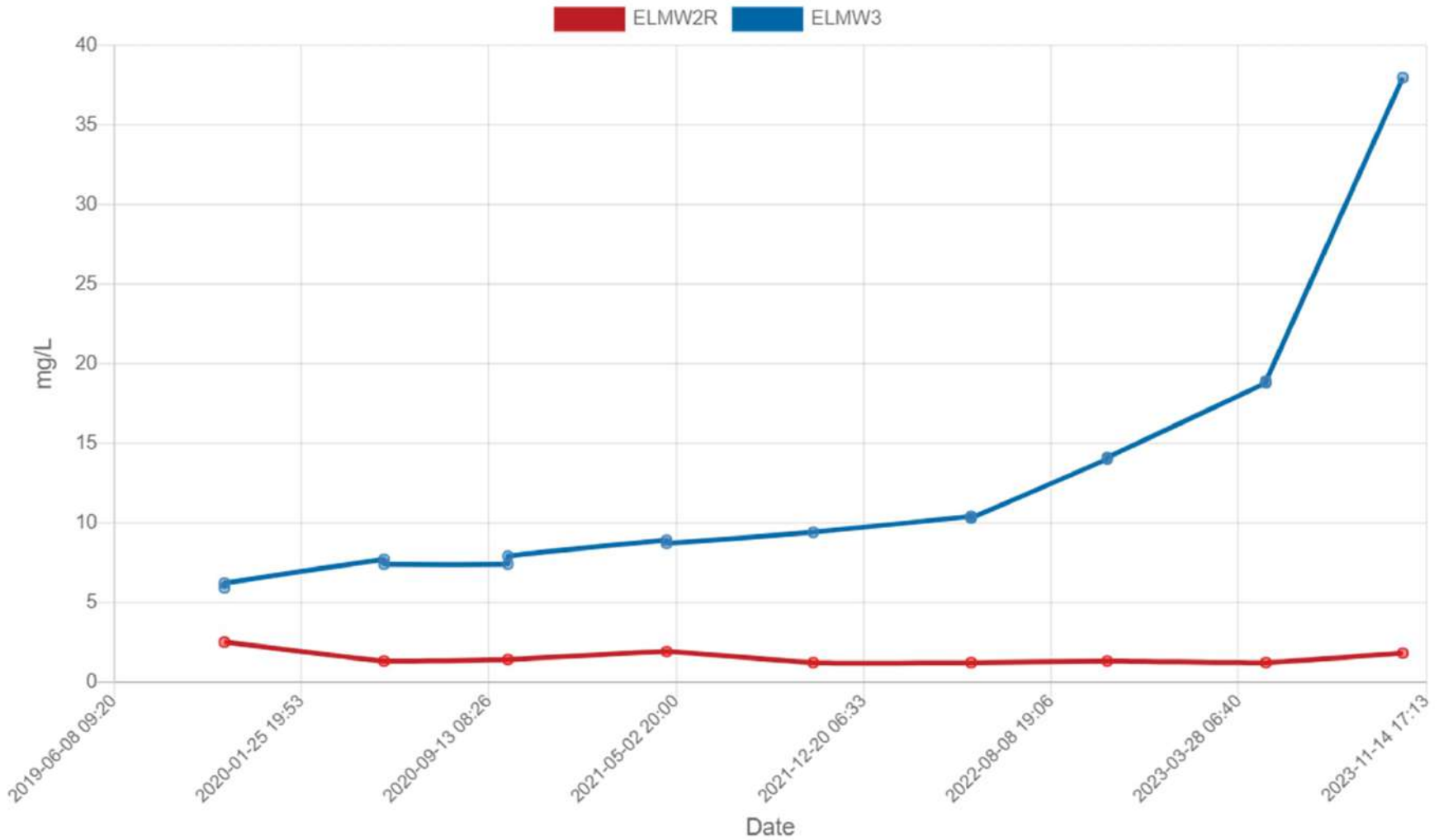
BluMetric Proj No: 230225
Date: February 15, 2024

Graph 7
DOC in Groundwater – Downgradient Wells

Created by: Megan Williamson
Checked by Carolyn Miller



Dissolved Organic Carbon



East Lake WDS
Municipality of Hasting's Highlands

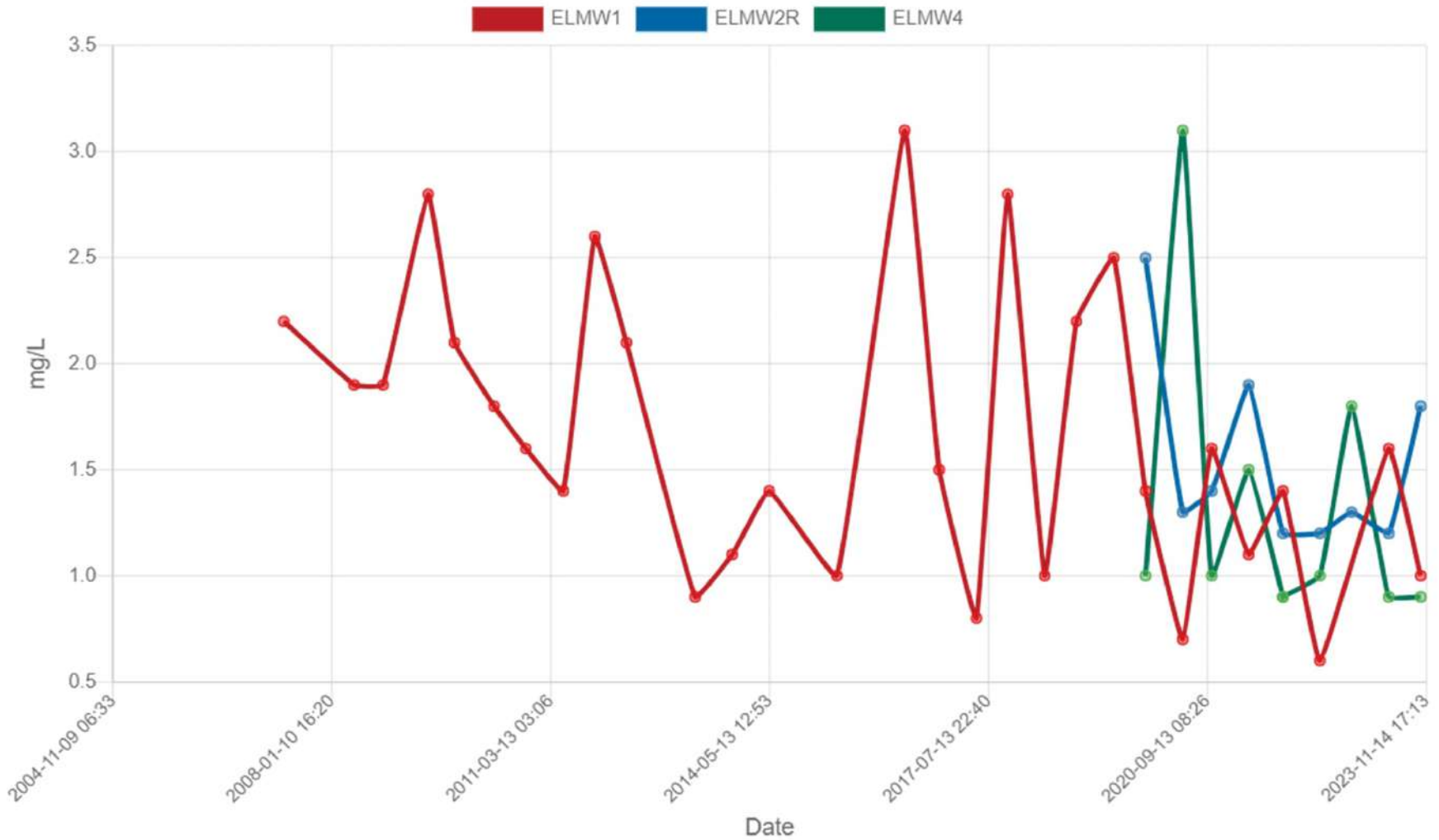
BluMetric Proj No: 230225
Date: February 15, 2024

Graph 8
DOC in Groundwater – Leachate Well

Created by: Megan Williamson
Checked by Carolyn Miller



Dissolved Organic Carbon



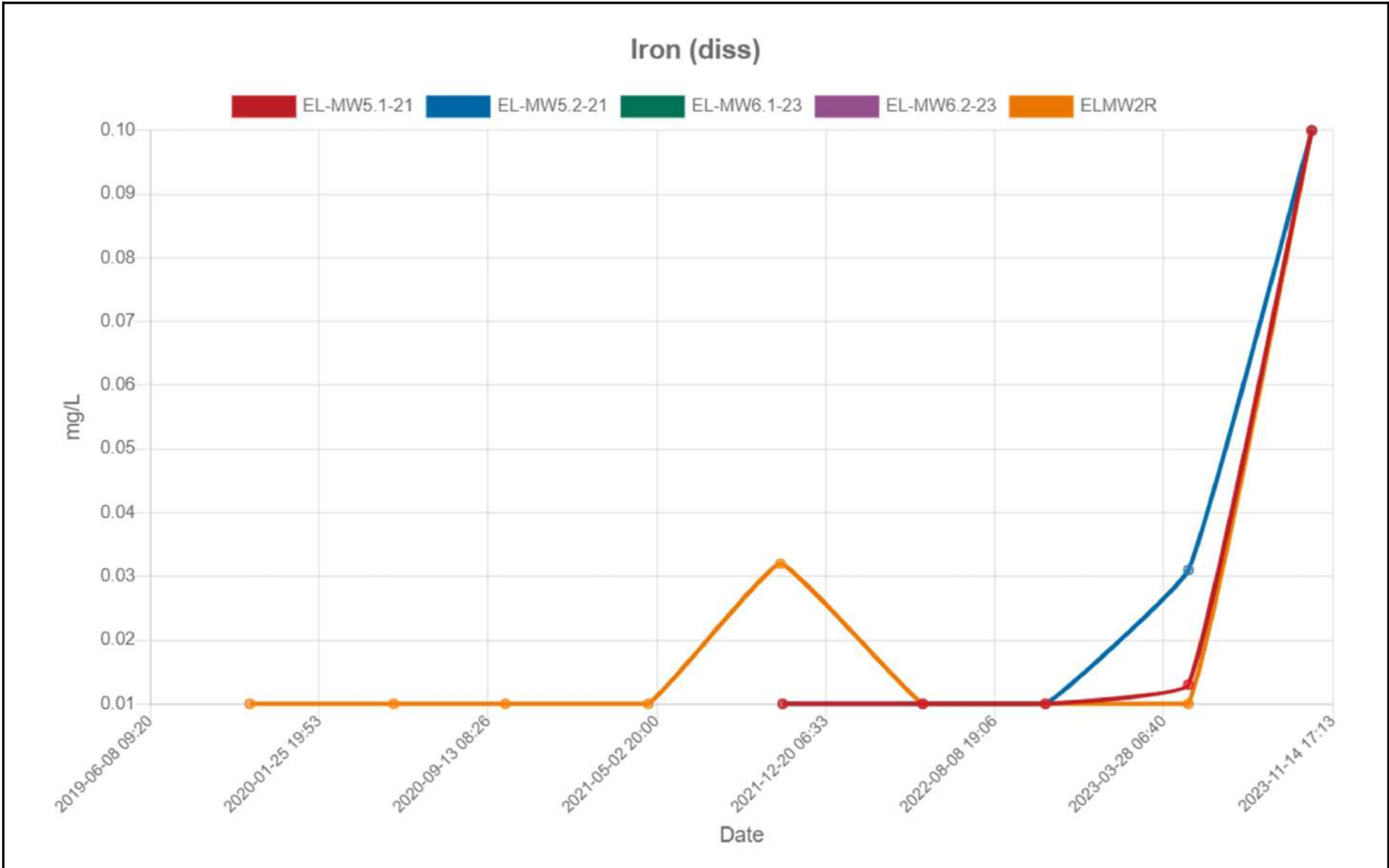
East Lake WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 230225
Date: February 15, 2024

Graph 9
DOC in Groundwater – Upgradient Wells

Created by: Megan Williamson
Checked by Carolyn Miller





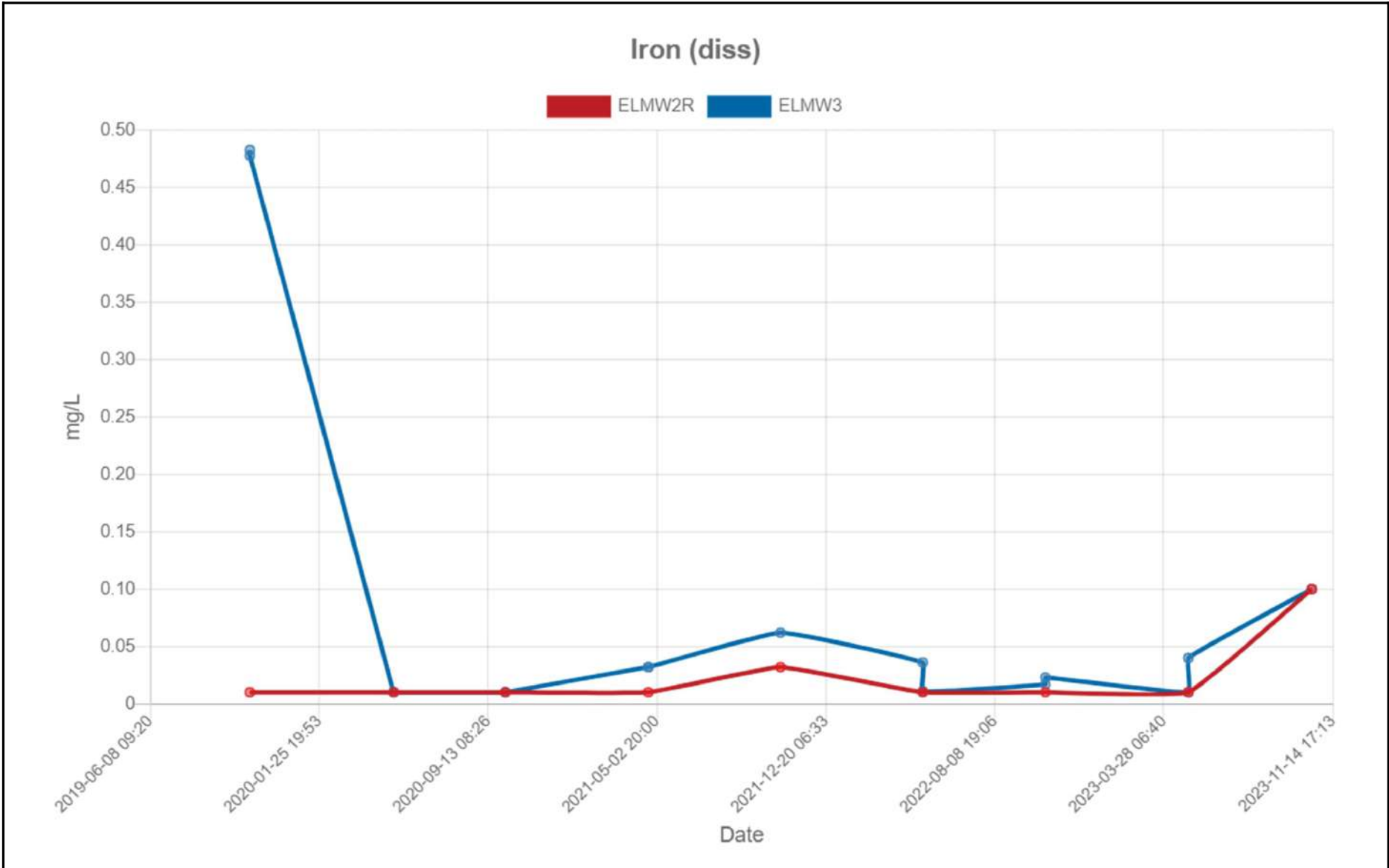
East Lake WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 230225
Date: February 15, 2024

Graph 10
Iron in Groundwater – Downgradient Wells

Created by: Megan Williamson
Checked by Carolyn Miller





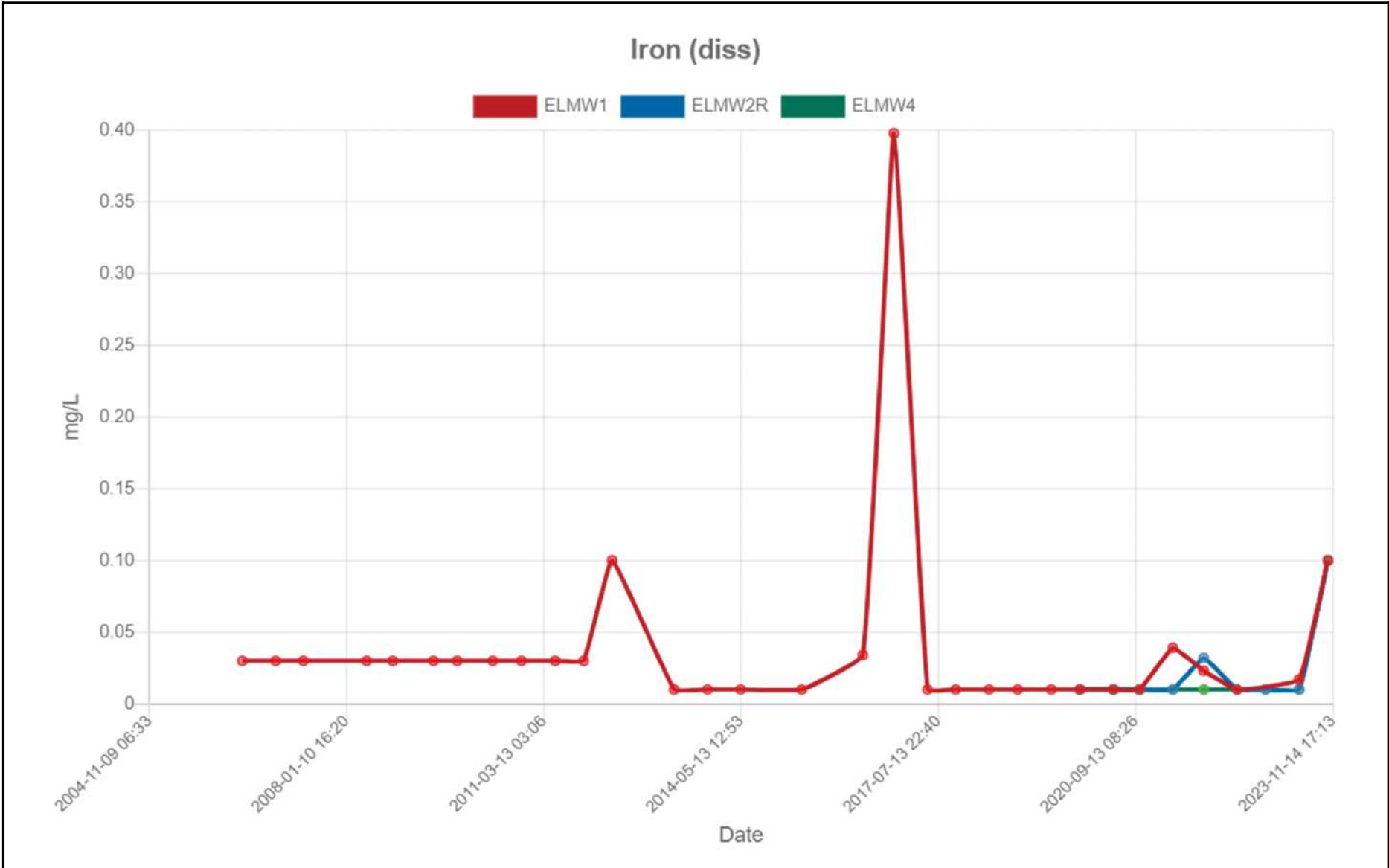
East Lake WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 230225
Date: February 15, 2024

Graph 11
Iron in Groundwater – Leachate Well

Created by: Megan Williamson
Checked by Carolyn Miller





East Lake WDS
Municipality of Hasting's Highlands

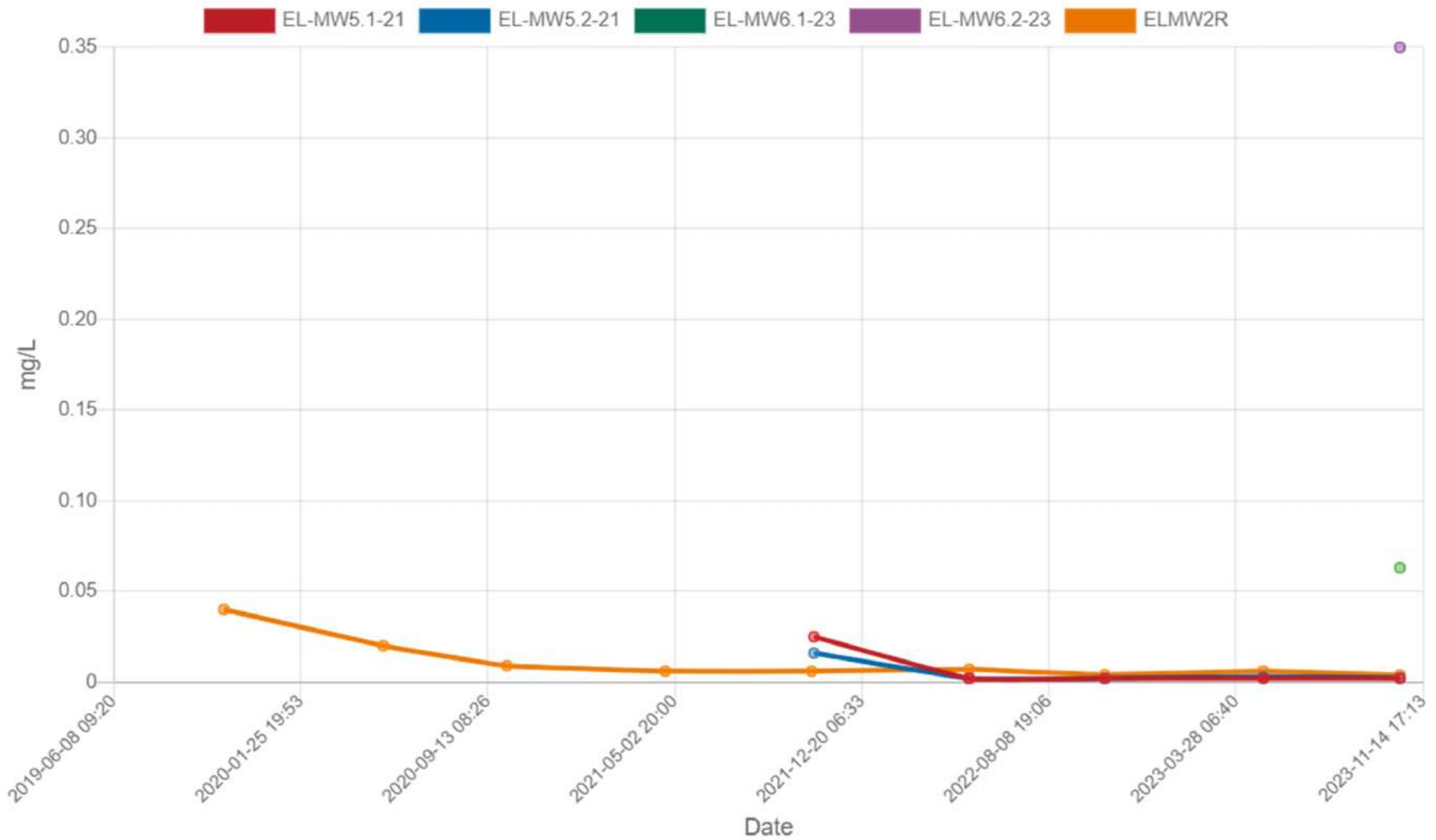
BluMetric Proj No: 230225
Date: February 15, 2024

Graph 12
Iron in Groundwater – Upgradient Wells

Created by: Megan Williamson
Checked by Carolyn Miller



Manganese (diss)



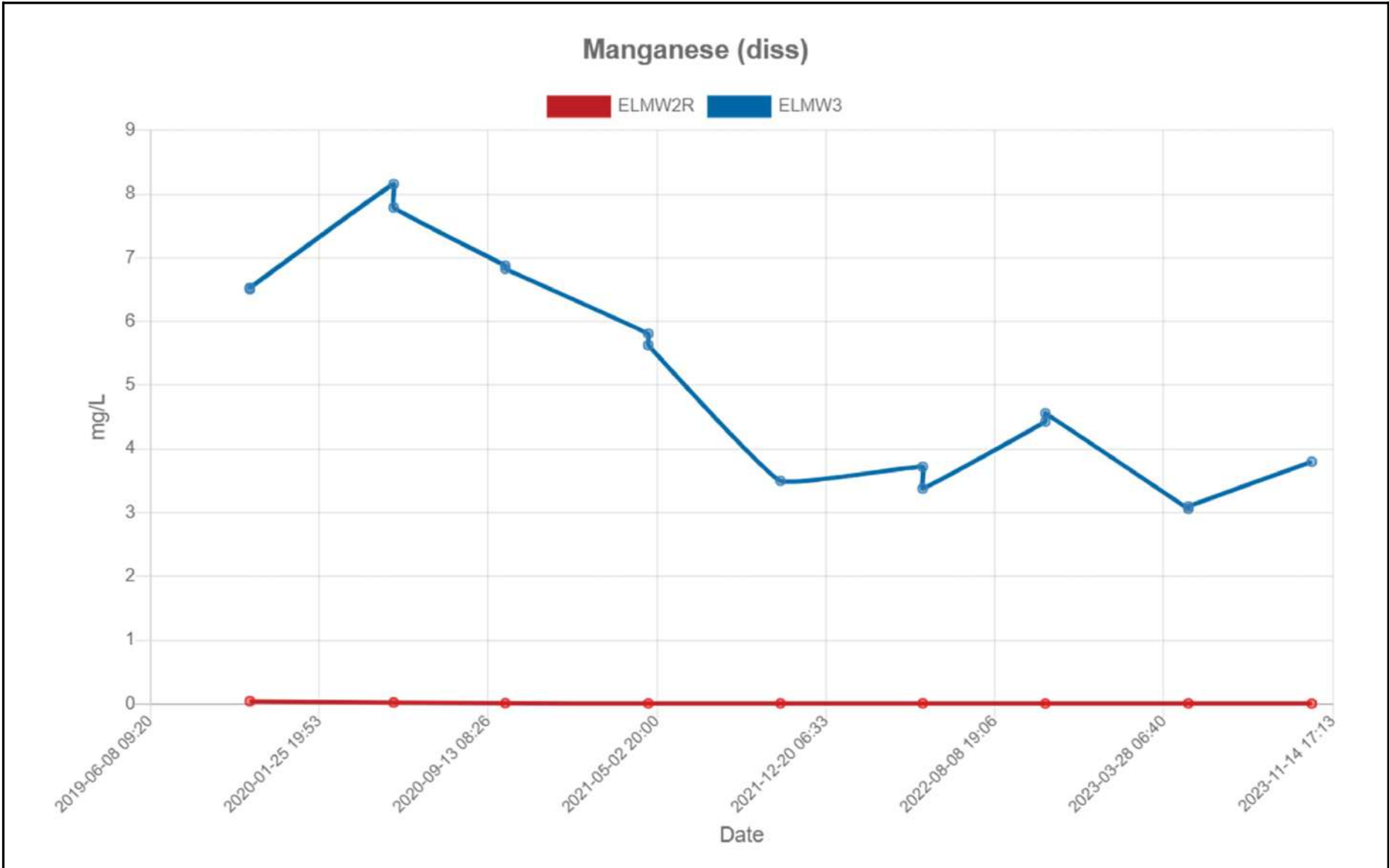
East Lake WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 230225
Date: February 15, 2024

Graph 13
Manganese in Groundwater – Downgradient Wells

Created by: Megan Williamson
Checked by: Carolyn Miller





East Lake WDS
Municipality of Hasting's Highlands

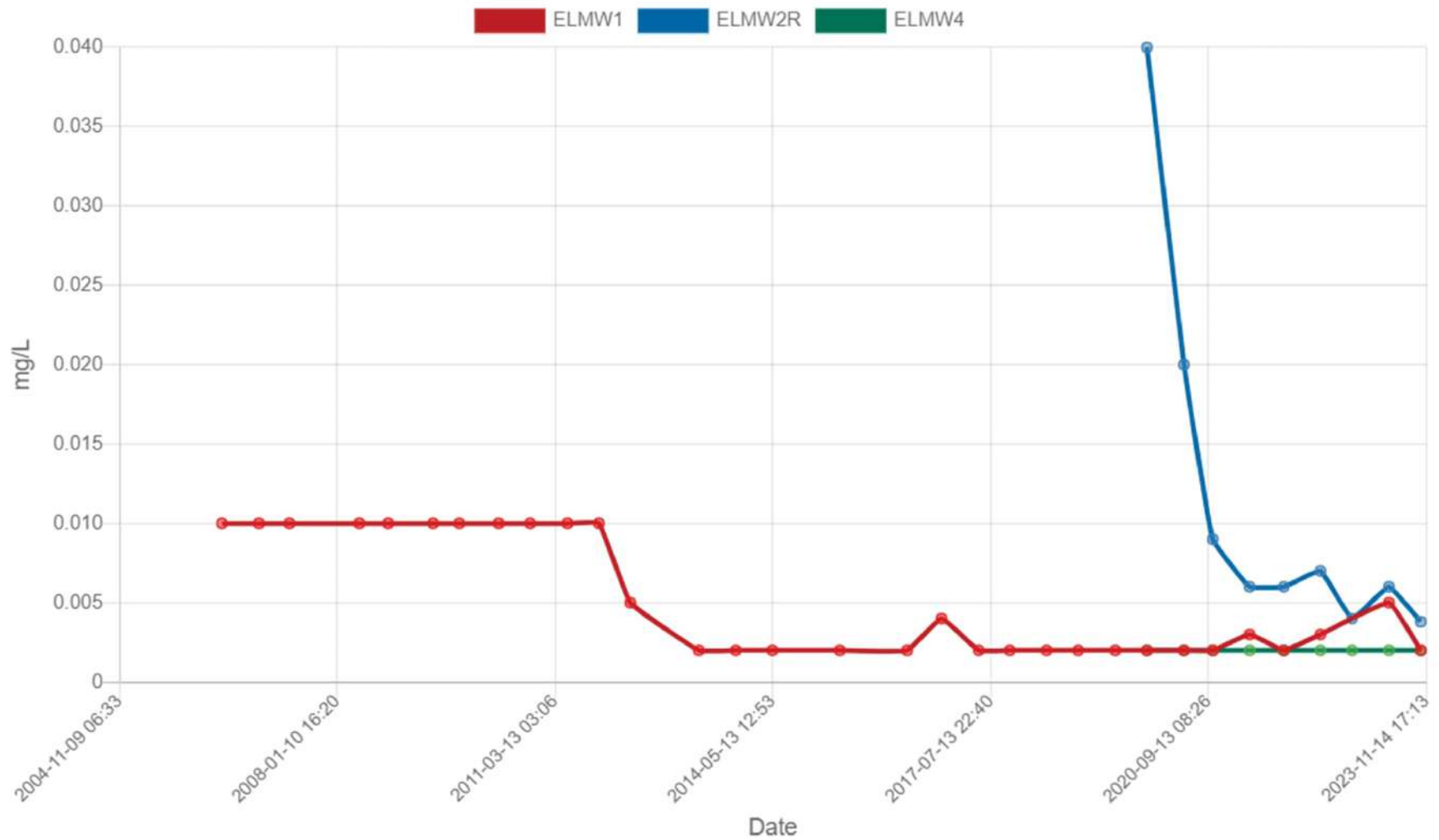
BluMetric Proj No: 230225
Date: February 15, 2024

Graph 14
Manganese in Groundwater – Leachate Well

Created by: Megan Williamson
Checked by Carolyn Miller



Manganese (diss)



East Lake WDS
Municipality of Hasting's Highlands

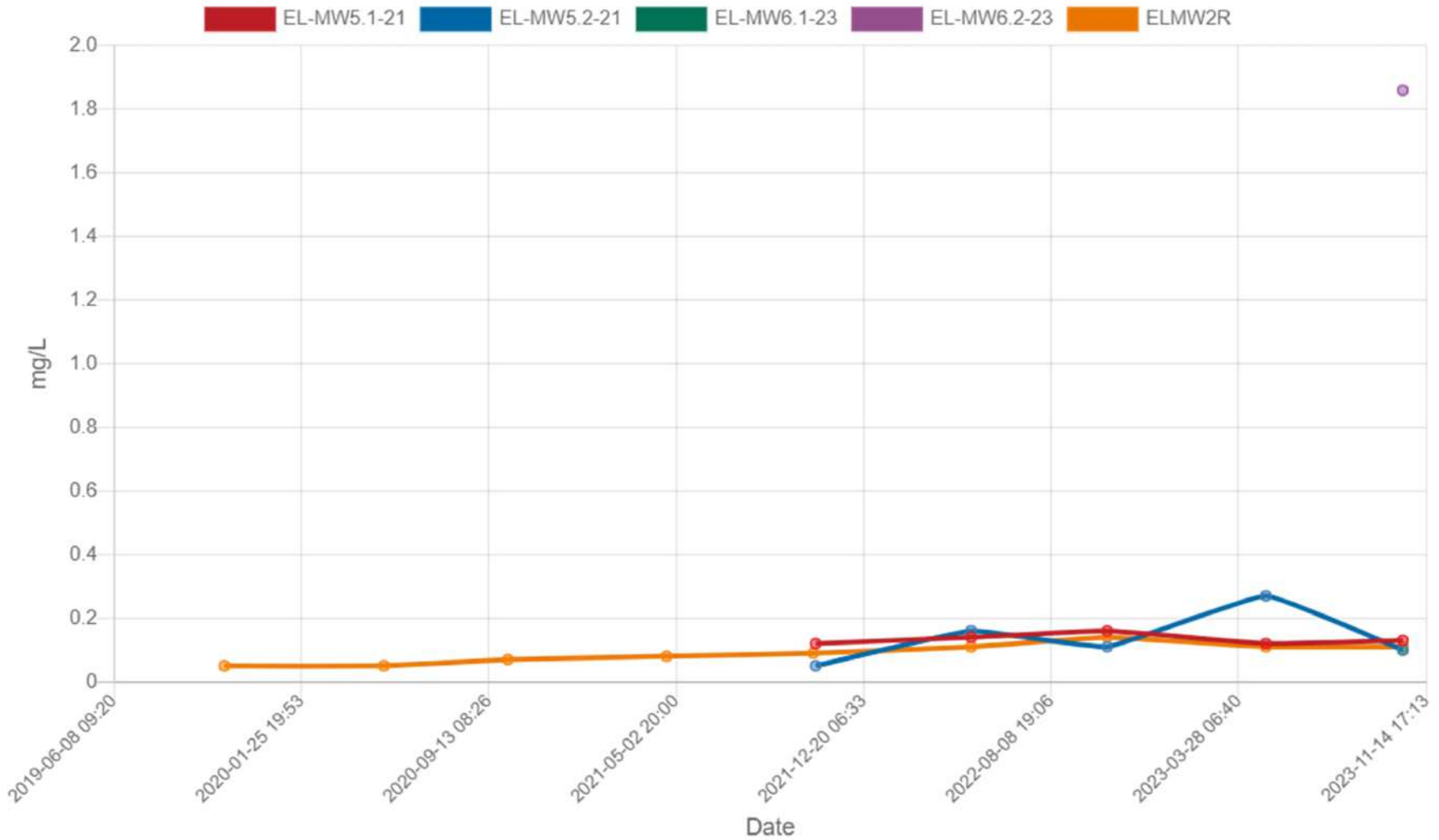
BluMetric Proj No: 230225
Date: February 15, 2024

Graph 15
Manganese in Groundwater – Upgradient Wells

Created by: Megan Williamson
Checked by Carolyn Miller



Nitrate as N



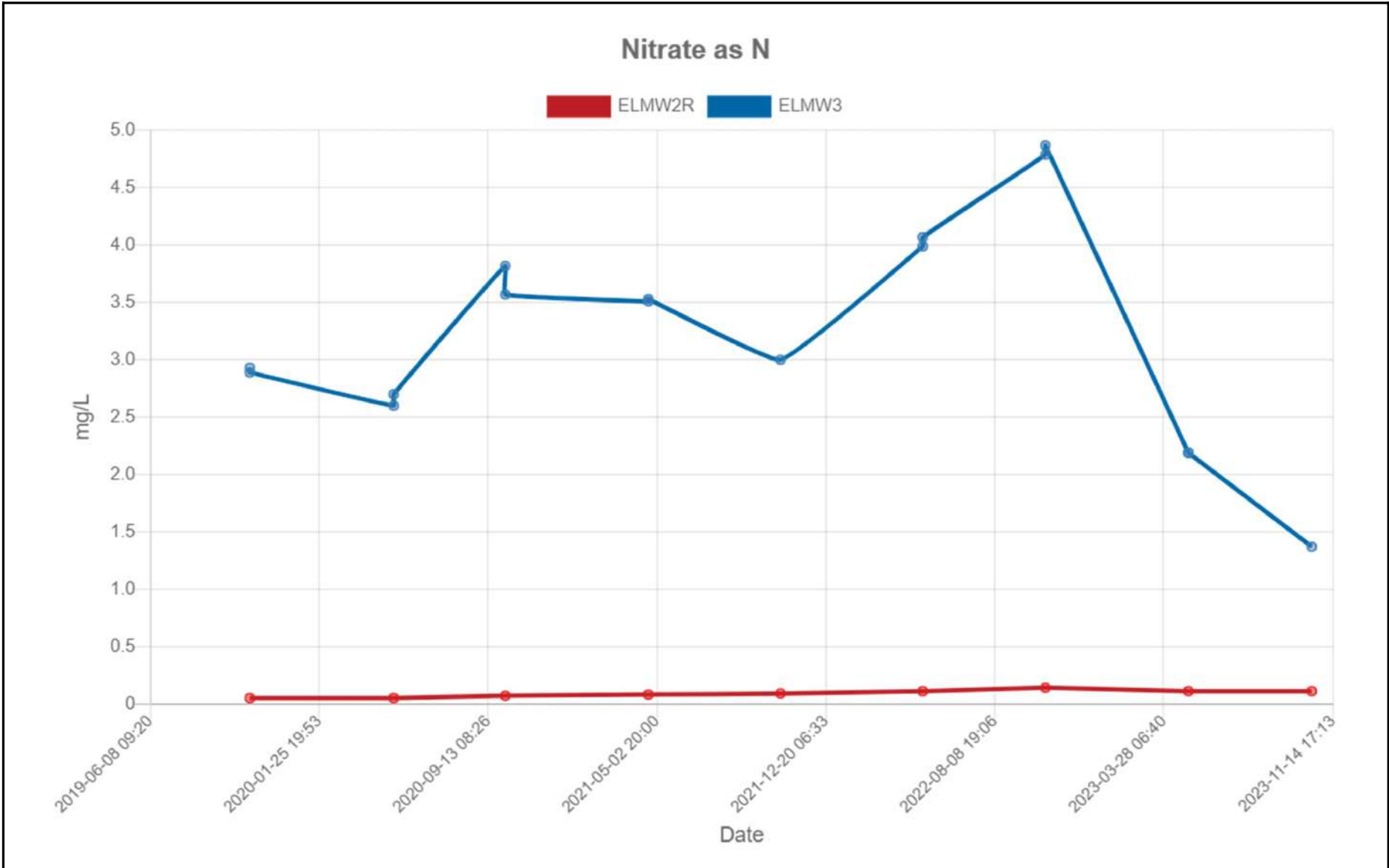
East Lake WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 230225
Date: February 15, 2024

Graph 16
Nitrate in Groundwater – Downgradient Wells

Created by: Megan Williamson
Checked by Carolyn Miller





East Lake WDS
Municipality of Hasting's Highlands

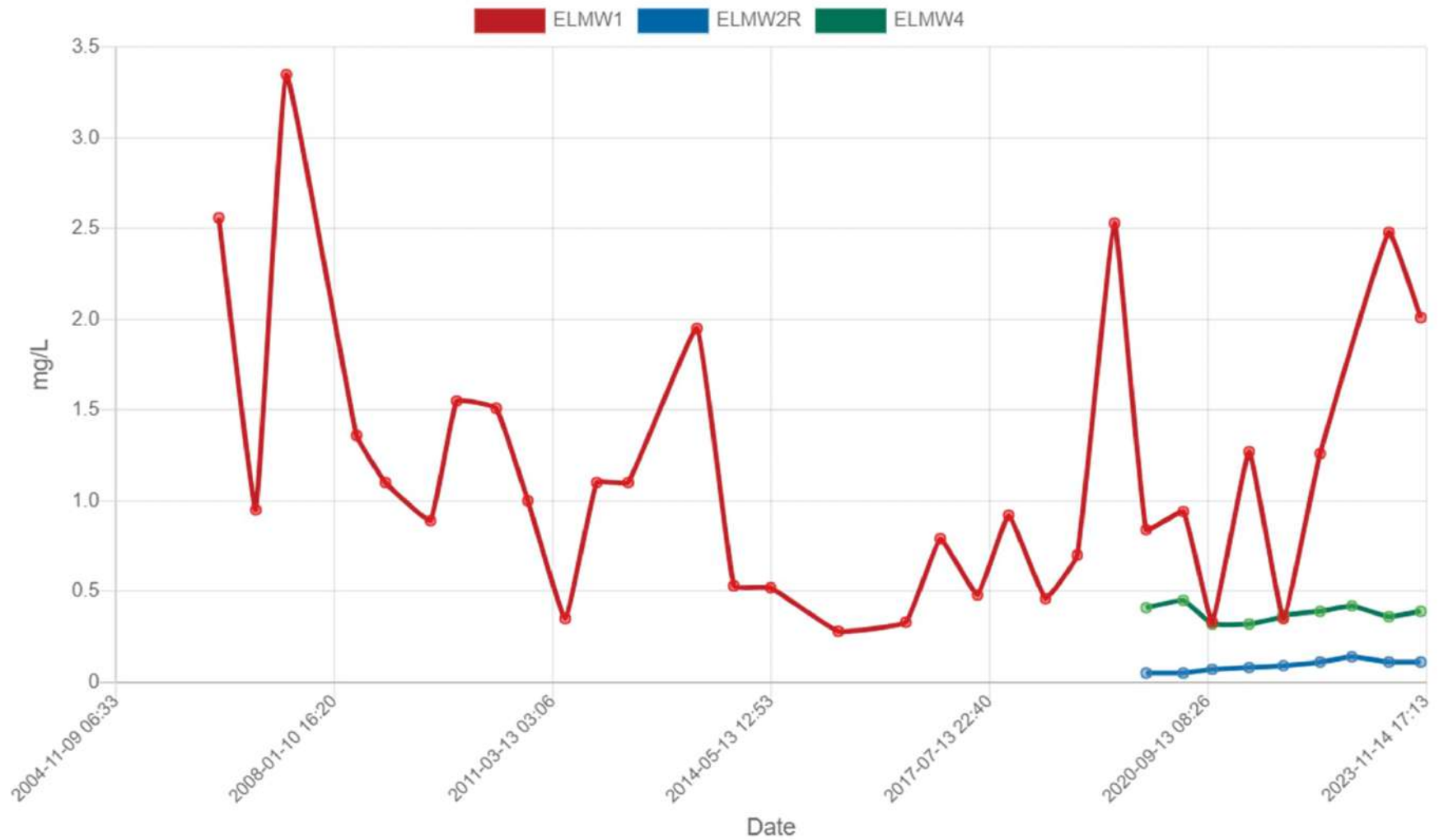
BluMetric Proj No: 230225
Date: February 15, 2024

Graph 17
Nitrate in Groundwater – Leachate Well

Created by: Megan Williamson
Checked by Carolyn Miller



Nitrate as N



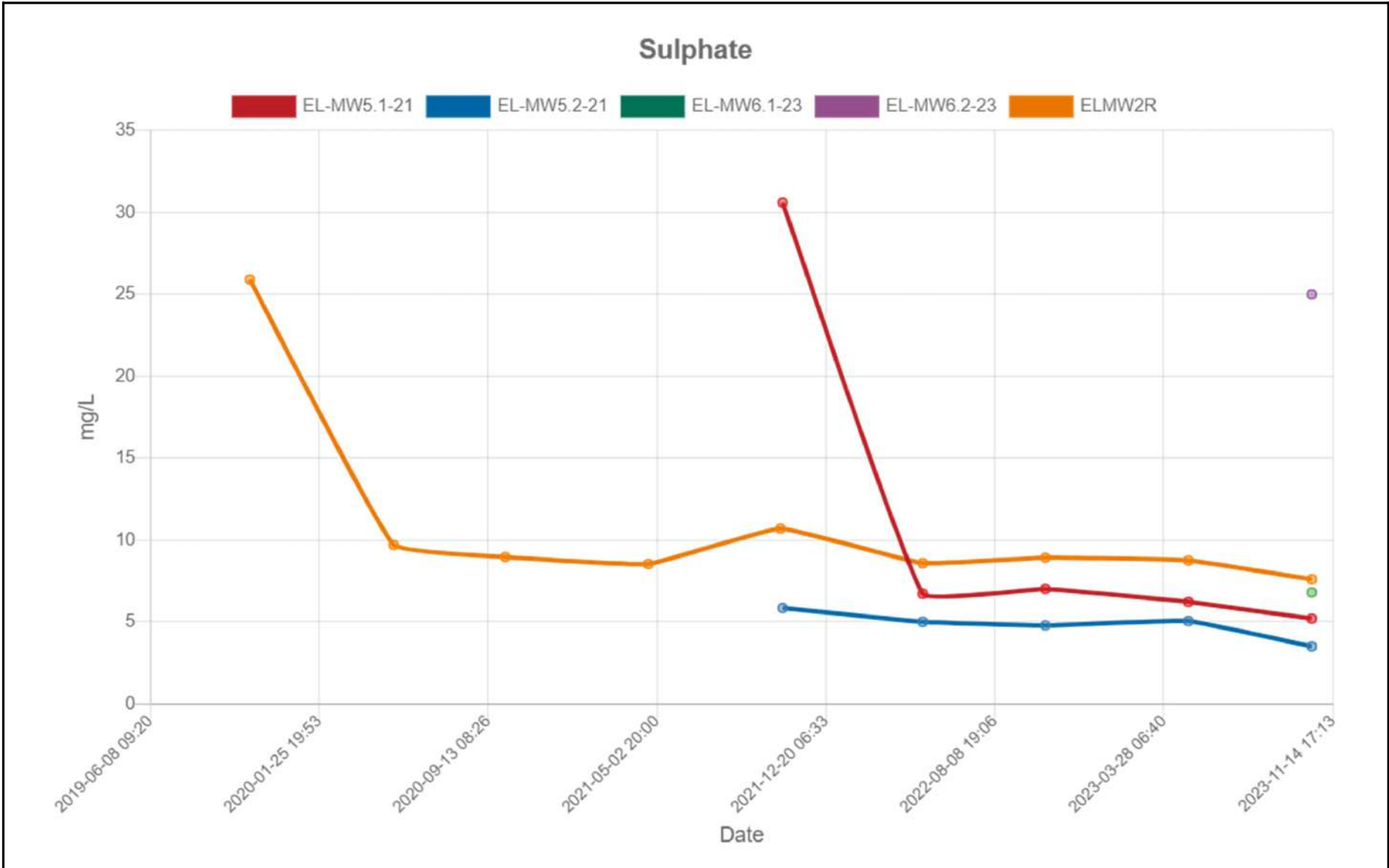
East Lake WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 230225
Date: February 15, 2024

Graph 18
Nitrate in Groundwater – Upgradient Wells

Created by: Megan Williamson
Checked by Carolyn Miller





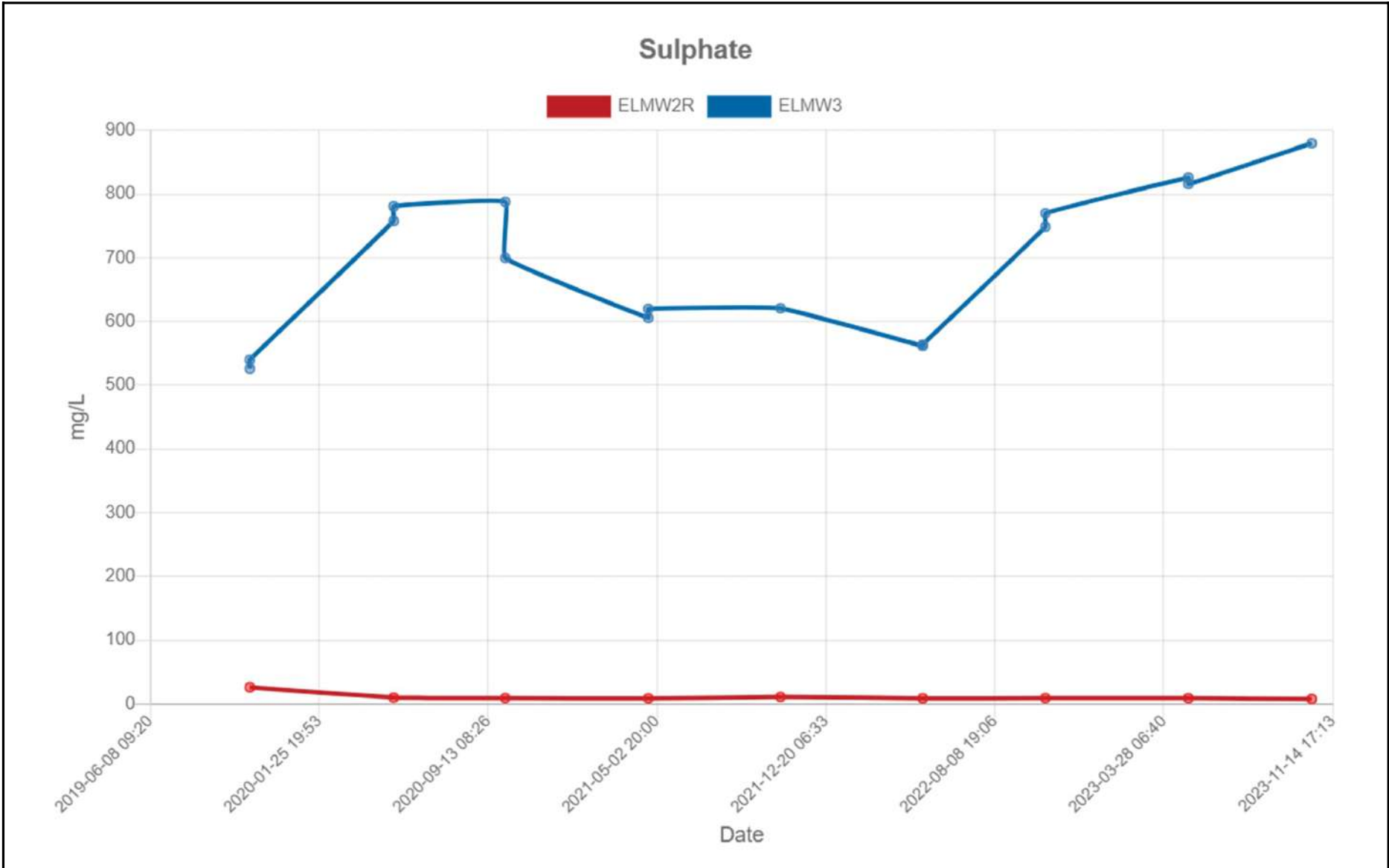
East Lake WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 230225
Date: February 15, 2024

Graph 19
Sulphate in Groundwater – Downgradient Wells

Created by: Megan Williamson
Checked by Carolyn Miller





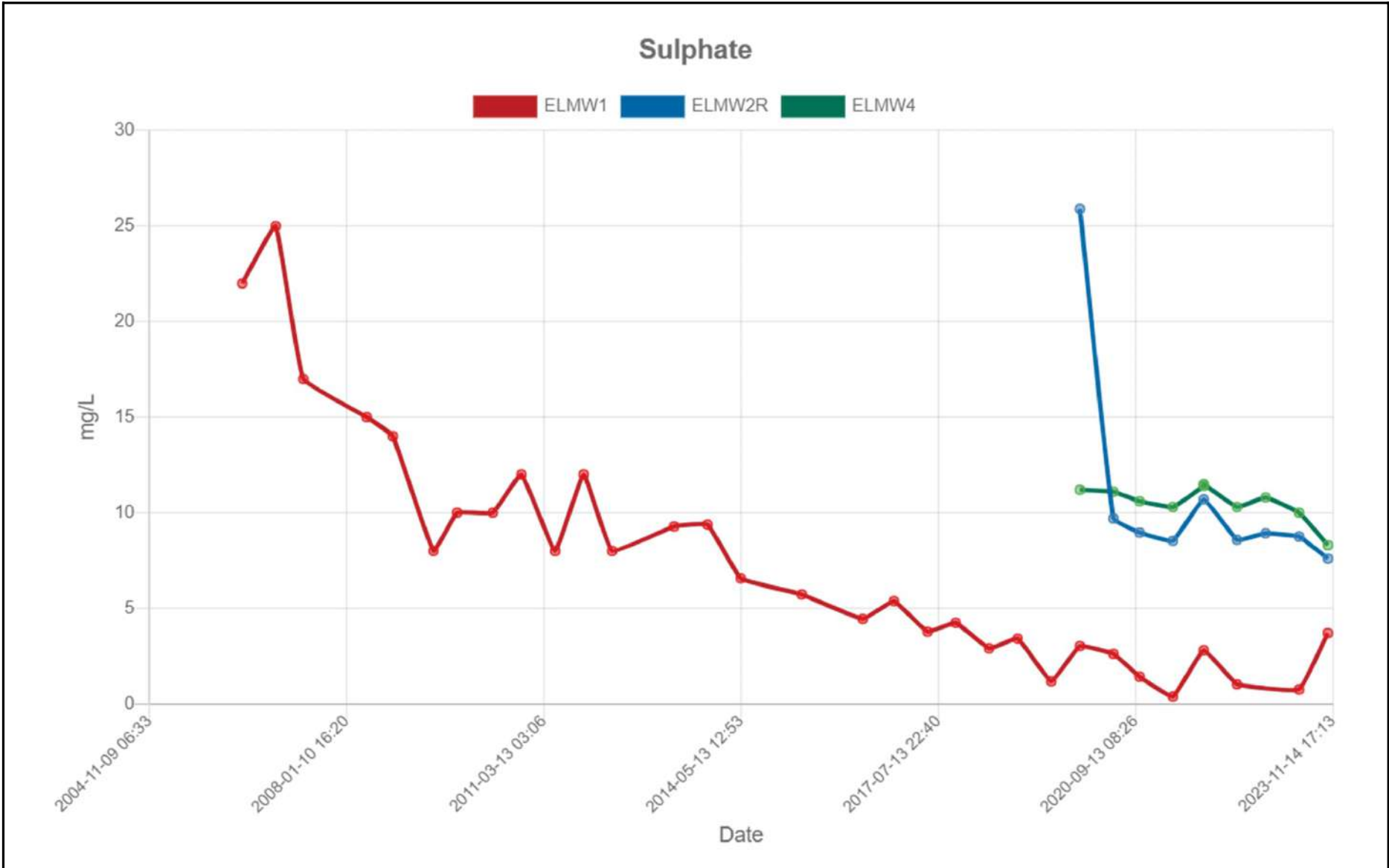
East Lake WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 230225
Date: February 15, 2024

Graph 20
Sulphate in Groundwater – Leachate Well

Created by: Megan Williamson
Checked by Carolyn Miller





East Lake WDS
Municipality of Hasting's Highlands

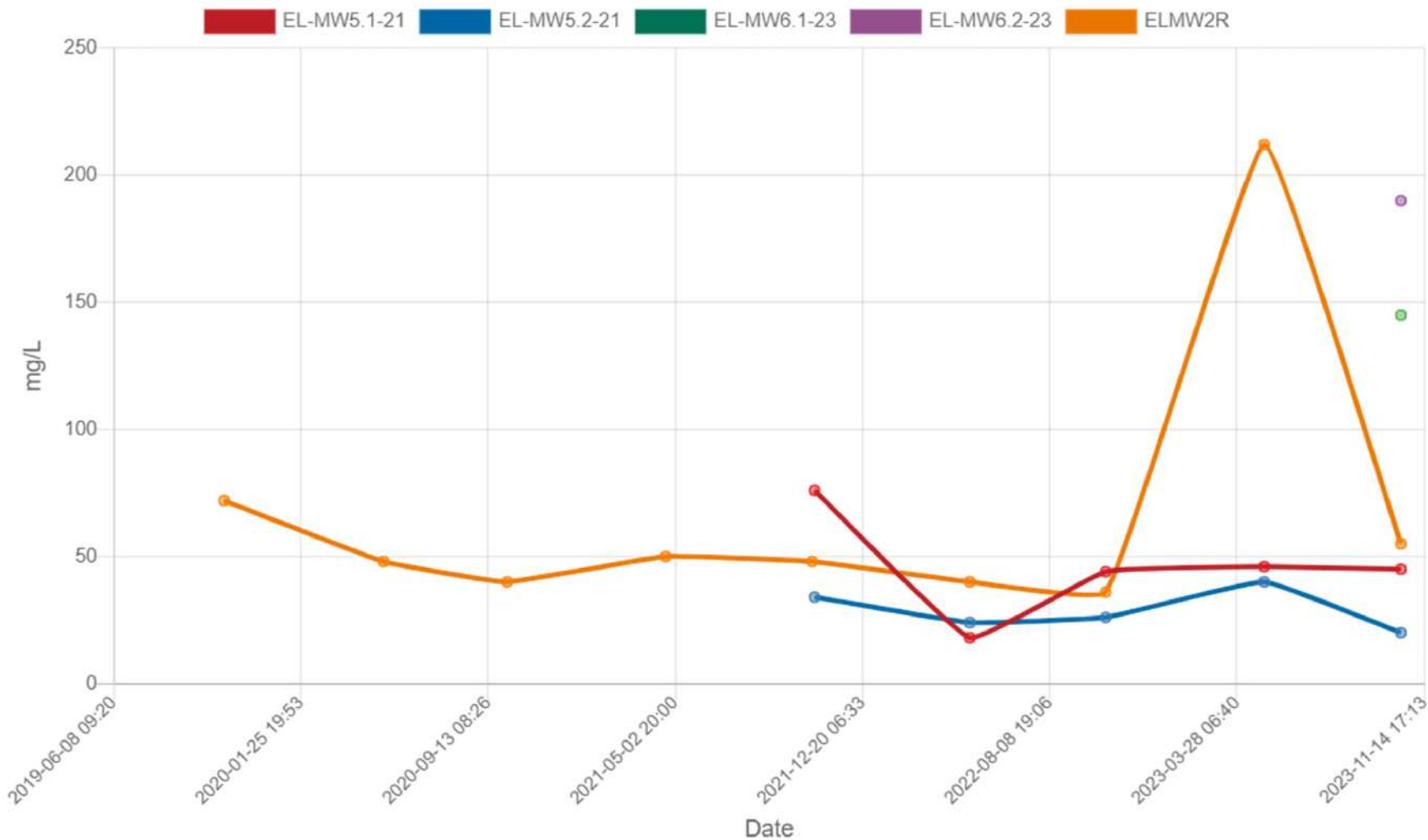
BluMetric Proj No: 230225
Date: February 15, 2024

Graph 21
Sulphate in Groundwater – Upgradient Wells

Created by: Megan Williamson
Checked by Carolyn Miller



Total Dissolved Solids



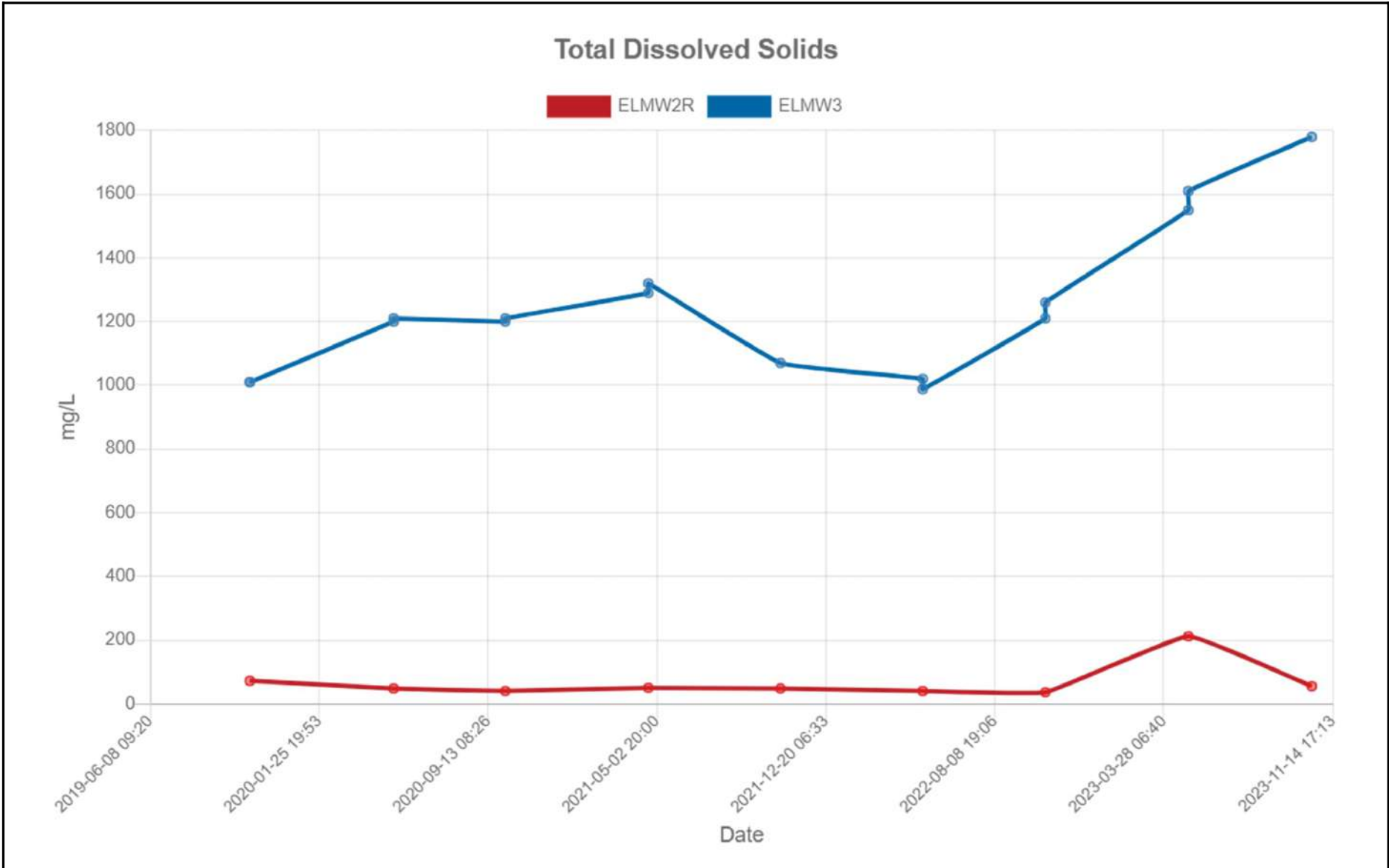
East Lake WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 230225
Date: February 15, 2024

Graph 22
TDS in Groundwater – Downgradient Wells

Created by: Megan Williamson
Checked by Carolyn Miller





East Lake WDS
Municipality of Hasting's Highlands

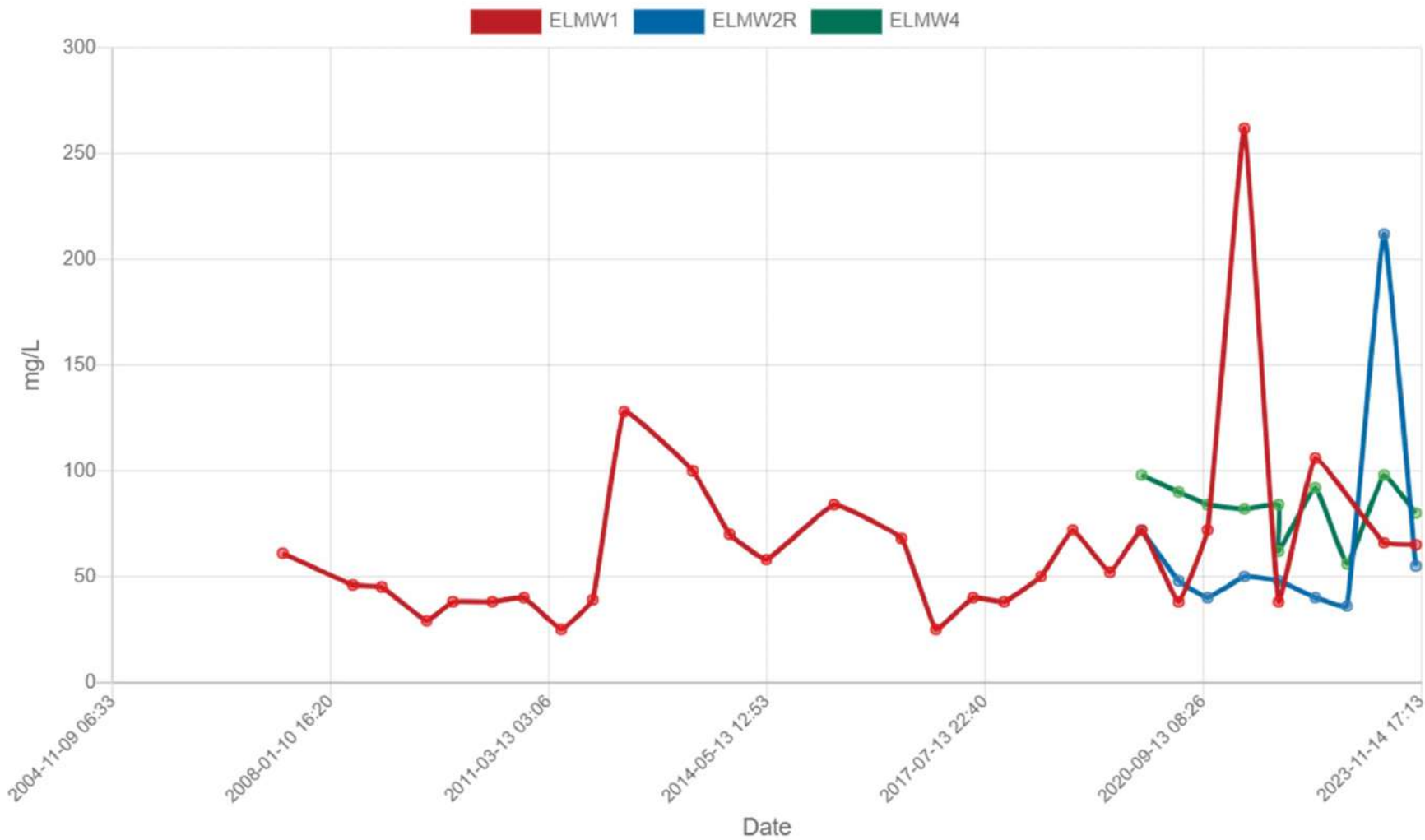
BluMetric Proj No: 230225
Date: February 15, 2024

Graph 23
TDS in Groundwater – Leachate Well

Created by: Megan Williamson
Checked by Carolyn Miller



Total Dissolved Solids



East Lake WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 230225
Date: February 15, 2024

Graph 24
TDS in Groundwater – Upgradient Wells

Created by: Megan Williamson
Checked by Carolyn Miller



Appendix A

A-1 Environmental Compliance Approval

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER A361115
Issue Date: August 9, 2018

The Corporation of the Municipality of Hastings Highlands
33011 Highway 62 N
Post Office Box, No. 130
Maynooth, Ontario
K0L 2S0

Site Location: East Lake (Cardwell) WDS
59 Cardwell Road
Lot Part of 29, Concession 3
Hastings Highlands Municipality, County of Hastings

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

the use and operation of a 2.3 hectare waste disposal site (landfilling) within a total site area of 4.05 hectares.

For the purpose of this environmental compliance approval, the following definitions apply:

"Approval" means this Environmental Compliance Approval and any Schedules to it, including the application and supporting documentation listed in Schedules "A" and "B";

"Director" means any Ministry employee appointed in writing by the Minister pursuant to section 5 of the EPA as a Director for the purposes of Part II.1 of the EPA;

"District Manager" means the District Manager of the local district office of the Ministry for the geographic area in which the Site is located;

"EPA" means the Environmental Protection Act, R.S.O. 1990, as amended;

"HHW" means household hazardous waste;

"Landfill" means the 2.3 hectare portion of the Site designated for the permanent deposition of waste;

"**Ministry**" and "**MOECC**" means the ministry of the government of Ontario responsible for the EPA and includes all officials, employees or other persons acting on its behalf;

"**ODWS**" means the Ontario Drinking Water Standards, as amended from time to time;

"**Ontario Regulation 463/10**" means Ontario Regulation 463/10, Ozone Depleting Substances and Other Halocarbons, made under the EPA;

"**Ontario Regulation 903**" means Ontario Regulation 903 – R.R.O. 1990, Wells, amended to Ontario Regulation 128/03, made under the OWRA;

"**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;

"**Owner**" means any person that is responsible for the establishment or operation of the Site being approved by this Approval, and includes Highland Hastings Municipality, its successors and assigns;

"**OWRA**" means the Ontario Water Resources Act, R.S.O. 1990, c.0.40, as amended;

"**PA**" means the Pesticides Act, R.S.O. 1990, c. P-11, as amended from time to time;

"**Provincial Officer**" means any person designated in writing by the Minister as a provincial officer pursuant to Section 5 of the OWRA or Section 5 of the EPA or Section 17 of PA;

"**PWQO**" means the Provincial Water Quality Objectives included in the July 1994 publication entitled *Water Management Policies, Guidelines, Provincial Water Quality Objectives*, as amended from time to time;

"**Regulation 347**" means Regulation 347, R.R.O. 1990, General - Waste Management, made under the EPA, as amended from time to time;

"**RUG**" means the Reasonable Use Guidance (Guideline B-7) of the Ministry;

"**Site**" means the entire 4.05 hectare waste disposal site, including the buffer lands, and any contaminant attenuation zone located at Lot Part of 29, Concession 3, Hastings Highlands Municipality, County of Hastings;

"**trained person**" means a person that has been trained through instruction and/or practice, and receives refresher training, in accordance with Condition 2.11 of this Approval; and

"WEEE" and "waste electrical and electronic equipment" means a device that is a waste, that required an electric current to operate and includes household appliances, information technology equipment, telecommunications equipment, audio-visual equipment, toys, leisure equipment, sport equipment, electrical or electronic tool and instruments, as listed in Schedules 1 through 7 of the Ontario Regulation 393/04 Waste Electrical and Electronic Equipment made under the Waste Diversion Act 2002, and similar devices.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

PART 1 - GENERAL

Revoke and Replace

- 1.1 This Approval revokes Provisional Certificate of Approval No. A361115 issued March 31, 1980 and Notices of Amendment issued June 9, 2000 and May 7, 2002. The approval given herein, including the terms and conditions set out, replaces all previously issued approvals and related terms and conditions under Part V of the *EPA* for this Site.

In Accordance With

- 1.2 Except as otherwise provided by this *Approval*, the *Site* shall be designed, developed, built, operated and maintained in accordance with the documentation listed in the attached Schedule "A".

Compliance

- 1.3 The requirements specified in this *Approval* are requirements under the *EPA*. Issuance of this *Approval* in no way abrogates the *Owner's* legal obligations to take all reasonable steps to avoid violating other applicable provisions of this legislation and other legislation and regulations.
- 1.4 The requirements of this *Approval* are severable. If any requirements of this *Approval*, or the application of any requirement of this *Approval* to any circumstance, is held invalid, the application of such requirement to other circumstances and the remainder of this *Approval* shall not be affected in any way.
- 1.5 The *Owner* must ensure compliance with all terms and conditions of this *Approval*. Any non-compliance constitutes a violation of the *EPA* and is grounds for enforcement.

- 1.6 a. The *Owner* shall, forthwith upon request of the *Director* , *District Manager* , or *Provincial Officer* , furnish any information requested by such persons with respect to compliance with this *Approval* , including but not limited to, any records required to be kept under this *Approval* ; and
- b. In the event the *Owner* provides the Ministry with information, records, documentation or notification in accordance with this *Approval* (for the purposes of this condition referred to as "Information"),
- i. the receipt of Information by the Ministry;
 - ii. the acceptance by the Ministry of the Information's completeness or accuracy; or
 - iii. the failure of the Ministry to prosecute the *Owner* , or to require the *Owner* to take any action, under this *Approval* or any statute or regulation in relation to the Information;
- shall not be construed as an approval, excuse or justification by the Ministry of any act of omission of the *Owner* relating to the Information, amounting to non-compliance with this *Approval* or any statute or regulation.

Ministry Inspections

- 1.7 The *Owner* shall allow Ministry personnel, or a Ministry authorized representative(s), upon presentation of credentials, to:
- a. Carry out any and all inspections authorized by Section 156, 157 or 158 of the *EPA* , Section 15, 16 or 17 of the *OWRA* or Section 19 or 20 of the *PA* , as amended from time to time, of any place to which this *Approval* relates; and
 - b. Without restricting the generality of the foregoing, to:
 - i. enter upon the premises where records required by the conditions of this *Approval* are kept;
 - ii. have access to and copy, at reasonable times, any records required by the conditions of this *Approval* ;
 - iii. inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations required by the conditions of this *Approval* ; and
 - iv. sample and monitor at reasonable times for the purposes of assuring compliance with the conditions of this *Approval* .

Interpretation

- 1.8 Where there is a conflict between a provision of any document referred to in Schedule "A", and the conditions of this *Approval* , the conditions in this *Approval* shall take precedence. Where there is a conflict between the documents listed in Schedule "A", the document bearing the most recent date shall prevail.

Transparency

- 1.9 Any information relating to this *Approval* and contained in Ministry files may be made available to the public in accordance with the provisions of the Freedom of Information and Protection of Privacy Act, R.S.O. 1990, C. F-31.

Record Retention

- 1.10 All records and monitoring data required by the conditions of this *Approval* must be kept on the Owner's premises for a minimum period of five (5) years from the date of their creation.

Certificate of Requirement/Registration on Title

- 1.11 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 *Approval* to each person acquiring an interest in the *Site* as a result of the dealing.
- 1.12 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*; and
 - (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.
- 1.13 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 is deposited with the *Ministry* to ensure that these conditions will be carried out.
- 1.14 In the event of any change in ownership of the *Site*, other than change to a successor municipality, the *Owner* shall notify the successor of and provide the successor with a copy of this *Approval*, and the *Owner* shall provide a copy of the notification to the *District Manager* and the *Director*.
- 1.15 Prior to dealing with the property in any way, the *Owner* shall provide a copy of this *Approval* and any amendments, to any person who will acquire an interest in the property as a result of the dealing.

Notification

- 1.16 The *Owner* shall ensure that all communications/correspondence made pursuant to this *Approval* references Environmental Compliance Approval No. A361115.

PART 2 - GENERAL OPERATIONS

Service Area

- 2.1 Only wastes generated from within the geographic boundary of The Corporation of the Municipality of Hastings Highlands may be received and disposed of at the *Site* .

Signage and Security

- 2.2 A sign shall be posted at the entrance gate of the *Site* with the following information:

- a. Name of the *Site* and *Owner* ;
- b. Environmental Compliance No. for the *Site*;
- c. Days and hours of operation of each area of the *Site*;
- d. Allowable and prohibited waste types in the Landfill and Waste Diversion;
- e. Contact telephone number(s); and
- f. Warning against unauthorized access and against dumping outside the *Site* .

- 2.3 The *Owner* shall ensure that:

- a. Access to the *Site* is restricted by fencing and/or natural features;
- b. Fencing and lockable gate are kept in good repair; and
- c. The *Site* is screened from public view on all sides.

Operating Hours

- 2.4 The *Owner* shall set operational hours, for each waste management activity conducted within the *Site* , which provides an adequate level of service. Hours of operation may be changed by the *Owner* at any time provided that the hours are correctly posted at the *Site* gate and that suitable public notice is given of any changes.

- 2.5 No waste shall be received at the *Site* except during the hours of operation and under the supervision of a trained person.

- 2.6 The *Owner* shall ensure that during non-operating hours, the *Site* entrance and exit gates, or areas of the *Site* which are not open to the public at those times, are locked or otherwise secured against access by unauthorized persons.

- 2.7 During non-operating hours when waste disposal is not permitted, the *Owner* may conduct equipment maintenance, administrative functions, and on-site activities including waste compaction and application of cover material; and allow licensed Contractors to transfer waste/recyclables off-site, as required.

Nuisance Control

- 2.8 If at any time problems such as odours, dust, litter, noise, vectors, vermin, rodents, bears or other nuisances are found at the *Site*, the *Owner* shall take appropriate, immediate remedial action to eliminate the problem.
- 2.9 The *Owner* shall implement a litter control plan which shall include:
- a. Taking all practical steps to prevent the escape of litter from the *Site*;
 - b. Litter pick-up at the *Site* during each operating day;
 - c. Monthly litter pick-up along the access road in the vicinity of the *Site*;
 - d. Private property adjacent to the *Site* shall be inspected as required and litter shall be collected if necessary, with permission from the property owner; and
 - e. litter fencing shall be erected around the working area of the landfill as required.
- 2.10 No burning of waste is permitted at the *Site*.
- a. Notwithstanding Condition 2.10, burning of segregated clean wood and brush at the landfill may be carried out in strict compliance with the Ministry document titled "Guideline C-7, Burning at Landfill Sites" dated April 1994.

Staff Training

- 2.11 The *Owner* shall develop and maintain a training plan for current and new *Site* employees and shall ensure that all *Site* employees have been adequately trained and receive on-going training with respect to the following:
- a. Terms, conditions, and operating requirements of this Approval;
 - b. An outline of the responsibilities of employees for each waste management activity undertaken at the *Site* ;
 - c. Operation and management of the *Site*, or area(s) within the *Site*, in accordance with the specific job requirements of each individual employee, including but not limited to procedures for receiving, screening and identifying waste, refusals, handling and temporarily storing wastes;
 - d. The operation, inspection, and maintenance of the *Site*, or area(s) within the *Site*, with respect to the approved design and operations documents listed in Schedule "A";
 - e. Record keeping requirements specific to each area / waste management activity;
 - f. Procedures for responding to public complaints;
 - g. Environmental concerns related to the type of waste handled in each area of the *Site*;
 - h. Occupational health and safety concerns related to waste management at the *Site*; and

- i. Emergency procedures and contingency plans in cases of fire, spills, off-site impacts and any other emergency situations.

Complaints

- 2.12 If at any time, the *Owner* receives complaints regarding the operation of the *Site*, or an area within the *Site*, the *Owner* shall respond to these complaints according to the following procedure:
 - a. The *Owner* shall record each complaint on a formal complaint form entered in a log book. The information recorded shall include the nature of the complaint, the name, address and telephone number of the complainant and the time and date of the complaint;
 - b. The *Owner*, upon notification of the complaint, shall initiate appropriate steps to determine all possible causes of the complaint, proceed to take the necessary actions to eliminate the cause of the complaint and forward a formal reply to the complainant; and
 - c. The *Owner* shall retain on-site a report written within one (1) week of the complaint date, listing the actions taken to resolve the complaint and any recommendations for remedial measures, and managerial or operational changes to reasonably avoid the reoccurrence of similar incidents.

Emergency Response

- 2.13 The *Owner* shall take immediate measures to clean-up all spills, related discharges, and process upsets of wastes which result from the operation of any portion of the *Site*.
- 2.14 All spills and upsets shall be immediately reported to the Ministry's Spills Action Centre at 416-325-3000 or 1-800-268-6060 and shall be recorded in a written log or an electronic file format, as to the nature of the spill or upset, and the action taken for clean-up, correction and prevention of future occurrences.

PART 3 - LANDFILL OPERATIONS

Landfill Capacity

- 3.1 The maximum approved capacity of the landfill including waste, daily cover, and final cover is 147,546 m³.

Waste Type

- 3.2 Only solid non-hazardous municipal waste, including wastes generated by residential, commercial and institutional sectors shall be received for disposal at this landfill. No household hazardous waste, hazardous waste, septic tank waste, sewage, biosolids, or liquid industrial wastes, as defined in *Regulation 347*, shall be disposed of at this landfill.

- 3.3 In the event that unacceptable waste is received at the *Landfill*, the *Owner* shall:
- a. refuse receipt of the unacceptable waste and return the waste to the generator if safe to do so; or
 - b. if return of the waste is not feasible, the *Owner* shall isolate the unacceptable waste and remove it from the *Landfill* within seventy-two (72) hours, in accordance with *Regulation 347* ; and
 - c. the *Owner* shall review the incident and take appropriate steps to prevent future receipt of unacceptable waste.

Waste Placement

- 3.4
- a. The *Owner* shall ensure that no waste is disposed of outside the limits of fill area and final contours as shown on Drawing No. 4, Item # 4, Schedule A, and final contours shall not exceed 4H:1V and shall not be less than 20H:1V;
 - b. The *Landfill* footprint shall be clearly marked at all times to prevent any fill beyond approved limits;
 - c. The waste placement at the Site shall progress as indicated on Drawing 07 to 09 of Item 4 in Schedule "A";
 - d. All waste shall be deposited at the active face of the *Landfill* except for waste handled in accordance with Part 4 and Part 5 of this Approval; and
 - e. Waste shall be deposited in a manner that minimizes the area of exposed waste at the active face of the *Landfill*

Cover Material

- 3.5
- a. Cover material shall be applied as follows:
 - i. Cover material consisting of a minimum of 0.15 m thickness of soil or approved alternative daily cover (i.e. 40% soil/60% chipped wood mix) shall be applied once every week; and
 - ii. The *Owner* shall increase the frequency of cover material application if it is determined by the District Manager or by the *Owner* that the frequency outlined in Condition 3.5(a)(i) does not provide adequate control.
 - b. In areas where waste placement is below the final approved contours and landfilling is to be suspended for six months or more, an interim cover consisting of a minimum of 0.30 m thickness of soil shall be applied;
 - c. In landfilling areas which are no longer in use (i.e. historical) and where final contours have reached, a final cover of 0.60 m thickness of soil with an additional 0.15 m of topsoil shall be applied; and

- d. Where existing cover material has eroded such that waste is exposed, the cover material shall be replaced promptly.

Inspections

- 3.6 The *Owner* shall ensure that the following *Landfill* inspection schedule is adhered to:
 - a. on a monthly basis, an inspection of the working face and storage areas, cover of waste, signage, fencing and gate;
 - b. on a monthly basis, an inspection of the areas under final cover, road condition, access road and adjacent property litter inspection; and
 - c. on an annual basis, an inspection of the monitoring wells and a field survey of the limit of fill area.

Design and Operations Report

- 3.7 The *Owner* shall submit an updated Design and Operations plan two (2) years prior to Phase 1 being filled to capacity (85,546 m³ - includes waste, daily cover, and final cover).

Landfill Closure

- 3.8 Two (2) years prior to the *Landfill* reaching the final approved capacity, the *Owner* shall submit to the *Director*, for approval, a plan for the closure, end use, post closure monitoring and long term maintenance of the *Landfill*.

PART 4 - WASTE DIVERSION OPERATIONS

- 4.1 The *Owner* shall ensure that:
 - a. All white goods which contain refrigerants accepted at the *Site* , which have not been tagged by a licensed technician to verify that the equipment no longer contains refrigerants, are stored in such a manner that allows for the safe handling and removal from the Site for removal of refrigerants as required by *Ontario Regulation 463/10* ;
 - b. White goods may be shipped off site for recycling after the refrigerants have been removed and tagged by a licensed technician in accordance with *Ontario Regulation 463/10*; and
 - c. A detailed log of all white goods, which contain refrigerants received is maintained and includes the following information:
 - i. date of the record;
 - ii. types, quantities, and source of white goods which contain refrigerants received;
 - iii. destination of the white goods; or

- iv. the details on removal of refrigerants, if conducted on Site, and the quantities and destination of the refrigerants transferred from the Site.
- 4.2 The diversion of other wastes including recyclables, tires, and scrap metals shall be removed from the *Site* at regular intervals to prevent potential nuisance and health and safety issues and includes the following information:
- a. a detailed log of all waste diverted including:
 - i. date of the record;
 - ii. types, and quantities; and
 - iii. destination of the wastes.
- 4.3 Any waste stored in sealable and lockable bins or containers received at the *Site* shall be stored and handled as follows:
- a. WEEE shall be packed in Gaylord boxes or stacked securely on skids;
 - b. Shall be clearly labelled as to the contents; and
 - c. All containers shall be maintained in good condition. If a container is found to be damaged or leaking, the contents of the container shall be immediately moved to an undamaged container;

PART 5 - MONITORING PROGRAM

Compliance

- 5.1 The *Site* shall be operated in such a way as to ensure compliance with the following:
- a. Reasonable Use *Guideline B-7* for the protection of groundwater at the *Site*; and;
 - b. Provincial Water Quality Objectives included in the July 1994 publication entitled *Water Management Policies, Guidelines, Provincial Water Quality Objectives*, as amended from time to time or limits set by the *Regional Director*, or the *Canadian Water Quality Guidelines* published by the Canadian Council of Ministers of the Environment, 1999 for the protection of surface water both on and off the *Site*.

Monitoring Program

- 5.2 Within six (6) months from the date of this *Approval* being issued, the *Owner* shall submit to the *Director and District Manager*, a monitoring program for review that considers the site and the natural environment including groundwater for the purpose of assessing potential impacts associated with the *Landfill*.
- a. The *Owner* shall construct and maintain to the satisfaction of the *Ministry*, a groundwater monitoring network which fully delineates the horizontal and vertical extent of leachate migration resulting from the landfilling activities at the Site. The groundwater monitoring network shall

adequately evaluate up-gradient or trans-gradient water quality for natural uncontaminated groundwater, at least one well to represent leachate impacted water, and at least one additional down-gradient well for a *Reasonable Use Guidance Assessment*. The location of groundwater monitoring wells shall be done in consultation with a *Ministry* Regional Technical Support hydrogeologist;

- b. Upon completing Condition 5.2, the *Owner* shall provide the details of the new groundwater monitors, so that Schedule "B" of the *Approval* can be updated to reflect the additional monitoring locations;
- c. The installation of additional groundwater monitoring wells shall occur within eighteen (18) months of this *Approval* being issued.
- d. A Professional Geoscientist or Professional Engineer possessing appropriate hydrogeologic training and experience shall execute, or directly supervise the execution of the groundwater monitoring and reporting program.

Groundwater Wells and Monitors

- 5.3 The *Owner* shall ensure that all groundwater monitoring wells which form part of the monitoring program are properly capped, locked and protected from damage.
- 5.4 Any groundwater monitoring well included in the on-going monitoring program that are damaged shall be assessed, repaired, replaced or decommissioned as prescribed by *O. Reg. 903* 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.

Changes to the Monitoring Plan

- 5.5 The *Owner* may request to make changes to the monitoring program(s) to the *District Manager* in accordance with the recommendations of the annual report. The *Owner* shall make clear reference to the proposed changes in separate letter that shall accompany the annual report.
- 5.6 Within thirty (30) days of receiving the written correspondence from the *District Manager* confirming that the *District Manager* is in agreement with the proposed changes to the environmental monitoring program, the *Owner* shall forward a letter identifying the proposed changes and a copy of the correspondences from the *District Manager* and all other correspondences and responses related to the changes to the monitoring program, to the *Director* requesting the *Approval* be amended to approve the proposed changes to the environmental monitoring plan prior to implementation.
- 5.7 In the event any other changes to the environmental monitoring program are proposed outside of the recommendation of the annual report, the *Owner* shall follow current ministry procedures for seeking approval for amending the *Approval*.

PART 6 - RECORD KEEPING AND REPORTING

Record Keeping

- 6.1 The *Owner* shall keep records pertaining to *Landfill* operations. The record shall include, but not be limited to:
- a. Date of record;
 - b. Quantity of waste and cover material received at the Landfill;
 - c. A notation of the area of the Landfill in which waste disposal operations are taking place; and
 - d. A description of maintenance activities completed (e.g. compaction, placement of cover material, etc).
- 6.2 The *Owner* shall keep records documenting the inspections undertaken in accordance with this *Approval*. The records shall include:
- a. The name and signature of person that conducted the inspection;
 - b. The date and time of the inspection;
 - c. The list of any deficiencies discovered;
 - d. Recommendations for remedial action; and
 - e. The date, time and description of remedial actions taken.
- 6.3 The *Owner* shall maintain a record of employee training. The record shall include, at a minimum:
- a. Date of training;
 - b. Name and signature of person who has been trained; and
 - c. Description of the training provided.

Annual Report

- 6.4 No later than March 31 of each year, the *Owner* shall submit to the *District Manager* an Annual Report on the development, operation and monitoring of the *Site* for the preceding calendar year. The Annual Report shall, as a minimum, include the following elements:
- a. *Executive Summary*

b. *Landfill Operations*

- i. A site plan of the landfilling area showing: the current and final contours and cross-sections; and any changes to the *Site* layout (based on topographic surveys to be updated a minimum of every 5 years);
- ii. A report on the landfill capacity used during the reporting period and the remaining capacity;
- iii. A report on the types and volumes of waste diverted from the landfill by transfer from the *Site*; and
- iv. A summary of complaints regarding *Site* operations and the *Owner's* response.

c. *Waste Diversion*

- i. A detailed monthly summary of the type and quantity of waste diverted for recycling.

d. *Environmental Quality Monitoring*

- i. An analysis and interpretation of gas, surface water and groundwater monitoring data;
- ii. An assessment of surface water quality at the *Site* boundaries with respect to *PWQO* , and groundwater quality with respect to *RUG*;
- iii. An assessment of the adequacy of the natural attenuation of leachate and gas generated by the *Site*;
- iv. In the event that the results predict an off-site exceedance of the *RUG* or *PWQO* , the details of any such predicted off-site exceedance, including the assumptions upon which the prediction is based;
- v. A discussion of the modifications, if any, to intended operations which would be necessary to prevent the predicted off-site exceedance;
- vi. A discussion of the modifications, if any, which should be made to the monitoring program; and
- vii. A discussion of other mitigation measures or contingency actions, if any, which may be necessary to prevent off-site impacts.

e. *Recommendations*

- i. Recommendations on any proposed changes to gas, surface water or groundwater monitoring programs or any repairs required to the monitoring well network;
- ii. Recommendations on any proposed changes to the operation of the *Landfill* or Waste Diversion Area; and
- iii. Recommendations on the requirement for any remedial works or contingency actions based on the monitoring results or *Site* operations.

The reasons for the imposition of these terms and conditions are as follows:

The reason for Condition 1.1 is to clarify that the previously issued Certificate of Approval No. A361115 issued on March 31, 1980 and Notices of Amendment issued June 9, 2000 and May 7, 2002, are no longer in effect and has been replaced and superseded by the Terms and Conditions stated in this Approval.

The reason for Conditions 1.2 and 3.8 is to ensure that the Site is designed, operated, monitored and maintained 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.

The reason for Conditions 1.3, 1.4, 1.5, 1.6 and 1.9 is to clarify the legal responsibilities and obligations imposed by this Approval.

The reason for Condition 1.7 is to ensure that appropriate Ministry staff have ready access to the Site in order to confirm that the Site is being operated according to this Approval. The condition is supplementary to the powers afforded a Provincial Officer pursuant to the EPA, the OWRA, and the PA, as amended.

The reason for Condition 1.8 is to clarify how to interpret this Approval in relation to the application and supporting documentation.

The reason for Condition 1.10, 6.1, 6.2, and 6.3 is to ensure that accurate records are maintained and available for review to demonstrate compliance with the conditions of this Approval, the EPA and its regulations.

The reason for Conditions 1.11, 1.12, 1.13, 1.14, 1.15, and 1.16 is to protect future occupants of the Site and the environment from any hazards which might occur as a result of waste being disposed of on the site. This prohibition and potential hazard should be drawn to the attention of future owners and occupants by the Approval being registered on title.

The reason for Condition 2.1 is to specify the approved areas from which waste may be accepted at the Site.

The reason for Condition 2.2 is to ensure that users of the Site are informed of the hours and services available as well as given contact information in the event of a complaint or emergency.

The reason for Condition 2.3 is to minimize the risk of unauthorized entry.

The reason for Conditions 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, and 2.10 is to ensure that the Site is operated in a manner which does not result in a nuisance or a hazard to the health and safety of the environment or people.

Schedule "B"

This Schedule "B" forms part of Environmental Compliance Approval No. A361115.

<i>Stations to be Sampled</i>	<i>Monitoring Frequency</i>	<i>Parameter List</i>
<p><u>Groundwater</u></p> <p>Representative Leachate Well: <i>To be determined.</i></p> <p>Background well(s): <i>*EL-MW2</i></p> <p>Impact evaluation well(s): <i>**EL-MW1</i></p> <p><i>* EL-MW2 will continue to be sampled until a replacement well is installed.</i></p> <p><i>** At least one additional downgradient monitor is to be installed.</i></p>	<p>Twice per year.</p> <p>Sampling shall be done semi-annually in the spring (April-May), and fall (October-November).</p>	<p><u>Organic Parameters</u> Dissolved Organic Carbon (DOC), Biochemical Oxygen Demand - 5 day test (BOD5), Volatile Organic Compounds (benzene, 1,4 dichlorobenzene, dichloromethane, toluene, and vinyl chloride)</p> <p><u>Inorganic Parameters</u> ammonia, chloride, nitrate, major ions (sodium, potassium, calcium, magnesium, sulphate, alkalinity)</p> <p><u>Metals</u> aluminum, boron, iron, lead, manganese, barium</p> <p><u>Physical/Chemical Parameters</u> Chemical Oxygen Demand (COD), conductivity, pH, Total Dissolved Solids (TDS), Total Suspended Solids (TSS), hardness</p> <p><u>Other</u> Total, Kjeldahl Nitrogen (TKN)</p>

Schedule "A"

This Schedule "A" forms part of Environmental Compliance Approval No. A361115.

1. General location map titled "Diagram 1, Wicklow Township" submitted November 15, 1977.
2. Site plan titled "Waste Disposal Site A361115, Township of Wicklow."
3. Letters outlining the operating programme from D.C. Bloom, Clerk-Treasurer to D.E. Graham, Ministry of the Environment, dated October 3, 1977 and January 26, 1978.
4. Application to amend Environmental Compliance Approval. Report entitled "Development and Operations Plan, East Lake Waste Disposal Site, Environmental Compliance Approval No. 361115" and all supporting documentation. Prepared by BluMetric Environmental Inc. February 2018.

f. *Conclusions*

- i. Any environmental or operational problems that could negatively impact the environment, encountered during the operation of the *Site* and any mitigative actions taken; and
- ii. An assessment as to whether or not the *Owner* is operating the *Site* in compliance with the Conditions of this *Approval* .

Condition 2.11 is included to ensure that the Owner properly trained the staff operating the site to ensure that the operations are undertaken in accordance with the requirements of this Approval.

The reason for Condition 2.12 is to ensure that complaints are properly and quickly resolved and that complaints and follow-up actions have been documented.

The reason for Condition 2.13 is to ensure the Owner immediately responds to a spill.

The reason for Condition 2.14 is to ensure that the Owner notifies the Ministry forthwith of any spills so that an appropriate response can be determined.

The reason for Conditions 3.1, 3.2, and 3.3 is to state the amounts and types of waste that may be accepted, based on the application and the supporting documentation and to ensure that only waste approved for receipt are accepted.

Condition 3.4 is included to ensure that waste disposal remains within the approved limits.

Condition 3.5 is included to ensure that the waste is covered with a suitable daily, interim and final cover material in a timely manner, to minimize the environmental impacts from the disposal of waste.

Condition 3.6 is included to ensure that efficient and environmentally sound procedures are employed during the operation of the landfill site.

The reason for Condition 3.8 is to ensure that the Site is closed in accordance with Ministry's standards and to protect the health and safety of the environment.

The reason for Condition 4.1 is to ensure that refrigerants are handled and disposed of in a manner which does not negatively impact the environment.

The reason for Condition 4.2 is to ensure proper record keeping of other wastes diverted from the Site.

The reason for Condition 4.3 is to ensure that waste stored in containers or bins are done in a safe and secure manner.

The reason for Condition 5.1 is to ensure that groundwater and surface water standards/objectives are used to evaluate potential water pollution impacts associated with the Site.

The reason for Condition 5.2 is to ensure an acceptable monitoring plan is proposed to assess potential impacts from the Site.

The reason for Conditions 5.3 and 5.4 is to ensure are to ensure that groundwater monitoring wells are properly maintained and decommissioned as required by Regulation 903.

The reason for Conditions 5.5, 5.6, and 5.7 is to outline the process for making changes to the

monitoring plan and amending the Approval.

Condition 6.4 is included to ensure that regular review of Site development, operations and monitoring is documented and any possible improvements to site design, operations or monitoring programs are identified.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). A361115 issued on March 31, 1980

In accordance with Section 139 of the Environmental Protection Act, 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:

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

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

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

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

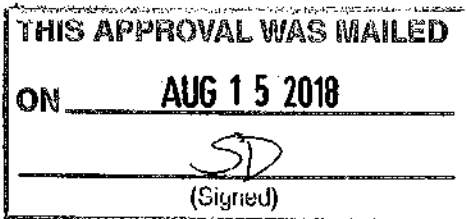
The Director appointed for the purposes of Part II.1 of
the Environmental Protection Act
Ministry of the Environment and Climate Change
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 9th day of August, 2018





Dale Gable, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

CF/

- c: Area Manager, MOECC Belleville
- c: District Manager, MOECC Kingston - District
Iris O'Connor P. Eng., BluMetric Environmental Inc.

Appendix A

A-2 2020 Annual Monitoring Report and Proposed Monitoring Plan Technical Review
(2022)

**Ministry of the
Environment,
Conservation and Parks**
Eastern Region
1259 Gardiners Road, Unit 3
Kingston ON K7P 3J6
Phone: 613.549.4000
or 1.800.267.0974

**Ministère de l'Environnement,
de la Protection de la nature
et des Parcs**
Région de l'Est
1259, rue Gardiners, unité 3
Kingston (Ontario) K7P 3J6
Tél: 613 549-4000
ou 1 800 267-0974



MEMORANDUM

March 23, 2022

TO: Jon Morrish
Senior Environmental Officer
Belleville Area Office
Eastern Region

FROM: Obai Mohammed
Hydrogeologist
Technical Support Section
Eastern Region

RE: East Lake Waste Disposal Site
2020 Annual Monitoring Report; and Proposed Monitoring Plan
Part of Lot 29, Concessions 3, Township of Hastings Highlands,
Environmental Compliance Approval (ECA) Number A361115

Purpose

I have reviewed the hydrogeological aspects of the document entitled: “2020 Annual Monitoring Report, East Lake Waste Disposal Site, Environmental Compliance Approval No. A361115”, dated March 2021 and prepared by BluMetric Environmental Inc. (BluMetric) on behalf of the Corporation of the Municipality of Hastings Highlands. In my review, I have also considered the proposed monitoring program detailed on the letter entitled “A361115 – East Lake (Cardwell) Waste Disposal Site (WDS), Proposed Monitoring Program”, dated February 1, 2019, and prepared by BluMetric. I offer the following comments for your consideration.

Environmental Compliance Approval

The East Lake Waste Disposal Site (the site) operates under the amended Environmental Compliance Approval (ECA) Number A361115, issued on August 9, 2018, as an active waste disposal site. The site is operated by the Municipality of Hastings Highlands (the Municipality), owned by the Crown and administered by the Ministry of Natural Resources and Forestry (MNR). It is understood from the Certificate of Approval (CofA) No. A361115 issued on March 31, 1980, that the site has been in operation since 1980. The site is approved to receive solid non-hazardous municipal waste, including residential, commercial, and institutional wastes, in an approved waste disposal area of 2.3 hectares (ha), included in a total area of 4.05 ha. It is further understood that the waste is currently transferred into the site from other waste disposal sites operated by the Municipality. The site receives most of the construction and demolition waste generated in the Municipality. The site has segregated collection areas for scrap metal, tires, large bulky items (e.g., couches and mattresses), electronic waste recycling and a recycling transfer station for household blue box recyclable containers (i.e., aluminum cans, metal cans, plastic bottles) and fibre (i.e., paper and cardboard).

Site Description

The site is located approximately 0.2 km from the Cardwell Lake Road North, in a Crown land, in Part of Lot 29, Concessions 3, in the former Wicklow Township, Township of Hastings Highlands. The site's civic address is 59 Cardwell Road, Maynooth, Ontario. Access to the site is via Highway 62, Highway 127, East Lake Road and Cardwell Lake Road North.

Figure 2, included in the report provided, shows that the site is surrounded mostly by vacant/forest lands, with a former sand and gravel pit within a forested area reportedly located adjacent to the site. There is no buffer, or other lands, designated as Contaminant Attenuation Zone (CAZ) within the total site area. There are no surface water features within the immediate vicinity of the WDS. Cardwell Lake is located approximately 250 m to the east of the site. The site does not comprise engineered control systems and therefore the site is considered a natural attenuating landfill site. The landfill reportedly has about 34 years of site life remaining, with a remaining volume estimated by the end of 2020 as 39,473.15 m³.

Geology

The regional geology of the area is described as glaciofluvial outwash deposits of sand and gravel and undifferentiated till of sand and sand-silt, possibly containing high clay content. The immediate area of the site is characterized generally by sandy overburden with a thickness ranging to depths over 5.5 meters (m).

The geology at the site is determined from the available site well records and is generally described as overburden, mainly comprised of dense fine silty sand, encountered between 5.5 and 14.5 m, on top of a sandy till layer that is overlying a granite bedrock expected to be at depths greater than 24.5 m.

Hydrogeology

Four (4) monitoring wells are available at the site to determine the static water levels and groundwater quality. Monitoring well EL-MW1 is located northeast and cross-gradient of the waste disposal area, monitoring well EL-MW2R-19 is located upgradient and southwest of waste disposal area near the southwest corner of the site, and therefore is considered to be the background monitor for the site, monitoring well EL-MW3-19 is located to the east and downgradient of the waste disposal area, and monitoring well EL-MW4-19 is located cross-gradient to the southeast of the historical waste area. It is understood that all of the four (4) monitoring wells at the site are screened in a water-bearing depths of the overburden unit.

In May 2020, groundwater elevations measured at the site were between 400.68 meters above mean sea level (masl) to 409.79 masl and were between 399.61 masl to 409.60masl in October 2020 monitoring event. Based on the geology, surface water features, and current and historic data, the shallow groundwater flow direction was determined to be northeast towards Cardwell Lake, with a horizontal hydraulic gradient of 0.05 m/m and 0.03 m/m in the spring and fall of 2020, respectively.

Hydraulic conductivity testing was conducted back on October 24, 2019, at the two (2) installed monitors, EL-MW3-19 and EL-MW4-19, at the site. The resulting hydraulic conductivity values reported ranged between 5.25×10^{-5} m/s and 6.42×10^{-5} m/s in the dense sand overburden at EL-MW3-19, and between 5.25×10^{-5} m/s and 4.24×10^{-5} m/s in the sand till at ELMW4-19.

Background Groundwater Quality

Monitoring well EL-MW2R-19, located upgradient and southwest of waste area near the southwest corner of the site, is considered representative of background conditions. In 2020, the background groundwater quality met the Ontario Drinking Water Standards (ODWS) criteria during both monitoring events, with the exception of alkalinity and pH. The alkalinity and pH concentrations below the lower limits of the ODWS are considered naturally occurring and are not attributed to be related to landfill leachate. It is also understood that low alkalinity and pH is typical of groundwater in the region.

Downgradient Groundwater Quality

Groundwater quality in monitor EL-MW1 did not meet the lower limit of ODWS criteria for Alkalinity and pH in 2020 monitoring events, both of which are described to be naturally occurring and typical of groundwater in the region. In 2020, concentrations of manganese, sulfate and total dissolved solids (TDS) are reported to be exceeding the ODWS criteria at EL-MW3-19. In addition to pH lower limit, described as naturally occurring in the region. It is understood that monitoring well EL-MW3-19 is intended to be used as the leachate monitoring well for the site. The groundwater quality at EL-MW4-19 was below or within range ODWSOG standards for all of the parameters with no exceedances reported at EL-MW4-19 location.

Regulatory Evaluation

Guideline B-7 applies to all operating waste disposal sites and those closed after 1986. Since East Lake is an operating WDS, compliance with Guideline B-7 is required. BluMetric provides the Reasonable Use Concept (RUC) assessment for alkalinity, boron, chloride, DOC, iron, manganese, sodium, nitrate sulphate, and TDS. It is understood that RUC values (RUV) were not recalculated in 2020, and the calculations will be updated for the 2021 monitoring report to revise the mean background concentrations at the replacement background monitor (i.e., well EL-MW2R-19).

The 2019 background groundwater quality results at monitor EL-MW2R-19 were used to calculate RUC values. Parameters that exceed the compliance criteria in 2020 were DOC, Nitrate, TDS at monitoring well EL-MW3-19. Elevated concentrations of manganese, sulphate, and TDS area are also reported above their respective ODWS criteria at EL-MW3-19. It is understood that monitoring well EL-MW3-19 is intended to be used as the leachate monitor for the site. Results for monitoring well EL-MW4-19 were below or within range of compliance and ODWS.

BluMetric concluded that the site is in compliance with Guideline B-7 along the site's north, west, and south boundaries, and that the site is potentially out of compliance with Guideline B-7 along the eastern property boundary. I concur with this conclusion.

Groundwater – Surface water Interaction

Vertical hydraulic gradient values are not provided, and no groundwater-surface water interaction assessment provided. It is understood that there are no surface water features in the immediate vicinity of the site. Cardwell Lake is located approximately 250 m to the east of the site. Future reports should provide discussion on groundwater-surface water interaction and potential impacts on Cardwell Lake.

Volatile Organic Compounds (VOCs)

VOCs were sampled for in 2019 at the leachate monitor, EL-MW3-19, and were found to be below detectable limits and were therefore not sampled in 2020. The next VOCs sampling is scheduled to be conducted in 2025.

Landfill Gas

The consultant has assessed the risk related to landfill gas with the results for 2020, indicating that landfill gas is not currently a hazard concern, with levels noted to be significantly less than the concentrations of concern in the subsurface, buildings and structures onsite. Landfill gas should continue to be monitored and associated risk should continue to be evaluated by the consultant in future reports.

Trigger Mechanisms and Contingency Plan

No triggers mechanisms and contingency plan provided in the AMR for the site. I recommend establishing groundwater trigger mechanisms, and a contingency plan for the site, for MECP review and approval, in the next AMR.

Groundwater Monitoring Program

A phased approach monitoring program for the site is proposed by BluMetric in their letter dated February 1, 2019. Monitoring wells were installed in 2019 in Phase 1 of the proposed monitoring program. Phase 2 of the program includes an additional groundwater monitoring well installation at the eastern property boundary of the site, immediately east of EL-MW3-19, to assess and confirm natural attenuation, and to confirm compliance with Guideline B-7 along the eastern boundary. A future monitoring well, or monitoring well nest, is recommended to be located along the west side of Cardwell Lake Road North, approximately 150 m to 300 m east of EL-MW3 19.

It is understood that Phase 1 is complete and included the current available overburden monitors up to the bedrock surface/drilling refusal. I recommend installing Phase 2 and Phase 3 proposed three (3) monitoring wells, to the east and northeast, to determine lateral and vertical extents of the landfill impacts. As listed in Table 2 of BluMetric's letter, Phase 2 includes monitoring well EL-MW6 installation and Phase 3 includes monitoring wells EL-MW7 and EL-MW8 installations. The monitoring wells, available or proposed to be installed, at the site are to be utilized to measure groundwater levels and to collect groundwater samples for quality analyses. The exact locations and details of the three (3) monitoring well installations (i.e., EL-MW6, EL-MW7, and EL-MW8) should be provided to the Ministry for review and approval.

Groundwater samples collected from the monitoring to be analysed for:

- organic parameters: dissolved organic carbon (DOC) and biological oxygen demand (BOD₅);
- inorganic parameters: Nitrate, Ammonia, Chloride, Major Ions (Sodium, Calcium, Magnesium, Potassium, Sulphate, Alkalinity), and TKN;
- dissolved metals: Aluminum, Barium, Boron, Iron, Lead, and Manganese;
- physical and chemical parameters: pH, Conductivity, Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Chemical Oxygen Demand (COD), and Hardness.

Volatile Organic Compounds (VOCs) are noted in the letter to be collected from monitoring wells EL-MW3 and EL-MW4-19 at every five years interval. Should the results from one or both wells indicate exceedances to ODWS criteria; the monitors will be sampled and analyzed for VOCs annually during the fall monitoring event. No VOCs were detected at the leachate monitor (i.e., EL-MW3-19) in 2019. The next VOCs sampling is scheduled to be conducted in 2025.

I generally concur with BluMetric's monitoring program. However, given the site is out of compliance with Guideline B-7 to the east, I recommend installing the remaining three (3) proposed monitoring wells as detailed in the proposed monitoring program. The exact locations and details of the monitoring well installations (i.e., EL-MW6, EL-MW7, and EL-MW8) should be provided to the Ministry for review and approval.

Conclusions and Recommendations

- The East Lake St. WDS is an active natural attenuation site, with approximately 34 years of site life remaining.
- Reasonable Use Guideline B-7 applies to all operating waste disposal sites and those closed after 1986. The site is not in compliance with Guideline B-7 along the eastern property boundary.
- The site has no buffer, or other lands, designated as Contaminant Attenuation Zone (CAZ) within the total site area.
- The shallow groundwater flow direction is to northeast towards Cardwell Lake.
- The background groundwater quality met the Ontario Drinking Water Standards in 2020, except for alkalinity and pH exceedances that were attributed to be naturally occurring, typical of groundwater in the region and not related to landfill leachate.
- It is understood that EL-MW3-19 is intended to be used as a leachate monitoring well. In 2020, concentrations of manganese, sulfate and total dissolved solids (TDS) are reported to be exceeding the OWDS criteria at EL-MW3-19. In addition to pH lower limit, described as naturally occurring in the region. RUV exceedances for DOC, Nitrate, TDS are also reported in 2020 at EL-MW3-19 location.

- Downgradient monitoring well EL-MW1 did not meet the lower limit of ODWS criteria for Alkalinity and pH in 2020, both of which described to be naturally occurring, and no exceedances were reported at the downgradient monitor EL-MW4-19.
- No groundwater-surface water interaction assessment is provided. Cardwell Lake is located 250 m to the east of the site. Future reports should include a discussion of groundwater-surface water interaction and potential impacts on Cardwell Lake.
- VOCs were not detected in the 2019 sampling conducted at the leachate monitor EL-MW3-19. The next VOCs sampling is scheduled to be conducted in 2025.
- Landfill gas currently appears to be of no hazard concerns. Landfill gas should continue to be monitored during the semi-annual sampling events.
- I concur with BluMetric's monitoring program for the site. Yet, I recommend installing the remaining proposed three (3) monitoring wells, to the east and northeast, to determine the lateral and vertical extents of the leachate impacts. The exact locations and details of the three (3) monitoring well installations (i.e., EL-MW6, EL-MW7, and EL-MW8) should be provided to the Ministry for review and approval.

Original to be signed by

Obai Mohammed, Ph.D., M.Sc., P.Eng., PMP
OYM/ob

ec: Cathy Chisholm
Victor Castro
James Mahoney

c: File GW HA HI 01 03 (East Lake WDS)
ECHO# 1-99894970

Appendix A

A-3 Land Use Permit



Use shaded areas for corrections.

Name of Applicant/Permittee (insert Corporate Name if Applicant is "Limited" or "Incorporated") Municipality of Hastings Highlands	Area Code 613	Telephone No. 398-2811
---	------------------	---------------------------

As Trustee for

Postal Address of Applicant/Permittee 33011 Hwy. 62 P.O. Box 130

City, Town or Village Maynooth	Prov/State ON	Country Canada	Postal Code K0L 2S0
-----------------------------------	------------------	-------------------	------------------------

Location of Land			
Lot 29	Concession/Block No 3	Geographic Township WICKLOW	Municipality HASTINGS HIGHLANDS M

U.T.M. Grid Zone 18 E 270123 N 5015960	Geographic Location North Cardwell Road	Area in ha. 4.05
---	--	---------------------

As per sketch and description which is attached to the original permit for this site and forms part of this permit. A copy of this sketch and description is on file at the District Office and available for inspection by the applicant at any time during normal business hours.

Improvement Type WASTE DISPOSAL, GARBAGE	Sales Tax I.D. Number R124668666
---	-------------------------------------

Fee(s) and Period of Land Use			
Amount Due \$542.97	Annual Fee (subject to adjustment) \$330.50 + \$42.97 (HST)	Permit Effective Date Oct 1, 2016	Permit Termination Date Sep 30, 2026

Note: Terms and Conditions applicable to all Land Use Permits are on the reverse side of this form.

Terms and Conditions applicable to this permit	Purpose Waste Disposal Site
	Sub-Purpose Dump

Applicant's certification	
I certify that the information given herein is true and complete, and that I have read, fully understand, and agree to comply with all of the terms and conditions set out in this permit and that I am of the age of majority.	
I agree that this is the complete agreement between the parties hereto.	Date Signed Jan 24/18

Corporation Use Only		
I have authority to bind the herein-named Corporation		
Initials and Surname of Corporation Official (Please Print) PET PUNARUM	Signature of Corporation Official <i>Pet Punarum</i>	Position CAO/ Clerk

Ministry Approval			
Under authority of the Regulations under the Public Lands Act, this Land Use Permit is hereby issued to the above applicant, subject to all terms and conditions contained herein and no other, and these shall be the exclusive terms and conditions applicable to the use of this land.			

Signature of MNRF Official	Date Signed	Cash Register Validation or Receipt No.	Amount Paid
----------------------------	-------------	---	-------------

Personal information on this form is collected under authority of the Public Lands Act and will be used for the administration of that Act. Questions about this information should be directed to the local MNRF Office, whose address and telephone number appear in the Ontario Government Telephone Directory.

Appendix B

Monitoring and Screening Checklist (MECP/MOE)

Appendix D-Monitoring and Screening Checklist

General Information and Instructions

General Information: The checklist is to be completed, and submitted with the Monitoring Report.

Instructions: A complete checklist consists of:

- (a) a completed and signed checklist, including any additional pages of information which can be attached as needed to provide further details where indicated.
- (b) completed contact information for the Competent Environmental Practitioner (CEP)
- (c) self-declaration that CEP(s) meet(s) the qualifications as set out below and in Section 1.2 of the Technical Guidance Document.

Definition of Groundwater CEP:

For groundwater, the CEP must have expertise in hydrogeology and meet one of the following:

- (a) the person holds a licence, limited licence or temporary licence under the *Professional Engineers Act*; or
- (b) the person holds a certificate of registration under the *Professional Geoscientists Act, 2000* and is a practicing member, temporary, member or limited member of the Association of Professional Geoscientists of Ontario. O. Reg. 66/08, s. 2..

Definition of Surface water CEP:

A CEP for surface water assessments is a scientist, professional engineer or professional geoscientist as described in (a) and (b) above with demonstrated experience and post-secondary education, either a diploma or degree, in hydrology, aquatic ecology, limnology, aquatic biology, physical geography with specialization in surface water, and/or water resource management.

The type of scientific work that a CEP performs must be consistent with that person's education and experience. If an individual has appropriate training and credentials in both groundwater and surface water and is responsible for both areas of expertise, the CEP may then complete and validate both sections of the checklist.

Monitoring Report and Site Information	
Waste Disposal Site Name	East Lake Waste Disposal Site
Location (e.g. street address, lot, concession)	59 Cardwell Lake Road
GPS Location (taken within the property boundary at front gate/ front entry)	18T 270144 m E, 5015519 m N
Municipality	Municipality of Hasting Highlands (formerly Twp. of Wicklow)
Client and/or Site Owner	The Corporation of the Municipality of Hasting Highlands
Monitoring Period (Year)	2023
This Monitoring Report is being submitted under the following:	
Environmental Compliance Approval Number:	A 361115
Director's Order No.:	
Provincial Officer's Order No.:	
Other:	

Report Submission Frequency	<input checked="" type="radio"/> Annual <input type="radio"/> Other	Required to be submitted to MECP, on March 31st following reporting year.	
The site is: (Operation Status)	<input checked="" type="radio"/> Open <input type="radio"/> Inactive <input type="radio"/> Closed		
Does your Site have a Total Approved Capacity?	<input checked="" type="radio"/> Yes <input type="radio"/> No		
If yes, please specify Total Approved Capacity	147,546	Units	Cubic Metres
Does your Site have a Maximum Approved Fill Rate?	<input type="radio"/> Yes <input checked="" type="radio"/> No		
If yes, please specify Maximum Approved Fill Rate		Units	
Total Waste Received within Monitoring Period (Year)	1,101.2	Units	Cubic Metres
Total Waste Received within Monitoring Period (Year) <i>Methodology</i>	Estimated		
Estimated Remaining Capacity	40,568	Units	Cubic Metres
Estimated Remaining Capacity <i>Methodology</i>	Estimated		
Estimated Remaining Capacity <i>Date Last Determined</i>	31-Dec-2023		
Non-Hazardous Approved Waste Types	<input checked="" type="checkbox"/> Domestic <input checked="" type="checkbox"/> Industrial, Commercial & Institutional (IC&I) <input type="checkbox"/> Source Separated Organics (Green Bin) <input checked="" type="checkbox"/> Tires	<input checked="" type="checkbox"/> Contaminated Soil <input checked="" type="checkbox"/> Wood Waste <input checked="" type="checkbox"/> Blue Box Material <input type="checkbox"/> Processed Organics <input checked="" type="checkbox"/> Leaf and Yard Waste	<input type="checkbox"/> Food Processing/Preparation Operations Waste <input type="checkbox"/> Hauled Sewage Other: <input type="text"/>
Subject Waste Approved Waste Classes: Hazardous & Liquid Industrial <i>(separate waste classes by comma)</i>			
Year Site Opened <i>(enter the Calendar Year <u>only</u>)</i>	1977	Current ECA Issue Date	9-Aug-2018
Is your Site required to submit Financial Assurance?	<input type="radio"/> Yes <input checked="" type="radio"/> No		
Describe how your Landfill is designed.	<input checked="" type="radio"/> Natural Attenuation only <input type="radio"/> Fully engineered Facility <input type="radio"/> Partially engineered Facility		
Does your Site have an approved Contaminant Attenuation Zone?	<input type="radio"/> Yes <input checked="" type="radio"/> No		

If closed, specify C of A, control or authorizing document closure date:

Has the nature of the operations at the site changed during this monitoring period?

Yes

No

If yes, provide details:

Have any measurements been taken since the last reporting period that indicate landfill gas volumes have exceeded the MOE limits for subsurface or adjacent buildings? (i.e. exceeded the LEL for methane)

Yes

No

Groundwater WDS Verification:

Based on all available information about the site and site knowledge, it is my opinion that:

Sampling and Monitoring Program Status:

<p>1) The monitoring program continues to effectively characterize site conditions and any groundwater discharges from the site. All monitoring wells are confirmed to be in good condition and are secure:</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>Two additional wells serving as the east-northeast and east-southeast property boundary wells were installed in 2023 as per Phase 3 of the proposed monitoring program.</p>
<p>2) All groundwater, leachate and WDS gas sampling and monitoring for the monitoring period being reported on was successfully completed as required by Certificate(s) of Approval or other relevant authorizing/control document (s):</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Not Applicable</p>	<p>If no, list exceptions below or attach information.</p>

Groundwater Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
All	Lead was inadvertently omitted from the groundwater quality monitoring parameter suite from 2017 to spring 2023. Lead was analyzed at all groundwater monitoring locations in fall 2023 as required by the ECA.	2017 to 2023

3) a) Is landfill gas being monitored or controlled at the site?	<input checked="" type="radio"/> Yes <input type="radio"/> No
--	--

If yes to 3(a), please answer the next two questions below.

b) Have any measurements been taken since the last reporting period that indicate landfill gas is present in the subsurface at levels exceeding criteria established for the site?	<input type="radio"/> Yes <input checked="" type="radio"/> No
--	--

c) Has the sampling and monitoring identified under 3(a) for the monitoring period being reported on was successfully completed in accordance with established protocols, frequencies, locations, and parameters developed as per the Technical Guidance Document:	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Not Applicable	If no, list exceptions below or attach additional information.
--	--	--

Groundwater Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date

4) All field work for groundwater investigations was done in accordance with standard operating procedures as established/outlined per the Technical Guidance Document (including internal/external QA/QC requirements) (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):	<input checked="" type="radio"/> Yes <input type="radio"/> No	If no, specify (Type Here):
--	--	-----------------------------

Sampling and Monitoring Program Results/WDS Conditions and Assessment:

<p>5) The site has an adequate buffer, Contaminant Attenuation Zone (CAZ) and/or contingency plan in place. Design and operational measures, including the size and configuration of any CAZ, are adequate to prevent potential human health impacts and impairment of the environment.</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>	<p>The Site is not compliant with Guideline B-7 along the eastern property boundary based on the results from EL-MW3. Two additional wells serving as the east-northeast property boundary wells were installed in 2023 as per Phase 3 of the proposed monitoring program. The required CAZ boundary will need be reassessed based on the results of these new boundary wells.</p>	
<p>6) The site meets compliance and assessment criteria.</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>	<p>Guideline B-7 compliance along the northern, southern and western property boundary. Not compliant with Guideline B-7 along the eastern property boundary.</p>	
<p>7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>		
<p>1) Is one or more of the following risk reduction practices in place at the site:</p> <p>(a) There is minimal reliance on natural attenuation of leachate due to the presence of an effective waste liner and active leachate collection/ treatment; or</p> <p>(b) There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or</p> <p>(c) The site meets the following two conditions (typically achieved after 15 years or longer of site operation):</p> <p><i>i.</i> The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and</p> <p><i>ii.</i> Seasonal and annual water levels and water quality fluctuations are well understood.</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>	<p>Note which practice(s):</p>	<p><input type="checkbox"/> (a) <input type="checkbox"/> (b) <input type="checkbox"/> (c)</p>
<p>9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):</p>	<p><input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Not Applicable</p>	<p>No MECP comments have been received on the proposed trigger plan at this time. While not required, groundwater quality at the proposed trigger location (EL-MW1) has been assessed for compliance with the proposed groundwater trigger plan. The groundwater chemical results in 2023 did not trigger the Tier 1 Contingency Plan response for groundwater.</p>	

Groundwater CEP Declaration:

I am a licensed professional Engineer or a registered professional geoscientist in Ontario with expertise in hydrogeology, as defined in Appendix D under Instructions. Where additional expertise was needed to evaluate the site monitoring data, I have relied on individuals who I believe to be experts in the relevant discipline, who have co-signed the compliance monitoring report or monitoring program status report, and who have provided evidence to me of their credentials.

I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended), and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories*, or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature and will be rectified for the next monitoring/reporting period. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

21-Feb-2023

Recommendations:


Based on my technical review of the monitoring results for the waste disposal site:

No changes to the monitoring program are recommended

The following change(s) to the monitoring program is/are recommended:

No Changes to site design and operation are recommended

The following change(s) to the site design and operation is/are recommended:

Name:	Mark Somers, M.Eng., P.Eng., ing.		
Seal:			
Signature:		Date:	25-Mar-2024
CEP Contact Information:	Mark Somers, M.Eng., P.Eng., ing.		
Company:	BluMetric Environmental Inc.		
Address:	1682 Woodward Dr, Ottawa, ON, K2C 3R8		
Telephone No.:	(877) 487-8436 ext. 246	Fax No. :	
E-mail Address:	msomers@blumetric.ca		
Co-signers for additional expertise provided:			
Signature:		Date:	
Signature:		Date:	

Surface Water WDS Verification:

Provide the name of surface water body/bodies potentially receiving the WDS effluent and the approximate distance to the waterbody (including the nearest surface water body/bodies to the site):

Name (s)	Cardwell Lake
Distance(s)	250 m to the East

Based on all available information and site knowledge, it is my opinion that:

Sampling and Monitoring Program Status:

1) The current surface water monitoring program continues to effectively characterize the surface water conditions, and includes data that relates upstream/background and downstream receiving water conditions:	<input checked="" type="radio"/> Yes <input type="radio"/> No	No surface water monitoring is required at the site.
2) All surface water sampling for the monitoring period being reported was successfully completed in accordance with the Certificate(s) of Approval or relevant authorizing/control document(s) (if applicable):	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Not applicable (No C of A, authorizing / control document applies)	If no, specify below or provide details in an attachment.

Surface Water Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date

<p>3) a) Some or all surface water sampling and monitoring program requirements for the monitoring period have been established outside of a ministry C of A or authorizing/control document.</p>	<p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p><input checked="" type="radio"/> Not Applicable</p>
---	---

<p>b) If yes, all surface water sampling and monitoring identified under 3 (a) was successfully completed in accordance with the established program from the site, including sampling protocols, frequencies, locations and parameters) as developed per the Technical Guidance Document:</p>	<p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p><input checked="" type="radio"/> Not Applicable</p>	<p>If no, specify below or provide details in an attachment.</p>
--	---	--

Surface Water Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date

<p>4) All field work for surface water investigations was done in accordance with standard operating procedures, including internal/external QA/QC requirements, as established/outlined as per the Technical Guidance Document, MOE 2010, or as amended. (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):</p>	<p><input type="radio"/> Yes</p> <p><input checked="" type="radio"/> No</p>	<p>No surface water monitoring is required at the site.</p>
--	---	---

Sampling and Monitoring Program Results/WDS Conditions and Assessment:

5) The receiving water body meets surface water-related compliance criteria and assessment criteria: i.e., there are no exceedances of criteria, based on MOE legislation, regulations, Water Management Policies, Guidelines and Provincial Water Quality Objectives and other assessment criteria (e.g., CWQGs, APVs), as noted in Table A or Table B in the Technical Guidance Document (Section 4.6):	<input type="radio"/> Yes <input checked="" type="radio"/> No
--	--

If no, list parameters that exceed criteria outlined above and the amount/percentage of the exceedance as per the table below or provide details in an attachment:

Parameter	Compliance or Assessment Criteria or Background	Amount by which Compliance or Assessment Criteria or Background Exceeded
e.g. Nickel	e.g. C of A limit, PWQO, background	e.g. X% above PWQO

6) In my opinion, any exceedances listed in Question 5 are the result of non-WDS related influences (such as background, road salting, sampling site conditions)?	<input type="radio"/> Yes <input checked="" type="radio"/> No	No surface water monitoring is required at the site.
--	--	--

<p>7) All monitoring program surface water parameter concentrations fall within a stable or decreasing trend. The site is not characterized by historical ranges of concentrations above assessment and compliance criteria.</p>	<p><input type="radio"/> Yes</p> <p><input checked="" type="radio"/> No</p>	<p>No surface water monitoring is required at the site.</p>
<p>8) For the monitoring program parameters, does the water quality in the groundwater zones adjacent to surface water receivers exceed assessment or compliance criteria (e.g. , PWQOs, CWQGs, or toxicity values for aquatic biota (APVs)):</p>	<p><input checked="" type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Not Known</p> <p><input type="radio"/> Not Applicable</p>	<p>Increasing trend at monitoring well EL-MW3 for alkalinity, boron, and DOC while the other parameters at this location are observed to be generally stable or decreasing. An increasing trend in nitrate concentrations is apparent at EL-MW2R since monitoring began in 2019. Concentrations at EL-MW1 and EL-MW4 are stable, with fluctuations reported within their typical range. There is insufficient data to properly assess trends at the monitoring wells installed in 2019, 2021 and 2023. It is anticipated that at least five years of semi-annual data will be required prior to analysing trends at these newer wells. No exceedances associated with landfill impacts were reported at the nested wells located downgradient of the landfill. There appears to be sufficient natural attenuation occurring between the leachate well EL-MW3 where a PWQO exceedance was reported and the WL-MW5.1 and EL-W52,, therefore surface water impacts to Cardwell Lake are unlikely.</p>
<p>9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):</p>	<p><input type="radio"/> Yes</p> <p><input checked="" type="radio"/> No</p> <p><input type="radio"/> Not Applicable</p>	

Surface Water CEP Declaration:

I, the undersigned hereby declare that I am a Competent Environmental Practitioner as defined in Appendix D under Instructions, holding the necessary level of experience and education to design surface water monitoring and sampling programs, conduct appropriate surface water investigations and interpret the related data as it pertains to the site for this monitoring period.


I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended) and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories*, or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature or will be rectified for future monitoring events. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:

<p><input checked="" type="radio"/> No Changes to the monitoring program are recommended</p> <p><input type="radio"/> The following change(s) to the monitoring program is/are recommended:</p>	
<p><input checked="" type="radio"/> No changes to the site design and operation are recommended</p> <p><input type="radio"/> The following change(s) to the site design and operation is/are recommended:</p>	

CEP Signature		
Relevant Discipline	Environmental Engineer	
Date:	25-Mar-2024	
CEP Contact Information:	Mark Somers, M.Eng., P.Eng., ing.	
Company:	BluMetric Environmental Inc.	
Address:	1682 Woodward Dr, Ottawa, ON, K2C 3R8	
Telephone No.:	(877) 487-8436 ext. 246	
Fax No. :		
E-mail Address:	msomers@blumetric.ca	
Save As		Print Form

Appendix C

C-1 Private Well Records

Instructions for Completing Form

- For use in the Province of Ontario only. This document is a permanent legal document. Please retain for future reference.
- All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Management Coordinator at 416-235-6203.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only									
MUN									LOT

Address of Well Location (County/District/Municipality) **Hastings Highland** Township **Hastings Highland**

RR#/Street Number/Name **59 Candwell Lake RD** City/Town/Village **MAPLETON** Site/Compartment/Block/Tract etc.

GPS Reading NAD **83** Zone **18** Easting **270965** Northing **5015915** Unit Make/Model **Garmin** Mode of Operation: Undifferentiated Averaged Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Metres To
Brown	SAND	Cobbles, Gravel	Dense	0	4.52
Brown	SAND	Gravel		0	7.62

Hole Diameter

Depth	Metres	Diameter
From	To	Centimetres
0	4.52	15.24
0	7.62	15.24

Water Record

Water found at m Kind of Water Fresh Sulphur Gas Salty Minerals Other

After test of well yield, water was Clear and sediment free Other, specify

Chlorinated Yes No

Construction Record

Inside diam	Material	Wall thickness	Depth	Metres
centimetres		centimetres	From	To
Casing				
5.08	<input checked="" type="checkbox"/> Plastic <input type="checkbox"/> Concrete <input type="checkbox"/> Galvanized	5.08	0	1.52
5.50	<input checked="" type="checkbox"/> Plastic <input type="checkbox"/> Concrete <input type="checkbox"/> Galvanized	5.08	0	3.048
Screen				
5.50	<input checked="" type="checkbox"/> Plastic <input type="checkbox"/> Concrete <input type="checkbox"/> Galvanized	0.10	3.04	7.62
No Casing or Screen				
<input type="checkbox"/> Open hole				

Test of Well Yield

Pumping test method	Draw Down		Recovery	
	Time min	Water Level Metres	Time min	Water Level Metres
Pump intake set at - (metres)	Static Level			
Pumping rate (litres/min)	1		1	
Duration of pumping (hrs + min)	2		2	
Final water level end of pumping (metres)	3		3	
Recommended pump type <input type="checkbox"/> Shallow <input type="checkbox"/> Deep	4		4	
Recommended pump depth (metres)	5		5	
Recommended pump rate (litres/min)	10		10	
If flowing give rate - (litres/min)	15		15	
If pumping discontinued, give reason.	20		20	
	25		25	
	30		30	
	40		40	
	50		50	
	60		60	

Plugging and Sealing Record Annular space Abandonment

Depth set at - Metres	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
From	To	
0	1.21	Bentonite chips
1.21	4.52	SAND
0	0.91	Bentonite chips
0.91	2.74	backfill Bentonite chips
2.74	7.62	SAND

Method of Construction

Cable Tool Rotary (air) Diamond Digging Rotary (conventional) Air percussion Jetting Other Rotary (reverse) Boring Driving

Water Use

Domestic Industrial Public Supply Other Stock Commercial Not used Cooling & air conditioning Irrigation Municipal

Final Status of Well

Water Supply Recharge well Unfinished Abandoned, (Other) Observation well Abandoned, insufficient supply Dewatering Test Hole Abandoned, poor quality Replacement well

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.

Audit No. **2 26211** Date Well Completed **2005 04 26**

Was the well owner's information package delivered? Yes No Date Delivered **2005 04 26**

Well Contractor/Technician Information

Name of Well Contractor **G.E.T. Drilling LTD** Well Contractor's Licence No. **7085**

Business Address (street name, number, city etc.) **1226 Nepean**

Name of Well Technician (last name, first name) **Marlison, Tim** Well Technician's Licence No. **2251**

Signature of Technician/Contractor **[Signature]** Date Submitted **2005 05 21**

Ministry Use Only

Data Source **7085** Contractor **7085**

Date Received **JUN 16 2005** Date of Inspection **2005 05 21**

Remarks Well Record Number



WATER WELL RECORD

3155W

Water management in Ontario 1. PRINT ONLY IN SPACES PROVIDED

2. CHECK CORRECT BOX WHERE APPLICABLE

11 290 5605

MUNICIP. 29023

CON. C.O.N. 103

COUNTY OR DISTRICT Hastings	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE Wicklow	CON., BLOCK, TRACT, SURVEY, ETC. II	LOT 28
---------------------------------------	--	---	------------------

ADDRESS
[Redacted] **Wynooth, Ont.**

DATE COMPLETED 48-53
DAY **20** MO. **09** YR. **72**

5016217 4 1285 6 25 MAR 21, 1975 249

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
	Top soil			0	1
Brown	med. sand	stones & dry gravel	loose	1	18
Brown	fine sand		packed	18	40
Brown	med. sand	gravel	packed	40	46
Brown	gravel	sand	porous	46	48

31 [Scale]

32 [Scale]

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
10-13	<input checked="" type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 14
04.2-4.8	2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
15-18	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 19
untested	1 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
20-23	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 24
	2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
25-28	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 29
	2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
30-33	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 34
	2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
10-11	<input checked="" type="checkbox"/> STEEL 12		FROM	TO
06	2 <input type="checkbox"/> GALVANIZED	.188	0	0048
17-18	3 <input type="checkbox"/> CONCRETE			
	4 <input type="checkbox"/> OPEN HOLE			
24-25	1 <input type="checkbox"/> STEEL 26			
	2 <input type="checkbox"/> GALVANIZED			
	3 <input type="checkbox"/> CONCRETE			
	4 <input type="checkbox"/> OPEN HOLE			

SCREEN

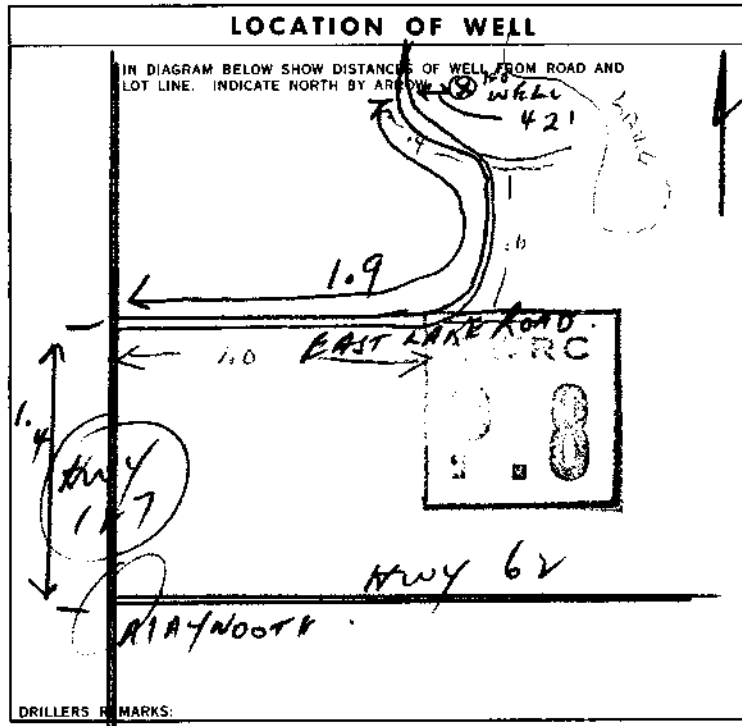
SIZE(S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
	INCHES	FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN	
	INCHES	FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET		MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
FROM	TO	
10-13	14-17	
18-21	22-25	
26-29	30-33	

71 PUMPING TEST

PUMPING TEST METHOD <input checked="" type="checkbox"/> AIR PUMP 3 <input type="checkbox"/> BAILER	PUMPING RATE 0060 GPM.	DURATION OF PUMPING 15-16 HOURS 00 17-18 MINS.
STATIC LEVEL 020 FEET	WATER LEVEL END OF PUMPING 042 FEET	WATER LEVELS DURING
		15 MINUTES 020 FEET
		30 MINUTES 020 FEET
		45 MINUTES 020 FEET
		60 MINUTES 020 FEET
IF FLOWING, GIVE RATE	PUMP INTAKE SET AT 42 GPM.	WATER AT END OF TEST 1 <input checked="" type="checkbox"/> CLEAR 2 <input type="checkbox"/> CLOUDY
RECOMMENDED PUMP TYPE <input type="checkbox"/> SHALLOW <input checked="" type="checkbox"/> DEEP	RECOMMENDED PUMP SETTING 042 FEET	RECOMMENDED PUMPING RATE 0020 GPM.
50-53 002.7 GPM./FT. SPECIFIC CAPACITY		



54 FINAL STATUS OF WELL

56-56 WATER USE

57 METHOD OF DRILLING

NAME OF WELL CONTRACTOR
Faulkner Well Drilling Co. Ltd.

LICENCE NUMBER
2104

ADDRESS
87 Water St., Peterborough, Ont.

NAME OF DRILLER OR BORER
Robert Latchford

LICENCE NUMBER

DATE OF CONTRACTOR
Faulkner

SUBMISSION DATE
DAY **20** MO. **9** YR. **72**

OFFICE USE ONLY

DATA SOURCE
1

CONTRACTOR
2104

DATE RECEIVED
271272

DATE OF INSPECTION

INSPECTOR

REMARKS

P K
WI

XC COPY



WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK CORRECT BOX WHERE APPLICABLE

(11) 2908932 MUNIC. 29.023 CON. 03

COUNTY OR DISTRICT: *01* TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: *Steklow* CON. BLOCK, TRACT, SURVEY ETC: *3* LOT: *028*

DATE COMPLETED: DAY *09* MO *06* YR *78*

RING: *015650* RC: *5* ELEVATION: *1300* RC: *6* BASIN CODE: *26*

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
				0	23
	<i>Stony gravel</i>				
	<i>2 inch sand</i>			23	60
	<i>Gravel</i>		<i>coarse</i>	60	65

31 *0023 12/11 0060 07 0065 31*

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER			
<i>0065</i>	<input checked="" type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERAL
	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERAL
	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERAL
	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERAL
	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERAL

51 CASING & OPEN HOLE RECORD

INS. OF DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
<i>06 1/4</i>	<input checked="" type="checkbox"/> STEEL	<i>0.188</i>	0	<i>0065</i>
	<input type="checkbox"/> GALVANIZED			
	<input type="checkbox"/> CONCRETE			
	<input type="checkbox"/> OPEN HOLE			
	<input type="checkbox"/> STEEL			
	<input type="checkbox"/> GALVANIZED			
	<input type="checkbox"/> CONCRETE			
	<input type="checkbox"/> OPEN HOLE			
	<input type="checkbox"/> STEEL			
	<input type="checkbox"/> GALVANIZED			
	<input type="checkbox"/> CONCRETE			
	<input type="checkbox"/> OPEN HOLE			

SCREEN

SIZE OF OPENING (5/8" NO. 1)

DIAMETER: *34-38* INCHES LENGTH: *39-40* FEET

MATERIAL AND TYPE: _____ DEPTH TO TOP OF SCREEN: _____ FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET	MATERIAL AND TYPE	CEMENT GROUT LEAD PACKER ETC.
<i>10-13</i>		
<i>18-21</i>	<i>Drum Phase</i>	
<i>26-29</i>		

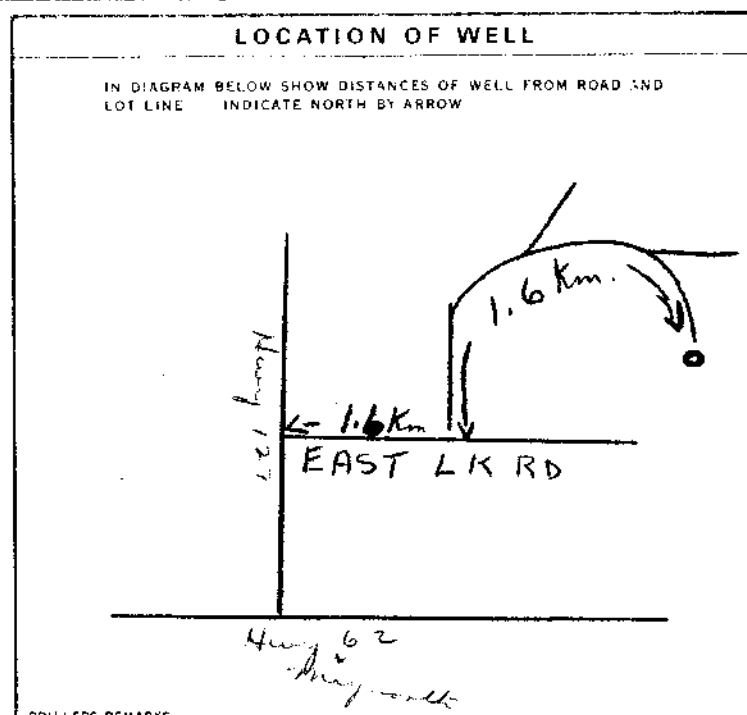
71 PUMPING TEST METHOD

1 PUMP 2 BAILER

PUMPING RATE: *0020* GPM DURATION OF PUMPING: *02* HOURS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING			
<i>020</i> FEET	<i>040</i> FEET	15 MINUTES: <i>040</i> FEET	30 MINUTES: _____ FEET	45 MINUTES: _____ FEET	60 MINUTES: _____ FEET

RECOMMENDED PUMP TYPE: SHALLOW DEEP RECOMMENDED PUMP SETTING: *050* FEET RECOMMENDED PUMPING RATE: *0015* GPM



FINAL STATUS OF WELL

1 WATER SUPPLY 5 ABANDONED - INSUFFICIENT SUPPLY

2 OBSERVATION WELL 6 ABANDONED - POOR QUALITY

3 TEST HOLE 7 UNFINISHED

4 RECHARGE WELL

WATER USE

1 DOMESTIC 5 COMMERCIAL

2 STOCK 6 MUNICIPAL

3 IRRIGATION 7 PUBLIC SUPPLY

4 INDUSTRIAL 8 COOLING OR AIR CONDITIONING

9 OTHER 9 NOT USED

METHOD OF DRILLING

1 CABLE TOOL 6 BORING

2 ROTARY (CONVENTIONAL) 7 DIAMOND

3 ROTARY (REVERSE) 8 JETTING

4 ROTARY (AIR) 9 DRIVING

5 AIR PERCUSSION

CONTRACTOR: *Bernard Marguardt & Son* LICENCE NUMBER: *3610*

ADDRESS: *R.R. 2 Palmer Rapids*

NAME OF DRILLER OR BORE: *Bernard Marguardt* LICENCE NUMBER: _____

SIGNATURE OF CONTRACTOR: *Bernard Marguardt* SUBMISSION DATE: _____

OFFICE USE ONLY

DATA SOURCE: *1* CONTRACTOR: *3610* DATE RECEIVED: *150279*

DATE OF INSPECTION: _____ INSPECTOR: *Km LC/JW*

REMARKS: _____

P

WI

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK CORRECT BOX WHERE APPLICABLE

11 2915252 MUNICIPAL 29023 CON 03

COUNTY OR DISTRICT: Hastings TOWNSHIP, BOROUGH CITY TOWN VILLAGE: Windsor CON. BLOCK TRACT. SURVEY ETC: Con 3 LOT: 28
DATE COMPLETED: DAY 17 MO 7 YR 92
AYWOODS-ONT

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)					
GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
<u>DK BR</u>	<u>Topsoil</u>			<u>8 FT</u>	<u>7.6'</u>
<u>W BR</u>	<u>GRAVEL</u>			<u>7.6</u>	<u>0</u>

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER					
<u>10-15</u>	<input checked="" type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERALS	<input type="checkbox"/> GAS	
<u>15-18</u>	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERALS	<input type="checkbox"/> GAS	
<u>20-23</u>	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERALS	<input type="checkbox"/> GAS	
<u>25-28</u>	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERALS	<input type="checkbox"/> GAS	
<u>30-33</u>	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERALS	<input type="checkbox"/> GAS	

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
<u>10-11</u>	<input type="checkbox"/> STEEL <input checked="" type="checkbox"/> GALVANIZED <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OPEN HOLE <input type="checkbox"/> PLASTIC	<u>4"</u>	<u>10</u>	<u>11</u>
<u>17-18</u>	<input type="checkbox"/> STEEL <input type="checkbox"/> GALVANIZED <input type="checkbox"/> CONCRETE <input type="checkbox"/> OPEN HOLE <input type="checkbox"/> PLASTIC		<u>17</u>	<u>18</u>
<u>24-25</u>	<input type="checkbox"/> STEEL <input type="checkbox"/> GALVANIZED <input type="checkbox"/> CONCRETE <input type="checkbox"/> OPEN HOLE <input type="checkbox"/> PLASTIC		<u>24</u>	<u>25</u>

SCREEN

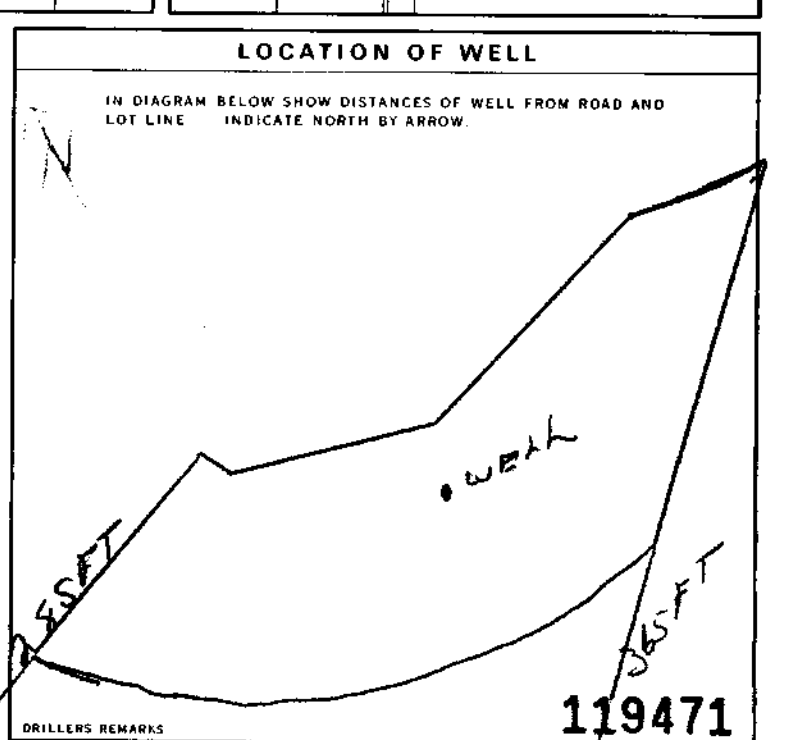
SIZE(S) OF OPENING (SLOT NO. 1)	DIAMETER INCHES	LENGTH FEET
	<u>34-38</u>	<u>99-100</u>
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN: <u>41-44</u> FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET	MATERIAL AND TYPE	CEMENT GROUT LEAD PACKER ETC.
<u>10-13</u>	<u>14-17</u>	
<u>18-21</u>	<u>22-25</u>	
<u>28-29</u>	<u>30-33</u>	

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
<input checked="" type="checkbox"/> PUMP <input type="checkbox"/> BAILEY	<u>15</u> GPM	<u>15</u> HOURS
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING
<u>19-21</u> FEET	<u>0</u> FEET	15 MINUTES: <u>2</u> FEET 30 MINUTES: <u>3</u> FEET 45 MINUTES: <u>3</u> FEET 60 MINUTES: <u>4</u> FEET
IF FLOWING GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
	<u>38-41</u> GPM	<u>42</u> FEET
RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
<input checked="" type="checkbox"/> SHALLOW <input type="checkbox"/> DEEP		<u>46-49</u> GPM



FINAL STATUS OF WELL

<input checked="" type="checkbox"/> WATER SUPPLY	<input type="checkbox"/> ABANDONED, INSUFFICIENT SUPPLY
<input type="checkbox"/> OBSERVATION WELL	<input type="checkbox"/> ABANDONED POOR QUALITY
<input type="checkbox"/> TEST HOLE	<input type="checkbox"/> UNFINISHED
<input type="checkbox"/> RECHARGE WELL	<input type="checkbox"/> DEWATERING

WATER USE

<input checked="" type="checkbox"/> DOMESTIC	<input type="checkbox"/> COMMERCIAL
<input type="checkbox"/> STOCK	<input type="checkbox"/> MUNICIPAL
<input type="checkbox"/> IRRIGATION	<input type="checkbox"/> PUBLIC SUPPLY
<input type="checkbox"/> INDUSTRIAL	<input type="checkbox"/> COOLING OR AIR CONDITIONING
<input type="checkbox"/> OTHER	<input type="checkbox"/> NOT USED

METHOD OF CONSTRUCTION

<input type="checkbox"/> CABLE TOOL	<input type="checkbox"/> BORING
<input type="checkbox"/> ROTARY (CONVENTIONAL)	<input type="checkbox"/> DIAMOND
<input type="checkbox"/> ROTARY (REVERSE)	<input type="checkbox"/> JETTING
<input type="checkbox"/> ROTARY (AIR)	<input type="checkbox"/> DRIVING
<input type="checkbox"/> AIR PERCUSSION	<input checked="" type="checkbox"/> DIGGING <input type="checkbox"/> OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: A.W. PETERS CONTRACTING WELL CONTRACTOR'S LICENCE NUMBER: 6270
ADDRESS: Box 55, MA, WOODH. ONT
NAME OF WELL TECHNICIAN: A.W. PETERS WELL TECHNICIAN'S LICENCE NUMBER: 11246
SIGNATURE OF TECHNICIAN/CONTRACTOR: [Signature] SUBMISSION DATE: DAY 19 MO 7 YR 92

OFFICE USE ONLY

DATA SOURCE: 6270 CONTRACTOR: 6270 DATE RECEIVED: JUL 22 1992
DATE OF INSPECTION: _____ INSPECTOR: _____
REMARKS: _____

CSS.ES

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

11

2917418

Municipality 29023 Con. CAN. 03

County or District: [Redacted] Township/Borough/City/Town/Village: **WICKLOW** Con block tract survey, etc. Lot: **28**
Address: **2150 BROMSGROVE RD APT 1007 MISSISSAUGA L5L 4G3** Date completed: **28 / 97**

Northing RC Elevation RC Basin Code

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)					
General colour	Most common material	Other materials	General description	Depth - feet	
				From	To
BROWN	GRAVEL	SAND	COARSE PIT RUN	0	32
GREY	SAND	SILT	FINE, LOOSE	32	49
"	"	"	" FIRM	49	71
"	"	"	fractured rock cobbles, Rough	71	73 1/2
GREY	GRANITE		AVERAGE	73 1/2	80
GREY, BLK	"	LARGE FRACTURE		80	81
GREY	"		AVERAGE	81	81 1/2

31
32

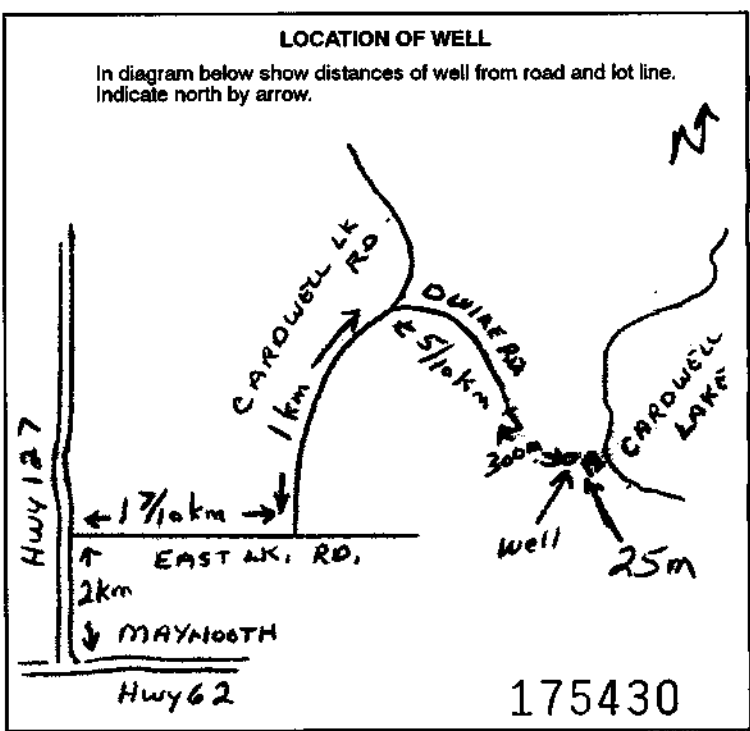
41 WATER RECORD			
Water found at - feet	Kind of water		
80-81	<input type="checkbox"/> Fresh <input type="checkbox"/> Salty	<input type="checkbox"/> Sulphur <input checked="" type="checkbox"/> Minerals <input type="checkbox"/> Gas	

51 CASING & OPEN HOLE RECORD				
Inside diam inches	Material	Wall thickness inches	Depth - feet	
			From	To
6 1/4	Steel	.188	71 1/2	78 1/2
5 7/8	Galvanized Concrete Open hole Plastic		78 1/2	81

SCREEN	Sizes of opening (Slot No.)	Diameter inches	Length feet

61 PLUGGING & SEALING RECORD			
Depth set at - feet		Material and type (Cement grout, bentonite, etc.)	
From	To		
0	20	PORTLAND	
20	60	Bentonite	

71 PUMPING TEST			
Pumping test method	Pumping rate	Duration of pumping	
<input checked="" type="checkbox"/> Pump	AIRBO 15 GPM	7	15
Static level	Water level end of pumping	Water levels during	Recovery
4 feet	8 feet	15 min: 6 feet 30 min: 6 1/2 feet 45 min: 7 feet 60 min: 7 1/2 feet	
If flowing give rate	Pump intake set at	Water at end of test	
	15 feet	Clear <input checked="" type="checkbox"/> Cloudy <input type="checkbox"/>	
Recommended pump type	Recommended pump setting	Recommended pump rate	
SUBM	30 feet	10 GPM	



FINAL STATUS OF WELL			
<input checked="" type="checkbox"/> Water supply	<input type="checkbox"/> Abandoned, insufficient supply	<input type="checkbox"/> Unfinished	
<input type="checkbox"/> Observation well	<input type="checkbox"/> Abandoned, poor quality	<input type="checkbox"/> Replacement well	
<input type="checkbox"/> Test hole	<input type="checkbox"/> Abandoned (Other)		
<input type="checkbox"/> Recharge well	<input type="checkbox"/> Dewatering		
WATER USE			
<input checked="" type="checkbox"/> Domestic	<input type="checkbox"/> Commercial	<input type="checkbox"/> Not used	
<input type="checkbox"/> Stock	<input type="checkbox"/> Municipal	<input type="checkbox"/> Other	
<input type="checkbox"/> Irrigation	<input type="checkbox"/> Public supply		
<input type="checkbox"/> Industrial	<input type="checkbox"/> Cooling & air conditioning		
METHOD OF CONSTRUCTION			
<input checked="" type="checkbox"/> Cable tool	<input checked="" type="checkbox"/> Air percussion	<input type="checkbox"/> Driving	
<input type="checkbox"/> Rotary (conventional)	<input type="checkbox"/> Boring	<input type="checkbox"/> Digging	
<input type="checkbox"/> Rotary (reverse)	<input type="checkbox"/> Diamond	<input type="checkbox"/> Other	
<input type="checkbox"/> Rotary (air)	<input type="checkbox"/> Jetting		

Name of Well Contractor EARL V. MARQUARDT & SON INC	Well Contractor's Licence No. 3611
Address RR1 Box 86 PALMER RAPIDS ON. K0J-2E0	
Name of Well Technician TERRY MARQUARDT	Well Technician's Licence No. T0062
Signature of Technician/Contractor <i>Terry Marquardt</i>	Submission date 30 4 97

MINISTRY USE ONLY	Data source	3611	Date received	MAY 07 1997
	Date of inspection		Inspector	
	Remarks			

CSS. S

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

2917442

Municipality: 29023 Con: CON 04

County or District: [Redacted] Township/Borough/City/Town/Village: **WICKLOW** Con block tract survey, etc.: **4** Lot: **28**
Address: **446 - Monk St** Date completed: **20 5 97**
COBOURG ON K9A-2S8

General colour	Most common material	Other materials	General description	Depth - feet	
				From	To
BROWN	GRAVEL	SAND	COARSE	0	24
GREY	SAND		FINE	24	44
GREY	CLAY	SAND, BOULDERS	PACKED HARD	44	72
GREY, RED	BOULDER			72	76
GREY	CLAY	SAND, COUBLES	HARD PACKED	76	172
GREY, RED	GRANITE		AVERAGE, to SOFT	172	206
RED	"		1 SOFT	206	218
RED, GREY	"		AVERAGE	218	240
"	"		POROUS SEAMY	240	245

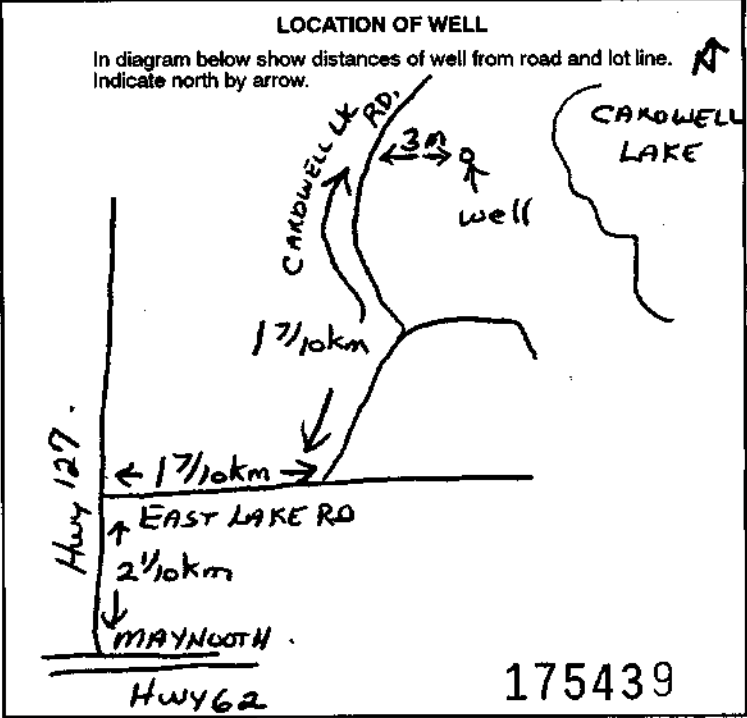
WATER RECORD	
Water found at - feet	Kind of water
240	1 <input type="checkbox"/> Fresh 3 <input type="checkbox"/> Sulphur 2 <input checked="" type="checkbox"/> Salty 4 <input checked="" type="checkbox"/> Minerals 5 <input type="checkbox"/> Gas 6 <input type="checkbox"/> Gas
	7 <input type="checkbox"/> Fresh 8 <input type="checkbox"/> Sulphur 9 <input type="checkbox"/> Salty 10 <input type="checkbox"/> Minerals 11 <input type="checkbox"/> Gas 12 <input type="checkbox"/> Gas
	13 <input type="checkbox"/> Fresh 14 <input type="checkbox"/> Sulphur 15 <input type="checkbox"/> Salty 16 <input type="checkbox"/> Minerals 17 <input type="checkbox"/> Gas 18 <input type="checkbox"/> Gas
	19 <input type="checkbox"/> Fresh 20 <input type="checkbox"/> Sulphur 21 <input type="checkbox"/> Salty 22 <input type="checkbox"/> Minerals 23 <input type="checkbox"/> Gas 24 <input type="checkbox"/> Gas
	25 <input type="checkbox"/> Fresh 26 <input type="checkbox"/> Sulphur 27 <input type="checkbox"/> Salty 28 <input type="checkbox"/> Minerals 29 <input type="checkbox"/> Gas 30 <input type="checkbox"/> Gas
	31 <input type="checkbox"/> Fresh 32 <input type="checkbox"/> Sulphur 33 <input type="checkbox"/> Salty 34 <input type="checkbox"/> Minerals 35 <input type="checkbox"/> Gas 36 <input type="checkbox"/> Gas

CASING & OPEN HOLE RECORD				
Inside diam inches	Material	Wall thickness inches	Depth - feet	
			From	To
6 1/4	1 <input checked="" type="checkbox"/> Steel 2 <input type="checkbox"/> Galvanized 3 <input type="checkbox"/> Concrete 4 <input type="checkbox"/> Open hole 5 <input type="checkbox"/> Plastic	.188	+2	179
5 1/16	1 <input type="checkbox"/> Steel 2 <input type="checkbox"/> Galvanized 3 <input checked="" type="checkbox"/> Concrete 4 <input type="checkbox"/> Open hole 5 <input type="checkbox"/> Plastic			179 245
	1 <input type="checkbox"/> Steel 2 <input type="checkbox"/> Galvanized 3 <input type="checkbox"/> Concrete 4 <input type="checkbox"/> Open hole 5 <input type="checkbox"/> Plastic			27-30

SCREEN	Sizes of opening (Slot No.)	Diameter inches	Length feet

PLUGGING & SEALING RECORD			
Annular space		Abandonment	
From	To	Material and type (Cement grout, bentonite, etc.)	
10-13	40-47	PORTLAND	
18-21	22-25	BENTONITE	

PUMPING TEST	
Pumping test method	Pumping rate
1 <input type="checkbox"/> Pump 2 <input checked="" type="checkbox"/> Bailor	7 GPM
Duration of pumping: 1 Hours 15 Mins	
Static level: 0 feet	Water level end of pumping: 245 feet
Water levels during pumping:	15 minutes: 206 feet
	30 minutes: 139 feet
	45 minutes: 84 feet
	60 minutes: 37 feet
Flowing give rate: 1/5 GPM	Pump intake set at: 245 AIR feet
Recommended pump type: <input checked="" type="checkbox"/> Deep	Recommended pump setting: 175 feet
	Recommended pump rate: 5 GPM



FINAL STATUS OF WELL

1 Water supply 5 Abandoned, insufficient supply 9 Unfinished
2 Observation well 6 Abandoned, poor quality 10 Replacement well
3 Test hole 7 Abandoned (Other)
4 Recharge well 8 Dewatering

WATER USE

1 Domestic 5 Commercial 9 Not used
2 Stock 6 Municipal 10 Other
3 Irrigation 7 Public supply
4 Industrial 8 Cooling & air conditioning

METHOD OF CONSTRUCTION

1 Cable tool 5 Air percussion 9 Driving
2 Rotary (conventional) 6 Boring 10 Digging
3 Rotary (reverse) 7 Diamond
4 Rotary (air) 8 Jetting

Name of Well Contractor: EARL V. MARQUARDT & SON INC	Well Contractor's Licence No.: 3611	Date received: JUN 13 1997
Address: RR1 Box 86 PALMER RAPIDS ONT K0J-2E0	Inspector: [Signature]	Remarks: [Signature]
Name of Well Technician: TERRY MARQUARDT	Well Technician's Licence No.: T0062	
Signature of Technician/Contractor: [Signature]	Submission date: 28 5 97	

Address of Well Location (Street Number/Name) 368 Cardwell Lake Road		Township Hastings Highlands	Lot 28	Concession 4
County/District/Municipality Hastings		City/Town/Village	Province Ontario	Postal Code
UTM Coordinates NAD 83	Zone 18	Easting 270394	Northing 5016775	Municipal Plan and Sublot Number
Other				

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)				
General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From To
brown	coarse gravel - sand			0' 42'
brown	boulders - clay - quicksand			42' 194'
red / grey	granite		soft	194' 280'

Annular Space		
Depth Set at (m/ft) From To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0' 20'	bentonite slurry	2 bags
0' 20'	H plug	2 bags

Method of Construction	Well Use
<input type="checkbox"/> Cable Tool <input checked="" type="checkbox"/> Rotary (Conventional) <input type="checkbox"/> Rotary (Reverse) <input type="checkbox"/> Boring <input type="checkbox"/> Air percussion <input type="checkbox"/> Other, specify _____	<input type="checkbox"/> Diamond <input type="checkbox"/> Jetting <input type="checkbox"/> Driving <input type="checkbox"/> Digging <input type="checkbox"/> Public <input checked="" type="checkbox"/> Domestic <input type="checkbox"/> Livestock <input type="checkbox"/> Irrigation <input type="checkbox"/> Industrial <input type="checkbox"/> Other, specify _____

Construction Record - Casing			Status of Well	
Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From To	<input type="checkbox"/> Water Supply <input type="checkbox"/> Replacement Well <input type="checkbox"/> Test Hole <input type="checkbox"/> Recharge Well <input type="checkbox"/> Dewatering Well <input type="checkbox"/> Observation and/or Monitoring Hole <input type="checkbox"/> Alteration (Construction) <input type="checkbox"/> Abandoned, Insufficient Supply <input type="checkbox"/> Abandoned, Poor Water Quality <input type="checkbox"/> Abandoned, other, specify _____ <input type="checkbox"/> Other, specify _____
6 1/4"	steel	.188"	+ 2' 196'	

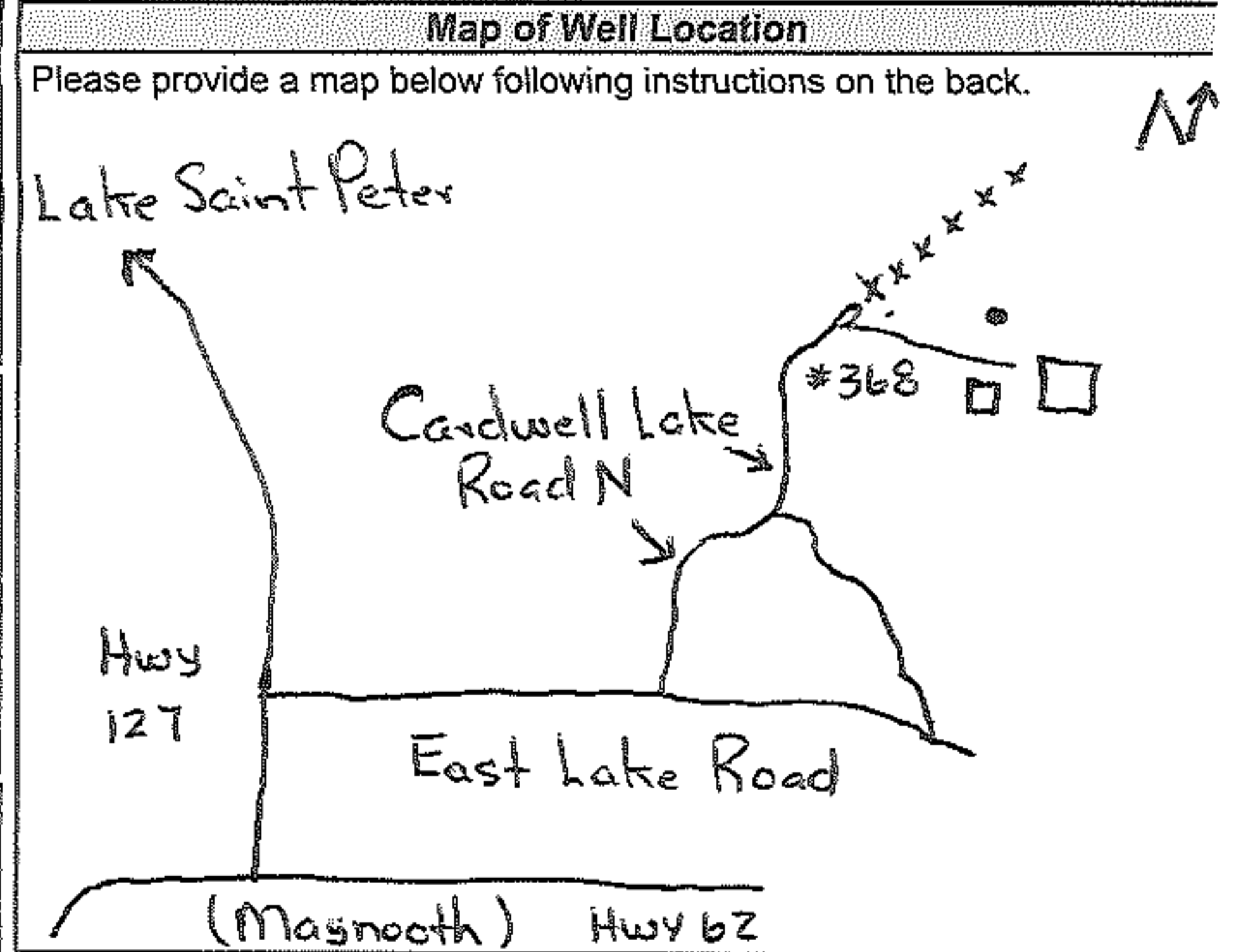
Construction Record - Screen			Status of Well
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	

Water Details		Hole Diameter	
Water found at Depth (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	Depth (m/ft) From To	Diameter (cm/in)
243'	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify _____	0' 196'	10"
261'	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify _____	196' 280'	5 7/8"

Well Contractor and Well Technician Information		
Business Name of Well Contractor Bernard Marquardt & Son Ltd.		Well Contractor's Licence No. 3 6 5 1
Business Address (Street Number/Name) 8 Crescent Drive, RR# 1		Municipality Palmer Rapids
Province ON	Postal Code K 0 J 2 E 0	Business E-mail Address info@cleandrinkingwater.ca

Bus. Telephone No. (inc. area code) 6 1 3 7 5 8 2 2 3 8	Name of Well Technician (Last Name, First Name) Marquardt, Brad
Well Technician's Licence No. 2 7 8 1	Signature of Technician and/or Contractor <i>Brad Marquardt</i>
Date Submitted 20180914	

Results of Well Yield Testing					
After test of well yield, water was:		Draw Down		Recovery	
<input type="checkbox"/> Clear and sand free <input type="checkbox"/> Other, specify _____		Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
If pumping discontinued, give reason:		Static Level	36' 1"		
Pump intake set at (m/ft) 250'		1	40' 2"	1	115' 9"
Pumping rate (l/min / GPM) 3 1/2 gpm		2	43' 5"	2	112' 8"
Duration of pumping 1 hrs + min		3	46'	3	109' 9"
Final water level end of pumping (m/ft) 119' 6"		4	48' 4"	4	107' 1"
If flowing give rate (l/min / GPM)		5	50' 8"	5	104' 8"
Recommended pump depth (m/ft) 250'		10	61' 2"	10	92' 7"
Recommended pump rate (l/min / GPM) 3 1/2 gpm		15	70' 1"	15	80' 9"
Well production (l/min / GPM) 5 gpm		20	78'	20	72' 3"
Disinfected? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		25	85'	25	64' 1"
		30	91' 4"	30	56' 7"
		40	102' 4"	40	42' 8"
		50	111' 5"	50	37' 1"
		60	119' 6"	60	36' 1"



Comments:
Distance from property line 42'
Distance from house 76' Distance from road 66'

Well owner's information package delivered <input type="checkbox"/> Yes <input type="checkbox"/> No	Date Package Delivered Y Y Y Y M M D D 2 0 1 8 0 8 1 3	Ministry Use Only Audit No. 2292840 SEP 10 2018 Received
--	--	---

Address of Well Location (Street Number/Name) 392 EAST LAKE RD		Township WICKLOW	Lot 29	Concession Z
County/District/Municipality HASTINGS		City/Town/Village MAYNOOTH	Province Ontario	Postal Code
UTM Coordinates Zone NAD 83	Easting 18270525	Northing 5015230	Municipal Plan and Sublot Number	Other

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)					
General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft)	
				From	To
BROWN	SAND, GRAVEL	SILT	FINE	0	40
GREY	CLAY	STONES	HOODPAN	40	138.4
GREY	GRANITE		BEDROCK	134	260

Annular Space			
Depth Set at (m/ft)	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)	
From	To		
0	136	BENTONITE SLURRY	34 FT³

Method of Construction		Well Use		
<input type="checkbox"/> Cable Tool	<input type="checkbox"/> Diamond	<input type="checkbox"/> Public	<input type="checkbox"/> Commercial	<input type="checkbox"/> Not used
<input checked="" type="checkbox"/> Rotary (Conventional)	<input type="checkbox"/> Jetting	<input checked="" type="checkbox"/> Domestic	<input type="checkbox"/> Municipal	<input type="checkbox"/> Dewatering
<input type="checkbox"/> Rotary (Reverse)	<input type="checkbox"/> Driving	<input type="checkbox"/> Livestock	<input type="checkbox"/> Test Hole	<input type="checkbox"/> Monitoring
<input type="checkbox"/> Boring	<input type="checkbox"/> Digging	<input type="checkbox"/> Irrigation	<input type="checkbox"/> Cooling & Air Conditioning	
<input checked="" type="checkbox"/> Air percussion		<input type="checkbox"/> Industrial		
<input type="checkbox"/> Other, specify _____		<input type="checkbox"/> Other, specify _____		

Construction Record - Casing				Status of Well	
Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)		<input checked="" type="checkbox"/> Water Supply <input type="checkbox"/> Replacement Well <input type="checkbox"/> Test Hole <input type="checkbox"/> Recharge Well <input type="checkbox"/> Dewatering Well <input type="checkbox"/> Observation and/or Monitoring Hole <input type="checkbox"/> Alteration (Construction) <input type="checkbox"/> Abandoned, Insufficient Supply <input type="checkbox"/> Abandoned, Poor Water Quality <input type="checkbox"/> Abandoned, other, specify _____ <input type="checkbox"/> Other, specify _____
			From	To	
6 1/4"	STEEL	1.88	+2	136	
6"	OPEN HOLE		136	260	

Construction Record - Screen				Status of Well	
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)		
			From	To	

Water Details		Hole Diameter	
Water found at Depth (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	Depth (m/ft)	Diameter (cm/in)
		From	To
257	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify _____	0	9"
		134	6"
		134	260

Well Contractor and Well Technician Information			
Business Name of Well Contractor JOE LEGGE & SONS		Well Contractor's Licence No. 71052	
Business Address (Street Number/Name) RR#3		Municipality BANBROFT	
Province ONT	Postal Code K0L1C0	Business E-mail Address	
Bus. Telephone No. (inc. area code) 6133392025	Name of Well Technician (Last Name, First Name) LEGGE JOE		
Well Technician's Licence No. 1879	Signature of Technician and/or Contractor J Legge	Date Submitted YYYYMMDD	

Results of Well Yield Testing				
After test of well yield, water was: <input checked="" type="checkbox"/> Clear and sand free <input type="checkbox"/> Other, specify _____	Draw Down		Recovery	
	Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
If pumping discontinued, give reason: Pump intake set at (m/ft) 178.2 Pumping rate (l/min / GPM) 15 Duration of pumping 1 hrs + 0 min Final water level end of pumping (m/ft) 178.2 If flowing give rate (l/min / GPM)	Static Level	63.4		178.2
	1	68.9	1	167.8
	2	77.5	2	162.0
	3	85.9	3	156.7
	4	93.7	4	151.3
	5	101	5	146.1
	10	133.5	10	120.2
	15	158.3	15	100.1
	20	178.2	20	84.7
	25	11	25	72.5
	30	11	30	66.5
	40	11	40	63.4
	50	11	50	11
	60	178.2	60	63.4
Recommended pump depth (m/ft) 240				
Recommended pump rate (l/min / GPM) 10				
Well production (l/min / GPM) 7				
Disinfected? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				

Map of Well Location	
Please provide a map below following instructions on the back.	
Comments:	

Well owner's information package delivered		Date Package Delivered		Ministry Use Only	
<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	YY	YY	MM	DD
Date Work Completed		20	19	08	01
		YY	YY	MM	DD
		Audit No. Z303307			
		AUG 23 2019			
		Received			

Measurements recorded in: Metric Imperial

Address of Well Location (Street Number/Name): **511 EAST LK RD** Township: **HASTINGS HIGHLANDS** Lot: Concession:

County/District/Municipality: **HASTINGS** City/Town/Village: **MAYNOOTH** Province: **Ontario** Postal Code:

UTM Coordinates Zone: Easting: Northing: **NAD 83 18 270 889 501 5669** Municipal Plan and Sublot Number: Other:

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BROWN	SAND	GRAVEL	PACKED	0	14
GREY	SILTY SAND	CLAY	SOFT	14	80
GREY	GRAVEL SAND	CLAY	PACKED	80	88
GRAY	GRANITE		BEDROCK	88	100

Annular Space

Depth Set at (m/ft) From	Depth Set at (m/ft) To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	88	BENTONITE SLURRY	21 FT³

Method of Construction:

Cable Tool Diamond Public Commercial Not used

Rotary (Conventional) Jetting Domestic Municipal Dewatering

Rotary (Reverse) Driving Livestock Test Hole Monitoring

Boring Digging Irrigation Cooling & Air Conditioning

Air percussion Industrial Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)	
			From	To
6 1/4"	STEEL	.188	12	88
6"	OPEN HOLE		88	100

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)	
			From	To

Water Details

Water found at Depth (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	Depth (m/ft) From	Depth (m/ft) To	Hole Diameter (cm/in)
8-10	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify	0	88	10"
	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify	88	100	6"

Well Contractor and Well Technician Information

Business Name of Well Contractor: **JOE LEGGE & SONS** Well Contractor's Licence No.: **7052**

Business Address (Street Number/Name): **RR#3** Municipality: **BANKROFT**

Province: **ONT** Postal Code: **K0L1C9** Business E-mail Address:

Business Telephone No. (inc. area code): **5133392025** Name of Well Technician (Last Name, First Name): **LEGGE JT.**

Well Technician's Licence No.: **4115** Signature of Technician and/or Contractor: *J. Legge* Date Submitted: **Y Y Y Y M M D D**

Draw Down and Recovery

Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
Static Level	8.8		9.1
1	9.0	1	9.0
2	9.0	2	"
3	9.1	3	"
4	"	4	"
5	"	5	"
10	9	10	"
15	"	15	"
20	"	20	8.8
25	"	25	"
30	"	30	"
40	"	40	"
50	"	50	"
60	9.1	60	8.8

After test of well yield, water was: Clear and sand free Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft): **40**

Pumping rate (l/min / GPM): **12**

Duration of pumping: **36** hrs + min

Final water level end of pumping (m/ft): **9.1**

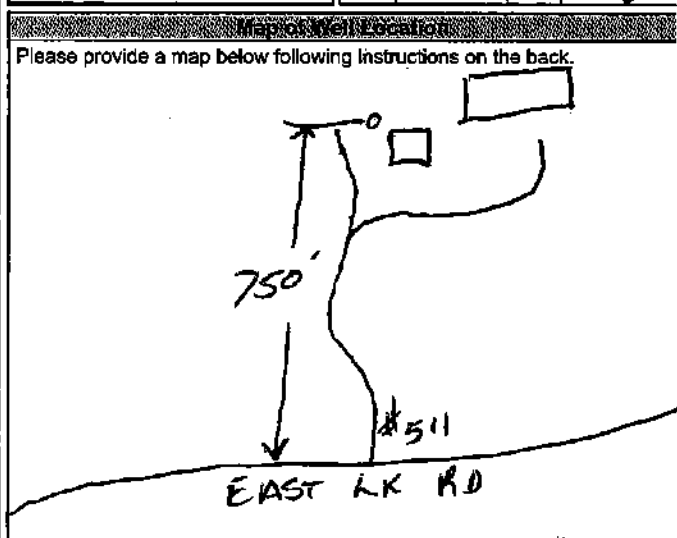
If flowing give rate (l/min / GPM):

Recommended pump depth (m/ft): **30**

Recommended pump rate (l/min / GPM): **10**

Well production (l/min / GPM): **12 +**

Disinfected? Yes No



Comments:

Well owner's information package delivered: Yes No

Date Package Delivered: **Y Y Y Y M M D D**

Date Work Completed: **2020 06 03**

Ministry Use Only

Audit No.: **Z303295**

Received: **JUN 26 2020**

Appendix C

C-2 Monitoring Well Logs

Project No: 06-1066

Monitoring Well: EL 1

Project: East Lake Landfill Site

Client: Municipality of Hastings Highlands

Location:

Depth	Symbol	Description	Elev.	Sample ID	Type	Recovery	Well Data	Remarks
-2 ft 0 m		Ground Surface	0.762					
1 2 3 4 5		Sand Fine grain, medium brown, dry						
6 7 8 9 10 11 12 13 14 15 16 17		Cobble Mixed with medium brown sand, dry	-2.29					
			-5.33					

Drill Method: Machine Auger

Drill Date: April 26, 2005

Hole Size:

Quinte-Eco Consultants
RR #7, Box 400
Belleville, Ontario
K8N 4Z7

Datum:

Checked by:

Sheet: 1 of 1



Project No.: 190495-04
Client: Municipality of Hastings Highlands
Report: 2019 Monitoring Well Installations
Site Address: East Lake W.D.S.
 59 Cardwell Lake Rd., Maynooth, Ontario

Well ID: ELMW2R

Elevation Ground: 417.46 m
 TOP: 418.22 m

UTM NAD83 (Zone 18T): 5015893 N
 270068 E

SUBSURFACE PROFILE				SAMPLE					WELL COMPLETION					
Depth (m)	Symbol	Description	Depth (m) / Elev. (m.a.s.l.)	Sample ID	Type	Blow Counts	Recovery (%)	Lab Analysis	Headspace Vapour Level (ppm)				Construction	Notes
									10	100	1000	10000		
0		Ground Surface	0.00 / 417.46										4 in. sq. steel monument with lock PVC Stickup = 0.76m	
0		Boulders and Cobbles Granitic, some rusty brown, damp sand.		AU1										
0.91			0.91 / 416.55											
1		Sand Light brown, damp, fine to medium grained, some gravel and cobbles.		AU2										
3		- very dense, greyish brown, fine to medium grained, some gravel, cobbles.		SS1		13 29 31 36	79							
6		- grey, wet,		SS2		32 for 5"	20							
7		- grey, wet, fine, trace gravel.		SS3		8 42 40 32	25							
8.43				SS4		19 90	25							
9.95				SS5		18 40 69	50							
10.40		End of well at 10.40 m	10.40 / 407.06											
11		Well Completion Details: Screened interval from 8.43 m to 9.95 m below surface Elevation at top of pipe (TOP) = 418.22 m											1.52m x 50mm slot 10 PVC screen within No. 2 silica sand pack bentonite gravel seal native soil collapse	

BH MW OB LOG V1.0 190495-04 EAST LAKE.GPJ WESA TEMPLATE V1.2.GDT 20-3-5

Drill Date: 2019 September 25
Drilled By: Orbit Garant
Drilling Method: Mud Rotary
Hole Diameter: 0.11 m (OD)
Logged By: B.A.
Checked By: B.M.

Notes: AUGER SAMPLE SPLIT SPOON

Sheet
 1 of 1



Well ID: ELMW3

Project No.: 190495-04
Client: Municipality of Hastings Highlands
Report: 2019 Monitoring Well Installations
Site Address: East Lake W.D.S.
 59 Cardwell Lake Rd., Maynooth, Ontario

Elevation Ground: 403.86 m
 TOP: 404.41 m

UTM NAD83 (Zone 18T): 5016002 N
 270232 E

SUBSURFACE PROFILE				SAMPLE				WELL COMPLETION						
Depth (m)	Symbol	Description	Depth (m) / Elev. (m.a.s.l.)	Sample ID	Type	Blow Counts	Recovery (%)	Lab Analysis	Headspace Vapour Level (ppm)				Construction	Notes
									10	100	1000	10000		
0		Ground Surface	0.00 / 403.86										4 in. sq. steel monument with lock PVC Stickup = 0.55m	
0-2.43		Boulders and Cobbles Light brown, some fine to medium grained sand.		AU1										
2.43-3.05		Sand Light grey, fine grained, trace shells.	2.43 / 401.43											
3.05-3.96		Boulders - granitic.	3.05 / 400.81											
3.96-4.00		Sand Dense, grey, wet, fine grained, some silt.	3.96 / 399.90	SS1		12 20 50 for 1"	54							
4.00-6.00		- fine to medium grained, some gravel.		SS2		16 17 23 20	54							
6.00-7.00		- fine grained, some gravel.		SS3		30 22 25 19	58							
7.00-8.53		- cobbles and boulders.												
8.53-11.58		- fine to medium grained, some gravel, some cobbles.		SS4		16 50 for 1"								
11.58-11.76		Sand Till Very dense, grey, moist, fine grained. End of well at 11.76 m	11.58 / 392.28	SS5		50 50 for 1"								
11.76-12.00		Well Completion Details: Screened interval from 8.53 m to 11.58 m below surface Elevation at top of pipe (TOP) = 404.41 m												3.05m x 50mm slot 10 PVC screen within No. 2 silica sand pack

BH MW OB LOG V1.0 190495-04 EAST LAKE.GPJ WESA TEMPLATE V1.2.GDT 20-3-5

Drill Date: 2019 September 27
Drilled By: Orbit Garant
Drilling Method: Mud Rotary
Hole Diameter: 0.11 m (OD)
Logged By: B.A.
Checked By: B.M.

Notes: AUGER SAMPLE SPLIT SPOON



Well ID: ELMW4

Project No.: 190495-04
Client: Municipality of Hastings Highlands
Report: 2019 Monitoring Well Installations
Site Address: East Lake W.D.S.
 59 Cardwell Lake Rd., Maynooth, Ontario

Elevation Ground: 403.63 m
 TOP: 404.44 m

UTM NAD83 (Zone 18T): 5015954 N
 270222 E

SUBSURFACE PROFILE				SAMPLE					WELL COMPLETION					
Depth (m)	Symbol	Description	Depth (m) / Elev. (m.a.s.l.)	Sample ID	Type	Blow Counts	Recovery (%)	Lab Analysis	Headspace Vapour Level (ppm)				Construction	Notes
									10	100	1000	10000		
0		Ground Surface	0.00 / 403.63											4 in. sq. steel monument with lock PVC Stickup = 0.81m
0 - 2.44		Sand Dense, brown, some cobbles.		AU1										
2.44 - 5.49		Sandy Silt Very dense, grey, some cobbles	2.44 / 401.19	SS1		21 27 16 18								
5.49 - 14.60		Silty Sand Very dense, fine grained, some cobbles. - grey. - grey, trace clay.	5.49 / 398.14	SS2		35 50 for 5"								
14.60 - 24.38		Sand Till Very dense, grey, coarse, some silt.	14.60 / 389.03	SS5		50 for 6"								
24.38 - 27		End of well at 24.38 m Well Completion Details: Screened interval from 15.24 m to 21.34 m below surface Elevation at top of pipe (TOP) = 404.44 m	24.38 / 379.25	SS6		50 for 6"								6.1 m x 50mm slot 10 PVC screen within No. 2 silica sand pack

BH MW OB LOG V1.0 190495-04 EAST LAKE.GPJ WESA TEMPLATE V1.2.GDT 20-3-5

Drill Date: 2019 October 1
Drilled By: Orbit Garant
Drilling Method: Mud Rotary
Hole Diameter: 0.11 m (OD)
Logged By: A.B.
Checked By: B.M.

Notes: AUGER SAMPLE SPLIT SPOON

Sheet
1 of 1



Monitoring Well ID: EL-MW5.1-21

Project No.: 210217-03
Client: Municipality of Hastings Highlands
Report: East Lake WDS
Site Address: 59 Cardwell Lake Road
 Maynooth, ON

Elevation Ground: 395.11 m
 TOP: 395.98 m

UTM NAD-83 (Zone 18): 5016010.000 N
 270380.000 E

SUBSURFACE PROFILE				SAMPLE						WELL COMPLETION		
Depth (m)	Elevation (m)	Symbol	Description	Depth (m) / Elev. (m.a.s.l.)	Type	Recovery (%)	Blow Counts	Sample ID	Lab Analysis	Headspace Vapour Level PID IBL ▲ ppm	Construction	Notes
-1	396									0 0 0 0	J-Plug	
0	395		Ground Surface	0.0 395.1							Monument Well Casing	
0	395		GRAVELLY SAND Brown sand and gravel									
1	394											
2	393			4.6							2.40 m bgs (392.71 m)	
3	392											
4	391										Granular Drainage Layer	
4.6	390.5			4.6 390.5								
5	390		SAND & GRAVEL Brown/grey sand, gravel, cobbles, trace amount of boulders									
6	389											
7	388											
8	387			7.9							Bentonite Seal	
9	386											
10	385											
11	384										Silica Sand Filter	
11	384										50 mm 010 Slot PVC Screen	
12	383											
12.5	382.6			12.5 382.6								
13	382		Observations made from augurs, descending cyclone and mudwash tub. EOH at 12.5 mbgs.									

BH MW OB LOG 210217-03 MW5.1-21 & MW5.2-21.GPJ BLUMETRIC STANDARD.GDT 22-2-1

Drill Date: 2021 September 21
Drilled By: Orbit Garant Drilling
Drilling Method: Tri-Cone

Hole Diameter (OD): 0.05 m
Logged By: BM
Checked By: IO

Perched Groundwater Strike / Unstabilized Groundwater Level
 True Groundwater Strike / Stabilized Groundwater Level



Monitoring Well ID: EL-MW5.2-21

Project No.: 210217-03
Client: Municipality of Hastings Highlands
Report: East Lake WDS
Site Address: 59 Cardwell Lake Road
 Maynooth, ON

Elevation Ground: 395.15 m
 TOP: 396.07 m

UTM NAD-83 (Zone 18): 5016010.000 N
 270378.000 E

SUBSURFACE PROFILE				SAMPLE						WELL COMPLETION			
Depth (m)	Elevation (m)	Symbol	Description	Depth (m) / Elev. (m.a.s.l.)	Type	Recovery (%)	Blow Counts	Sample ID	Lab Analysis	Headspace Vapour Level PID IBL ▲ ppm	Construction	Notes	
-1	-396									0 0 0 0			
			Ground Surface	0.0 395.2								J-Plug	
												Stickup Monument Well Casing	
0	-395		GRAVELLY SAND Brown sand and gravel										
1	-394											Granular Drainage Layer	
2	-393			4.6								Bentonite Seal	
												2.40 m bgs (392.75 m)	
3	-392												
4	-391												
5	-390		SAND & GRAVEL Brown/grey sand, gravel, cobbles, trace amount of boulders	4.6 390.6								Silica Sand Filter	
												50 mm 010 Slot PVC Screen	
6	-389			6.1 389.1									
			Observations made by auger, descending cyclone and mud wash tub. EOH at 6.1 mbgs										
7	-388												
8	-387												
Drill Date: 2021 September 22 Drilled By: Orbit Garant Drilling Drilling Method: Tri-Cone				Hole Diameter (OD): 0.05 m Logged By: BM Checked By: IO		▼ Perched Groundwater Strike / Unstabilized Groundwater Level ▼ True Groundwater Strike / Stabilized Groundwater Level						Sheet 1 of 1	

BH MW OB LOG 210217-03 MW5.1-21 & MW5.2-21.GPJ BLUMETRIC STANDARD.GDT 22-2-1

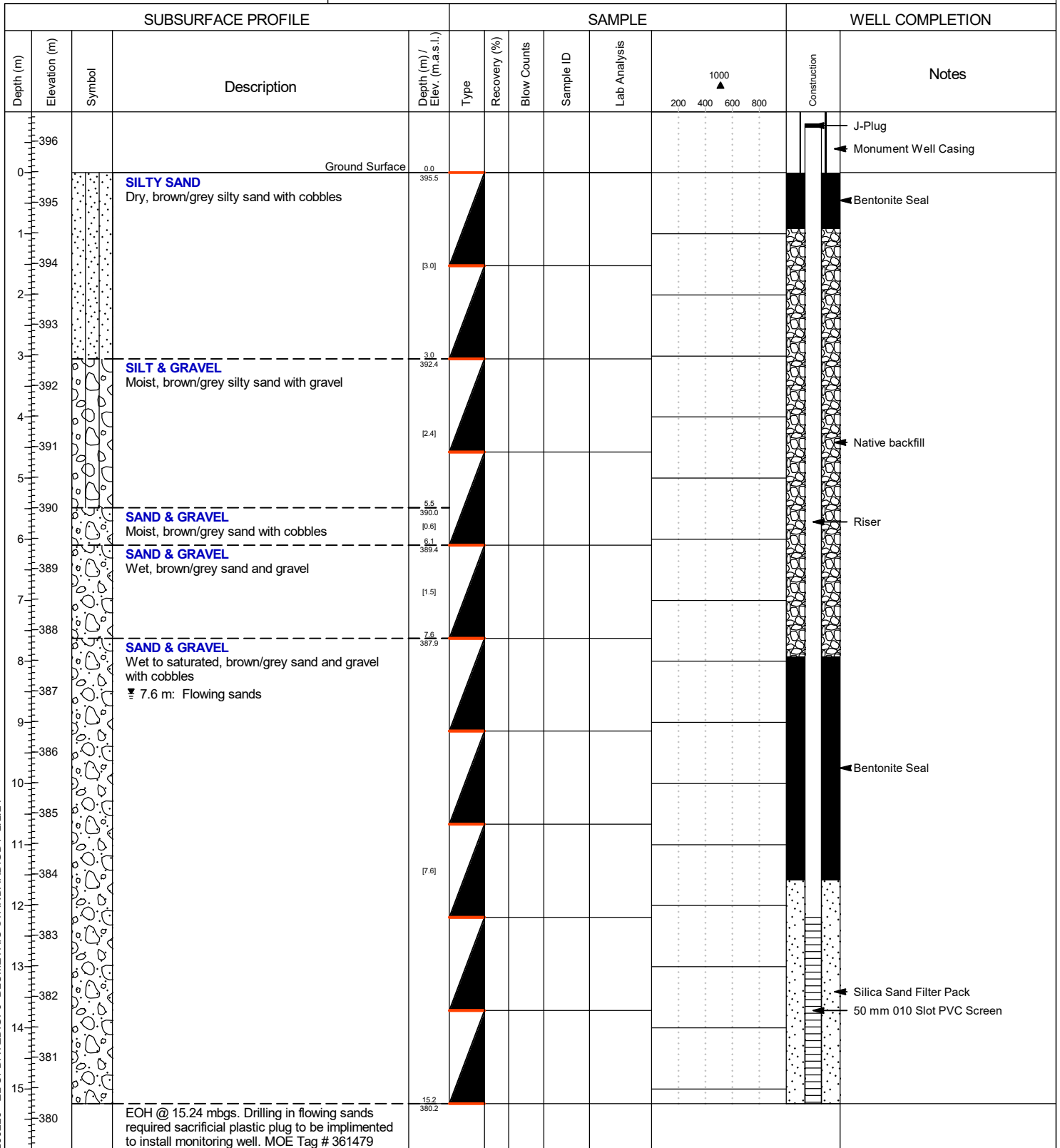


Monitoring Well ID: EL-MW6.1-23

Project No.: 230226
Client: MHH
Report: East Lake WDS
Site Address: East Lake
 Ontario

Elevation Ground: 395.48 m
TOP: 396.28 m

UTM NAD 83 (Zone 17): 5016150.903 N
 270307.126 E



BH MW OB LOG 230226 - EL UPDATED.GPJ BLUMETRIC STANDARD.GDT 2/2/24

Drill Date: September 19, 2023
Drilled By: Canadian Environmental
Drilling Method: Hollow Stem Auger
Hole Diameter (OD): 0.20 m
Logged By: BM
Checked By: CM

- AUGER SAMPLE
- Perched Groundwater Strike / Unstabilized Groundwater Level
- True Groundwater Strike / Stabilized Groundwater Level

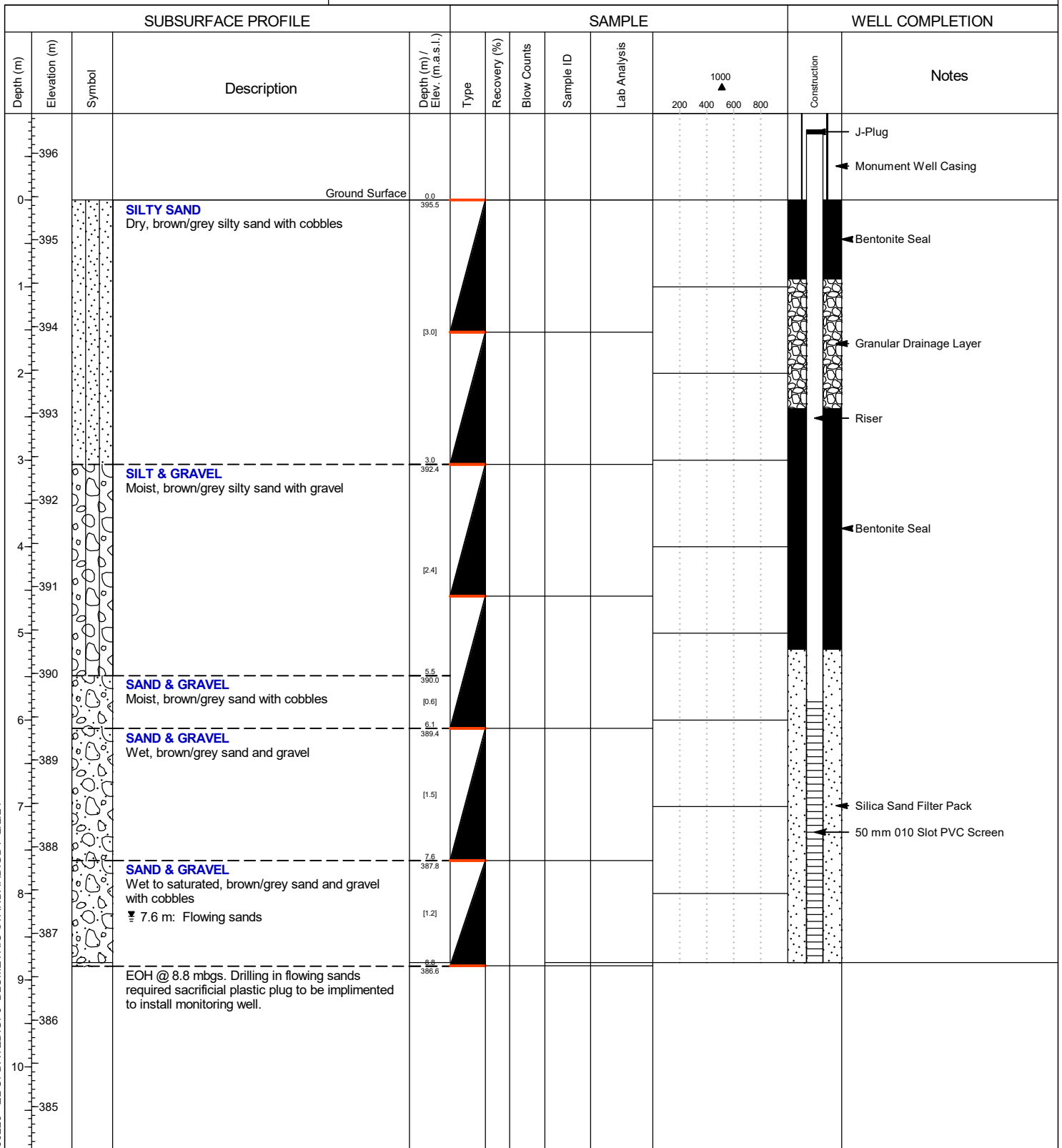


Monitoring Well ID: EL-MW6.2-23

Project No.: 230226
Client: MHH
Report: East Lake WDS
Site Address: East Lake
 Ontario

Elevation Ground: 395.46 m
TOP: 396.31 m

UTM NAD 83 (Zone 17): 5016152.961 N
 270303.473 E



BH MW OB LOG 230226 - EL UPDATED.GPJ BLUMETRIC STANDARD.GDT 2/2/24

Drill Date: September 20, 2023
Drilled By: Canadian Environmental
Drilling Method: Hollow Stem Auger
Hole Diameter (OD): 0.20 m
Logged By: BM
Checked By: CM

- AUGER SAMPLE
- Perched Groundwater Strike / Unstabilized Groundwater Level
- True Groundwater Strike / Stabilized Groundwater Level

Appendix D

D-1 Field Inspection Forms

**SMALL LANDFILL
OPERATION AND INSPECTION FORM**



Site Name: East Lake WDS, MHHS	Date: May 1, 2023	Weather: Overcast, Rain, 5 th
Project #: 230825-06	BluMetric Staff:	

Photographs of each item below should be collected during site visits.

OVERALL INSPECTION AND OPERATION REVIEW

- Signage in good condition Yes No
- ECA and emergency numbers on signage Yes No
- Hour of operation observed Yes No
- Site open under normal operating hours Yes No
- Perimeter fencing and gate in good condition Yes No
- Gate locked if closed Yes No

DESIGNATED WASTE AREA

- Working active/trench area (moderate size, daily cover, compacted) Yes No
- Designated waste areas are properly signed and easily accessed by public Yes No

RECYCLING OPERATION (if applicable)

- Proper signage and bins present Yes No
- Clearly signed Yes No
- Overall neat in appearance Yes No

SEGREGATED SCRAP PILES (metal, tires, brush, etc.)

- Metals neat and appropriate size Yes No
- Tires neat and appropriate size Yes No
- Bulky Items neat and appropriate size Yes No
- Brush pile neat and appropriate size Yes No
- Construction Debris neat and appropriate size Yes No

*Metalst Bulk needs spring pick up
Berms between cells needs improvement*

MONITORING WELL CONDITION

- Casing conditions (frost heave, lock, cap) Yes No
- Monitor condition (capped, vented) Yes No
- Wells clearly labeled (re-label as required) Yes No
- Well clearly visible (clear brush if necessary) Yes No

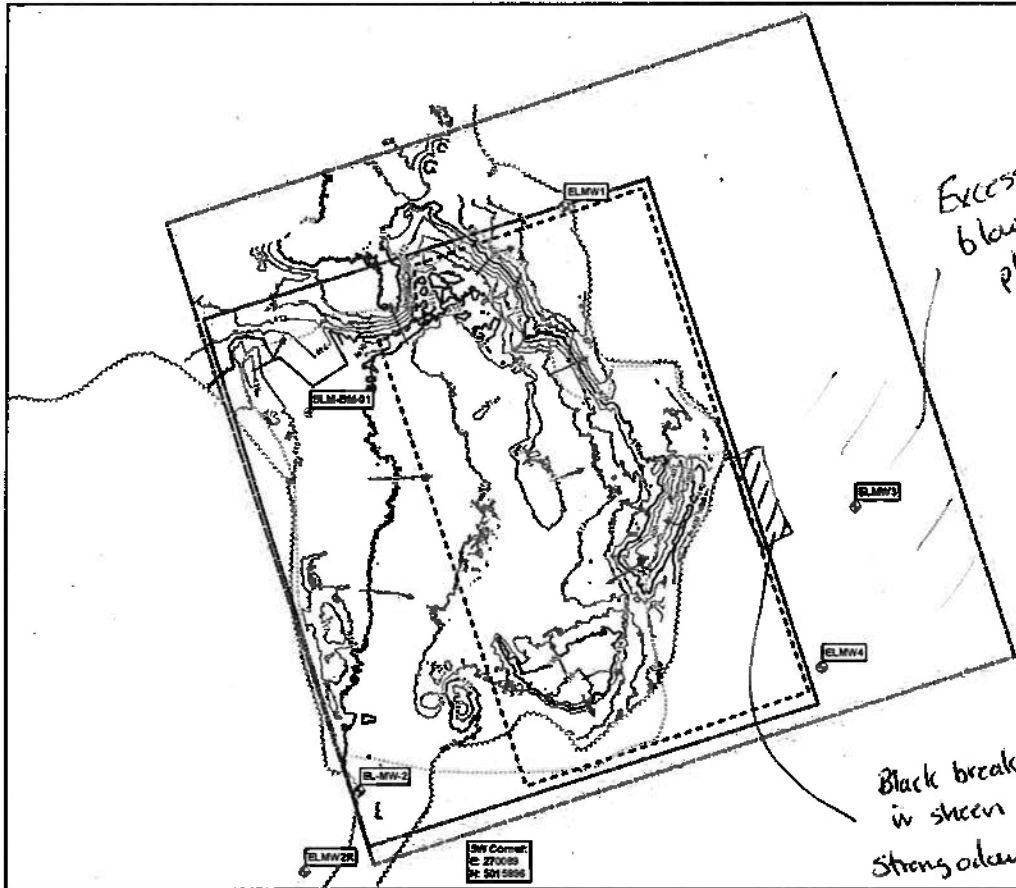
LANDFILL GAS MONITORING

- Conducted at structures Yes No
- Conducted at monitoring wells Yes No

REPAIRS: Provide details of repairs made or materials required for repairs upon next site visit:

OBSERVATIONS OF PHYSICAL ENVIRONMENT: Please comment on any changes to the local environment (e.g. settling or slumping of waste/cover, new or altered drainage, presence of seeps, changes in vegetation cover, etc.)

This form is intended as a general reminder of information that should recorded during monitoring activities. The above information is a minimum guide. Any information deemed important should be recorded in the field notes for each site.



Excessive blown plastic

Black breakouts in stream strong odours in this area

LEGEND

- ⊙ Geometric Marking Location
- ⊕ Decommissioned Geometric Marking Location
- ⊙ Benchmark Location
- Surface Water Drainage Direction
- Traffic
- Approximate Outline of Buried Waste
- Proposed Waste Footprint 2-20 ha
- Property Outline 4.05 ha (As surveyed by P.A. MFC 2013)
- Proposed Mound Outline
- Elevation Contours
- 1.0 m
- 0.5 m

REV	DESCRIPTION	DATE	BY	CHK
REFERENCES				
<p>2013 Final Report of Investigation of the Environmental Impacts of the Remedial Action Plan (RAP) for the East Lake Waste Disposal Site</p>				
<p>CLIENT</p> <p>Municipality of Hastings Highlands</p>				
<p>PROJECT</p> <p>East Lake Waste Disposal Site</p>				
<p>TITLE</p> <p>Existing Topography and Surface Water Flow Direction</p>				
<p>The Tower - The Woolen Mill, 4 Colborne St., Kingston, Ontario K7K 1Z7 TEL: (613) 531-2725 FAX: (613) 531-1052 Email: info@blumetric.ca Web: http://www.blumetric.ca</p>				
PROJECT #		DATE		
190983-05		2020-1-06		
DRAWN	CHECKED	FIG. NO.	REV.	
KH	IOC	03	0	

Identify any changes to site layout on drawing and/or comment:

preventive measures should be put in place to keep SW from flowing downhill + offsite

**SMALL LANDFILL
OPERATION AND INSPECTION FORM**



Site Name: East Lake WDS, MHHs	Date: Oct 17 2023	Weather: sunny/cloud 5-10°C
Project #: 230225-06	BluMetric Staff:	

Photographs of each item below should be collected during site visits.

OVERALL INSPECTION AND OPERATION REVIEW

- Signage in good condition Yes No
- ECA and emergency numbers on signage Yes No
- Hour of operation observed Yes No
- Site open under normal operating hours Yes No
- Perimeter fencing and gate in good condition Yes No
- Gate locked if closed Yes No

DESIGNATED WASTE AREA

- Working active/trench area (moderate size, daily cover, compacted) Yes No
- Designated waste areas are properly signed and easily accessed by public Yes No

RECYCLING OPERATION (if applicable)

- Proper signage and bins present Yes No
- Clearly signed Yes No
- Overall neat in appearance Yes No

SEGREGATED SCRAP PILES (metal, tires, brush, etc.)

- Metals neat and appropriate size Yes No
- Tires neat and appropriate size Yes No
- Bulky Items neat and appropriate size Yes No overflowing
- Brush pile neat and appropriate size Yes No large
- Construction Debris neat and appropriate size Yes No

MONITORING WELL CONDITION

- Casing conditions (frost heave, lock, cap) Yes No
- Monitor condition (capped, vented) Yes No
- Wells clearly labeled (re-label as required) Yes No
- Well clearly visible (clear brush if necessary) Yes No

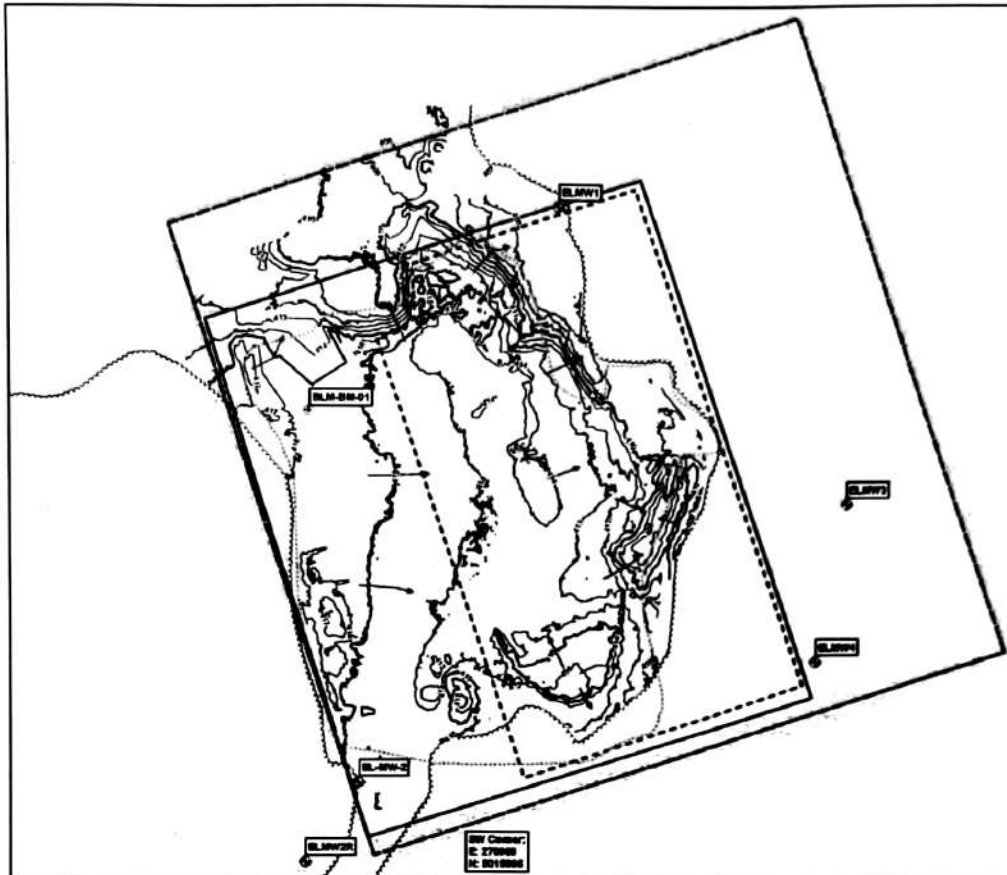
LANDFILL GAS MONITORING

- Conducted at structures Yes No 10 PPM
- Conducted at monitoring wells Yes No

REPAIRS: Provide details of repairs made or materials required for repairs upon next site visit:

OBSERVATIONS OF PHYSICAL ENVIRONMENT: Please comment on any changes to the local environment (e.g. settling or slumping of waste/cover, new or altered drainage, presence of seeps, changes in vegetation cover, etc.)

This form is intended as a general reminder of information that should recorded during monitoring activities. The above information is a minimum guide. Any information deemed important should be recorded in the field notes for each site.



LEGEND

- ◆ Groundwater Monitoring Location
- ◆ Decommissioned Groundwater Monitoring Location
- ⊕ Benchmark Location
- Surface Water Drainage Direction
- Trench
- Approximate Outline of Buried Waste
- Proposed Waste Footprint 2.38 ha
- Property Outline 4.08 ha (As surveyed by P.A. Miller 2013)
- Proposed Mound Outline

Elevation Contours

- 1.0 m
- 5.0 m

REV	DESCRIPTION	BY/ISSUED	DATE
1			

CLIENT
Municipality of Hastings Highlands

PROJECT
East Lake
Waste Disposal Site

TITLE
Existing Topography and
Surface Water Flow Direction

PROJECT #
190389-06

DATE
2020-1-08

BluMetric Environmental
The Tower - The Woods #82,
4 Colborne St.,
Kingston, Ontario K7E 1Z7
TEL: (613) 533-2729
FAX: (613) 533-1862
Email: info@blumetric.ca
Web: http://www.blumetric.ca

DESIGN	CHECKED	ISSUED	REV
DM	OC	DS	D

Identify any changes to site layout on drawing and/or comment:

along the north side - exposed waste not compacted
Active public dumping area not covered or compacted

This form is intended as a general reminder of information that should be recorded during monitoring activities. The above information is a minimum guide. Any information deemed important should be recorded in the field notes for each site.

Appendix D

D-2 Groundwater Laboratory Reports

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

**4 Cataraqui Street
Kingston, ON K7K1Z7
(613) 531-2725**

ATTENTION TO: Carolyn Miller

PROJECT: 230225-06

AGAT WORK ORDER: 23T020437

DATE REPORTED: May 17, 2023

PAGES (INCLUDING COVER): 7

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*
- *For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.*



Certificate of Analysis

AGAT WORK ORDER: 23T020437

PROJECT: 230225-06

5835 COOPERS AVENUE
 MISSISSAUGA, ONTARIO
 CANADA L4Z 1Y2
 TEL (905)712-5100
 FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

SAMPLING SITE: East Lake

ATTENTION TO: Carolyn Miller

SAMPLED BY:

BOD5

DATE RECEIVED: 2023-05-03

DATE REPORTED: 2023-05-17

		SAMPLE DESCRIPTION:		EL-MW1	EL-MW2R	EL-MW3	EL-MW4	EL-MW5.1-21	EL-MW5.2-21	EL-QAQC-GW1
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2023-05-01 16:26	2023-05-01 16:05	2023-05-01 16:46	2023-05-01 16:55	2023-05-01 17:10	2023-05-01 17:15	2023-05-01 16:46
Parameter	Unit	G / S	RDL	4957890	4957891	4957892	4957893	4957894	4957895	4957896
Biochemical Oxygen Demand, Total	mg/L		2	<2	<2	<2	<2	<2	<2	<2

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
 Analysis performed at AGAT Halifax (unless marked by *)

Certified By: _____

Certificate of Analysis

AGAT WORK ORDER: 23T020437

PROJECT: 230225-06

5835 COOPERS AVENUE
 MISSISSAUGA, ONTARIO
 CANADA L4Z 1Y2
 TEL (905)712-5100
 FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

ATTENTION TO: Carolyn Miller

SAMPLING SITE: East Lake

SAMPLED BY:

Groundwater Parameters

DATE RECEIVED: 2023-05-03

DATE REPORTED: 2023-05-17

Parameter	Unit	SAMPLE DESCRIPTION:		EL-MW1	EL-MW2R	EL-MW3	EL-MW4	EL-MW5.1-21	EL-MW5.2-21		
		G / S	RDL	Water	Water	Water	Water	Water	Water		
		DATE SAMPLED:		2023-05-01	2023-05-01	2023-05-01	2023-05-01	2023-05-01	2023-05-01		
				16:26	16:05	16:46	16:55	17:10	17:15		
				4957890	4957891	RDL	4957892	RDL	4957893	4957894	4957895
Electrical Conductivity	µS/cm		2	189	63	2	1930	2	122	58	32
pH	pH Units		NA	6.44	6.92	NA	6.75	NA	7.47	6.93	6.27
Total Suspended Solids	mg/L		10	3230	682	10	328	10	1130	524	146
Total Dissolved Solids	mg/L		10	66	212	10	1550	10	98	46	40
Alkalinity (as CaCO3)	mg/L		5	<5	18	5	180	5	40	14	<5
Chloride	mg/L		0.10	46.9	0.64	0.24	97.7	0.10	5.06	2.07	1.59
Nitrate as N	mg/L		0.05	2.48	0.11	0.07	2.19	0.05	0.36	0.12	0.27
Sulphate	mg/L		0.10	0.75	8.75	0.19	826	0.10	10.0	6.22	5.05
Ammonia as N	mg/L		0.02	<0.02	<0.02	0.02	0.09	0.02	<0.02	<0.02	<0.02
Chemical Oxygen Demand	mg/L		5	<5	<5	5	38	5	<5	<5	<5
Total Kjeldahl Nitrogen	mg/L		0.10	<0.10	<0.10	0.10	1.07	0.10	<0.10	<0.10	0.10
Dissolved Organic Carbon	mg/L		0.5	1.6	1.2	0.5	18.8	0.5	0.9	0.9	1.4
Aluminum-dissolved	mg/L		0.004	<0.004	<0.004	0.004	<0.004	0.004	<0.004	<0.004	0.028
Dissolved Calcium	mg/L		0.05	44.7	5.47	0.05	356	0.05	10.7	5.88	3.46
Dissolved Magnesium	mg/L		0.05	11.0	1.23	0.05	33.9	0.05	4.57	1.43	0.62
Dissolved Potassium	mg/L		0.50	1.80	0.60	0.50	8.37	0.50	1.00	0.55	<0.50
Dissolved Sodium	mg/L		0.05	12.2	2.73	0.05	93.6	0.05	4.30	3.15	1.59
Dissolved Aluminum	mg/L		0.004	0.008	0.026	0.004	0.013	0.004	0.023	0.014	0.037
Dissolved Barium	mg/L		0.002	0.008	0.005	0.002	0.041	0.002	0.006	0.006	0.013
Dissolved Boron	mg/L		0.010	<0.010	<0.010	0.010	2.72	0.010	0.011	<0.010	<0.010
Dissolved Iron	mg/L		0.010	0.017	<0.010	0.010	<0.010	0.010	<0.010	0.013	0.031
Dissolved Manganese	mg/L		0.002	0.005	0.006	0.002	3.06	0.002	<0.002	<0.002	0.003
Lab Filtration Aluminum Dissolved				2023/05/06	2023/05/06		2023/05/06		2023/05/06	2023/05/06	2023/05/06

Certified By: _____

Certificate of Analysis

AGAT WORK ORDER: 23T020437

PROJECT: 230225-06

 5835 COOPERS AVENUE
 MISSISSAUGA, ONTARIO
 CANADA L4Z 1Y2
 TEL (905)712-5100
 FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

ATTENTION TO: Carolyn Miller

SAMPLING SITE: East Lake

SAMPLED BY:

Groundwater Parameters

DATE RECEIVED: 2023-05-03

DATE REPORTED: 2023-05-17

SAMPLE DESCRIPTION: EL-QAQC-GW1

SAMPLE TYPE: Water

 DATE SAMPLED: 2023-05-01
 16:46

Parameter	Unit	G / S	RDL	4957896
Electrical Conductivity	µS/cm		2	1900
pH	pH Units		NA	6.79
Total Suspended Solids	mg/L		10	352
Total Dissolved Solids	mg/L		10	1610
Alkalinity (as CaCO ₃)	mg/L		5	173
Chloride	mg/L		0.24	96.5
Nitrate as N	mg/L		0.07	2.19
Sulphate	mg/L		0.19	816
Ammonia as N	mg/L		0.02	0.08
Chemical Oxygen Demand	mg/L		5	41
Total Kjeldahl Nitrogen	mg/L		0.10	1.09
Dissolved Organic Carbon	mg/L		0.5	18.9
Aluminum-dissolved	mg/L		0.004	<0.004
Dissolved Calcium	mg/L		0.05	266
Dissolved Magnesium	mg/L		0.05	30.2
Dissolved Potassium	mg/L		0.50	9.31
Dissolved Sodium	mg/L		0.05	98.5
Dissolved Aluminum	mg/L		0.004	0.013
Dissolved Barium	mg/L		0.002	0.040
Dissolved Boron	mg/L		0.010	2.55
Dissolved Iron	mg/L		0.010	0.040
Dissolved Manganese	mg/L		0.002	3.10
Lab Filtration Aluminum Dissolved				2023/05/06

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4957892 Dilution required, RDL has been increased accordingly.

4957896 Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: _____

Quality Assurance

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.
PROJECT: 230225-06
SAMPLING SITE: East Lake

AGAT WORK ORDER: 23T020437
ATTENTION TO: Carolyn Miller
SAMPLED BY:

Water Analysis																
RPT Date: May 17, 2023			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits		
								Lower	Upper		Lower	Upper		Lower	Upper	

Groundwater Parameters

Electrical Conductivity	4957885		1180	1170	0.1%	< 2	100%	90%	110%						
pH	4957885		7.78	7.82	0.5%		101%	90%	110%						
Total Suspended Solids	4964871		11	12	NA	< 10	100%	80%	120%						
Total Dissolved Solids	4957896	4957896	1610	1570	2.3%	< 10	104%	80%	120%						
Alkalinity (as CaCO3)	4957885		330	332	0.6%	< 5	94%	80%	120%						
Chloride	4957891	4957891	0.64	0.63	1.3%	< 0.10	91%	70%	130%	99%	80%	120%	99%	70%	130%
Nitrate as N	4957891	4957891	0.11	0.11	NA	< 0.05	92%	70%	130%	101%	80%	120%	96%	70%	130%
Sulphate	4957891	4957891	8.75	8.80	0.6%	< 0.10	95%	70%	130%	101%	80%	120%	99%	70%	130%
Ammonia as N	4963236		<0.02	<0.02	NA	< 0.02	114%	70%	130%	101%	80%	120%	100%	70%	130%
Chemical Oxygen Demand	4957848		29	16	NA	< 5	93%	80%	120%	101%	90%	110%	88%	70%	130%
Total Kjeldahl Nitrogen	4956811		9.04	9.07	0.3%	< 0.10	102%	70%	130%	101%	80%	120%	NA	70%	130%
Dissolved Organic Carbon	4957890	4957890	1.6	1.7	NA	< 0.5	100%	90%	110%	93%	90%	110%	91%	80%	120%
Aluminum-dissolved	4957890	4957890	0.008	0.009	NA	< 0.004	88%	70%	130%	93%	80%	120%	101%	70%	130%
Dissolved Calcium	4957890	4957890	44.7	42.0	6.1%	< 0.05	109%	70%	130%	97%	80%	120%	88%	70%	130%
Dissolved Magnesium	4957890	4957890	11.0	11.3	2.9%	< 0.05	91%	70%	130%	105%	80%	120%	120%	70%	130%
Dissolved Potassium	4957890	4957890	1.80	1.71	NA	< 0.50	106%	70%	130%	109%	80%	120%	104%	70%	130%
Dissolved Sodium	4957890	4957890	12.2	13.5	10.1%	< 0.05	93%	70%	130%	100%	80%	120%	116%	70%	130%
Dissolved Aluminum	4957890	4957890	0.008	0.009	NA	< 0.004	88%	70%	130%	93%	80%	120%	101%	70%	130%
Dissolved Barium	4957890	4957890	0.008	0.009	NA	< 0.002	100%	70%	130%	104%	80%	120%	99%	70%	130%
Dissolved Boron	4957890	4957890	<0.010	<0.010	NA	< 0.010	96%	70%	130%	100%	80%	120%	100%	70%	130%
Dissolved Iron	4957890	4957890	0.017	<0.010	NA	< 0.010	96%	70%	130%	110%	80%	120%	95%	70%	130%
Dissolved Manganese	4957890	4957890	0.005	0.004	NA	< 0.002	98%	70%	130%	99%	80%	120%	102%	70%	130%

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

Groundwater Parameters

Ammonia as N	4957891	4957891	<0.02	<0.02	NA	< 0.02	110%	70%	130%	101%	80%	120%	105%	70%	130%
Aluminum-dissolved	4965521		0.095	0.098	2.7%	< 0.004	97%	70%	130%	109%	80%	120%	113%	70%	130%

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

BOD5

Biochemical Oxygen Demand, Total 4957885			80	83	3.7%	< 2	90%	70%	130%	NA			NA		
--	--	--	----	----	------	-----	-----	-----	------	----	--	--	----	--	--

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By: _____

Method Summary

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

AGAT WORK ORDER: 23T020437

PROJECT: 230225-06

ATTENTION TO: Carolyn Miller

SAMPLING SITE: East Lake

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Biochemical Oxygen Demand, Total	INOR-121-6023	SM 5210 B	INCUBATOR
Electrical Conductivity	INOR-93-6000	modified from SM 2510 B	PC TITRATE
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Total Suspended Solids	INOR-93-6028	modified from EPA 1684, ON MOECC E3139, SM 2540C, D	BALANCE
Total Dissolved Solids	INOR-93-6028	modified from EPA 1684, ON MOECC E3139, SM 2540C, D	BALANCE
Alkalinity (as CaCO ₃)	INOR-93-6000	Modified from SM 2320 B	PC TITRATE
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	modified from SM 4500-NH ₃ H	LACHAT FIA
Chemical Oxygen Demand	INOR-93-6042	modified from SM 5220 A and SM 5220 D	SPECTROPHOTOMETER
Total Kjeldahl Nitrogen	INOR-93-6048	modified from EPA 351.2 and SM 4500-NORG D	LACHAT FIA
Dissolved Organic Carbon	INOR-93-6049	modified from SM 5310 B	SHIMADZU CARBON ANALYZER
Aluminum-dissolved	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Calcium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP/MS
Dissolved Magnesium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Dissolved Potassium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP/MS
Dissolved Sodium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP/MS
Dissolved Aluminum	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Barium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Boron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Iron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Manganese	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Lab Filtration Aluminum Dissolved	SR-78-9001		FILTRATION



AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
web@earth.agatlabs.com

Laboratory Use Only

Work Order #: 23T020437

Cooler Quantity: 1 large

Arrival Temperatures: 4.3 | 4.9 | 4.5

Custody Seal Intact: Yes No N/A

Notes: bugged out

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: BluMetric

Contact: Carolyn Miller

Address: 4 Cataragui St
Kingston, ON, K7K1Z7

Phone: 613-328-0243 Fax: _____

Reports to be sent to: cmiller@blumetric.ca

1. Email: _____

2. Email: cbandler@blumetric.ca

Regulatory Requirements:

(Please check all applicable boxes)

Regulation 153/04 Excess Soils R406 Sewer Use
 Sanitary Storm

Table Indicate One Ind/Com Res/Park Agriculture

Table Indicate One Regulation 558 CCME Other

Soil Texture (Check One) Coarse Fine

Region: _____

Indicate One

Is this submission for a Record of Site Condition?

Yes No

Report Guideline on Certificate of Analysis

Yes No

Sample Matrix Legend

- B** Biota
- GW** Ground Water
- O** Oil
- P** Paint
- S** Soil
- SD** Sediment
- SW** Surface Water

Project Information:

Project: 230225-06

Site Location: East Lake

Sampled By: _____

AGAT Quote #: 740798 PO: 230225-06

Please note: if quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes No

Company: _____

Contact: _____

Address: _____

Email: ap@blumetric.ca

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y/N	Field Filtered	Metals	Hg	CrVI	DOC	0. Reg 153	0. Reg 406	93-262 Groundwater	121-405 BOD	93-214 Diss. Al (PWQO)	Potentially Hazardous or High Concentration (Y/N)
EL-MW1	May 1, 2023	16:26 AM	7	GW		Y								<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
EL-MW2R	May 1, 2023	16:05 AM	7	GW	Field Filter: Metals, DOC	Y								<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
EL-MW3	May 1, 2023	16:46 AM	7	GW	Lab Filter: Diss. Al	Y								<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
EL-MW4	May 1, 2023	16:55 AM	7	GW		Y								<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
EL-MWS.1-21	May 1, 2023	17:10 AM	7	GW		Y								<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
EL-MWS.2-21	May 1, 2023	17:15 AM	7	GW		Y								<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
EL-QAQC-GW1	May 1, 2023	16:46 AM	7	GW		Y								<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
		AM															
		PM															
		AM															
		PM															

Samples Relinquished By (Print Name and Sign): <u>Brad H. Callum / Brad M. Leck</u>	Date: <u>May 2, 2023</u>	Time: <u>8:00 AM</u>	Samples Received By (Print Name and Sign): <u>T. Peterson</u>	Date: <u>May 3</u>	Time: <u>8:45 AM</u>
Samples Relinquished By (Print Name and Sign): _____	Date: _____	Time: _____	Samples Received By (Print Name and Sign): _____	Date: _____	Time: _____
Samples Relinquished By (Print Name and Sign): _____	Date: _____	Time: _____	Samples Received By (Print Name and Sign): _____	Date: _____	Time: _____

Page 1 of 1



Your Project #: 230225-06
 Site Location: East Lake
 Your C.O.C. #: 781225

Attention: Cecilia Bandler

BluMetric Environmental Inc
 The Tower - The Woolen Mill
 4 Cataraqui St
 Kingston, ON
 CANADA K7K 1Z7

Report Date: 2023/10/27
 Report #: R7882597
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3W5728

Received: 2023/10/19, 10:43

Sample Matrix: Water
 # Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Dissolved Aluminum (0.2 u, clay free)	9	N/A	2023/10/25	CAM SOP-00447	EPA 6020B m
Alkalinity	9	N/A	2023/10/25	CAM SOP-00448	SM 23 2320 B m
Biochemical Oxygen Demand (BOD)	9	2023/10/20	2023/10/25	CAM SOP-00427	SM 23 5210B m
Chloride by Automated Colourimetry	6	N/A	2023/10/24	CAM SOP-00463	SM 23 4500-Cl E m
Chloride by Automated Colourimetry	3	N/A	2023/10/26	CAM SOP-00463	SM 23 4500-Cl E m
Chemical Oxygen Demand	9	N/A	2023/10/25	CAM SOP-00416	SM 23 5220 D m
Conductivity	9	N/A	2023/10/25	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1)	9	N/A	2023/10/27	CAM SOP-00446	SM 23 5310 B m
Hardness (calculated as CaCO3)	2	N/A	2023/10/26	CAM SOP 00102/00408/00447	SM 2340 B
Hardness (calculated as CaCO3)	7	N/A	2023/10/27	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Metals by ICPMS	9	N/A	2023/10/26	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	9	N/A	2023/10/24	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (2)	1	N/A	2023/10/24	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Nitrate & Nitrite as Nitrogen in Water (2)	8	N/A	2023/10/25	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH	9	2023/10/21	2023/10/25	CAM SOP-00413	SM 4500H+ B m
Sulphate by Automated Turbidimetry	6	N/A	2023/10/24	CAM SOP-00464	SM 23 4500-SO42- E m
Sulphate by Automated Turbidimetry	3	N/A	2023/10/26	CAM SOP-00464	SM 23 4500-SO42- E m
Total Dissolved Solids	2	2023/10/24	2023/10/25	CAM SOP-00428	SM 23 2540C m
Total Dissolved Solids	7	2023/10/25	2023/10/26	CAM SOP-00428	SM 23 2540C m
Total Kjeldahl Nitrogen in Water	9	2023/10/23	2023/10/24	CAM SOP-00938	OMOE E3516 m
Total Suspended Solids	7	2023/10/24	2023/10/25	CAM SOP-00428	SM 23 2540D m
Total Suspended Solids	2	2023/10/25	2023/10/26	CAM SOP-00428	SM 23 2540D m

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, MELCCFP, EPA, APHA.

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



Your Project #: 230225-06
Site Location: East Lake
Your C.O.C. #: 781225

Attention: Cecilia Bandler

BluMetric Environmental Inc
The Tower - The Woolen Mill
4 Cataraqui St
Kingston, ON
CANADA K7K 1Z7

Report Date: 2023/10/27
Report #: R7882597
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3W5728

Received: 2023/10/19, 10:43

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.

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:

Christine Gripton, Senior Project Manager
Email: Christine.Gripton@bureauveritas.com
Phone# (519)652-9444

=====
This report has been generated and distributed using a secure automated process.

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 #: C3W5728
Report Date: 2023/10/27

BluMetric Environmental Inc
Client Project #: 230225-06
Site Location: East Lake
Sampler Initials: BM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		XIM070		XIM071		XIM072		
Sampling Date		2023/10/17 13:10		2023/10/17 13:30		2023/10/17 12:30		
COC Number		781225		781225		781225		
	UNITS	EL-MW1	QC Batch	EL-MW2R	RDL	EL-MW3	RDL	QC Batch
Calculated Parameters								
Hardness (CaCO3)	mg/L	13	8992976	18	1.0	1200	1.0	8992976
Inorganics								
Total Ammonia-N	mg/L	ND	9000408	ND	0.050	0.15	0.050	9000408
Total BOD	mg/L	ND	8994130	ND	2	2	2	8994130
Total Chemical Oxygen Demand (COD)	mg/L	4.3	9000852	ND	4.0	110	4.0	9000852
Conductivity	umho/cm	60	8997978	57	1.0	2200	1.0	8997978
Total Dissolved Solids	mg/L	65	9004608	55	10	1780	10	9002041
Total Kjeldahl Nitrogen (TKN)	mg/L	ND	9000830	ND	0.10	1.5	0.20	9000830
Dissolved Organic Carbon	mg/L	1.0	8999278	1.8	0.4	38	0.4	8999278
pH	pH	6.90	8997977	7.04		7.52		8997977
Total Suspended Solids	mg/L	960	9004459	940	10	990	10	9000296
Dissolved Sulphate (SO4)	mg/L	3.7	8997926	7.6	1.0	880	3.0	8997920
Alkalinity (Total as CaCO3)	mg/L	7.5	8997974	16	1.0	210	1.0	8997974
Dissolved Chloride (Cl-)	mg/L	4.9	8997922	ND	1.0	95	1.0	8997913
Nitrate (N)	mg/L	2.01	8998023	0.11	0.10	1.37	0.10	8998023
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.								



BUREAU
VERITAS

Bureau Veritas Job #: C3W5728
Report Date: 2023/10/27

BluMetric Environmental Inc
Client Project #: 230225-06
Site Location: East Lake
Sampler Initials: BM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		XIM072			XIM073			XIM073		
Sampling Date		2023/10/17 12:30			2023/10/17 12:20			2023/10/17 12:20		
COC Number		781225			781225			781225		
	UNITS	EL-MW3 Lab-Dup	RDL	QC Batch	EL-MW4	RDL	QC Batch	EL-MW4 Lab-Dup	RDL	QC Batch
Calculated Parameters										
Hardness (CaCO3)	mg/L				49	1.0	8992976			
Inorganics										
Total Ammonia-N	mg/L				ND	0.050	9000408			
Total BOD	mg/L				ND	2	8994130			
Total Chemical Oxygen Demand (COD)	mg/L				ND	4.0	9000852			
Conductivity	umho/cm				120	1.0	8997978			
Total Dissolved Solids	mg/L				80	10	9003218			
Total Kjeldahl Nitrogen (TKN)	mg/L				ND	0.10	9000830			
Dissolved Organic Carbon	mg/L	39	0.4	8999278	0.9	0.4	8999278			
pH	pH				7.54		8997977			
Total Suspended Solids	mg/L				2200	17	9004459			
Dissolved Sulphate (SO4)	mg/L				8.3	1.0	8998062	8.5	1.0	8998062
Alkalinity (Total as CaCO3)	mg/L				40	1.0	8997974			
Dissolved Chloride (Cl-)	mg/L				4.3	1.0	8998061	3.8	1.0	8998061
Nitrate (N)	mg/L				0.39	0.10	8998023			
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.										



BUREAU
VERITAS

Bureau Veritas Job #: C3W5728
Report Date: 2023/10/27

BluMetric Environmental Inc
Client Project #: 230225-06
Site Location: East Lake
Sampler Initials: BM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		XIM074		XIM075			XIM075		
Sampling Date		2023/10/17 12:52		2023/10/17 12:45			2023/10/17 12:45		
COC Number		781225		781225			781225		
	UNITS	EL-MW5.1-21	QC Batch	EL-MW5.2-21	RDL	QC Batch	EL-MW5.2-21 Lab-Dup	RDL	QC Batch

Calculated Parameters									
Hardness (CaCO ₃)	mg/L	18	8991798	10	1.0	8991798			
Inorganics									
Total Ammonia-N	mg/L	ND	9000408	ND	0.050	9000408			
Total BOD	mg/L	ND	8994130	ND	2	8994130			
Total Chemical Oxygen Demand (COD)	mg/L	ND	9000852	9.2	4.0	9000852			
Conductivity	umho/cm	57	8997978	33	1.0	8998021			
Total Dissolved Solids	mg/L	45	9002041	20	10	9002041	20	10	9002041
Total Kjeldahl Nitrogen (TKN)	mg/L	ND	9000830	0.15	0.10	9000830			
Dissolved Organic Carbon	mg/L	1.0	8999278	1.5	0.4	8999278			
pH	pH	7.23	8997977	6.54		8998020			
Total Suspended Solids	mg/L	980	9000296	240	10	9000296			
Dissolved Sulphate (SO ₄)	mg/L	5.2	8998062	3.5	1.0	8997920			
Alkalinity (Total as CaCO ₃)	mg/L	15	8997974	3.9	1.0	8998017			
Dissolved Chloride (Cl ⁻)	mg/L	ND	8998061	3.2	1.0	8997913			
Nitrate (N)	mg/L	0.13	8998023	ND	0.10	8998023	ND	0.10	8998023

RDL = Reportable Detection Limit
 QC Batch = Quality Control Batch
 Lab-Dup = Laboratory Initiated Duplicate
 ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.



BUREAU
VERITAS

Bureau Veritas Job #: C3W5728
Report Date: 2023/10/27

BluMetric Environmental Inc
Client Project #: 230225-06
Site Location: East Lake
Sampler Initials: BM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		XIM076			XIM077			XIM078		
Sampling Date		2023/10/17 11:35			2023/10/17 11:42			2023/10/17 11:35		
COC Number		781225			781225			781225		
	UNITS	EL-MW6.1-23	RDL	QC Batch	EL-MW6.2-23	RDL	QC Batch	EL-QAQC-GW1	RDL	QC Batch
Calculated Parameters										
Hardness (CaCO3)	mg/L	43	1.0	8991798	98	1.0	8991798	45	1.0	8991798
Inorganics										
Total Ammonia-N	mg/L	0.16	0.050	9000408	0.12	0.050	9000408	0.14	0.050	9000441
Total BOD	mg/L	ND	2	8994130	ND	2	8994130	ND	2	8994130
Total Chemical Oxygen Demand (COD)	mg/L	11	4.0	9000852	7.6	4.0	9000852	7.2	4.0	9000852
Conductivity	umho/cm	120	1.0	8997978	270	1.0	8998021	110	1.0	8997978
Total Dissolved Solids	mg/L	145	10	9002041	190	10	9002041	105	10	9003218
Total Kjeldahl Nitrogen (TKN)	mg/L	0.16	0.10	9000830	ND	0.10	9000830	0.12 (1)	0.10	9000830
Dissolved Organic Carbon	mg/L	1.5	0.4	8999278	2.6	0.4	8999278	0.8	0.4	8999278
pH	pH	7.80		8997977	7.54		8998020	7.81		8997977
Total Suspended Solids	mg/L	25000	200	9000296	1400	20	9000296	30000	100	8990017
Dissolved Sulphate (SO4)	mg/L	6.8	1.0	8998062	25	1.0	8997920	14	1.0	8997920
Alkalinity (Total as CaCO3)	mg/L	40	1.0	8997974	100	1.0	8998017	39	1.0	8997974
Dissolved Chloride (Cl-)	mg/L	ND	1.0	8998061	2.1	1.0	8997913	ND	1.0	8997913
Nitrate (N)	mg/L	ND	0.10	8998023	1.86	0.10	8997678	ND	0.10	8998023

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

(1) TKN < NH4: Both values fall within acceptable RPD limits for duplicates and are likely equivalent.



BUREAU
VERITAS

Bureau Veritas Job #: C3W5728
Report Date: 2023/10/27

BluMetric Environmental Inc
Client Project #: 230225-06
Site Location: East Lake
Sampler Initials: BM

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		XIM070	XIM071	XIM072		XIM073			XIM073		
Sampling Date		2023/10/17 13:10	2023/10/17 13:30	2023/10/17 12:30		2023/10/17 12:20			2023/10/17 12:20		
COC Number		781225	781225	781225		781225			781225		
	UNITS	EL-MW1	EL-MW2R	EL-MW3	QC Batch	EL-MW4	RDL	QC Batch	EL-MW4 Lab-Dup	RDL	QC Batch

Metals											
Dissolved (0.2u) Aluminum (Al)	ug/L	ND	ND	ND	8999957	ND	5	8999957			
Dissolved Aluminum (Al)	ug/L	ND	ND	4.9	8997066	ND	4.9	8997068	ND	4.9	8997068
Dissolved Barium (Ba)	ug/L	ND	4.2	42	8997066	5.7	2.0	8997068	5.6	2.0	8997068
Dissolved Boron (B)	ug/L	ND	ND	3500	8997066	ND	10	8997068	ND	10	8997068
Dissolved Calcium (Ca)	ug/L	3900	5600	400000	8997066	12000	200	8997068	12000	200	8997068
Dissolved Iron (Fe)	ug/L	ND	ND	ND	8997066	ND	100	8997068	ND	100	8997068
Dissolved Lead (Pb)	ug/L	ND	ND	ND	8997066	ND	0.50	8997068	ND	0.50	8997068
Dissolved Magnesium (Mg)	ug/L	870	1100	38000	8997066	4800	50	8997068	4700	50	8997068
Dissolved Manganese (Mn)	ug/L	ND	3.8	3800	8997066	ND	2.0	8997068	ND	2.0	8997068
Dissolved Potassium (K)	ug/L	840	770	7600	8997066	1300	200	8997068	1300	200	8997068
Dissolved Sodium (Na)	ug/L	3100	2800	100000	8997066	4900	100	8997068	4900	100	8997068

RDL = Reportable Detection Limit
 QC Batch = Quality Control Batch
 Lab-Dup = Laboratory Initiated Duplicate
 ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

Bureau Veritas ID		XIM074	XIM075	XIM076	XIM077		XIM078		
Sampling Date		2023/10/17 12:52	2023/10/17 12:45	2023/10/17 11:35	2023/10/17 11:42		2023/10/17 11:35		
COC Number		781225	781225	781225	781225		781225		
	UNITS	EL-MW5.1-21	EL-MW5.2-21	EL-MW6.1-23	EL-MW6.2-23	QC Batch	EL-QAQC-GW1	RDL	QC Batch

Metals									
Dissolved (0.2u) Aluminum (Al)	ug/L	ND	28	11	ND	8999957	10	5	8999957
Dissolved Aluminum (Al)	ug/L	ND	37	11	ND	8997066	10	4.9	8997068
Dissolved Barium (Ba)	ug/L	5.5	14	10	19	8997066	9.5	2.0	8997068
Dissolved Boron (B)	ug/L	ND	ND	ND	93	8997066	ND	10	8997068
Dissolved Calcium (Ca)	ug/L	5100	2900	12000	29000	8997066	12000	200	8997068
Dissolved Iron (Fe)	ug/L	ND	ND	ND	ND	8997066	ND	100	8997068
Dissolved Lead (Pb)	ug/L	ND	ND	ND	ND	8997066	ND	0.50	8997068
Dissolved Magnesium (Mg)	ug/L	1400	660	3400	5900	8997066	3500	50	8997068
Dissolved Manganese (Mn)	ug/L	ND	2.3	63	350	8997066	64	2.0	8997068
Dissolved Potassium (K)	ug/L	890	590	2200	2800	8997066	2200	200	8997068
Dissolved Sodium (Na)	ug/L	2500	1500	3900	15000	8997066	4000	100	8997068

RDL = Reportable Detection Limit
 QC Batch = Quality Control Batch
 ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.



BUREAU
VERITAS

Bureau Veritas Job #: C3W5728
Report Date: 2023/10/27

BluMetric Environmental Inc
Client Project #: 230225-06
Site Location: East Lake
Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: XIM070
Sample ID: EL-MW1
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	8999957	N/A	2023/10/25	Azita Fazaeli
Alkalinity	AT	8997974	N/A	2023/10/25	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	8994130	2023/10/20	2023/10/25	Frank Zhang
Chloride by Automated Colourimetry	KONE	8997922	N/A	2023/10/24	Massarat Jan
Chemical Oxygen Demand	SPEC	9000852	N/A	2023/10/25	Nimarta Singh
Conductivity	AT	8997978	N/A	2023/10/25	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8999278	N/A	2023/10/27	Gyulshen Idriz
Hardness (calculated as CaCO3)		8992976	N/A	2023/10/27	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	8997066	N/A	2023/10/26	Nan Raykha
Total Ammonia-N	LACH/NH4	9000408	N/A	2023/10/24	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8998023	N/A	2023/10/25	Chandra Nandlal
pH	AT	8997977	2023/10/21	2023/10/25	Nachiketa Gohil
Sulphate by Automated Turbidimetry	KONE	8997926	N/A	2023/10/24	Massarat Jan
Total Dissolved Solids	BAL	9004608	2023/10/25	2023/10/26	Shaneil Hall
Total Kjeldahl Nitrogen in Water	SKAL	9000830	2023/10/23	2023/10/24	Kruti Jitesh Patel
Total Suspended Solids	BAL	9004459	2023/10/25	2023/10/26	Shaneil Hall

Bureau Veritas ID: XIM071
Sample ID: EL-MW2R
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	8999957	N/A	2023/10/25	Azita Fazaeli
Alkalinity	AT	8997974	N/A	2023/10/25	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	8994130	2023/10/20	2023/10/25	Frank Zhang
Chloride by Automated Colourimetry	KONE	8997913	N/A	2023/10/24	Massarat Jan
Chemical Oxygen Demand	SPEC	9000852	N/A	2023/10/25	Nimarta Singh
Conductivity	AT	8997978	N/A	2023/10/25	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8999278	N/A	2023/10/27	Gyulshen Idriz
Hardness (calculated as CaCO3)		8992976	N/A	2023/10/27	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	8997066	N/A	2023/10/26	Nan Raykha
Total Ammonia-N	LACH/NH4	9000408	N/A	2023/10/24	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8998023	N/A	2023/10/25	Chandra Nandlal
pH	AT	8997977	2023/10/21	2023/10/25	Nachiketa Gohil
Sulphate by Automated Turbidimetry	KONE	8997920	N/A	2023/10/24	Massarat Jan
Total Dissolved Solids	BAL	9002041	2023/10/25	2023/10/26	Razieh Tabesh
Total Kjeldahl Nitrogen in Water	SKAL	9000830	2023/10/23	2023/10/24	Kruti Jitesh Patel
Total Suspended Solids	BAL	9000296	2023/10/24	2023/10/25	Razieh Tabesh



BUREAU
VERITAS

Bureau Veritas Job #: C3W5728
Report Date: 2023/10/27

BluMetric Environmental Inc
Client Project #: 230225-06
Site Location: East Lake
Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: XIM072
Sample ID: EL-MW3
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	8999957	N/A	2023/10/25	Azita Fazaeli
Alkalinity	AT	8997974	N/A	2023/10/25	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	8994130	2023/10/20	2023/10/25	Frank Zhang
Chloride by Automated Colourimetry	KONE	8997913	N/A	2023/10/24	Massarat Jan
Chemical Oxygen Demand	SPEC	9000852	N/A	2023/10/25	Nimarta Singh
Conductivity	AT	8997978	N/A	2023/10/25	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8999278	N/A	2023/10/27	Gyulshen Idriz
Hardness (calculated as CaCO3)		8992976	N/A	2023/10/27	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	8997066	N/A	2023/10/26	Nan Raykha
Total Ammonia-N	LACH/NH4	9000408	N/A	2023/10/24	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8998023	N/A	2023/10/25	Chandra Nandlal
pH	AT	8997977	2023/10/21	2023/10/25	Nachiketa Gohil
Sulphate by Automated Turbidimetry	KONE	8997920	N/A	2023/10/24	Massarat Jan
Total Dissolved Solids	BAL	9002041	2023/10/25	2023/10/26	Razieh Tabesh
Total Kjeldahl Nitrogen in Water	SKAL	9000830	2023/10/23	2023/10/24	Kruti Jitesh Patel
Total Suspended Solids	BAL	9000296	2023/10/24	2023/10/25	Razieh Tabesh

Bureau Veritas ID: XIM072 Dup
Sample ID: EL-MW3
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8999278	N/A	2023/10/27	Gyulshen Idriz

Bureau Veritas ID: XIM073
Sample ID: EL-MW4
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	8999957	N/A	2023/10/25	Azita Fazaeli
Alkalinity	AT	8997974	N/A	2023/10/25	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	8994130	2023/10/20	2023/10/25	Frank Zhang
Chloride by Automated Colourimetry	KONE	8998061	N/A	2023/10/26	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9000852	N/A	2023/10/25	Nimarta Singh
Conductivity	AT	8997978	N/A	2023/10/25	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8999278	N/A	2023/10/27	Gyulshen Idriz
Hardness (calculated as CaCO3)		8992976	N/A	2023/10/26	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	8997068	N/A	2023/10/26	Nan Raykha
Total Ammonia-N	LACH/NH4	9000408	N/A	2023/10/24	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8998023	N/A	2023/10/25	Chandra Nandlal
pH	AT	8997977	2023/10/21	2023/10/25	Nachiketa Gohil
Sulphate by Automated Turbidimetry	KONE	8998062	N/A	2023/10/26	Alina Dobreanu
Total Dissolved Solids	BAL	9003218	2023/10/24	2023/10/25	Shaneil Hall
Total Kjeldahl Nitrogen in Water	SKAL	9000830	2023/10/23	2023/10/24	Kruti Jitesh Patel



BUREAU
VERITAS

Bureau Veritas Job #: C3W5728
Report Date: 2023/10/27

BluMetric Environmental Inc
Client Project #: 230225-06
Site Location: East Lake
Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: XIM073
Sample ID: EL-MW4
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Suspended Solids	BAL	9004459	2023/10/25	2023/10/26	Shaneil Hall

Bureau Veritas ID: XIM073 Dup
Sample ID: EL-MW4
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride by Automated Colourimetry	KONE	8998061	N/A	2023/10/26	Alina Dobreanu
Dissolved Metals by ICPMS	ICP/MS	8997068	N/A	2023/10/26	Nan Raykha
Sulphate by Automated Turbidimetry	KONE	8998062	N/A	2023/10/26	Alina Dobreanu

Bureau Veritas ID: XIM074
Sample ID: EL-MW5.1-21
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	8999957	N/A	2023/10/25	Azita Fazaeli
Alkalinity	AT	8997974	N/A	2023/10/25	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	8994130	2023/10/20	2023/10/25	Frank Zhang
Chloride by Automated Colourimetry	KONE	8998061	N/A	2023/10/26	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9000852	N/A	2023/10/25	Nimarta Singh
Conductivity	AT	8997978	N/A	2023/10/25	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8999278	N/A	2023/10/27	Gyulshen Idriz
Hardness (calculated as CaCO3)		8991798	N/A	2023/10/27	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	8997066	N/A	2023/10/26	Nan Raykha
Total Ammonia-N	LACH/NH4	9000408	N/A	2023/10/24	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8998023	N/A	2023/10/25	Chandra Nandlal
pH	AT	8997977	2023/10/21	2023/10/25	Nachiketa Gohil
Sulphate by Automated Turbidimetry	KONE	8998062	N/A	2023/10/26	Alina Dobreanu
Total Dissolved Solids	BAL	9002041	2023/10/25	2023/10/26	Razieh Tabesh
Total Kjeldahl Nitrogen in Water	SKAL	9000830	2023/10/23	2023/10/24	Kruti Jitesh Patel
Total Suspended Solids	BAL	9000296	2023/10/24	2023/10/25	Razieh Tabesh

Bureau Veritas ID: XIM075
Sample ID: EL-MW5.2-21
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	8999957	N/A	2023/10/25	Azita Fazaeli
Alkalinity	AT	8998017	N/A	2023/10/25	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	8994130	2023/10/20	2023/10/25	Frank Zhang
Chloride by Automated Colourimetry	KONE	8997913	N/A	2023/10/24	Massarat Jan
Chemical Oxygen Demand	SPEC	9000852	N/A	2023/10/25	Nimarta Singh
Conductivity	AT	8998021	N/A	2023/10/25	Nachiketa Gohil



BUREAU
VERITAS

Bureau Veritas Job #: C3W5728
Report Date: 2023/10/27

BluMetric Environmental Inc
Client Project #: 230225-06
Site Location: East Lake
Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: XIM075
Sample ID: EL-MW5.2-21
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8999278	N/A	2023/10/27	Gyulshen Idriz
Hardness (calculated as CaCO3)		8991798	N/A	2023/10/27	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	8997066	N/A	2023/10/26	Nan Raykha
Total Ammonia-N	LACH/NH4	9000408	N/A	2023/10/24	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8998023	N/A	2023/10/25	Chandra Nandlal
pH	AT	8998020	2023/10/21	2023/10/25	Nachiketa Gohil
Sulphate by Automated Turbidimetry	KONE	8997920	N/A	2023/10/24	Massarat Jan
Total Dissolved Solids	BAL	9002041	2023/10/25	2023/10/26	Razieh Tabesh
Total Kjeldahl Nitrogen in Water	SKAL	9000830	2023/10/23	2023/10/24	Kruti Jitesh Patel
Total Suspended Solids	BAL	9000296	2023/10/24	2023/10/25	Razieh Tabesh

Bureau Veritas ID: XIM075 Dup
Sample ID: EL-MW5.2-21
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate & Nitrite as Nitrogen in Water	LACH	8998023	N/A	2023/10/25	Chandra Nandlal
Total Dissolved Solids	BAL	9002041	2023/10/25	2023/10/26	Razieh Tabesh

Bureau Veritas ID: XIM076
Sample ID: EL-MW6.1-23
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	8999957	N/A	2023/10/25	Azita Fazaeli
Alkalinity	AT	8997974	N/A	2023/10/25	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	8994130	2023/10/20	2023/10/25	Frank Zhang
Chloride by Automated Colourimetry	KONE	8998061	N/A	2023/10/26	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9000852	N/A	2023/10/25	Nimarta Singh
Conductivity	AT	8997978	N/A	2023/10/25	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8999278	N/A	2023/10/27	Gyulshen Idriz
Hardness (calculated as CaCO3)		8991798	N/A	2023/10/27	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	8997066	N/A	2023/10/26	Nan Raykha
Total Ammonia-N	LACH/NH4	9000408	N/A	2023/10/24	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8998023	N/A	2023/10/25	Chandra Nandlal
pH	AT	8997977	2023/10/21	2023/10/25	Nachiketa Gohil
Sulphate by Automated Turbidimetry	KONE	8998062	N/A	2023/10/26	Alina Dobreanu
Total Dissolved Solids	BAL	9002041	2023/10/25	2023/10/26	Razieh Tabesh
Total Kjeldahl Nitrogen in Water	SKAL	9000830	2023/10/23	2023/10/24	Kruti Jitesh Patel
Total Suspended Solids	BAL	9000296	2023/10/24	2023/10/25	Razieh Tabesh



BUREAU
VERITAS

Bureau Veritas Job #: C3W5728
Report Date: 2023/10/27

BluMetric Environmental Inc
Client Project #: 230225-06
Site Location: East Lake
Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: XIM077
Sample ID: EL-MW6.2-23
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	8999957	N/A	2023/10/25	Azita Fazaeli
Alkalinity	AT	8998017	N/A	2023/10/25	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	8994130	2023/10/20	2023/10/25	Frank Zhang
Chloride by Automated Colourimetry	KONE	8997913	N/A	2023/10/24	Massarat Jan
Chemical Oxygen Demand	SPEC	9000852	N/A	2023/10/25	Nimarta Singh
Conductivity	AT	8998021	N/A	2023/10/25	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8999278	N/A	2023/10/27	Gyulshen Idriz
Hardness (calculated as CaCO3)		8991798	N/A	2023/10/27	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	8997066	N/A	2023/10/26	Nan Raykha
Total Ammonia-N	LACH/NH4	9000408	N/A	2023/10/24	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8997678	N/A	2023/10/24	Chandra Nandlal
pH	AT	8998020	2023/10/21	2023/10/25	Nachiketa Gohil
Sulphate by Automated Turbidimetry	KONE	8997920	N/A	2023/10/24	Massarat Jan
Total Dissolved Solids	BAL	9002041	2023/10/25	2023/10/26	Razieh Tabesh
Total Kjeldahl Nitrogen in Water	SKAL	9000830	2023/10/23	2023/10/24	Kruti Jitesh Patel
Total Suspended Solids	BAL	9000296	2023/10/24	2023/10/25	Razieh Tabesh

Bureau Veritas ID: XIM078
Sample ID: EL-QAQC-GW1
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	8999957	N/A	2023/10/25	Azita Fazaeli
Alkalinity	AT	8997974	N/A	2023/10/25	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	8994130	2023/10/20	2023/10/25	Frank Zhang
Chloride by Automated Colourimetry	KONE	8997913	N/A	2023/10/24	Massarat Jan
Chemical Oxygen Demand	SPEC	9000852	N/A	2023/10/25	Nimarta Singh
Conductivity	AT	8997978	N/A	2023/10/25	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8999278	N/A	2023/10/27	Gyulshen Idriz
Hardness (calculated as CaCO3)		8991798	N/A	2023/10/26	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	8997068	N/A	2023/10/26	Nan Raykha
Total Ammonia-N	LACH/NH4	9000441	N/A	2023/10/24	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8998023	N/A	2023/10/25	Chandra Nandlal
pH	AT	8997977	2023/10/21	2023/10/25	Nachiketa Gohil
Sulphate by Automated Turbidimetry	KONE	8997920	N/A	2023/10/24	Massarat Jan
Total Dissolved Solids	BAL	9003218	2023/10/24	2023/10/25	Shaneil Hall
Total Kjeldahl Nitrogen in Water	SKAL	9000830	2023/10/23	2023/10/24	Kruti Jitesh Patel
Total Suspended Solids	BAL	8990017	2023/10/24	2023/10/25	Razieh Tabesh



BUREAU
VERITAS

Bureau Veritas Job #: C3W5728
Report Date: 2023/10/27

BluMetric Environmental Inc
Client Project #: 230225-06
Site Location: East Lake
Sampler Initials: BM

GENERAL COMMENTS

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

Package 1	5.7°C
-----------	-------

TDS Analysis: Analysis was performed past sample holding time. This may increase the variability associated with these results.

TSS Analysis: Analysis was performed past sample holding time. This may increase the variability associated with these results.

Sample XIM073 [EL-MW4] : TSS Analysis: Due to the nature of the sample, a smaller than usual portion of the sample was used.

Sample XIM076 [EL-MW6.1-23] : TSS Analysis: Due to the nature of the sample, a smaller than usual portion of the sample was used.

Sample XIM077 [EL-MW6.2-23] : TSS Analysis: Due to the nature of the sample, a smaller than usual portion of the sample was used.

Sample XIM078 [EL-QAQC-GW1] : TKN < Ammonia: Both values fall within the method uncertainty for duplicates and are likely equivalent.

TSS Analysis: Due to the nature of the sample, a smaller than usual portion of the sample was used.

Results relate only to the items tested.



BUREAU
VERITAS

Bureau Veritas Job #: C3W5728

Report Date: 2023/10/27

QUALITY ASSURANCE REPORT

BluMetric Environmental Inc

Client Project #: 230225-06

Site Location: East Lake

Sampler Initials: BM

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8990017	Total Suspended Solids	2023/10/25			95	85 - 115	ND, RDL=10	mg/L	NC	20		
8994130	Total BOD	2023/10/25					ND,RDL=2	mg/L	NC	30	93	80 - 120
8997066	Dissolved Aluminum (Al)	2023/10/26	104	80 - 120	105	80 - 120	ND, RDL=4.9	ug/L				
8997066	Dissolved Barium (Ba)	2023/10/26	NC	80 - 120	104	80 - 120	ND, RDL=2.0	ug/L				
8997066	Dissolved Boron (B)	2023/10/26	102	80 - 120	97	80 - 120	ND, RDL=10	ug/L				
8997066	Dissolved Calcium (Ca)	2023/10/26	NC	80 - 120	106	80 - 120	ND, RDL=200	ug/L				
8997066	Dissolved Iron (Fe)	2023/10/26	NC (1)	80 - 120	104	80 - 120	ND, RDL=100	ug/L				
8997066	Dissolved Lead (Pb)	2023/10/26	100	80 - 120	102	80 - 120	ND, RDL=0.50	ug/L				
8997066	Dissolved Magnesium (Mg)	2023/10/26	100	80 - 120	106	80 - 120	ND, RDL=50	ug/L				
8997066	Dissolved Manganese (Mn)	2023/10/26	NC	80 - 120	101	80 - 120	ND, RDL=2.0	ug/L				
8997066	Dissolved Potassium (K)	2023/10/26	100	80 - 120	108	80 - 120	ND, RDL=200	ug/L				
8997066	Dissolved Sodium (Na)	2023/10/26	NC	80 - 120	106	80 - 120	ND, RDL=100	ug/L				
8997068	Dissolved Aluminum (Al)	2023/10/26	108	80 - 120	107	80 - 120	ND, RDL=4.9	ug/L	NC	20		
8997068	Dissolved Barium (Ba)	2023/10/26	108	80 - 120	107	80 - 120	ND, RDL=2.0	ug/L	0.76	20		
8997068	Dissolved Boron (B)	2023/10/26	98	80 - 120	100	80 - 120	ND, RDL=10	ug/L	NC	20		
8997068	Dissolved Calcium (Ca)	2023/10/26	114	80 - 120	108	80 - 120	ND, RDL=200	ug/L	1.1	20		
8997068	Dissolved Iron (Fe)	2023/10/26	105	80 - 120	104	80 - 120	ND, RDL=100	ug/L	NC	20		
8997068	Dissolved Lead (Pb)	2023/10/26	101	80 - 120	98	80 - 120	ND, RDL=0.50	ug/L	NC	20		
8997068	Dissolved Magnesium (Mg)	2023/10/26	107	80 - 120	108	80 - 120	ND, RDL=50	ug/L	0.28	20		
8997068	Dissolved Manganese (Mn)	2023/10/26	103	80 - 120	102	80 - 120	ND, RDL=2.0	ug/L	NC	20		
8997068	Dissolved Potassium (K)	2023/10/26	110	80 - 120	108	80 - 120	ND, RDL=200	ug/L	0.87	20		
8997068	Dissolved Sodium (Na)	2023/10/26	107	80 - 120	107	80 - 120	ND, RDL=100	ug/L	0.28	20		
8997678	Nitrate (N)	2023/10/24	99	80 - 120	100	80 - 120	ND, RDL=0.10	mg/L	NC	20		
8997913	Dissolved Chloride (Cl-)	2023/10/24	94	80 - 120	101	80 - 120	ND, RDL=1.0	mg/L	NC	20		
8997920	Dissolved Sulphate (SO4)	2023/10/24	96	75 - 125	102	80 - 120	ND, RDL=1.0	mg/L	0.55	20		
8997922	Dissolved Chloride (Cl-)	2023/10/24	NC	80 - 120	98	80 - 120	ND, RDL=1.0	mg/L	0.34	20		
8997926	Dissolved Sulphate (SO4)	2023/10/24	NC	75 - 125	101	80 - 120	ND, RDL=1.0	mg/L	0.23	20		
8997974	Alkalinity (Total as CaCO3)	2023/10/25			97	85 - 115	ND, RDL=1.0	mg/L	2.1	20		
8997977	pH	2023/10/25			102	98 - 103			0.34	N/A		
8997978	Conductivity	2023/10/25			101	85 - 115	ND, RDL=1.0	umho/cm	0.29	10		



BUREAU
VERITAS

Bureau Veritas Job #: C3W5728

Report Date: 2023/10/27

QUALITY ASSURANCE REPORT(CONT'D)

BluMetric Environmental Inc

Client Project #: 230225-06

Site Location: East Lake

Sampler Initials: BM

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8998017	Alkalinity (Total as CaCO3)	2023/10/25			96	85 - 115	ND, RDL=1.0	mg/L	0.22	20		
8998020	pH	2023/10/25			102	98 - 103			0.54	N/A		
8998021	Conductivity	2023/10/25			101	85 - 115	ND, RDL=1.0	umho/cm	0	10		
8998023	Nitrate (N)	2023/10/25	98	80 - 120	100	80 - 120	ND, RDL=0.10	mg/L	NC	20		
8998061	Dissolved Chloride (Cl-)	2023/10/26	88	80 - 120	98	80 - 120	ND, RDL=1.0	mg/L	11	20		
8998062	Dissolved Sulphate (SO4)	2023/10/26	88	75 - 125	95	80 - 120	ND, RDL=1.0	mg/L	1.6	20		
8999278	Dissolved Organic Carbon	2023/10/27	NC	80 - 120	93	80 - 120	ND, RDL=0.4	mg/L	2.1	20		
8999957	Dissolved (0.2u) Aluminum (Al)	2023/10/25	103	80 - 120	102	80 - 120	ND, RDL=5	ug/L	NC	20		
9000296	Total Suspended Solids	2023/10/25			95	85 - 115	ND, RDL=10	mg/L	NC	20		
9000408	Total Ammonia-N	2023/10/24	101	75 - 125	104	80 - 120	ND, RDL=0.050	mg/L	NC	20		
9000441	Total Ammonia-N	2023/10/24	99	75 - 125	102	80 - 120	ND, RDL=0.050	mg/L	2.8	20		
9000830	Total Kjeldahl Nitrogen (TKN)	2023/10/24	110	80 - 120	101	80 - 120	ND, RDL=0.10	mg/L	16	20	101	80 - 120
9000852	Total Chemical Oxygen Demand (COD)	2023/10/25	90	80 - 120	97	80 - 120	ND, RDL=4.0	mg/L	2.6	20		
9002041	Total Dissolved Solids	2023/10/26			102	90 - 110	ND, RDL=10	mg/L	0	20		
9003218	Total Dissolved Solids	2023/10/25			95	90 - 110	ND, RDL=10	mg/L	1.3	20		
9004459	Total Suspended Solids	2023/10/26			96	85 - 115	ND, RDL=10	mg/L	10	20		



BUREAU
VERITAS

Bureau Veritas Job #: C3W5728

Report Date: 2023/10/27

QUALITY ASSURANCE REPORT(CONT'D)

BluMetric Environmental Inc

Client Project #: 230225-06

Site Location: East Lake

Sampler Initials: BM

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9004608	Total Dissolved Solids	2023/10/26			98	90 - 110	ND, RDL=10	mg/L	11	20		

N/A = Not Applicable

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).

(1) The recovery in the matrix spike was not calculated (NC). Because of the high concentration of this analyte in the parent sample, the relative difference between the spiked and unspiked concentrations is not sufficiently significant to permit a reliable recovery calculation.



BUREAU
VERITAS

Bureau Veritas Job #: C3W5728
Report Date: 2023/10/27

BluMetric Environmental Inc
Client Project #: 230225-06
Site Location: East Lake
Sampler Initials: BM

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.



Custody Tracking Form



T781225

Please use this form for custody tracking when submitting the work instructions via eCOC (electronic Chain of Custody). Please ensure your form has a barcode or a Bureau Veritas eCOC confirmation number in the top right hand side. This number links your electronic submission to your samples. This form should be placed in the cooler with your samples.

First Sample: EL-MW1
Last Sample: EL-QAQC-GW1
Sample Count: 9

Relinquished By				Received By			
Print Brad M Callum	Sign Brad M Callum	Date	2023/10/18	Print RANDEE KAWR BRAL	Sign Rameet	Date	2023/10/19
		Time (24 HR)	08:00			Time (24 HR)	10:43
Print	Sign	Date	YYYY/MM/DD	Print	Sign	Date	YYYY/MM/DD
		Time (24 HR)	HH:MM			Time (24 HR)	HH:MM
Print	Sign	Date	YYYY/MM/DD	Print	Sign	Date	YYYY/MM/DD
		Time (24 HR)	HH:MM			Time (24 HR)	HH:MM

Unless otherwise agreed to, submissions and use of services are governed by Bureau Veritas' standard terms and conditions which can be found at www.bvna.com.

Triage Information

Sampled By (Print) # of Coolers/Pkgs:

Brad M Callum / Matt DeGeer

1

Rush Immediate Test Food Residue

Micro Food Chemistry

*** LABORATORY USE ONLY ***

Received At

Labeled By

Verified By

Lab Comments:

19-Oct-23 10:43
Christine Gripton
C3W5728

DK ENV-936

Custody Seal		Cooling Media	Temperature °C		
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3
Y	Y	Y	5	6	6

Drinking Water Metals Preservation Check Done (Circle) YES NO

COR FCD-00383/4

Appendix D

D-3 QA/QC Calculations

2023 Groundwater Sampling Quality Assurance and Quality Control
(Spring)

Sample Description		RDL	EL-MW3	EL-QAQC-GW1 (ELMW3)	Relative Percent Difference
Date Sampled			1-May-23	1-May-23	
Parameter	Unit				
pH	pH Units	NA	6.75	6.79	
Alkalinity (as CaCO3)	mg/L	5	180	173	4%
Electrical Conductivity	uS/cm	2	1930	1900	2%
Total Dissolved Solids	mg/L	10	1550	1610	4%
Total Suspended Solids	mg/L	10	328	352	7%
Chloride	mg/L	0.10	97.7	96.5	1%
Nitrate as N	mg/L	0.05	2.19	2.19	0%
Sulphate	mg/L	0.10	826	816	1%
Ammonia as N	mg/L	0.02	0.09	0.08	NA
Total Kjeldahl Nitrogen	mg/L	0.10	1.07	1.09	2%
Chemical Oxygen Demand	mg/L	5	38	41	8%
Dissolved Organic Carbon	mg/L	0.5	18.8	18.9	1%
Dissolved Calcium	mg/L	0.05	356	266	29%
Dissolved Magnesium	mg/L	0.05	33.9	30.2	12%
Dissolved Potassium	mg/L	0.50	8.37	9.31	11%
Dissolved Sodium	mg/L	0.05	93.6	98.5	5%
Aluminum-dissolved	mg/L	0.004	0.013	0.013	NA
Dissolved Aluminum	mg/L	0.004	<0.004	<0.004	NA
Dissolved Barium	mg/L	0.002	0.041	0.04	2%
Dissolved Boron	mg/L	0.010	2.72	2.55	6%
Dissolved Iron	mg/L	0.010	<0.01	0.04	NA
Dissolved Manganese	mg/L	0.002	3.06	3.1	1%
Biochemical Oxygen Demand, Total	mg/L	2	<2	<2	NA

Yellow shading indicates RPD value is above the percentage for a high level of reproducibility:

- 10% for electrical conductivity
- 20% for metals and inorganics
- 30% for BTEX and PHC.

2023 Groundwater Sampling Quality Assurance and Quality Control
(Fall)

Sample Description		RDL	EL-MW6.1	EL-QAQC-GW (ELMW6.1)	Relative Percent Difference
Date Sampled			17-Oct-23	17-Oct-23	
Parameter	Unit				
pH	pH Units	NA	7.80	7.81	
Alkalinity (as CaCO ₃)	mg/L	5	40	39	3%
Electrical Conductivity	uS/cm	2	120	110	9%
Total Dissolved Solids	mg/L	10	145	105	32%
Total Suspended Solids	mg/L	10	25000	30000	18%
Chloride	mg/L	0.10	<1	<1	NA
Nitrate as N	mg/L	0.05	<0.10	<0.10	NA
Sulphate	mg/L	0.10	6.8	14	69%
Ammonia as N	mg/L	0.02	0.16	0.14	13%
Total Kjeldahl Nitrogen	mg/L	0.10	0.16	0.12	NA
Chemical Oxygen Demand	mg/L	5	11	7.2	NA
Dissolved Organic Carbon	mg/L	0.5	1.5	0.8	NA
Dissolved Calcium	mg/L	0.05	12	12	0%
Dissolved Magnesium	mg/L	0.05	3.4	3.5	3%
Dissolved Potassium	mg/L	0.50	2.2	2.2	NA
Dissolved Sodium	mg/L	0.05	3.9	4	3%
Aluminum-dissolved	mg/L	0.004	0.011	0.010	NA
Dissolved Aluminum	mg/L	0.004	0.011	0.010	NA
Dissolved Barium	mg/L	0.002	0.010	0.0095	NA
Dissolved Boron	mg/L	0.010	<0.01	<0.01	NA
Dissolved Iron	mg/L	0.010	<0.1	<0.1	NA
Dissolved Lead	mg/L	0.0005	<0.0005	<0.0005	NA
Dissolved Manganese	mg/L	0.002	0.063	0.064	2%
Biochemical Oxygen Demand, Total	mg/L	2	<2	<2	NA

Yellow shading indicates RPD value is above the percentage for a high level of reproducibility:

- 10% for electrical conductivity
- 20% for metals and inorganics
- 30% for BTEX and PHC.

Appendix E

E-1 Historical Groundwater Chemistry Results

E-1 Historical Groundwater Chemistry Results						Location	EL-MW2	EL-MW2	EL-MW5.1-21	EL-MW5.1-21	EL-MW5.1-21	EL-MW5.1-21	EL-MW5.1-21	EL-MW5.1-21	EL-MW5.2-21	EL-MW5.2-21	EL-MW5.2-21	EL-MW5.2-21	EL-MW5.2-21	EL-MW5.2-21	EL-MW6.1-23	EL-MW6.1-23
Parameter	Units	RUV-EL-2022	ODWQS	PWQO-GENERAL	PWQO-INTERIM	Sample ID	EL-MW2	EL-MW2	EL-MW5.1	EL-MW5.1	EL-MW5.1	EL-MW5.1-21	EL-MW5.2-21	EL-MW5.2	EL-MW5.2	EL-MW5.2	EL-MW5.2	EL-MW5.2	EL-MW5.2	EL-MW6.1-23	EL-QAQC-GW1 (ELMW6.1)	
						Sample Date	2008-May-08	2008-Oct-08	2021-Oct-22	2022-May-02	2022-Oct-17	2023-May-01	2023-Oct-17	2021-Oct-22	2022-May-02	2022-Oct-17	2023-May-01	2023-Oct-17	2023-Oct-17	2023-Oct-17	2023-Oct-17	
Anions																						
Chloride	mg/L	125.25	250	-	-	Detection Limit	8	5	13.1	1.32	1.73	2.07	<1	1.63	1.93	2.89	1.59	3.2	<1	<1		
Nitrate as N	mg/L	2.56	10	-	-	0.05, 0.07, 0.24	6.62	5.13	0.12	0.14	0.16	0.12	0.13	<0.05	0.16	0.11	0.27	<0.1	<0.1	<0.10		
Nitrite as N	mg/L	-	1	-	-	0.02	<0.02	<0.02	-	-	-	-	-	-	-	-	-	-	-	-		
Sulphate	mg/L	254.48	500	-	-	0.1, 0.19, 1	58	130	30.6	6.72	7.01	6.22	5.2	5.85	5	4.78	5.05	3.5	6.8	14		
Cations																						
Calcium (diss)	mg/L	-	-	-	-	0.05, 0.25, 0.5	47	61	5.82	4.63	5.54	5.88	5.1	2.75	2.75	2.77	3.46	2.9	12	12		
Magnesium (diss)	mg/L	-	-	-	-	0.05, 0.25, 0.5	10	15	1.49	1.31	1.25	1.43	1.4	0.65	0.66	0.63	0.62	0.66	3.4	3.5		
Potassium (diss)	mg/L	-	-	-	-	0.05, 0.5, 2.5	12	12	1.25	0.87	0.96	0.55	0.89	0.71	<0.5	0.67	<0.5	0.59	2.2	2.2		
Sodium (diss)	mg/L	101.3	200	-	-	0.05, 0.25, 0.5	6	7	8.31	2.4	2.6	3.15	2.5	2.24	1.28	1.43	1.59	1.5	3.9	4		
General Chemistry																						
Alkalinity (as CaCO3)	mg/L	256.5	30 - 500	See Factsheet	-	5	90	120	31	16	18	14	15	9	7	6	<5	3.9	40	39		
Ammonia as N	mg/L	-	-	-	-	0.02	-	-	0.3	<0.02	<0.02	<0.02	<0.05	0.11	<0.02	<0.02	<0.02	<0.05	0.16	0.14		
Biochemical Oxygen Demand	mg/L	-	-	-	-	2, 5	-	-	3	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2		
Chemical Oxygen Demand	mg/L	-	-	-	-	5	5	10	<5	<5	12	<5	<4	<5	<5	15	<5	9.2	11	7.2		
Dissolved Organic Carbon	mg/L	3.15	5	-	-	0.5	4.4	4.3	2.3	1.1	1.1	0.9	1	1.9	1.7	3	1.4	1.5	1.5	0.8		
Electrical Conductivity	uS/cm	-	-	-	-	2	384	560	97	57	61	58	57	34	37	34	32	33	120	110		
Total Dissolved Solids	mg/L	274	500	-	-	5, 10, 20	250	364	76	18	44	6.93	7.23	34	24	26	40	20	145	105		
Total Hardness (as CaCO3)	mg/L	-	80 - 100	-	-	-	158.5	214.1	20.7	17	19	46	45	9.5	9.6	9.5	-	18	-	10		
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	-	-	<0.1	<0.1	<0.1	-	18	<0.1	<0.1	0.12	0.1	0.15	0.16	0.12		
Total Suspended Solids	mg/L	-	-	-	-	10	-	-	687	306	2330	<0.1	<0.1	828	420	458	146	240	25000	30000		
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-	-	7.05	7.48	7.03	6.64	7.11	524	980	6.37	6.34	6.27	6.27	6.54	7.80	7.81		
Metals																						
Aluminum (diss) ¹	mg/L	-	0.1	-	-	0.004	<0.01	<0.01	0.011	0.008	0.01	0.014	<0.0049	0.028	0.072	0.047	0.037	0.037	0.011	0.01		
Barium (diss)	mg/L	-	1	-	-	0.002	0.05	0.07	0.013	0.005	0.005	0.006	0.0055	0.012	0.01	0.012	0.013	0.014	0.01	0.0095		
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-		
Boron (diss)	mg/L	1.25375	5	-	0.2	0.01, 0.02, 0.2	0.2	0.28	0.01	<0.01	0.014	<0.01	<0.01	<0.01	<0.01	0.012	<0.01	<0.01	<0.01	<0.01		
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.0001	<0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-		
Chromium (diss)	mg/L	-	0.05	-	-	0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-		
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0002	<0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-		
Copper (diss)	mg/L	-	1	-	Calculated	0.001	0.003	0.003	-	-	-	-	-	-	-	-	-	-	-	-		
Dissolved Aluminum (PWQO) ²	mg/L	-	-	-	Calculated	0.004	-	-	-	0.009	0.008	<0.004	<0.005	-	0.008	0.032	0.028	0.028	0.011	0.01		
Iron (diss)	mg/L	0.1525	0.3	0.3	-	0.01	<0.03	<0.03	<0.01	<0.01	<0.01	0.013	<0.1	<0.01	<0.01	<0.01	0.031	<0.1	<0.1	<0.1		
Lead (diss)	mg/L	-	0.01	-	Calculated	0.001	<0.001	<0.001	-	-	-	-	<0.0005	-	-	-	-	<0.0005	<0.0005	<0.0005		
Manganese (diss)	mg/L	0.0285	0.05	-	-	0.002	<0.01	<0.01	0.025	<0.002	<0.002	<0.002	<0.002	0.016	0.002	0.002	0.003	0.0023	0.063	0.064		
Molybdenum (diss)	mg/L	-	-	-	0.04	0.005	<0.005	<0.005	-	-	-	-	-	-	-	-	-	-	-	-		
Nickel (diss)	mg/L	-	-	0.025	-	0.005	<0.005	<0.005	-	-	-	-	-	-	-	-	-	-	-	-		
Silicon (diss)	mg/L	-	-	-	-	0.1	5.8	4.9	-	-	-	-	-	-	-	-	-	-	-	-		
Silver (diss)	mg/L	-	-	0.0001	-	0.0001	<0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-		
Strontium (diss)	mg/L	-	-	-	-	0.001	0.427	0.149	-	-	-	-	-	-	-	-	-	-	-	-		
Thallium (diss)	mg/L	-	-	-	0.0003	0.0001	<0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-		
Titanium (diss)	mg/L	-	-	-	-	0.002	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-	-	-		
Vanadium (diss)	mg/L	-	-	-	0.006	0.001	0.002	<0.001	-	-	-	-	-	-	-	-	-	-	-	-		
Zinc (diss)	mg/L	-	5	-	0.02	0.01	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-	-	-		

-LEGEND-
Detection Limit May vary between sample locations and events
Filled Concentration exceeds RUV-EL-2022 Reasonable Use Values East Lake 2022
Red Concentration exceeds ODWQS Ontario Drinking Water Quality Standards
Bold Concentration exceeds PWQO-GENERAL Provincial Water Quality Objectives General
Underline Concentration exceeds PWQO-INTERIM Provincial Water Quality Objectives Interim
1 - Aluminum (diss) refers to the field-filtered dissolved aluminum parameter (0.45 micron filter) for comparison to ODWSOG.
2 - Dissolved Aluminum (PWQO) refers to the lab-filtered dissolved aluminum parameter (0.20 micron filter) for comparison to PWQO.

E-1 Historical Groundwater Chemistry Results						Location	EL-MW6 2-23	ELMW1	ELMW1	ELMW1	ELMW1	ELMW1	ELMW1	ELMW1	ELMW1	ELMW1	ELMW1	ELMW1	ELMW1	ELMW1	ELMW1	ELMW1
Parameter	Units	RUV-EL-2022	ODWOS	PWOO-GENERAL	PWOO-INTERIM	Sample ID	EL-MW6 2-23	EL-MW1	EL-MW1	EL-MW1	EL-MW1	EL-MW1	EL-MW1	EL-MW1	EL-MW1	EL-MW1	EL-MW1	EL-MW1	EL-MW1	EL-MW1	EL-MW1	
						Sample Date	2023-Oct-17	2006-May-09	2006-Nov-21	2007-May-02	2008-May-08	2008-Oct-08	2009-Jun-04	2009-Oct-21	2010-May-18	2010-Nov-02	2011-May-19	2011-Nov-02	2012-Apr-17	2013-Apr-16	2013-Oct-29	
Anions						Detection Limit																
Chloride	mg/L	125.25	250	-	-	0.12, 0.2, 0.24	2.1	-	-	2	1	<1	1	1	2	5	2	<1	<1	0.43	0.43	
Nitrate as N	mg/L	2.56	10	-	-	0.05, 0.07, 0.25	1.86	2.56	0.95	3.35	1.36	1.1	0.89	1.55	1.51	1	0.35	1.1	1.1	1.95	0.53	
Nitrite as N	mg/L	-	1	-	-	0.02	-	-	-	0.08	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	0.04	0.1	0.02	0.13	<0.02	
Sulphate	mg/L	254.48	500	-	-	0.1, 0.19, 1	25	22	25	17	15	14	8	10	10	12	8	12	8	9.28	9.38	
Cations																						
Calcium (diss)	mg/L	-	-	-	-	0.05, 0.25, 0.5	29	11	8	8	6	5	3	4	4	5	2	2	3.29	5.34	3.58	
Magnesium (diss)	mg/L	-	-	-	-	0.05, 0.25, 0.5	5.9	3	2	2	1	1	<1	<1	<1	1	<1	<1	0.682	1.2	0.81	
Potassium (diss)	mg/L	-	-	-	-	0.05, 0.5, 2.5	2.8	2	2	1	1	1	<1	1	<1	<1	<1	<1	0.739	1.17	0.99	
Sodium (diss)	mg/L	101.3	200	-	-	0.05, 0.25, 0.5	15	6	6	5	5	4	4	4	4	4	2	2	3.77	6.69	4.1	
General Chemistry																						
Alkalinity (as CaCO3)	mg/L	256.5	30 - 500	See Factsheet	-	5	100	14	14	15	11	12	7	10	9	6	10	10	7	18	9	
Ammonia as N	mg/L	-	-	-	-	0.02	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Biochemical Oxygen Demand	mg/L	-	-	-	-	2, 5	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chemical Oxygen Demand	mg/L	-	-	-	-	5	7.6	-	-	<5	15	<5	8	8	<5	<5	8	40	52	<5	<5	
Dissolved Organic Carbon	mg/L	3.15	5	-	-	0.5	2.6	-	-	2.2	1.9	1.9	2.8	2.1	1.8	1.6	1.4	2.6	2.1	0.9	1.1	
Electrical Conductivity	uS/cm	-	-	-	-	2	270	119	98	93	71	69	45	58	59	61	38	58	52	79	48	
Total Dissolved Solids	mg/L	274	500	-	-	5, 10, 20	190	-	-	61	46	45	29	38	38	40	25	39	128	100	70	
Total Hardness (as CaCO3)	mg/L	-	80 - 100	-	-	-	98	39.8	28.2	28.2	19.1	16.6	9.6	12	12	16.6	7.1	7.1	11	18.3	12.3	
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total Suspended Solids	mg/L	-	-	-	-	10	1400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-	-	7.54	6.61	6.62	6.24	6.78	6.83	6.64	6.73	6.74	6.64	6.75	6.17	6.4	7.32	7.18	
Metals																						
Aluminum (diss) ¹	mg/L	-	0.1	-	-	0.004	<0.0049	0.03	0.02	0.02	<0.01	<0.01	0.02	0.03	<0.01	<0.01	0.03	0.02	0.018	0.032	0.045	
Barium (diss)	mg/L	-	1	-	-	0.002	0.019	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	0.002	<0.002	
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.001	<0.001	
Boron (diss)	mg/L	1.25375	5	-	0.2	0.01, 0.02, 0.2	0.093	0.03	0.02	0.02	0.02	0.03	0.01	0.02	0.03	0.03	<0.01	0.02	0.025	0.015	0.015	
Cadmium (diss)	mg/L	-	0.005	-	Calculated	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	<0.002	<0.002	
Chromium (diss)	mg/L	-	0.05	-	-	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	<0.003	<0.003	
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.001	<0.001	
Copper (diss)	mg/L	-	1	-	Calculated	0.001	-	0.002	0.001	0.001	<0.001	0.003	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.0005	<0.003	<0.003	
Dissolved Aluminum (PWQO) ²	mg/L	-	-	-	Calculated	0.004	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Iron (diss)	mg/L	0.1525	0.3	0.3	-	0.01	<0.1	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.1	<0.01	<0.01	
Lead (diss)	mg/L	-	0.01	-	Calculated	0.001	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.002	<0.002	
Manganese (diss)	mg/L	0.0285	0.05	-	-	0.002	0.35	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.002	<0.002	
Molybdenum (diss)	mg/L	-	-	-	0.04	0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0005	<0.002	<0.002	
Nickel (diss)	mg/L	-	-	0.025	-	0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.003	<0.003	
Silicon (diss)	mg/L	-	-	-	-	0.1	-	7.6	-	6.1	6.4	8.6	4.9	8.2	5.8	7.8	5.5	5.2	4.58	7.52	7.18	
Silver (diss)	mg/L	-	-	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	<0.002	<0.002	
Strontium (diss)	mg/L	-	-	-	-	0.001	-	0.105	0.067	0.063	0.043	0.045	0.021	0.04	0.033	0.044	0.021	<0.0001	0.026	0.042	0.03	
Thallium (diss)	mg/L	-	-	-	0.0003	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	<0.006	<0.006	
Titanium (diss)	mg/L	-	-	-	-	0.002	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.002	<0.002	
Vanadium (diss)	mg/L	-	-	-	0.006	0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.002	<0.002	
Zinc (diss)	mg/L	-	5	-	0.02	0.01	-	<0.01	0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	0.006	0.029	

-LEGEND-

Detection Limit May vary between sample locations and events

Filled Concentration exceeds RUV-EL-2022 Reasonable Use \

Red Concentration exceeds ODWOS Ontario Drinking

Bold Concentration exceeds PWQO-GENERAL Provincial Water

Underline Concentration exceeds PWQO-INTERIM Provincial Water

1 - Aluminum (diss) refers to the field-filtered dissolved aluminum parameter (0.45 micron filter) for comparison to ODWSOG.

2 - Dissolved Aluminum (PWQO) refers to the lab-filtered dissolved aluminum parameter (0.20 micron filter) for comparison to PWQO.

E-1 Historical Groundwater Chemistry Results						Location	ELMW1	ELMW1	ELMW1	ELMW1	ELMW1	ELMW1	ELMW1	ELMW1	ELMW1	ELMW1	ELMW1	ELMW1	ELMW1	ELMW1	ELMW1	
Parameter	Units	RUV-EL-2022	ODWQS	PWOO-GENERAL	PWOO-INTERIM	Sample ID	EL-MW1	EL-MW1	EL-MW1	EL-MW1	EL-MW1	EL-MW1	EL-MW1	EL-MW1	EL-MW1	EL-MW1	EL-MW1	EL-MW1	EL-MW1	EL-MW1		
						Sample Date	2014-May-12	2015-May-05	2016-Apr-27	2016-Oct-27	2017-May-12	2017-Oct-24	2018-May-08	2018-Oct-23	2019-May-08	2019-Oct-23	2020-May-07	2020-Oct-07	2021-Apr-21	2021-Oct-19	2022-May-02	
Anions																						
Chloride	mg/L	125.25	250	-	-	Detection Limit	0.12, 0.2, 0.24,	0.35	0.42	0.29	0.55	0.33	0.27	0.28	1.52	0.35	0.15	0.21	20.8	96.7	2.3	35.3
Nitrate as N	mg/L	2.56	10	-	-	0.05, 0.07, 0.25	0.52	0.28	0.33	0.79	0.48	0.92	0.46	0.7	2.53	0.84	0.94	0.33	1.27	0.35	1.26	
Nitrite as N	mg/L	-	1	-	-	0.02	0.03	<0.02	0.05	<0.02	<0.02	0.17	0.22	<0.02	-	-	-	-	-	-	-	
Sulphate	mg/L	254.48	500	-	-	0.1, 0.19, 1	6.57	5.72	4.44	5.37	3.77	4.24	2.9	3.41	1.18	3.02	2.61	1.42	0.38	2.8	1.02	
Cations																						
Calcium (diss)	mg/L	-	-	-	-	0.05, 0.25, 0.5	2.03	1.94	1.38	2.22	1.56	1.55	1.09	0.06	2.08	1.17	1.15	8.36	41	1.93	24.2	
Magnesium (diss)	mg/L	-	-	-	-	0.05, 0.25, 0.5	0.48	0.47	0.35	0.48	0.3	0.46	0.26	<0.05	0.63	0.27	0.26	1.97	9.8	0.45	5.9	
Potassium (diss)	mg/L	-	-	-	-	0.05, 0.5, 2.5	0.71	0.66	0.64	0.72	-	-	0.49	<0.05	0.88	0.57	0.46	1.73	2.95	0.71	2.26	
Sodium (diss)	mg/L	101.3	200	-	-	0.05, 0.25, 0.5	3.34	3.19	3.02	3.62	2.69	3.42	2.22	<0.05	2.35	3.31	1.9	8.59	19.3	3.37	13.1	
General Chemistry																						
Alkalinity (as CaCO3)	mg/L	256.5	30 - 500	See Factsheet	-	5	6	8	8	10	8	7	7	7	6	6	5	6	<5	6	<5	
Ammonia as N	mg/L	-	-	-	-	0.02	-	-	-	-	-	-	-	-	<0.02	0.07	<0.02	<0.02	<0.02	0.09	<0.02	
Biochemical Oxygen Demand	mg/L	-	-	-	-	2, 5	-	-	-	-	<5	<5	<5	<5	<5	<5	<5	<5	<2	<2	<2	
Chemical Oxygen Demand	mg/L	-	-	-	-	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	
Dissolved Organic Carbon	mg/L	3.15	5	-	-	0.5	1.4	1	3.1	1.5	0.8	2.8	1	2.2	2.5	1.4	0.7	1.6	1.1	1.4	0.6	
Electrical Conductivity	uS/cm	-	-	-	-	2	36	35	30	41	30	29	22	31	34	119	27	82	340	28	142	
Total Dissolved Solids	mg/L	274	500	-	-	5, 10, 20	58	84	68	25	40	38	50	72	52	72	38	72	262	38	106	
Total Hardness (as CaCO3)	mg/L	-	80 - 100	-	-	-	7	6.8	4.9	7.5	5.1	5.8	3.8	0.3	7.8	4	3.9	29	142.7	6.7	84.7	
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	0.44	<0.1	<0.1	<0.1	0.18	0.12	-	<0.1	<0.1	
Total Suspended Solids	mg/L	-	-	-	-	10	-	-	-	-	3220	4360	2240	4650	1750	4040	2850	3080	2120	1440	1780	
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-	-	6.85	7.27	6.83	6.69	6.91	7.66	6.38	6.73	6.11	6.93	6.52	6.08	5.93	6.37	6.18	
Metals																						
Aluminum (diss) ¹	mg/L	-	0.1	-	-	0.004	0.009	0.033	0.061	0.564	-	-	-	-	-	-	-	0.014	0.048	0.021	0.016	
Barium (diss)	mg/L	-	1	-	-	0.002	<0.002	<0.002	<0.002	0.01	0.003	<0.002	<0.002	<0.002	<0.002	0.003	0.002	0.002	0.01	<0.002	0.006	
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	
Boron (diss)	mg/L	1.25375	5	-	0.2	0.01, 0.02, 0.2	0.011	0.01	0.01	0.011	<0.01	0.018	0.016	<0.01	<0.01	<0.01	<0.01	0.067	0.012	<0.01	<0.01	
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.0001	<0.002	<0.002	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	
Chromium (diss)	mg/L	-	0.05	-	-	0.001	<0.003	<0.003	<0.003	<0.003	-	-	-	-	-	-	-	-	-	-	-	
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0002	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	
Copper (diss)	mg/L	-	1	-	Calculated	0.001	<0.003	<0.003	<0.003	<0.003	-	-	-	-	-	-	-	-	-	-	-	
Dissolved Aluminum (PWQO) ²	mg/L	-	-	-	Calculated	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.004	
Iron (diss)	mg/L	0.1525	0.3	0.3	-	0.01	<0.01	<0.01	0.034	0.398	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.039	0.023	<0.01	
Lead (diss)	mg/L	-	0.01	-	Calculated	0.001	<0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-	-	-	-	
Manganese (diss)	mg/L	0.0285	0.05	-	-	0.002	<0.002	<0.002	<0.002	0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.003	<0.002	0.003	
Molybdenum (diss)	mg/L	-	-	-	0.04	0.005	<0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-	-	-	-	
Nickel (diss)	mg/L	-	-	0.025	-	0.005	<0.003	<0.003	<0.003	<0.003	-	-	-	-	-	-	-	-	-	-	-	
Silicon (diss)	mg/L	-	-	-	-	0.1	5.84	6.15	6.45	7.78	-	-	-	-	-	-	-	-	-	-	-	
Silver (diss)	mg/L	-	-	0.0001	-	0.0001	<0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-	-	-	-	
Strontium (diss)	mg/L	-	-	-	-	0.001	0.019	0.019	0.016	0.025	-	-	-	-	-	-	-	-	-	-	-	
Thallium (diss)	mg/L	-	-	-	0.0003	0.0001	<0.006	<0.006	<0.006	<0.006	-	-	-	-	-	-	-	-	-	-	-	
Titanium (diss)	mg/L	-	-	-	-	0.002	<0.002	<0.002	0.002	0.025	-	-	-	-	-	-	-	-	-	-	-	
Vanadium (diss)	mg/L	-	-	-	0.006	0.001	<0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-	-	-	-	
Zinc (diss)	mg/L	-	5	-	0.02	0.01	<0.005	<0.005	<0.005	<0.005	-	-	-	-	-	-	-	-	-	-	-	

-LEGEND-
Detection Limit May vary between sample locations and events
Filled Concentration exceeds RUV-EL-2022 Reasonable Use \
Red Concentration exceeds ODWQS Ontario Drinking
Bold Concentration exceeds PWQO-GENERAL Provincial Water
Underline Concentration exceeds PWQO-INTERIM Provincial Water
1 - Aluminum (diss) refers to the field-filtered dissolved aluminum parameter (0.45 micron filter) for comparison to ODWSOG.
2 - Dissolved Aluminum (PWQO) refers to the lab-filtered dissolved aluminum parameter (0.20 micron filter) for comparison to PWQO.

E-1 Historical Groundwater Chemistry Results						Location	ELMW1
Parameter	Units	RUV-EL-2022	ODWQS	PWQO-GENERAL	PWQO-INTERIM	Sample ID	EL-MW1
						Sample Date	2023-May-01
Anions						Detection Limit	
Chloride	mg/L	125.25	250	-	-	0.12, 0.2, 0.24,	46.9
Nitrate as N	mg/L	2.56	10	-	-	0.05, 0.07, 0.25	2.48
Nitrite as N	mg/L	-	1	-	-	0.02	-
Sulphate	mg/L	254.48	500	-	-	0.1, 0.19, 1	0.75
Cations							
Calcium (diss)	mg/L	-	-	-	-	0.05, 0.25, 0.5	44.7
Magnesium (diss)	mg/L	-	-	-	-	0.05, 0.25, 0.5	11
Potassium (diss)	mg/L	-	-	-	-	0.05, 0.5, 2.5	1.8
Sodium (diss)	mg/L	101.3	200	-	-	0.05, 0.25, 0.5	12.2
General Chemistry							
Alkalinity (as CaCO3)	mg/L	256.5	30 - 500	See Factsheet	-	5	<5
Ammonia as N	mg/L	-	-	-	-	0.02	<0.02
Biochemical Oxygen Demand	mg/L	-	-	-	-	2, 5	<2
Chemical Oxygen Demand	mg/L	-	-	-	-	5	<5
Dissolved Organic Carbon	mg/L	3.15	5	-	-	0.5	1.6
Electrical Conductivity	uS/cm	-	-	-	-	2	189
Total Dissolved Solids	mg/L	274	500	-	-	5, 10, 20	66
Total Hardness (as CaCO3)	mg/L	-	80 - 100	-	-	-	-
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	<0.1
Total Suspended Solids	mg/L	-	-	-	-	10	3230
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-	-	6.44
Metals							
Aluminum (diss) ¹	mg/L	-	0.1	-	-	0.004	0.008
Barium (diss)	mg/L	-	1	-	-	0.002	0.008
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	-
Boron (diss)	mg/L	1.25375	5	-	0.2	0.01, 0.02, 0.2	<0.01
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.0001	-
Chromium (diss)	mg/L	-	0.05	-	-	0.001	-
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0002	-
Copper (diss)	mg/L	-	1	-	Calculated	0.001	-
Dissolved Aluminum (PWQO) ²	mg/L	-	-	-	Calculated	0.004	<0.004
Iron (diss)	mg/L	0.1525	0.3	0.3	-	0.01	0.017
Lead (diss)	mg/L	-	0.01	-	Calculated	0.001	-
Manganese (diss)	mg/L	0.0285	0.05	-	-	0.002	0.005
Molybdenum (diss)	mg/L	-	-	-	0.04	0.005	-
Nickel (diss)	mg/L	-	-	0.025	-	0.005	-
Silicon (diss)	mg/L	-	-	-	-	0.1	-
Silver (diss)	mg/L	-	-	0.0001	-	0.0001	-
Strontium (diss)	mg/L	-	-	-	-	0.001	-
Thallium (diss)	mg/L	-	-	-	0.0003	0.0001	-
Titanium (diss)	mg/L	-	-	-	-	0.002	-
Vanadium (diss)	mg/L	-	-	-	0.006	0.001	-
Zinc (diss)	mg/L	-	5	-	0.02	0.01	-

-LEGEND-

Detection Limit	May vary between sample locations and events	
Filled	Concentration exceeds RUV-EL-2022	Reasonable Use \
Red	Concentration exceeds ODWQS	Ontario Drinking
Bold	Concentration exceeds PWQO-GENERAL	Provincial Water
Underline	Concentration exceeds PWQO-INTERIM	Provincial Water

1 - Aluminum (diss) refers to the field-filtered dissolved aluminum parameter (0.45 micron filter) for comparison to ODWSOG.

2 - Dissolved Aluminum (PWQO) refers to the lab-filtered dissolved aluminum parameter (0.20 micron filter) for comparison to PWQO.

E-1 Historical Groundwater Chemistry Results						Location	ELMW1	ELMW2R	ELMW2R	ELMW2R	ELMW2R	ELMW2R	ELMW2R	ELMW2R	ELMW2R	ELMW2R	ELMW2R	ELMW3	ELMW3	ELMW3	ELMW3
Parameter	Units	RUV-EL-2022	ODWQS	PWQO-GENERAL	PWQO-INTERIM	Sample ID	EL-MW1	EL-MW2R-19	EL-MW2R	EL-MW2R	EL-MW2R	EL-MW2R	EL-MW2R	EL-MW2R	EL-MW2R	EL-MW2R	EL-MW2R	EL-MW3	EL-QAOC GW-F19	EL-MW3	EL-MW3-QAOC GW-S20
						Sample Date	2023-Oct-17	2019-Oct-23	2020-May-07	2020-Oct-07	2021-Apr-21	2021-Oct-19	2022-May-02	2022-Oct-17	2023-May-01	2023-Oct-17	2019-Oct-23	2019-Oct-23	2020-May-07	2020-May-07	
Anions						Detection Limit															
Chloride	mg/L	125.25	250	-	-	0.12, 0.2, 0.24	4.9	1.43	0.33	0.69	0.32	0.5	0.48	0.54	0.64	<1	54.2	54.8	98.1	95.6	
Nitrate as N	mg/L	2.56	10	-	-	0.05, 0.07, 0.25	2.01	<0.05	0.05	0.07	0.08	0.09	0.11	0.14	0.11	0.11	2.93	2.89	2.7	2.6	
Nitrite as N	mg/L	-	1	-	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sulphate	mg/L	254.48	500	-	-	0.1, 0.19, 1	3.7	25.9	9.7	8.96	8.53	10.7	8.58	8.92	8.75	7.6	526	540	781	758	
Cations																					
Calcium (diss)	mg/L	-	-	-	-	0.05, 0.25, 0.5	3.9	7.7	4.9	5.01	4.94	4.8	4.79	6.15	5.47	5.6	155	144	229	225	
Magnesium (diss)	mg/L	-	-	-	-	0.05, 0.25, 0.5	0.87	1.26	1.02	1.02	1.05	0.98	1.01	1.09	1.23	1.1	29.8	28.3	43.4	43.4	
Potassium (diss)	mg/L	-	-	-	-	0.05, 0.5, 2.5	0.84	1.06	0.77	0.82	-	0.79	0.75	0.94	0.6	0.77	5.25	4.96	6.65	6.58	
Sodium (diss)	mg/L	101.3	200	-	-	0.05, 0.25, 0.5	3.1	10.4	2.44	2.63	2.4	2.5	2.47	2.59	2.73	2.8	69	63.8	68.1	66.8	
General Chemistry																					
Alkalinity (as CaCO3)	mg/L	256.5	30 - 500	See Factsheet	-	5	7.5	26	12	15	13	12	12	21	18	16	86	87	71	75	
Ammonia as N	mg/L	-	-	-	-	0.02	<0.05	0.1	<0.02	<0.02	<0.02	0.08	<0.02	0.03	<0.02	<0.05	0.48	0.5	0.44	0.45	
Biochemical Oxygen Demand	mg/L	-	-	-	-	2, 5	<2	<5	<5	<2	<2	<2	<2	<2	<2	<2	<5	<5	<5	<5	
Chemical Oxygen Demand	mg/L	-	-	-	-	5	4.3	<5	<5	<5	<5	<5	<5	14	<5	<4	<5	<5	6	11	
Dissolved Organic Carbon	mg/L	3.15	5	-	-	0.5	1	2.5	1.3	1.4	1.9	1.2	1.3	1.2	1.8	5.9	6.2	7.4	7.7		
Electrical Conductivity	uS/cm	-	-	-	-	2	60	191	67	51	51	55	55	60	63	57	1460	1440	1930	1940	
Total Dissolved Solids	mg/L	274	500	-	-	5, 10, 20	65	72	48	40	50	48	40	36	212	55	1010	1010	1210	1200	
Total Hardness (as CaCO3)	mg/L	-	80 - 100	-	-	-	13	24.4	16.4	16.7	16.7	16	16.1	19.8	-	18	509.8	476.1	750.5	740.5	
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	<0.1	<0.1	0.13	0.11	-	<0.1	<0.1	<0.1	<0.1	0.79	0.75	1.02	1.01		
Total Suspended Solids	mg/L	-	-	-	-	10	960	1220	360	1080	272	735	524	509	682	940	488	268	288		
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-	-	6.9	7.51	6.6	6.46	6.82	6.55	6.46	7.17	6.92	7.04	7.29	7.31	6.38	6.34	
Metals																					
Aluminum (diss) ¹	mg/L	-	0.1	-	-	0.004	<0.0049	-	-	0.019	0.006	<0.004	0.008	0.015	0.026	<0.0049	-	-	-	-	
Barium (diss)	mg/L	-	1	-	-	0.002	<0.002	0.01	0.007	0.005	0.004	0.004	0.004	0.004	0.005	0.0042	0.076	0.076	0.058	0.06	
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Boron (diss)	mg/L	1.25375	5	-	0.2	0.01, 0.02, 0.2	<0.01	<0.01	<0.01	0.042	<0.01	<0.01	<0.01	0.014	<0.01	<0.01	1.4	1.41	1.58	1.58	
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chromium (diss)	mg/L	-	0.05	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Copper (diss)	mg/L	-	1	-	Calculated	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Dissolved Aluminum (PWQO) ²	mg/L	-	-	-	Calculated	0.004	<0.005	-	-	-	-	0.005	<0.004	<0.004	<0.005	-	-	-	-		
Iron (diss)	mg/L	0.1525	0.3	0.3	-	0.01	<0.1	<0.01	<0.01	<0.01	<0.01	0.032	<0.01	<0.01	<0.01	<0.1	0.483	0.478	<0.01	<0.01	
Lead (diss)	mg/L	-	0.01	-	Calculated	0.001	<0.0005	-	-	-	-	-	-	-	-	<0.0005	-	-	-	-	
Manganese (diss)	mg/L	0.0285	0.05	-	-	0.002	<0.002	0.04	0.02	0.009	0.006	0.006	0.007	0.004	0.006	0.0038	6.51	6.53	7.79	8.16	
Molybdenum (diss)	mg/L	-	-	-	0.04	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nickel (diss)	mg/L	-	-	0.025	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silicon (diss)	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silver (diss)	mg/L	-	-	0.0001	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Strontium (diss)	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Thallium (diss)	mg/L	-	-	-	0.0003	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Titanium (diss)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Vanadium (diss)	mg/L	-	-	-	0.006	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Zinc (diss)	mg/L	-	5	-	0.02	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

-LEGEND-
Detection Limit May vary between sample locations and events
Filled Concentration exceeds RUV-EL-2022 Reasonable Use \
Red Concentration exceeds ODWQS Ontario Drinking
Bold Concentration exceeds PWQO-GENERAL Provincial Water
Underline Concentration exceeds PWQO-INTERIM Provincial Water
1 - Aluminum (diss) refers to the field-filtered dissolved aluminum parameter (0.45 micron filter) for comparison to ODWSOG.
2 - Dissolved Aluminum (PWQO) refers to the lab-filtered dissolved aluminum parameter (0.20 micron filter) for comparison to PWQO.

E-1 Historical Groundwater Chemistry Results						Location	ELMW3	ELMW3	ELMW3	ELMW3	ELMW3	ELMW3	ELMW3	ELMW3	ELMW3	ELMW3	ELMW3	ELMW3	ELMW3	ELMW4	ELMW4
Parameter	Units	RUV-EL-2022	ODWQS	PWQO-GENERAL	PWQO-INTERIM	Sample ID	EL-MW3	EL-QAQC GW-F20	EL-MW3	EL-QAQC GW-S21	EL-MW3	EL-MW3	EL-QAQC GW-S22	EL-MW3	EL-QAQC GW1-F22	EL-MW3	QAQC-GW1 (ELM)	EL-MW3	EL-MW4-19	EL-MW4	
						Sample Date	2020-Oct-07	2020-Oct-07	2021-Apr-21	2021-Apr-21	2021-Oct-19	2022-May-02	2022-May-02	2022-Oct-17	2022-Oct-17	2023-May-01	2023-May-01	2023-Oct-17	2019-Oct-23	2020-May-07	
Anions																					
Chloride	mg/L	125.25	250	-	-	Detection Limit	70.1	64.5	101	102	55.1	67.1	67.6	89.3	91.2	97.7	95	95	3.37	5	
Nitrate as N	mg/L	2.56	10	-	-	0.05, 0.07, 0.25	3.82	3.57	3.51	3.53	3	3.99	4.07	4.79	4.87	2.19	1.37	1.37	0.41	0.45	
Nitrite as N	mg/L	-	1	-	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sulphate	mg/L	254.48	500	-	-	0.1, 0.19, 1	788	700	606	620	621	562	564	749	770	826	880	880	11.2	11.1	
Cations																					
Calcium (diss)	mg/L	-	-	-	-	0.05, 0.25, 0.5	222	220	208	215	194	194	196	279	278	356	400	400	9.92	10.4	
Magnesium (diss)	mg/L	-	-	-	-	0.05, 0.25, 0.5	39.5	39	36.2	36.9	23.1	25.5	25.9	30.8	32.3	33.9	38	38	4.38	4.62	
Potassium (diss)	mg/L	-	-	-	-	0.05, 0.5, 2.5	7.21	6.91	-	-	6.24	5.66	5.84	7.11	7.18	8.37	7.6	7.6	1.37	1.29	
Sodium (diss)	mg/L	101.3	200	-	-	0.05, 0.25, 0.5	73.9	73.3	63.2	65.1	69.8	65.6	66.9	75.2	76.5	93.6	100	100	4.27	4.49	
General Chemistry																					
Alkalinity (as CaCO3)	mg/L	256.5	30 - 500	See Factsheet	-	5	59	59	63	63	84	88	73	121	118	180	210	210	41	42	
Ammonia as N	mg/L	-	-	-	-	0.02	0.65	0.71	0.54	0.53	0.18	0.03	0.03	0.08	0.08	0.09	0.15	0.15	0.08	<0.02	
Biochemical Oxygen Demand	mg/L	-	-	-	-	2, 5	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	2	2	<5	<5	
Chemical Oxygen Demand	mg/L	-	-	-	-	5	19	25	<5	<5	20	25	24	31	38	38	110	110	<5	<5	
Dissolved Organic Carbon	mg/L	3.15	5	-	-	0.5	7.4	7.9	8.9	8.7	9.4	10.4	10.3	14	14.1	18.8	38	38	1	3.1	
Electrical Conductivity	uS/cm	-	-	-	-	2	1470	1460	1510	1500	1380	1310	1340	1710	1730	1930	2200	2200	247	158	
Total Dissolved Solids	mg/L	274	500	-	-	5, 10, 20	1200	1210	1290	1320	1070	1020	988	1210	1260	1550	1610	1780	98	90	
Total Hardness (as CaCO3)	mg/L	-	80 - 100	-	-	-	717	709.9	668.4	688.8	579.5	589.4	596.1	823.5	827.2	-	-	1200	42.8	45	
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	1.26	1.32	-	-	0.71	0.7	0.72	1.07	1.09	1.07	1.09	1.5	<0.1	0.14	
Total Suspended Solids	mg/L	-	-	-	-	10	366	360	281	267	313	440	792	589	681	328	352	990	884	489	
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-	-	6.72	6.71	6.61	6.61	6.71	7.03	6.68	6.91	6.89	6.75	6.79	7.52	7.48	7.15	
Metals																					
Aluminum (diss) ¹	mg/L	-	0.1	-	-	0.004	0.02	0.028	0.005	0.008	<0.004	0.034	0.029	0.012	0.012	0.013	0.0049	0.0049	-	-	
Barium (diss)	mg/L	-	1	-	-	0.002	0.042	0.041	0.037	0.038	0.033	0.035	0.032	0.036	0.036	0.041	0.042	0.042	0.007	0.006	
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Boron (diss)	mg/L	1.25375	5	-	0.2	0.01, 0.02, 0.2	1.64	1.65	1.74	1.64	1.66	2.09	1.91	2.16	2.18	2.72	3.5	3.5	0.043	0.022	
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chromium (diss)	mg/L	-	0.05	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Copper (diss)	mg/L	-	1	-	Calculated	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Dissolved Aluminum (PWQO) ²	mg/L	-	-	-	Calculated	0.004	-	-	-	-	<0.004	0.007	0.007	0.004	<0.004	<0.005	<0.005	-	-		
Iron (diss)	mg/L	0.1525	0.3	0.3	-	0.01	<0.01	<0.01	0.032	0.032	0.062	0.036	0.011	0.017	0.023	<0.01	<0.1	<0.1	<0.01	<0.01	
Lead (diss)	mg/L	-	0.01	-	Calculated	0.001	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	-	-	
Manganese (diss)	mg/L	0.0285	0.05	-	-	0.002	6.88	6.83	5.81	5.63	3.5	3.72	3.38	4.43	4.56	3.06	3.8	3.8	0.002	<0.002	
Molybdenum (diss)	mg/L	-	-	-	0.04	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nickel (diss)	mg/L	-	-	0.025	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silicon (diss)	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silver (diss)	mg/L	-	-	0.0001	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Strontium (diss)	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Thallium (diss)	mg/L	-	-	-	0.0003	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Titanium (diss)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Vanadium (diss)	mg/L	-	-	-	0.006	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Zinc (diss)	mg/L	-	5	-	0.02	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

-LEGEND-
Detection Limit May vary between sample locations and events
Filled Concentration exceeds RUV-EL-2022 Reasonable Use \
Red Concentration exceeds ODWQS Ontario Drinking
Bold Concentration exceeds PWQO-GENERAL Provincial Water
Underline Concentration exceeds PWQO-INTERIM Provincial Water
1 - Aluminum (diss) refers to the field-filtered dissolved aluminum parameter (0.45 micron filter) for comparison to ODWSOG.
2 - Dissolved Aluminum (PWQO) refers to the lab-filtered dissolved aluminum parameter (0.20 micron filter) for comparison to PWQO.

E-1 Historical Groundwater Chemistry Results						Location	ELMW4	ELMW4	ELMW4	ELMW4	ELMW4	ELMW4	ELMW4	ELMW4	
Parameter	Units	RUV-EL-2022	ODWOS	PWQO-GENERAL	PWQO-INTERIM	Sample ID	EL-MW4	EL-MW4	EL-MW4	EL-QAOC GW-F21	EL-MW4	EL-MW4	EL-MW4	EL-MW4	
						Sample Date	2020-Oct-07	2021-Apr-21	2021-Oct-19	2021-Oct-19	2022-May-02	2022-Oct-17	2023-May-01	2023-Oct-17	
Anions						Detection Limit									
Chloride	mg/L	125.25	250	-	-	0.12, 0.2, 0.24	3.16	3.17	3.88	3.91	4.56	4.66	5.06	4.3	
Nitrate as N	mg/L	2.56	10	-	-	0.05, 0.07, 0.25	0.32	0.32	0.36	0.37	0.39	0.42	0.36	0.39	
Nitrite as N	mg/L	-	1	-	-	0.02	-	-	-	-	-	-	-	-	
Sulphate	mg/L	254.48	500	-	-	0.1, 0.19, 1	10.6	10.3	11.4	11.5	10.3	10.8	10	8.3	
Cations															
Calcium (diss)	mg/L	-	-	-	-	0.05, 0.25, 0.5	9.89	10.2	10.2	9.78	9.22	10.8	10.7	12	
Magnesium (diss)	mg/L	-	-	-	-	0.05, 0.25, 0.5	4.2	4.53	4.3	4.16	4.01	4.74	4.57	4.8	
Potassium (diss)	mg/L	-	-	-	-	0.05, 0.5, 2.5	1.21	-	1.31	1.25	1.17	1.44	1	1.3	
Sodium (diss)	mg/L	101.3	200	-	-	0.05, 0.25, 0.5	4.22	4.32	4.34	4.18	3.98	4.16	4.3	4.9	
General Chemistry															
Alkalinity (as CaCO3)	mg/L	256.5	30 - 500	See Factsheet	-	5	42	39	42	42	39	40	40	40	
Ammonia as N	mg/L	-	-	-	-	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	
Biochemical Oxygen Demand	mg/L	-	-	-	-	2, 5	<2	<2	<2	<2	<2	<2	<2	<2	
Chemical Oxygen Demand	mg/L	-	-	-	-	5	<5	<5	<5	<5	<5	<5	<5	<4	
Dissolved Organic Carbon	mg/L	3.15	5	-	-	0.5	1	1.5	0.9	0.9	1	1.8	0.9	0.9	
Electrical Conductivity	uS/cm	-	-	-	-	2	111	113	128	128	121	124	122	120	
Total Dissolved Solids	mg/L	274	500	-	-	5, 10, 20	84	82	84	62	92	56	98	80	
Total Hardness (as CaCO3)	mg/L	-	80 - 100	-	-	-	42	44.1	43.2	41.6	39.5	46.5	-	49	
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Total Suspended Solids	mg/L	-	-	-	-	10	961	294	313	252	180	715	1130	2200	
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-	-	6.87	7.41	7.18	7.19	7.03	7.56	7.47	7.54	
Metals															
Aluminum (diss) ¹	mg/L	-	0.1	-	-	0.004	0.016	0.008	<0.004	<0.004	0.015	0.011	0.023	<0.0049	
Barium (diss)	mg/L	-	1	-	-	0.002	0.005	0.005	0.005	0.005	0.005	0.005	0.006	0.0057	
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	-	-	-	-	-	-	-	-	
Boron (diss)	mg/L	1.25375	5	-	0.2	0.01, 0.02, 0.2	0.064	0.012	<0.01	<0.01	0.014	0.014	0.011	<0.01	
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.0001	-	-	-	-	-	-	-	-	
Chromium (diss)	mg/L	-	0.05	-	-	0.001	-	-	-	-	-	-	-	-	
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0002	-	-	-	-	-	-	-	-	
Copper (diss)	mg/L	-	1	-	Calculated	0.001	-	-	-	-	-	-	-	-	
Dissolved Aluminum (PWQO) ²	mg/L	-	-	-	Calculated	0.004	-	-	-	<0.004	0.007	<0.004	<0.005		
Iron (diss)	mg/L	0.1525	0.3	0.3	-	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	
Lead (diss)	mg/L	-	0.01	-	Calculated	0.001	-	-	-	-	-	-	-	<0.0005	
Manganese (diss)	mg/L	0.0285	0.05	-	-	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Molybdenum (diss)	mg/L	-	-	-	0.04	0.005	-	-	-	-	-	-	-	-	
Nickel (diss)	mg/L	-	-	0.025	-	0.005	-	-	-	-	-	-	-	-	
Silicon (diss)	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	
Silver (diss)	mg/L	-	-	0.0001	-	0.0001	-	-	-	-	-	-	-	-	
Strontium (diss)	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	
Thallium (diss)	mg/L	-	-	-	0.0003	0.0001	-	-	-	-	-	-	-	-	
Titanium (diss)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	
Vanadium (diss)	mg/L	-	-	-	0.006	0.001	-	-	-	-	-	-	-	-	
Zinc (diss)	mg/L	-	5	-	0.02	0.01	-	-	-	-	-	-	-	-	

-LEGEND-

Detection Limit	May vary between sample locations and events	Reasonable Use \
Filled	Concentration exceeds RUV-EL-2022	Ontario Drinking
Red	Concentration exceeds ODWOS	Provincial Water
Bold	Concentration exceeds PWQO-GENERAL	Provincial Water
Underline	Concentration exceeds PWQO-INTERIM	Provincial Water

1 - Aluminum (diss) refers to the field-filtered dissolved aluminum parameter (0.45 micron filter) for comparison to ODWSOG.

2 - Dissolved Aluminum (PWQO) refers to the lab-filtered dissolved aluminum parameter (0.20 micron filter) for comparison to PWQO.

Appendix E

E-2 Historical Groundwater VOCs Results

E-2 Historical Groundwater VOC Results					Location	ELMW3	ELMW3	ELMW4
Parameter	Units	ODWQS- ALL- MERGED	PWQO- GENERAL	PWQO- INTERIM	Sample Name	EL-MW3	EL-QAQC GW- F19	EL-MW4-19
					Sample Date	2019-Oct-23	2019-Oct-23	2019-Oct-23
VOCs					Detection Limit			
1,4-Dichlorobenzene	mg/L	0.001	0.004	-	0.0001	<0.0001	<0.0001	<0.0001
Benzene	mg/L	0.001	-	0.1	0.0002	<0.0002	<0.0002	<0.0002
Methylene Chloride	mg/L	-	-	0.1	0.0003	<0.0003	<0.0003	<0.0003
Toluene	mg/L	0.024	-	0.0008	0.0002	<0.0002	<0.0002	<0.0002
Vinyl Chloride	mg/L	0.001	-	0.6	0.00017	<0.00017	<0.00017	<0.00017

-LEGEND-

Detection Limit	May vary between sample locations and events	
Filled	Concentration exceeds ODWQS-ALL-MERGED	Ontario Drinking Water Quality Standards All Types Merged
Bold	Concentration exceeds PWQO-GENERAL	Provincial Water Quality Objectives General
Red	Concentration exceeds PWQO-INTERIM	Provincial Water Quality Objectives Interim

Appendix F

Trigger Mechanisms and Contingency Plan

EAST LAKE WASTE DISPOSAL SITE TRIGGER MECHANISMS - (DRAFT-PROPOSED)

OBJECTIVE AND BACKGROUND

The objective of the trigger mechanisms and contingency plan for the East Lake Waste Disposal Site (WDS) is to identify the potential off-site migration of leachate impacted groundwater, and ensure timely action to prevent and mitigate any adverse impacts to the environment.

North Property Boundary-Groundwater

Assessment Point- EL-MW-1

Trigger Mechanisms- Aluminum, Boron, Chloride, DOC, Iron, Manganese, and TDS

Frequency-Sampling twice per year (Spring and Fall)

Contingency Plan is activated if the following occurs: —

- Four or more of the following chemical parameters exceed at EL-MW-1 assessment point for one sampling event; Aluminum, Boron, Chloride, DOC, Iron, Manganese, and TDS exceeds the RUVs presented in Table 1

Table 1: Trigger Values –RUVs (2-Data Points only in 2008 from EL-MW2)

Parameter	RUV mg/L
Aluminum	0.055
Boron	1.43
Chloride	128
DOC	4.7
Iron	0.165
Manganese	0.03
TDS	253

Note: RUVs to be recalculated in the future

East and South Property Boundary-Groundwater

Assessment Point- Future Buffer Monitoring Wells

Trigger Mechanisms- Aluminum, Boron, Chloride, DOC, Iron, Manganese, and TDS

Frequency-Sampling twice per year (Spring and Fall)

Contingency Plan is activated if the following occurs: —

- Four or more RUV chemical parameters are exceed at the future east assessment point(s) for one sampling event for Aluminum, Boron, Chloride, DOC, Iron, Manganese and TDS. The RUVs are currently set at the values presented in Table 1 but are to be updated



once a new background well is drilled and a minimum of 10 sample results have been obtained.

CONTINGENCY PLAN – GROUNDWATER

Tier 1: If four or more triggers are exceeded at EL-MW-1 or future buffer monitoring wells, during one sampling event, a repeat sampling will be conducted within one (1) month to confirm or refute the results at that location.

Tier 2: If the triggers are exceeded at one assessment point and are confirmed through Tier 1 additional sampling then the following measures will be implemented depending on the nature of the trigger activation:

- a. Increase monitoring frequency to twice monthly, for four months, if exceedances continue. Revert back to typical annual monitoring sampling frequency if there are two consecutive sampling results that do not show exceedances; and/or
- b. Identification of other potential causes for elevated concentrations through additional studies.

Tier 3: If the increased sampling indicates a continuing issue resulting in impacts or potential significant impacts to the environment, then mitigation/remediation measures will be implemented to prevent further impact. These measures would be aimed at intercepting or diverting the impacted groundwater before it reaches a receptor. The specifics of the plan will be dependent on the nature of the impact.



BluMetric Environmental Inc.

1682 Woodward Drive
Ottawa, Ontario
Canada K2C 3R8
Tel: 877.487.8436
Fax: 877.487.8436
Ottawa@blumetric.ca

4 Cataragui Street
The Tower, The Woolen Mill
Kingston, Ontario
Canada K7K 1Z7
Tel: 877.487.8436
Kingston@blumetric.ca

3B - 209 Frederick Street
Kitchener, Ontario
Canada N2H 2M7
Tel: 877.487.8436
Kitchener@blumetric.ca

825 Milner Avenue
Toronto, Ontario
Canada M1B 3C3
Tel: 877.487.8436
Toronto@blumetric.ca

6-410 Falconbridge Road
Sudbury, Ontario Canada
P3A 4S4
Tel: 877.487.8436
Sudbury@blumetric.ca

260-15 Taschereau Street
Gatineau, Quebec
Canada J8Y 2V6
Tel: 877.487.8436
Gatineau@blumetric.ca

200-1500 Du College Street
Saint-Laurent, Quebec
Canada H4L 5G6
Tel: 877.487.8436
Montreal@blumetric.ca

4916 - 49th Street
Yellowknife, NT
Canada X1A 1P3
Tel: 877.487.8436
Yellowknife@blumetric.ca

Whitehorse, Yukon
Canada Y1A 2J8
Tel: 877.487.8436
Whitehorse@blumetric.ca

www.blumetric.ca