

2024 Annual Monitoring Report Musclow-Greenview WDS Environmental Compliance Approval No. A362303

Prepared for:

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1 Introduction

This report provides a summary and analysis of environmental monitoring activities at the Musclow-Greenview Waste Disposal Site (WDS), in Maynooth, Ontario. The WDS is herein referred to as the “Site”.

BluMetric Environmental Inc. (BluMetric®) was retained by The Corporation of the Municipality of Hastings Highlands (MHHs or Municipality) to conduct the 2024 environmental monitoring and sampling program and prepare the 2024 Annual Monitoring Report. This report is prepared in accordance with Condition 6 of the Environmental Compliance approval (ECA) No. A362303 (amended April 27, 2018), a copy of which is included in **Appendix A (A-1)**.

This report covers all work and activities carried out for the period from January 1 to December 31, 2024. The report includes details on both the environmental monitoring and sampling program as well as details relating to site operations, including the Waste Transfer (WT) areas at the Site.

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, 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 2024.

1.1 Location

The WDS is located on Part of Lot 11, Concession 11, at 3375 Musclow Greenview Road, Maynooth, Ontario in the Municipality of Hastings Highlands (Figure 01). The total area of the Site is 2.0 hectares (ha) with a 1.0 ha approved landfilling area. The Site layout is shown in Figure 02.

The Site is accessed via Musclow Greenview Road which is east of Highway 62. There are approximately 10 residences within 500 m of the Site. All are located topographically upgradient from the WDS.

1.2 Ownership and Key Personnel

The facility is operated by the MHHs, with the Municipal office located in Maynooth, Ontario. A copy of the land registry information showing the transfer of the land to the Township of Montegale in 1980 is also provided in **Appendix A (A-2)**. The ownership of which was transferred to the MHHs under amalgamation procedures.

The facility's operational representative is responsible for all activities on-site. The Competent Environmental Practitioner (CEP) for both groundwater and surface water is Mar Somers, P.Eng., of BluMetric. 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	Senior Engineer, BluMetric – Mark Somers, P.Eng.	1682 Woodward Drive, Ottawa, ON, K2C 3R8	(877) 487-8436 ext.446	msomers@blumetric.ca

1.3 Description and Development of the WDS

As mentioned, the Site has a total area of 2.0 ha with a 1.0 ha approved landfilling area. In addition to domestic waste, the WDS also contains a scrap metal pile, a tire pile, a brush pile, a bulky waste pile, and electrical and electronic waste bin, and a recycling transfer station for handling aluminum, metal cans, plastic bottles, paper, cardboard, etc.

The initial development of the Site is unknown, and it is unlikely that studies were undertaken prior to the Site development. It is also unlikely that any engineering or cell planning was completed prior to the initial placement of waste. The original ECA is dated 1989, however anecdotally, it is believed that the first waste was placed around 1970.

1.4 Monitoring and Reporting Program 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 has been developed with these objectives in mind. In addition, the monitoring and reporting programs are designed to adhere to the MECP's WDS-Technical Guidance (November 2010) document and the ECA for the Site. The amended ECA (April 2018) stipulates the requirements for surface water monitoring under Schedule B of the ECA. Historically, the Municipality has undertaken monitoring voluntarily because of the potential for site runoff to impact surface water (from 2006 onward). Shallow groundwater monitoring was initiated in the fall of 2016 with the installation of drive-point piezometers at the Site. The ECA now stipulates groundwater monitoring of the drive point piezometers in Schedule C of the ECA. Subsequent to the ECA Amendment, the MECP requested that additional site characterization be carried out and that a leachate and background well be installed at the Site. Three groundwater monitoring wells were installed at the Site in December 2018.

2 Physical Setting

2.1 Geology and Potential Receptors

2.1.1 Surficial Geology

The surficial geology underlying the Site is sand and gravel as determined from groundwater well information from the online Groundwater Information Network (GIN). Geological maps describe the surficial geology as glaciofluvial outwash deposits (MNDM, 2556). The immediate area of the Site is characterized by sand and gravel overburden with a thickness ranging from 0 to 3 metres below ground surface (mbgs) overlying bedrock. Further site characterization work was carried out in December 2018 which encountered a range of overburden thickness from 8.5 mbgs to 14.5 mbgs along the north and west sides of the waste footprint. The monitoring well logs are provided in **Appendix C**.

2.1.2 Bedrock Geology

The Musclow-Greenview WDS is located within the Grenville geological province, on Precambrian metamorphic bedrock. The bedrock geology of the area is predominantly clastic metasedimentary rocks (for example conglomerate, wacke, quartz arenite, arkose, limestone) to mafic to ultramafic plutonic rocks such as diorite, gabbro, periodite, pyroxenite, anorthosite, derived metamorphic rocks (Map 2544, MNDM). The undifferentiated igneous and metamorphic rock is exposed at surface or covered by a discontinuous, thin layer of drift (Map 2556, MNDM).

2.2 MECP Well Records

A groundwater well information search in 2015 indicated that there are eight domestic wells within 0.5 km of the Site, and 25 domestic and two municipal wells within 1.5 km of the Site. Records show all wells are drilled into bedrock at depths of 30 mbgs or more. Only three of the wells appear to be topographically downgradient from the Site.

2.3 Surface Water Features

The Site is situated along the edge of a topographic high and is bordered by low-lying land to the north and west. The low-lying areas are connected to a wetland southwest of the WDS. These areas are designated as an Environmental Protection area. Based on the topography, the area to the north of the Site contains surface water that is primarily stagnant and if there is any flow, it flows east to west. The wetland area to the west of the Site drains south and west to an unnamed lake, however, a direct connection has not been observed during field investigations. Forested land makes up the majority of the remainder of the surroundings.

Potential groundwater and surface water receptors in the area surrounding the Site include:

- Unnamed Lake, 0.25 km southwest of the Site (Figure 01).
- Goodkey Creek, 0.6 km west of the Site (Figure 01), which flows north from the unnamed lake.

3 Description of Monitoring Program

3.1 Site Inspections and Operations Monitoring

Site visits to the Musclow-Greenview WDS were conducted on May 1, 2024, and October 30, 2024. The detailed site checklists are provided in **Appendix D (D-1)**. Generally, the Site was in good condition although the following concerns were noted:

- A large area of uncovered and uncompacted waste was noted during the spring inspection. In the fall the working area was noted as not compacted.
- Plastic was blown across the site and out the entranceway to the opposite side of the roadway during the spring
- The bulky waste and scrap metal waste piles were noted to be large during the fall inspection
- The brush pile was noted to be still smoldering while on site in the fall
- Monitoring well MG-18-2 was noted to be broken at 4.42 mbTPVC.

The locations of groundwater and surface water monitoring locations are shown on Figure 02, Figure 03, and Figure 04. 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 Drive-Point Piezometer Monitoring

The Musclow-Greenview WDS has five drive-point piezometers which were installed to determine if impacted shallow groundwater from the Site is discharging to surface water. Four of the drive-point piezometers, MG-DP1 to MG-DP4, were installed by BluMetric personnel on October 6, 2016, and were installed from 2.3 mbgs to 2.9 mbgs. More detailed installation data for MG-DP1 to MG-DP4 has been provided in the 2016 Annual Monitoring Report. The fifth drive-point piezometer (MG-DP5) was installed by BluMetric personnel on October 20, 2021, to a depth of 2.63 mbgs.

Drive-point piezometers are monitored on a semi-annual basis (spring and fall). **Table 2** summarizes the coordinates and monitoring location descriptions of the drive-point piezometers.

Table 2: Drive-Point Piezometer Sampling Locations

Sample Location	Northing	Easting	Description
MG-DP1	5,010,719	279,833	Adjacent to MG-SW1 approximately 75 m north of the waste mound.
MG-DP2	5,010,642	279,776	Adjacent to MG-SW2, approximately 45 m NW of the toe of the waste mound.
MG-DP3	5,010,568	279,750	Adjacent to MG-SW-3 approximately 55 m SW from the toe of the waste mound.
MG-DP4	5,010,676	279,838	Located approximately halfway between MG-SW-1 and the waste mound, approximately 35 m north of the waste mound.
MG-DP5	5,010,576	279,699	Located approximately 50 m west of MG-DP3 and 15 m northeast of MG-SW6, approximately 100 m west-southwest of the waste mound.

Note: An elevation survey was carried out on January 10, 2019, and provides the data in Table 5 for MG-DP1 to MG-DP4. An additional survey on October 20, 2021, provides the data for MG-DP5. Coordinates are in NAD 83 and Zone 18.

Groundwater samples were collected from the drive-point piezometers on May 1, 2024, and October 30, 2024. The laboratory reports and chain of custody records are included in **Appendix D (D-2)**. Table 4 lists the groundwater quality monitoring parameters. Field measurements of groundwater pH, temperature, and conductivity were collected at the time of sampling.

3.2.2 Groundwater Monitoring

The Musclow-Greenview WDS is monitored on a semi-annual basis (spring and fall). Three groundwater monitoring wells (MG-18-1, MG-18-2, and MG-18-3) were installed at the Site between December 18-20, 2018, and were surveyed on January 10, 2019. The groundwater sampling locations are illustrated on the Site Plan (Figure 02). These groundwater monitoring wells were installed as per the 2018 ECA amendment for the Site, which stipulated that further investigation into groundwater and surface water impacts be conducted within 12 months after issuance of the amendment. Bedrock drilling did not occur. Due to the background monitoring well MG-18-3 continuously being dry and being unable to collect a sample, a replacement well, MG-18-3R, was installed on September 18, 2023, to a depth of 16.2 mbgs. The boreholes were drilled to depths of 17.4 mbgs, 21.5 mbgs, and 16.2 mbgs (MG-18-1, MG-18-2, and MG-18-3R,

respectively) and are completed in the overburden unit. **Table 3** summarizes the GPS coordinates and location description of the groundwater monitoring wells. Monitoring well logs are provided in **Appendix C**.

Table 3: Groundwater Monitoring Well Details

Sample Location	Northing (m)	Easting (m)	Description	Screened Interval(mbgs)
MG-18-1	5,010,620	279,830	Leachate characterization well (inside the approved footprint of the Site). North edge of the site.	14.33 to 17.38
MG-18-2	5,010,588	279,805	Leachate characterization well (inside the approved footprint of the Site). West side of the site.	18.28 to 21.30
MG-18-3	5,010,638	279,919	Installed to monitor background groundwater quality. East side of the site, depth was limited by boulders encountered during drilling. Monitoring well was decommissioned due to historical dry conditions.	4.72 to 6.25
MG-18-3R	5,010,639	279,918	Installed on September 18, 2023, to replace original background monitoring well, MG-18-3. East side of the site, directly adjacent to MG-18-3.	13.10 to 16.15

Note: Elevations and coordinates as per BluMetric surveys (January 2018, October 2021, and September 2023). NAD 83 and Zone 18.

Groundwater was sampled from the groundwater monitoring locations on May 1, 2024, and October 30, 2024. The laboratory reports and chain of custody records are included in **Appendix D (D-2)**. **Table 4** lists the groundwater quality parameters which were analyzed in 2024.

Table 4: Groundwater Quality Monitoring Parameters

Category	Parameters
Organic Parameters	Biochemical Oxygen Demand (BOD ₅), Dissolved Organic Carbon (DOC), Chemical Oxygen Demand (COD)
Inorganic Parameters	Nitrate, Ammonia, Chloride, Major Ions (Sodium, Calcium, Magnesium, Sulphate, Alkalinity)
Metals (dissolved)	Iron, Chromium, Lead, Cadmium, Boron, Barium, Aluminum, Cobalt, Manganese, Silver, Zinc
Volatile Organic Compounds*	Vinyl Chloride, Methylene Chloride, Benzene, Toluene, and 1,4-Dichlorobenzene
Other	Electrical Conductivity, pH (lab), Total Dissolved Solids (TDS), Total Suspended Solids (TSS)

Note: *MECP requested leachate wells be analyzed for VOCs in 2020. Since there were criteria exceedances, these wells were analyzed for VOCs again in 2022. VOC sampling was not conducted in 2023; however, a VOC sampling event was completed in 2024.

Field measurements of groundwater pH, temperature, and conductivity were collected at the time of sampling. The field pH results for events in 2024 ranged from 6.26 to 7.89 in the spring and ranged from 6.45 to 7.31 in the fall. Low pH values are typical in the region.

During the 2024 monitoring events, the conditions of groundwater monitoring wells were inspected. Any repairs, such as new locks, labels, or well caps, were made as necessary. 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 and are in line with industry best practices.

3.2.2.1 Groundwater Elevation and Flow Monitoring

During both monitoring events groundwater elevations were collected from each of the groundwater monitoring wells. Groundwater level measurements were collected using a Solinst electronic water level meter prior to the purging/sampling activity.

Groundwater elevations are typically not measured at drive-point locations because the water level tape cannot fit in the casing. Consequently the 2024 groundwater elevation data include only one drive-point measurement (MG-DP5). Groundwater elevation data is summarized in **Table 5**.

Table 5: Groundwater Elevation Data

Groundwater Monitor	Elevation (TPVC)* (masl)	Water Level (m) 1-May-24	Groundwater Elevation (masl) 1-May-24	Water Level (m) 30-Oct-24	Groundwater Elevation (masl) 30-Oct-24
MG-DP1	377.55	NR	NR	NR	NR
MG-DP2	376.56	NR	NR	NR	NR
MG-DP3	376.63	NR	NR	NR	NR
MG-DP4	377.28	NR	NR	NR	NR
MG-DP5	376.80	1.095	375.71	1.14	375.66
MG-18-1	391.01	12.64	378.37	13.17	377.84
MG-18-2	391.39 (spring) 395.96 (fall)	18.05	373.34	NR ²	NR ²
MG-18-3	390.80	NA	NA	NA	NA
MG-18-3R	390.78	9.62	381.16	10.83	379.95

Notes: Elevations and coordinates as per BluMetric surveys (January 2018, October 2021, September 2023). NAD 83 and Zone 18.

*TPVC – Elevation (m) at top of PVC casing.

² – Monitoring well broken, unable to measure water level.

NR – No Reading

NA – Not applicable

3.2.2.2 Groundwater Gradients and Flow Direction

Groundwater elevations were not collected from the drive-point piezometers (except for MG-DP5). Therefore, groundwater flow gradients and direction could not be calculated. Historic data varies but generally, shallow groundwater is inferred to be mounding below the WDS and flowing radially away from the Site towards the west. A wetland is located approximately 140 m to the southwest of the final waste footprint. The wetland is adjacent to an unnamed lake which discharges to the north towards Goodkey Creek.

3.2.3 Surface Water Monitoring

Under the ECA, the current surface water monitoring program consists of four locations (historical locations MG-SW1, MG-SW2, MG-SW3, and a background location) which are monitored on a semi-annual frequency. The current background location is MG-SW4A. The sampling locations are identified on Figure 03. Location MG-SW1 is located north of the landfill. Location MG-SW2 is located near the north-northwest toe of the landfill and is intended to provide results reflective of potential runoff related impacts in this direction. Location MG-SW3 is located downstream of the landfill and is used to monitor potential surface water impacts from the landfill to the west and potentially to the lake southwest of the Site. Location MG-SW4A is an up-gradient background sample location collected from Goodkey Creek approximately 1 km north of the Site.

Previously, background surface water was sampled at location MG-SW4 and MG-SW5. These locations were found to be frequently dry and therefore were replaced by the current background location MG-SW4A. The former sample locations MG-SW4 and MG-SW5 are shown on Figure 02.

One-time, supplemental surface water samples (MG-SW6 and MG-SW7) were collected in the late summer and early fall of 2020 as requested by the MECP. Location MG-SW6 is located approximately 70 m west of MG-SW3 and MG-SW7 is located approximately 130 m southwest of MG-SW3. These two supplemental surface water sampling locations are illustrated on Figure 03. These locations were sampled to assist in determining the extent of potential downgradient WDS impacts on surface water. MG-SW6 should be sampled on a semi-annual frequency and MG-SW7 should be sampled every five years (e.g., 2025, 2030, etc.).

Surface water samples were collected from MG-SW1, MG-SW2, MG-SW3, MG-SW4A, and MG-SW6 on May 1, 2024, and from MG-SW4A on October 30, 2024. Samples could not be collected from MG-SW2, during the October sampling event due to dry conditions. Each sampling station was photographed, and physical conditions (velocity and watercourse dimensions) were documented. Table 6 details the GPS coordinates and general descriptions for the sample locations.

Table 6: Surface Water Sampling Locations

Sample Location	Northing	Easting	Location Description
ECA Sampling Locations			
MG-SW1	5,010,713	279,836	90 m north of the final waste footprint.
MG-SW2	5,010,640	279,775	45 m northwest of the toe of the final waste mound.
MG-SW3	5,010,566	279,754	55 m southwest from the toe of the final waste mound.
MG-SW4A (Background)	5,011,183	279,650	Goodkey Creek is approximately 860 m northwest of the final waste footprint.
Supplemental Sampling Locations			
MG-SW6	5,010,569	279,685	70 m west of MG-SW3 and 120 m west of the final waste footprint, sampled semi-annually
MG-SW7	5,010,539	279,636	130 m southwest of MG-SW3 and 180 m west of the final waste footprint, sampled every five years.
Former Background Locations			
MG-SW4	5,011,754	279,563	Goodkey Creek is approximately 1 km north of the final waste footprint.
MG-SW5	5,011,732	279,580	Off of the access road to the municipal aggregate pit, 600 m to the north of the final waste footprint.

Note: NAD 83 datum, UTM Zone 18

Surface water temperature, pH, conductivity, and dissolved oxygen field measurements were recorded at the time of sampling. The field pH values ranged from 6.53 to 7.92 in the spring and 7.13 to 7.85 in the fall. Surface water samples were analyzed for the parameters listed in Schedule B of the ECA. Table 7 lists the surface water quality parameters which were analyzed in 2024.

Table 7: Surface Water Quality Parameters

Category	Parameters
Biological Parameters	BOD ₅
Organic Parameters	COD, Phenols
Inorganic Parameters	Alkalinity, Chloride, Nitrite, Nitrate, Sulphate, Phosphorous (total), Total Kjeldahl Nitrogen (TKN), Ammonia (N) – Total, Calcium, Aluminum – Dissolved, Barium, Boron, Cadmium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Potassium, Sodium, Zinc
Physical/Chemical Parameters	pH, Conductivity, TDS, TSS, Total Hardness (as CaCO ₃)

Surface flow measurements were collected using a Global Flow Probe for open channel flow. The flow velocity in meters per second (m/s) was recorded along with the width and depth of flow. Table 8 summarizes the calculated flow measurements and water clarity observations for each location.

Table 8: Surface Water Sampling Locations and Observations

Date	Location	Field Observations
May 1, 2024	MG-SW1	Flooded wetland area, no flow observed. The water was clear with a light brown colour. Sample collected
	MG-SW2	Flooded wetland, no flow observed, algae growth. Sample collected.
	MG-SW3	Swampy area with no direct flow path, “trickle” of flow noted at stake location. The water was a light colour. Sample collected and one pail for toxicity.
	MG-SW4A	Flow = 0.338 m ³ /s. Beaver activity up and down stream, minnows observed. The water was clear with a light brown tinge. Sample collected.
	MG-SW6	Wetland sample, no flow observed. The water was clear with a light brown colour. Sample collected.
October 30, 2024	MG-SW1	Flooded low lying area, no flow observed. High organics, iron staining/precipitate. Sample collected.
	MG-SW2	Pockets of shallow standing water. No flow, no connection between standing water. Organics, leaf covered, <4cm depth. No sample collected.
	MG-SW3	Very small trickle of water observed leaving location. The water was clear. Sample collected. Pail for toxicity sample was collected October 29 th to meet shipping deadlines.
	MG-SW4A	Flow = 0.028 m ³ /s. The water was clear. Sample collected.
	MG-SW6	Large flooded swampy area, no flow observed. The water was clear with a light brown colour and some organics. Sample collected.

3.2.4 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. Regulation 232/98 methane concentration limits 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 required at the Site.

3.3 Monitoring Procedures and Methods

3.3.1 Drive-Point Piezometer Monitoring

Drive-point piezometer purging and sampling was conducted using a peristaltic pump. Minimum purge and ultra-low flow rate techniques were used to purge and sample each drive-point. Each location was purged of the standing water in the sample tubing prior to filling sample bottles. In the case where a drive-point was purged dry, samples were collected after sufficient water had recovered. Field temperature, pH, and conductivity measurements were recorded at the time of sampling using a YSI multi-meter. The instrument was calibrated and/or checked for pH and conductivity. Samples were field filtered for DOC and metals analyses. Samples were collected in laboratory-prepared and supplied bottles and submitted for analysis to Bureau Veritas (BV) Laboratories. Laboratory reports and chain of custody forms are compiled in **Appendix D (D-2)**. Bureau Veritas is an accredited member of the Canadian Association of Laboratory Accreditation (CALA).

3.3.2 Groundwater Monitoring

Groundwater monitoring wells were purged a minimum of three borehole volumes or until the monitor purged dry. In the case where a monitor 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 and/or checked for pH and conductivity. Samples were field filtered for DOC and metals analyses. Samples were collected in laboratory prepared and supplied bottles and submitted to Bureau Veritas (BV) Laboratories. Laboratory reports and chain of custody forms are compiled in **Appendix D (D-2)**.

3.3.3 Surface Water Monitoring

Surface water samples were collected using a peristaltic pump and new sample tubing. Field temperature, pH, conductivity, and dissolved oxygen measurements were recorded at the time of sampling. During both sampling events the field parameters were measured using a YSI multi-meter calibrated as per the manufacturer's instructions. Surface water samples were filtered by the laboratory for the dissolved aluminum and mercury sample analyses.

Surface water samples were collected in laboratory-prepared and supplied bottles and submitted to Bureau Veritas (BV) Laboratories. Surface water samples were stored at approximately 4° Celsius during shipment to BV Laboratories for chemical analyses. Holding 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 chain of custody forms are compiled in **Appendix D (D-3)**.

3.3.4 Landfill Gas Monitoring

An RKL Eagle gas monitor with methane detection was used to monitor landfill gas at the Site during the semi-annual monitoring events.

There are no sampling valves, ports, or vapour monitors on-site. Gas monitoring was conducted for the site attendant's building and from the groundwater monitoring wells and drive-point piezometers during both the spring and fall 2024 sampling events. Gas monitoring measurements from the groundwater monitoring wells were collected prior to collecting groundwater levels or samples. These measurements were completed by inserting the intake of the gas monitoring equipment under the cap of the monitoring well prior to removal of the cap and by keeping the best seal possible around the cap and gas equipment intake.

3.3.5 Quality Assurance/Quality Control 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. One field duplicate per sample matrix was collected during each sampling event 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, 20% for metals and inorganics, and 30% for BTEX and PHC. 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 can produce repeatable results.

All equipment for field parameter testing and gas monitoring is calibrated in the field during each sampling event, or by the supplier.

One blind field duplicate per media was sampled and submitted for analysis during each of the sampling events. The field duplicate bottles were filled simultaneously with the actual sample bottles at the sample location selected for duplication. The laboratory prepared bottles (identified and duplicate) for each group of chemical parameters (e.g., metals, nutrients, general chemistry etc.) were filled simultaneously to ensure identical water was collected into each container. This continued for each matching parameter group bottle until both sample bottle sets for that location were filled.

4 Monitoring Program Results

4.1 Groundwater Monitoring Results

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

Ontario Drinking Water Standards and Operational Guidelines (ODWSOG)

The 2024 drive-point and monitoring well groundwater chemistry results are shown in Table 16 (end of the text). The laboratory reports and chain of custody records are included in **Appendix D (D-3)**. The groundwater chemistry results were compared to the ODWSOG and parameters with results falling outside the criteria are summarized in Table 9 below.

Table 9: Groundwater Quality Parameters Below or Exceeding ODWSOG

Location	General Description	Parameter(s) Not Meeting ODWSOG
Drive-point Piezometer Data		
MG-DP1	Downgradient to the north of the WDS	DOC TDS Manganese
MG-DP2	Downgradient to the northwest of the WDS	DOC Manganese
MG-DP3	Downgradient to the west of the WDS	Alkalinity DOC TDS Iron Manganese

Location	General Description	Parameter(s) Not Meeting ODWSOG
Drive-point Piezometer Data		
MG-DP4	Downgradient to the north of the WDS	None
MG-DP5	Downgradient to the west of the WDS	DOC TDS Iron Manganese Zinc
Monitoring Well Data		
MG-18-1	Leachate well on the north side of the WDS	DOC TDS Iron Manganese
MG-18-2 (Spring only)	Leachate well on the west side of the WDS	Alkalinity DOC TDS Iron Manganese Benzene Vinyl C
MG-18-3R	Replacement background well on the east side of the WDS	TDS

A limited group of VOCs were analyzed at MG-18-1 and MG-18-2 during the fall 2019, 2020, 2021 and spring 2022 sampling events with a full suite of VOCs sampled during the 2022 fall sampling event and the spring 2024 sampling event. Benzene and vinyl chloride exceeded ODWSOG guidelines during the 2024 sampling event at MG-18-2. Benzene and vinyl chloride concentrations have exceeded the ODWSOG guidelines at MG-18-2 during previous sampling events.

Reasonable Use Values (RUVs)

The following calculations are based on the background groundwater (MG-18-3 and MG-18-3R) quality from the May 2019, May 2023, October 2023, May 2024, and October 2024 sampling events. It is important to note that the RUVs are based on only five data points (five sampling events) and as a result are not fully reliable. As more sampling events are added to the calculations, the reliability of the RUVs will increase.

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

Where:

- C_m: maximum allowable concentration in groundwater beneath adjacent property (RUV)
- C_b: median background concentration before any effects from human activity
- C_r: maximum concentration that should be present based on use (ODWSOG)
- x: 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)

The following Table 10 summarizes the data used to calculate C_m values (RUVs).

Table 10: Reasonable Use Calculations

Parameter	Units	ODWSOG	Historical Median	x	RUV
		Cr	Cb		Cm
Alkalinity as CaCO ₃ (lower)	mg/L	30	65.5	0.5	47.8
Alkalinity as CaCO ₃ (upper)	mg/L	500	65.5	0.5	282.8
pH (lower)		6.5	7.355	0.5	6.9
pH (upper)		8.5	7.355	0.5	7.9
Aluminum	mg/L	0.1	0.00245	0.5	0.051225
Barium	mg/L	1.0	0.016	0.25	0.262
Boron	mg/L	5.0	0.0105	0.25	1.257875
Cadmium	mg/L	0.005	0.000045	0.25	0.00128375
Chromium	mg/L	0.05	0.0025	0.25	0.014375
Chloride	mg/L	250	0.5	0.5	125.25
DOC	mg/L	5.0	2.1	0.5	3.55
Iron	mg/L	0.30	0.05	0.5	0.175
Lead	mg/L	0.01	0.00025	0.25	0.0026875
Manganese	mg/L	0.05	0.0135	0.5	0.04075
Nitrate	mg/L	10	0.085	0.25	2.56375
Sodium	mg/L	200	3	0.5	101.5
Sulphate	mg/L	500	7.15	0.5	253.575
TDS	mg/L	500	465	0.5	482.5
Zinc	mg/L	5.0	0.0025	0.50	2.50125

Parameters from the 2024 Musclow-Greenview WDS monitoring program that exceeded the RUVs are shown in the following Table 11.

Table 11: Groundwater Quality Parameters Below or Exceeding RUV Criteria

Location	Parameter(s) Below or Exceeding RUV Criteria
Drive-Point Data	
MG-DP1	DOC TDS Manganese
MG-DP2	DOC Manganese
MG-DP3	Alkalinity (upper limit) DOC TDS Iron Manganese
MG-DP4	DOC pH (upper limit in spring)
MG-DP5	DOC TDS Iron Manganese Zinc
Monitoring Well Data	
MG-18-1	DOC TDS Iron Manganese
MG-18-2 (spring only)	Alkalinity (upper limit) Chloride DOC TDS Boron Iron Manganese
MG-18-3R	TDS

Provincial Water Quality Objectives (PWQO)

Since groundwater has the potential to discharge to surface water at the Musclow-Greenview WDS, groundwater has also been compared to the surface water criteria and the results are presented in Table 16 at the end of the text. The parameters not meeting PWQO criteria are summarized below in Table 12.

Table 12: Groundwater Quality Parameters Below or Exceeding PWQO Criteria

Location	General Description	Parameter(s) Not Meeting PWQO
Drive-Point Data		
MG-DP1	Downgradient to the north of the WDS	None
MG-DP2	Downgradient to the northwest of the WDS	None
MG-DP3	Downgradient to the west of the WDS	Iron Boron Cobalt
MG-DP4	Downgradient to the north of the WDS	None
MG-DP5	Downgradient to the west of the WDS	Iron Cobalt Zinc
Monitoring Well Data		
MG-18-1	Leachate well on the west side of the WDS	Iron Cobalt
MG-18-2 (Spring only)	Background well on the east side of the WDS	Iron Boron Cobalt
MG-18-3R	Leachate well on the west side of the WDS	None

Historic groundwater data up to and including 2024 is provided in **Appendix E (E-1)**.

4.2 Surface Water Monitoring Locations Observations

Based on site observations, it appears that surface water does not have a direct flow path away from the mound and is relatively stagnant in the northwest and north portions of the Site, particularly at MG-SW1. This is especially true in the drier summer months and when water levels in the wetland are low. The wetland area surrounding the northwest and west sides of the WDS ultimately drains toward MG-SW3 and MG-SW6 which act as the downgradient sampling locations. These historic observations were confirmed during the spring sampling event with no flow observed at MG-SW1, MG-SW2, and MG-SW6, and minimal flow observed at MG-SW3. The water at the background location (MG-SW4A) was observed to have a flow of 0.3375 m³/s and beaver activity up and down stream of the location.

During the fall sampling event, no flow was observed at MG-SW1, MG-SW2, and MG-SW6, with insufficient water to collect a representative sample at MG-SW2. MG-SW3 was observed to have a small trickle of flow. Background location MG-SW4A was noted to have a flow of 0.0276 m³/s

4.3 Surface Water Quality Results

Surface water quality results were compared to PWQO, Table A, and Table B criteria of the WDS Technical Guidance document (MOE, 2010).

Table 13 summarizes the parameters that exceeded the criteria. The 2024 surface water results are summarized in Table 17 at the end of the text.

Table 13: Surface Water Quality Parameter Exceedances

Location	Exceeded PWQO	Exceeded Table A	Exceeded Table B
MG-SW1	Phenols (spring only) Iron (fall only)	Iron (fall only)	None
MG-SW2	Phenols (spring only)	None	None
MG-SW3	Phenols (spring only) Boron (fall only)	None	None
MG-SW4A	Iron (fall only)	None	None
MG-SW6	Total phosphorus (fall only)	None	None

The laboratory detection limit (LDL) for cadmium exceeded the Table B guidelines for all surface water samples submitted in 2024. This has routinely occurred since surface water monitoring began in 2006 at all locations, including the background sample locations. The Table B cadmium criteria is an interim guideline and well below the PWQO criteria (0.0001 mg/L or 0.0005 mg/L, hardness dependent). As a result, the cadmium LDL exceeding the Table B guideline is not considered to be a concern.

The average 2024 alkalinity concentration for MG-SW4A (background in the creek) was 40.5 mg/L. Alkalinity is typically low in the region. PWQO criteria states that alkalinity cannot be decreased by more than 25%, which in this case would be 30.38 mg/L. Alkalinity concentrations in all other monitoring locations above 30.38 mg/L for each sampling event in 2024.

Historic surface water data up to and including 2024 is provided in **Appendix E (E-2)**.

4.4 Landfill Gas Monitoring

Landfill gas readings collected during the 2024 spring and fall sampling events are presented in Table 14 below.

Table 14: 2024 Landfill Gas Field Data

Building	Description of Reading Location	Reading (ppm)
May 1, 2024, Sampling Event		
Attendant's Building	RKI probe inserted through main door	0
DP1	Well head	15
DP2	Well head	15
DP3	Well head	15
DP4	Well head	10
DP5	Well head	0
MG-18-1	Well head	25
MG-18-2	Well head	>100% LEL
MG-18-3	Well head	0
October 30, 2024, Sampling Event		
Attendant's Building	RKI probe inserted through main door	0
DP1	Well head	0
DP2	Well head	5
DP3	Well head	5
DP4	Well head	0
DP5	Well head	15
MG-18-1	Well head	0
MG-18-2	Well head	NR ²
MG-18-3R	Well head	0

Notes:

² – Monitoring well broken, unable to take reading.

NR – No Reading

4.5 QA/QC Results

One groundwater and one surface water duplicate sample were collected during each of the spring and fall sampling events in 2024. The consistency of the results was evaluated based on the relative percentage difference (RPD) of each duplicate pair. The only groundwater duplicate sampling parameter that exceeded the QAQC criteria was TSS with a RPD of 20% during the fall sampling event. The surface water duplicate sampling parameters that exceeded the QAQC criteria during the spring sampling event were chloride with a RPD of 22%, alkalinity with a RDP of 53%, COD with a RPD of 29%, and conductivity with a RPD of 41%. The only surface water duplicate sampling parameters that exceeded the QAQC criteria during the fall sampling event was dissolved aluminum with a RPD of 116%. The QA/QC results are provided in **Appendix D (D-4)**.

4.6 Trigger Mechanisms and Contingency Plan

In August 2019, BluMetric in consultation with the MECP developed revised Trigger Mechanisms and Contingency Plans for the Musclow-Greenview WDS. This document is provided in **Appendix F**. The document is to be further revised based on future monitoring results and discussions between BluMetric and the MECP. As part of this document, MG-SW1 and MG-SW3 are considered the surface water trigger points for the north and west property boundaries, respectively.

MG-SW1 (north property boundary) is sampled semi-annually with assessment criteria of iron, boron, lead, aluminum, unionized ammonia, and zinc. The contingency plan is activated if two or more of the assessment criteria exceeds PWQO. The MG-SW1 chemical results in 2024 did not trigger the Tier 1 Contingency Plan response for surface water.

MG-SW3 (west property boundary) is sampled semi-annually in the spring and fall for toxicity results. A toxicity sample was collected from MG-SW3 during the spring and fall sampling event in 2024 for single-concentration acute lethality testing of *Daphnia magna* (48 hour) and rainbow trout (96 hour). The single concentration test is typically reported as a “pass” or “fail” test, with 50% mortality being the passing limit. The results from the toxicity testing at MG-SW3 for both sampling events indicated that the percent mortality for *Daphnia magna* and Rainbow Trout were 0%. The MG-SW3 toxicity results in 2024 did not trigger the Tier 1 Contingency Plan response for surface water. The toxicity laboratory results are presented in **Appendix D (D-3)**.

In addition to the surface water trigger mechanisms, a groundwater trigger mechanism and contingency plan is provided. A future assessment point will be determined if deemed necessary in consultation with the MECP. The assessment point will be sampled semi-annually with assessment criteria of alkalinity, aluminum, boron, DOC, iron, lead, manganese, TDS, and zinc. The Contingency Plan will be activated if three or more of the assessment criteria exceeds the specified criteria (PWQO or RUV).

5 Assessment, Interpretation, and Discussion

5.1 Groundwater Assessment

The groundwater chemistry results for the five drive-point piezometers and the on-site monitoring wells sampled during the two monitoring events in 2024 are summarized in Table 16 (end of text). Parameters that were outside the RUVs, ODWSOG, and/or PWQO criteria are flagged. **Appendix E-1** presents the historical groundwater quality results from the Musclow-Greenview WDS. Chemistry trend graphs for select parameters are provided following the tables, figures, and photographs at the end of this report.

5.1.1 Drive-Point Water Quality Assessment

Drive-point MG-DP1 is located to the north of the WDS and is considered to be a downgradient monitoring location due to the radial flow away from the WDS. Concentrations at MG-DP1 have generally remained consistent since monitoring began in 2016, with the exception of barium, chloride, sodium, and TDS which have shown a slight increasing trend. In addition, sulphate remains at the highest concentration among all drive-point monitoring locations, however, it remains well below ODWSOG and RUV limits. Exceedances of ODWSOG and RUV criteria at MG-DP1 include DOC, TDS, and manganese. No PWQO exceedances were recorded at this monitoring location.

Drive-point MG-DP2 is located northwest of the toe of the waste mound and is a downgradient monitoring location. Concentrations for all monitored parameters have generally remained consistent at this location since monitoring began in 2016. Exceedances of ODWSOG and RUV criteria at MG-DP2 are limited to DOC and manganese. No PWQO exceedances were recorded at this monitoring location. No apparent trend in groundwater quality is apparent at MG-DP2.

Impacts related to the WDS are present at MG-DP3, located west of the WDS, with consistent ODWSOG, RUV, and PWQO exceedances of several parameters including alkalinity, DOC, TDS, boron, cobalt, iron, and manganese. Increasing concentrations of boron, cobalt, iron, alkalinity, barium, sodium, and TDS have been observed since monitoring began in 2016. PWQO exceedances at MG-DP3 were recorded for boron, cobalt, and iron. Boron at MG-DP3 remains well below the ODWSOG criteria but has consistently exceeded the interim PWQO criteria since 2017. Based on the 2024

sampling events, it appears that shallow groundwater in the vicinity of MG-DP3 has the potential to impact MG-SW3.

Drive-point MG-DP4 is located north of the WDS, between MG-DP1 and the WDS. Concentrations at MG-DP4 have generally remained consistent since monitoring began in 2016 with the exception of aluminum which had a significant spike in fall 2022 sampling event exceeding the RUV and PWQO. The concentration for aluminum was below the laboratory detection limit for both sampling events in 2024. An increasing trend in chloride concentrations has also been apparent since 2019. The DOC results for both sampling events were above the RUV and ODWSOG. The results for pH were above the upper limit in the spring. No other exceedances were recorded in 2024. Based on aluminum results for both sampling events in 2023 and 2024, the spike observed in the fall 2022 sampling event does not indicate an emerging trend. Concentrations for many of the monitored parameters are greater at MG-DP1.

Impacts related to the WDS may be present at MG-DP5. Increasing concentrations of iron, and manganese are observed since monitoring began in fall 2021. Cobalt concentrations have decreased in 2024 after peaking in 2023 but remain elevated. Exceedances of ODWSOG, RUV, and PWQO include DOC, TDS, cobalt, iron, manganese, and zinc. Continued monitoring is required to assess potential downgradient WDS impacts.

Some of the elevated DOC concentrations may be attributed to naturally occurring conditions associated with the wetland. Marshes and peatland have recorded ranges of DOC from 19 to 38 mg/L (Moore, 2003), and the 2024 data fell below this range at each location. The historical results for DOC at the Site that range from 59.9 to 185 mg/L could be attributed to WDS impacts.

To address potential impacts at MG-DP3 and MG-DP5, it is recommended that the Municipality plan for an assessment of the development of the Site based on this new data. Based on the results at MG-DP5, it is suggested that MG-SW6 continue to be sampled on a semi-annual basis.

Groundwater is expected to discharge to surface at or before the property line and therefore it is expected that groundwater downgradient from the WDS property boundary is not being impacted by leachate and is compliant with Guideline B-7.

5.1.2 Monitoring Well Water Quality Assessment

Groundwater quality on site is monitored by the three on-site monitoring wells, MG-18-1, MG-18-2, and MG-18-3/MG-18-3R. MG-18-3R was installed directly adjacent to the original background monitoring well MG-18-3, in response to the MECP indicating that if MG-18-3 continued to be dry that an alternate background monitoring well may be required (MECP, July 2019). Background monitoring well MG-18-3 had previously only been sampled once (2019) due to insufficient water, however, was sampled during the 2024 spring and fall sampling events. Exceedances at MG-18-3R were limited to TDS (RUV and ODWSOG). Future sampling is required to establish water quality trends.

MG-18-1 is a leachate characterization well located on the north edge of the approved footprint. Groundwater quality at MG-18-1 has been relatively consistent since monitoring began in 2019. A minor increasing trend for chloride, sodium, boron, cobalt, manganese, and TDS is apparent at this location, with consistent RUV and ODWSOG exceedances of manganese and consistent PWQO exceedances for cobalt since monitoring began in 2019. In addition to the above noted exceedances, consistent RUV exceedances of iron (since October 2021), TDS, and DOC have been observed since monitoring began.

MG-18-2 is also a leachate characterization well, located on the west edge of the approved footprint. Several increasing trends are apparent at this location since monitoring began in 2019, including boron, cobalt, manganese, and sodium, as shown by the attached trend graphs at the end of the text. Remaining measured parameters have generally remained consistent and within the historical range of results. A new maximum was recorded for manganese during the spring sampling in 2024. During the fall 2024 event the well was broken and not sampled. Consistent criteria exceedances have been reported at this location since monitoring began for several parameters including alkalinity, TDS, DOC, iron, and manganese for RUV and ODWSOG. In 2024 Chloride also exceeded the RUV during spring event. In addition, concentrations of boron, cobalt, and iron have consistently exceeded the PWQO. Concentrations at MG-18-2 tend to be the highest on site.

VOC monitoring was conducted at MG-18-1 and MG-18-2 during the spring sampling event in 2024. Concentration of benzene and vinyl chloride at MG-18-2 exceeded the ODWSOG, however, remained well below PWQO. Benzene exceedances were also reported at this location during both the 2022 events, as well as the fall 2021 and fall 2019 sampling events. No VOC exceedances have been reported at MG-18-1 since monitoring began in 2019. The MECP review comments received in July 2019 indicate that comprehensive VOC sampling shall be conducted at only MG-18-1 and MG-18-2 on a biannual frequency. The next VOC sampling event will occur in 2026.

It is not currently expected that the bedrock groundwater aquifer is impacted by leachate, or out of compliance with RUVs and Guideline B-7. Due to the wetland surrounding the Site, groundwater is expected to discharge to surface at or before the property line prior to reaching any potential groundwater receptors. Based on this, a bedrock monitoring well is not deemed necessary. In addition, the WDS is considered to be compliant with Guideline B-7.

5.2 Surface Water Assessment

The surface water chemistry results from the two monitoring events in 2024 are summarized in Table 17 (end of text). Parameters that were outside the PWQO, MECP Table A and/or MECP Table B criteria are flagged. **Appendix E (E-2)** presents the historical surface water quality results from the Musclow-Greenview WDS. Chemistry trend graphs for select parameters are provided following the tables, figures, and photographs at the end of this report.

Surface water monitoring location MG-SW4A represents background surface water conditions for the Musclow-Greenview WDS. It is located on Goodkey Creek, approximately 860 m northwest of the final waste footprint. The only criteria exceedance observed at MG-SW4A was for the PWQO for iron during both sampling events. The PWQO for iron has been routinely exceeded during the fall sampling events along with sporadic exceedances of phenols and aluminum. The former background location MG-SW4 also had sporadic exceedances of phenols, total phosphorus, cadmium, iron, and zinc. No apparent trend in water quality is apparent at MG-SW4A, however, data is limited to due to the location only being established in spring 2020.

An increasing trend in boron concentrations has been apparent at MG-SW3 since the spring 2019 sampling event, however, a notable drop in concentration was observed during the spring 2024 sampling event followed by a new record high during the fall 2024 sampling event. Boron routinely exceeds the PWQO at MG-SW3. Boron was also slightly elevated at MG-SW2 and MG-SW3 during the spring 2022 sampling event.

There are no other apparent trends in water quality at any of the monitored locations. Several parameters have had sporadic exceedances throughout the years of monitoring. Examples include cobalt which has sporadically been detected above PWQO at MG-SW1, MG-SW2, and MG-SW3 with the highest concentrations observed at MG-SW2 and MG-SW3. No cobalt PWQO exceedances have been recorded since 2018 at any of the monitored locations. Zinc concentrations have also been sporadically detected above the PWQO between 2006 and 2017 at MG-SW1, MG-SW2, and MG-SW3, with no exceedances since 2018 with the exception of an exceedance at former background location MG-SW4 during the fall 2020 sampling event. Other parameters which have had sporadic exceedances throughout the years of monitoring at MG-SW1, MG-SW2, and/or MG-SW3 include cadmium, copper, lead, silver, thallium, and vanadium with the highest concentrations generally observed at MG-SW2 and MG-SW3.

Dissolved aluminum exceeded PWQO at MG-SW1 and MG-SW4A during the spring 2023 sampling event. These represent the first dissolved aluminum exceedances since monitoring began in 2006. In 2024 the dissolved aluminum concentrations returned to levels below the PWQO. Continued monitoring is recommended to determine whether these exceedances represent an emerging trend in water quality.

Total phosphorus concentrations have routinely been detected above PWQO criteria at all sampling locations except for the background sampling locations (MG-SW4A and previously MG-SW4). The highest concentrations of total phosphorus have generally been observed at MG-SW2 and MG-SW3. Wetland complexes can have naturally elevated concentrations of total phosphorus with respect to the PWQO. The only PWQO exceedance for total phosphorus in 2024 was recorded at MG-SW6 during the fall sampling event.

Iron concentrations have also been routinely detected above the PWQO at MG-SW1, MG-SW2, MG-SW3, and MG-SW4A (and previously MG-SW4) with large fluctuations in concentrations for MG-SW1, MG-SW2, and MG-SW3. Typically, concentrations are higher during the fall sampling events when locations tend to have less water. There were exceedances of iron at MG-SW1 (PWQO and Table A) and MG-SW4A (PWQO) during the fall 2024 sampling period.

Phenols concentrations have been detected above the PWQO during sampling events at all sampling locations, including the newly added MG-SW4A. Of these exceedances, the concentrations tend to be the highest at MG-SW3. The fall 2021 phenols concentration at MG-SW3 represents the maximum recorded concentration. Wetland complexes can have naturally elevated concentrations of phenols. Phenols concentrations in 2024 exceeded the PWQO at four locations. MG-SW1, MG-SW2, and MG-SW3 all had exceeding results in the spring, while MG-SW6 had an exceedance in the fall. Analytical data for MG-SW6 is limited compared to other sampling locations with the first sampling event occurring in spring 2020. Concentrations of cadmium and iron have previously exceeded PWQO in 2020 and 2022. Concentrations of total phosphorus has also exceeded for those years as well as being the only exceedance during the 2023 sampling period during just the spring event. Continued monitoring is required to assess whether there are any emerging trends at MG-SW6.

Historically, concentrations of parameters above PWQO are generally higher for surface water sampling locations MG-SW2 and MG-SW3 when compared to MG-SW1, and MG-SW4/MG-SW4A. The concentrations of multiple parameters above the PWQO at all locations indicate there are impacts from site operations to the surface water in the immediate vicinity of the WDS.

5.3 Landfill Gas Assessment

The RKI Eagle gas monitoring results for 2024 indicated one results of methane gas concentrations above the concentration of concern, 25,000 ppm, for the subsurface. During the spring event a reading of >100% LEL was recorded at MG-18-2. In the fall monitoring well MG-18-2 was broken and no gas reading was able to be recorded. All other locations had concentrations between 0 and 25 ppm which is well below the concentration of concern. Gas monitoring must be conducted at all groundwater monitoring wells and onsite structures (site attendant's building).

6 Site Observations

6.1 Annual Waste Summary

Although access to the Site is controlled via a locked security steel gate, some residents deposit garbage at the disposal site outside of the landfill’s normal operating hours. This contribution is collected by site personnel, recorded, and included in the total waste volumes identified for the Site.

Estimated volumes for the Site are provided below in Table 15 and are based on Contractors’ tonnages and estimations based on the number of bags deposited at the Site. The tonnages below include recyclables and waste from primarily residential sources in the municipality.

The waste report for 2024 indicates that approximately 25.4 tonnes of recyclables (R) and 195.9 tonnes of waste (W) were deposited in the Musclow-Greenview WDS. The quarterly breakdown is shown below in Table 15. Based on the estimated numbers, a total of 11.5% of residential waste was recycled in 2024. Waste deposited at the Site increased in 2024 by 9.2%. The 2024 numbers also indicate an approximate 7.6% decrease in the recycling of mixed fibres and commingled containers at the Musclow-Greenview WDS from 2024 tonnages.

It should be noted that 2024 and 2023 waste numbers are based on estimates. The 2024 and 2023 waste calculations are based on bag counts at the waste sites. There were 13,057 bags deposited at the Musclow-Greenview WDS in 2024, and an assumed 15 kg/bag (MHH’s) was used in the tonnage calculations.

Table 15: Annual Recycling and Waste Tonnages

Q1		Q2		Q3		Q4		Year End	
(R)	(W)	(R)	(W)	(R)	(W)	(R)	(W)	(R)	(W)
2023									
6.7	36.1	6.5	44.0	8.1	54.4	6.2	44.8	27.5	179.3
2024									
5.8	35.3	6.2	51.9	7.8	60.1	5.7	48.7	25.4	195.9

In addition, segregated materials were collected at the nine waste disposal/transfer sites in the MHHs. The breakdown of these wastes in 2024 at the Musclow-Greenview site was:

- Scrap metal – 7.58 tonnes;
- Bulky wastes – 14.11 tonnes;
- Leaf and yard waste – 205 truck/trailer loads;
- Electrical and Electronic Equipment – 1.69 tonnes; and
- 55 tires.

Battery quantities were not tracked by site, but a total of 975 kg was received at all nine sites. There were no documented complaints for rejected waste at the Musclow-Greenview WDS and there were no emergency situations in 2024.

6.2 Capacity and Remaining Site Life

The approved capacity for the Musclow-Greenview WDS is 27,500 m³. According to the most recent survey data (November 2022) and the updated 2017 D&O Plan, the current net volume remaining was calculated to be 18,103 m³, including intermediate cover. The total volume of fill (intermediate cover) required to cover the waste site was calculated at 3,964 m³. Thus, the volume remaining for waste and daily cover placement was estimated at 14,139 m³. The remaining capacity of the WDS as of November 9, 2022, is illustrated on Figure 05.

The last five annual monitoring reports for the Site have recorded annual waste generation rates of 112.7 (2020), 138.3 (2021), 160.7 (2022), 179.3 (2023) tonnes, and 195.9 (2024) tonnes, resulting in an average tonnage of 157.4 tonnes per year. The 157.4 tonnes are estimated to equate to 314.8 m³ of compacted waste per year (no soil cover), assuming a compaction rate of 500 kg/m³. Taking the requirement for clean fill to be applied as daily cover between waste layers, soil requirements are assumed to be 25% of the total waste volume. Therefore, the total annual fill rate is expected to be approximately 419.7 m³ per year.

Based on the current available information and the average fill rate of 373 m³ for the last five years, the life expectancy of the waste site is estimated to be 34 years from the November 2022 survey (i.e. 2056).

A number of factors (e.g., environmental capacity and changes to fill rates) can result in significant changes to the actual life of the Site. Due to the impacts to the wetland, a reduced capacity is likely.

7 Summary Statements, Conclusions, and Recommendations

The following summary statements, conclusions, and recommendations are based on the results of the 2024 monitoring program.

7.1 Groundwater

7.1.1 Drive-Point Piezometers

- It is recommended that the drive-point piezometers continue to be used as a measure of surface water quality not groundwater quality and therefore compared to the surface water criteria for compliance.
- An upwards trend in boron, cobalt, iron, alkalinity, barium, sodium, and TDS concentrations is observed at MG-DP3. Comparatively, a similar potential increasing trend in boron concentrations is also apparent at MG-SW3. Boron at MG-DP3 remains well below the ODWSOG criteria but exceeds the interim PWQO criteria. Based on the 2024 sampling events, it appears that shallow groundwater in the vicinity of MG-DP3 has the potential to impact surface water at MG-SW3.
- Impacts related to the WDS may be present at MG-DP5, the dataset at this location is limited, but trends are beginning to emerge. Continued monitoring is required to assess and confirm potential downgradient WDS impacts.
- To address potential impacts at MG-DP3 and MG-DP5, it is recommended that the Municipality plan for an assessment of the development of the Site based on this new data. Based on the results at MG-DP5 it is suggested that MG-SW6 be formally added to the semi-annual surface water monitoring program.

7.1.2 Groundwater Monitoring Wells

- MG-18-2 was found to be broken at approximately 2.2 m below ground surface. It is recommended that this leachate characterization well be replaced in order to continue to monitor the impacts on the west side of the site.

- Groundwater adjacent to the WDS continues to be impacted by the Site.
- In 2024, the leachate monitoring wells (MG-18-1 and MG-18-2) were sampled for VOCs with exceedances of ODWSOG guidelines for benzene and vinyl chloride during the spring sampling event at MG-18-2. Benzene concentrations have exceeded the ODWSOG guidelines at MG-18-2 previously during the fall 2019, fall 2021 sampling events, and both 2022 sampling events. In accordance with the MECP review comments received in July 2019, comprehensive VOC sampling shall be conducted at MG-18-1 and MG-18-2 on a biannual frequency. The next VOC sampling event will occur in 2026.
- A replacement background monitoring well, MG-18-3R was installed in September 2023, directly adjacent to the original background monitoring well MG-18-3, in response to the MECP indicating that if MG-18-3 continued to be dry that an alternate background monitoring well may be required (MECP, July 2019).
- Groundwater is expected to discharge to surface at or before the property line and therefore it is expected that groundwater downgradient from the WDS property boundary is not being impacted by leachate and is compliant with Guideline B-7.
- It is not currently expected that the bedrock groundwater aquifer is impacted by leachate based on the above interpretation. Based on this, a bedrock monitoring well is not deemed necessary.

7.2 Surface Water

- Surface water in the wetland adjacent to the WDS continues to be impacted by the Site.
- Historically, concentrations of parameters above PWQO are generally higher for surface water sampling locations MG-SW2 and MG-SW3 when compared to MG-SW1. The concentrations of multiple parameters above the PWQO at all locations indicate there are impacts from site operations to the surface water in the immediate vicinity of the WDS.
- Recent results at MG-SW3 from 2018 to 2024 indicate a potential increasing trend in boron concentrations, a new historical maximum concentration was recorded in the fall 2024 sampling events, following a notable drop during the spring 2023 and spring 2024 sampling events. Continued monitoring is required to assess the potential upwards trend at these monitoring locations. No other surface water locations exhibited any increasing trends.

- Surface water monitoring should continue at four locations on a semi-annual basis for the Musclow-Greenview site. It is recommended that MG-SW4A continue to be sampled as the background location, replacing prior background locations MG-SW4 and MG-SW5. It is recommended that site visits be made during the wet seasons in the spring and fall of 2025 to obtain the most representative samples.
- It is recommended that MG-SW6 continue to be sampled on a semi-annual basis and be formally added to the annual surface water monitoring program based on the results at MG-DP5.
- It is recommended that surface water location MG-SW7 be sampled every five years (e.g., 2025, 2030).
- Surface water samples should continue to be collected by peristaltic pump to avoid introducing organic matter into samples collected from shallow conditions.

7.3 Landfill Gas

- Landfill gas readings were collected from all monitoring wells and drive-point piezometers during both sampling events in 2024. During the spring event a reading of >100% LEL was recorded at MG-18-2. In the fall monitoring well MG-18-2 was broken and no gas reading was able to be recorded. All other locations had concentrations between 0 and 25 ppm which are levels well below the applicable Regulation 232/98 limit of 25,000 ppm for methane in the subsurface.
- Landfill gas monitoring at all monitoring wells and the attendant's building should be continued during the 2025 semi-annual monitoring program.

7.4 Site Operations

- Site operations and the order and management of debris have greatly improved during recent years at the Musclow-Greenview WDS. The Municipality should continue these efforts.
- Construction of berms was initiated in 2016 to define locations for segregated materials. Materials should be removed at a frequency to maintain good segregation of metal, tires, and bulky items into the appropriately signed designated areas. The berms should also assist in reducing surface water contact with waste and the potential impacts site run-off may have on adjacent surface water bodies. There was standing water noted to be in the active waste area, scrap metals pile, and brush pile.

- Interim/daily cover should be applied on a regular basis to reduce the wind-blown litter around the site. The active waste area was noted as not compacted at both sites visits, and during the spring event there was plastic blown across the site as well as out the entrance way and to the opposite side of the roadway.
- It is recommended that waste transferred to the Site continue to be accounted for and documented by tracking the number of bags/vehicles deposited at the Site. Detailed descriptions and quantities of rejected waste should continue to be documented for the Musclow-Greenview WDS.
- Public education with respect to waste reduction and recycling should be an ongoing effort by the Municipality, including reminders on the local collection points for household hazardous waste and electronic waste.

7.5 Landfill Capacity

- Based on the current available information and the average fill rate of 419.7 m³ for the last five years, the life expectancy of the waste site is estimated to be 34 years from the November 2022 survey (i.e. 2056).
- A number of factors (e.g., environmental capacity and changes to fill rates) can result in significant changes to the actual life of the Site.

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.

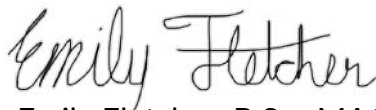
The findings presented in this report are based on conditions observed at the specified dates and locations, the analysis of samples for the specified parameters, and information obtained for this project. Unless otherwise stated, the findings cannot be extended to previous or future site conditions,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



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Environmental Scientist



Megan Williamson, B.Sc.
Environmental Scientist



Mark Somers, M.Eng., P.Eng.
Senior Environmental Engineer



9 References

BluMetric 2017, Development and Operations Plan Musclow Greenview WDS, The Corporation of the Township of Hastings Highlands, November 2017.

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http://geog.mcgill.ca/faculty/moore/Global%20BiogeochemCycles_%2017_2050.pdf

Tables

-LEGEND-	
Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds RUV-MG	Reasonable Use Values Musclove Greenview
Concentration exceeds ODWQS-ALL-MERGED	Ontario Drinking Water Quality Standards All Types Merged
Concentration exceeds PWQO-GENERAL	Provincial Water Quality Objectives General
<u>Concentration exceeds PWQO-INTERIM</u>	Provincial Water Quality Objectives Interim

Hastings Highlands Analytical Chemistry Results: Anions, Cations, FPs, GenChem, Met in Surface Water						Site Name	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview
						Location	MG-SW1	MG-SW1	MG-SW2	MG-SW3	MG-SW3	MG-SW4A	MG-SW4A	MG-SW4A	MG-SW4A	MG-SW4A	MG-SW6
						Sample ID	MG-SW1	MG-SW1	MG-SW2	MG-SW3	MG-SW3	MG-SW4A	MG-SW4A	MG-SW4A	MG-SW4A	MG-SW4A	MG-SW6
						Sample Date	2024-May-01	2024-Oct-30	2024-May-01	2024-May-01	2024-Oct-30	2024-May-01	2024-May-01	2024-Oct-30	2024-Oct-30	2024-May-01	2024-Oct-30
Parameter	Units	PWQO- GENERAL	PWQO- INTERIM	MECP-GD- TA	MECP-GD- TB	Lab Job Number	C4D2266	C4Y5029	C4D2266	C4D2266	C4Y5029	C4D2266	C4D2266	C4Y5029	C4Y5029	C4Y5029	C4D2266
						Lab Sample ID	ZBM036		ZBM037	ZBM038		ZBM039	ZBM041			ZBM040	
Anions						Detection Limit											
Chloride	mg/L	-	-	180	128	1	24	45	24	25	84	3.6	2.9	5.6	6.1	16	31
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nitrate as N	mg/L	-	-	-	-	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nitrite as N	mg/L	-	-	-	-	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sulphate	mg/L	-	-	100	-	1	39	17	9.3	11	35	9	8.1	6.4	6.3	16	2.7
Cations																	
Calcium (tot)	mg/L	-	-	-	-	0.2	48	92	22	45	140	10	11	16	16	31	51
Magnesium (tot)	mg/L	-	-	-	-	0.05	2	4.1	2.8	6.8	36	1.5	1.5	2.1	2.2	3	5.2
Potassium (tot)	mg/L	-	-	-	-	0.2	1.2	2.1	1.3	5.1	5.1	0.93	0.95	1.4	1.4	1.3	4.1
Sodium (tot)	mg/L	-	-	-	-	0.1	19	27	15	16	76	3.2	3.1	3.6	3.8	9.4	14
Field Parameters																	
pH (Field)	pH units	-	-	-	-		7	-	7.3	7.92	-	6.53	6.53	-	-	7.14	-
Temperature	deg. C	-	-	-	-		8.4	-	13.6	11.9	-	8	8	-	-	9.3	-
General Chemistry																	
Alkalinity (as CaCO3)	mg/L	See Factsheet	-	-	-	1	100	240	60	130	530	48	28	44	42	73	140
Ammonia as N	mg/L	-	-	-	-	0.05	<0.05	0.11	<0.05	<0.05	0.089	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	<2	<2	3	<2	<2	<2	<2	<2	<2	<2	<2
Chemical Oxygen Demand	mg/L	-	-	-	-	4	24	29	25	23	31	28	21	12	7.2	16	38
Electrical Conductivity	uS/cm	-	-	-	-	1	360	630	210	360	1300	120	79	120	120	220	370
Hardness (as CaCO3)	mg/L	-	-	-	-	1	130	300	68	150	580	34	33	56	56	94	160
pH	pH units	6.5 - 8.5	-	6 - 9	-		7.75	7.7	7.52	7.95	8.17	8.32	7.36	7.7	7.68	7.79	7.66
Phenols	mg/L	0.001	-	0.04	0.004	0.001	0.0023	<0.001	0.0023	0.0024	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Dissolved Solids	mg/L	-	-	-	-	10	205	385	110	195	775	60	55	110	120	130	270
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	0.38	0.44	0.28	0.36	0.55	0.44	0.37	0.21	0.2	0.28	0.36
Total Phosphorus	mg/L	0.03	-	-	-	0.02	<0.02	0.023	<0.02	<0.02	0.029	<0.02	<0.02	<0.02	<0.02	<0.02	0.14
Total Suspended Solids	mg/L	-	-	-	-	10	<10	<10	16	<10	<10	<10	<10	<10	<10	<10	21
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.00062, 0.00074	<0.00061	<0.00061	<0.00061	<0.0011	0.0011	<0.00061	<0.00061	<0.00061	<0.00061	<0.00061	<0.00079
Metals																	
Aluminum (diss, 0.2 µm)	mg/L	-	Calculated	-	-	0.005	0.032	<0.005	0.006	<0.005	<0.005	0.06	0.06	0.049	0.013	0.005	<0.005
Barium (tot)	mg/L	-	-	2.3	-	0.002	0.028	0.064	0.017	0.035	0.12	0.012	0.012	0.014	0.015	0.014	0.037
Boron (tot)	mg/L	-	0.2	3.55	1.5	0.01	<0.01	<0.01	0.011	0.14	0.79	<0.01	<0.01	0.012	<0.01	0.026	0.025
Cadmium (tot)	mg/L	-	Calculated	0.00021	0.000017	0.00009	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009
Cobalt (tot)	mg/L	-	0.0009	-	-	0.0005	<0.0005	0.00052	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Copper (tot)	mg/L	-	Calculated	0.0069	-	0.0009	0.0016	<0.0009	<0.0009	<0.0009	<0.0009	<0.0009	<0.0009	<0.0009	<0.0009	<0.0009	<0.0009
Iron (tot)	mg/L	0.3	-	1	-	0.1	0.19	2.4	0.21	0.14	0.17	0.23	0.23	0.33	0.35	<0.1	0.29
Lead (tot)	mg/L	-	Calculated	0.002	-	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Manganese (tot)	mg/L	-	-	-	-	0.002	0.017	2.7	0.046	0.055	0.49	0.0096	0.0096	0.01	0.01	0.0035	0.45
Zinc (tot)	mg/L	-	0.02	0.089	0.03	0.005	<0.005	<0.005	<0.005	<0.005	0.0079	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

-LEGEND-

Detection Limit

DL: May vary between sample locations and events

DL exceeds criteria

Concentration exceeds PWQO-GENERAL

Provincial Water Quality Objectives General

Concentration exceeds PWQO-INTERIM

Provincial Water Quality Objectives Interim

Concentration exceeds MECP-GD-TA

MECP Guidance Document Table A

Concentration exceeds MECP-GD-TB

MECP Guidance Document Table B

Figures



LEGEND

Waste Disposal Site

Private Wells Within 500m of the 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. 05001,000Meters N E S W				
CLIENT				
Municipality of Hasting Highlands				
PROJECT				
Musclow – Greenview 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 #		DATE		
240205-07		February 18, 2025		
DRAWN	CHECKED	FIG NO.	REV	
PB	EF	01	0	



- LEGEND
- Approximate Property Outline (2 ha)
 - Site Features
 - Final Footprint Design (0.87 ha)
 - Abandoned Monitoring Well
 - Groundwater Monitoring Location
 - Benchmark
 - Surface Water Sampling Locations
 - Supplemental Surface Water Sampling Locations
 - Historical Surface Water Sampling Locations

NOTES:
Imagery taken on July 9th 2024

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
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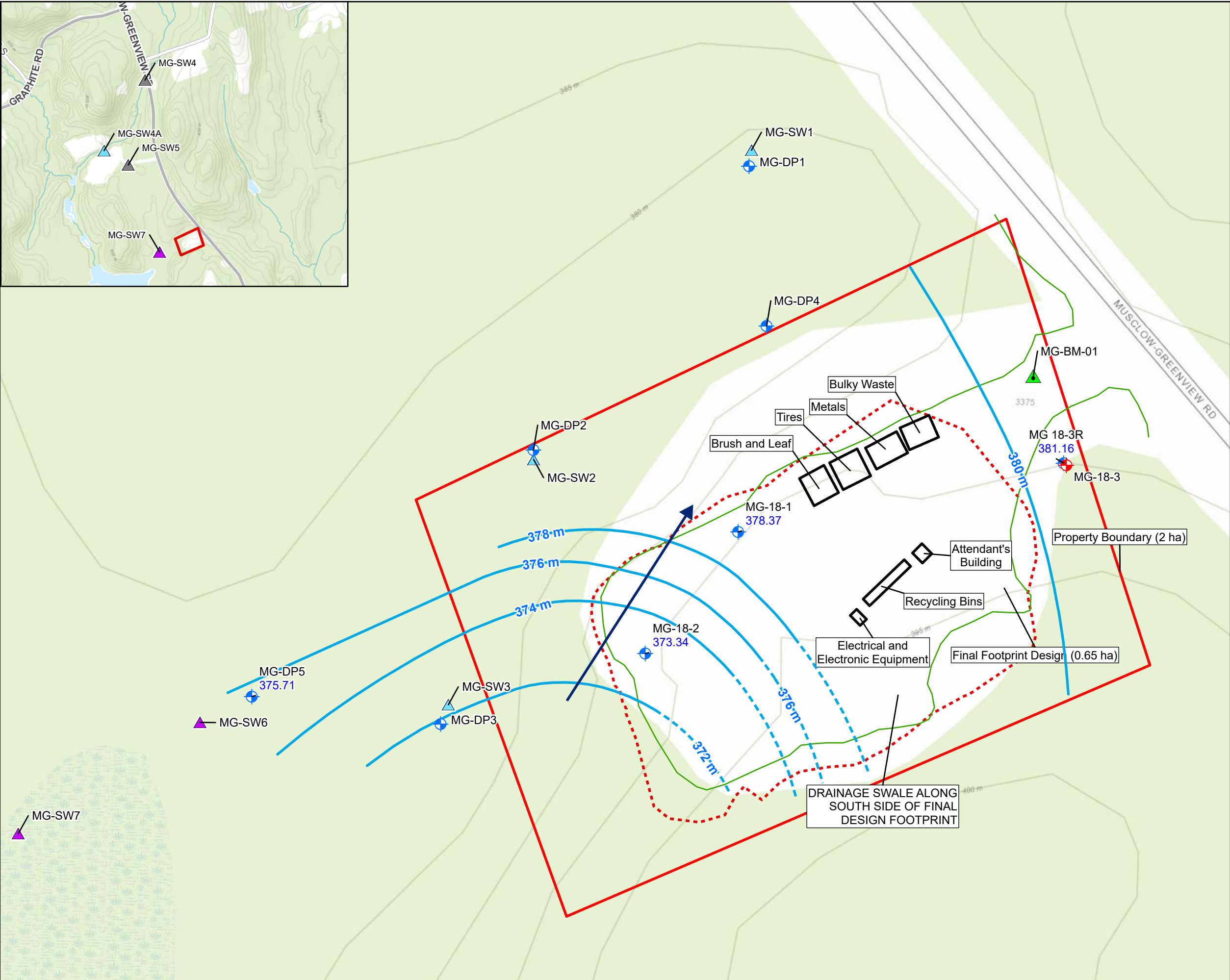
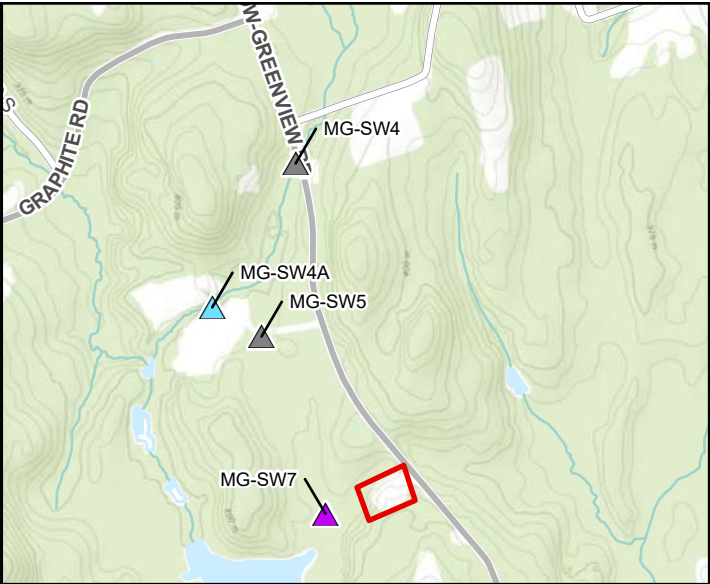
CLIENT
Municipality of Hasting Highlands

PROJECT
Musclow – Greenview Waste Disposal Site

TITLE
Site Plan

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 # 240205-07		DATE February 18, 2025	
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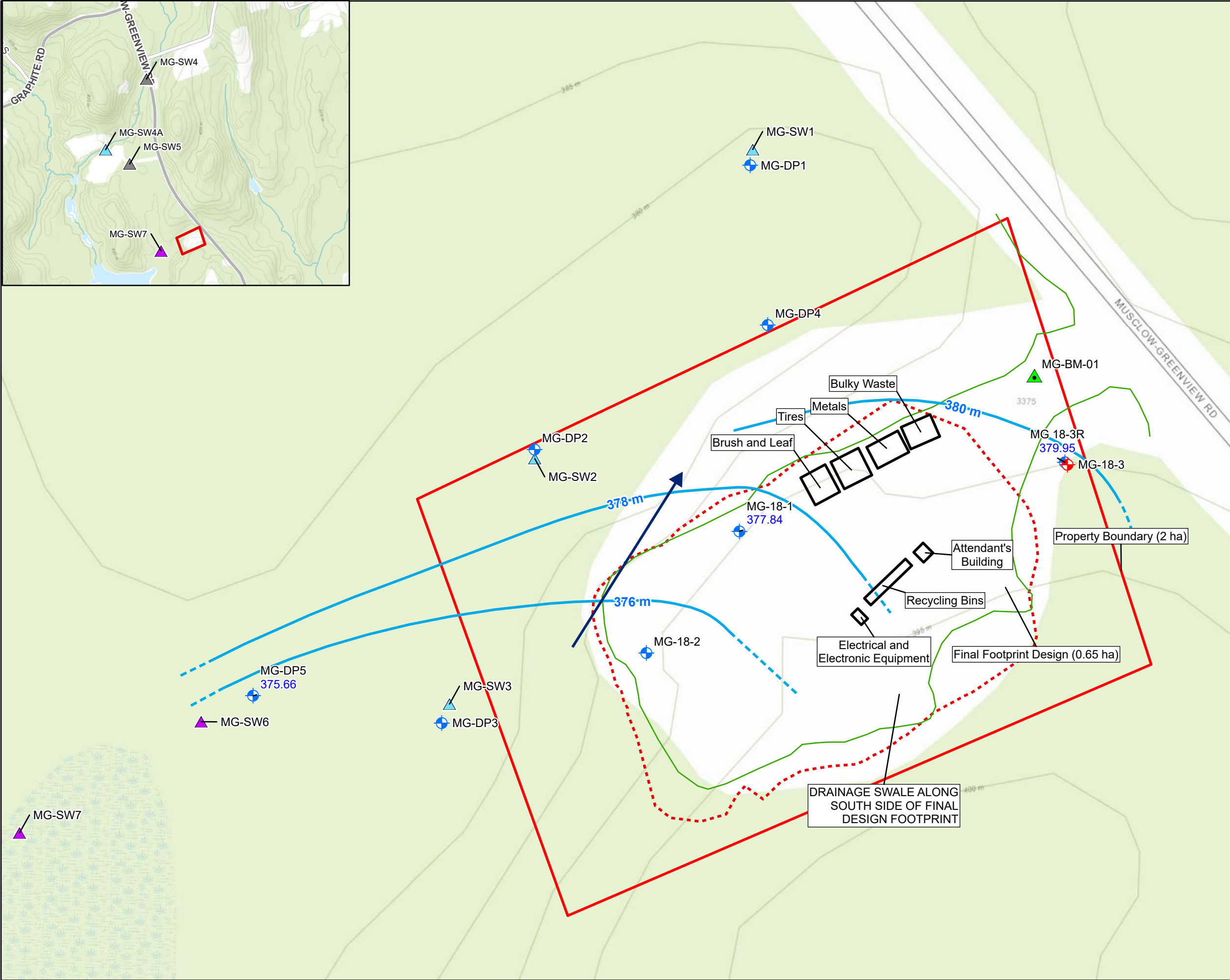
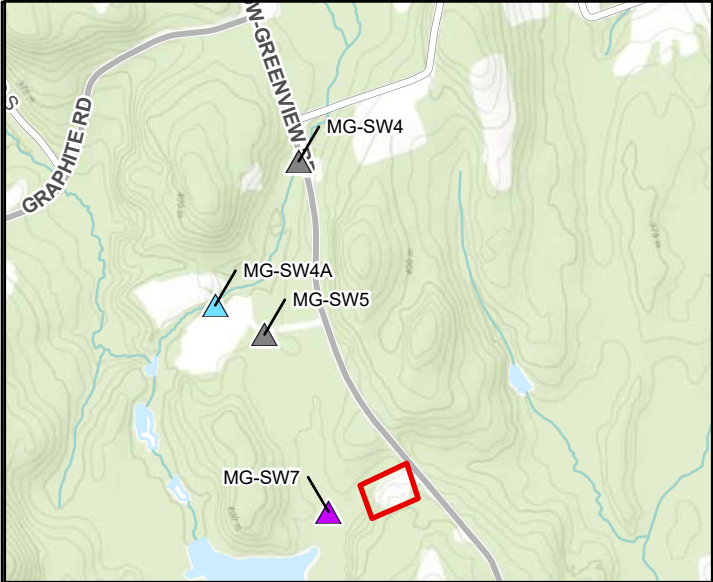


LEGEND

- Approximate Property Outline (2 ha)
- Site Features
- Final Footprint Design (0.87 ha)
- Treeline
- Groundwater Monitoring Well
- Abandoned Monitoring Well
- Benchmark
- Historical Surface Water Sampling Locations;
- Supplemental Surface Water Sampling Locations
- Surface Water Sampling Locations
- Inferred Ground Water Flow Dirrection
- Water Elevation Contour (Inferred) (2m)
- Water Elevation Contour (Interpreted) (2m)
- Groundwater Elevation (Spring, 2024)

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 25 50 Meters 1:1,000				
CLIENT				
Municipality of Hasting Highlands				
PROJECT				
Musclow – Greenview Waste Disposal Site				
TITLE				
Groundwater Elevations - Spring 2024				
PROJECT #		DATE		
240205-07		February 18, 2025		
DRAWN	CHECKED	FIG NO.	REV	
PB	EF	03	0	

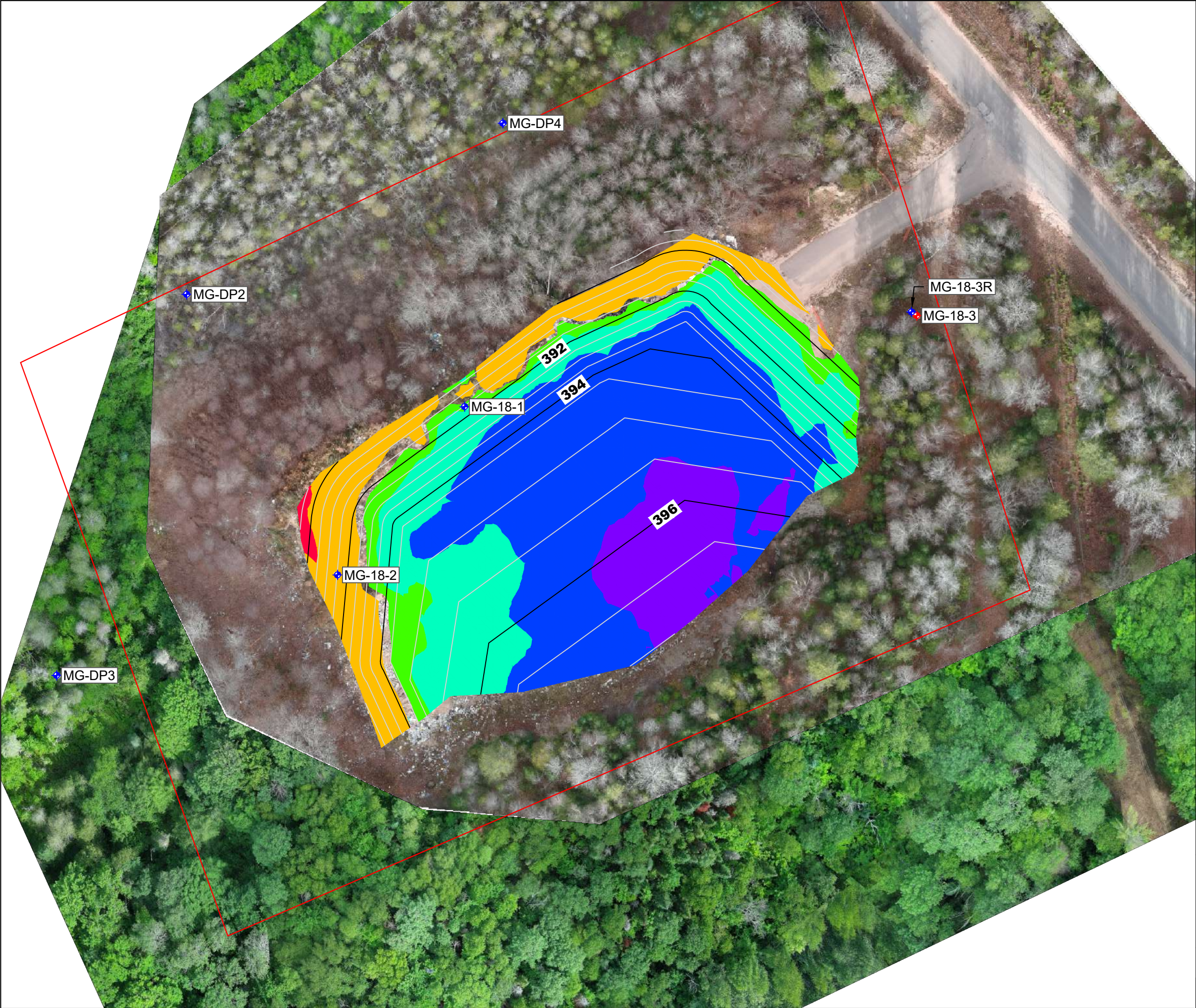
The Tower - The Woolen Mill,
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TEL: (613) 531-2725
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LEGEND

- Approximate Property Outline (2 ha)
- Site Features
- Final Footprint Design (0.87 ha)
- Treeline
- Groundwater Monitoring Well
- Abandoned Monitoring Well
- Benchmark
- Historical Surface Water Sampling Locations;
- Supplemental Surface Water Sampling Locations
- Surface Water Sampling Locations
- Water Elevation Contour (Inferred) (2m)
- Water Elevation Contour (Interpreted) (2m)
- Inferred Ground Water Flow Dirrection
- Groundwater Elevation (Fall, 2024)

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 25 50 Meters 1:1,000				
CLIENT Municipality of Hasting Highlands				
PROJECT Musclow – Greenview Waste Disposal Site				
TITLE Groundwater Elevations - Fall 2024				
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 # 240205-07		DATE February 18, 2025		
DRAWN PB	CHECKED EF	FIG NO. 04	REV 0	



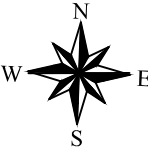
- LEGEND
- Monitoring Well Location
 - Abandoned Monitoring Well Location
 - Approximate Property Outline (2 ha)
 - Final Elevation Contour (0.5 m)
 - Final Elevation Contour (2.0 m)

Volume to Remove (Cut): 1,162 m³
Volume to be Added (Fill): 18,130 m³
Volume of Intermediate Cover: 3,800 m³
Net Volume to be Added (Netfill): 16,967 m³

Elevations Table				
Number	Minimum Elevation	Maximum Elevation	Volume	Color
1	-4.08	-3.00	11	
2	-3.00	-0.25	906	
3	0.25	1.00	3800	
4	1.00	3.00	8182	
5	3.00	5.00	4549	
6	5.00	5.90	266	

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
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CLIENT

Municipality of Hastings Highlands

PROJECT

Musclow-Grenview Waste Disposal Site

TITLE

Remaining Fill Capacity
as of July 7th, 2024



1682 Woodward Drive
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Web: http://www.blumetric.ca

PROJECT # 240205-07		DATE February 18, 2025	
DRAWN PB	CHECKED EF	DWG NO. 05	REV 0

Site Photographs



Photo 1: Front entrance with signage –
May 1, 2024



Photo 2: Attendant's building and recycling
depot – May 1, 2024



Photo 3: View of MG-18-2 facing southwest –
May 1, 2024



Photo 4: Brush and yard waste –
May 1, 2024



Photo 5: Segregated metals – May 1, 2024



Photo 6: Segregated tires – May 1, 2024



Photo 7: Bulk waste area – May 1, 2024



Photo 8: MG-SW1 monitoring location – May 1, 2024



Photo 9: MG-SW2 monitoring location – May 1, 2024



Photo 10: MG-SW3 monitoring location – May 1, 2024



Photo 11: MG-SW4A monitoring location – May 1, 2024



Photo 12: MG-SW6 monitoring location – May 1, 2024



Photo 13: Front entrance with signage –
October 30, 2024



Photo 14: Attendant's building and recycling depot –
October 30, 2024



Photo 15: Active waste area – October 30, 2024



Photo 16: Segregated waste piles – October 30, 2024



Photo 17: Segregated metals –
October 30, 2024



Photo 18: Segregated tires –
October 30, 2024



Photo 19: Bulk waste area –
October 30, 2024



Photo 20: Brush and yard waste –
October 30, 2024



Photo 21: Northeast view of Site –
October 30, 2024



Photo 22: MG-18-1 –
October 30, 2024



Photo 23: MG-18-2 –
October 30, 2024



Photo 24: MG-SW1 monitoring location –
October 30, 2024



Photo 25: MG-SW2 monitoring location –
October 30, 2024



Photo 26: MG-SW3 monitoring location –
October 30, 2024

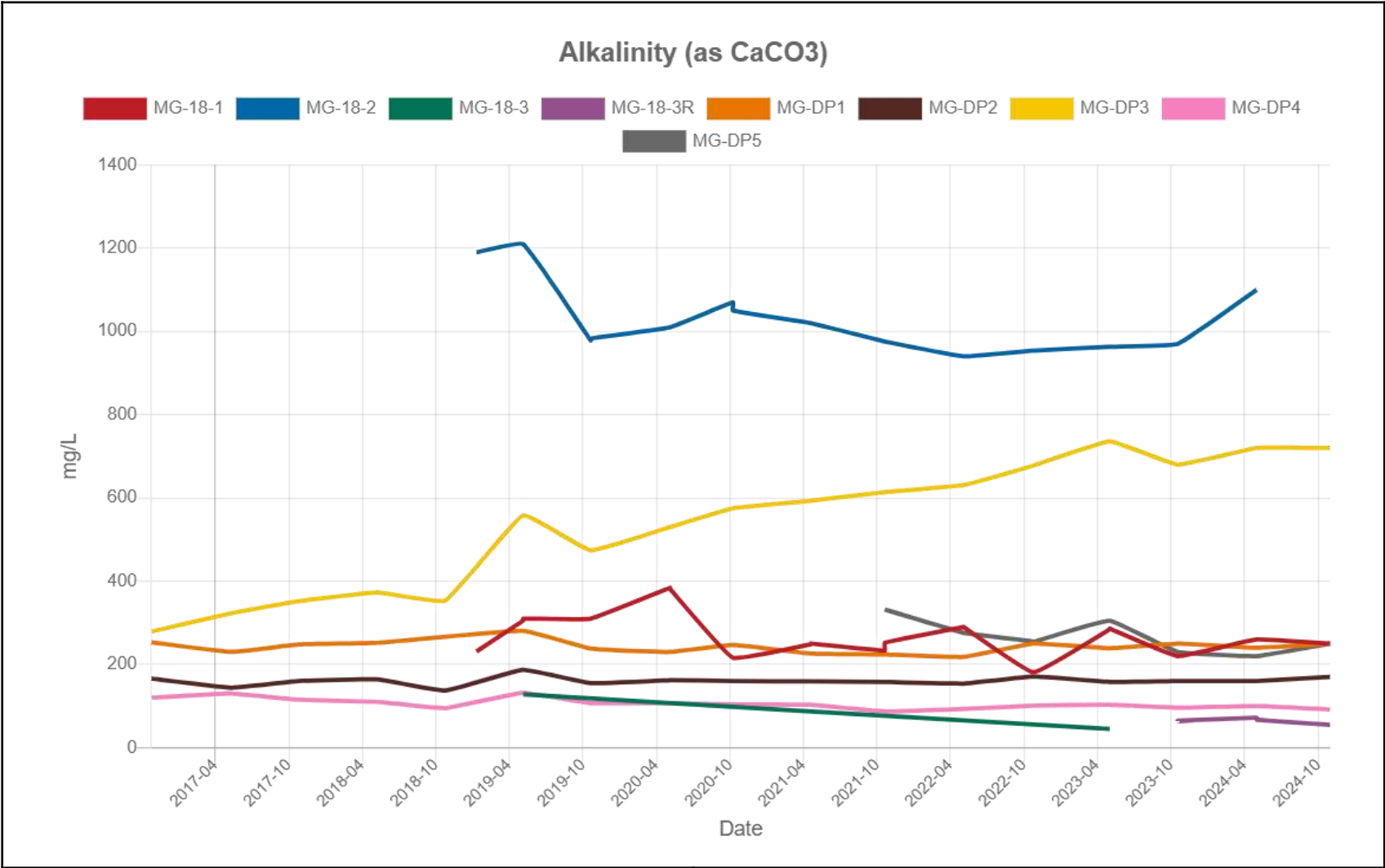


Photo 27: MG-SW4A monitoring location –
October 30, 2024



Photo 28: MG-SW6 monitoring location –
October 30, 2024

Chemistry Trend Graphs



Musclow-Greenview WDS
Municipality of Hasting's Highlands

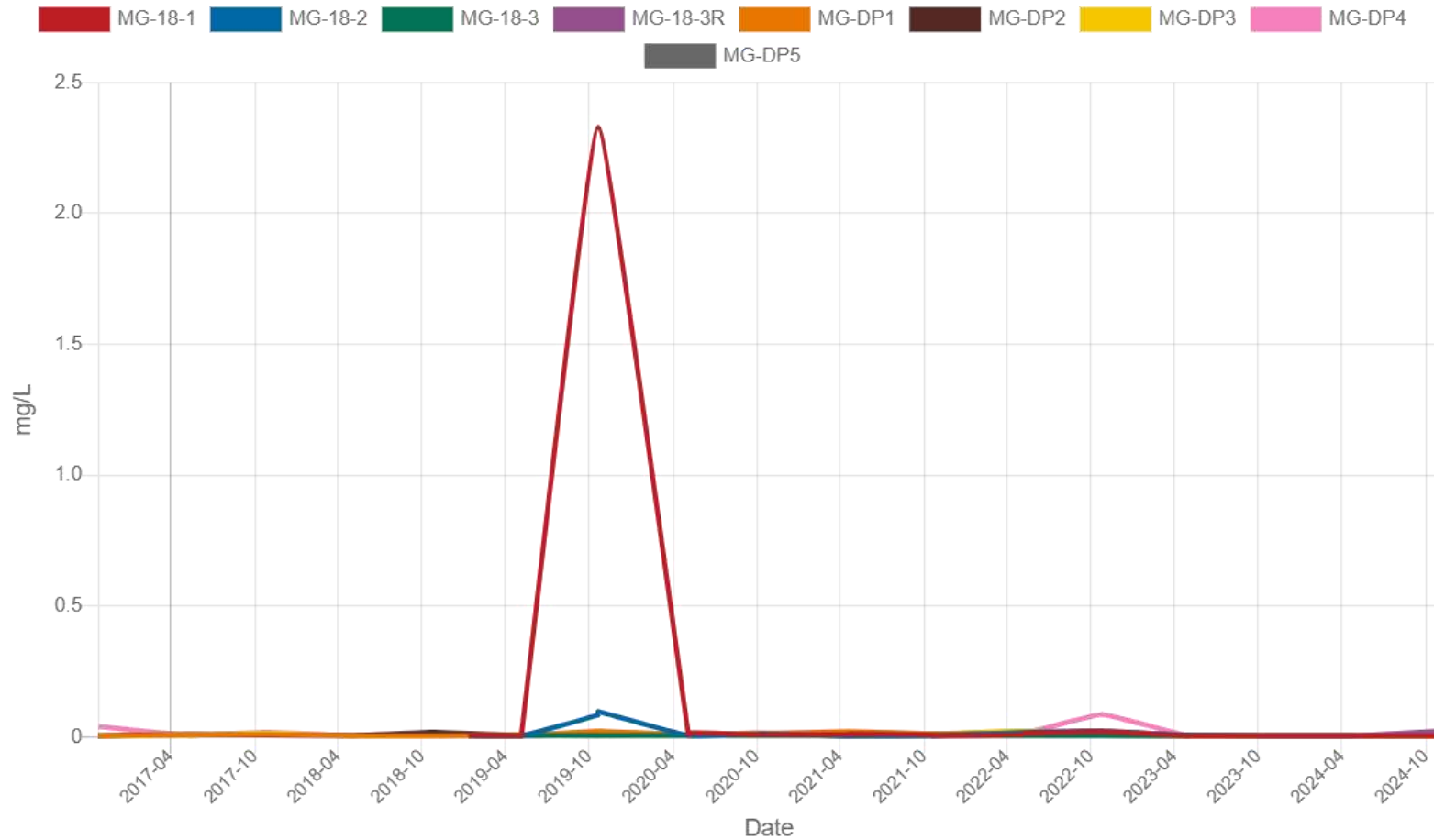
BluMetric Proj No: 240205
Date: February 12, 2025

Graph 1
Alkalinity in Groundwater

Created by: Megan Williamson
Checked by: Megan Williamson



Aluminum (diss, 0.45 µm)



East Lake WDS
Municipality of Hasting's Highlands

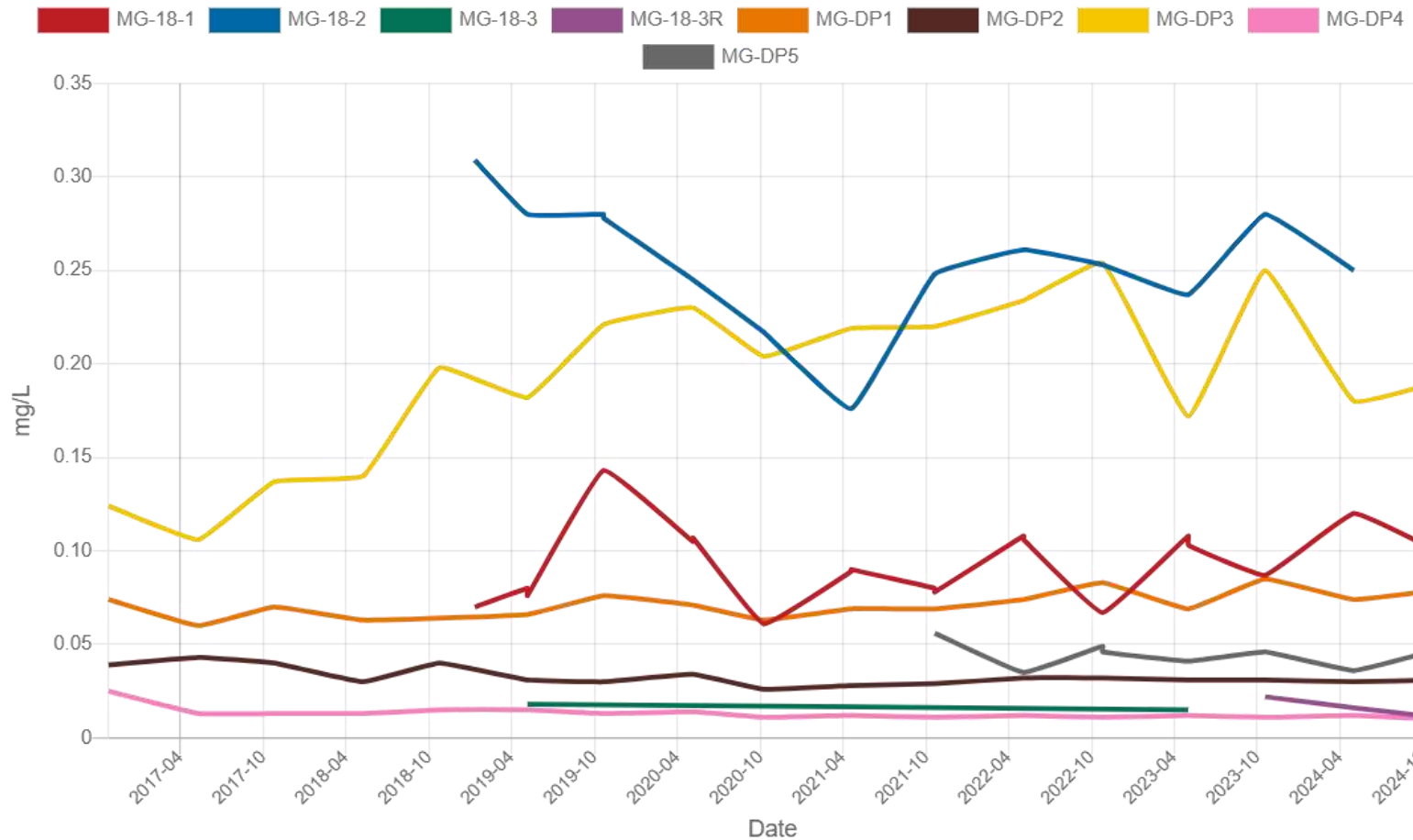
BluMetric Proj No: 240205
Date: February 12, 2025

Graph 2
Dissolved Aluminum in Groundwater

Created by: Megan Williamson
Checked by: Megan Williamson



Barium (diss)



East Lake WDS
Municipality of Hasting's Highlands

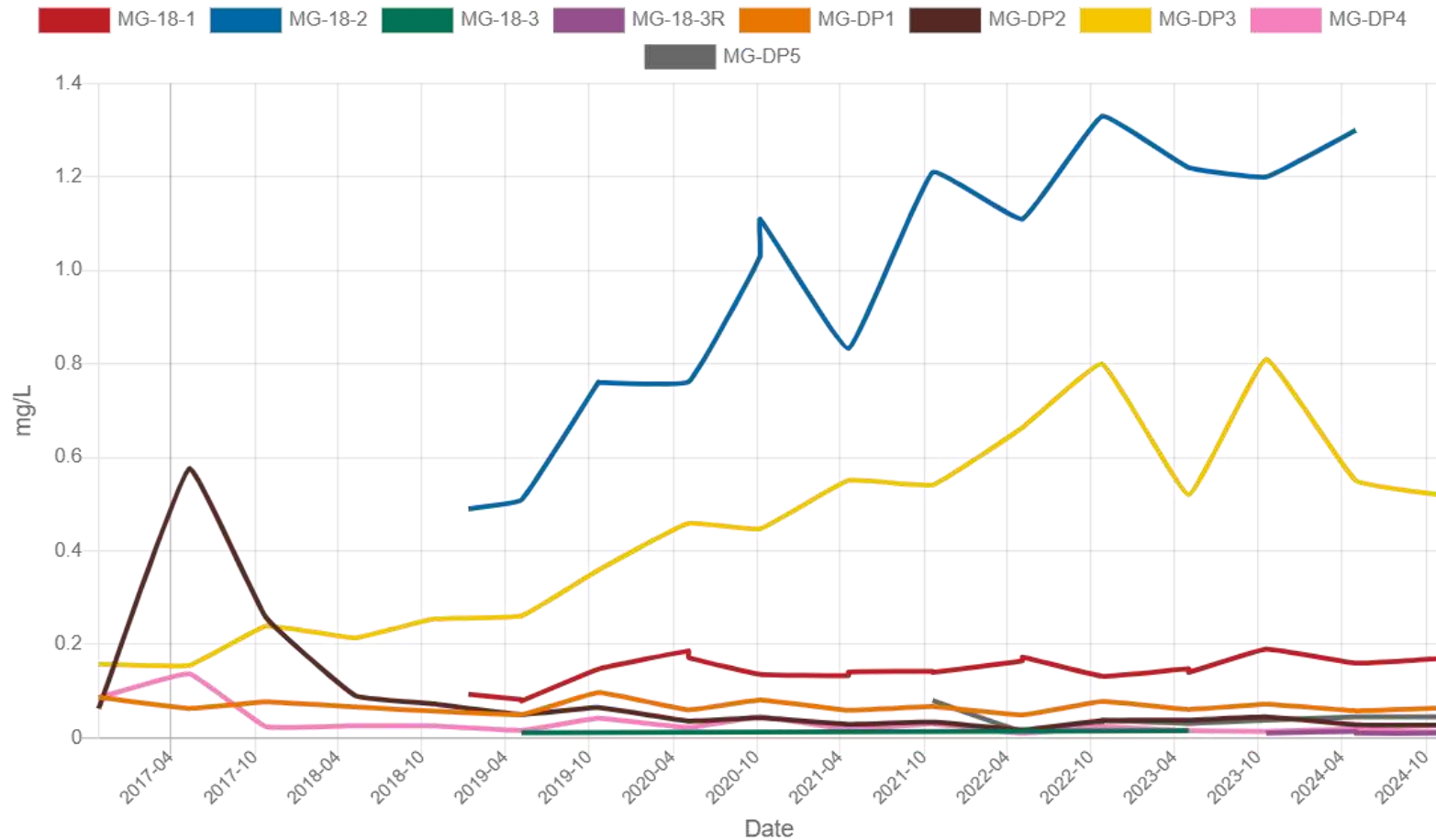
BluMetric Proj No: 240205
Date: February 12, 2025

Graph 3
Dissolved Barium in Groundwater

Created by: Megan Williamson
Checked by: Megan Williamson



Boron (diss)



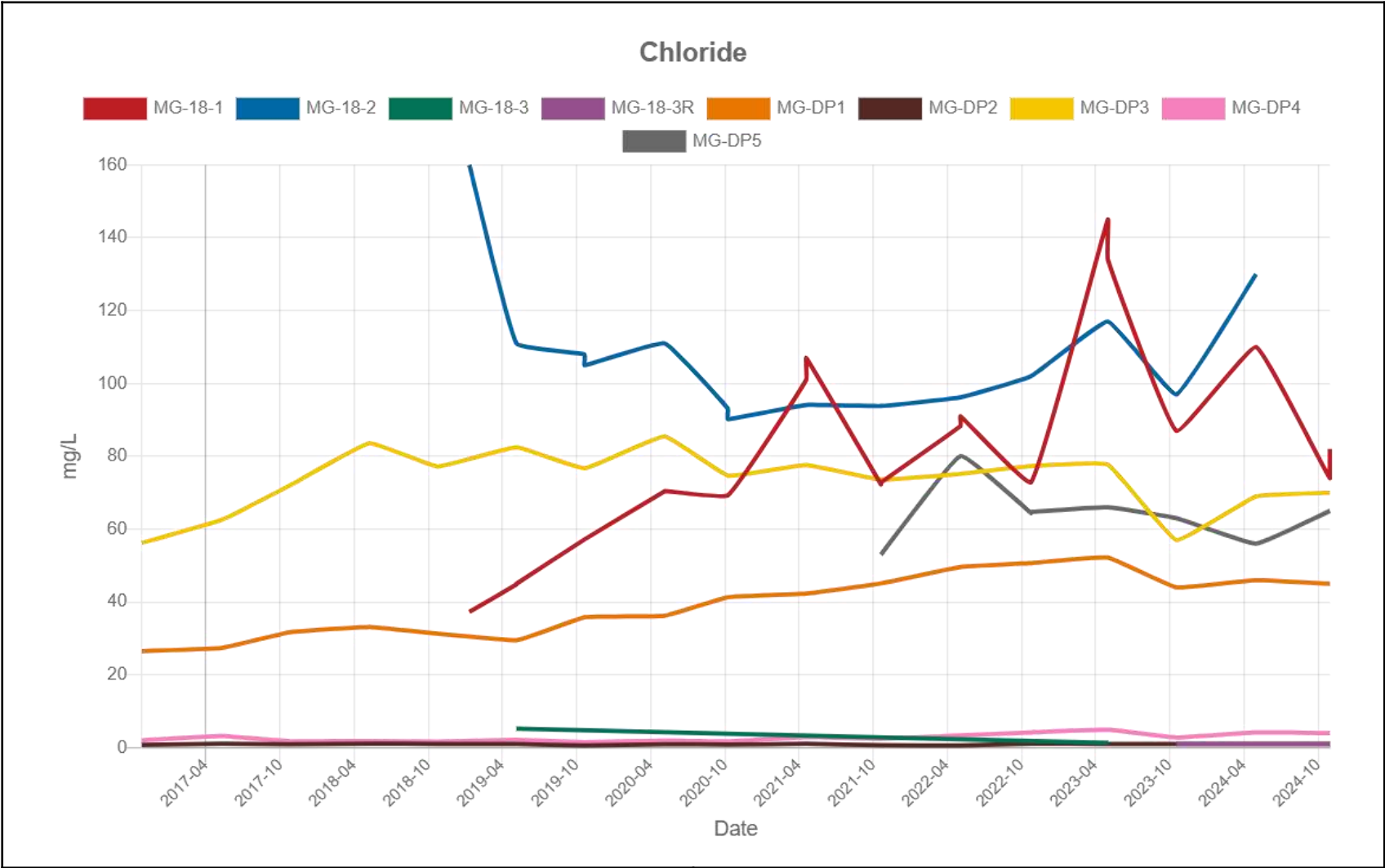
East Lake WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 240205
Date: February 12, 2025

Graph 4
Dissolved Boron in Groundwater

Created by: Megan Williamson
Checked by: Megan Williamson





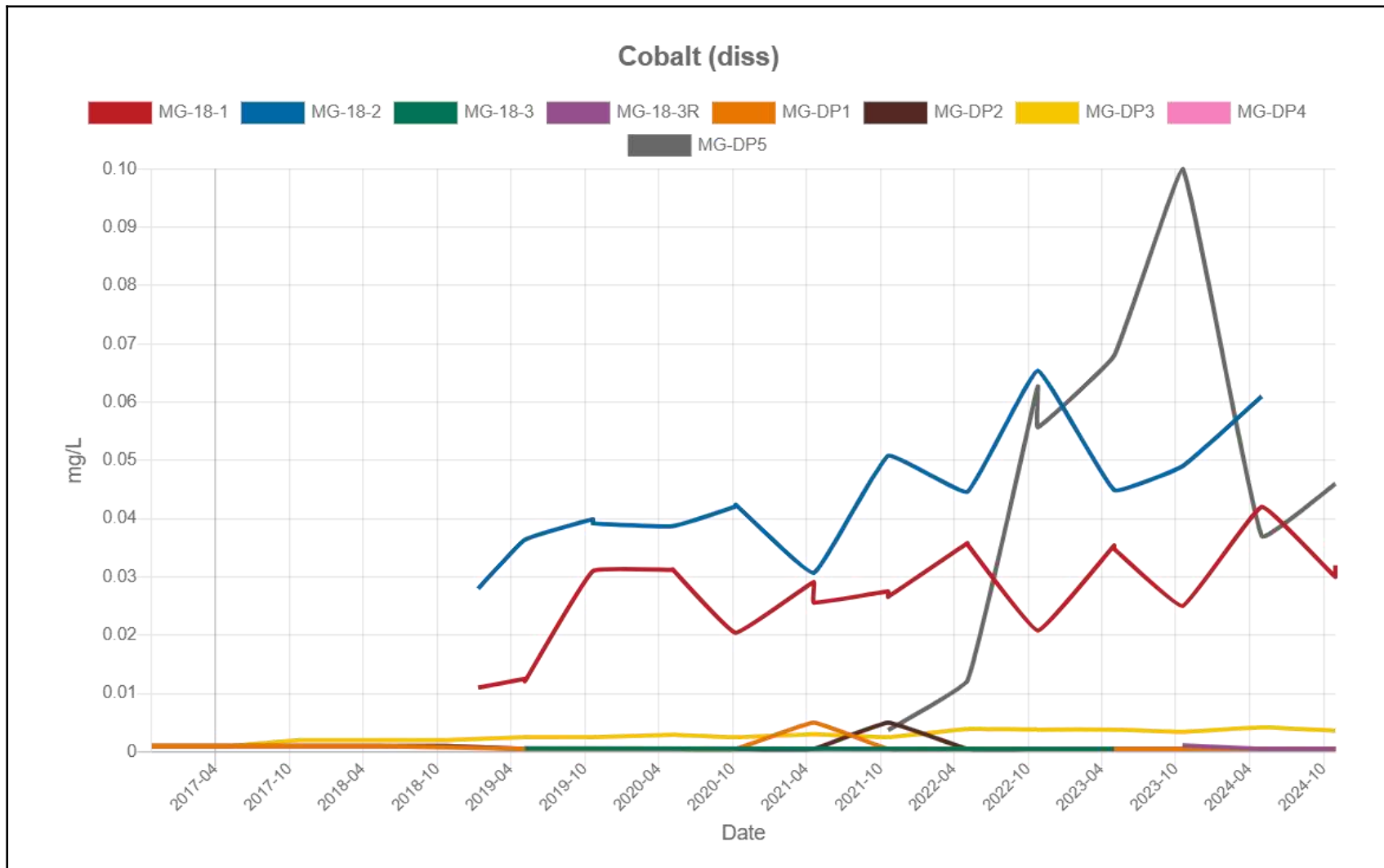
East Lake WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 240205
Date: February 12, 2025

Graph 5
Chloride in Groundwater

Created by: Megan Williamson
Checked by: Megan Williamson





East Lake WDS
Municipality of Hasting's Highlands

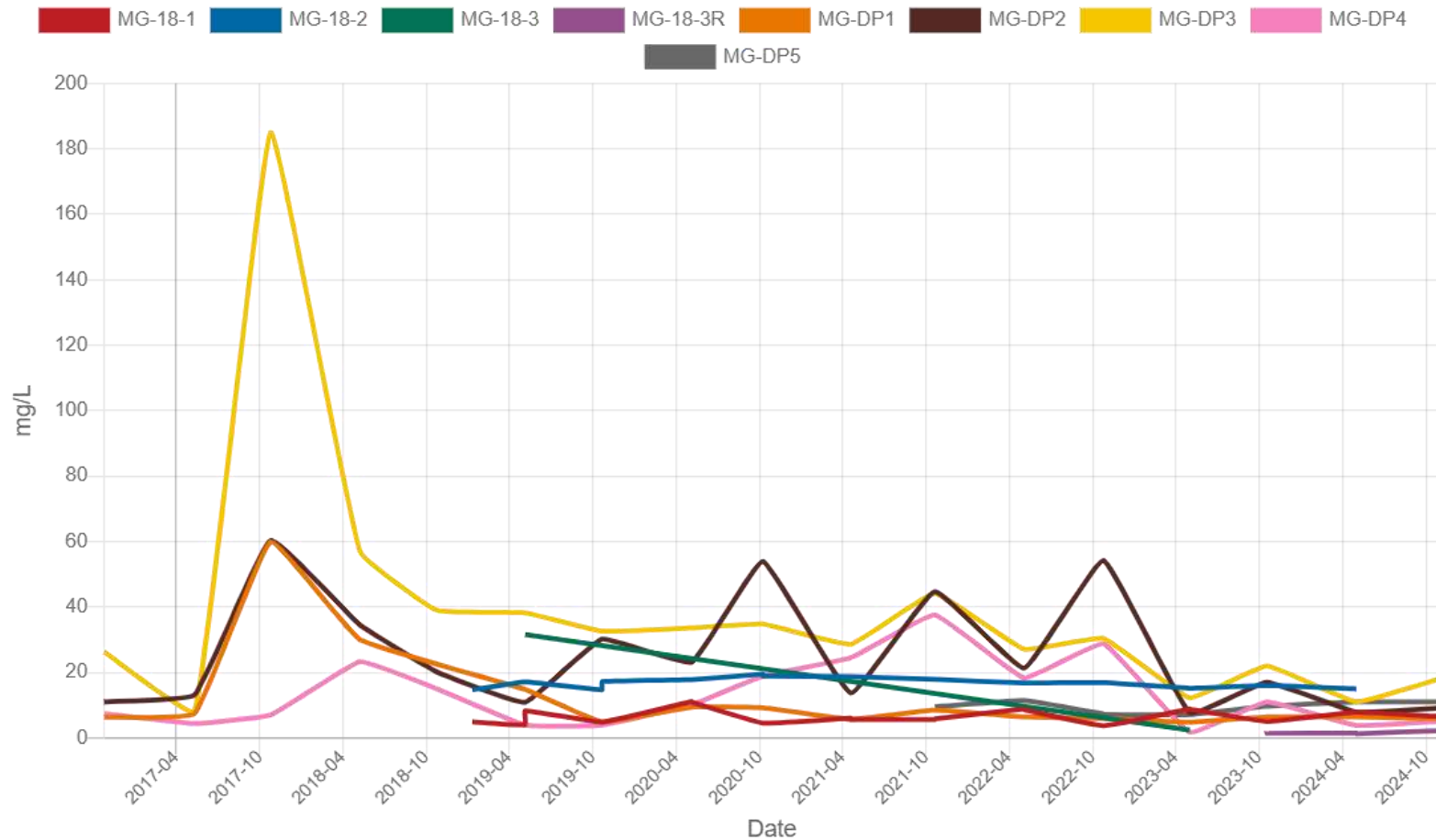
BluMetric Proj No: 240205
Date: February 12, 2025

Graph 6
Dissolved Cobalt in Groundwater

Created by: Megan Williamson
Checked by: Megan Williamson



Dissolved Organic Carbon



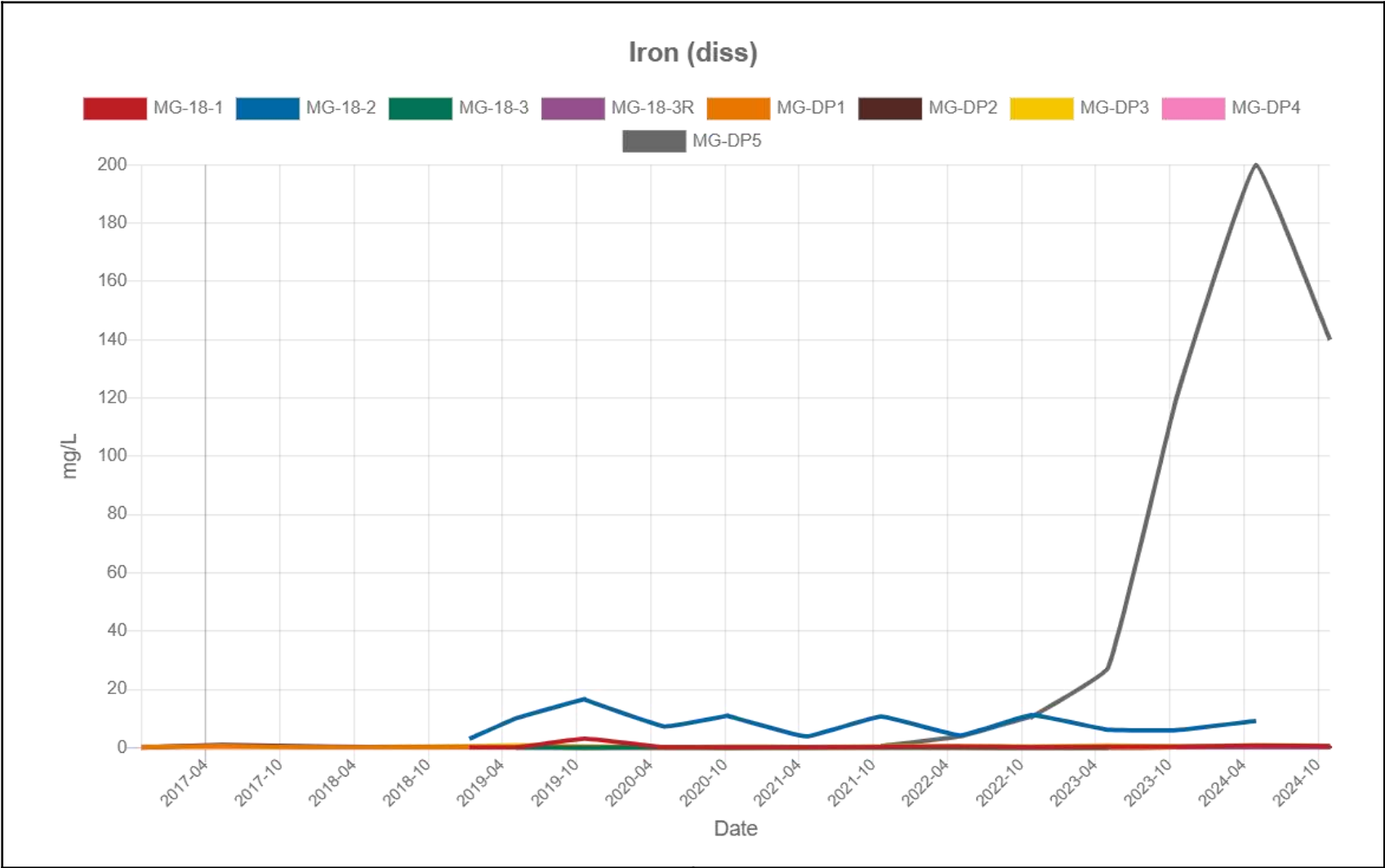
East Lake WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 240205
Date: February 12, 2025

Graph 7
Dissolved Organic Carbon in Groundwater

Created by: Megan Williamson
Checked by: Megan Williamson





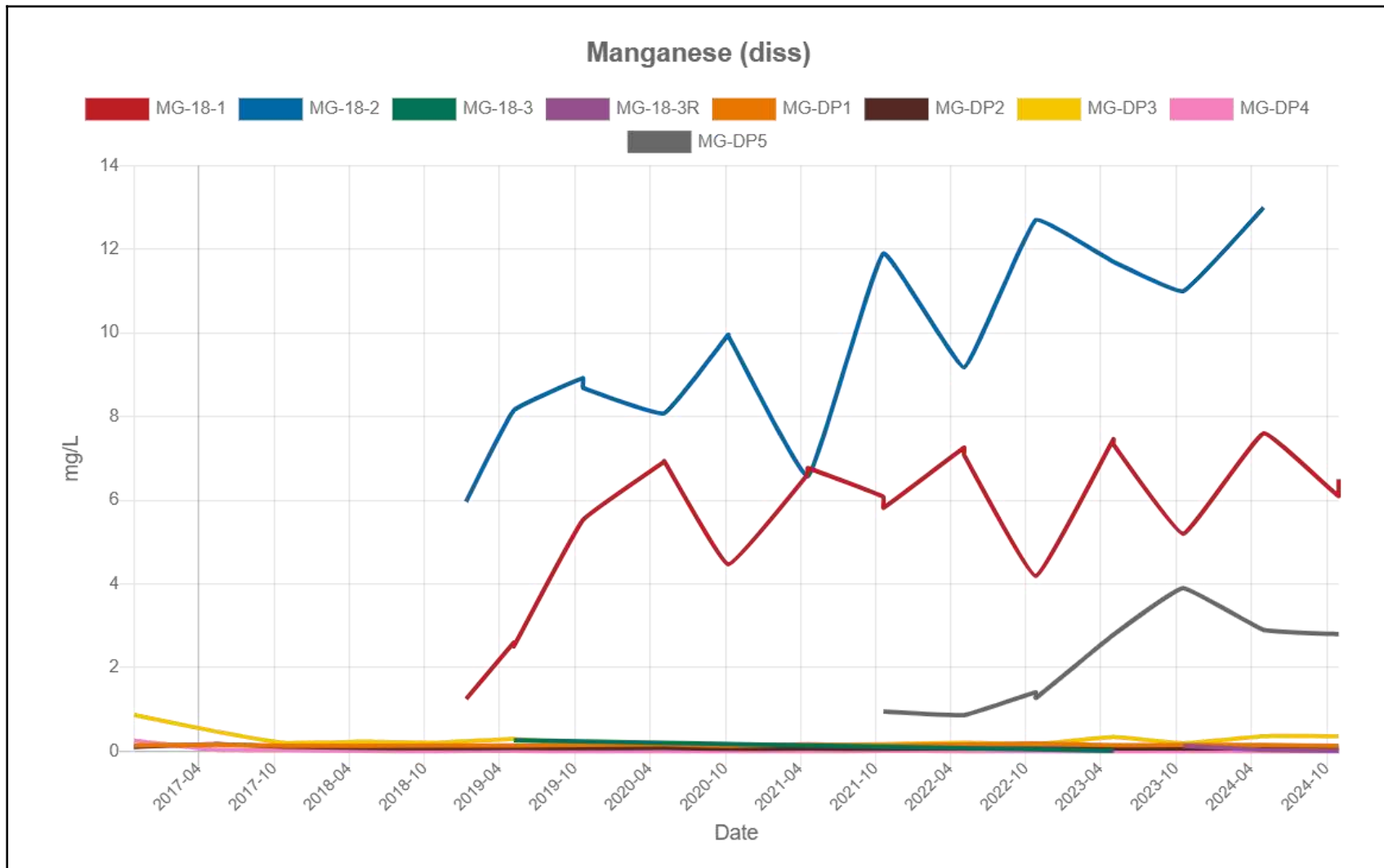
East Lake WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 240205
Date: February 12, 2025

Graph 8
Dissolved Iron in Groundwater

Created by: Megan Williamson
Checked by: Megan Williamson





East Lake WDS
Municipality of Hasting's Highlands

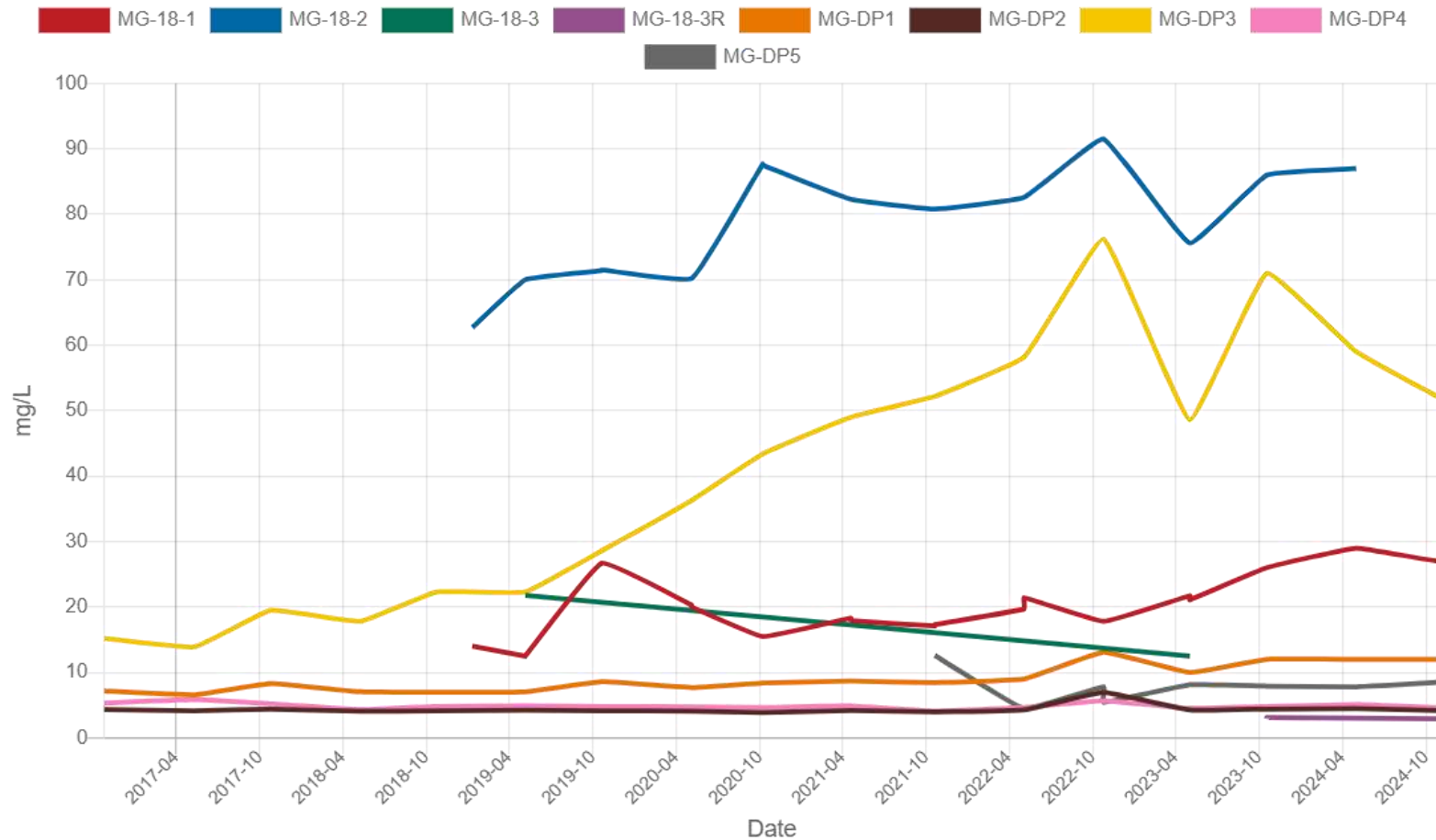
BluMetric Proj No: 240205
Date: February 12, 2025

Graph 9
Dissolved Manganese in Groundwater

Created by: Megan Williamson
Checked by: Megan Williamson



Sodium (diss)



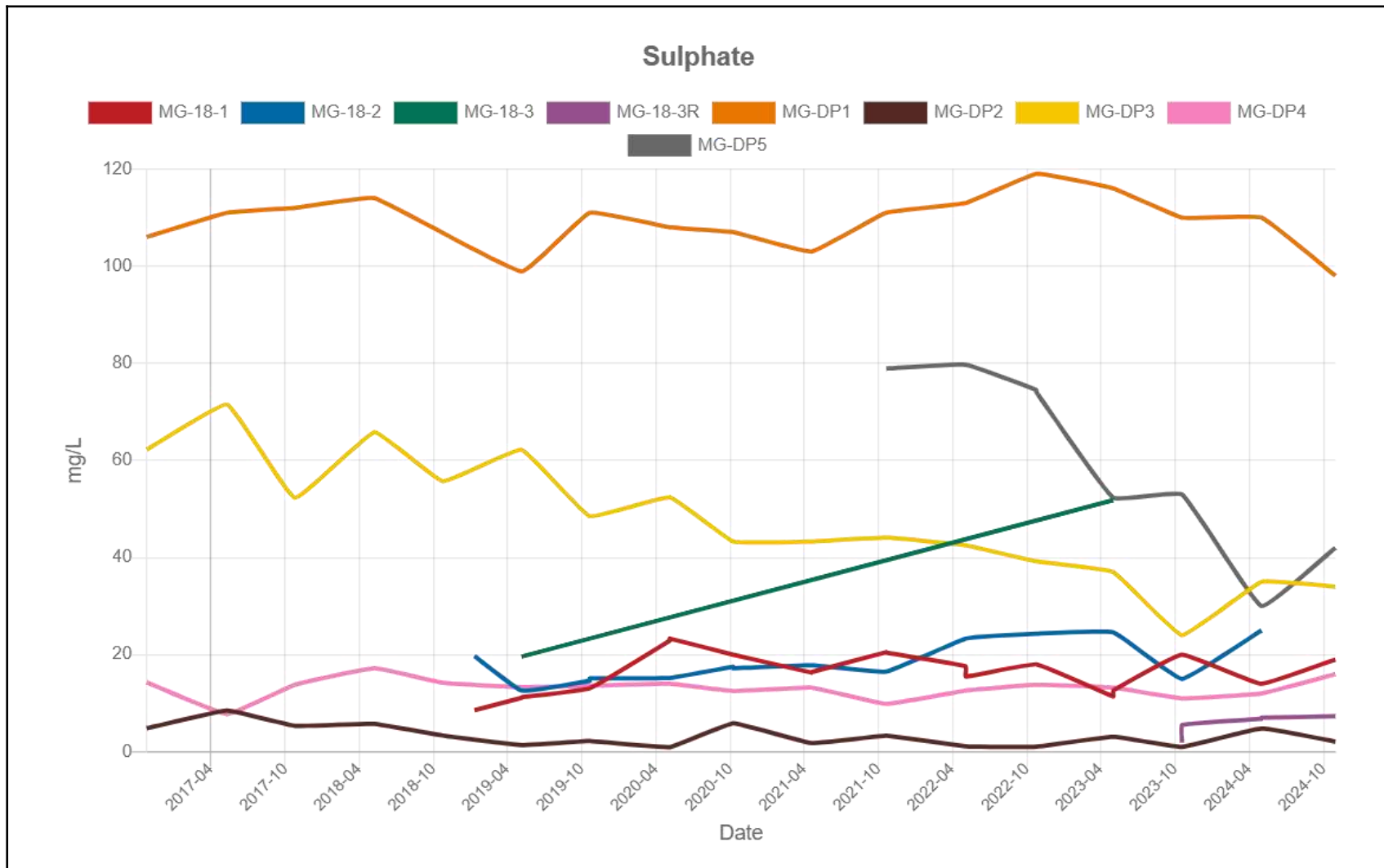
East Lake WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 240205
Date: February 12, 2025

Graph 10
Dissolved Sodium in Groundwater

Created by: Megan Williamson
Checked by: Megan Williamson





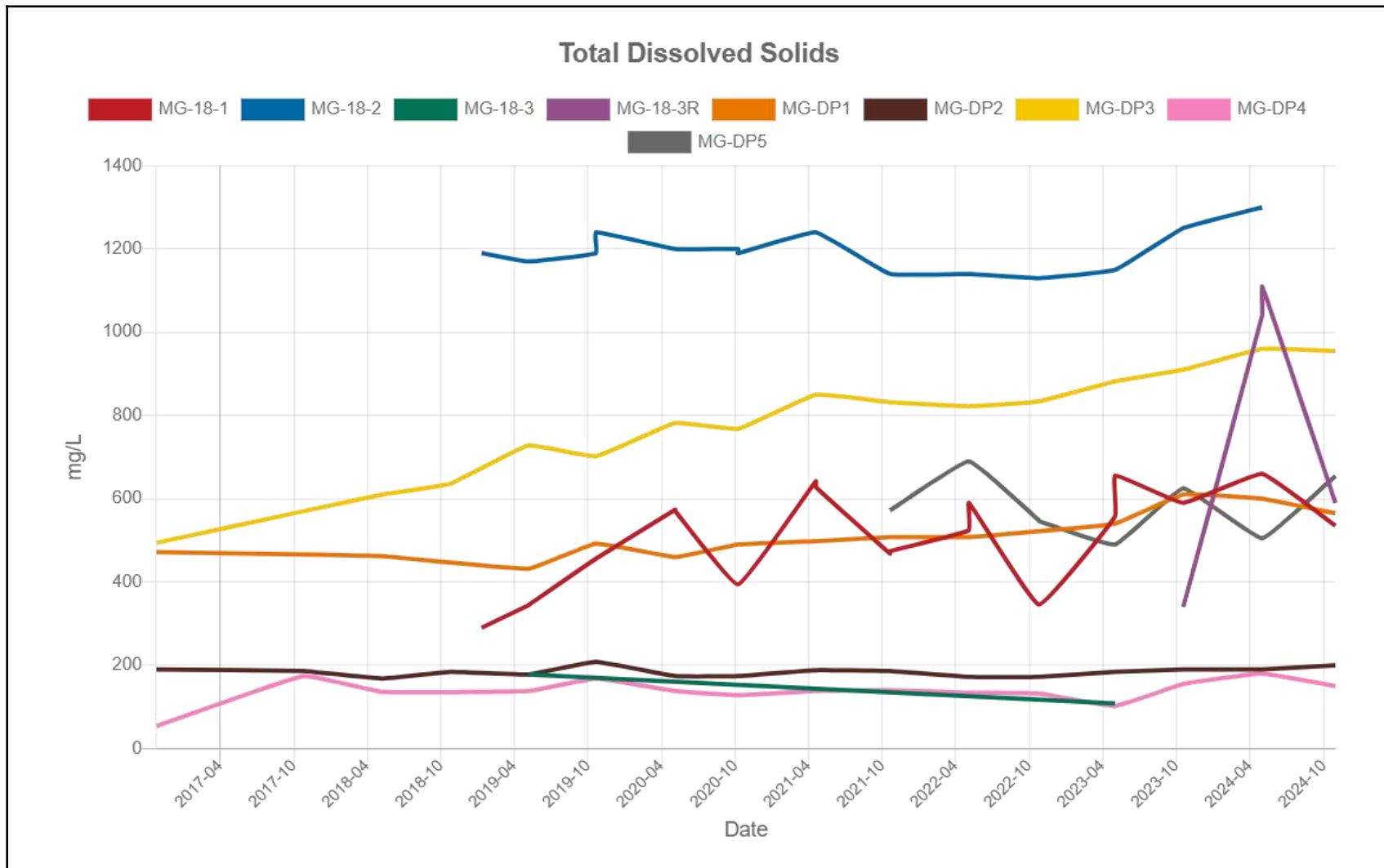
East Lake WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 240205
Date: February 12, 2025

Graph 11
Sulphate in Groundwater

Created by: Megan Williamson
Checked by: Megan Williamson





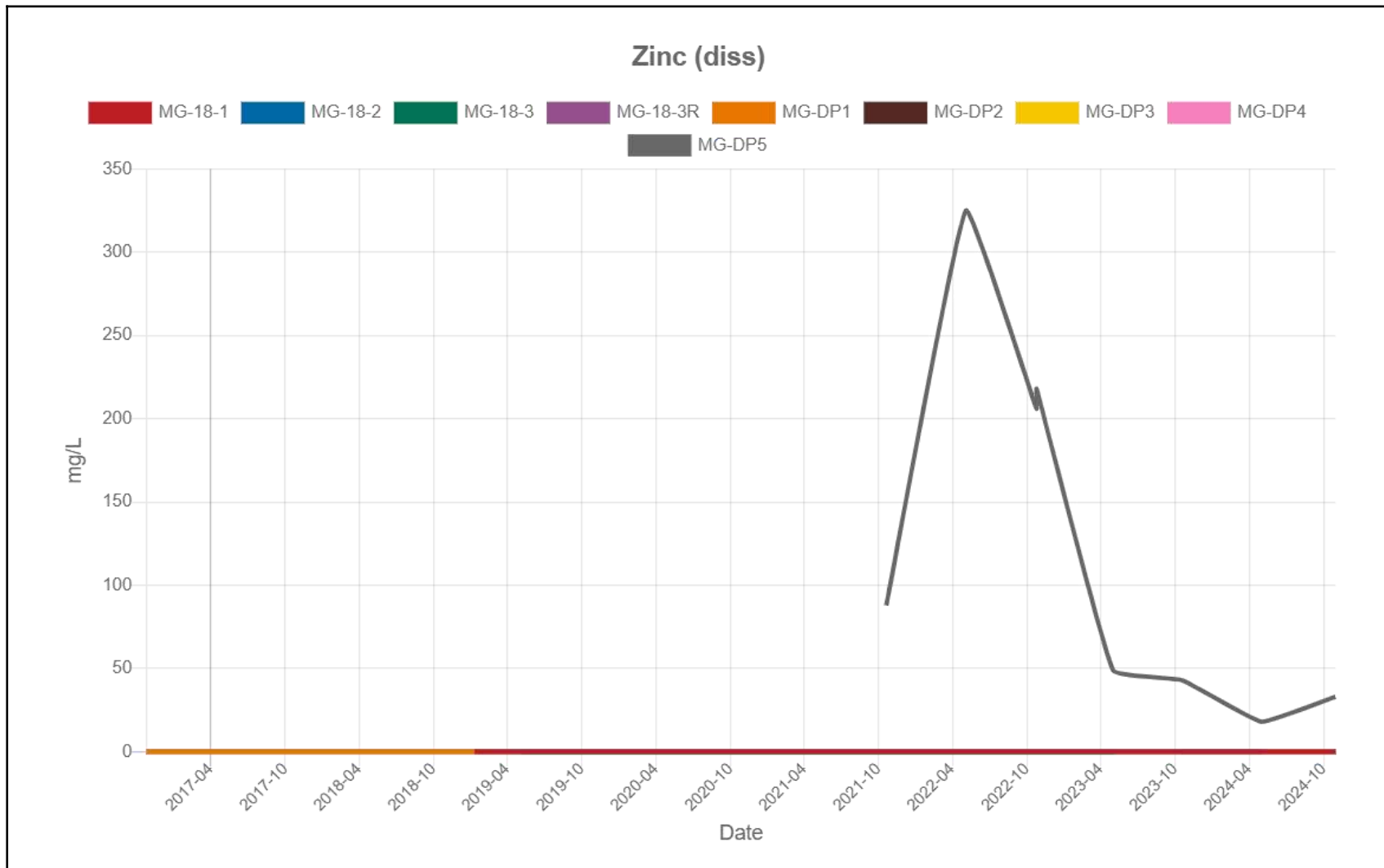
East Lake WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 240205
Date: February 12, 2025

Graph 12
Total Dissolved Solids in Groundwater

Created by: Megan Williamson
Checked by: Megan Williamson





East Lake WDS
Municipality of Hasting's Highlands

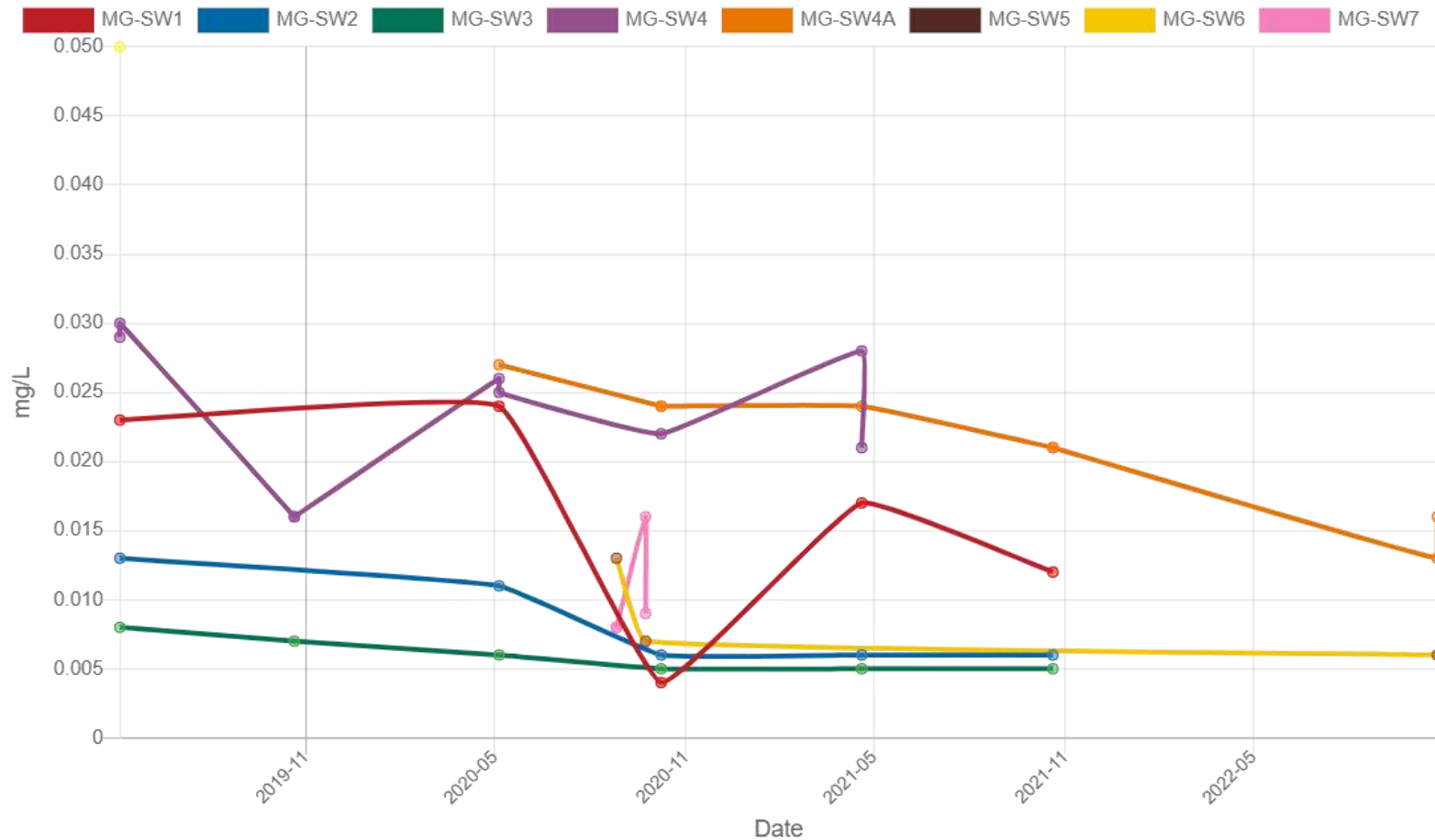
BluMetric Proj No: 240205
Date: February 12, 2025

Graph 13
Dissolved Zinc in Groundwater

Created by: Megan Williamson
Checked by: Megan Williamson



Aluminum (diss, 0.45 µm)



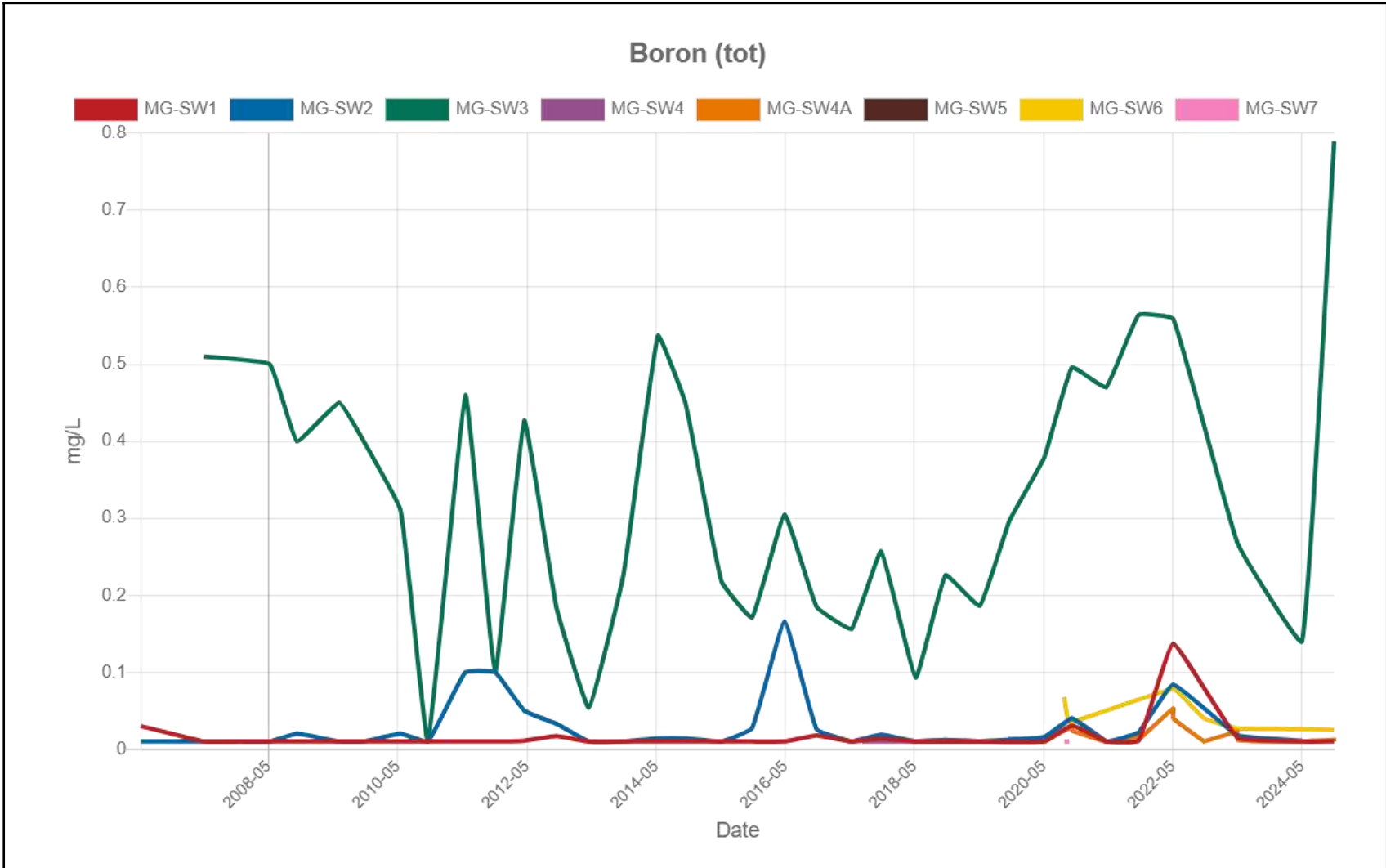
East Lake WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 240205
Date: February 12, 2025

Graph 14
Dissolved Aluminum in Surface Water

Created by: Megan Williamson
Checked by: Megan Williamson





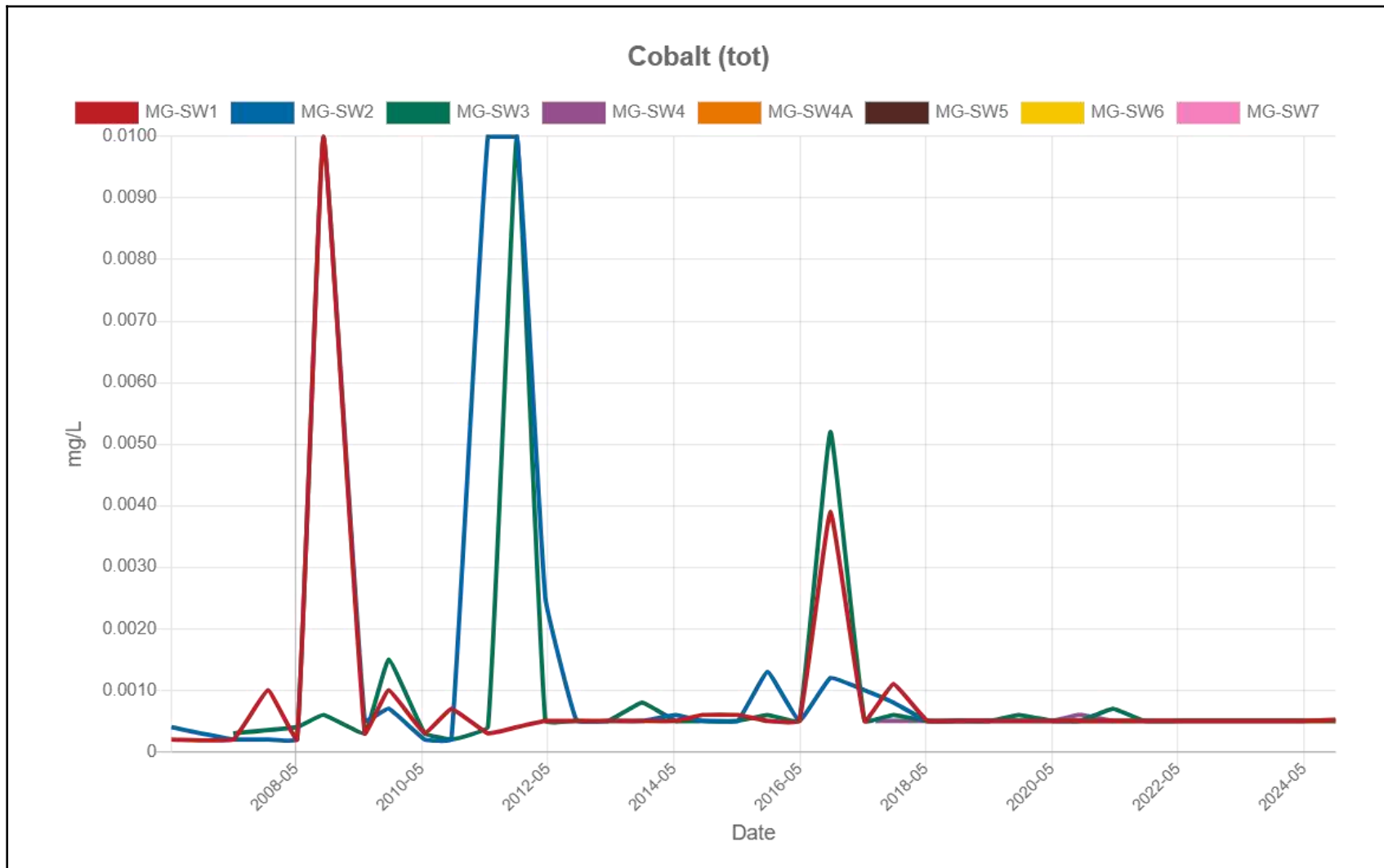
East Lake WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 240205
Date: February 12, 2025

Graph 15
Total Boron in Surface Water

Created by: Megan Williamson
Checked by: Megan Williamson





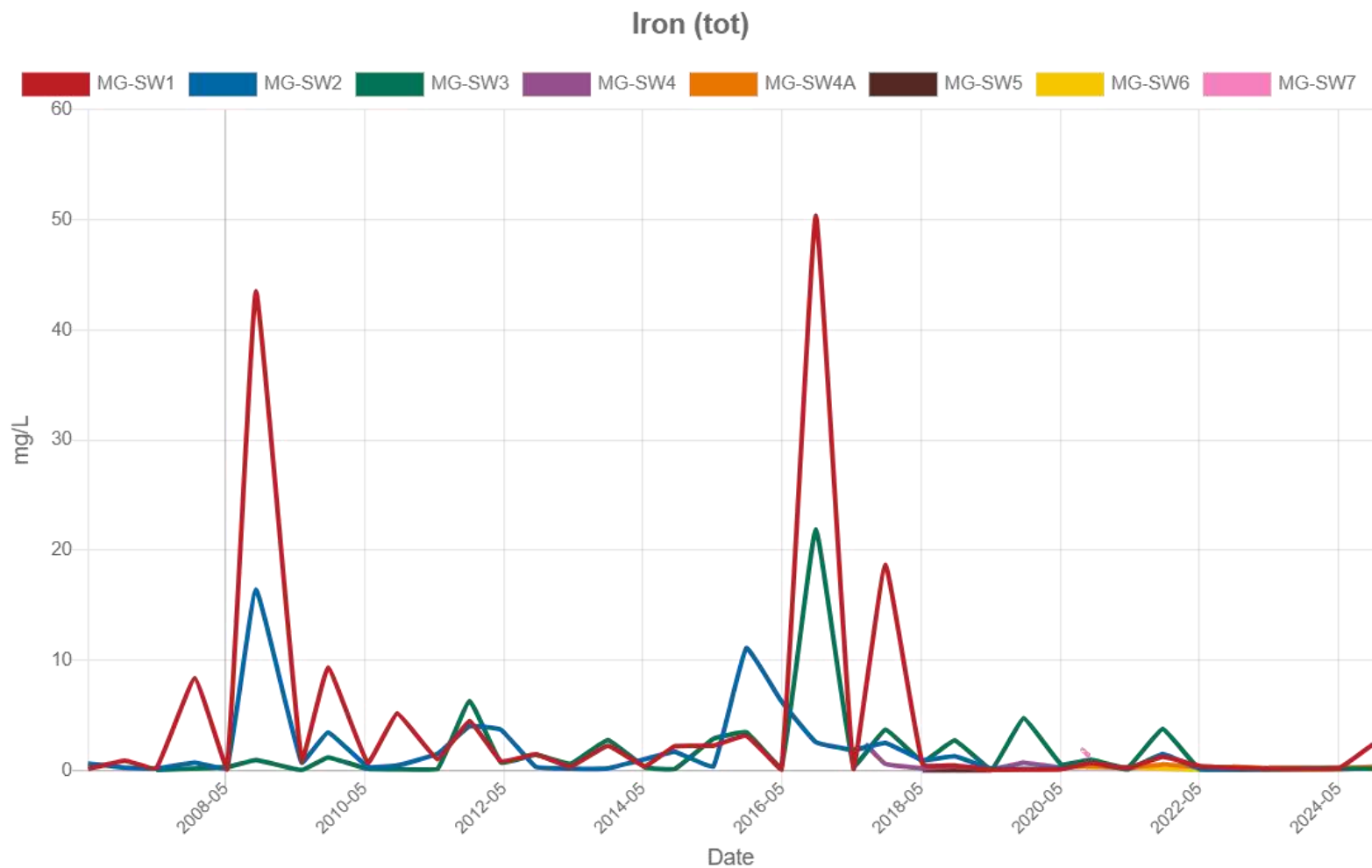
East Lake WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 240205
Date: February 12, 2025

Graph 16
Total Cobalt in Surface Water

Created by: Megan Williamson
Checked by: Megan Williamson





East Lake WDS
Municipality of Hasting's Highlands

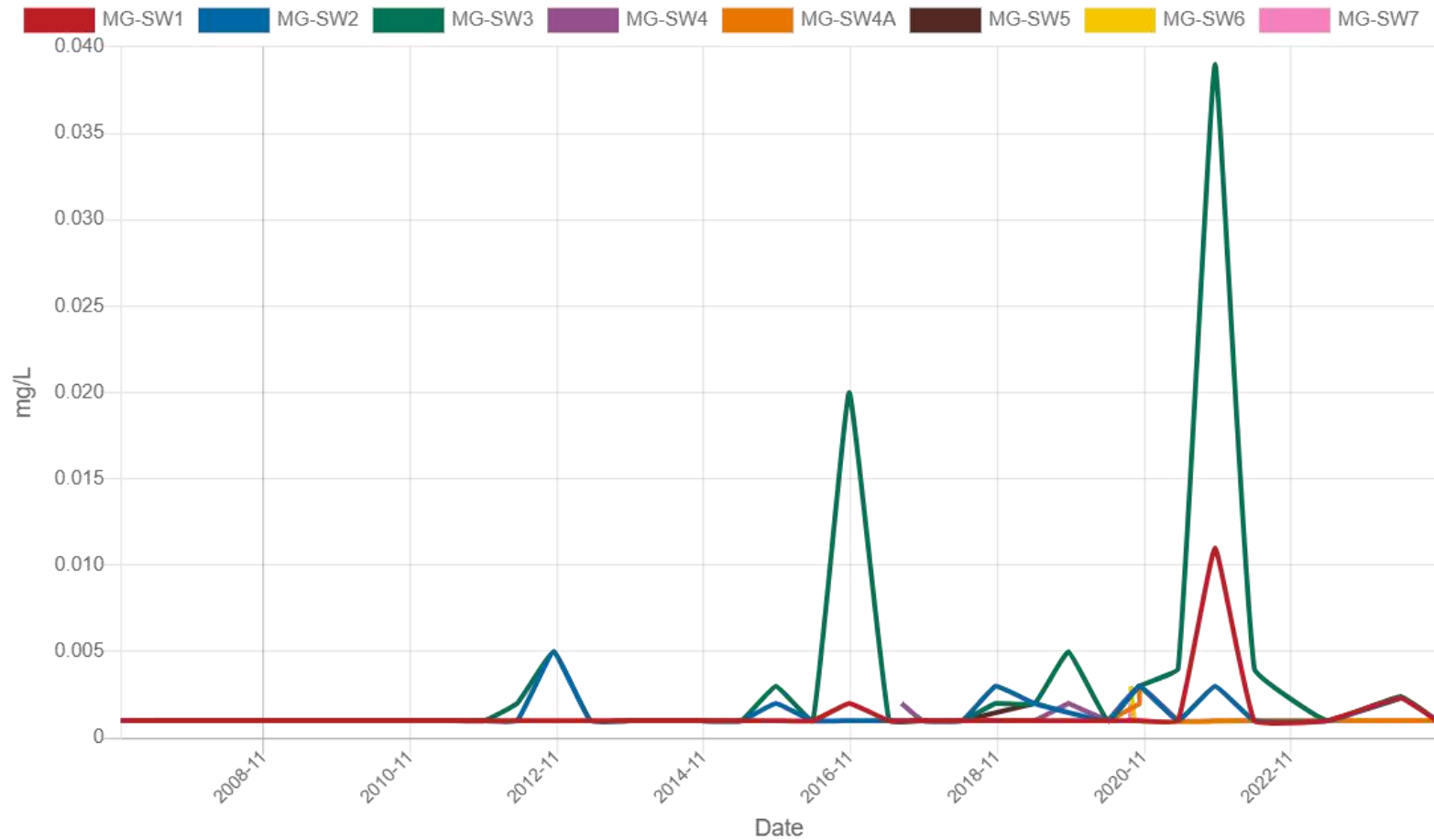
BluMetric Proj No: 240205
Date: February 12, 2025

Graph 17
Total Iron in Surface Water

Created by: Megan Williamson
Checked by: Megan Williamson



Phenols



East Lake WDS
Municipality of Hasting's Highlands

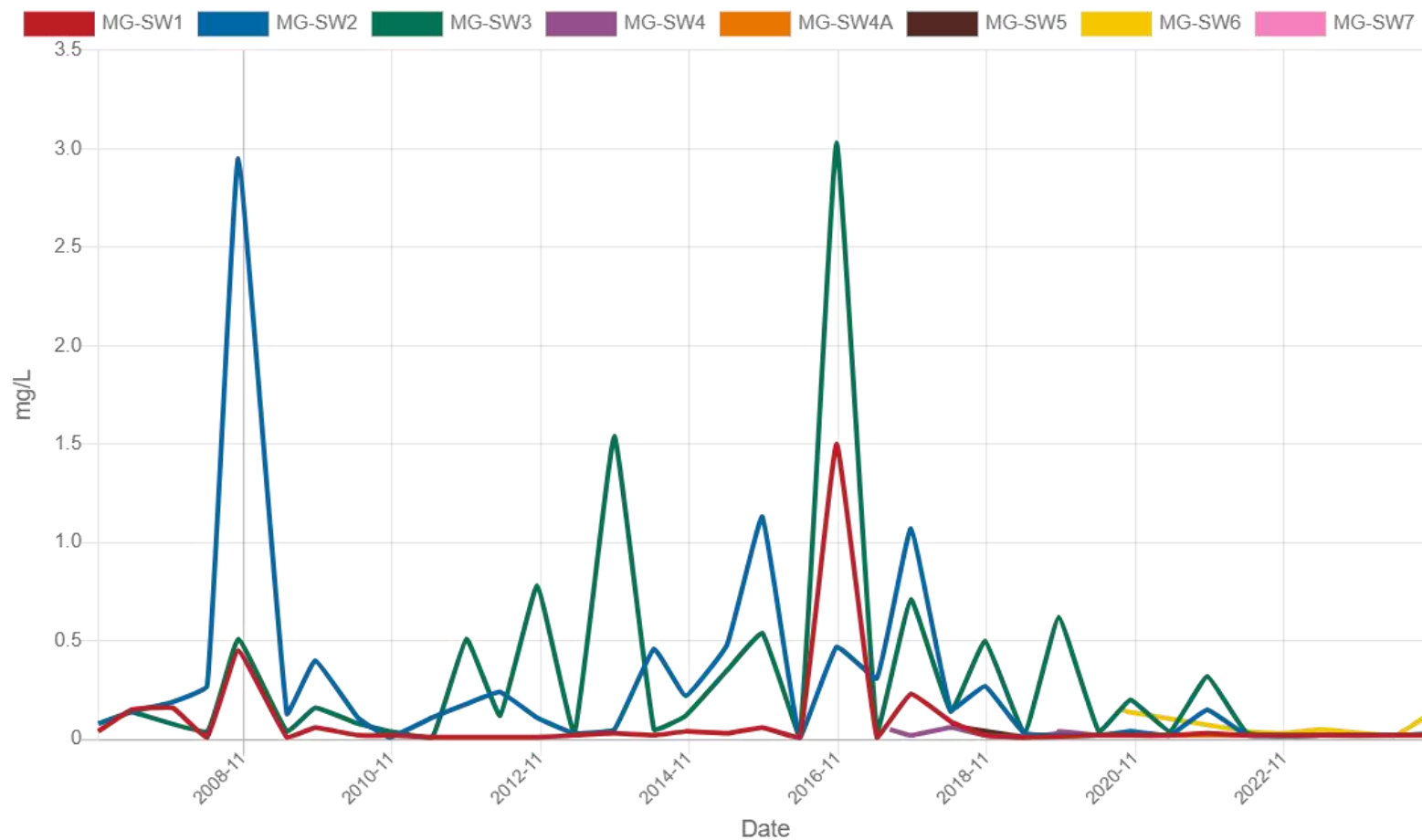
BluMetric Proj No: 240205
Date: February 12, 2025

Graph 18
Phenols in Surface Water

Created by: Megan Williamson
Checked by: Megan Williamson



Total Phosphorus



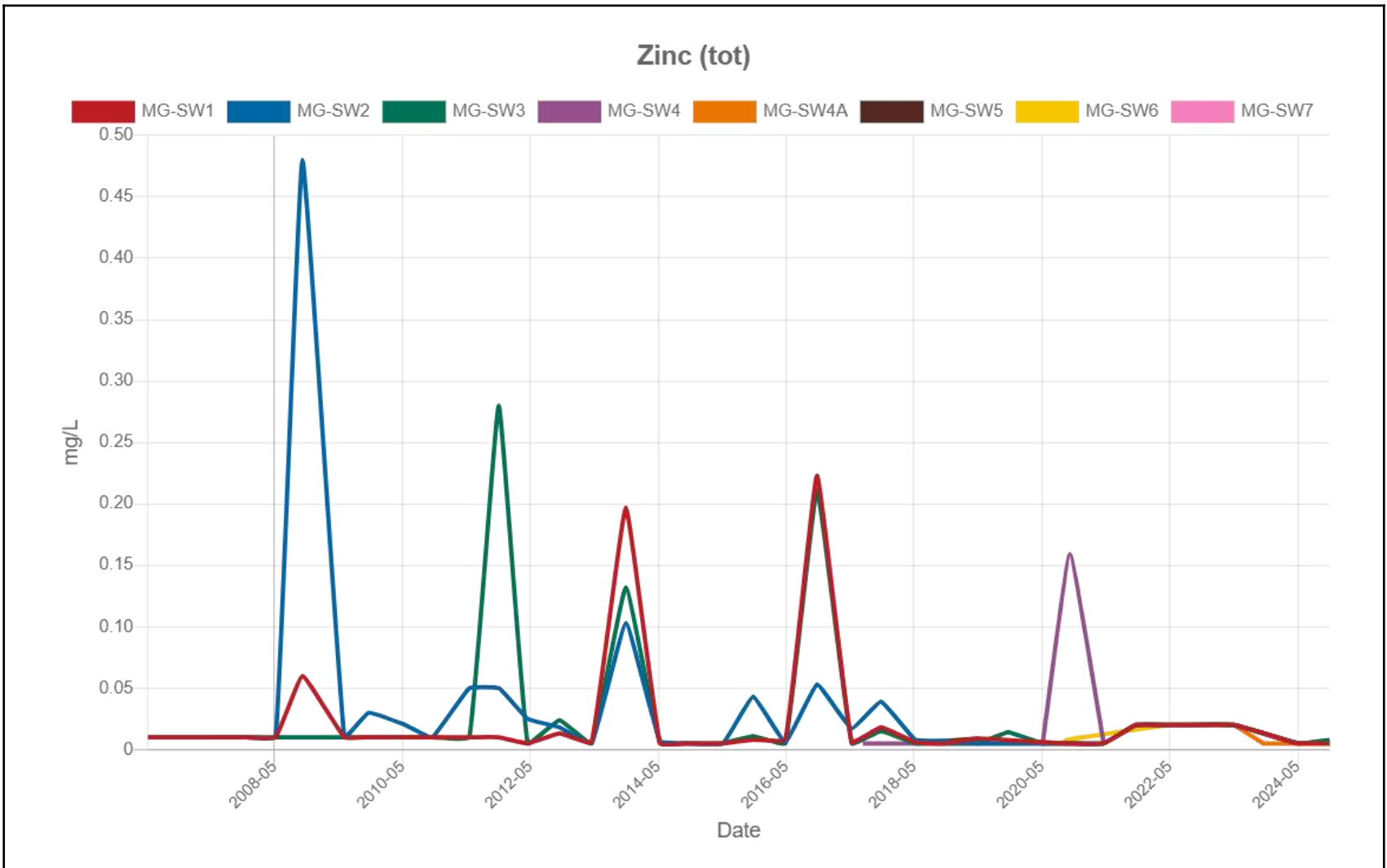
East Lake WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 240205
Date: February 12, 2025

Graph 19
Total Phosphorus in Surface Water

Created by: Megan Williamson
Checked by: Megan Williamson





East Lake WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 240205
Date: February 12, 2025

Graph 20
Total Zinc in Surface Water

Created by: Megan Williamson
Checked by: Megan Williamson



Appendix A

A-1 Environmental Compliance Approval

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER A362303
Issue Date: April 27, 2018

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

Site Location: Musclow-Greenview WDS
3375 Musclow-Greenview Road
Lot Part of 11, Concession 11
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 1 hectare waste disposal/transfer site within a total site area of 2 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 Schedule "A";
- "Contaminating Life Span" means contaminating life span as defined in Ontario Regulation 232/98;
- "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* in which the *Site* is geographically located;
- "EPA" means *Environmental Protection Act*, R.S.O. 1990, c. E. 19, as amended;

- "*HHW*" means household hazardous waste;
- "*Ministry*" means the Ontario Ministry of the Environment and Climate Change;
- "*NMA*" means *Nutrient Management Act* , 2002, S.O. 2002, c. 4, as amended;
- "*Ontario Drinking Water Quality Standards*" means Ontario Regulation 169/03 (Ontario Drinking Water Quality Standards) as amended;
- "*Operator*" means any person, other than the *Owner's* employees, authorized by the *Owner* as having the charge, management or control of any aspect of the *Site* and includes its successors or assigns;
- "*Owner*" means any person that is responsible for the establishment or operation of the *Site* being approved by this *Approval*, and includes the Corporation of the Municipality of Hastings Highlands and its successors and assigns;
- "*OWRA*" means the *Ontario Water Resources Act* , R.S.O. 1990, c. O.40, as amended;
- "*PA*" means the *Pesticides Act* , R.S.O. 1990, c. P-11, as amended;
- "*Provincial Officer*" means any person designated in writing by the Minister as a provincial officer pursuant to Section 5 of the *OWRA*, Section 5 of the *EPA*, Section 17 of the *PA*, Section 4 of the *NMA*, or Section 8 of the *SDWA*;
- "*Refrigerant Appliances*" means household appliances which use, or may use refrigerants, and which include, but is not restricted to, refrigerators, freezers and air-conditioning systems;
- "*Regional Director*" means the Regional Director of the local Regional Office of the *Ministry* in which the *Site* is located;
- "*Regulation 347*" means Regulation 347, R.R.O. 1990, made under the *EPA*, as amended;
- "*Regulation 903*" means Regulation 903, R.R.O. 1990, made under the *OWRA*, as amended;
- "*SDWA*" means *Safe Drinking Water Act*, 2002, S.O. 2002, c. 32, as amended;
- "*Site*" means the entire waste disposal site, including the buffer lands, and contaminant attenuation zone at Musclow-Greenview WDS, 3375 Musclow-Greenview Road; and
- "*Trained Personnel*" means personnel knowledgeable in the following through instruction and/or practice:
 - relevant waste management legislation, regulations and guidelines;
 - major environmental concerns pertaining to the waste to be handled;

- occupational health and safety concerns pertaining to the processes and wastes to be handled;
- management procedures including the use and operation of equipment for the processes and wastes to be handled;
- emergency response procedures;
- specific written procedures for the control of nuisance conditions;
- specific written procedures for refusal of unacceptable waste loads; and
- the requirements of this *Approval*.

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

TERMS AND CONDITIONS

1. GENERAL

Compliance

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

In Accordance

- (3) 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".

Interpretation

- (4) Where there is a conflict between a provision of any document listed in Schedule "A" in this *Approval*, and the conditions of this *Approval*, the conditions in this *Approval* shall take precedence.
- (5) Where there is a conflict between the application and a provision in any document listed in Schedule "A", the application shall take precedence, unless it is clear that the purpose of the document was to amend the application and that the *Ministry* approved the

amendment.

- (6) Where there is a conflict between any two documents listed in Schedule "A", the document bearing the most recent date shall take precedence.
- (7) The conditions of this *Approval* are severable. If any condition of this *Approval*, or the application of any condition of this *Approval* to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this *Approval* shall not be affected thereby.

Other Legal Obligations

- (8) The issuance of, and compliance with, this *Approval* does not:
 - (a) relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement; or
 - (b) limit in any way the authority of the *Ministry* to require certain steps be taken or to require the *Owner* and *Operator* to furnish any further information related to compliance with this *Approval*.

Adverse Effect

- (9) The *Owner* and *Operator* shall take steps to minimize and ameliorate any adverse effect on the natural environment or impairment of water quality resulting from the *Site*, including such accelerated or additional monitoring as may be necessary to determine the nature and extent of the effect or impairment.
- (10) Despite an *Owner*, *Operator* or any other person fulfilling any obligations imposed by this *Approval* the person remains responsible for any contravention of any other condition of this *Approval* or any applicable statute, regulation, or other legal requirement resulting from any act or omission that caused the adverse effect to the natural environment or impairment of water quality.

Change of Ownership

- (11) 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.
- (12) 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.

- (13) 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*.

Registration on Title Requirement

- (14) 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.
- (15) (a) Within thirty (30) calendar days from the date of issuance of this *Approval*, the *Owner* shall submit to the *Director* a completed Certificate of Requirement which shall include:
- (i) a plan of survey prepared, signed and sealed by an Ontario Land Surveyor, which shows the area of the *Site* where waste has been or is to be deposited at the *Site*;
 - (ii) proof of ownership of the *Site*;
 - (iii) a letter signed by a member of the Law Society of Upper Canada or other qualified legal practitioner acceptable to the *Director*, verifying the legal description provided in the Certificate of Requirement;
 - (iv) the legal abstract of the property; and
 - (v) any supporting documents including a registerable description of the *Site*.
- (b) Within thirty (30) calendar days of receiving a Certificate of Requirement authorized by the *Director*, the *Owner* shall:
- (i) register the Certificate of Requirement in the appropriate Land Registry Office on the title to the property; and
 - (ii) submit to the *Director* and the *District Manager*, written verification that the Certificate of Requirement has been registered on title.

Inspections by the *Ministry*

- (16) No person shall hinder or obstruct a *Provincial Officer* from carrying out any and all inspections authorized by the *OWRA*, the *EPA*, the *PA*, the *SDWA* or the *NMA*, of any place to which this *Approval* relates, and without limiting the foregoing:
- (a) to enter upon the premises where the approved works are located, or the location where the records required by the conditions of this *Approval* are kept;
 - (b) to have access to, inspect, and copy any records required to be kept by the conditions of this *Approval*;
 - (c) to inspect the *Site*, related equipment and appurtenances;
 - (d) to inspect the practices, procedures, or operations required by the conditions of

- this *Approval*; and
- (e) to sample and monitor for the purposes of assessing compliance with the terms and conditions of this *Approval* or the *EPA*, the *OWRA*, the *PA*, the *SDWA* or the *NMA*.

Information and Record Retention

- (17) (a) Except as authorized in writing by the *Director*, all records required by this *Approval* shall be retained at the *Site* for a minimum of two (2) years from their date of creation.
- (b) The *Owner* shall retain all documentation listed in Schedule "A" for as long as this *Approval* is valid.
- (c) All monthly summary reports of waste records collected are to be kept at the *Site* until they are included in the Annual Report.
- (d) The *Owner* shall retain employee training records as long as the employee is working at the *Site*.
- (e) The *Owner* shall make all of the above documents available for inspection upon request of *Ministry* staff.
- (18) The receipt of any information by the *Ministry* or the failure of the *Ministry* to prosecute any person or to require any person to take any action under this *Approval* or under any statute, regulation or other legal requirement, in relation to the information, shall not be construed as:
- (a) an approval, waiver, or justification by the *Ministry* of any act or omission of any person that contravenes any term or condition of this *Approval* or any statute, regulation or other legal requirement; or
- (b) acceptance by the *Ministry* of the information's completeness or accuracy.
- (19) The *Owner* shall ensure that a copy of this *Approval*, in its entirety and including all its Notices of Amendment, and documentation listed in Schedule "A", are retained at the *Site* at all times.
- (20) Any information related 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, RSO 1990, CF-31.

2. SITE OPERATION

Operation

- (1) The *Site* shall be operated and maintained at all times including management and disposal of all waste, in accordance with the *EPA, Regulation 347*, and the conditions of this *Approval*. At no time shall the discharge of a contaminant that causes or is likely to cause an adverse effect be permitted.

Signs

- (2) A sign shall be installed and maintained at the main entrance/exit to the *Site* which legibly display the following information:
 - (a) the name of the *Site* and *Owner*;
 - (b) the number of the *Approval*;
 - (c) the name of the *Operator*;
 - (d) the normal hours of operation;
 - (e) the allowable and prohibited waste types;
 - (f) the telephone number to which complaints may be directed;
 - (g) a warning against unauthorized access;
 - (h) a twenty-four (24) hour emergency telephone number (if different from above); and
 - (i) a warning against dumping outside the *Site*.
- (3) The *Owner* shall install and maintain signs to direct vehicles to working face and recycling areas.
- (4) The *Owner* shall provide signs at recycling depot informing users what materials are acceptable and directing users to appropriate storage areas.

Vermin, Vectors, Dust, Litter, Odour, Noise and Traffic

- (5) The *Site* shall be operated and maintained such that the vermin, vectors, dust, litter, odour, noise and traffic do not create a nuisance.

Burning Waste Prohibited

- (6)
 - (a) Burning of waste at the *Site* is prohibited.
 - (b) Notwithstanding Condition 2. (6) (a) above, burning of segregated, clean wood and brush at the landfill may be carried out in strict compliance with the Ministry of the Environment Document titled "Guideline C-7, Burning at Landfill Sites" dated April 1994.

Site Access

- (7) Waste shall only be accepted during the following time periods:

Winter (Thanksgiving Day to Victoria Day)

Sunday : 12:00 p.m. - 5:00 p.m.

Summer (Victoria Day to Thanksgiving Day)

Saturday : 7:00 a.m. - 12:00 p.m.

Sunday : 12:00 p.m. - 5:00 p.m.

Statutory Holiday Monday : 12:00 p.m. - 5:00 p.m.

- (8) On-site equipment used for daily site preparation and closing activities may be operated one (1) hour before and one (1) hour after the hours of operation approved by this *Approval*.
- (9) With the prior written approval from the *District Manager*, the time periods may be extended to accommodate seasonal or unusual quantities of waste.

Site Security

- (10) (a) No waste shall be received, landfilled or removed from the *Site* unless a site supervisor or an attendant is present and supervises the operations during operating hours. The *Site* shall be closed when a site attendant is not present to supervise landfilling operations.
- (b) Waste/recyclables relocated on-site or removed from the *Site* by a registered/licensed waste hauler shall be carried out by trained personnel during the hours of 7 a.m. and 5 p.m. Monday to Friday.
- (11) The *Site* shall be operated and maintained in a safe and secure manner. During non-operating hours, the *Site* entrance and exit gates shall be locked and the *Site* shall be secured against access by unauthorized persons.

3. EMPLOYEE TRAINING

- (1) A training plan for all employees that operate any aspect of the *Site* shall be developed and implemented by the *Owner* or the *Operator*. Only *Trained Personnel* shall operate any aspect of the *Site* or carry out any activity required under this *Approval*.

4. COMPLAINTS RESPONSE PROCEDURE

- (1) If at any time the *Owner* receives complaints regarding the operation of the *Site*, the

Owner shall respond to these complaints according to the following procedure:

- (a) The *Owner* shall record and number each complaint, either electronically or in a log book, and shall include the following information: the nature of the complaint, the name, address and the telephone number of the complainant if the complainant will provide this information and the time and date of the complaint;
- (b) The *Owner*, upon notification of the complaint, shall initiate appropriate steps to determine 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 complete and 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 recurrence of similar incidents.

5. EMERGENCY RESPONSE

- (1) All Spills as defined in the *EPA* shall be immediately reported to the **Ministry's Spills Action Centre at 1-800-268-6060** and shall be recorded in the log book as to the nature of the emergency situation, and the action taken for clean-up, correction and prevention of future occurrences.
- (2) In addition, the *Owner* shall submit, to the *District Manager* a written report within three (3) business days of the emergency situation, outlining the nature of the incident, remedial measures taken, handling of waste generated as a result of the emergency situation and the measures taken to prevent future occurrences at the *Site*.
- (3) All wastes resulting from an emergency situation shall be managed and disposed of in accordance with *Reg. 347*.
- (4) All equipment and materials required to handle the emergency situations shall be:
 - (a) kept on hand at all times that waste landfilling and/or handling is undertaken at the *Site*; and
 - (b) adequately maintained and kept in good repair.
- (5) The *Owner* shall ensure that the emergency response personnel are familiar with the use of such equipment and its location(s).

6. INSPECTIONS, RECORD KEEPING AND REPORTING

Daily Log Book

- (1) A daily log shall be maintained in written or electronic format and shall include the following information:
 - (a) the type, date and time of arrival, hauler, and quantity (tonnes) of all waste and cover material received at the *Site*;
 - (b) the area of the *Site* in which waste disposal operations are taking place;
 - (c) a record of litter collection activities and the application of any dust suppressants;
 - (d) a record of the daily inspections; and
 - (e) a description of any out-of-service period of any control, treatment, disposal or monitoring facilities, the reasons for the loss of service, and action taken to restore and maintain service.
- (2) Any information requested, by the *Director* or a *Provincial Officer*, concerning the *Site* and its operation under this *Approval*, including but not limited to any records required to be kept by this *Approval* shall be provided to the *Ministry*, upon request.

Daily Inspections and Log Book

- (3) An inspection of the entire *Site* and all equipment on the *Site* shall be conducted each day the *Site* is in operation to ensure that: the *Site* is secure; that the operation of the *Site* is not causing any nuisances; that the operation of the *Site* is not causing any adverse effects on the environment and that the *Site* is being operated in compliance with this *Approval*. Any deficiencies discovered as a result of the inspection shall be remedied immediately, including temporarily ceasing operations at the *Site* if needed.
- (4) A record of the inspections shall be kept in a daily log book that includes:
 - (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) the recommendations for remedial action; and
 - (e) the date, time and description of actions taken.
- (5) A record shall be kept in the daily log book of all refusals of waste shipments, the reason(s) for refusal, and the origin of the waste, if known.

Annual Report

- (6) A written report on the development, operation and monitoring of the *Site*, shall be completed annually (the "Annual Report"). The Annual Report shall be submitted to the *District Manager*, by March 31st of the year following the period being reported upon.
- (7) The Annual Report shall include but not be limited to the following information:

- (a) the results and an interpretive analysis of the results of all leachate, groundwater surface water and landfill gas monitoring, including an assessment of the need to amend the monitoring programs;
- (b) an assessment of the operation and performance of all engineered facilities, the need to amend the design or operation of the *Site*, and the adequacy of and need to implement the contingency plans;
- (c) site plans showing the existing contours of the *Site*; areas of landfilling operation during the reporting period; areas of intended operation during the next reporting period; areas of excavation during the reporting period; the progress of final cover, vegetative cover, and any intermediate cover application; facilities existing, added or removed during the reporting period; and site preparations and facilities planned for installation during the next reporting period;
- (d) calculations of the volume of waste, daily and intermediate cover, and final cover deposited or placed at the *Site* during the reporting period and a calculation of the total volume of *Site* capacity used during the reporting period;
- (e) a calculation of the remaining capacity of the *Site* and an estimate of the remaining *Site* life;
- (f) a summary of the weekly and total annual quantity (volume or tonnes) of waste received at the *Site*;
- (g) a summary of any complaints received and the responses made;
- (h) a discussion of any operational problems encountered at the *Site* and corrective action taken;
- (i) any changes to the Design and Operations Report and the Closure Plan that have been approved by the *Director* since the last *Annual Report*;
- (j) a report on the status of all monitoring wells and a statement as to compliance with *Ontario Regulation 903*; and
- (k) any other information with respect to the *Site* which the *District Manager* may require from time to time.

7. LANDFILL DESIGN AND DEVELOPMENT

Approved Waste Types

- (1) Only municipal waste as defined under *Reg. 347* being solid non-hazardous shall be accepted at the *Site* for landfilling.
- (2) The *Owner* shall develop and implement a program to inspect waste to ensure that the waste received at the *Site* is of a type approved for acceptance under this *Approval*.
- (3) The *Owner* shall ensure that all loads of waste are properly inspected by *Trained personnel* prior to acceptance at the *Site* and that the waste vehicles are directed to the appropriate areas for disposal or transfer of the waste. The *Owner* shall notify the *District*

Manager, in writing, of load rejections at the *Site* within one (1) business day from their occurrence.

Capacity

- (4) The approved volumetric capacity of the *Site*, consisting of the waste, daily cover and intermediate cover, but excluding the final cover is 27,500 cubic metres.
- (5) This approval is for the design, operation and use of 27,500 cubic meters as described in the Development and Operations Plan dated November 2017 prepared by BlueMetric Environmental included in Schedule "A". This volume includes the historical waste volume of 11,680 cubic meters as of July 2017.

Service Area

- (6) Only waste that is generated within the boundaries of the Municipality of Hastings Highlands may be accepted at the *Site*.
- (7) Waste from Universal Seal Incorporated shall not be deposited at the *Site*.

Cover

- (8) Alternative materials to soil may be used as weekly and interim cover material, based on an application with supporting information and applicable fee for a trial use or permanent use, submitted by the *Owner* to the *Director*, copied to the *District Manager* and as approved by the *Director* via an amendment to this *Approval*. The alternative material shall be non-hazardous according to *Reg. 347* and will be expected to perform at least as well as soil in relation to the following functions:
 - (a) Control of blowing litter, odours, dust, landfill gas, gulls, vectors, vermin and fires;
 - (b) Provision for an aesthetic condition of the landfill during the active life of the *Site*;
 - (c) Provision for vehicle access to the active tipping face; and
 - (d) Compatibility with the design of the *Site* for groundwater protection, leachate management and landfill gas management.
- (9) Cover material shall be applied as follows:
 - (a) **Periodic Cover** - Weather permitting, deposited waste shall be covered **at the end of each third week** in a manner acceptable to the *District Manager* so that no waste is exposed to the atmosphere. If this frequency creates nuisance effects the *Owner* shall apply more frequent cover as directed by the *District Manager*;
 - (b) **Intermediate Cover** - In areas where landfilling has been temporarily discontinued for six (6) months or more, a minimum thickness of 300 millimetre of soil cover or an approved thickness of alternative cover material shall be placed; and
 - (c) **Final Cover** - In areas where landfilling has been completed to final contours, a

minimum 600 millimetre thick layer of soil of medium permeability and 150 millimetres of top soil (vegetative cover) shall be placed. Fill areas shall be progressively completed and rehabilitated as landfill development reaches final contours.

8. LANDFILL MONITORING

Landfill Gas

- (1) The *Owner* shall ensure that any buildings or structures at the *Site* contain adequate ventilation systems to relieve any possible landfill gas accumulation to prevent methane concentration reaching the levels within its explosive range. Routine monitoring for explosive methane gas levels shall be conducted in all buildings or structures at the *Site*, especially enclosed structures which at times are occupied by people.

Compliance

- (2) 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 the 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*, for the protection of the surface water at and off the *Site*.
 - (c) *Ontario Drinking Water Quality Standards*, as amended from time to time or limits set by the *Regional Director*, for the protection of the groundwater at and off the *Site*.

Surface Water and Groundwater

- (3) The *Owner* shall monitor surface water and ground water in accordance with Schedules "B" and "C".
- (4) A certified Professional Geoscientist or 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) The *Owner* shall ensure that all groundwater monitoring wells which form part of the monitoring program are properly capped, locked and protected from damage.

- (6) Where landfilling is to proceed around monitoring wells, suitable extensions shall be added to the wells and the wells shall be properly re-secured.
- (7) Any groundwater monitoring well included in the on-going monitoring program that is damaged shall be assessed, repaired, replaced or decommissioned by the *Owner*, as required.
 - (a) The *Owner* shall repair or replace any monitoring well which is destroyed or in any way made to be inoperable for sampling such that no more than one regular sampling event is missed.
 - (b) All monitoring wells which are no longer required as part of the groundwater monitoring program, and have been approved by the *Director* for abandonment, shall be decommissioned by the *Owner*, as required, in accordance with *O.Reg. 903*, to prevent contamination through the abandoned well. A report on the decommissioning of the well shall be included in the Annual Report for the period during which the well was decommissioned.

Trigger Mechanisms and Contingency Plans

- (8)
 - (a) Trigger mechanisms shall be in accordance with Appendix F (revised March 13, 2018), the Development and Operations Plan dated November 2017 prepared by BlueMetric Environmental included in Schedule "A".
 - (b) Within six (6) months from the date of this *Approval*, the *Owner* shall submit to the *Director* for *Approval* a detailed contingency plan for surface water and groundwater in the event of a confirmed exceedance of a site-specific trigger level relating to leachate mounding or groundwater or surface water impacts due to leachate.
- (9) Within twelve (12) months from the date of this *ECA Approval*, the *Owner* shall conduct further investigations into surface water impacts at the site, and provide a summary of the findings in the 2018 Annual Monitoring Report (to be submitted by March 31, 2019). The summary of the findings shall include alternatives for potential mitigations measures and the associated schedules for their implementation, should they be required.
- (10) If monitoring results, investigative activities and/or trigger mechanisms indicate the need to implement contingency measures, the *Owner* shall ensure that the following steps are taken:
 - (a) The *Owner* shall notify the *District Manager*, in writing of the need to implement contingency measures, no later than 30 days after confirmation of the exceedances;

- (b) Detailed plans, specifications and descriptions for the design, operation and maintenance of the contingency measures shall be prepared and submitted by the *Owner* to the *Director* for approval; and
 - (c) The contingency measures shall be implemented by the *Owner* upon approval by the *Director*.
- (11) The *Owner* shall ensure that any proposed changes to the site-specific trigger levels for leachate impacts to the surface water or groundwater, are approved in advance by the *Director* via an amendment to this *Approval*.

Changes to the Monitoring Plan

- (12) 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 a separate letter that shall accompany the annual report.
- (13) Within fourteen (14) 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.
- (14) 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*.

9. CLOSURE PLAN

- (1) At least three (3) years prior to the anticipated date of closure of this *Site*, the *Owner* shall submit to the *Director* for approval, with copies to the *District Manager*, a detailed *Site* closure plan pertaining to the termination of landfilling operations at this *Site*, post-closure inspection, maintenance and monitoring, and end use. The plan shall include but not be limited to the following information:
- (a) a plan showing *Site* appearance after closure;
 - (b) a description of the proposed end use of the *Site*;
 - (c) a description of the procedures for closure of the *Site*, including:
 - (i) advance notification of the public of the landfill closure;
 - (ii) posting of a sign at the *Site* entrance indicating the landfill is closed and identifying any alternative waste disposal arrangements;
 - (iii) completion, inspection and maintenance of the final cover and landscaping;

- (iv) *Site* security;
 - (v) removal of unnecessary landfill-related structures, buildings and facilities;
 - (vi) final construction of any control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas; and
 - (vii) a schedule indicating the time-period for implementing sub-conditions (i) to (vi) above;
 - (d) descriptions of the procedures for post-closure care of the *Site*, including:
 - (i) operation, inspection and maintenance of the control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;
 - (ii) record keeping and reporting; and
 - (iii) complaint contact and response procedures;
 - (e) an assessment of the adequacy of and need to implement the contingency plans for leachate and methane gas; and
 - (f) an updated estimate of the *contaminating life span* of the *Site*, based on the results of the monitoring programs to date.
- (2) The *Site* shall be closed in accordance with the closure plan as approved by the *Director*.

10. WASTE DIVERSION

- (1) The *Owner* shall ensure that:
- (a) all bins and waste storage areas are clearly labelled;
 - (b) all lids or doors on bins shall be kept closed during non-operating hours and during high wind events; and
 - (c) if necessary to prevent litter, waste storage areas shall be covered during high winds events.
- (2) The *Owner* shall provide a segregated area for the storage of *Refrigerant Appliances* so that the following are ensured:
- (a) all *Refrigerant Appliances* have been tagged to indicate that the refrigerant has been removed by a licensed technician. The tag number shall be recorded in the log book and shall remain affixed to the appliance until transferred from the *Site*;
 - or
 - (b) all *Refrigerant Appliances* accepted at the *Site*, which have not been tagged by a licensed technician to verify that the equipment no longer contains refrigerants, are stored segregated, in a clearly marked area, in an upright position and in a manner which allows for the safe handling and transfer from the *Site* for removal of refrigerants as required by O.Reg. 189; and
 - (c) all *Refrigerant Appliances* received on-site shall either have the refrigerant removed prior to being transferred from the *Site* or shall be shipped off-site only to facilities where the refrigerants can be removed by a licensed technician in accordance with O.Reg. 189.

- (3) The *Owner* shall transfer waste and recyclable materials from the *Site* as follows:
 - (a) recyclable materials shall be transferred off-site once their storage bins are full;
 - (b) scrap metal shall be transferred off-site at least twice a year;
 - (c) tires shall be transferred off-site as soon as a load for the contractor hired by the *Owner* has accumulated or as soon as the accumulated volume exceeds the storage capacity of its bunker; and
 - (d) immediately, in the event that waste is creating an odour or vector problem.
- (4) The *Owner* shall notify the appropriate contractors that waste and recyclable wastes that are to be transferred off-site are ready for removal. Appropriate notice time, as determined by the contract shall be accommodated in the notification procedure.
- (5) Collection, storage and transfer of Waste Electrical and Electronic Equipment shall be in accordance with the documents in the Schedule "A". If there is any discrepancy between the guideline titled "Collection Site Organizing & Operating Waste Electrical and Electronic Equipment (WEEE) Guidebook" dated November 2012 as amended prepared by Ontario Electronic Stewardship and the documents in Schedule "A", the guideline shall take precedence.

SCHEDULE "A"

1. Application for Provisional Certificate of Approval for a Waste disposal Site dated June 21, 1989.
2. Letter from J.W. Tooley, MOE, to E.N. Tulley, Township of Monteagle, dated November 21, 1989.
3. Letter from E.N. Tulley, Township of Monteagle, to J.W. Tooley, MOE, dated December 8, 1989.
4. Agreement dated August 4, 1992, between The Centre & South Hastings Waste Management Board and the Corporation of the Township of Monteagle of the Province of Ontario, Re: Recycling facility.
5. Letter dated February 18, 1993, from Eleanor N. Tully, Monteagle Township, to Jim Mulder, Ministry of the Environment and Energy, Re: Application for a Transfer Site to allow recycling site at landfill.
6. Letter dated March 3, 1993, from Eleanor N. Tully, Monteagle Township, to Brian Nickel, Ministry of the Environment and Energy, Re: Reply to Brian Nickel's faxed letter of March 3, 1993.
7. Ministry of Natural Resources Land Use Permit No. LUP 5201075 dated March 26, 1993.

8. Letter dated July 20, 1993, from Eleanor N. Tully, Monteagle Township, to D.E. Graham, Ministry of the Environment and Energy, Re: Submission of application requirements as requested by D.E. Graham's letter of May 7, 1993.
9. Application for a Certificate of Approval for a waste disposal site (transfer) dated July 20, 1993.
10. Letter dated July 26, 1994, from Eleanor N. Tully, Monteagle Township, to Ed Tarvich, Ministry of the Environment and Energy, Re: Withdrawal of application.
11. Letter dated November 6, 1996, from Eleanor N. Tully, Monteagle Township, to D.E. Graham, Ministry of the Environment and Energy, Re: Re-submission of application package previously returned by the Ministry.
12. Letter and application form dated December 13, 1996, from Eleanor N. Tully, Monteagle Township, to Jim Mulder, Ministry of Environment and Energy, Re: Submission of application form to amend Certificate of Approval.
13. Environmental Compliance Approval Application dated November 29, 2017 and signed by Pat Pilgrim, CAO, the Corporation of the Municipality of Hastings Highlands, including the attached supporting documentation.
14. Report titled "Development and Operations Plan, Musclow-Greenview Waste Disposal Site" dated November 2017 and prepared by BluMetric Environmental Inc.
15. Letter report dated April 18, 2018 from Iris O'Connor, BluMetric Environmental Inc. to Ranjani Munasinghe, Ministry of the Environment and Climate Change responding to comments from Technical Support Section, Ministry of the Environment and Climate Change for the Development and Operations Plan dated November 2017.

SCHEDULE "B"
Surface Water Monitoring Plan

Monitoring Locations	Parameters
SW1, SW2, SW3, new background	Biological Oxygen Demand (BOD ₅), Phenols, Total Phosphorus, Total Kjeldahl Nitrogen (TKN), Ammonia, Chloride, Nitrate, Nitrite, Sodium, Calcium, Magnesium, Sulphate, Alkalinity, Potassium, Aluminum, Barium, Boron, Cadmium, Copper, Cobalt, Iron, Lead, Manganese, Zinc, Chemical Oxygen Demand (COD), Conductivity, pH, Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Hardness

SCHEDULE "C"
Groundwater Monitoring Plan

Monitoring Locations	Parameters
MG-DP1, MG-DP2, MG-DP3, MG-DP4	Dissolved Organic Carbon (DOC), Biological Oxygen Demand (BOD ₅), Ammonia, Chloride, Nitrate, Sodium, Calcium, Magnesium, Sulphate, Alkalinity, Aluminum (dissolved), Barium, Boron, Cadmium, Chromium, Cobalt, Iron, Lead, Manganese, Silver, Zinc, Chemical Oxygen Demand (COD), Conductivity, pH, Total Dissolved Solids (TDS), Total Suspended Solids (TSS)

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

GENERAL

- The reason for Conditions 1(1), (2), (4), (5), (6), (7), (8), (9), (10), (17), (18) and (19) is to clarify the legal rights and responsibilities of the *Owner* and *Operator* under this *Approval*.
- The reasons for Condition 1(3) are 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 reasons for Condition 1(11) are to ensure that the *Site* is operated under the corporate name which appears on the application form submitted for this *approval* and to ensure that the *Director* is informed of any changes.
- The reasons for Condition 1(12) are to restrict potential transfer or encumbrance of the *Site* without the approval of the *Director* and to ensure that any transfer of encumbrance can be made only on the basis that it will not endanger compliance with this *Approval*.
- The reason for Condition 1(13) is to ensure that the successor is aware of its legal responsibilities.
- The reasons for Conditions 1(14) and (15) are that the Part II.1 *Director* is an individual with authority pursuant to Section 197 of the Environmental Protection Act to require registration on title and provide any person with an interest in property before dealing with the property in any way to give a copy of the *Approval* to any person who will acquire an interest in the property as a result of the dealing.
- The reason for Condition 1(16) is to ensure that appropriate Ministry staff has ready access to the

Site for inspection of facilities, equipment, practices and operations required by the conditions in this *Approval*. This Condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the *Act*, the *OWRA*, the *PA*, the *NMA* and the *SDWA*.

- Condition 1 (20) has been included in order to clarify what information may be subject to the *Freedom of Information Act*.

SITE OPERATION

- The reasons for Conditions 2(1), 2(5) and 6(3) are to ensure that the *Site* is operated, inspected and maintained in an environmentally acceptable manner and does not result in a hazard or nuisance to the natural environment or any person.
- The reason for Conditions 2 (2), 2(3) and 2(4) is to ensure that users of the *Site* are fully aware of important information and restrictions related to *Site* operations and access under this *Approval*.
- The reasons for Condition 2(6) (a) and (b) are open burning of municipal waste is unacceptable because of concerns with air emissions, smoke and other nuisance effects, and the potential fire hazard and to make sure burning of brush and wood are carried out in accordance with Ministry guidelines.
- The reasons for Condition 2(7), 2(8) and 2(9) are to specify the hours of operation for the landfill site and a mechanism for amendment of the hours of operation, as required.
- The reasons for Condition 2(10) and 2(11) are to ensure that the *Site* is supervised by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person and to ensure the controlled access and integrity of the *Site* by preventing unauthorized access when the Site is closed and no site attendant is on duty.

EMPLOYEE TRAINING

- The reason for Condition 3(1) is to ensure that the *Site* is supervised and operated by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person.

COMPLAINTS RESPONSE PROCEDURE

- The reason for Condition 4(1) is to ensure that any complaints regarding landfill operations at this *Site* are responded to in a timely and efficient manner.

EMERGENCY RESPONSE

- Conditions 5(1) and 5(2) are included to ensure that emergency situations are reported to the Ministry to ensure public health and safety and environmental protection.

- Conditions 5(3), 5(4) and 5(5) are included to ensure that emergency situations are handled in a manner to minimize the likelihood of an adverse effect and to ensure public health and safety and environmental protection.

RECORD KEEPING AND REPORTING

- The reason for Conditions 6(1) and 6(2) is to ensure that accurate waste records are maintained to ensure compliance with the conditions in this *Approval* (such as fill rate, site capacity, record keeping, annual reporting, and financial assurance requirements), the *EPA* and its regulations.
- The reason for Conditions 6(4) and 6(5) is to ensure that detailed records of *Site* inspections are recorded and maintained for inspection and information purposes.
- The reasons for Conditions 6(6) and 6(7) are to ensure that regular review of site development, operations and monitoring data is documented and any possible improvements to site design, operations or monitoring programs are identified. An annual report is an important tool used in reviewing site activities and for determining the effectiveness of site design.

LANDFILL DESIGN AND DEVELOPMENT

- The reason for Conditions 7(1) to 7(7) inclusive is to specify the approved areas from which waste may be accepted at the *Site* and the types and amounts of waste that may be accepted for disposal at the *Site*, based on the *Owner*'s application and supporting documentation.
- Condition 7(8) is to provide the *Owner* the process for getting the approval for alternative daily and intermediate cover material.
- The reasons for Condition 7(9) are to ensure that daily/weekly and intermediate cover are used to control potential nuisance effects, to facilitate vehicle access on the *Site*, and to ensure an acceptable site appearance is maintained. The proper closure of a landfill site requires the application of a final cover which is aesthetically pleasing, controls infiltration, and is suitable for the end use planned for the *Site*.

LANDFILL MONITORING

- Reasons for Condition 8(1) are to ensure that off-site migration of landfill gas is monitored and all buildings at the *Site* are free of any landfill gas accumulation, which due to a methane gas component may be explosive and thus create a danger to any persons at the *Site*.
- Condition 8(2) is included to provide the groundwater and surface water limits to prevent water pollution at the *Site*.
- Conditions 8(3) and 8(4) are included to require the *Owner* to demonstrate that the *Site* is performing as designed and the impacts on the natural environment are acceptable. Regular monitoring allows for the analysis of trends over time and ensures that there is an early warning

of potential problems so that any necessary remedial/contingency action can be taken.

- Conditions 8(5), 8(6) and 8(7) are included to ensure the integrity of the groundwater monitoring network so that accurate monitoring results are achieved and the natural environment is protected.
- Conditions 8(8) to 8(11) inclusive are added to ensure the *Owner* has a plan with an organized set of procedures for identifying and responding to potential issues relating to groundwater and surface water contamination at the *Site's* compliance point.
- Conditions 8(12), 8(13) and 8(14) are included to streamline the approval of the changes to the monitoring plan.

CLOSURE PLAN

- The reasons for Condition 9 are to ensure that final closure of the *Site* is completed in an aesthetically pleasing manner, in accordance with Ministry standards, and to ensure the long-term protection of the health and safety of the public and the environment.

WASTE DIVERSION

- Condition 10 is included to ensure that the recyclable materials are stored in their temporary storage location and transferred off-site in a manner as to minimize a likelihood of an adverse effect or a hazard to the natural environment or any person.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). A362303 issued on April 24, 1991 as amended.

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

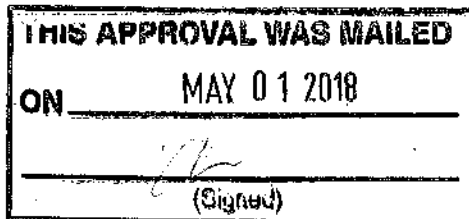
AND

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 27th day of April, 2018



Dale D. Gable

Dale Gable, P.Eng.

Director

appointed for the purposes of Part II.1 of the
Environmental Protection Act

RM/

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

Appendix A

A-2 Land Transfer Information



Ontario ServiceOntario

PARCEL REGISTER (ABBREVIATED) FOR PROPERTY IDENTIFIER

LAND
REGISTRY
OFFICE #21

40034-0210 (LT)

PAGE 1 OF 1
PREPARED FOR Cassidy1
ON 2017/08/28 AT 14:59:56

* CERTIFIED IN ACCORDANCE WITH THE LAND TITLES ACT * SUBJECT TO RESERVATIONS IN CROWN GRANT *

PROPERTY DESCRIPTION: PT LT 11 CON 11 MONTEAGLE PT 1 21R663; HASTINGS HIGHLANDS ; COUNTY OF HASTINGS

PROPERTY REMARKS:

ESTATE/QUALIFIER:

FEE SIMPLE
LT CONVERSION QUALIFIED

RECENTLY:

FIRST CONVERSION FROM BOOK

PIN CREATION DATE:

2008/03/17

OWNERS' NAMES

THE CORPORATION OF THE TOWNSHIP OF MONTEAGLE

CAPACITY SHARE

CROWN

REG. NUM.	DATE	INSTRUMENT TYPE	AMOUNT	PARTIES FROM	PARTIES TO	CERT/ CHKD
** PRINTOUT	INCLUDES ALL DOCUMENT TYPES AND	DELETED INSTRUMENTS	SINCE 2008/03/14 **			
**SUBJECT,	ON FIRST REGISTRATION UNDER THE	LAND TITLES ACT, TO				
**	SUBSECTION 44(1) OF THE LAND TITLES ACT, EXCEPT PARAGRAPH 11, PARAGRAPH 14, PROVINCIAL SUCCESSION DUTIES *					
**	AND ESCHEATS OR FORFEITURE TO THE CROWN.					
**	THE RIGHTS OF ANY PERSON WHO WOULD, BUT FOR THE LAND TITLES ACT, BE ENTITLED TO THE LAND OR ANY PART OF					
**	IT THROUGH LENGTH OF ADVERSE POSSESSION, PRESCRIPTION, MISDESCRIPTION OR BOUNDARIES SETTLED BY					
**	CONVENTION.					
**	ANY LEASE TO WHICH THE SUBSECTION 70(2) OF THE REGISTRY ACT APPLIES.					
**DATE OF CONVERSION TO	LAND TITLES: 2008/03/17 **					
21R663	1913/05/28	PLAN REFERENCE				C
QR284199	1980/07/02	TRANSFER	\$2		THE CORPORATION OF THE TOWNSHIP OF MONTEAGLE	C
QR284200	1980/07/02	NOTICE			CORPORATION OF THE TOWNSHIP OF MONTEAGLE	C

NOTE: ADJOINING PROPERTIES SHOULD BE INVESTIGATED TO ASCERTAIN DESCRIPTIVE INCONSISTENCIES, IF ANY, WITH DESCRIPTION REPRESENTED FOR THIS PROPERTY.
NOTE: ENSURE THAT YOUR PRINTOUT STATES THE TOTAL NUMBER OF PAGES AND THAT YOU HAVE PICKED THEM ALL UP.

... ..



This Indenture

made in duplicate the Seventh day of May,
one thousand nine hundred and eighty.

In Pursuance of the Short Forms of Conveyances Act:

Between

ARNOLD CLIFFORD KELUSKY, Farmer, and
MAMIE KELUSKY, his wife, both of the
Township of Monteaale, in the County
of Hastings,

Hereinafter called the GRANTORS,

of the FIRST PART;

- and -

THE CORPORATION OF THE TOWNSHIP OF MONTEAGLE,

Hereinafter called the GRANTEE,

of the SECOND PART;

Witnesseth that in consideration of other good and valuable consideration
and the sum of TWO-----(\$2.00)-----DOLLARS

now paid by the said Grantee to the said Grantor, the receipt whereof is hereby by him
acknowledged, he the said Grantor DOTH GRANT unto the said Grantee in fee simple

THOSE lands and premises located in the following municipality, namely,
in the Township of Monteaale, in the County of Hastings,
and being composed of Part of Lot 11 in Concession 11 of the said
Township of Monteaale, and which said parcel or tract of land
is more particularly described as PART 1 according to
Plan 21R-663 now deposited in the Registry Office for the
Registry Division of Hastings.

COMPARED
633

TO HAVE AND TO HOLD unto the said Grantee, his heirs, executors, administrators, successors and assigns to and for their sole and only use forever;
SUBJECT NEVERTHELESS to the reservations, limitations, provisos and conditions expressed in the original grant thereof from the Crown.

The said Grantor COVENANTS with the said Grantee that he has the right to convey the said lands to the said Grantee notwithstanding any act of the said Grantor.

AND that the said Grantee shall have quiet possession of the said lands free from all encumbrances.

AND the said Grantor COVENANTS with the said Grantee that he will execute such further assurances of the said lands as may be requisite.

AND the said Grantor COVENANTS with the said Grantee that he has done no act to encumber the said lands.

AND the said Grantor RELEASES to the said Grantee ALL his claims upon the said lands.

PROVIDED that in construing these presents the words "Grantor" and "Grantee" and the pronouns "he", "his" or "him" relating thereto and used therewith shall be read and construed as "Grantor" or "Grantors", "Grantee" or "Grantees", and "he", "she", "it" or "they", "his", "her", "its" or "their", or "him", "her", "it" or "them", respectively, as the number and gender of the party or parties referred to in each case require, and the number of the verb agreeing therewith shall be construed as agreeing with the said word or pronoun so substituted.

IN WITNESS WHEREOF the said parties hereto have hereunto set their hands and seals.

SIGNED, SEALED AND DELIVERED
In the Presence of

Minimail Blazek

Arnold Clifford Kelusky
ARNOLD CLIFFORD KELUSKY
Mamie Kelusky
MAMIE KELUSKY

SEAL

SEAL

The Land Transfer Tax Act, 1974
AFFIDAVIT OF RESIDENCE AND OF VALUE OF THE CONSIDERATION

IN THE MATTER OF THE CONVEYANCE OF (insert brief description of land) PT. LOT 11, CONCESSION 11, PART 1,
PLAN 21R-663, TOWNSHIP OF MONTEAGLE, COUNTY OF HASTINGS

BY (print names of all transferee in full) ARNOLD CLIFFORD KELUSKY & MARIE KELUSKY

TO (see instruction 1 and print names of all transferee in full) THE CORPORATION OF THE TOWNSHIP OF MONTEAGLE

I, (see instruction 2 and print name(s) in full) O. GREGORY ANDERSON, OF THE VILLAGE OF BANCROFT, IN
THE COUNTY OF HASTINGS,

MAKE OATH AND SAY THAT:

1. I am (place a check mark within the square opposite that one of the following paragraphs that describes the capacity of the deponent(s)) (see instruction 2)

- ☐ (a) A person in trust for whom the land conveyed in the above-described conveyance is being conveyed;
- ☐ (b) A trustee named in the above-described conveyance to whom the land is being conveyed;
- ☐ (c) A transferee named in the above-described conveyance;
- ☒ (d) The ~~trustee or trustees~~ solicitor acting in this transaction for (insert name(s) of principal(s)) The Corporation of the
Township of Montecagle described in paragraph (a), (b) or (c) above; (strike out references to inapplicable paragraph(s))
- ☐ (e) The President, Vice-President, Manager, Secretary, Director, or Treasurer authorized to act for (insert name(s) of corporation(s))
- ☐ (f) A transferee described in paragraph () described in paragraph(s) (a), (b), (c) above. (strike out references to inapplicable paragraph(s))
behalf and on behalf of (insert name of spouse) (insert only one of paragraph (a), (b) or (c) above, as applicable) and am making this affidavit on my own
who is my spouse described in paragraph () (insert only one of paragraph (a), (b) or (c) above, as applicable)

and as such, I have personal knowledge of the facts herein deposed to.

2. I have read and considered the definitions of "non-resident corporation" and "non-resident person" set out respectively in clauses f and g of sub-section 1 of section 1 of the Act. (see instruction 3)

3. The following persons to whom or in trust for whom the land conveyed in the above-described conveyance is being conveyed are non-resident persons within the meaning of the Act. (see instruction 4) NONE

4. THE TOTAL CONSIDERATION FOR THIS TRANSACTION IS ALLOCATED AS FOLLOWS:

(a) Monies paid or to be paid in cash	\$ 350.00	\$ 350.00
(b) Mortgages (i) Assumed (show principal and interest to be credited against purchase price)	\$ nil	
(ii) Given back to vendor	\$ nil	
(c) Property transferred in exchange (detail below)	\$ nil	
(d) Securities transferred to the value of (detail below)	\$ nil	
(e) Liens, legacies, annuities and maintenance charges to which transfer is subject	\$ nil	
(f) Other valuable consideration subject to land transfer tax (detail below)	\$ nil	
(g) VALUE OF LAND, BUILDING, FIXTURES AND GOODWILL SUBJECT TO LAND TRANSFER TAX (TOTAL OF (a) to (f))	\$ 350.00	\$ 350.00
(h) VALUE OF ALL CHATTELS - Items of tangible personal property (detail below)	\$ nil	
(i) Other consideration for transaction not included in (g) or (h) above	\$ nil	
(j) TOTAL CONSIDERATION	\$ 350.00	\$ 350.00

ALL BLANKS
MUST BE
FILLED IN.
INSERT "NIL"
WHERE
APPLICABLE.

5. If consideration is nominal, describe relationship between transferor and transferee and state purpose of conveyance. (see instruction 5) N/A

6. Other remarks and explanations, if necessary N/A

SWORN before me at the Village of Bancroft,
in the County of Hastings,
this 20th day of May, 19 80.

(Signature of Commissioner)
A Commissioner for taking Affidavits, etc.

(Signature of O. Gregory Anderson)
O. GREGORY ANDERSON

Notarize Certified, by O. Gregory Anderson, Q.C.

PROPERTY INFORMATION RECORD

A. Description of Instrument: Deed

B. (i) Address of property being conveyed (if available) R.R. #1, MAPLE LEAF, Ontario, KOL 2R0

(ii) Assessment Roll No. (if available) N/A

C. Mailing address(es) for future Notices of Assessment under The Assessment Act for property being conveyed (see instruction 6) R.R. #1, Maple Leaf, Ontario, KOL 2R0

D. (i) Registration number for last conveyance of property being conveyed (if available) 11516

(ii) Legal description of property conveyed: Same as in D(i) above. Yes ☐ No ☒ Not Known ☐

E. Name(s) and address(es) of each transferee's solicitor O. Gregory Anderson, Q.C.,
Barrister & Solicitor,
P.O. Box 700,
BANCROFT, Ontario,
KOL 1C0

For Land Registry Office use only	
REGISTRATION NO.	
Land Registry Office No.	
Registration Date	

make out and say:

*New Installation

**ଅନୁବାଚନ*: ବିଜୟପୁର ଗ୍ରାମପଞ୍ଚାୟତ

General Blyth

Ch. H. H. H.
A COMMISSIONER FOR TAKING AFFIDAVITS, ETC

* իր անարհեստ
նախնական

Այդիւր տալ
յոպրիւանիւ
ւրաքա.

¹⁴Not a
Marionist
himself, yet
my favorite.

Քեռիկով և
Կրոնիկով, ԽՍՀՄ

ARNOLD CLIFFORD KELUSKY
MAMIE KELUSKY

Secretary, Ministry of Commerce, etc. A COMMISSIONER FOR TRADING AFFAIRS, LTD.

Noting Case, for D. Gonzalez, D.C. 1976, and after I have read the attached statement of (name), he/she was (adult/child) (male/female, name of agency) within the meaning of Section 111 of The Family Law Reform Act, 1976, and after I have read the power of attorney, he/she has attained the age of majority.

²After a public show on 11 June 1977 at 10.00 am, and Section 13(2) of the Immunity from Prosecution Act, 1912 (or similar equivalent legislation).

AFFIDAVIT OF SUBSCRIBING WITNESS

I,
of the
in the

make oath and say:

I am a subscribing witness to the attached instrument and I was present and saw it executed
at by

*See footnote

*See footnote

I verily believe that each person whose signature I witnessed is the party of the same name referred to in the instrument.

SWORN before me at the

this day of 19

A COMMISSIONER FOR TAKING AFFIDAVITS, ETC.

Where a party is unable to read the instrument or where a party signs by making his mark or in foreign characters add "after the instrument had been read to him and he appeared fully to understand it". Where executed under a power of attorney insert "I am an attorney in fact for (name of party)" and for next clause substitute "I verily believe that the person whose signature I witnessed was authorized to execute the instrument as attorney for (name)".

Dated 284199
May 7, 19 80

ARNOLD CLIFFORD KELUSKY
and
MARIE KELUSKY

TO

THE CORPORATION OF THE TOWNSHIP
OF MONTEAGLE

Address: R. R. #1,
MAPLE LEAF, Ontario.
KOL 2R0

Deed of Land

SITUATE
in the Township of Monteaale,
in the County of Hastings.

DYE & BURMAN CO. LIMITED

ASSESSMENT ROLL NO.

ADDRESS OF PROPERTY:

O. GREGORY ANDERSON, Q.C.,
Barrister & Solicitor,
P.O. Box 700,
BANCROFT, Ontario.
KOL 1C0

FOR RECORDABLE BY MHA
OR RECORDER HERE

G. Anderson

PROPERTY OF THE
REGISTRY OFFICE

ENTERED IN BOOK
FOR
ENTERED BY
CHECKED BY

1980 JUN -2 PM 1:34
AT BELLEVILLE, ONTARIO

284199
REGISTRY DIVISION OF
HASTINGS (21)

REGISTRATION FEE	15.00
LAND TRANSFER TAX	1.40
RETAIL SALES TAX	

THE REGISTRY ACT
DECLARATION UNDER SECTION 23 OF THE ACT

I, OSWALD GREGORY ANDERSON, of the Village of Bancroft, in the County of Hastings, solicitor, do solemnly declare that I am the Solicitor for The Corporation of the Township of Monteagle which is a party to the Provisional Certificate of Approval for a Waste Disposal Site hereto attached. The said instrument affects land within the Registry Division of the County of Hastings and more particularly THOSE lands and premises located in the following municipality, namely, in the Township of Monteagle, in the County of Hastings, and being composed of Part of Lot 11 in Concession 11 of the said Township of Monteagle, and which said parcel or tract of land is more particularly described as Part 1 according to Plan 21R-663 now deposited in the Registry Office for the Registry Division of Hastings.

I make this solemn declaration conscientiously believing it to be true and knowing that it is of the same force and effect as if made under oath.

DECLARED before me)
at the Village of Bancroft,)
in the County of Hastings,)
this 23rd day of June, 1980)

Oswald Gregory Anderson
OSWALD GREGORY ANDERSON

Charmaine Stoyke
A Commissioner, etc.

Notarialis Publicus, a Commissioner of the
Hastings County, for O. Gregory Anderson Q.C.
Expires December 30, 1982



Ministry of the
Environment

NOTICE

TO: Corporation of the Township of Montezagle
R.R. # 1
Maple Leaf, Ontario
K0L 2R0

You are hereby notified that Provisional Certificate of Approval No. A 362303 has been issued to you subject to the conditions outlined therein.

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

The reason for the condition requiring registration of the Certificate is that Section 46 of The Environmental Protection Act, 1971 prohibits any use being made of the lands after they cease to be used for waste disposal purposes in order 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 Certificate being registered on title.

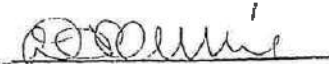
You may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board.

This Notice should be served upon:

The Secretary,
Environmental Appeal Board, AND
1 St. Clair Ave. West,
5th Floor,
Toronto, Ontario.
M4V 1K7

The Director,
Section 39
Ministry of the Environment,

DATED this 31st day of March , 1980 .


Director,
Section 39
Ministry of the Environment.

DATED THE 31st DAY OF
MARCH, 1980

BETWEEN

THE DIRECTOR

-and-

CORPORATION OF THE TOWNSHIP OF MONTEAGLE

PROVISIONAL CERTIFICATE

OF APPROVAL

UNDER

THE ENVIRONMENTAL
PROTECTION ACT, 1971

N. PART LOT 11, CONCESSION 11
TOWNSHIP OF MONTEAGLE
COUNTY OF HASTINGS

CORPORATION OF THE TOWNSHIP OF MONTEAGLE
MAPLE LEAF, ONTARIO
K0L 2R0



Ministry
of the
Environment

Provisional Certificate No. A 362303

PROVISIONAL CERTIFICATE OF APPROVAL WASTE DISPOSAL SITE

Under The Environmental Protection Act, 1971 and the regulations and subject to the limitations thereof, this Provisional Certificate of Approval is issued to:

Corporation of the Township of Monteaagle
R.R. # 1
Maple Leaf, Ontario
K0L 2R0

for the use and operation of a 1.0 hectare landfilling site within a total site area of 2.0 hectares.

all in accordance with the following plans and specifications:

Located: N. Part Lot 11, Concession 11
Township of Monteaagle
County of Hastings

which includes the use of the site only for the disposal of the following categories of waste (NOTE: Use of the site for additional categories of wastes requires a new application and amendments to the Provisional Certificate of Approval) domestic and commercial waste.

and subject to the following conditions:

1. No operation shall be carried out at the site after sixty days from this condition becoming enforceable unless this Certificate including the reasons for this condition has been registered by the applicant as an instrument in the appropriate Land Registry Office against title to the site and a duplicate registered copy thereof has been returned by the applicant to the Director.

Dated this 31st day of March, 19 80.


Director, Section 39,
The Environmental Protection Act, 1971

284200

PROPERTY OF THE
REGISTRY OFFICE

DATED MAY A.D. 1980

ENTERED IN BOOK 7
FOR Hastings
ENTERED BY [Signature]
CHECKED BY [Signature]

IN THE MATTER OF Part of
Lot 11, Concession 11
in the Township of Faraday
being Part 1, Plan 21R-663
County of Hastings

LAND REGISTRY OFFICE
OF BELLEVILLE,
ONTARIO

1980 JUL -2 PM 1:35

S. C. Hargreaves
LAND REGISTRAR

NOTICE RE: WASTE DISPOSAL
SITE

LAND REGISTRY THIS
DOCUMENT IS
REGISTERED IN THE

284200

REGISTRY DIVISION OF
HASTINGS (21)

5

O. GREGORY ANDERSON, Q.C.
Barrister & Solicitor,
P.O. Box 700
BANCROFT, Ontario
K0L 1C0

1500

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	Musclow-Greenview Waste Disposal Site
Location (e.g. street address, lot, concession)	3375 Musclow Greenview Road
GPS Location (taken within the property boundary at front gate/ front entry)	279,927 m E, 5,010,658 m N
Municipality	Former Geographic Township of Monteaagle
Client and/or Site Owner	Corporation of the Municipality of Hastings Highlands
Monitoring Period (Year)	2024
This Monitoring Report is being submitted under the following:	
Environmental Compliance Approval Number:	A362303
Director's Order No.:	
Provincial Officer's Order No.:	
Other:	

Report Submission Frequency	☒ Annual ☐ Other	March 31st of year following reporting period	
The site is: (Operation Status)	☒ Open ☐ Inactive ☐ Closed		
Does your Site have a Total Approved Capacity?	☒ Yes ☐ No		
If yes, please specify Total Approved Capacity	27,500	Units	Cubic Metres
Does your Site have a Maximum Approved Fill Rate?	☐ Yes ☒ No		
If yes, please specify Maximum Approved Fill Rate	0	Units	
Total Waste Received within Monitoring Period (Year)	195.9	Units	Tonnes
Total Waste Received within Monitoring Period (Year) Methodology	Estimation		
Estimated Remaining Capacity	13,360	Units	Cubic Metres
Estimated Remaining Capacity Methodology	Estimation based on topographic survey completed on Nov 9, 2022 and 2023/2024 waste received		
Estimated Remaining Capacity Date Last Determined	31/Dec/2024		
Non-Hazardous Approved Waste Types	☒ Domestic ☒ Industrial, Commercial & Institutional (IC&I) ☒ Source Separated Organics (Green Bin) ☒ Tires	☒ Contaminated Soil ☒ Wood Waste ☒ Blue Box Material ☐ Processed Organics ☒ Leaf and Yard Waste	☐ Food Processing/Preparation Operations Waste ☐ Hauled Sewage Other:
Subject Waste Approved Waste Classes: Hazardous & Liquid Industrial (separate waste classes by comma)			
Year Site Opened (enter the Calendar Year <u>only</u>)		Current ECA Issue Date	3/21/2018
Is your Site required to submit Financial Assurance?	☐ Yes ☒ No		
Describe how your Landfill is designed.	☒ Natural Attenuation only ☐ Fully engineered Facility ☐ Partially engineered Facility		
Does your Site have an approved Contaminant Attenuation Zone?	☐ Yes ☒ No		

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

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:	☐ Yes ☒ No	Measures are still required to set groundwater triggers.
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):	☐ Yes ☒ No ☐ Not Applicable	If no, list exceptions below or attach information.

Groundwater Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
MG-18-2	Well broken at 2.2 meters below ground surface. Unable to sample.	2024-Oct-30

3) a) Is landfill gas being monitored or controlled at the site?		☒ Yes ☐ 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?		☒ Yes ☐ 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:		☒ Yes ☐ No ☐ 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	
MG-18-2	Gas monitoring >100% LEL	2024-May-1	
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):	☒ Yes ☐ No		

Sampling and Monitoring Program Results/WDS Conditions and Assessment:

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.	☐ Yes ☒ No	No CAZ has been established for the Site. Additional work is concurrently being reported on and action items have been identified to minimize environmental impacts. Groundwater is believed to be discharging to surface water and Contingency Plans are being updated for surface water triggers.	
6) The site meets compliance and assessment criteria.	☐ Yes ☒ No	See above.	
7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.	☒ Yes ☐ No	New drive-point piezometer DP5 had exceedances further to the west of the WDS, including notable zinc exceedances. Boron concentrations to the west of the Site at SW3 are on an increasing trend.	
1) Is one or more of the following risk reduction practices in place at the site: (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 (b) There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or (c) The site meets the following two conditions (typically achieved after 15 years or longer of site operation): <i>i.</i> The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and <i>ii.</i> Seasonal and annual water levels and water quality fluctuations are well understood.	☐ Yes ☒ No	Note which practice(s):	☐ (a) ☐ (b) ☐ (c)
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	☐ Yes ☐ No ☒ Not Applicable		

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:

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:	Measures are still required to set groundwater triggers.
☐ No Changes to site design and operation are recommended ☒ The following change(s) to the site design and operation is/are recommended:	A new surface water diversion ditch/berm was installed in the fall of 2019. Operations should ensure this is kept clear, is flowing properly around the Site and is protected against erosion. Operations at the Site should be assessed in 2025 and an action plan to minimize water infiltration made at the Site.

Name:	Mark Somers		
Seal:			
Signature:		Date:	28-Mar-2025
CEP Contact Information:			
Company:	BluMetric Environmental Inc.		
Address:	1682 Woodward Drive, 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:	Select Date
Signature:		Date:	Select 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)	Un-named Lake, Goodkey Creek
Distance(s)	0.25 km, 0.6 km

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:	☒ Yes ☐ No	After several years of work, SW4A has now been determined to be the best location for monitoring background surface water.
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):	☐ Yes ☒ No ☐ 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
MG-SW2	Dry	30-Oct-2024

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.		☒ Yes ☐ No ☐ Not Applicable
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:		☒ Yes ☐ No ☐ Not Applicable 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
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):	☒ Yes ☐ No	Not applicable

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):	☐ Yes ☒ 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
SEE SW ATTACHMENT		.
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)?	☐ Yes ☒ No	

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.	☐ Yes ☒ No	Cross gradient and downgradient concentrations remain above criteria for many parameters (iron, boron, phenols, total phosphorous) when compared to background.
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)):	☒ Yes ☐ No ☐ Not Known ☐ Not Applicable	Boron, cobalt, iron, zinc exceeds the PWQO.
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	☐ Yes ☒ No ☐ Not Applicable	Toxicity sampling at SW3 was initiated as regular sampling and if passes no further sampling is required. Both spring and fall toxicity sampling passed in 2024.

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:

☒ No Changes to the monitoring program are recommended ☐ The following change(s) to the monitoring program is/are recommended:	Sampling to be done at SW1, SW2, SW3, and SW4A, and SW6 in 2025.
☐ No changes to the site design and operation are recommended ☒ The following change(s) to the site design and operation is/are recommended:	Operations are to be evaluated and additional measures should be taken to reduce infiltration, run-off.

CEP Signature		
Relevant Discipline	Professional Engineer	
Date:	28-Mar-2025	
CEP Contact Information:	Mark Somers, M.Eng., P.Eng.	
Company:	BluMetric Environmental Inc.	
Address:	1682 Woodward Drive, Ottawa, ON, K2C 3R8	
Telephone No.:	877-487-8436 ext. 246	
Fax No. :		
E-mail Address:	msomers@blumetric.ca	
Save As		Print Form

MECP Checklist – SW – 2024 PWQO Exceedances

Location	PWQO Exceedance	PWQO Value (mg/L)	Sampling Event	% above PWQO
MG-SW1	Phenols (0.0023 mg/L)	0.001	May 1	57
	Iron (2.4 mg/L)	0.3	October 30	88
MG-SW2	Phenols (0.0023 mg/L)	0.001	May 1	57
MG-SW3	Boron (0.79 mg/L)	0.2	October 30	75
	Phenols (0.0024 mg/L)	0.001	May 1	58
MG-SW4A	Iron (0.33 mg/L)	0.3	October 30	9
MG-SW6	Total Phosphorus (0.14 mg/L)	0.03	October 30	79

Appendix C

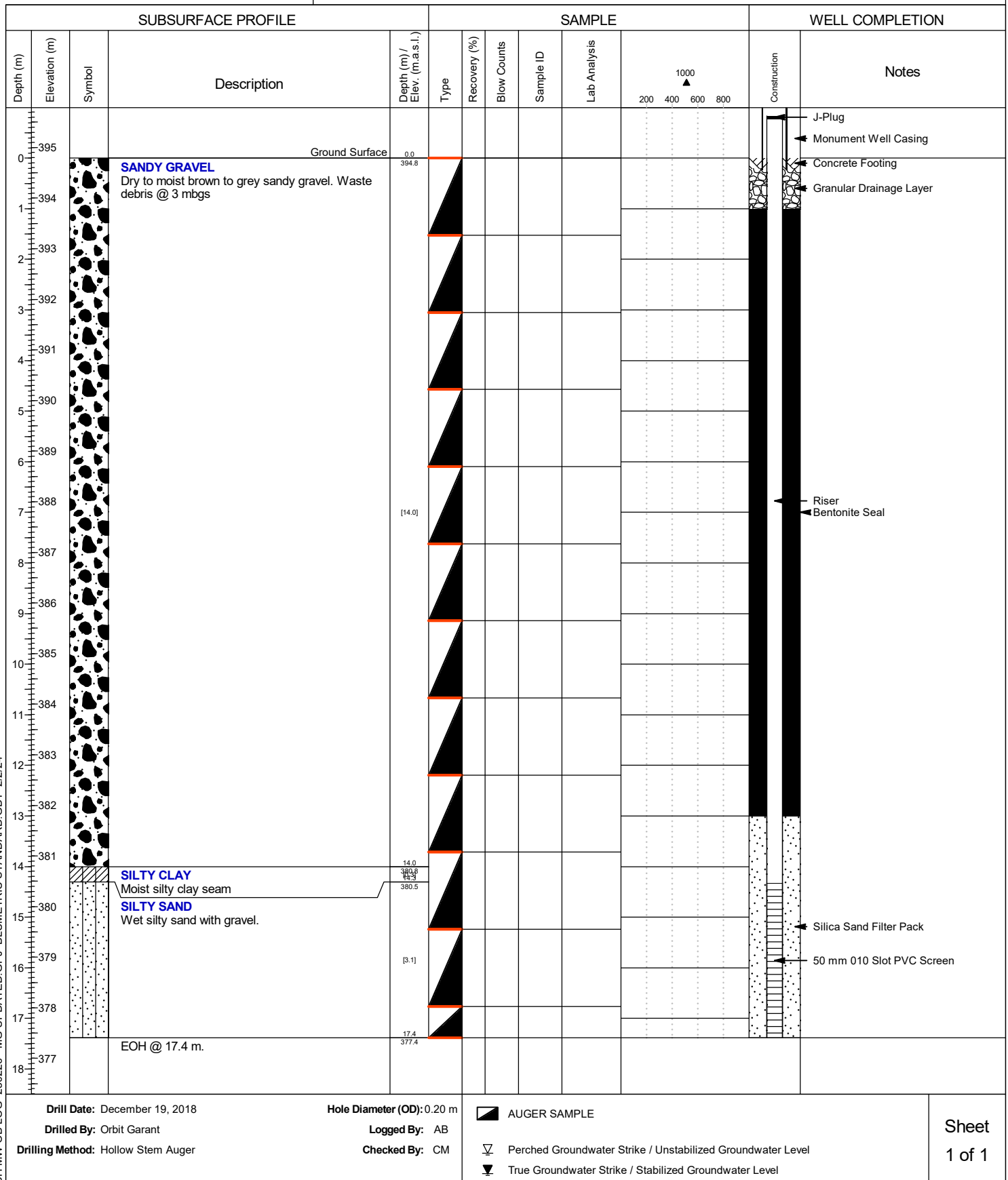
Monitoring Well Logs



Monitoring Well ID: MG18-1

Project No.: 180580-01
Client: MHH
Report: Musclow Greenview WDS
Site Address: Musclow Greenview
Ontario

Elevation Ground: 394.79 m
TOP: 395.57 m



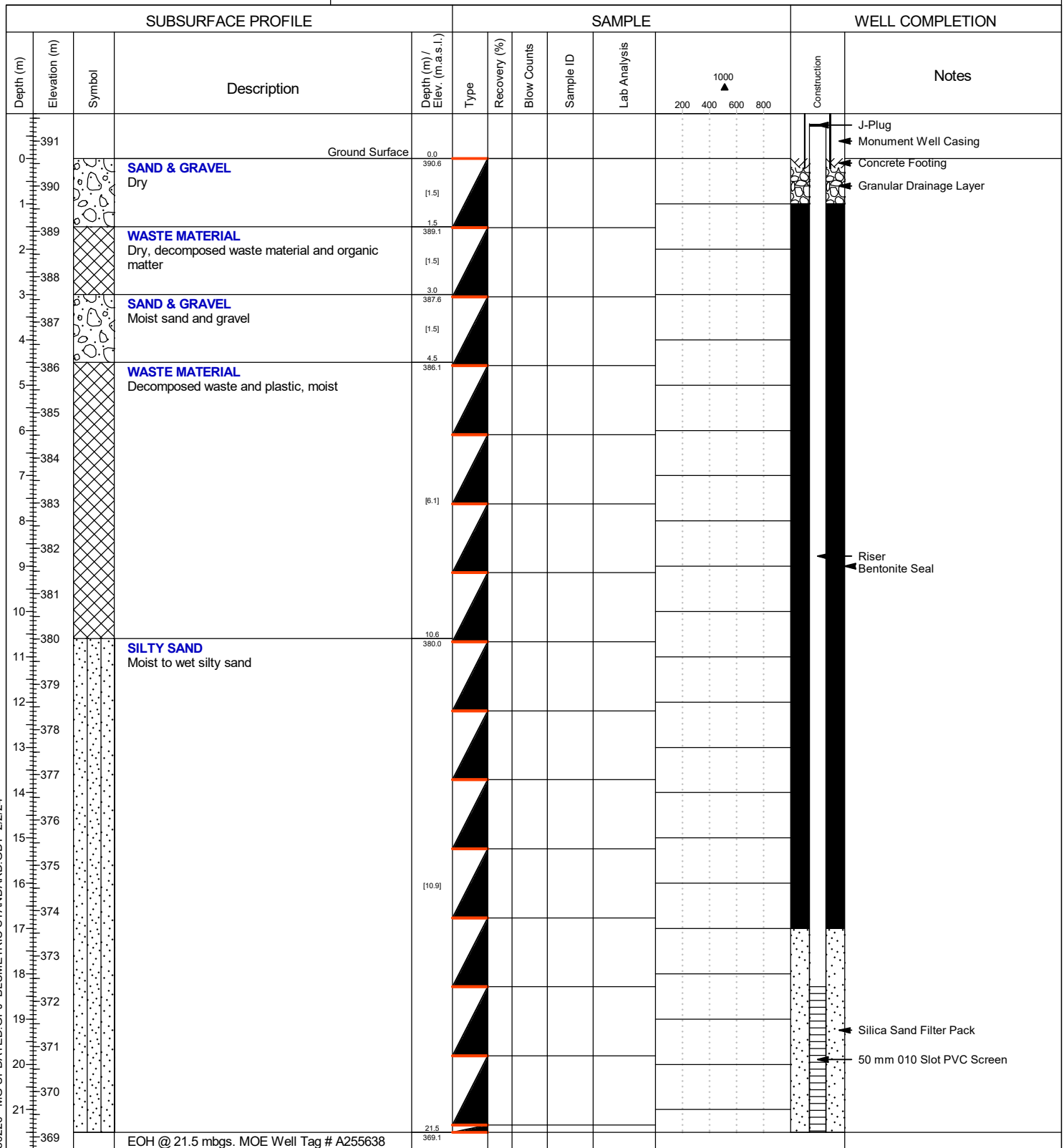
BH MW OB LOG 230226 - MG UPDATED.GPJ BLUMETRIC STANDARD.GDT 2/2/24



Monitoring Well ID: MG18-2

Project No.: 180580-01
Client: MHH
Report: Musclow Greenview WDS
Site Address: Musclow Greenview
Ontario

Elevation Ground: 390.61 m
TOP: 391.33 m



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

Drill Date: December 18, 2018
Drilled By: Orbit Garant
Drilling Method: Hollow Stem Auger

Hole Diameter (OD): 0.20 m
Logged By: AB
Checked By: CM

AUGER SAMPLE

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

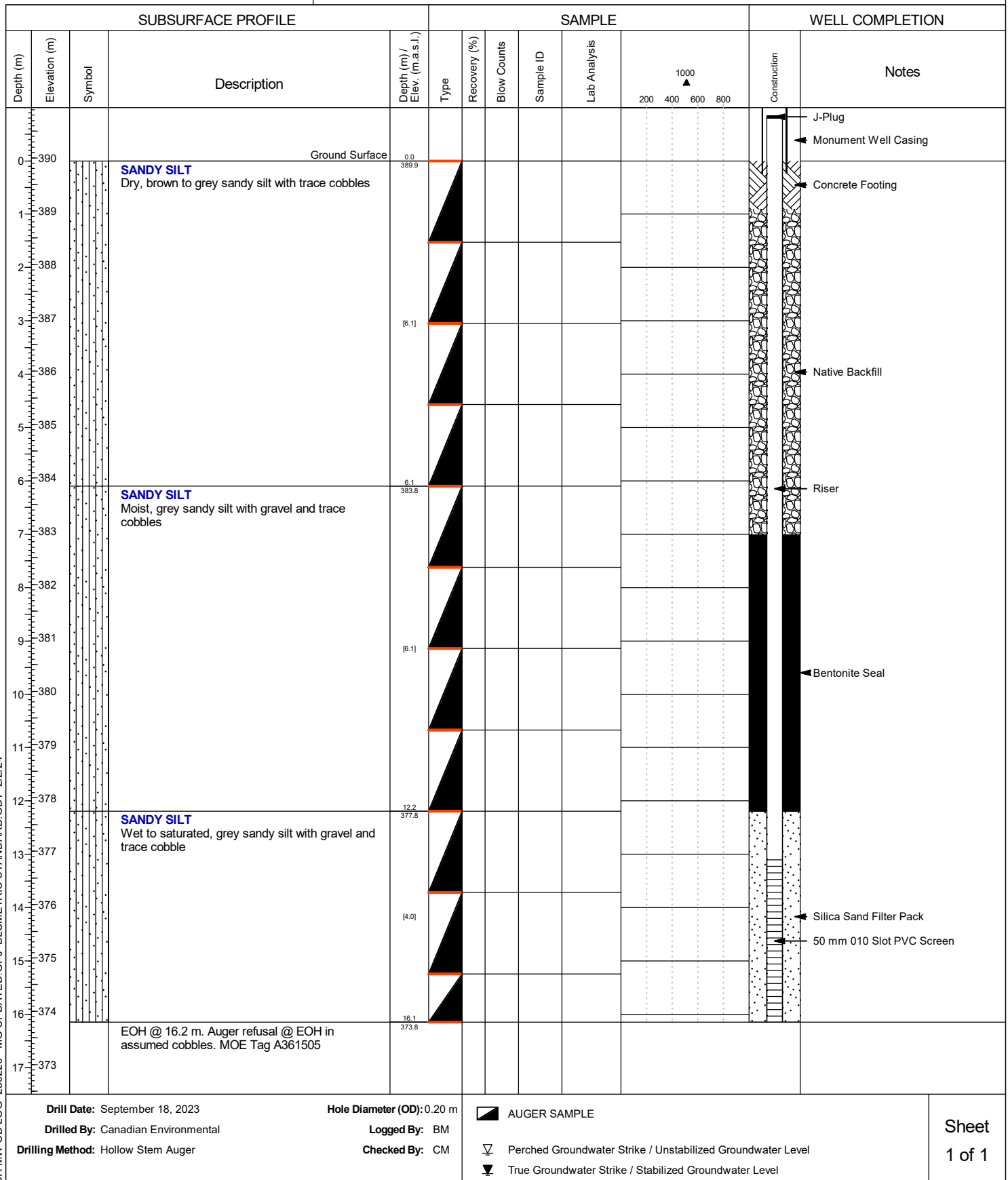
Sheet
1 of 1



Monitoring Well ID: MG18-3R

Project No.: 230226
Client: MHH
Report: Musclow Greenview WDS
Site Address: Musclow Greenview
Ontario

Elevation Ground: 389.94 m
TOP: 390.78 m



Appendix D

Inspection Forms, Laboratory Reports, and Chain of Custody Records

Appendix D

D-1 Operation and Inspection Forms

SMALL LANDFILL OPERATION AND INSPECTION FORM



Site Name: Musclow-Greenview
WDS, MHHs

Date: May 1, 2024

Weather:

Sun/Cloud 12-16°C

Project #: 240205-07

BluMetric Staff: BM/MD

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 ☒ | Not covered/
packed |
| ☐ 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 ☐ |

NA ☒

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 ☐ |

Attendant Building = Oppm

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 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.

SMALL LANDFILL OPERATION AND INSPECTION FORM



Site Name: Musclove-Greenview WDS, MHHS	Date: Oct 30, 2024	Weather: 20°C Sunny + clouds
Project #: 240205-07	BluMetric Staff: NW/BM	10 km/h winds SW

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 ☒ closed while on-site |
| ☐ 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 ☐ → not compacted |
| ☐ 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 ☒ → Large |
| ☐ Brush pile neat and appropriate size | Yes ☒ | No ☐ → Was still smoldering while on-site |
| ☐ Construction Debris neat and appropriate size | Yes ☒ | No ☒ → Not accepted |

MONITORING WELL CONDITION

- | | | |
|--|---|---|
| ☐ Casing conditions (frost heave, lock, cap) | Yes ☒ | No ☐ → MG-18-2 Broken 4.42m TPVC |
| ☐ 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 ☐ → Attendant building; RKI = 0 ppm |
| ☐ Conducted at monitoring wells | Yes ☒ | No ☐ |

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

→ Add vehicle protection to MG-18-3R

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.)



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

Appendix D

D-2 Groundwater Laboratory Reports



Your Project #: 240205-07
Site Location: Musclow Greenview
Your C.O.C. #: 880147

Attention: MHH Distribution

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

Report Date: 2024/05/14
Report #: R8148859
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4D3558

Received: 2024/05/03, 10:31

Sample Matrix: Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	1	N/A	2024/05/14	CAM SOP-00448	SM 24 2320 B m
Alkalinity	8	N/A	2024/05/07	CAM SOP-00448	SM 24 2320 B m
Biochemical Oxygen Demand (BOD)	9	2024/05/05	2024/05/10	CAM SOP-00427	SM 24 5210B m
Chloride by Automated Colourimetry	1	N/A	2024/05/13	CAM SOP-00463	SM 24 4500-Cl E m
Chloride by Automated Colourimetry	8	N/A	2024/05/09	CAM SOP-00463	SM 24 4500-Cl E m
Chemical Oxygen Demand	9	N/A	2024/05/09	CAM SOP-00416	SM 24 5220 D m
Conductivity	9	N/A	2024/05/07	CAM SOP-00414	SM 24 2510 m
Dissolved Organic Carbon (DOC) (1)	1	N/A	2024/05/06	CAM SOP-00446	SM 24 5310 B m
Dissolved Organic Carbon (DOC) (1)	8	N/A	2024/05/07	CAM SOP-00446	SM 24 5310 B m
Dissolved Metals by ICPMS	1	N/A	2024/05/13	CAM SOP-00447	EPA 6020B m
Dissolved Metals by ICPMS	8	N/A	2024/05/07	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	9	N/A	2024/05/10	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (2)	9	N/A	2024/05/07	CAM SOP-00440	SM 24 4500-NO3I/NO2B
pH (3)	9	2024/05/06	2024/05/07	CAM SOP-00413	SM 24th - 4500H+ B
Sulphate by Automated Turbidimetry	1	N/A	2024/05/13	CAM SOP-00464	SM 24 4500-SO42- E m
Sulphate by Automated Turbidimetry	8	N/A	2024/05/09	CAM SOP-00464	SM 24 4500-SO42- E m
Total Dissolved Solids	7	2024/05/07	2024/05/08	CAM SOP-00428	SM 24 2540C m
Total Dissolved Solids	2	2024/05/09	2024/05/10	CAM SOP-00428	SM 24 2540C m
Total Suspended Solids	8	2024/05/08	2024/05/10	CAM SOP-00428	SM 24 2540D m
Total Suspended Solids	1	2024/05/08	2024/05/09	CAM SOP-00428	SM 24 2540D m
Volatile Organic Compounds in Water	2	N/A	2024/05/08	CAM SOP-00228	EPA 8260D

Remarks:

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

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



Your Project #: 240205-07
Site Location: Musclow Greenview
Your C.O.C. #: 880147

Attention: MHH Distribution

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

Report Date: 2024/05/14
Report #: R8148859
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4D3558

Received: 2024/05/03, 10:31

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.

(3) "The CCME method and Analytical Protocol (O. Reg 153/04, O. Reg. 406/19) requires pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME and Analytical Protocol (O. Reg 153/04, O. Reg. 406/19) holding time. Bureau Veritas endeavors to analyze samples as soon as possible after receipt."

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:

Christine Gipton, Senior Project Manager
Email: Christine.Gipton@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 #: C4D3558

Report Date: 2024/05/14

BluMetric Environmental Inc

Client Project #: 240205-07

Site Location: Musclow Greenview

Sampler Initials: BM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		ZBS433			ZBS433			ZBS434		
Sampling Date		2024/05/01 11:45			2024/05/01 11:45			2024/05/01 12:40		
COC Number		880147			880147			880147		
	UNITS	MG-DP1	RDL	QC Batch	MG-DP1 Lab-Dup	RDL	QC Batch	MG-DP2	RDL	QC Batch

Inorganics										
Total Ammonia-N	mg/L	0.28	0.050	9377600				6.0	0.050	9377600
Total BOD	mg/L	ND	2	9374694				ND	2	9374694
Total Chemical Oxygen Demand (COD)	mg/L	17	4.0	9378474				63	4.0	9378474
Conductivity	umho/cm	810	1.0	9376069				320	1.0	9376069
Total Dissolved Solids	mg/L	600	10	9377073				190	10	9377073
Dissolved Organic Carbon	mg/L	6.4	0.4	9375722				7.9	0.4	9375722
pH	pH	7.82		9376068				7.32		9376068
Total Suspended Solids	mg/L	ND	10	9380344				ND	10	9380344
Dissolved Sulphate (SO4)	mg/L	110	1.0	9377997				4.8	1.0	9378033
Alkalinity (Total as CaCO3)	mg/L	240	1.0	9376058				160	1.0	9376058
Dissolved Chloride (Cl-)	mg/L	46	1.0	9377934				ND	1.0	9378028
Nitrate (N)	mg/L	ND	0.10	9375739	ND	0.10	9375739	ND	0.10	9375739

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 Job #: C4D3558
Report Date: 2024/05/14

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		ZBS434			ZBS435	ZBS436		
Sampling Date		2024/05/01 12:40			2024/05/01 14:00	2024/05/01 13:15		
COC Number		880147			880147	880147		
	UNITS	MG-DP2 Lab-Dup	RDL	QC Batch	MG-DP3	MG-DP4	RDL	QC Batch
Inorganics								
Total Ammonia-N	mg/L				0.37	ND	0.050	9377600
Total BOD	mg/L				ND	25	2	9374694
Total Chemical Oxygen Demand (COD)	mg/L				62	37	4.0	9378474
Conductivity	umho/cm	320	1.0	9376069	1500	230	1.0	9376069
Total Dissolved Solids	mg/L				960	180	10	9377073
Dissolved Organic Carbon	mg/L				11	3.8	0.4	9375722
pH	pH	7.35		9376068	7.35	8.23		9376068
Total Suspended Solids	mg/L				ND	340	10	9380344
Dissolved Sulphate (SO4)	mg/L				35	12	1.0	9377997
Alkalinity (Total as CaCO3)	mg/L	160	1.0	9376058	720	100	1.0	9376058
Dissolved Chloride (Cl-)	mg/L				69	4.2	1.0	9377934
Nitrate (N)	mg/L				ND	0.18	0.10	9375739
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 #: C4D3558

Report Date: 2024/05/14

BluMetric Environmental Inc

Client Project #: 240205-07

Site Location: Musclow Greenview

Sampler Initials: BM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		ZBS436			ZBS437			ZBS438		
Sampling Date		2024/05/01 13:15			2024/05/01 11:05			2024/05/01 14:50		
COC Number		880147			880147			880147		
	UNITS	MG-DP4 Lab-Dup	RDL	QC Batch	MG-DP5	RDL	QC Batch	MG-18-1	RDL	QC Batch

Inorganics										
Total Ammonia-N	mg/L				0.11	0.050	9377600	0.11	0.050	9377600
Total BOD	mg/L				11	2	9374694	ND	2	9374694
Total Chemical Oxygen Demand (COD)	mg/L				53	4.0	9378474	17	4.0	9378474
Conductivity	umho/cm				690	1.0	9376069	890	1.0	9376069
Total Dissolved Solids	mg/L				505	10	9377073	660	10	9377073
Dissolved Organic Carbon	mg/L	3.9	0.4	9375722	11	0.4	9375722	7.9	0.4	9375722
pH	pH				6.98		9376068	7.20		9376068
Total Suspended Solids	mg/L				310	10	9380344	3400	33	9380344
Dissolved Sulphate (SO4)	mg/L				30	1.0	9387932	14	1.0	9377997
Alkalinity (Total as CaCO3)	mg/L				220	1.0	9387945	260	1.0	9376058
Dissolved Chloride (Cl-)	mg/L				56	1.0	9387925	110	1.0	9377934
Nitrate (N)	mg/L				ND	0.10	9375739	ND	0.10	9375739

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 #: C4D3558

Report Date: 2024/05/14

BluMetric Environmental Inc

Client Project #: 240205-07

Site Location: Musclow Greenview

Sampler Initials: BM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		ZBS439			ZBS440			ZBS441		
Sampling Date		2024/05/01 15:20			2024/05/01 14:30			2024/05/01 14:30		
COC Number		880147			880147			880147		
	UNITS	MG-18-2	RDL	QC Batch	MG-18-3R	RDL	QC Batch	MG-QAQC-GW1	RDL	QC Batch
Inorganics										
Total Ammonia-N	mg/L	0.57	0.050	9377600	0.058	0.050	9377600	0.050	0.050	9377600
Total BOD	mg/L	ND	2	9374694	ND	2	9374694	ND	2	9374694
Total Chemical Oxygen Demand (COD)	mg/L	43	4.0	9378474	ND	4.0	9378474	ND	4.0	9378474
Conductivity	umho/cm	2000	1.0	9376069	140	1.0	9376069	140	1.0	9376069
Total Dissolved Solids	mg/L	1300	10	9377073	1040	10	9384380	1110	10	9384380
Dissolved Organic Carbon	mg/L	15	0.4	9375722	1.5	0.4	9375722	1.3	0.4	9375722
pH	pH	7.18		9376068	7.35		9376068	7.36		9376068
Total Suspended Solids	mg/L	3400	33	9380344	39000	200	9380481	37000	100	9380344
Dissolved Sulphate (SO ₄)	mg/L	25	1.0	9377997	6.8	1.0	9377997	7.0	1.0	9378033
Alkalinity (Total as CaCO ₃)	mg/L	1100	1.0	9376058	72	1.0	9376058	67	1.0	9376058
Dissolved Chloride (Cl ⁻)	mg/L	130	1.0	9377934	ND	1.0	9377934	ND	1.0	9378028
Nitrate (N)	mg/L	ND	0.10	9375739	0.12	0.10	9375739	0.13	0.10	9375739
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.										



ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		ZBS433	ZBS434	ZBS435	ZBS436			ZBS437		
Sampling Date		2024/05/01 11:45	2024/05/01 12:40	2024/05/01 14:00	2024/05/01 13:15			2024/05/01 11:05		
COC Number		880147	880147	880147	880147			880147		
	UNITS	MG-DP1	MG-DP2	MG-DP3	MG-DP4	RDL	QC Batch	MG-DP5	RDL	QC Batch
Metals										
Dissolved Aluminum (Al)	ug/L	ND	ND	ND	ND	4.9	9377118	ND	4.9	9389038
Dissolved Barium (Ba)	ug/L	74	30	180	12	2.0	9377118	36	2.0	9389038
Dissolved Boron (B)	ug/L	58	28	550	19	10	9377118	45	10	9389038
Dissolved Cadmium (Cd)	ug/L	ND	ND	ND	ND	0.090	9377118	ND	0.090	9389038
Dissolved Calcium (Ca)	ug/L	140000	50000	260000	33000	200	9377118	120000	200	9389038
Dissolved Chromium (Cr)	ug/L	ND	ND	ND	ND	5.0	9377118	ND	5.0	9389038
Dissolved Cobalt (Co)	ug/L	ND	ND	4.2	ND	0.50	9377118	37	0.50	9389038
Dissolved Iron (Fe)	ug/L	ND	ND	800	ND	100	9377118	200000	500	9389038
Dissolved Lead (Pb)	ug/L	ND	ND	ND	ND	0.50	9377118	ND	0.50	9389038
Dissolved Magnesium (Mg)	ug/L	11000	4200	36000	5100	50	9377118	11000	50	9389038
Dissolved Manganese (Mn)	ug/L	150	70	360	2.2	2.0	9377118	2900	2.0	9389038
Dissolved Silver (Ag)	ug/L	ND	ND	ND	ND	0.090	9377118	ND	0.090	9389038
Dissolved Sodium (Na)	ug/L	12000	4500	59000	5100	100	9377118	7800	100	9389038
Dissolved Zinc (Zn)	ug/L	ND	ND	ND	ND	5.0	9377118	18000	5.0	9389038
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 Job #: C4D3558
Report Date: 2024/05/14

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		ZBS438		ZBS439		ZBS440	ZBS441		
Sampling Date		2024/05/01 14:50		2024/05/01 15:20		2024/05/01 14:30	2024/05/01 14:30		
COC Number		880147		880147		880147	880147		
	UNITS	MG-18-1	RDL	MG-18-2	RDL	MG-18-3R	MG-QAQC-GW1	RDL	QC Batch
Metals									
Dissolved Aluminum (Al)	ug/L	ND	4.9	ND	4.9	ND	ND	4.9	9377118
Dissolved Barium (Ba)	ug/L	120	2.0	250	2.0	16	16	2.0	9377118
Dissolved Boron (B)	ug/L	160	10	1300	10	14	ND	10	9377118
Dissolved Cadmium (Cd)	ug/L	0.10	0.090	0.19	0.090	ND	ND	0.090	9377118
Dissolved Calcium (Ca)	ug/L	120000	200	310000	200	23000	22000	200	9377118
Dissolved Chromium (Cr)	ug/L	ND	5.0	ND	5.0	ND	ND	5.0	9377118
Dissolved Cobalt (Co)	ug/L	42	0.50	61	0.50	ND	ND	0.50	9377118
Dissolved Iron (Fe)	ug/L	720	100	9200	100	ND	ND	100	9377118
Dissolved Lead (Pb)	ug/L	ND	0.50	ND	0.50	ND	ND	0.50	9377118
Dissolved Magnesium (Mg)	ug/L	26000	50	54000	50	1400	1400	50	9377118
Dissolved Manganese (Mn)	ug/L	7600	2.0	13000	10	32	31	2.0	9377118
Dissolved Silver (Ag)	ug/L	ND	0.090	ND	0.090	ND	ND	0.090	9377118
Dissolved Sodium (Na)	ug/L	29000	100	87000	100	3000	3000	100	9377118
Dissolved Zinc (Zn)	ug/L	ND	5.0	ND	5.0	ND	ND	5.0	9377118
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 Job #: C4D3558
Report Date: 2024/05/14

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

VOLATILE ORGANICS BY GC/MS (WATER)

Bureau Veritas ID		ZBS438	ZBS439		
Sampling Date		2024/05/01 14:50	2024/05/01 15:20		
COC Number		880147	880147		
	UNITS	MG-18-1	MG-18-2	RDL	QC Batch
Volatile Organics					
Acetone (2-Propanone)	ug/L	ND	ND	10	9377647
Benzene	ug/L	0.22	4.5	0.20	9377647
Bromodichloromethane	ug/L	ND	ND	0.50	9377647
Bromoform	ug/L	ND	ND	1.0	9377647
Bromomethane	ug/L	ND	ND	0.50	9377647
Carbon Tetrachloride	ug/L	ND	ND	0.19	9377647
Chlorobenzene	ug/L	ND	ND	0.20	9377647
Chloroform	ug/L	ND	ND	0.20	9377647
Dibromochloromethane	ug/L	ND	ND	0.50	9377647
1,2-Dichlorobenzene	ug/L	ND	ND	0.40	9377647
1,3-Dichlorobenzene	ug/L	ND	ND	0.40	9377647
1,4-Dichlorobenzene	ug/L	ND	ND	0.40	9377647
Dichlorodifluoromethane (FREON 12)	ug/L	ND	ND	1.0	9377647
1,1-Dichloroethane	ug/L	ND	0.64	0.20	9377647
1,2-Dichloroethane	ug/L	ND	1.1	0.49	9377647
1,1-Dichloroethylene	ug/L	ND	ND	0.20	9377647
cis-1,2-Dichloroethylene	ug/L	ND	20	0.50	9377647
trans-1,2-Dichloroethylene	ug/L	ND	ND	0.50	9377647
1,2-Dichloropropane	ug/L	ND	ND	0.20	9377647
cis-1,3-Dichloropropene	ug/L	ND	ND	0.30	9377647
trans-1,3-Dichloropropene	ug/L	ND	ND	0.40	9377647
Ethylbenzene	ug/L	ND	ND	0.20	9377647
Ethylene Dibromide	ug/L	ND	ND	0.19	9377647
Hexane	ug/L	ND	ND	1.0	9377647
Methylene Chloride(Dichloromethane)	ug/L	ND	ND	2.0	9377647
Methyl Ethyl Ketone (2-Butanone)	ug/L	ND	ND	10	9377647
Methyl Isobutyl Ketone	ug/L	ND	ND	5.0	9377647
Methyl t-butyl ether (MTBE)	ug/L	ND	ND	0.50	9377647
Styrene	ug/L	ND	ND	0.40	9377647
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.					



VOLATILE ORGANICS BY GC/MS (WATER)

Bureau Veritas ID		ZBS438	ZBS439		
Sampling Date		2024/05/01 14:50	2024/05/01 15:20		
COC Number		880147	880147		
	UNITS	MG-18-1	MG-18-2	RDL	QC Batch
1,1,1,2-Tetrachloroethane	ug/L	ND	ND	0.50	9377647
1,1,2,2-Tetrachloroethane	ug/L	ND	ND	0.40	9377647
Tetrachloroethylene	ug/L	ND	ND	0.20	9377647
Toluene	ug/L	ND	ND	0.20	9377647
1,1,1-Trichloroethane	ug/L	ND	ND	0.20	9377647
1,1,2-Trichloroethane	ug/L	ND	ND	0.40	9377647
Trichloroethylene	ug/L	ND	ND	0.20	9377647
Trichlorofluoromethane (FREON 11)	ug/L	ND	ND	0.50	9377647
Vinyl Chloride	ug/L	ND	1.4	0.20	9377647
p+m-Xylene	ug/L	ND	ND	0.20	9377647
o-Xylene	ug/L	ND	ND	0.20	9377647
Total Xylenes	ug/L	ND	ND	0.20	9377647
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	95	93		9377647
D4-1,2-Dichloroethane	%	118	118		9377647
D8-Toluene	%	91	89		9377647
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 Job #: C4D3558
Report Date: 2024/05/14

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: ZBS433
Sample ID: MG-DP1
Matrix: Water

Collected: 2024/05/01
Shipped:
Received: 2024/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9376058	N/A	2024/05/07	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9374694	2024/05/05	2024/05/10	Frank Zhang
Chloride by Automated Colourimetry	SKAL	9377934	N/A	2024/05/09	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9378474	N/A	2024/05/09	Neil Dassanayake
Conductivity	AT	9376069	N/A	2024/05/07	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9375722	N/A	2024/05/07	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	9377118	N/A	2024/05/07	Prempal Bhatti
Total Ammonia-N	LACH/NH4	9377600	N/A	2024/05/10	Yogesh Patel
Nitrate & Nitrite as Nitrogen in Water	LACH	9375739	N/A	2024/05/07	Jinal Chavda
pH	AT	9376068	2024/05/06	2024/05/07	Nachiketa Gohil
Sulphate by Automated Turbidimetry	SKAL	9377997	N/A	2024/05/09	Alina Dobreanu
Total Dissolved Solids	BAL	9377073	2024/05/07	2024/05/08	Razieh Tabesh
Total Suspended Solids	BAL	9380344	2024/05/08	2024/05/10	Madhav Somani

Bureau Veritas ID: ZBS433 Dup
Sample ID: MG-DP1
Matrix: Water

Collected: 2024/05/01
Shipped:
Received: 2024/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate & Nitrite as Nitrogen in Water	LACH	9375739	N/A	2024/05/07	Jinal Chavda

Bureau Veritas ID: ZBS434
Sample ID: MG-DP2
Matrix: Water

Collected: 2024/05/01
Shipped:
Received: 2024/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9376058	N/A	2024/05/07	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9374694	2024/05/05	2024/05/10	Frank Zhang
Chloride by Automated Colourimetry	SKAL	9378028	N/A	2024/05/09	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9378474	N/A	2024/05/09	Neil Dassanayake
Conductivity	AT	9376069	N/A	2024/05/07	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9375722	N/A	2024/05/07	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	9377118	N/A	2024/05/07	Prempal Bhatti
Total Ammonia-N	LACH/NH4	9377600	N/A	2024/05/10	Yogesh Patel
Nitrate & Nitrite as Nitrogen in Water	LACH	9375739	N/A	2024/05/07	Jinal Chavda
pH	AT	9376068	2024/05/06	2024/05/07	Nachiketa Gohil
Sulphate by Automated Turbidimetry	SKAL	9378033	N/A	2024/05/09	Alina Dobreanu
Total Dissolved Solids	BAL	9377073	2024/05/07	2024/05/08	Razieh Tabesh
Total Suspended Solids	BAL	9380344	2024/05/08	2024/05/10	Madhav Somani



Bureau Veritas Job #: C4D3558
Report Date: 2024/05/14

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: ZBS434 Dup
Sample ID: MG-DP2
Matrix: Water

Collected: 2024/05/01
Shipped:
Received: 2024/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9376058	N/A	2024/05/07	Nachiketa Gohil
Conductivity	AT	9376069	N/A	2024/05/07	Nachiketa Gohil
pH	AT	9376068	2024/05/06	2024/05/07	Nachiketa Gohil

Bureau Veritas ID: ZBS435
Sample ID: MG-DP3
Matrix: Water

Collected: 2024/05/01
Shipped:
Received: 2024/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9376058	N/A	2024/05/07	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9374694	2024/05/05	2024/05/10	Frank Zhang
Chloride by Automated Colourimetry	SKAL	9377934	N/A	2024/05/09	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9378474	N/A	2024/05/09	Neil Dassanayake
Conductivity	AT	9376069	N/A	2024/05/07	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9375722	N/A	2024/05/07	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	9377118	N/A	2024/05/07	Prempal Bhatti
Total Ammonia-N	LACH/NH4	9377600	N/A	2024/05/10	Yogesh Patel
Nitrate & Nitrite as Nitrogen in Water	LACH	9375739	N/A	2024/05/07	Jinal Chavda
pH	AT	9376068	2024/05/06	2024/05/07	Nachiketa Gohil
Sulphate by Automated Turbidimetry	SKAL	9377997	N/A	2024/05/09	Alina Dobreanu
Total Dissolved Solids	BAL	9377073	2024/05/07	2024/05/08	Razieh Tabesh
Total Suspended Solids	BAL	9380344	2024/05/08	2024/05/10	Madhav Somani

Bureau Veritas ID: ZBS436
Sample ID: MG-DP4
Matrix: Water

Collected: 2024/05/01
Shipped:
Received: 2024/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9376058	N/A	2024/05/07	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9374694	2024/05/05	2024/05/10	Frank Zhang
Chloride by Automated Colourimetry	SKAL	9377934	N/A	2024/05/09	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9378474	N/A	2024/05/09	Neil Dassanayake
Conductivity	AT	9376069	N/A	2024/05/07	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9375722	N/A	2024/05/06	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	9377118	N/A	2024/05/07	Prempal Bhatti
Total Ammonia-N	LACH/NH4	9377600	N/A	2024/05/10	Yogesh Patel
Nitrate & Nitrite as Nitrogen in Water	LACH	9375739	N/A	2024/05/07	Jinal Chavda
pH	AT	9376068	2024/05/06	2024/05/07	Nachiketa Gohil
Sulphate by Automated Turbidimetry	SKAL	9377997	N/A	2024/05/09	Alina Dobreanu
Total Dissolved Solids	BAL	9377073	2024/05/07	2024/05/08	Razieh Tabesh
Total Suspended Solids	BAL	9380344	2024/05/08	2024/05/10	Madhav Somani



Bureau Veritas Job #: C4D3558
Report Date: 2024/05/14

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: ZBS436 Dup
Sample ID: MG-DP4
Matrix: Water

Collected: 2024/05/01
Shipped:
Received: 2024/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9375722	N/A	2024/05/06	Gyulshen Idriz

Bureau Veritas ID: ZBS437
Sample ID: MG-DP5
Matrix: Water

Collected: 2024/05/01
Shipped:
Received: 2024/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9387945	N/A	2024/05/14	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9374694	2024/05/05	2024/05/10	Frank Zhang
Chloride by Automated Colourimetry	SKAL	9387925	N/A	2024/05/13	Geetee Noorzaad
Chemical Oxygen Demand	SPEC	9378474	N/A	2024/05/09	Neil Dassanayake
Conductivity	AT	9376069	N/A	2024/05/07	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9375722	N/A	2024/05/07	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	9389038	N/A	2024/05/13	Azita Fazaeli
Total Ammonia-N	LACH/NH4	9377600	N/A	2024/05/10	Yogesh Patel
Nitrate & Nitrite as Nitrogen in Water	LACH	9375739	N/A	2024/05/07	Jinal Chavda
pH	AT	9376068	2024/05/06	2024/05/07	Nachiketa Gohil
Sulphate by Automated Turbidimetry	SKAL	9387932	N/A	2024/05/13	Geetee Noorzaad
Total Dissolved Solids	BAL	9377073	2024/05/07	2024/05/08	Razieh Tabesh
Total Suspended Solids	BAL	9380344	2024/05/08	2024/05/10	Madhav Somani

Bureau Veritas ID: ZBS438
Sample ID: MG-18-1
Matrix: Water

Collected: 2024/05/01
Shipped:
Received: 2024/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9376058	N/A	2024/05/07	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9374694	2024/05/05	2024/05/10	Frank Zhang
Chloride by Automated Colourimetry	SKAL	9377934	N/A	2024/05/09	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9378474	N/A	2024/05/09	Neil Dassanayake
Conductivity	AT	9376069	N/A	2024/05/07	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9375722	N/A	2024/05/07	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	9377118	N/A	2024/05/07	Prempal Bhatti
Total Ammonia-N	LACH/NH4	9377600	N/A	2024/05/10	Yogesh Patel
Nitrate & Nitrite as Nitrogen in Water	LACH	9375739	N/A	2024/05/07	Jinal Chavda
pH	AT	9376068	2024/05/06	2024/05/07	Nachiketa Gohil
Sulphate by Automated Turbidimetry	SKAL	9377997	N/A	2024/05/09	Alina Dobreanu
Total Dissolved Solids	BAL	9377073	2024/05/07	2024/05/08	Razieh Tabesh
Total Suspended Solids	BAL	9380344	2024/05/08	2024/05/10	Madhav Somani
Volatile Organic Compounds in Water	GC/MS	9377647	N/A	2024/05/08	Gabriella Morrone



Bureau Veritas Job #: C4D3558
Report Date: 2024/05/14

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: ZBS439
Sample ID: MG-18-2
Matrix: Water

Collected: 2024/05/01
Shipped:
Received: 2024/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9376058	N/A	2024/05/07	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9374694	2024/05/05	2024/05/10	Frank Zhang
Chloride by Automated Colourimetry	SKAL	9377934	N/A	2024/05/09	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9378474	N/A	2024/05/09	Neil Dassanayake
Conductivity	AT	9376069	N/A	2024/05/07	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9375722	N/A	2024/05/07	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	9377118	N/A	2024/05/07	Prempal Bhatti
Total Ammonia-N	LACH/NH4	9377600	N/A	2024/05/10	Yogesh Patel
Nitrate & Nitrite as Nitrogen in Water	LACH	9375739	N/A	2024/05/07	Jinal Chavda
pH	AT	9376068	2024/05/06	2024/05/07	Nachiketa Gohil
Sulphate by Automated Turbidimetry	SKAL	9377997	N/A	2024/05/09	Alina Dobreanu
Total Dissolved Solids	BAL	9377073	2024/05/07	2024/05/08	Razieh Tabesh
Total Suspended Solids	BAL	9380344	2024/05/08	2024/05/10	Madhav Somani
Volatile Organic Compounds in Water	GC/MS	9377647	N/A	2024/05/08	Gabriella Morrone

Bureau Veritas ID: ZBS440
Sample ID: MG-18-3R
Matrix: Water

Collected: 2024/05/01
Shipped:
Received: 2024/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9376058	N/A	2024/05/07	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9374694	2024/05/05	2024/05/10	Frank Zhang
Chloride by Automated Colourimetry	SKAL	9377934	N/A	2024/05/09	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9378474	N/A	2024/05/09	Neil Dassanayake
Conductivity	AT	9376069	N/A	2024/05/07	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9375722	N/A	2024/05/07	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	9377118	N/A	2024/05/07	Prempal Bhatti
Total Ammonia-N	LACH/NH4	9377600	N/A	2024/05/10	Yogesh Patel
Nitrate & Nitrite as Nitrogen in Water	LACH	9375739	N/A	2024/05/07	Jinal Chavda
pH	AT	9376068	2024/05/06	2024/05/07	Nachiketa Gohil
Sulphate by Automated Turbidimetry	SKAL	9377997	N/A	2024/05/09	Alina Dobreanu
Total Dissolved Solids	BAL	9384380	2024/05/09	2024/05/10	Madhav Somani
Total Suspended Solids	BAL	9380481	2024/05/08	2024/05/09	Madhav Somani

Bureau Veritas ID: ZBS441
Sample ID: MG-QAQC-GW1
Matrix: Water

Collected: 2024/05/01
Shipped:
Received: 2024/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9376058	N/A	2024/05/07	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9374694	2024/05/05	2024/05/10	Frank Zhang
Chloride by Automated Colourimetry	SKAL	9378028	N/A	2024/05/09	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9378474	N/A	2024/05/09	Neil Dassanayake
Conductivity	AT	9376069	N/A	2024/05/07	Nachiketa Gohil



Bureau Veritas Job #: C4D3558
Report Date: 2024/05/14

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: ZBS441
Sample ID: MG-QAQC-GW1
Matrix: Water

Collected: 2024/05/01
Shipped:
Received: 2024/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9375722	N/A	2024/05/07	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	9377118	N/A	2024/05/07	Prempal Bhatti
Total Ammonia-N	LACH/NH4	9377600	N/A	2024/05/10	Yogesh Patel
Nitrate & Nitrite as Nitrogen in Water	LACH	9375739	N/A	2024/05/07	Jinal Chavda
pH	AT	9376068	2024/05/06	2024/05/07	Nachiketa Gohil
Sulphate by Automated Turbidimetry	SKAL	9378033	N/A	2024/05/09	Alina Dobreanu
Total Dissolved Solids	BAL	9384380	2024/05/09	2024/05/10	Madhav Somani
Total Suspended Solids	BAL	9380344	2024/05/08	2024/05/10	Madhav Somani



Bureau Veritas Job #: C4D3558
Report Date: 2024/05/14

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

GENERAL COMMENTS

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

Package 1	4.3°C
Package 2	11.3°C

Results relate only to the items tested.

BUREAU
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Bureau Veritas Job #: C4D3558

Report Date: 2024/05/14

QUALITY ASSURANCE REPORT

BluMetric Environmental Inc

Client Project #: 240205-07

Site Location: Musclow Greenview

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
9377647	4-Bromofluorobenzene	2024/05/08	98	70 - 130	100	70 - 130	100	%				
9377647	D4-1,2-Dichloroethane	2024/05/08	109	70 - 130	105	70 - 130	112	%				
9377647	D8-Toluene	2024/05/08	108	70 - 130	107	70 - 130	91	%				
9374694	Total BOD	2024/05/10					ND,RDL=2	mg/L	0.73	30	96	80 - 120
9375722	Dissolved Organic Carbon	2024/05/06	87	80 - 120	94	80 - 120	ND, RDL=0.4	mg/L	0.57	20		
9375739	Nitrate (N)	2024/05/07	98	80 - 120	100	80 - 120	ND, RDL=0.10	mg/L	NC	20		
9376058	Alkalinity (Total as CaCO3)	2024/05/07			102	85 - 115	ND, RDL=1.0	mg/L	1.3	20		
9376068	pH	2024/05/07			102	98 - 103			0.50	N/A		
9376069	Conductivity	2024/05/07			102	85 - 115	ND, RDL=1.0	umho/cm	0.98	10		
9377073	Total Dissolved Solids	2024/05/08			97	80 - 120	ND, RDL=10	mg/L	0	20		
9377118	Dissolved Aluminum (Al)	2024/05/07	108	80 - 120	97	80 - 120	ND, RDL=4.9	ug/L	NC	20		
9377118	Dissolved Barium (Ba)	2024/05/07	102	80 - 120	96	80 - 120	ND, RDL=2.0	ug/L	4.3	20		
9377118	Dissolved Boron (B)	2024/05/07	102	80 - 120	95	80 - 120	ND, RDL=10	ug/L	0.72	20		
9377118	Dissolved Cadmium (Cd)	2024/05/07	104	80 - 120	97	80 - 120	ND, RDL=0.090	ug/L	NC	20		
9377118	Dissolved Calcium (Ca)	2024/05/07	NC	80 - 120	100	80 - 120	ND, RDL=200	ug/L	3.1	20		
9377118	Dissolved Chromium (Cr)	2024/05/07	103	80 - 120	97	80 - 120	ND, RDL=5.0	ug/L	NC	20		
9377118	Dissolved Cobalt (Co)	2024/05/07	103	80 - 120	98	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9377118	Dissolved Iron (Fe)	2024/05/07	106	80 - 120	100	80 - 120	ND, RDL=100	ug/L	NC	20		
9377118	Dissolved Lead (Pb)	2024/05/07	100	80 - 120	97	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9377118	Dissolved Magnesium (Mg)	2024/05/07	NC	80 - 120	100	80 - 120	ND, RDL=50	ug/L	1.9	20		
9377118	Dissolved Manganese (Mn)	2024/05/07	104	80 - 120	98	80 - 120	ND, RDL=2.0	ug/L	NC	20		
9377118	Dissolved Silver (Ag)	2024/05/07	105	80 - 120	97	80 - 120	ND, RDL=0.090	ug/L	NC	20		
9377118	Dissolved Sodium (Na)	2024/05/07	NC	80 - 120	101	80 - 120	ND, RDL=100	ug/L	1.3	20		
9377118	Dissolved Zinc (Zn)	2024/05/07	101	80 - 120	97	80 - 120	ND, RDL=5.0	ug/L	2.9	20		
9377600	Total Ammonia-N	2024/05/10	106	75 - 125	102	80 - 120	ND, RDL=0.050	mg/L	1.9	20		
9377647	1,1,1,2-Tetrachloroethane	2024/05/08	111	70 - 130	108	70 - 130	ND, RDL=0.50	ug/L				
9377647	1,1,1-Trichloroethane	2024/05/08	108	70 - 130	104	70 - 130	ND, RDL=0.20	ug/L				

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VERITAS

Bureau Veritas Job #: C4D3558

Report Date: 2024/05/14

QUALITY ASSURANCE REPORT(CONT'D)

BluMetric Environmental Inc

Client Project #: 240205-07

Site Location: Musclove Greenview

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
9377647	1,1,2,2-Tetrachloroethane	2024/05/08	113	70 - 130	106	70 - 130	ND, RDL=0.40	ug/L				
9377647	1,1,2-Trichloroethane	2024/05/08	115	70 - 130	107	70 - 130	ND, RDL=0.40	ug/L				
9377647	1,1-Dichloroethane	2024/05/08	112	70 - 130	108	70 - 130	ND, RDL=0.20	ug/L				
9377647	1,1-Dichloroethylene	2024/05/08	110	70 - 130	105	70 - 130	ND, RDL=0.20	ug/L				
9377647	1,2-Dichlorobenzene	2024/05/08	102	70 - 130	102	70 - 130	ND, RDL=0.40	ug/L				
9377647	1,2-Dichloroethane	2024/05/08	108	70 - 130	102	70 - 130	ND, RDL=0.49	ug/L				
9377647	1,2-Dichloropropane	2024/05/08	108	70 - 130	104	70 - 130	ND, RDL=0.20	ug/L				
9377647	1,3-Dichlorobenzene	2024/05/08	100	70 - 130	104	70 - 130	ND, RDL=0.40	ug/L				
9377647	1,4-Dichlorobenzene	2024/05/08	112	70 - 130	115	70 - 130	ND, RDL=0.40	ug/L				
9377647	Acetone (2-Propanone)	2024/05/08	135	60 - 140	120	60 - 140	ND, RDL=10	ug/L				
9377647	Benzene	2024/05/08	102	70 - 130	99	70 - 130	ND, RDL=0.20	ug/L				
9377647	Bromodichloromethane	2024/05/08	113	70 - 130	109	70 - 130	ND, RDL=0.50	ug/L				
9377647	Bromoform	2024/05/08	100	70 - 130	94	70 - 130	ND, RDL=1.0	ug/L				
9377647	Bromomethane	2024/05/08	105	60 - 140	100	60 - 140	ND, RDL=0.50	ug/L				
9377647	Carbon Tetrachloride	2024/05/08	106	70 - 130	101	70 - 130	ND, RDL=0.19	ug/L				
9377647	Chlorobenzene	2024/05/08	108	70 - 130	107	70 - 130	ND, RDL=0.20	ug/L				
9377647	Chloroform	2024/05/08	111	70 - 130	107	70 - 130	ND, RDL=0.20	ug/L	2.3	30		
9377647	cis-1,2-Dichloroethylene	2024/05/08	108	70 - 130	104	70 - 130	ND, RDL=0.50	ug/L				
9377647	cis-1,3-Dichloropropene	2024/05/08	102	70 - 130	96	70 - 130	ND, RDL=0.30	ug/L				
9377647	Dibromochloromethane	2024/05/08	109	70 - 130	103	70 - 130	ND, RDL=0.50	ug/L				
9377647	Dichlorodifluoromethane (FREON 12)	2024/05/08	94	60 - 140	91	60 - 140	ND, RDL=1.0	ug/L				
9377647	Ethylbenzene	2024/05/08	100	70 - 130	101	70 - 130	ND, RDL=0.20	ug/L				
9377647	Ethylene Dibromide	2024/05/08	114	70 - 130	106	70 - 130	ND, RDL=0.19	ug/L				
9377647	Hexane	2024/05/08	111	70 - 130	105	70 - 130	ND, RDL=1.0	ug/L				
9377647	Methyl Ethyl Ketone (2-Butanone)	2024/05/08	119	60 - 140	107	60 - 140	ND, RDL=10	ug/L				
9377647	Methyl Isobutyl Ketone	2024/05/08	123	70 - 130	114	70 - 130	ND, RDL=5.0	ug/L				
9377647	Methyl t-butyl ether (MTBE)	2024/05/08	111	70 - 130	107	70 - 130	ND, RDL=0.50	ug/L				
9377647	Methylene Chloride(Dichloromethane)	2024/05/08	110	70 - 130	105	70 - 130	ND, RDL=2.0	ug/L				
9377647	o-Xylene	2024/05/08	87	70 - 130	93	70 - 130	ND, RDL=0.20	ug/L				
9377647	p+m-Xylene	2024/05/08	103	70 - 130	106	70 - 130	ND, RDL=0.20	ug/L				
9377647	Styrene	2024/05/08	112	70 - 130	118	70 - 130	ND, RDL=0.40	ug/L				

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Bureau Veritas Job #: C4D3558

Report Date: 2024/05/14

QUALITY ASSURANCE REPORT(CONT'D)

BluMetric Environmental Inc

Client Project #: 240205-07

Site Location: Musclove Greenview

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
9377647	Tetrachloroethylene	2024/05/08	103	70 - 130	102	70 - 130	ND, RDL=0.20	ug/L				
9377647	Toluene	2024/05/08	104	70 - 130	102	70 - 130	ND, RDL=0.20	ug/L				
9377647	Total Xylenes	2024/05/08					ND, RDL=0.20	ug/L				
9377647	trans-1,2-Dichloroethylene	2024/05/08	104	70 - 130	103	70 - 130	ND, RDL=0.50	ug/L				
9377647	trans-1,3-Dichloropropene	2024/05/08	115	70 - 130	107	70 - 130	ND, RDL=0.40	ug/L				
9377647	Trichloroethylene	2024/05/08	103	70 - 130	102	70 - 130	ND, RDL=0.20	ug/L				
9377647	Trichlorofluoromethane (FREON 11)	2024/05/08	106	70 - 130	100	70 - 130	ND, RDL=0.50	ug/L				
9377647	Vinyl Chloride	2024/05/08	103	70 - 130	100	70 - 130	ND, RDL=0.20	ug/L				
9377934	Dissolved Chloride (Cl-)	2024/05/09	NC	80 - 120	96	80 - 120	ND, RDL=1.0	mg/L	1.3	20		
9377997	Dissolved Sulphate (SO4)	2024/05/09	NC	75 - 125	98	80 - 120	ND, RDL=1.0	mg/L	0.28	20		
9378028	Dissolved Chloride (Cl-)	2024/05/09	NC	80 - 120	96	80 - 120	ND, RDL=1.0	mg/L	0.41	20		
9378033	Dissolved Sulphate (SO4)	2024/05/09	NC	75 - 125	96	80 - 120	ND, RDL=1.0	mg/L	2.7	20		
9378474	Total Chemical Oxygen Demand (COD)	2024/05/09	99	80 - 120	99	80 - 120	ND, RDL=4.0	mg/L	1.2	20		
9380344	Total Suspended Solids	2024/05/10			98	80 - 120	ND, RDL=10	mg/L	11	20		
9380481	Total Suspended Solids	2024/05/09			98	80 - 120	ND, RDL=10	mg/L	NC	20		
9384380	Total Dissolved Solids	2024/05/10			98	80 - 120	ND, RDL=10	mg/L	5.2	20		
9387925	Dissolved Chloride (Cl-)	2024/05/13	NC	80 - 120	96	80 - 120	ND, RDL=1.0	mg/L	0.91	20		
9387932	Dissolved Sulphate (SO4)	2024/05/13	NC	75 - 125	97	80 - 120	ND, RDL=1.0	mg/L	0.22	20		
9387945	Alkalinity (Total as CaCO3)	2024/05/14			94	85 - 115	ND, RDL=1.0	mg/L	3.3	20		
9389038	Dissolved Aluminum (Al)	2024/05/13	NC	80 - 120	100	80 - 120	ND, RDL=4.9	ug/L				
9389038	Dissolved Barium (Ba)	2024/05/13	104	80 - 120	98	80 - 120	ND, RDL=2.0	ug/L	4.0	20		
9389038	Dissolved Boron (B)	2024/05/13	113	80 - 120	104	80 - 120	ND, RDL=10	ug/L	NC	20		
9389038	Dissolved Cadmium (Cd)	2024/05/13	101	80 - 120	99	80 - 120	ND, RDL=0.090	ug/L	NC	20		
9389038	Dissolved Calcium (Ca)	2024/05/13	112	80 - 120	100	80 - 120	ND, RDL=200	ug/L				
9389038	Dissolved Chromium (Cr)	2024/05/13	103	80 - 120	96	80 - 120	ND, RDL=5.0	ug/L	NC	20		
9389038	Dissolved Cobalt (Co)	2024/05/13	101	80 - 120	96	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9389038	Dissolved Iron (Fe)	2024/05/13	106	80 - 120	101	80 - 120	ND, RDL=100	ug/L				
9389038	Dissolved Lead (Pb)	2024/05/13	93	80 - 120	99	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9389038	Dissolved Magnesium (Mg)	2024/05/13	108	80 - 120	99	80 - 120	ND, RDL=50	ug/L				
9389038	Dissolved Manganese (Mn)	2024/05/13	105	80 - 120	99	80 - 120	ND, RDL=2.0	ug/L				



Bureau Veritas Job #: C4D3558
Report Date: 2024/05/14

QUALITY ASSURANCE REPORT(CONT'D)

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
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
9389038	Dissolved Silver (Ag)	2024/05/13	87	80 - 120	100	80 - 120	ND, RDL=0.090	ug/L	NC	20		
9389038	Dissolved Sodium (Na)	2024/05/13	NC	80 - 120	100	80 - 120	ND, RDL=100	ug/L	1.4	20		
9389038	Dissolved Zinc (Zn)	2024/05/13	94	80 - 120	98	80 - 120	ND, RDL=5.0	ug/L	NC	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.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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

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



Bureau Veritas Job #: C4D3558
Report Date: 2024/05/14

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
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



T880147

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: MG-DP1
Last Sample: MG-QAQC-GW1
Sample Count: 9

Relinquished By				Received By			
Brad McCallum	Brad McCallum	Date	2024/05/02			Date	05/02/2024
		Time (24 HR)	09:30			Time (24 HR)	10:31
		Date	YY-MM-DD			Date	YY-MM-DD
		Time (24 HR)	HH-MM			Time (24 HR)	HH-MM
		Date	YY-MM-DD			Date	YY-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)

Brad McCallum / Matthew DeGeer

of Coolers/Pkgs:

2

Rush ☐Immediate Test ☐Food Residue ☐Micro ☐Food Chemistry ☐

*** LABORATORY USE ONLY ***

Received At

Lab Comments:

Labeled By

Verified By

03-May-24 10:31

Christine Gipton

C4D3558

RIUK

ENV-1133

Custody Seal		Cooling Media	Temperature °C		
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3
N	N	Y	4	5	4
		Y	11	11	12
Drinking Water Metals Preservation Check Done (Circle)			YES	NO	

COR FCD-00383/4

Page 1 of 1



Your Project #: 240205-07
Site Location: Musclow Greenview
Your C.O.C. #: 971311

Attention: MHH Distribution

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

Report Date: 2024/11/12
Report #: R8402089
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4Y5038

Received: 2024/11/01, 10:10

Sample Matrix: Ground Water
Samples Received: 8

Analyses	Date		Date Analyzed	Laboratory Method	Analytical Method
	Quantity	Extracted			
Alkalinity	2	N/A	2024/11/12	CAM SOP-00448	SM 24 2320 B m
Alkalinity	6	N/A	2024/11/07	CAM SOP-00448	SM 24 2320 B m
Biochemical Oxygen Demand (BOD)	8	2024/11/03	2024/11/08	CAM SOP-00427	SM 24 5210B m
Chloride by Automated Colourimetry	2	N/A	2024/11/11	CAM SOP-00463	SM 24 4500-Cl E m
Chloride by Automated Colourimetry	6	N/A	2024/11/08	CAM SOP-00463	SM 24 4500-Cl E m
Chemical Oxygen Demand	8	N/A	2024/11/05	CAM SOP-00416	SM 24 5220 D m
Conductivity	7	N/A	2024/11/07	CAM SOP-00414	SM 24 2510 m
Conductivity	1	N/A	2024/11/08	CAM SOP-00414	SM 24 2510 m
Dissolved Organic Carbon (DOC) (1)	7	N/A	2024/11/06	CAM SOP-00446	SM 24 5310 B m
Dissolved Organic Carbon (DOC) (1)	1	N/A	2024/11/07	CAM SOP-00446	SM 24 5310 B m
Dissolved Metals by ICPMS	2	N/A	2024/11/11	CAM SOP-00447	EPA 6020B m
Dissolved Metals by ICPMS	6	N/A	2024/11/05	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	8	N/A	2024/11/06	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (2)	7	N/A	2024/11/05	CAM SOP-00440	SM 24 4500-NO3I/NO2B
Nitrate & Nitrite as Nitrogen in Water (2)	1	N/A	2024/11/06	CAM SOP-00440	SM 24 4500-NO3I/NO2B
pH (3)	7	2024/11/04	2024/11/07	CAM SOP-00413	SM 24th - 4500H+ B
pH (3)	1	2024/11/04	2024/11/08	CAM SOP-00413	SM 24th - 4500H+ B
Sulphate by Automated Turbidimetry	2	N/A	2024/11/11	CAM SOP-00464	SM 24 4500-SO42- E m
Sulphate by Automated Turbidimetry	6	N/A	2024/11/08	CAM SOP-00464	SM 24 4500-SO42- E m
Total Dissolved Solids	8	2024/11/02	2024/11/04	CAM SOP-00428	SM 24 2540C m
Total Suspended Solids	8	2024/11/02	2024/11/05	CAM SOP-00428	SM 24 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, EPA, APHA or the Quebec Ministry of Environment.

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



Your Project #: 240205-07
Site Location: Musclow Greenview
Your C.O.C. #: 971311

Attention: MHH Distribution

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

Report Date: 2024/11/12
Report #: R8402089
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4Y5038

Received: 2024/11/01, 10:10

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.

(3) "The CCME method and Analytical Protocol (O. Reg 153/04, O. Reg. 406/19) requires pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME and Analytical Protocol (O. Reg 153/04, O. Reg. 406/19) holding time. Bureau Veritas endeavors to analyze samples as soon as possible after receipt."

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:

Elora Di Bratto, Project Manager

Email: Elora.Di-Bratto@bureauveritas.com

Phone# (905) 817-5700

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



Bureau Veritas Job #: C4Y5038
Report Date: 2024/11/12

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

RESULTS OF ANALYSES OF GROUND WATER

Bureau Veritas ID		AHRM14			AHRM14			AHRM15		
Sampling Date		2024/10/30 11:36			2024/10/30 11:36			2024/10/30 12:18		
COC Number		971311			971311			971311		
	UNITS	MG-DP1	RDL	QC Batch	MG-DP1 Lab-Dup	RDL	QC Batch	MG-DP2	RDL	QC Batch
Inorganics										
Total Ammonia-N	mg/L	0.28	0.050	9743376				5.9	0.050	9743376
Total BOD	mg/L	ND	2	9742348	ND	2	9742348	ND	2	9742348
Total Chemical Oxygen Demand (COD)	mg/L	15	4.0	9743088				57	4.0	9743088
Conductivity	umho/cm	810	1.0	9743321				330	1.0	9743339
Total Dissolved Solids	mg/L	565	10	9741972				200	10	9741972
Dissolved Organic Carbon	mg/L	5.9	0.4	9749819				9.1	0.4	9749819
pH	pH	7.79		9743323				7.66		9743340
Total Suspended Solids	mg/L	ND	10	9742131				ND	10	9742131
Dissolved Sulphate (SO4)	mg/L	98	1.0	9743349				2.1	1.0	9744622
Alkalinity (Total as CaCO3)	mg/L	250	1.0	9743319				170	1.0	9743334
Dissolved Chloride (Cl-)	mg/L	45	1.0	9743344				ND	1.0	9744620
Nitrite (N)	mg/L	ND	0.010	9742896				ND	0.010	9743303
Nitrate (N)	mg/L	ND	0.10	9742896				ND	0.10	9743303
Nitrate + Nitrite (N)	mg/L	ND	0.10	9742896				ND	0.10	9743303
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.										



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Bureau Veritas Job #: C4Y5038

Report Date: 2024/11/12

BluMetric Environmental Inc

Client Project #: 240205-07

Site Location: Musclow Greenview

Sampler Initials: BM

RESULTS OF ANALYSES OF GROUND WATER

Bureau Veritas ID		AHRM15			AHRM16		AHRM17		
Sampling Date		2024/10/30 12:18			2024/10/30 13:35		2024/10/30 12:48		
COC Number		971311			971311		971311		
	UNITS	MG-DP2 Lab-Dup	RDL	QC Batch	MG-DP3	QC Batch	MG-DP4	RDL	QC Batch
Inorganics									
Total Ammonia-N	mg/L				0.26	9743370	ND	0.050	9743376
Total BOD	mg/L				ND	9742348	29	2	9742348
Total Chemical Oxygen Demand (COD)	mg/L				76	9743088	38	4.0	9743088
Conductivity	umho/cm				1500	9743339	220	1.0	9743321
Total Dissolved Solids	mg/L				955	9741972	150	10	9741972
Dissolved Organic Carbon	mg/L				18	9749819	5.0	0.4	9749819
pH	pH				7.65	9743340	7.82		9743323
Total Suspended Solids	mg/L				ND	9742131	79	10	9742131
Dissolved Sulphate (SO ₄)	mg/L				34	9744622	16	1.0	9743349
Alkalinity (Total as CaCO ₃)	mg/L				720	9743334	92	1.0	9743319
Dissolved Chloride (Cl ⁻)	mg/L				70	9744620	4.0	1.0	9743344
Nitrite (N)	mg/L	ND	0.010	9743303	ND	9743308	ND	0.010	9742896
Nitrate (N)	mg/L	ND	0.10	9743303	ND	9743308	ND	0.10	9742896
Nitrate + Nitrite (N)	mg/L	ND	0.10	9743303	ND	9743308	ND	0.10	9742896
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.									



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VERITAS

Bureau Veritas Job #: C4Y5038

Report Date: 2024/11/12

BluMetric Environmental Inc

Client Project #: 240205-07

Site Location: Musclow Greenview

Sampler Initials: BM

RESULTS OF ANALYSES OF GROUND WATER

Bureau Veritas ID		AHRM17			AHRM18			AHRM18		
Sampling Date		2024/10/30 12:48			2024/10/30 10:49			2024/10/30 10:49		
COC Number		971311			971311			971311		
	UNITS	MG-DP4 Lab-Dup	RDL	QC Batch	MG-DP5	RDL	QC Batch	MG-DP5 Lab-Dup	RDL	QC Batch
Inorganics										
Total Ammonia-N	mg/L				0.082	0.050	9743376			
Total BOD	mg/L				7	2	9742348			
Total Chemical Oxygen Demand (COD)	mg/L				41	4.0	9743088			
Conductivity	umho/cm				740	1.0	9743339	740	1.0	9743339
Total Dissolved Solids	mg/L				655	10	9741972			
Dissolved Organic Carbon	mg/L				11	0.4	9749819			
pH	pH				7.06		9743340	7.08		9743340
Total Suspended Solids	mg/L				250	10	9742131			
Dissolved Sulphate (SO ₄)	mg/L	15	1.0	9743349	42	1.0	9757047	44	1.0	9757047
Alkalinity (Total as CaCO ₃)	mg/L				250	1.0	9757042	250	1.0	9757042
Dissolved Chloride (Cl ⁻)	mg/L	4.3	1.0	9743344	65	1.0	9757046	67	1.0	9757046
Nitrite (N)	mg/L				ND	0.050	9743299			
Nitrate (N)	mg/L				ND	0.50	9743299			
Nitrate + Nitrite (N)	mg/L				ND	0.50	9743299			
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.										

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Bureau Veritas Job #: C4Y5038

Report Date: 2024/11/12

BluMetric Environmental Inc

Client Project #: 240205-07

Site Location: Musclow Greenview

Sampler Initials: BM

RESULTS OF ANALYSES OF GROUND WATER

Bureau Veritas ID		AHRM19			AHRM20			AHRM21		
Sampling Date		2024/10/30 09:33			2024/10/30 08:42			2024/10/30 09:33		
COC Number		971311			971311			971311		
	UNITS	MG-18-1	RDL	QC Batch	MG-18-3R	RDL	QC Batch	MG-QAQC-GW1	RDL	QC Batch
Inorganics										
Total Ammonia-N	mg/L	0.086	0.050	9743370	ND	0.050	9743376	0.099	0.050	9743370
Total BOD	mg/L	ND	2	9742348	ND	2	9742348	ND	2	9742348
Total Chemical Oxygen Demand (COD)	mg/L	ND	4.0	9743088	ND	4.0	9743088	4.5	4.0	9743088
Conductivity	umho/cm	770	1.0	9743321	120	1.0	9743321	770	1.0	9743948
Total Dissolved Solids	mg/L	535	10	9741972	590	10	9741972	535	10	9741972
Dissolved Organic Carbon	mg/L	6.6	0.4	9749819	2.2	0.4	9749819	7.4	0.4	9749862
pH	pH	7.19		9743323	7.28		9743323	7.84		9743949
Total Suspended Solids	mg/L	4600	100	9742131	33000	200	9742131	5600	100	9742131
Dissolved Sulphate (SO ₄)	mg/L	19	1.0	9744622	7.3	1.0	9743349	19	1.0	9757047
Alkalinity (Total as CaCO ₃)	mg/L	250	1.0	9743319	55	1.0	9743319	250	1.0	9757042
Dissolved Chloride (Cl ⁻)	mg/L	74	1.0	9744620	ND	1.0	9743344	82	1.0	9757046
Nitrite (N)	mg/L	ND	0.010	9743299	0.011	0.010	9743299	ND	0.010	9743933
Nitrate (N)	mg/L	ND	0.10	9743299	ND	0.10	9743299	ND	0.10	9743933
Nitrate + Nitrite (N)	mg/L	ND	0.10	9743299	ND	0.10	9743299	ND	0.10	9743933
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 ID		AHRM21		
Sampling Date		2024/10/30 09:33		
COC Number		971311		
	UNITS	MG-QAQC-GW1 Lab-Dup	RDL	QC Batch
Inorganics				
Dissolved Organic Carbon	mg/L	7.2	0.4	9749862
Dissolved Sulphate (SO ₄)	mg/L	19	1.0	9757047
Alkalinity (Total as CaCO ₃)	mg/L	250	1.0	9757042
Dissolved Chloride (Cl ⁻)	mg/L	81	1.0	9757046
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				
Lab-Dup = Laboratory Initiated Duplicate				



Bureau Veritas Job #: C4Y5038
Report Date: 2024/11/12

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

ELEMENTS BY ATOMIC SPECTROSCOPY (GROUND WATER)

Bureau Veritas ID		AHRM14	AHRM15	AHRM16	AHRM17	AHRM17		
Sampling Date		2024/10/30 11:36	2024/10/30 12:18	2024/10/30 13:35	2024/10/30 12:48	2024/10/30 12:48		
COC Number		971311	971311	971311	971311	971311		
	UNITS	MG-DP1	MG-DP2	MG-DP3	MG-DP4	MG-DP4 Lab-Dup	RDL	QC Batch
Metals								
Dissolved Aluminum (Al)	ug/L	ND	ND	ND	ND	ND	4.9	9742962
Dissolved Barium (Ba)	ug/L	79	31	190	10	12	2.0	9742962
Dissolved Boron (B)	ug/L	64	27	520	13	13	10	9742962
Dissolved Cadmium (Cd)	ug/L	ND	ND	ND	ND	ND	0.090	9742962
Dissolved Calcium (Ca)	ug/L	130000	46000	240000	28000	28000	200	9742962
Dissolved Chromium (Cr)	ug/L	ND	ND	ND	ND	ND	5.0	9742962
Dissolved Cobalt (Co)	ug/L	ND	ND	3.6	ND	ND	0.50	9742962
Dissolved Iron (Fe)	ug/L	ND	ND	680	ND	ND	100	9742962
Dissolved Lead (Pb)	ug/L	ND	ND	ND	ND	ND	0.50	9742962
Dissolved Magnesium (Mg)	ug/L	10000	3900	30000	4500	4400	50	9742962
Dissolved Manganese (Mn)	ug/L	130	66	360	ND	ND	2.0	9742962
Dissolved Silver (Ag)	ug/L	ND	ND	ND	ND	ND	0.090	9742962
Dissolved Sodium (Na)	ug/L	12000	4200	52000	4600	4600	100	9742962
Dissolved Zinc (Zn)	ug/L	ND	ND	6.2	ND	ND	5.0	9742962
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.								



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Bureau Veritas Job #: C4Y5038

Report Date: 2024/11/12

BluMetric Environmental Inc

Client Project #: 240205-07

Site Location: Musclow Greenview

Sampler Initials: BM

ELEMENTS BY ATOMIC SPECTROSCOPY (GROUND WATER)

Bureau Veritas ID		AHRM18			AHRM19	AHRM20		AHRM21		
Sampling Date		2024/10/30 10:49			2024/10/30 09:33	2024/10/30 08:42		2024/10/30 09:33		
COC Number		971311			971311	971311		971311		
	UNITS	MG-DP5	RDL	QC Batch	MG-18-1	MG-18-3R	QC Batch	MG-QAQC-GW1	RDL	QC Batch
Metals										
Dissolved Aluminum (Al)	ug/L	ND	4.9	9757600	ND	22	9742962	ND	4.9	9757600
Dissolved Barium (Ba)	ug/L	47	2.0	9757600	100	11	9742962	99	2.0	9757600
Dissolved Boron (B)	ug/L	45	10	9757600	170	ND	9742962	180	10	9757600
Dissolved Cadmium (Cd)	ug/L	ND	0.090	9757600	0.12	ND	9742962	0.090	0.090	9757600
Dissolved Calcium (Ca)	ug/L	130000	200	9757600	89000	19000	9742962	94000	200	9757600
Dissolved Chromium (Cr)	ug/L	ND	5.0	9757600	ND	ND	9742962	ND	5.0	9757600
Dissolved Cobalt (Co)	ug/L	46	0.50	9757600	30	ND	9742962	32	0.50	9757600
Dissolved Iron (Fe)	ug/L	140000	500	9757600	530	ND	9742962	570	100	9757600
Dissolved Lead (Pb)	ug/L	ND	0.50	9757600	ND	ND	9742962	0.82	0.50	9757600
Dissolved Magnesium (Mg)	ug/L	11000	50	9757600	21000	1200	9742962	23000	50	9757600
Dissolved Manganese (Mn)	ug/L	2800	2.0	9757600	6100	7.1	9742962	6500	2.0	9757600
Dissolved Silver (Ag)	ug/L	ND	0.090	9757600	ND	ND	9742962	ND	0.090	9757600
Dissolved Sodium (Na)	ug/L	8500	100	9757600	27000	2900	9742962	29000	100	9757600
Dissolved Zinc (Zn)	ug/L	33000	25	9757600	ND	ND	9742962	ND	5.0	9757600
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 Job #: C4Y5038
Report Date: 2024/11/12

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: AHRM14
Sample ID: MG-DP1
Matrix: Ground Water

Collected: 2024/10/30
Shipped:
Received: 2024/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9743319	N/A	2024/11/07	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9742348	2024/11/03	2024/11/08	Amrutha Anilkumar
Chloride by Automated Colourimetry	SKAL	9743344	N/A	2024/11/08	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9743088	N/A	2024/11/05	Shivani Shivani
Conductivity	AT	9743321	N/A	2024/11/07	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9749819	N/A	2024/11/06	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	9742962	N/A	2024/11/05	Azita Fazaeli
Total Ammonia-N	SKAL/NH4	9743376	N/A	2024/11/06	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9742896	N/A	2024/11/05	Chandra Nandlal
pH	AT	9743323	2024/11/04	2024/11/07	Nachiketa Gohil
Sulphate by Automated Turbidimetry	SKAL	9743349	N/A	2024/11/08	Alina Dobreanu
Total Dissolved Solids	BAL	9741972	2024/11/02	2024/11/04	Manowalage shanika GUNASEKARA
Total Suspended Solids	BAL	9742131	2024/11/02	2024/11/05	Madhav Somani

Bureau Veritas ID: AHRM14 Dup
Sample ID: MG-DP1
Matrix: Ground Water

Collected: 2024/10/30
Shipped:
Received: 2024/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Biochemical Oxygen Demand (BOD)	DO	9742348	2024/11/03	2024/11/08	Amrutha Anilkumar

Bureau Veritas ID: AHRM15
Sample ID: MG-DP2
Matrix: Ground Water

Collected: 2024/10/30
Shipped:
Received: 2024/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9743334	N/A	2024/11/07	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9742348	2024/11/03	2024/11/08	Amrutha Anilkumar
Chloride by Automated Colourimetry	SKAL	9744620	N/A	2024/11/08	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9743088	N/A	2024/11/05	Shivani Shivani
Conductivity	AT	9743339	N/A	2024/11/07	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9749819	N/A	2024/11/06	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	9742962	N/A	2024/11/05	Azita Fazaeli
Total Ammonia-N	SKAL/NH4	9743376	N/A	2024/11/06	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9743303	N/A	2024/11/06	Chandra Nandlal
pH	AT	9743340	2024/11/04	2024/11/07	Nachiketa Gohil
Sulphate by Automated Turbidimetry	SKAL	9744622	N/A	2024/11/08	Alina Dobreanu
Total Dissolved Solids	BAL	9741972	2024/11/02	2024/11/04	Manowalage shanika GUNASEKARA
Total Suspended Solids	BAL	9742131	2024/11/02	2024/11/05	Madhav Somani



Bureau Veritas Job #: C4Y5038
Report Date: 2024/11/12

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: AHRM15 Dup
Sample ID: MG-DP2
Matrix: Ground Water

Collected: 2024/10/30
Shipped:
Received: 2024/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate & Nitrite as Nitrogen in Water	LACH	9743303	N/A	2024/11/06	Chandra Nandlal

Bureau Veritas ID: AHRM16
Sample ID: MG-DP3
Matrix: Ground Water

Collected: 2024/10/30
Shipped:
Received: 2024/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9743334	N/A	2024/11/07	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9742348	2024/11/03	2024/11/08	Amrutha Anilkumar
Chloride by Automated Colourimetry	SKAL	9744620	N/A	2024/11/08	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9743088	N/A	2024/11/05	Shivani Shivani
Conductivity	AT	9743339	N/A	2024/11/07	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9749819	N/A	2024/11/06	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	9742962	N/A	2024/11/05	Azita Fazaeli
Total Ammonia-N	SKAL/NH4	9743370	N/A	2024/11/06	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9743308	N/A	2024/11/05	Jinal Chavda
pH	AT	9743340	2024/11/04	2024/11/07	Nachiketa Gohil
Sulphate by Automated Turbidimetry	SKAL	9744622	N/A	2024/11/08	Alina Dobreanu
Total Dissolved Solids	BAL	9741972	2024/11/02	2024/11/04	Manowalage shanika GUNASEKARA
Total Suspended Solids	BAL	9742131	2024/11/02	2024/11/05	Madhav Somani

Bureau Veritas ID: AHRM17
Sample ID: MG-DP4
Matrix: Ground Water

Collected: 2024/10/30
Shipped:
Received: 2024/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9743319	N/A	2024/11/07	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9742348	2024/11/03	2024/11/08	Amrutha Anilkumar
Chloride by Automated Colourimetry	SKAL	9743344	N/A	2024/11/08	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9743088	N/A	2024/11/05	Shivani Shivani
Conductivity	AT	9743321	N/A	2024/11/07	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9749819	N/A	2024/11/06	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	9742962	N/A	2024/11/05	Azita Fazaeli
Total Ammonia-N	SKAL/NH4	9743376	N/A	2024/11/06	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9742896	N/A	2024/11/05	Chandra Nandlal
pH	AT	9743323	2024/11/04	2024/11/07	Nachiketa Gohil
Sulphate by Automated Turbidimetry	SKAL	9743349	N/A	2024/11/08	Alina Dobreanu
Total Dissolved Solids	BAL	9741972	2024/11/02	2024/11/04	Manowalage shanika GUNASEKARA
Total Suspended Solids	BAL	9742131	2024/11/02	2024/11/05	Madhav Somani



Bureau Veritas Job #: C4Y5038
Report Date: 2024/11/12

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: AHRM17 Dup
Sample ID: MG-DP4
Matrix: Ground Water

Collected: 2024/10/30
Shipped:
Received: 2024/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride by Automated Colourimetry	SKAL	9743344	N/A	2024/11/08	Alina Dobreanu
Dissolved Metals by ICPMS	ICP/MS	9742962	N/A	2024/11/05	Azita Fazaeli
Sulphate by Automated Turbidimetry	SKAL	9743349	N/A	2024/11/08	Alina Dobreanu

Bureau Veritas ID: AHRM18
Sample ID: MG-DP5
Matrix: Ground Water

Collected: 2024/10/30
Shipped:
Received: 2024/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9757042	N/A	2024/11/12	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9742348	2024/11/03	2024/11/08	Amrutha Anilkumar
Chloride by Automated Colourimetry	SKAL	9757046	N/A	2024/11/11	Massarat Jan
Chemical Oxygen Demand	SPEC	9743088	N/A	2024/11/05	Shivani Shivani
Conductivity	AT	9743339	N/A	2024/11/07	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9749819	N/A	2024/11/06	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	9757600	N/A	2024/11/11	Nan Raykha
Total Ammonia-N	SKAL/NH4	9743376	N/A	2024/11/06	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9743299	N/A	2024/11/05	Chandra Nandlal
pH	AT	9743340	2024/11/04	2024/11/07	Nachiketa Gohil
Sulphate by Automated Turbidimetry	SKAL	9757047	N/A	2024/11/11	Massarat Jan
Total Dissolved Solids	BAL	9741972	2024/11/02	2024/11/04	Manowalage shanika GUNASEKARA
Total Suspended Solids	BAL	9742131	2024/11/02	2024/11/05	Madhav Somani

Bureau Veritas ID: AHRM18 Dup
Sample ID: MG-DP5
Matrix: Ground Water

Collected: 2024/10/30
Shipped:
Received: 2024/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9757042	N/A	2024/11/12	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9757046	N/A	2024/11/11	Massarat Jan
Conductivity	AT	9743339	N/A	2024/11/07	Nachiketa Gohil
pH	AT	9743340	2024/11/04	2024/11/07	Nachiketa Gohil
Sulphate by Automated Turbidimetry	SKAL	9757047	N/A	2024/11/11	Massarat Jan

Bureau Veritas ID: AHRM19
Sample ID: MG-18-1
Matrix: Ground Water

Collected: 2024/10/30
Shipped:
Received: 2024/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9743319	N/A	2024/11/07	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9742348	2024/11/03	2024/11/08	Amrutha Anilkumar
Chloride by Automated Colourimetry	SKAL	9744620	N/A	2024/11/08	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9743088	N/A	2024/11/05	Shivani Shivani
Conductivity	AT	9743321	N/A	2024/11/07	Nachiketa Gohil



Bureau Veritas Job #: C4Y5038
Report Date: 2024/11/12

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: AHRM19
Sample ID: MG-18-1
Matrix: Ground Water

Collected: 2024/10/30
Shipped:
Received: 2024/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9749819	N/A	2024/11/06	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	9742962	N/A	2024/11/05	Azita Fazaeli
Total Ammonia-N	SKAL/NH4	9743370	N/A	2024/11/06	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9743299	N/A	2024/11/05	Chandra Nandlal
pH	AT	9743323	2024/11/04	2024/11/07	Nachiketa Gohil
Sulphate by Automated Turbidimetry	SKAL	9744622	N/A	2024/11/08	Alina Dobreanu
Total Dissolved Solids	BAL	9741972	2024/11/02	2024/11/04	Manowalage shanika GUNASEKARA
Total Suspended Solids	BAL	9742131	2024/11/02	2024/11/05	Madhav Somani

Bureau Veritas ID: AHRM20
Sample ID: MG-18-3R
Matrix: Ground Water

Collected: 2024/10/30
Shipped:
Received: 2024/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9743319	N/A	2024/11/07	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9742348	2024/11/03	2024/11/08	Amrutha Anilkumar
Chloride by Automated Colourimetry	SKAL	9743344	N/A	2024/11/08	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9743088	N/A	2024/11/05	Shivani Shivani
Conductivity	AT	9743321	N/A	2024/11/07	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9749819	N/A	2024/11/06	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	9742962	N/A	2024/11/05	Azita Fazaeli
Total Ammonia-N	SKAL/NH4	9743376	N/A	2024/11/06	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9743299	N/A	2024/11/05	Chandra Nandlal
pH	AT	9743323	2024/11/04	2024/11/07	Nachiketa Gohil
Sulphate by Automated Turbidimetry	SKAL	9743349	N/A	2024/11/08	Alina Dobreanu
Total Dissolved Solids	BAL	9741972	2024/11/02	2024/11/04	Manowalage shanika GUNASEKARA
Total Suspended Solids	BAL	9742131	2024/11/02	2024/11/05	Madhav Somani

Bureau Veritas ID: AHRM21
Sample ID: MG-QAQC-GW1
Matrix: Ground Water

Collected: 2024/10/30
Shipped:
Received: 2024/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9757042	N/A	2024/11/12	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9742348	2024/11/03	2024/11/08	Amrutha Anilkumar
Chloride by Automated Colourimetry	SKAL	9757046	N/A	2024/11/11	Massarat Jan
Chemical Oxygen Demand	SPEC	9743088	N/A	2024/11/05	Shivani Shivani
Conductivity	AT	9743948	N/A	2024/11/08	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9749862	N/A	2024/11/07	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	9757600	N/A	2024/11/11	Nan Raykha
Total Ammonia-N	SKAL/NH4	9743370	N/A	2024/11/06	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9743933	N/A	2024/11/05	Jinal Chavda
pH	AT	9743949	2024/11/04	2024/11/08	Nachiketa Gohil
Sulphate by Automated Turbidimetry	SKAL	9757047	N/A	2024/11/11	Massarat Jan



Bureau Veritas Job #: C4Y5038
Report Date: 2024/11/12

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: AHRM21
Sample ID: MG-QAQC-GW1
Matrix: Ground Water

Collected: 2024/10/30
Shipped:
Received: 2024/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Dissolved Solids	BAL	9741972	2024/11/02	2024/11/04	Manowalage shanika GUNASEKARA
Total Suspended Solids	BAL	9742131	2024/11/02	2024/11/05	Madhav Somani

Bureau Veritas ID: AHRM21 Dup
Sample ID: MG-QAQC-GW1
Matrix: Ground Water

Collected: 2024/10/30
Shipped:
Received: 2024/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9757042	N/A	2024/11/12	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9757046	N/A	2024/11/11	Massarat Jan
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9749862	N/A	2024/11/07	Gyulshen Idriz
Sulphate by Automated Turbidimetry	SKAL	9757047	N/A	2024/11/11	Massarat Jan



Bureau Veritas Job #: C4Y5038
Report Date: 2024/11/12

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

GENERAL COMMENTS

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

Package 1	5.3°C
Package 2	5.3°C
Package 3	5.7°C

Sample AHRM18 [MG-DP5] : Nitrite/Nitrate: Due to colour interferences, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.



Bureau Veritas Job #: C4Y5038
Report Date: 2024/11/12

QUALITY ASSURANCE REPORT

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclove Greenview
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
9741972	Total Dissolved Solids	2024/11/04			103	80 - 120	ND, RDL=10	mg/L	6.2	20		
9742131	Total Suspended Solids	2024/11/05			100	80 - 120	ND, RDL=10	mg/L	NC	20		
9742348	Total BOD	2024/11/08					ND, RDL=2	mg/L	NC	30	97	80 - 120
9742896	Nitrate (N)	2024/11/05	88	80 - 120	92	80 - 120	ND, RDL=0.10	mg/L	NC	20		
9742896	Nitrite (N)	2024/11/05	99	80 - 120	101	80 - 120	ND, RDL=0.010	mg/L	NC	20		
9742962	Dissolved Aluminum (Al)	2024/11/05	95	80 - 120	99	80 - 120	ND, RDL=4.9	ug/L	NC	20		
9742962	Dissolved Barium (Ba)	2024/11/05	97	80 - 120	99	80 - 120	ND, RDL=2.0	ug/L	12	20		
9742962	Dissolved Boron (B)	2024/11/05	90	80 - 120	90	80 - 120	ND, RDL=10	ug/L	0.45	20		
9742962	Dissolved Cadmium (Cd)	2024/11/05	97	80 - 120	96	80 - 120	ND, RDL=0.090	ug/L	NC	20		
9742962	Dissolved Calcium (Ca)	2024/11/05	NC	80 - 120	98	80 - 120	ND, RDL=200	ug/L	0.42	20		
9742962	Dissolved Chromium (Cr)	2024/11/05	95	80 - 120	97	80 - 120	ND, RDL=5.0	ug/L	NC	20		
9742962	Dissolved Cobalt (Co)	2024/11/05	93	80 - 120	95	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9742962	Dissolved Iron (Fe)	2024/11/05	97	80 - 120	98	80 - 120	ND, RDL=100	ug/L	NC	20		
9742962	Dissolved Lead (Pb)	2024/11/05	95	80 - 120	97	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9742962	Dissolved Magnesium (Mg)	2024/11/05	94	80 - 120	94	80 - 120	ND, RDL=50	ug/L	1.0	20		
9742962	Dissolved Manganese (Mn)	2024/11/05	96	80 - 120	97	80 - 120	ND, RDL=2.0	ug/L	NC	20		
9742962	Dissolved Silver (Ag)	2024/11/05	95	80 - 120	94	80 - 120	ND, RDL=0.090	ug/L	NC	20		
9742962	Dissolved Sodium (Na)	2024/11/05	96	80 - 120	98	80 - 120	ND, RDL=100	ug/L	0.97	20		
9742962	Dissolved Zinc (Zn)	2024/11/05	98	80 - 120	98	80 - 120	ND, RDL=5.0	ug/L	NC	20		
9743088	Total Chemical Oxygen Demand (COD)	2024/11/05	103	80 - 120	102	80 - 120	ND, RDL=4.0	mg/L	7.0	20		
9743299	Nitrate (N)	2024/11/05	88	80 - 120	94	80 - 120	ND, RDL=0.10	mg/L	2.6	20		
9743299	Nitrite (N)	2024/11/05	98	80 - 120	101	80 - 120	ND, RDL=0.010	mg/L	NC	20		
9743303	Nitrate (N)	2024/11/06	100	80 - 120	97	80 - 120	ND, RDL=0.10	mg/L	NC	20		
9743303	Nitrite (N)	2024/11/06	109	80 - 120	106	80 - 120	ND, RDL=0.010	mg/L	NC	20		
9743308	Nitrate (N)	2024/11/05	89	80 - 120	93	80 - 120	ND, RDL=0.10	mg/L	NC	20		
9743308	Nitrite (N)	2024/11/05	99	80 - 120	101	80 - 120	ND, RDL=0.010	mg/L	NC	20		

BUREAU
VERITAS

Bureau Veritas Job #: C4Y5038

Report Date: 2024/11/12

QUALITY ASSURANCE REPORT(CONT'D)

BluMetric Environmental Inc

Client Project #: 240205-07

Site Location: Musclove Greenview

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
9743319	Alkalinity (Total as CaCO ₃)	2024/11/07			95	85 - 115	ND, RDL=1.0	mg/L	1.1	20		
9743321	Conductivity	2024/11/07			99	85 - 115	ND, RDL=1.0	umho/cm	0.30	10		
9743323	pH	2024/11/07			102	98 - 103			0.57	N/A		
9743334	Alkalinity (Total as CaCO ₃)	2024/11/07			97	85 - 115	ND, RDL=1.0	mg/L				
9743339	Conductivity	2024/11/07			101	85 - 115	ND, RDL=1.0	umho/cm	0.53	10		
9743340	pH	2024/11/07			102	98 - 103			0.21	N/A		
9743344	Dissolved Chloride (Cl ⁻)	2024/11/08	105	80 - 120	99	80 - 120	ND, RDL=1.0	mg/L	6.6	20		
9743349	Dissolved Sulphate (SO ₄)	2024/11/08	95	75 - 125	98	80 - 120	ND, RDL=1.0	mg/L	0.74	20		
9743370	Total Ammonia-N	2024/11/06	100	75 - 125	99	80 - 120	ND, RDL=0.050	mg/L	NC	20		
9743376	Total Ammonia-N	2024/11/06	96	75 - 125	101	80 - 120	ND, RDL=0.050	mg/L	0.99	20		
9743933	Nitrate (N)	2024/11/05	NC	80 - 120	87	80 - 120	ND, RDL=0.10	mg/L	0.29	20		
9743933	Nitrite (N)	2024/11/05	101	80 - 120	100	80 - 120	ND, RDL=0.010	mg/L	8.6	20		
9743948	Conductivity	2024/11/08			99	85 - 115	ND, RDL=1.0	umho/cm	0.53	10		
9743949	pH	2024/11/08			102	98 - 103			0.43	N/A		
9744620	Dissolved Chloride (Cl ⁻)	2024/11/08	101	80 - 120	100	80 - 120	ND, RDL=1.0	mg/L	0.074	20		
9744622	Dissolved Sulphate (SO ₄)	2024/11/08	94	75 - 125	95	80 - 120	ND, RDL=1.0	mg/L	3.2	20		
9749819	Dissolved Organic Carbon	2024/11/06	96	80 - 120	98	80 - 120	ND, RDL=0.4	mg/L	1.5	20		
9749862	Dissolved Organic Carbon	2024/11/07	97	80 - 120	103	80 - 120	ND, RDL=0.4	mg/L	2.2	20		
9757042	Alkalinity (Total as CaCO ₃)	2024/11/12			98	85 - 115	ND, RDL=1.0	mg/L	2.1	20		
9757046	Dissolved Chloride (Cl ⁻)	2024/11/11	NC	80 - 120	107	80 - 120	ND, RDL=1.0	mg/L	6.1	20		
9757047	Dissolved Sulphate (SO ₄)	2024/11/11	NC	75 - 125	94	80 - 120	ND, RDL=1.0	mg/L	4.2	20		
9757600	Dissolved Aluminum (Al)	2024/11/11	98	80 - 120	99	80 - 120	ND, RDL=4.9	ug/L				
9757600	Dissolved Barium (Ba)	2024/11/11	98	80 - 120	99	80 - 120	ND, RDL=2.0	ug/L	4.2	20		
9757600	Dissolved Boron (B)	2024/11/11	96	80 - 120	99	80 - 120	ND, RDL=10	ug/L	2.4	20		
9757600	Dissolved Cadmium (Cd)	2024/11/11	100	80 - 120	100	80 - 120	ND, RDL=0.090	ug/L	NC	20		

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VERITAS

Bureau Veritas Job #: C4Y5038

Report Date: 2024/11/12

QUALITY ASSURANCE REPORT(CONT'D)

BluMetric Environmental Inc

Client Project #: 240205-07

Site Location: Musclove Greenview

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
9757600	Dissolved Calcium (Ca)	2024/11/11	NC	80 - 120	100	80 - 120	ND, RDL=200	ug/L				
9757600	Dissolved Chromium (Cr)	2024/11/11	99	80 - 120	101	80 - 120	ND, RDL=5.0	ug/L	NC	20		
9757600	Dissolved Cobalt (Co)	2024/11/11	99	80 - 120	100	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9757600	Dissolved Iron (Fe)	2024/11/11	102	80 - 120	104	80 - 120	ND, RDL=100	ug/L				
9757600	Dissolved Lead (Pb)	2024/11/11	96	80 - 120	99	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9757600	Dissolved Magnesium (Mg)	2024/11/11	NC	80 - 120	105	80 - 120	ND, RDL=50	ug/L				
9757600	Dissolved Manganese (Mn)	2024/11/11	99	80 - 120	102	80 - 120	ND, RDL=2.0	ug/L				
9757600	Dissolved Silver (Ag)	2024/11/11	97	80 - 120	98	80 - 120	ND, RDL=0.090	ug/L	NC	20		
9757600	Dissolved Sodium (Na)	2024/11/11	96	80 - 120	104	80 - 120	ND, RDL=100	ug/L				
9757600	Dissolved Zinc (Zn)	2024/11/11	96	80 - 120	100	80 - 120	ND, RDL=5.0	ug/L	NC	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).



Bureau Veritas Job #: C4Y5038
Report Date: 2024/11/12

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

VALIDATION SIGNATURE PAGE

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

A handwritten signature in black ink that reads "Cristina Carriere".

Cristina Carriere, Senior 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



T971311

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: MG-DP1
Last Sample: MG-QAQC-GW1
Sample Count: 9

2024/11/01/RA

Relinquished By				Received By			
Brad McCallum	Brad McCallum	Date	2024/10/31	ASHITA SAKUMA	ASHITA SAKUMA	Date	2024/11/01
		Time (24 HR)	11:00 PM			Time (24 HR)	10:10
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)

BM / NW

of Coolers/Pkgs:

1

Rush ☐

Immediate Test ☐

Food Residue ☐

Micro ☐

Food Chemistry ☐

*** LABORATORY USE ONLY ***

Received At

Lab Comments:

01-Nov-24 10:10

Labeled By

Elora Di Bratto
C4Y5038

Verified By

GMJ ENV-1157

Custody Seal		Cooling Media	Temperature °C		
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3
Y	Y	Y	7	4	5
Y	Y	Y	6	5	5
Y	Y	Y	6	6	5
Drinking Water Metals Preservation Check Done (Circle)			YES	NO	

COR FCD-00383/4

Page 1 of 1

Appendix D

D-3 Surface Water Laboratory Reports (Including Toxicity)



Your Project #: 240205-07
Site Location: Musclow Greenview
Your C.O.C. #: 880145

Attention: MHH Distribution

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

Report Date: 2024/05/17
Report #: R8153192
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4D2266

Received: 2024/05/03, 10:17

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Dissolved Aluminum (0.2 u, clay free)	6	N/A	2024/05/07	CAM SOP-00447	EPA 6020B m
Alkalinity	2	N/A	2024/05/11	CAM SOP-00448	SM 24 2320 B m
Alkalinity	4	N/A	2024/05/05	CAM SOP-00448	SM 24 2320 B m
Biochemical Oxygen Demand (BOD)	6	2024/05/04	2024/05/09	CAM SOP-00427	SM 24 5210B m
Chloride by Automated Colourimetry	3	N/A	2024/05/10	CAM SOP-00463	SM 24 4500-Cl E m
Chloride by Automated Colourimetry	2	N/A	2024/05/07	CAM SOP-00463	SM 24 4500-Cl E m
Chloride by Automated Colourimetry	1	N/A	2024/05/09	CAM SOP-00463	SM 24 4500-Cl E m
Chemical Oxygen Demand	6	N/A	2024/05/09	CAM SOP-00416	SM 24 5220 D m
Conductivity	2	N/A	2024/05/11	CAM SOP-00414	SM 24 2510 m
Conductivity	4	N/A	2024/05/05	CAM SOP-00414	SM 24 2510 m
Hardness (calculated as CaCO3)	4	N/A	2024/05/08	CAM SOP 00102/00408/00447	SM 2340 B
Hardness (calculated as CaCO3)	2	N/A	2024/05/09	CAM SOP 00102/00408/00447	SM 2340 B
Total Metals Analysis by ICPMS	6	2024/05/07	2024/05/07	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	6	N/A	2024/05/10	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (2)	6	N/A	2024/05/08	CAM SOP-00440	SM 24 4500-NO3I/NO2B
pH (3)	2	2024/05/04	2024/05/10	CAM SOP-00413	SM 24th - 4500H+ B
pH (3)	4	2024/05/04	2024/05/05	CAM SOP-00413	SM 24th - 4500H+ B
Phenols (4AAP)	2	N/A	2024/05/06	CAM SOP-00444	OMOE E3179 m
Phenols (4AAP)	4	N/A	2024/05/07	CAM SOP-00444	OMOE E3179 m
Field Measured pH (4)	6	N/A	2024/05/03		Field pH Meter
Sulphate by Automated Turbidimetry	3	N/A	2024/05/10	CAM SOP-00464	SM 24 4500-SO42- E m
Sulphate by Automated Turbidimetry	2	N/A	2024/05/07	CAM SOP-00464	SM 24 4500-SO42- E m
Sulphate by Automated Turbidimetry	1	N/A	2024/05/09	CAM SOP-00464	SM 24 4500-SO42- E m
48-h Daphnia Magna Single Concentration (1)	1	N/A	N/A		
96-h Rainbow Trout Single Concentration (1)	1	N/A	N/A		
Total Dissolved Solids	6	2024/05/08	2024/05/09	CAM SOP-00428	SM 24 2540C m
Field Temperature (4)	6	N/A	2024/05/03		Field Thermometer
Total Kjeldahl Nitrogen in Water	5	2024/05/07	2024/05/08	CAM SOP-00938	OMOE E3516 m



Your Project #: 240205-07
Site Location: Musclow Greenview
Your C.O.C. #: 880145

Attention: MHH Distribution

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

Report Date: 2024/05/17
Report #: R8153192
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4D2266

Received: 2024/05/03, 10:17

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Total Kjeldahl Nitrogen in Water	1	2024/05/07	2024/05/09	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	1	2024/05/07	2024/05/08	CAM SOP-00407	SM 24 4500-P I
Total Phosphorus (Colourimetric)	5	2024/05/07	2024/05/09	CAM SOP-00407	SM 24 4500-P I
Total Suspended Solids	6	2024/05/06	2024/05/07	CAM SOP-00428	SM 24 2540D m
Un-ionized Ammonia (5)	6	2024/05/03	2024/05/10	Auto Calc.	PWQO

Remarks:

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

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

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

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) This test was performed by Nautilus Environmental Company Inc, 11 Nicholas Beaver Rd Unit B, Puslinch, ON, N0B 2C0

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

(3) "The CCME method and Analytical Protocol (O. Reg 153/04, O. Reg. 406/19) requires pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME and Analytical Protocol (O. Reg 153/04, O. Reg. 406/19) holding time. Bureau Veritas endeavors to analyze samples as soon as possible after receipt."



Your Project #: 240205-07
Site Location: Musclow Greenview
Your C.O.C. #: 880145

Attention: MHH Distribution

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

Report Date: 2024/05/17
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CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4D2266

Received: 2024/05/03, 10:17

(4) This is a field test, therefore, the results relate to items that were not analysed at Bureau Veritas.

(5) Un-ionized ammonia is calculated using the total ammonia result and field data provided by the client for pH and temperature.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:

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

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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 #: C4D2266

Report Date: 2024/05/17

BluMetric Environmental Inc

Client Project #: 240205-07

Site Location: Musclow Greenview

Sampler Initials: BM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		ZBM036			ZBM036			ZBM037		
Sampling Date		2024/05/01 11:35			2024/05/01 11:35			2024/05/01 12:45		
COC Number		880145			880145			880145		
	UNITS	MG-SW1	RDL	QC Batch	MG-SW1 Lab-Dup	RDL	QC Batch	MG-SW2	RDL	QC Batch

Calculated Parameters										
Hardness (CaCO ₃)	mg/L	130	1.0	9372985				68	1.0	9372985
Total Un-ionized Ammonia	mg/L	ND	0.00061	9372143				ND	0.00061	9372143
Field Measurements										
Field Temperature	Celsius	8.4	N/A	ONSITE				13.6	N/A	ONSITE
Field Measured pH	pH	7		ONSITE				7.3		ONSITE
Inorganics										
Total Ammonia-N	mg/L	ND	0.050	9377600				ND	0.050	9377600
Total BOD	mg/L	ND	2	9374373	ND	2	9374373	3	2	9374373
Total Chemical Oxygen Demand (COD)	mg/L	24	4.0	9378780				25	4.0	9378780
Conductivity	umho/cm	360	1.0	9374464	360	1.0	9374464	210	1.0	9374368
Total Dissolved Solids	mg/L	205	10	9378955				110	10	9378955
Total Kjeldahl Nitrogen (TKN)	mg/L	0.38	0.10	9378796	0.38	0.10	9378796	0.28	0.10	9378796
pH	pH	7.75		9374465	7.73		9374465	7.52		9374369
Phenols-4AAP	mg/L	0.0023	0.0010	9378103				0.0023	0.0010	9378103
Total Phosphorus	mg/L	ND	0.020	9378607				ND	0.020	9378607
Total Suspended Solids	mg/L	ND	10	9375191				16	10	9375191
Dissolved Sulphate (SO ₄)	mg/L	39	1.0	9374390				9.3	1.0	9377510
Alkalinity (Total as CaCO ₃)	mg/L	100	1.0	9374462	110	1.0	9374462	60	1.0	9374367
Dissolved Chloride (Cl ⁻)	mg/L	24	1.0	9374387				24	1.0	9377496
Nitrite (N)	mg/L	ND	0.010	9374398				ND	0.010	9374398
Nitrate (N)	mg/L	ND	0.10	9374398				ND	0.10	9374398
Nitrate + Nitrite (N)	mg/L	ND	0.10	9374398				ND	0.10	9374398

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.

N/A = Not Applicable

BUREAU
VERITAS

Bureau Veritas Job #: C4D2266

Report Date: 2024/05/17

BluMetric Environmental Inc

Client Project #: 240205-07

Site Location: Musclow Greenview

Sampler Initials: BM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		ZBM038			ZBM039			ZBM039		
Sampling Date		2024/05/01 13:55			2024/05/01 10:15			2024/05/01 10:15		
COC Number		880145			880145			880145		
	UNITS	MG-SW3	RDL	QC Batch	MG-SW4A	RDL	QC Batch	MG-SW4A Lab-Dup	RDL	QC Batch

Calculated Parameters										
Hardness (CaCO ₃)	mg/L	150	1.0	9372985	34	1.0	9372985			
Total Un-ionized Ammonia	mg/L	ND	0.0011	9372143	ND	0.00061	9372143			
Field Measurements										
Field Temperature	Celsius	11.9	N/A	ONSITE	8	N/A	ONSITE			
Field Measured pH	pH	7.92		ONSITE	6.53		ONSITE			
Inorganics										
Total Ammonia-N	mg/L	ND	0.050	9377600	ND	0.050	9377600			
Total BOD	mg/L	ND	2	9374373	ND	2	9374373			
Total Chemical Oxygen Demand (COD)	mg/L	23	4.0	9378780	28	4.0	9378474	29	4.0	9378474
Conductivity	umho/cm	360	1.0	9374368	120	1.0	9374464			
Total Dissolved Solids	mg/L	195	10	9378955	60	10	9378955			
Total Kjeldahl Nitrogen (TKN)	mg/L	0.36	0.10	9378796	0.44	0.10	9377949			
pH	pH	7.95		9374369	8.32		9374465			
Phenols-4AAP	mg/L	0.0024	0.0010	9378103	ND	0.0010	9378928			
Total Phosphorus	mg/L	ND	0.020	9378607	ND	0.020	9377651			
Total Suspended Solids	mg/L	ND	10	9375191	ND	10	9375191			
Dissolved Sulphate (SO ₄)	mg/L	11	1.0	9377510	9.0	1.0	9374381			
Alkalinity (Total as CaCO ₃)	mg/L	130	1.0	9374367	48	1.0	9374462			
Dissolved Chloride (Cl ⁻)	mg/L	25	1.0	9377496	3.6	1.0	9374380			
Nitrite (N)	mg/L	ND	0.010	9374398	ND	0.010	9374398			
Nitrate (N)	mg/L	ND	0.10	9374398	ND	0.10	9374398			
Nitrate + Nitrite (N)	mg/L	ND	0.10	9374398	ND	0.10	9374398			

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.

N/A = Not Applicable



Bureau Veritas Job #: C4D2266
Report Date: 2024/05/17

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		ZBM040			ZBM040			ZBM041		
Sampling Date		2024/05/01 11:00			2024/05/01 11:00			2024/05/01 10:15		
COC Number		880145			880145			880145		
	UNITS	MG-SW6	RDL	QC Batch	MG-SW6 Lab-Dup	RDL	QC Batch	MG-QAQC-SW1	RDL	QC Batch

Calculated Parameters										
Hardness (CaCO ₃)	mg/L	94	1.0	9372985				33	1.0	9372985
Total Un-ionized Ammonia	mg/L	ND	0.00061	9372143				ND	0.00061	9372143
Field Measurements										
Field Temperature	Celsius	9.3	N/A	ONSITE				8	N/A	ONSITE
Field Measured pH	pH	7.14		ONSITE				6.53		ONSITE
Inorganics										
Total Ammonia-N	mg/L	ND	0.050	9377600				ND	0.050	9377600
Total BOD	mg/L	ND	2	9374373				ND	2	9374373
Total Chemical Oxygen Demand (COD)	mg/L	16	4.0	9378780	16	4.0	9378780	21	4.0	9378780
Conductivity	umho/cm	220	1.0	9374368				79	1.0	9374368
Total Dissolved Solids	mg/L	130	10	9378955				55	10	9378955
Total Kjeldahl Nitrogen (TKN)	mg/L	0.28	0.10	9378796				0.37	0.10	9378796
pH	pH	7.79		9374369				7.36		9374369
Phenols-4AAP	mg/L	ND	0.0010	9376307				ND	0.0010	9376307
Total Phosphorus	mg/L	ND	0.020	9378607				ND	0.020	9378607
Total Suspended Solids	mg/L	ND	10	9375191				ND	10	9375191
Dissolved Sulphate (SO ₄)	mg/L	16	1.0	9374381				8.1	1.0	9377510
Alkalinity (Total as CaCO ₃)	mg/L	73	1.0	9374367				28	1.0	9374367
Dissolved Chloride (Cl ⁻)	mg/L	16	1.0	9374380				2.9	1.0	9377496
Nitrite (N)	mg/L	ND	0.010	9374398				ND	0.010	9374398
Nitrate (N)	mg/L	ND	0.10	9374398				ND	0.10	9374398
Nitrate + Nitrite (N)	mg/L	ND	0.10	9374398				ND	0.10	9374398

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.
N/A = Not Applicable



ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		ZBM036	ZBM037	ZBM038		ZBM039	ZBM040	ZBM041		
Sampling Date		2024/05/01 11:35	2024/05/01 12:45	2024/05/01 13:55		2024/05/01 10:15	2024/05/01 11:00	2024/05/01 10:15		
COC Number		880145	880145	880145		880145	880145	880145		
	UNITS	MG-SW1	MG-SW2	MG-SW3	QC Batch	MG-SW4A	MG-SW6	MG-QAQC-SW1	RDL	QC Batch
Metals										
Dissolved (0.2u) Aluminum (Al)	ug/L	32	6	ND	9375514	60	5	60	5	9375525
Total Barium (Ba)	ug/L	28	17	35	9377389	12	14	12	2.0	9377389
Total Boron (B)	ug/L	ND	11	140	9377389	ND	26	ND	10	9377389
Total Cadmium (Cd)	ug/L	ND	ND	ND	9377389	ND	ND	ND	0.090	9377389
Total Calcium (Ca)	ug/L	48000	22000	45000	9377389	10000	31000	11000	200	9377389
Total Cobalt (Co)	ug/L	ND	ND	ND	9377389	ND	ND	ND	0.50	9377389
Total Copper (Cu)	ug/L	1.6	ND	ND	9377389	ND	ND	ND	0.90	9377389
Total Iron (Fe)	ug/L	190	210	140	9377389	230	ND	230	100	9377389
Total Lead (Pb)	ug/L	ND	ND	ND	9377389	ND	ND	ND	0.50	9377389
Total Magnesium (Mg)	ug/L	2000	2800	6800	9377389	1500	3000	1500	50	9377389
Total Manganese (Mn)	ug/L	17	46	55	9377389	9.6	3.5	9.6	2.0	9377389
Total Potassium (K)	ug/L	1200	1300	5100	9377389	930	1300	950	200	9377389
Total Sodium (Na)	ug/L	19000	15000	16000	9377389	3200	9400	3100	100	9377389
Total Zinc (Zn)	ug/L	ND	ND	ND	9377389	ND	ND	ND	5.0	9377389
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 #: C4D2266

Report Date: 2024/05/17

BluMetric Environmental Inc

Client Project #: 240205-07

Site Location: Musclow Greenview

Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: ZBM036
Sample ID: MG-SW1
Matrix: Water

Collected: 2024/05/01
Shipped:
Received: 2024/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	9375514	N/A	2024/05/07	Prempal Bhatti
Alkalinity	AT	9374462	N/A	2024/05/11	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9374373	2024/05/04	2024/05/09	Nusrat Naz
Chloride by Automated Colourimetry	SKAL	9374387	N/A	2024/05/09	Massarat Jan
Chemical Oxygen Demand	SPEC	9378780	N/A	2024/05/09	Neil Dassanayake
Conductivity	AT	9374464	N/A	2024/05/11	Nachiketa Gohil
Hardness (calculated as CaCO3)		9372985	N/A	2024/05/08	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	9377389	2024/05/07	2024/05/07	Indira HarryPaul
Total Ammonia-N	LACH/NH4	9377600	N/A	2024/05/10	Yogesh Patel
Nitrate & Nitrite as Nitrogen in Water	LACH	9374398	N/A	2024/05/08	Jinal Chavda
pH	AT	9374465	2024/05/04	2024/05/10	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9378103	N/A	2024/05/07	Chandra Nandlal
Field Measured pH	PH	ONSITE	N/A	2024/05/03	Jimmy Liu
Sulphate by Automated Turbidimetry	SKAL	9374390	N/A	2024/05/09	Massarat Jan
Total Dissolved Solids	BAL	9378955	2024/05/08	2024/05/09	Madhav Somani
Field Measured pH	PH	ONSITE	N/A	2024/05/03	Jimmy Liu
Total Kjeldahl Nitrogen in Water	SKAL	9378796	2024/05/07	2024/05/08	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9378607	2024/05/07	2024/05/09	Sachi Patel
Total Suspended Solids	BAL	9375191	2024/05/06	2024/05/07	Razieh Tabesh
Un-ionized Ammonia	CALC/NH3	9372143	2024/05/10	2024/05/10	Automated Statchk

Bureau Veritas ID: ZBM036 Dup
Sample ID: MG-SW1
Matrix: Water

Collected: 2024/05/01
Shipped:
Received: 2024/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9374462	N/A	2024/05/11	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9374373	2024/05/04	2024/05/09	Nusrat Naz
Conductivity	AT	9374464	N/A	2024/05/11	Nachiketa Gohil
pH	AT	9374465	2024/05/04	2024/05/10	Nachiketa Gohil
Total Kjeldahl Nitrogen in Water	SKAL	9378796	2024/05/07	2024/05/08	Rajni Tyagi

Bureau Veritas ID: ZBM037
Sample ID: MG-SW2
Matrix: Water

Collected: 2024/05/01
Shipped:
Received: 2024/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	9375514	N/A	2024/05/07	Prempal Bhatti
Alkalinity	AT	9374367	N/A	2024/05/05	Surinder Rai
Biochemical Oxygen Demand (BOD)	DO	9374373	2024/05/04	2024/05/09	Nusrat Naz
Chloride by Automated Colourimetry	SKAL	9377496	N/A	2024/05/10	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9378780	N/A	2024/05/09	Neil Dassanayake
Conductivity	AT	9374368	N/A	2024/05/05	Surinder Rai
Hardness (calculated as CaCO3)		9372985	N/A	2024/05/08	Automated Statchk



Bureau Veritas Job #: C4D2266
Report Date: 2024/05/17

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: ZBM037
Sample ID: MG-SW2
Matrix: Water

Collected: 2024/05/01
Shipped:
Received: 2024/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals Analysis by ICPMS	ICP/MS	9377389	2024/05/07	2024/05/07	Indira HarryPaul
Total Ammonia-N	LACH/NH4	9377600	N/A	2024/05/10	Yogesh Patel
Nitrate & Nitrite as Nitrogen in Water	LACH	9374398	N/A	2024/05/08	Jinal Chavda
pH	AT	9374369	2024/05/04	2024/05/05	Surinder Rai
Phenols (4AAP)	TECH/PHEN	9378103	N/A	2024/05/07	Chandra Nandlal
Field Measured pH	PH	ONSITE	N/A	2024/05/03	Jimmy Liu
Sulphate by Automated Turbidimetry	SKAL	9377510	N/A	2024/05/10	Alina Dobreanu
Total Dissolved Solids	BAL	9378955	2024/05/08	2024/05/09	Madhav Somani
Field Measured pH	PH	ONSITE	N/A	2024/05/03	Jimmy Liu
Total Kjeldahl Nitrogen in Water	SKAL	9378796	2024/05/07	2024/05/08	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9378607	2024/05/07	2024/05/09	Sachi Patel
Total Suspended Solids	BAL	9375191	2024/05/06	2024/05/07	Razieh Tabesh
Un-ionized Ammonia	CALC/NH3	9372143	2024/05/10	2024/05/10	Automated Statchk

Bureau Veritas ID: ZBM038
Sample ID: MG-SW3
Matrix: Water

Collected: 2024/05/01
Shipped:
Received: 2024/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	9375514	N/A	2024/05/07	Prempal Bhatti
Alkalinity	AT	9374367	N/A	2024/05/05	Surinder Rai
Biochemical Oxygen Demand (BOD)	DO	9374373	2024/05/04	2024/05/09	Nusrat Naz
Chloride by Automated Colourimetry	SKAL	9377496	N/A	2024/05/10	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9378780	N/A	2024/05/09	Neil Dassanayake
Conductivity	AT	9374368	N/A	2024/05/05	Surinder Rai
Hardness (calculated as CaCO3)		9372985	N/A	2024/05/09	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	9377389	2024/05/07	2024/05/07	Indira HarryPaul
Total Ammonia-N	LACH/NH4	9377600	N/A	2024/05/10	Yogesh Patel
Nitrate & Nitrite as Nitrogen in Water	LACH	9374398	N/A	2024/05/08	Jinal Chavda
pH	AT	9374369	2024/05/04	2024/05/05	Surinder Rai
Phenols (4AAP)	TECH/PHEN	9378103	N/A	2024/05/07	Chandra Nandlal
Field Measured pH	PH	ONSITE	N/A	2024/05/03	Jimmy Liu
Sulphate by Automated Turbidimetry	SKAL	9377510	N/A	2024/05/10	Alina Dobreanu
48-h Daphnia Magna Single Concentration		9385613	N/A		Christine Gripton
96-h Rainbow Trout Single Concentration		9385614	N/A		Christine Gripton
Total Dissolved Solids	BAL	9378955	2024/05/08	2024/05/09	Madhav Somani
Field Measured pH	PH	ONSITE	N/A	2024/05/03	Jimmy Liu
Total Kjeldahl Nitrogen in Water	SKAL	9378796	2024/05/07	2024/05/08	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9378607	2024/05/07	2024/05/09	Sachi Patel
Total Suspended Solids	BAL	9375191	2024/05/06	2024/05/07	Razieh Tabesh
Un-ionized Ammonia	CALC/NH3	9372143	2024/05/10	2024/05/10	Automated Statchk



Bureau Veritas Job #: C4D2266
Report Date: 2024/05/17

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: ZBM039
Sample ID: MG-SW4A
Matrix: Water

Collected: 2024/05/01
Shipped:
Received: 2024/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	9375525	N/A	2024/05/07	Indira HarryPaul
Alkalinity	AT	9374462	N/A	2024/05/11	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9374373	2024/05/04	2024/05/09	Nusrat Naz
Chloride by Automated Colourimetry	SKAL	9374380	N/A	2024/05/07	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9378474	N/A	2024/05/09	Neil Dassanayake
Conductivity	AT	9374464	N/A	2024/05/11	Nachiketa Gohil
Hardness (calculated as CaCO3)		9372985	N/A	2024/05/08	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	9377389	2024/05/07	2024/05/07	Indira HarryPaul
Total Ammonia-N	LACH/NH4	9377600	N/A	2024/05/10	Yogesh Patel
Nitrate & Nitrite as Nitrogen in Water	LACH	9374398	N/A	2024/05/08	Jinal Chavda
pH	AT	9374465	2024/05/04	2024/05/10	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9378928	N/A	2024/05/07	Chandra Nandlal
Field Measured pH	PH	ONSITE	N/A	2024/05/03	Jimmy Liu
Sulphate by Automated Turbidimetry	SKAL	9374381	N/A	2024/05/07	Alina Dobreanu
Total Dissolved Solids	BAL	9378955	2024/05/08	2024/05/09	Madhav Somani
Field Measured pH	PH	ONSITE	N/A	2024/05/03	Jimmy Liu
Total Kjeldahl Nitrogen in Water	SKAL	9377949	2024/05/07	2024/05/09	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9377651	2024/05/07	2024/05/08	Muskan
Total Suspended Solids	BAL	9375191	2024/05/06	2024/05/07	Razieh Tabesh
Un-ionized Ammonia	CALC/NH3	9372143	2024/05/10	2024/05/10	Automated Statchk

Bureau Veritas ID: ZBM039 Dup
Sample ID: MG-SW4A
Matrix: Water

Collected: 2024/05/01
Shipped:
Received: 2024/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chemical Oxygen Demand	SPEC	9378474	N/A	2024/05/09	Neil Dassanayake

Bureau Veritas ID: ZBM040
Sample ID: MG-SW6
Matrix: Water

Collected: 2024/05/01
Shipped:
Received: 2024/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	9375525	N/A	2024/05/07	Indira HarryPaul
Alkalinity	AT	9374367	N/A	2024/05/05	Surinder Rai
Biochemical Oxygen Demand (BOD)	DO	9374373	2024/05/04	2024/05/09	Nusrat Naz
Chloride by Automated Colourimetry	SKAL	9374380	N/A	2024/05/07	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9378780	N/A	2024/05/09	Neil Dassanayake
Conductivity	AT	9374368	N/A	2024/05/05	Surinder Rai
Hardness (calculated as CaCO3)		9372985	N/A	2024/05/08	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	9377389	2024/05/07	2024/05/07	Indira HarryPaul
Total Ammonia-N	LACH/NH4	9377600	N/A	2024/05/10	Yogesh Patel
Nitrate & Nitrite as Nitrogen in Water	LACH	9374398	N/A	2024/05/08	Jinal Chavda
pH	AT	9374369	2024/05/04	2024/05/05	Surinder Rai



Bureau Veritas Job #: C4D2266
Report Date: 2024/05/17

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: ZBM040
Sample ID: MG-SW6
Matrix: Water

Collected: 2024/05/01
Shipped:
Received: 2024/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	9376307	N/A	2024/05/06	Chandra Nandlal
Field Measured pH	PH	ONSITE	N/A	2024/05/03	Jimmy Liu
Sulphate by Automated Turbidimetry	SKAL	9374381	N/A	2024/05/07	Alina Dobreanu
Total Dissolved Solids	BAL	9378955	2024/05/08	2024/05/09	Madhav Somani
Field Measured pH	PH	ONSITE	N/A	2024/05/03	Jimmy Liu
Total Kjeldahl Nitrogen in Water	SKAL	9378796	2024/05/07	2024/05/08	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9378607	2024/05/07	2024/05/09	Sachi Patel
Total Suspended Solids	BAL	9375191	2024/05/06	2024/05/07	Razieh Tabesh
Un-ionized Ammonia	CALC/NH3	9372143	2024/05/10	2024/05/10	Automated Statchk

Bureau Veritas ID: ZBM040 Dup
Sample ID: MG-SW6
Matrix: Water

Collected: 2024/05/01
Shipped:
Received: 2024/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chemical Oxygen Demand	SPEC	9378780	N/A	2024/05/09	Neil Dassanayake

Bureau Veritas ID: ZBM041
Sample ID: MG-QAQC-SW1
Matrix: Water

Collected: 2024/05/01
Shipped:
Received: 2024/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	9375525	N/A	2024/05/07	Indira HarryPaul
Alkalinity	AT	9374367	N/A	2024/05/05	Surinder Rai
Biochemical Oxygen Demand (BOD)	DO	9374373	2024/05/04	2024/05/09	Nusrat Naz
Chloride by Automated Colourimetry	SKAL	9377496	N/A	2024/05/10	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9378780	N/A	2024/05/09	Neil Dassanayake
Conductivity	AT	9374368	N/A	2024/05/05	Surinder Rai
Hardness (calculated as CaCO3)		9372985	N/A	2024/05/09	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	9377389	2024/05/07	2024/05/07	Indira HarryPaul
Total Ammonia-N	LACH/NH4	9377600	N/A	2024/05/10	Yogesh Patel
Nitrate & Nitrite as Nitrogen in Water	LACH	9374398	N/A	2024/05/08	Jinal Chavda
pH	AT	9374369	2024/05/04	2024/05/05	Surinder Rai
Phenols (4AAP)	TECH/PHEN	9376307	N/A	2024/05/06	Chandra Nandlal
Field Measured pH	PH	ONSITE	N/A	2024/05/03	Jimmy Liu
Sulphate by Automated Turbidimetry	SKAL	9377510	N/A	2024/05/10	Alina Dobreanu
Total Dissolved Solids	BAL	9378955	2024/05/08	2024/05/09	Madhav Somani
Field Measured pH	PH	ONSITE	N/A	2024/05/03	Jimmy Liu
Total Kjeldahl Nitrogen in Water	SKAL	9378796	2024/05/07	2024/05/08	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9378607	2024/05/07	2024/05/09	Sachi Patel
Total Suspended Solids	BAL	9375191	2024/05/06	2024/05/07	Razieh Tabesh
Un-ionized Ammonia	CALC/NH3	9372143	2024/05/10	2024/05/10	Automated Statchk



Bureau Veritas Job #: C4D2266
Report Date: 2024/05/17

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

GENERAL COMMENTS

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

Package 1	4.7°C
Package 2	18.0°C

Results relate only to the items tested.

BUREAU
VERITAS

Bureau Veritas Job #: C4D2266

Report Date: 2024/05/17

QUALITY ASSURANCE REPORT

BluMetric Environmental Inc

Client Project #: 240205-07

Site Location: Musclove Greenview

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
9374367	Alkalinity (Total as CaCO ₃)	2024/05/05			101	85 - 115	ND, RDL=1.0	mg/L	1.8	20		
9374368	Conductivity	2024/05/05			102	85 - 115	ND, RDL=1.0	umho/cm	0	10		
9374369	pH	2024/05/05			102	98 - 103			0.98	N/A		
9374373	Total BOD	2024/05/09					ND, RDL=2	mg/L	NC	30	100	80 - 120
9374380	Dissolved Chloride (Cl ⁻)	2024/05/07	NC	80 - 120	99	80 - 120	ND, RDL=1.0	mg/L	0.77	20		
9374381	Dissolved Sulphate (SO ₄)	2024/05/07	NC	75 - 125	96	80 - 120	ND, RDL=1.0	mg/L	0.53	20		
9374387	Dissolved Chloride (Cl ⁻)	2024/05/09	NC	80 - 120	102	80 - 120	ND, RDL=1.0	mg/L	0.017	20		
9374390	Dissolved Sulphate (SO ₄)	2024/05/09	NC	75 - 125	101	80 - 120	ND, RDL=1.0	mg/L	0.62	20		
9374398	Nitrate (N)	2024/05/08	99	80 - 120	102	80 - 120	ND, RDL=0.10	mg/L	NC	20		
9374398	Nitrite (N)	2024/05/08	102	80 - 120	103	80 - 120	ND, RDL=0.010	mg/L	3.0	20		
9374462	Alkalinity (Total as CaCO ₃)	2024/05/11			100	85 - 115	ND, RDL=1.0	mg/L	4.2	20		
9374464	Conductivity	2024/05/11			101	85 - 115	ND, RDL=1.0	umho/cm	1.1	10		
9374465	pH	2024/05/10			102	98 - 103			0.24	N/A		
9375191	Total Suspended Solids	2024/05/07			99	80 - 120	ND, RDL=10	mg/L	0	20		
9375514	Dissolved (0.2u) Aluminum (Al)	2024/05/07	102	80 - 120	99	80 - 120	ND, RDL=5	ug/L	NC	20		
9375525	Dissolved (0.2u) Aluminum (Al)	2024/05/07	98	80 - 120	95	80 - 120	ND, RDL=5	ug/L	1.1	20		
9376307	Phenols-4AAP	2024/05/06	98	80 - 120	99	80 - 120	ND, RDL=0.0010	mg/L	NC	20		
9377389	Total Barium (Ba)	2024/05/07	96	80 - 120	100	80 - 120	ND, RDL=2.0	ug/L				
9377389	Total Boron (B)	2024/05/07	97	80 - 120	100	80 - 120	ND, RDL=10	ug/L				
9377389	Total Cadmium (Cd)	2024/05/07	97	80 - 120	99	80 - 120	ND, RDL=0.090	ug/L				
9377389	Total Calcium (Ca)	2024/05/07	NC	80 - 120	103	80 - 120	ND, RDL=200	ug/L				
9377389	Total Cobalt (Co)	2024/05/07	100	80 - 120	102	80 - 120	ND, RDL=0.50	ug/L				
9377389	Total Copper (Cu)	2024/05/07	102	80 - 120	101	80 - 120	ND, RDL=0.90	ug/L				
9377389	Total Iron (Fe)	2024/05/07	100	80 - 120	101	80 - 120	ND, RDL=100	ug/L				
9377389	Total Lead (Pb)	2024/05/07	98	80 - 120	100	80 - 120	ND, RDL=0.50	ug/L				
9377389	Total Magnesium (Mg)	2024/05/07	95	80 - 120	100	80 - 120	ND, RDL=50	ug/L				
9377389	Total Manganese (Mn)	2024/05/07	93	80 - 120	94	80 - 120	ND, RDL=2.0	ug/L				



Bureau Veritas Job #: C4D2266
Report Date: 2024/05/17

QUALITY ASSURANCE REPORT(CONT'D)

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclove Greenview
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
9377389	Total Potassium (K)	2024/05/07	96	80 - 120	102	80 - 120	ND, RDL=200	ug/L				
9377389	Total Sodium (Na)	2024/05/07	100	80 - 120	103	80 - 120	ND, RDL=100	ug/L				
9377389	Total Zinc (Zn)	2024/05/07	101	80 - 120	103	80 - 120	ND, RDL=5.0	ug/L				
9377496	Dissolved Chloride (Cl-)	2024/05/10	NC	80 - 120	97	80 - 120	ND, RDL=1.0	mg/L	0.67	20		
9377510	Dissolved Sulphate (SO4)	2024/05/10	NC	75 - 125	96	80 - 120	ND, RDL=1.0	mg/L	0.36	20		
9377600	Total Ammonia-N	2024/05/10	106	75 - 125	102	80 - 120	ND, RDL=0.050	mg/L	1.9	20		
9377651	Total Phosphorus	2024/05/08	98	80 - 120	98	80 - 120	ND, RDL=0.020	mg/L	0.22	20	99	80 - 120
9377949	Total Kjeldahl Nitrogen (TKN)	2024/05/08	NC	80 - 120	101	80 - 120	ND, RDL=0.10	mg/L	3.0	20	108	80 - 120
9378103	Phenols-4AAP	2024/05/07	104	80 - 120	104	80 - 120	ND, RDL=0.0010	mg/L	NC	20		
9378474	Total Chemical Oxygen Demand (COD)	2024/05/09	99	80 - 120	99	80 - 120	ND, RDL=4.0	mg/L	1.2	20		
9378607	Total Phosphorus	2024/05/09	90	80 - 120	99	80 - 120	ND, RDL=0.020	mg/L	2.7	20	93	80 - 120
9378780	Total Chemical Oxygen Demand (COD)	2024/05/09	102	80 - 120	99	80 - 120	ND, RDL=4.0	mg/L	0	20		
9378796	Total Kjeldahl Nitrogen (TKN)	2024/05/08	105	80 - 120	106	80 - 120	ND, RDL=0.10	mg/L	0	20	106	80 - 120
9378928	Phenols-4AAP	2024/05/07	104	80 - 120	105	80 - 120	ND, RDL=0.0010	mg/L	NC	20		
9378955	Total Dissolved Solids	2024/05/09			93	80 - 120	ND, RDL=10	mg/L	2.7	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 $\leq 2 \times \text{RDL}$).



BUREAU
VERITAS

Bureau Veritas Job #: C4D2266

Report Date: 2024/05/17

BluMetric Environmental Inc

Client Project #: 240205-07

Site Location: Musclow Greenview

Sampler Initials: BM

VALIDATION SIGNATURE PAGE

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

Christine Gripton, Senior Project Manager

Cristina Carriere, Senior 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



T880145

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: MG-SW1
Last Sample: MG-QAQC-SW1
Sample Count: 6

Relinquished By				Received By			
Brad M'Callum	Brad M'Callum	Date	2024/05/02			Date	6/12/2024
		Time (24 HR)	09:30			Time (24 HR)	
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:	Rush ☐	Immediate Test ☐
Brad M'Callum / Matthew DeGeev	2	Micro ☐	Food Residue ☐
			Food Chemistry ☐

*** LABORATORY USE ONLY ***						
Received At	Lab Comments:	Custody Seal		Cooling Media		Temperature °C
		Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2
Labeled By	03-May-24 10:17	✓	✓	✓	✓	✓
Verified By	Christine Gripton	✓	✓	✓	18	18
	C4D2266					
	J_L ENV-1317					
		Drinking Water Metals Preservation Check Done (Circle)				YES NO

COR FCD-00383/4

Page 1 of 1

Work Order : 254665

Sample Number : 82256

SAMPLE IDENTIFICATION

Company :	Bureau Veritas Laboratories		
Location :	Mississauga ON	Sampling Date :	2024-05-01
Job Number :	C4D2266	Sampling Time :	13:55
Substance :	MG-SW3	Date Received :	2024-05-03
Sampling Method :	Not provided	Time Received :	14:35
Sampled By :	B. McCallum	Temperature at Receipt :	15 °C
Sample Description :	Clear, yellow, settled solids	Date Tested :	2024-05-04
Test Method :	Reference Method for Determining Acute Lethality of Effluents to <i>Daphnia magna</i> . Environment Canada EPS 1/RM/14 (Second Edition, December 2000, with February 2016 amendments).		

48-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Immobility	0.0 %
	Mean Mortality	0.0 %
100%	Mean Immobility	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Species :	<i>Daphnia magna</i>	Time to First Brood :	8.0 days
Organism Batch :	Dm24-08	Average Brood Size :	32.9
Culture Mortality :	1.0% (previous 7 days)		

TEST CONDITIONS

Sample Treatment :	None	Number of Replicates :	3
pH Adjustment :	None	Organisms per Replicate :	10
Pre-aeration Rate :	~30 mL/min/L	Organisms per Test Level :	30
Duration of Pre-Aeration :	0 minutes	Organism Loading Rate :	15.0 mL/organism
Test Aeration :	None	Impaired Control Organisms :	0.0%
Hardness Adjustment :	None	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Sodium Chloride		
Date Tested :	2024-05-07	LC50 :	6.6 g/L
Organism Batch :	Dm24-08	95% Confidence Limits :	6.3 - 6.9 g/L
Analyst(s) :	AA, GR	Historical Mean LC50 :	6.3 g/L
Statistical Method :	Spearman-Kärber	Warning Limits (± 2SD) :	5.9 - 6.7 g/L

COMMENTS

- All test validity criteria as specified in the test method were satisfied.

Approved By :

Project Manager

Work Order : 254665

Sample Number : 82256

TEST DATA

	pH	Dissolved O ₂ (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O ₂ Saturation (%)*	Hardness (as CaCO ₃)
Initial Chemistry (100%) :	7.6	7.5	355	21	87	160 mg/L

0 HOURS

Date & Time : 2024-05-04 11:05

Analyst(s) : JW

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O ₂	Conductivity	Temperature	O ₂ Saturation*	Hardness
100	A	0	0	7.6	7.5	355	21	87	160
100	B	0	0	7.6	7.5	355	21	87	160
100	C	0	0	7.6	7.5	355	21	87	160
Control	A	0	0	8.3	8.5	465	22	100	150
Control	B	0	0	8.3	8.5	465	22	100	150
Control	C	0	0	8.3	8.5	465	22	100	150

Notes: Indigenous organisms were removed by pipette from the 100% concentration prior to test initiation.

24 HOURS

Date & Time : 2024-05-05 11:00

Analyst(s) : JW

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O ₂	Conductivity	Temperature
100	A	—	0	—	—	—	20
100	B	—	0	—	—	—	20
100	C	—	0	—	—	—	20
Control	A	—	0	—	—	—	20
Control	B	—	0	—	—	—	20
Control	C	—	0	—	—	—	20

Notes:

48 HOURS

Date & Time : 2024-05-06 11:30

Analyst(s) : SV

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O ₂	Conductivity	Temperature
100	A	0	0	8.4	8.5	361	21
100	B	0	0	8.4	8.5	357	21
100	C	0	0	8.4	8.5	362	21
Control	A	0	0	8.4	8.6	490	21
Control	B	0	0	8.4	8.6	491	21
Control	C	0	0	8.3	8.5	486	21

Notes:

Number immobile does not include number dead.

"—" = not measured/not required

* adjusted for temperature and barometric pressure

Test Data Reviewed By : JL

Date : 2024-05-14

Work Order : 254665

Sample Number : 82256

SAMPLE IDENTIFICATION

Company :	Bureau Veritas Laboratories		
Location :	Mississauga ON	Sampling Date :	2024-05-01
Job Number :	C4D2266	Sampling Time :	13:55
Substance :	MG-SW3	Date Received :	2024-05-03
Sampling Method :	Not provided	Time Received :	14:35
Sampled By :	B. McCallum	Temperature at Receipt :	15 °C
Sample Description :	Clear, yellow, settled solids	Date Tested :	2024-05-04
Test Method(s) :	Reference Method for Determining Acute Lethality of Liquid Effluents to Rainbow Trout. Environment Canada, EPS 1/RM/13 (2nd Edition, December 2000, with May 2007, February 2016, and December 2023 amendments).		

96-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Impairment	0.0 %
	Mean Mortality	0.0 %
100%	Mean Impairment	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Test Organism :	<i>Oncorhynchus mykiss</i>	Mean Fork Length :	36.7 mm
Organism Batch :	T24-08	Range of Fork Lengths :	34 - 40 mm
Control Sample Size :	9 ¹	Mean Wet Weight :	0.4 g
Cumulative stock mortality rate :	0.3% (previous 7 days)	Organism Loading Rate :	0.3 g/L
Control organisms showing stress :	0 (at test completion)		

¹Nine test organisms observed in the Control exposure on 2024-05-06 (refer to page 2)

TEST CONDITIONS

Test Type :	Single concentration	Number of Replicates :	1
Sample pH Adjustment :	None	Organisms Per Replicate :	10
Sample Pre-aeration/Aeration Rate :	6.5 ± 1 mL/min/L	Organisms Per Test Level :	10
Duration of Sample Pre-Aeration :	30 minutes	Volume of Sample :	17 L
Control Pre-aeration/Aeration Rate :	6.5 ± 1 mL/L/min	Volume of Control :	17 L
Duration of Control Pre-aeration:	30 minutes	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Potassium Chloride		
Organism Batch :	T24-08	LC50 :	3661 mg/L
Date Tested :	2024-05-01	95% Confidence Limits :	3264 - 4089 mg/L
Analyst(s) :	AJS, FM, PC	Historical Mean LC50 :	4334 mg/L
Statistical Method :	Linear Regression (MLE)	Warning Limits (± 2SD) :	3413 - 5504 mg/L

COMMENTS

•All test validity criteria as specified in the test method were satisfied.

¹NOTE: On 2024-05-06, at the 48-hour observation period, nine test organisms were observed in the Control exposure. It was confirmed that 10 organisms had been added at test initiation. It is likely that the missing test organism jumped out of the test chamber between the 24-hour and the 48-hour observation periods. Since all validity criteria were satisfied, this test is considered to be valid.

 Approved By : _____
 Project Manager

Work Order : 254665

Sample Number : 82256

TEST DATA

	pH	Dissolved O ₂ (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O ₂ Saturation (%) ³
Initial Water Chemistry (100%) :	7.7	7.9	353	15	82
After 30 min pre-aeration :	7.8	8.2	345	16	86

0 HOURS

Date & Time	2024-05-04	9:15					
Analyst(s) :	PC						
Concentration	Dead	Impaired	pH	Dissolved O ₂	Conductivity	Temperature	O ₂ Saturation ³
100%	0	0	7.8	8.2	345	16	86
Control	0	0	8.3	9.7	767	14	99

Notes:

24 HOURS

Date & Time	2024-05-05	8:15					
Analyst(s) :	PC						
Concentration	Dead	Impaired	pH	Dissolved O ₂	Conductivity	Temperature	
100%	0	0	—	—	—	15	
Control	0	0	—	—	—	15	

Notes:

48 HOURS

Date & Time	2024-05-06	8:20					
Analyst(s) :	FM (PG)						
Concentration	Dead	Impaired	pH	Dissolved O ₂	Conductivity	Temperature	
100%	0	0	—	—	—	15	
Control	0 ¹	0	—	—	—	15	

Notes: ¹Nine test organisms observed in the Control exposure.

72 HOURS

Date & Time	2024-05-07	8:20					
Analyst(s) :	FM (SV)						
Concentration	Dead	Impaired	pH	Dissolved O ₂	Conductivity	Temperature	
100%	0	0	—	—	—	15	
Control	0 ¹	0	—	—	—	15	

Notes: ¹Nine test organisms observed in the Control exposure.

96 HOURS

Date & Time	2024-05-08	8:30					
Analyst(s) :	AJS						
Concentration	Dead	Impaired	pH	Dissolved O ₂	Conductivity	Temperature	
100%	0	0	8.2	9.3	357	15	
Control	0 ¹	0	8.3	9.4	744	15	

Notes: ¹Nine test organisms observed in the Control exposure.

"—" = not measured/not required

Number impaired does not include number dead.

³ adjusted for temperature and barometric pressure

Test Data Reviewed By : JL

Date : 2024-05-14



CHAIN OF CUSTODY RECORD

Nautilus Work Order No:

254665

Shipping Address: Nautilus Environmental Guelph.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412

Fax: (519) 763-4419

P.O. Number:	C4D2266
Field Sampler Name (print):	Blumetric - Brad McCallum
Signature:	
Affiliation:	
Sample Storage (prior to shipping):	
Custody Relinquished by:	
Date/Time Shipped:	

Client:	Bureau Veritas 6740 Campobello Rd, Mississauga, ON
Phone:	(905) 817-5700
Fax:	
Contact:	Christine Gripton christine.gripton@bureauveritas.com

Sample Identification					Analyses Requested										Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name	Nautilus Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	Daphnia magna Single Concentration	Daphnia magna LC50	Fathead Minnow Survival & Growth	Ceriodaphnia dubia Survival & Reproduction	Lemna minor Growth	Pseudokirchneriella subcapitata Growth	RISS Data Entry	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2024-05-01	13:55	MG-SW3	82256	15	✓		✓										1 x 20L

For Lab Use Only

Received By:

SV

Date:

14-2024-05-03

Time:

14:35

Storage Location:

Storage Temp.(°C)

Please list any special requests or instructions:



Your Project #: 240205-07
Site Location: Musclow Greenview
Your C.O.C. #: 971313

Attention: MHH Distribution

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

Report Date: 2024/11/08
Report #: R8397299
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4Y5029

Received: 2024/11/01, 10:02

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Dissolved Aluminum (0.2 u, clay free)	5	N/A	2024/11/06	CAM SOP-00447	EPA 6020B m
Alkalinity	4	N/A	2024/11/07	CAM SOP-00448	SM 24 2320 B m
Alkalinity	1	N/A	2024/11/08	CAM SOP-00448	SM 24 2320 B m
Biochemical Oxygen Demand (BOD)	5	2024/11/02	2024/11/07	CAM SOP-00427	SM 24 5210B m
Chloride by Automated Colourimetry	5	N/A	2024/11/08	CAM SOP-00463	SM 24 4500-Cl E m
Chemical Oxygen Demand	5	N/A	2024/11/05	CAM SOP-00416	SM 24 5220 D m
Conductivity	4	N/A	2024/11/07	CAM SOP-00414	SM 24 2510 m
Conductivity	1	N/A	2024/11/08	CAM SOP-00414	SM 24 2510 m
Hardness (calculated as CaCO3)	5	N/A	2024/11/08	CAM SOP 00102/00408/00447	SM 2340 B
Total Metals Analysis by ICPMS	2	2024/11/05	2024/11/06	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS	3	2024/11/05	2024/11/07	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	5	N/A	2024/11/06	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (1)	5	N/A	2024/11/05	CAM SOP-00440	SM 24 4500-NO3I/NO2B
pH (2)	4	2024/11/04	2024/11/07	CAM SOP-00413	SM 24th - 4500H+ B
pH (2)	1	2024/11/04	2024/11/08	CAM SOP-00413	SM 24th - 4500H+ B
Phenols (4AAP)	5	N/A	2024/11/08	CAM SOP-00444	OMOE E3179 m
Field Measured pH (3)	5	N/A	2024/11/01		Field pH Meter
Sulphate by Automated Turbidimetry	5	N/A	2024/11/08	CAM SOP-00464	SM 24 4500-SO42- E m
Total Dissolved Solids	5	2024/11/02	2024/11/04	CAM SOP-00428	SM 24 2540C m
Field Temperature (3)	5	N/A	2024/11/01		Field Thermometer
Total Kjeldahl Nitrogen in Water	5	2024/11/04	2024/11/05	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	5	2024/11/05	2024/11/06	CAM SOP-00407	SM 24 4500-P I
Total Suspended Solids	5	2024/11/02	2024/11/05	CAM SOP-00428	SM 24 2540D m
Un-ionized Ammonia (4)	5	2024/11/01	2024/11/06	Auto Calc.	PWQO

Remarks:

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



Your Project #: 240205-07
Site Location: Musclow Greenview
Your C.O.C. #: 971313

Attention: MHH Distribution

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

Report Date: 2024/11/08
Report #: R8397299
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4Y5029

Received: 2024/11/01, 10:02

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

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

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

(2) "The CCME method and Analytical Protocol (O. Reg. 153/04, O. Reg. 406/19) requires pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME and Analytical Protocol (O. Reg. 153/04, O. Reg. 406/19) holding time. Bureau Veritas endeavors to analyze samples as soon as possible after receipt."

(3) This is a field test, therefore, the results relate to items that were not analysed at Bureau Veritas.

(4) Un-ionized ammonia is calculated using the total ammonia result and field data provided by the client for pH and temperature.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:

Elora Di Bratto, Project Manager

Email: Elora.Di-Bratto@bureauveritas.com

Phone# (905) 817-5700

=====

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



Bureau Veritas Job #: C4Y5029
Report Date: 2024/11/08

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		AHRL57			AHRL57			AHRL58		
Sampling Date		2024/10/30 11:12			2024/10/30 11:12			2024/10/30 13:20		
COC Number		971313			971313			971313		
	UNITS	MG-SW1	RDL	QC Batch	MG-SW1 Lab-Dup	RDL	QC Batch	MG-SW3	RDL	QC Batch
Calculated Parameters										
Hardness (CaCO ₃)	mg/L	300	1.0	9741392				580	1.0	9741392
Total Un-ionized Ammonia	mg/L	ND	0.00061	9739493				0.0011	0.00062	9739493
Field Measurements										
Field Temperature	Celsius	10.6	N/A	ONSITE				10.4	N/A	ONSITE
Field Measured pH	pH	7.13		ONSITE				7.73		ONSITE
Inorganics										
Total Ammonia-N	mg/L	0.11	0.050	9743376				0.089	0.050	9743376
Total BOD	mg/L	ND	2	9741638				ND	2	9741638
Total Chemical Oxygen Demand (COD)	mg/L	29	4.0	9743088	31	4.0	9743088	31	4.0	9743088
Conductivity	umho/cm	630	1.0	9743321				1300	1.0	9743948
Total Dissolved Solids	mg/L	385	10	9741972				775	10	9741972
Total Kjeldahl Nitrogen (TKN)	mg/L	0.44	0.10	9743670				0.55	0.10	9743670
pH	pH	7.70		9743323				8.17		9743949
Phenols-4AAP	mg/L	ND	0.0010	9753907				ND	0.0010	9753907
Total Phosphorus	mg/L	0.023	0.020	9746033				0.029	0.020	9746033
Total Suspended Solids	mg/L	ND	10	9742131				ND	10	9742131
Dissolved Sulphate (SO ₄)	mg/L	17	1.0	9743349				35	1.0	9744622
Alkalinity (Total as CaCO ₃)	mg/L	240	1.0	9743319				530	1.0	9743946
Dissolved Chloride (Cl ⁻)	mg/L	45	1.0	9743344				84	1.0	9744620
Nitrite (N)	mg/L	ND	0.010	9742896				ND	0.010	9743933
Nitrate (N)	mg/L	ND	0.10	9742896				ND	0.10	9743933
Nitrate + Nitrite (N)	mg/L	ND	0.10	9742896				ND	0.10	9743933
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. N/A = Not Applicable										



Bureau Veritas Job #: C4Y5029
Report Date: 2024/11/08

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		AHRL59			AHRL59			AHRL60		
Sampling Date		2024/10/30 10:10			2024/10/30 10:10			2024/10/30 10:41		
COC Number		971313			971313			971313		
	UNITS	MG-SW4A	RDL	QC Batch	MG-SW4A Lab-Dup	RDL	QC Batch	MG-SW6	RDL	QC Batch
Calculated Parameters										
Hardness (CaCO ₃)	mg/L	56	1.0	9741392				160	1.0	9741392
Total Un-ionized Ammonia	mg/L	ND	0.00061	9739493				ND	0.00079	9739493
Field Measurements										
Field Temperature	Celsius	7.8	N/A	ONSITE				10.0	N/A	ONSITE
Field Measured pH	pH	7.30		ONSITE				7.85		ONSITE
Inorganics										
Total Ammonia-N	mg/L	ND	0.050	9743376				ND	0.050	9743376
Total BOD	mg/L	ND	2	9741638				ND	2	9741638
Total Chemical Oxygen Demand (COD)	mg/L	12	4.0	9743088				38	4.0	9743088
Conductivity	umho/cm	120	1.0	9743321				370	1.0	9743321
Total Dissolved Solids	mg/L	110	10	9741972				270	10	9741972
Total Kjeldahl Nitrogen (TKN)	mg/L	0.21	0.10	9743670				0.36	0.10	9743670
pH	pH	7.70		9743323				7.66		9743323
Phenols-4AAP	mg/L	ND	0.0010	9753907				ND	0.0010	9753907
Total Phosphorus	mg/L	ND	0.020	9746033				0.14	0.020	9746033
Total Suspended Solids	mg/L	ND	10	9742131				21	10	9742131
Dissolved Sulphate (SO ₄)	mg/L	6.4	1.0	9744622	6.6	1.0	9744622	2.7	1.0	9744622
Alkalinity (Total as CaCO ₃)	mg/L	44	1.0	9743319				140	1.0	9743319
Dissolved Chloride (Cl ⁻)	mg/L	5.6	1.0	9744620	5.6	1.0	9744620	31	1.0	9744620
Nitrite (N)	mg/L	ND	0.010	9743299				ND	0.010	9743299
Nitrate (N)	mg/L	ND	0.10	9743299				ND	0.10	9743299
Nitrate + Nitrite (N)	mg/L	ND	0.10	9743299				ND	0.10	9743299
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. N/A = Not Applicable										



BUREAU
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Bureau Veritas Job #: C4Y5029

Report Date: 2024/11/08

BluMetric Environmental Inc

Client Project #: 240205-07

Site Location: Musclow Greenview

Sampler Initials: BM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		AHRL61		
Sampling Date		2024/10/30 10:10		
COC Number		971313		
	UNITS	MG-QAQC-SW1	RDL	QC Batch
Calculated Parameters				
Hardness (CaCO ₃)	mg/L	56	1.0	9741392
Total Un-ionized Ammonia	mg/L	ND	0.00061	9739493
Field Measurements				
Field Temperature	Celsius	7.8	N/A	ONSITE
Field Measured pH	pH	7.30		ONSITE
Inorganics				
Total Ammonia-N	mg/L	ND	0.050	9743376
Total BOD	mg/L	ND	2	9741638
Total Chemical Oxygen Demand (COD)	mg/L	7.2	4.0	9743088
Conductivity	umho/cm	120	1.0	9743321
Total Dissolved Solids	mg/L	120	10	9741972
Total Kjeldahl Nitrogen (TKN)	mg/L	0.20	0.10	9743670
pH	pH	7.68		9743323
Phenols-4AAP	mg/L	ND	0.0010	9753907
Total Phosphorus	mg/L	ND	0.020	9746033
Total Suspended Solids	mg/L	ND	10	9742131
Dissolved Sulphate (SO ₄)	mg/L	6.3	1.0	9743349
Alkalinity (Total as CaCO ₃)	mg/L	42	1.0	9743319
Dissolved Chloride (Cl ⁻)	mg/L	6.1	1.0	9743344
Nitrite (N)	mg/L	ND	0.010	9743299
Nitrate (N)	mg/L	ND	0.10	9743299
Nitrate + Nitrite (N)	mg/L	ND	0.10	9743299
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.				
N/A = Not Applicable				



BUREAU
VERITAS

Bureau Veritas Job #: C4Y5029

Report Date: 2024/11/08

BluMetric Environmental Inc

Client Project #: 240205-07

Site Location: Musclow Greenview

Sampler Initials: BM

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		AHRL57			AHRL57			AHRL58	AHRL59		
Sampling Date		2024/10/30 11:12			2024/10/30 11:12			2024/10/30 13:20	2024/10/30 10:10		
COC Number		971313			971313			971313	971313		
	UNITS	MG-SW1	RDL	QC Batch	MG-SW1 Lab-Dup	RDL	QC Batch	MG-SW3	MG-SW4A	RDL	QC Batch

Metals											
Dissolved (0.2u) Aluminum (Al)	ug/L	ND	5	9747792	ND	5	9747792	ND	49	5	9747792
Total Barium (Ba)	ug/L	64	2.0	9745296				120	14	2.0	9745296
Total Boron (B)	ug/L	ND	10	9745296				790	12	10	9745296
Total Cadmium (Cd)	ug/L	ND	0.090	9745296				ND	ND	0.090	9745296
Total Calcium (Ca)	ug/L	92000	200	9745296				140000	16000	200	9745296
Total Cobalt (Co)	ug/L	0.52	0.50	9745296				ND	ND	0.50	9745296
Total Copper (Cu)	ug/L	ND	0.90	9745296				ND	ND	0.90	9745296
Total Iron (Fe)	ug/L	2400	100	9745296				170	330	100	9745296
Total Lead (Pb)	ug/L	ND	0.50	9745296				ND	ND	0.50	9745296
Total Magnesium (Mg)	ug/L	4100	50	9745296				36000	2100	50	9745296
Total Manganese (Mn)	ug/L	2700	2.0	9745296				490	10	2.0	9745296
Total Potassium (K)	ug/L	2100	200	9745296				5100	1400	200	9745296
Total Sodium (Na)	ug/L	27000	100	9745296				76000	3600	100	9745296
Total Zinc (Zn)	ug/L	ND	5.0	9745296				7.9	ND	5.0	9745296

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 Job #: C4Y5029
Report Date: 2024/11/08

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		AHRL60	AHRL61		
Sampling Date		2024/10/30 10:41	2024/10/30 10:10		
COC Number		971313	971313		
	UNITS	MG-SW6	MG-QAQC-SW1	RDL	QC Batch
Metals					
Dissolved (0.2u) Aluminum (Al)	ug/L	ND	13	5	9747792
Total Barium (Ba)	ug/L	37	15	2.0	9745296
Total Boron (B)	ug/L	25	ND	10	9745296
Total Cadmium (Cd)	ug/L	ND	ND	0.090	9745296
Total Calcium (Ca)	ug/L	51000	16000	200	9745296
Total Cobalt (Co)	ug/L	ND	ND	0.50	9745296
Total Copper (Cu)	ug/L	ND	ND	0.90	9745296
Total Iron (Fe)	ug/L	290	350	100	9745296
Total Lead (Pb)	ug/L	ND	ND	0.50	9745296
Total Magnesium (Mg)	ug/L	5200	2200	50	9745296
Total Manganese (Mn)	ug/L	450	10	2.0	9745296
Total Potassium (K)	ug/L	4100	1400	200	9745296
Total Sodium (Na)	ug/L	14000	3800	100	9745296
Total Zinc (Zn)	ug/L	ND	ND	5.0	9745296
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 Job #: C4Y5029
Report Date: 2024/11/08

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: AHRL57
Sample ID: MG-SW1
Matrix: Water

Collected: 2024/10/30
Shipped:
Received: 2024/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	9747792	N/A	2024/11/06	Azita Fazaeli
Alkalinity	AT	9743319	N/A	2024/11/07	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9741638	2024/11/02	2024/11/07	Amrutha Anilkumar
Chloride by Automated Colourimetry	SKAL	9743344	N/A	2024/11/08	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9743088	N/A	2024/11/05	Shivani Shivani
Conductivity	AT	9743321	N/A	2024/11/07	Nachiketa Gohil
Hardness (calculated as CaCO3)		9741392	N/A	2024/11/08	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	9745296	2024/11/05	2024/11/06	Indira HarryPaul
Total Ammonia-N	SKAL/NH4	9743376	N/A	2024/11/06	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9742896	N/A	2024/11/05	Chandra Nandlal
pH	AT	9743323	2024/11/04	2024/11/07	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9753907	N/A	2024/11/08	Sachi Patel
Field Measured pH	PH	ONSITE	N/A	2024/11/01	Pardeep Purewal
Sulphate by Automated Turbidimetry	SKAL	9743349	N/A	2024/11/08	Alina Dobreanu
Total Dissolved Solids	BAL	9741972	2024/11/02	2024/11/04	Manowalage shanika GUNASEKARA
Field Measured pH	PH	ONSITE	N/A	2024/11/01	Pardeep Purewal
Total Kjeldahl Nitrogen in Water	SKAL	9743670	2024/11/04	2024/11/05	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9746033	2024/11/05	2024/11/06	Vidhi Khatri
Total Suspended Solids	BAL	9742131	2024/11/02	2024/11/05	Madhav Somani
Un-ionized Ammonia	CALC/NH3	9739493	2024/11/06	2024/11/06	Automated Statchk

Bureau Veritas ID: AHRL57 Dup
Sample ID: MG-SW1
Matrix: Water

Collected: 2024/10/30
Shipped:
Received: 2024/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	9747792	N/A	2024/11/06	Azita Fazaeli
Chemical Oxygen Demand	SPEC	9743088	N/A	2024/11/05	Shivani Shivani

Bureau Veritas ID: AHRL58
Sample ID: MG-SW3
Matrix: Water

Collected: 2024/10/30
Shipped:
Received: 2024/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	9747792	N/A	2024/11/06	Azita Fazaeli
Alkalinity	AT	9743946	N/A	2024/11/08	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9741638	2024/11/02	2024/11/07	Amrutha Anilkumar
Chloride by Automated Colourimetry	SKAL	9744620	N/A	2024/11/08	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9743088	N/A	2024/11/05	Shivani Shivani
Conductivity	AT	9743948	N/A	2024/11/08	Nachiketa Gohil
Hardness (calculated as CaCO3)		9741392	N/A	2024/11/08	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	9745296	2024/11/05	2024/11/07	Indira HarryPaul
Total Ammonia-N	SKAL/NH4	9743376	N/A	2024/11/06	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9743933	N/A	2024/11/05	Jinal Chavda



Bureau Veritas Job #: C4Y5029
Report Date: 2024/11/08

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: AHRL58
Sample ID: MG-SW3
Matrix: Water

Collected: 2024/10/30
Shipped:
Received: 2024/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
pH	AT	9743949	2024/11/04	2024/11/08	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9753907	N/A	2024/11/08	Sachi Patel
Field Measured pH	PH	ONSITE	N/A	2024/11/01	Pardeep Purewal
Sulphate by Automated Turbidimetry	SKAL	9744622	N/A	2024/11/08	Alina Dobreanu
Total Dissolved Solids	BAL	9741972	2024/11/02	2024/11/04	Manowalage shanika GUNASEKARA
Field Measured pH	PH	ONSITE	N/A	2024/11/01	Pardeep Purewal
Total Kjeldahl Nitrogen in Water	SKAL	9743670	2024/11/04	2024/11/05	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9746033	2024/11/05	2024/11/06	Vidhi Khatri
Total Suspended Solids	BAL	9742131	2024/11/02	2024/11/05	Madhav Somani
Un-ionized Ammonia	CALC/NH3	9739493	2024/11/06	2024/11/06	Automated Statchk

Bureau Veritas ID: AHRL59
Sample ID: MG-SW4A
Matrix: Water

Collected: 2024/10/30
Shipped:
Received: 2024/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	9747792	N/A	2024/11/06	Azita Fazaeli
Alkalinity	AT	9743319	N/A	2024/11/07	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9741638	2024/11/02	2024/11/07	Amrutha Anilkumar
Chloride by Automated Colourimetry	SKAL	9744620	N/A	2024/11/08	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9743088	N/A	2024/11/05	Shivani Shivani
Conductivity	AT	9743321	N/A	2024/11/07	Nachiketa Gohil
Hardness (calculated as CaCO3)		9741392	N/A	2024/11/08	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	9745296	2024/11/05	2024/11/06	Indira HarryPaul
Total Ammonia-N	SKAL/NH4	9743376	N/A	2024/11/06	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9743299	N/A	2024/11/05	Chandra Nandlal
pH	AT	9743323	2024/11/04	2024/11/07	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9753907	N/A	2024/11/08	Sachi Patel
Field Measured pH	PH	ONSITE	N/A	2024/11/01	Pardeep Purewal
Sulphate by Automated Turbidimetry	SKAL	9744622	N/A	2024/11/08	Alina Dobreanu
Total Dissolved Solids	BAL	9741972	2024/11/02	2024/11/04	Manowalage shanika GUNASEKARA
Field Measured pH	PH	ONSITE	N/A	2024/11/01	Pardeep Purewal
Total Kjeldahl Nitrogen in Water	SKAL	9743670	2024/11/04	2024/11/05	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9746033	2024/11/05	2024/11/06	Vidhi Khatri
Total Suspended Solids	BAL	9742131	2024/11/02	2024/11/05	Madhav Somani
Un-ionized Ammonia	CALC/NH3	9739493	2024/11/06	2024/11/06	Automated Statchk

Bureau Veritas ID: AHRL59 Dup
Sample ID: MG-SW4A
Matrix: Water

Collected: 2024/10/30
Shipped:
Received: 2024/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride by Automated Colourimetry	SKAL	9744620	N/A	2024/11/08	Alina Dobreanu
Sulphate by Automated Turbidimetry	SKAL	9744622	N/A	2024/11/08	Alina Dobreanu



Bureau Veritas Job #: C4Y5029
Report Date: 2024/11/08

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: AHRL60
Sample ID: MG-SW6
Matrix: Water

Collected: 2024/10/30
Shipped:
Received: 2024/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	9747792	N/A	2024/11/06	Azita Fazaeli
Alkalinity	AT	9743319	N/A	2024/11/07	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9741638	2024/11/02	2024/11/07	Amrutha Anilkumar
Chloride by Automated Colourimetry	SKAL	9744620	N/A	2024/11/08	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9743088	N/A	2024/11/05	Shivani Shivani
Conductivity	AT	9743321	N/A	2024/11/07	Nachiketa Gohil
Hardness (calculated as CaCO3)		9741392	N/A	2024/11/08	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	9745296	2024/11/05	2024/11/07	Indira HarryPaul
Total Ammonia-N	SKAL/NH4	9743376	N/A	2024/11/06	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9743299	N/A	2024/11/05	Chandra Nandlal
pH	AT	9743323	2024/11/04	2024/11/07	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9753907	N/A	2024/11/08	Sachi Patel
Field Measured pH	PH	ONSITE	N/A	2024/11/01	Pardeep Purewal
Sulphate by Automated Turbidimetry	SKAL	9744622	N/A	2024/11/08	Alina Dobreanu
Total Dissolved Solids	BAL	9741972	2024/11/02	2024/11/04	Manowalage shanika GUNASEKARA
Field Measured pH	PH	ONSITE	N/A	2024/11/01	Pardeep Purewal
Total Kjeldahl Nitrogen in Water	SKAL	9743670	2024/11/04	2024/11/05	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9746033	2024/11/05	2024/11/06	Vidhi Khatri
Total Suspended Solids	BAL	9742131	2024/11/02	2024/11/05	Madhav Somani
Un-ionized Ammonia	CALC/NH3	9739493	2024/11/06	2024/11/06	Automated Statchk

Bureau Veritas ID: AHRL61
Sample ID: MG-QAQC-SW1
Matrix: Water

Collected: 2024/10/30
Shipped:
Received: 2024/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	9747792	N/A	2024/11/06	Azita Fazaeli
Alkalinity	AT	9743319	N/A	2024/11/07	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9741638	2024/11/02	2024/11/07	Amrutha Anilkumar
Chloride by Automated Colourimetry	SKAL	9743344	N/A	2024/11/08	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9743088	N/A	2024/11/05	Shivani Shivani
Conductivity	AT	9743321	N/A	2024/11/07	Nachiketa Gohil
Hardness (calculated as CaCO3)		9741392	N/A	2024/11/08	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	9745296	2024/11/05	2024/11/07	Indira HarryPaul
Total Ammonia-N	SKAL/NH4	9743376	N/A	2024/11/06	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9743299	N/A	2024/11/05	Chandra Nandlal
pH	AT	9743323	2024/11/04	2024/11/07	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9753907	N/A	2024/11/08	Sachi Patel
Field Measured pH	PH	ONSITE	N/A	2024/11/01	Pardeep Purewal
Sulphate by Automated Turbidimetry	SKAL	9743349	N/A	2024/11/08	Alina Dobreanu
Total Dissolved Solids	BAL	9741972	2024/11/02	2024/11/04	Manowalage shanika GUNASEKARA
Field Measured pH	PH	ONSITE	N/A	2024/11/01	Pardeep Purewal
Total Kjeldahl Nitrogen in Water	SKAL	9743670	2024/11/04	2024/11/05	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9746033	2024/11/05	2024/11/06	Vidhi Khatri



Bureau Veritas Job #: C4Y5029
Report Date: 2024/11/08

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: AHRL61
Sample ID: MG-QAQC-SW1
Matrix: Water

Collected: 2024/10/30
Shipped:
Received: 2024/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Suspended Solids	BAL	9742131	2024/11/02	2024/11/05	Madhav Somani
Un-ionized Ammonia	CALC/NH3	9739493	2024/11/06	2024/11/06	Automated Statchk



Bureau Veritas Job #: C4Y5029
Report Date: 2024/11/08

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

GENERAL COMMENTS

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

Package 1	5.0°C
Package 2	5.3°C
Package 3	5.7°C

Results relate only to the items tested.



Bureau Veritas Job #: C4Y5029
Report Date: 2024/11/08

QUALITY ASSURANCE REPORT

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclove Greenview
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
9741638	Total BOD	2024/11/07					ND,RDL=2	mg/L	4.7	30	97	80 - 120
9741972	Total Dissolved Solids	2024/11/04			103	80 - 120	ND, RDL=10	mg/L	6.2	20		
9742131	Total Suspended Solids	2024/11/05			100	80 - 120	ND, RDL=10	mg/L	NC	20		
9742896	Nitrate (N)	2024/11/05	88	80 - 120	92	80 - 120	ND, RDL=0.10	mg/L	NC	20		
9742896	Nitrite (N)	2024/11/05	99	80 - 120	101	80 - 120	ND, RDL=0.010	mg/L	NC	20		
9743088	Total Chemical Oxygen Demand (COD)	2024/11/05	103	80 - 120	102	80 - 120	ND, RDL=4.0	mg/L	7.0	20		
9743299	Nitrate (N)	2024/11/05	88	80 - 120	94	80 - 120	ND, RDL=0.10	mg/L	2.6	20		
9743299	Nitrite (N)	2024/11/05	98	80 - 120	101	80 - 120	ND, RDL=0.010	mg/L	NC	20		
9743319	Alkalinity (Total as CaCO3)	2024/11/07			95	85 - 115	ND, RDL=1.0	mg/L	1.1	20		
9743321	Conductivity	2024/11/07			99	85 - 115	ND, RDL=1.0	umho/cm	0.30	10		
9743323	pH	2024/11/07			102	98 - 103			0.57	N/A		
9743344	Dissolved Chloride (Cl-)	2024/11/08	105	80 - 120	99	80 - 120	ND, RDL=1.0	mg/L	6.6	20		
9743349	Dissolved Sulphate (SO4)	2024/11/08	95	75 - 125	98	80 - 120	ND, RDL=1.0	mg/L	0.74	20		
9743376	Total Ammonia-N	2024/11/06	96	75 - 125	101	80 - 120	ND, RDL=0.050	mg/L	0.99	20		
9743670	Total Kjeldahl Nitrogen (TKN)	2024/11/05	101	80 - 120	101	80 - 120	ND, RDL=0.10	mg/L	0	20	96	80 - 120
9743933	Nitrate (N)	2024/11/05	NC	80 - 120	87	80 - 120	ND, RDL=0.10	mg/L	0.29	20		
9743933	Nitrite (N)	2024/11/05	101	80 - 120	100	80 - 120	ND, RDL=0.010	mg/L	8.6	20		
9743946	Alkalinity (Total as CaCO3)	2024/11/08			96	85 - 115	ND, RDL=1.0	mg/L	0.083	20		
9743948	Conductivity	2024/11/08			99	85 - 115	ND, RDL=1.0	umho/cm	0.53	10		
9743949	pH	2024/11/08			102	98 - 103			0.43	N/A		
9744620	Dissolved Chloride (Cl-)	2024/11/08	101	80 - 120	100	80 - 120	ND, RDL=1.0	mg/L	0.074	20		
9744622	Dissolved Sulphate (SO4)	2024/11/08	94	75 - 125	95	80 - 120	ND, RDL=1.0	mg/L	3.2	20		
9745296	Total Barium (Ba)	2024/11/07	99	80 - 120	100	80 - 120	ND, RDL=2.0	ug/L	3.1	20		
9745296	Total Boron (B)	2024/11/07	108	80 - 120	100	80 - 120	ND, RDL=10	ug/L	3.2	20		
9745296	Total Cadmium (Cd)	2024/11/07	102	80 - 120	102	80 - 120	ND, RDL=0.090	ug/L	NC	20		

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VERITAS

Bureau Veritas Job #: C4Y5029

Report Date: 2024/11/08

QUALITY ASSURANCE REPORT(CONT'D)

BluMetric Environmental Inc

Client Project #: 240205-07

Site Location: Musclove Greenview

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
9745296	Total Calcium (Ca)	2024/11/07	NC	80 - 120	98	80 - 120	ND, RDL=200	ug/L	4.2	20		
9745296	Total Cobalt (Co)	2024/11/07	94	80 - 120	96	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9745296	Total Copper (Cu)	2024/11/07	106	80 - 120	109	80 - 120	ND, RDL=0.90	ug/L	1.4	20		
9745296	Total Iron (Fe)	2024/11/07	98	80 - 120	97	80 - 120	ND, RDL=100	ug/L	9.2	20		
9745296	Total Lead (Pb)	2024/11/07	95	80 - 120	100	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9745296	Total Magnesium (Mg)	2024/11/07	90	80 - 120	94	80 - 120	ND, RDL=50	ug/L	6.2	20		
9745296	Total Manganese (Mn)	2024/11/07	93	80 - 120	91	80 - 120	ND, RDL=2.0	ug/L	1.8	20		
9745296	Total Potassium (K)	2024/11/07	98	80 - 120	97	80 - 120	ND, RDL=200	ug/L	2.5	20		
9745296	Total Sodium (Na)	2024/11/07	NC	80 - 120	95	80 - 120	ND, RDL=100	ug/L	2.9	20		
9745296	Total Zinc (Zn)	2024/11/07	99	80 - 120	104	80 - 120	ND, RDL=5.0	ug/L	5.5	20		
9746033	Total Phosphorus	2024/11/06	100	80 - 120	107	80 - 120	ND, RDL=0.020	mg/L	5.6	20	109	80 - 120
9747792	Dissolved (0.2u) Aluminum (Al)	2024/11/06	98	80 - 120	100	80 - 120	ND, RDL=5	ug/L	NC	20		
9753907	Phenols-4AAP	2024/11/08	97	80 - 120	99	80 - 120	ND, RDL=0.0010	mg/L	6.5	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).



Bureau Veritas Job #: C4Y5029
Report Date: 2024/11/08

BluMetric Environmental Inc
Client Project #: 240205-07
Site Location: Musclow Greenview
Sampler Initials: BM

VALIDATION SIGNATURE PAGE

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

A handwritten signature in black ink that reads "Cristina Carriere".

Cristina Carriere, Senior 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



T971313

IMMEDIATE

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: MG-SW1
Last Sample: MG-QAQC-SW1
Sample Count: 6

Relinquished By				Received By			
Brad M Callum	<i>Brad M Callum</i>	Date	2024/10/31	<i>Arithu Sukumar</i>	<i>Arithu Sukumar</i>	Date	2024/10/31
		Time (24 HR)	11:00 AM			Time (24 HR)	10:01
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:	Rush ☐	Immediate Test ☐
Brad M Callum / Nathan Wilson	1	Micro ☐	Food Residue ☐
			Food Chemistry ☐

*** LABORATORY USE ONLY ***						
Received At	Lab Comments:	Custody Seal				
Labeled By		Present (Y/N)	Intact (Y/N)	Present (Y/N)	Cooling Media	
Verified By					1	2
		Y	Y	Y	5	5
		Y	Y	Y	6	5
		Y	Y	Y	6	5
		Drinking Water Metals Preservation Check Done (Circle)			YES	NO

01-Nov-24 10:02
Elora Di Bratto
C4Y5029
URE ENV-685

COR FCD-00383/4

Work Order : 256314

Sample Number : 84747

SAMPLE IDENTIFICATION

Company :	Bureau Veritas Laboratories		
Location :	Mississauga ON	Sampling Date :	2024-10-29
Job Number :	C4Y2201	Sampling Time :	13:30
Substance :	MG-SW3	Date Received :	2024-10-31
Sampling Method :	Grab	Time Received :	14:15
Sampled By :	NW, BM	Temperature at Receipt :	16 °C
Sample Description :	Cloudy, yellow.	Date Tested :	2024-11-02
Test Method :	Reference Method for Determining Acute Lethality of Effluents to <i>Daphnia magna</i> . Environment Canada EPS 1/RM/14 (Second Edition, December 2000, with February 2016 amendments).		

48-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Immobility	0.0 %
	Mean Mortality	0.0 %
100%	Mean Immobility	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Species :	<i>Daphnia magna</i>	Time to First Brood :	7.6 days
Organism Batch :	Dm24-21	Average Brood Size :	40.8
Culture Mortality :	0.7% (previous 7 days)		

TEST CONDITIONS

Sample Treatment :	None	Number of Replicates :	3
pH Adjustment :	None	Organisms per Replicate :	10
Pre-aeration Rate :	~30 mL/min/L	Organisms per Test Level :	30
Duration of Pre-Aeration :	30 minutes	Organism Loading Rate :	15.0 mL/organism
Test Aeration :	None	Impaired Control Organisms :	0.0%
Hardness Adjustment :	None	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Sodium Chloride		
Date Tested :	2024-11-05	LC50 :	6.3 g/L
Organism Batch :	Dm24-21	95% Confidence Limits :	5.9 - 6.6 g/L
Analyst(s) :	JJ, MK, JGR	Historical Mean LC50 :	6.4 g/L
Statistical Method :	Linear Regression (MLE)	Warning Limits ($\pm$ 2SD) :	5.7 - 7.2 g/L

COMMENTS

- All test validity criteria as specified in the test method were satisfied.

Approved By :



 Conrad Neufeld
 I am approving this
 document
 Nautilus
 2024-11-19 12:33:05:00

Project Manager

Work Order : 256314

Sample Number : 84747

TEST DATA

	pH	Dissolved O ₂ (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O ₂ Saturation (%)*	Hardness (as CaCO ₃)
Initial Chemistry (100%) :	7.6	8.8	1183	20	101	540 mg/L

0 HOURS

Date & Time : 2024-11-02 12:30

Analyst(s) : MK(SSF)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O ₂	Conductivity	Temperature	O ₂ Saturation*	Hardness
100	A	0	0	8.0	8.6	1174	20	99	540
100	B	0	0	8.0	8.6	1174	20	99	540
100	C	0	0	8.0	8.6	1174	20	99	540
Control	A	0	0	8.2	8.6	466	20	99	150
Control	B	0	0	8.2	8.6	466	20	99	150
Control	C	0	0	8.2	8.6	466	20	99	150

Notes:

24 HOURS

Date & Time : 2024-11-03 13:30

Analyst(s) : MK(SSF)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O ₂	Conductivity	Temperature
100	A	—	0	—	—	—	20
100	B	—	0	—	—	—	20
100	C	—	0	—	—	—	20
Control	A	—	0	—	—	—	20
Control	B	—	0	—	—	—	20
Control	C	—	0	—	—	—	20

Notes:

48 HOURS

Date & Time : 2024-11-04 12:35

Analyst(s) : KP

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O ₂	Conductivity	Temperature
100	A	0	0	8.2	8.4	1041	20
100	B	0	0	8.2	8.4	1076	20
100	C	0	0	8.2	8.5	1038	20
Control	A	0	0	8.3	8.6	477	20
Control	B	0	0	8.3	8.5	476	20
Control	C	0	0	8.3	8.5	477	20

Notes:

Number immobile does not include number dead.

"—" = not measured/not required

* adjusted for temperature and barometric pressure

 Test Data Reviewed By : JL

 Date : 2024-11-06

Work Order : 256314
 Sample Number : 84747

SAMPLE IDENTIFICATION

Company :	Bureau Veritas Laboratories		
Location :	Mississauga ON	Sampling Date :	2024-10-29
Job Number :	C4Y2201	Sampling Time :	13:30
Substance :	MG-SW3	Date Received :	2024-10-31
Sampling Method :	Grab	Time Received :	14:15
Sampled By :	NW, BM	Temperature at Receipt :	16 °C
Sample Description :	Cloudy, yellow.	Date Tested :	2024-11-03

 Test Method(s) : Reference Method for Determining Acute Lethality of Liquid Effluents to Rainbow Trout.
 Environment Canada, EPS 1/RM/13 (2nd Edition, December 2000, with May 2007, February 2016, and December 2023 amendments).

96-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Impairment	0.0 %
	Mean Mortality	0.0 %
100%	Mean Impairment	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Test Organism :	<i>Oncorhynchus mykiss</i>	Mean Fork Length :	38.0 mm
Organism Batch :	T24-22	Range of Fork Lengths :	35 - 41 mm
Control Sample Size :	10	Mean Wet Weight :	0.5 g
Cumulative stock mortality rate :	0% (previous 7 days)	Organism Loading Rate :	0.3 g/L
Control organisms showing stress :	0 (at test completion)		

TEST CONDITIONS

Test Type :	Single concentration	Number of Replicates :	1
Sample pH Adjustment :	None	Organisms Per Replicate :	10
Sample Pre-aeration/Aeration Rate :	6.5 ± 1 mL/min/L	Organisms Per Test Level :	10
Duration of Sample Pre-Aeration :	30 minutes	Volume of Sample :	18 L
Control Pre-aeration/Aeration Rate :	6.5 ± 1 mL/min/L	Volume of Control :	19 L
Duration of Control Pre-aeration:	30 minutes	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Potassium Chloride		
Organism Batch :	T24-22	LC50 :	4561 mg/L
Date Tested :	2024-11-03	95% Confidence Limits :	4151 - 5011 mg/L
Analyst(s) :	GR, JGR, NWP	Historical Mean LC50 :	3487 mg/L
Statistical Method :	Linear Regression (MLE)	Warning Limits (± 2SD) :	2536 - 4793 mg/L

COMMENTS

•All test validity criteria as specified in the test method were satisfied.

Approved By :



 Conrad Neufeld
 I am approving this
 document
 Nautilus
 2024-11-19 12:33:05:00

Project Manager

Work Order : 256314

Sample Number : 84747

TEST DATA

	pH	Dissolved O ₂ (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O ₂ Saturation (%) ³
Initial Water Chemistry (100%) :	7.2	8.0	1229	14	81
After 30 min pre-aeration :	7.3	8.5	1228	14	87

0 HOURS

Date & Time	2024-11-03	11:50					
Analyst(s) :	GR (SV)						
Concentration	Dead	Impaired	pH	Dissolved O ₂	Conductivity	Temperature	O ₂ Saturation ³
100%	0	0	7.3	8.5	1228	14	87
Control	0	0	8.2	9.8	742	14	100

Notes:

24 HOURS

Date & Time	2024-11-04	12:50					
Analyst(s) :	JGR						
Concentration	Dead	Impaired	pH	Dissolved O ₂	Conductivity	Temperature	
100%	0	0	—	—	—	15	
Control	0	0	—	—	—	15	

Notes:

48 HOURS

Date & Time	2024-11-05	10:00					
Analyst(s) :	NWP						
Concentration	Dead	Impaired	pH	Dissolved O ₂	Conductivity	Temperature	
100%	0	0	—	—	—	15	
Control	0	0	—	—	—	15	

Notes:

72 HOURS

Date & Time	2024-11-06	12:45					
Analyst(s) :	NWP						
Concentration	Dead	Impaired	pH	Dissolved O ₂	Conductivity	Temperature	
100%	0	0	—	—	—	15	
Control	0	0	—	—	—	15	

Notes:

96 HOURS

Date & Time	2024-11-07	12:10					
Analyst(s) :	GR (AJS)						
Concentration	Dead	Impaired	pH	Dissolved O ₂	Conductivity	Temperature	
100%	0	0	8.5	9.8	987	15	
Control	0	0	8.5	9.4	686	15	

Notes:

"—" = not measured/not required

Number impaired does not include number dead.

³ adjusted for temperature and barometric pressure

Test Data Reviewed By : JJ

Date : 2024-11-13



CHAIN OF CUSTODY RECORD

Nautilus Work Order No:

256314

Shipping Address: Nautilus Environmental Guelph.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412

Fax: (519) 763-4419

P.O. Number: 240205-07
Field Sampler Name (print):
Signature:
Affiliation:
Sample Storage (prior to shipping):
Custody Relinquished by:
Date/Time Shipped:

Client: Bureau Veritas 6740 Campobello Rd. Mississauga, ON L5N 2L8
Phone:
Fax:
Contact: Elora.di-bratto@bureauveritas.com

Sample Identification					Analyses Requested										Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name	Nautilus Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	Daphnia magna Single Concentration	Daphnia magna LC50	Fathead Minnow Survival & Growth	Ceriodaphnia dubia Survival & Reproduction	Lemna minor Growth	Pseudokirchnerella subcapitata Growth	RISS Data Entry	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2024-10-29	13:30	MG-SW3	84747	16°C	✓		✓								✓		1 x20L

For Lab Use Only
Received By: KP/XD
Date: 2024-10-31
Time: 14:15
Storage Location:
Storage Temp.(°C):

Please list any special requests or instructions:

Reg TAT

*Grab selected on pail label (KP)

** BV Job # C4Y22001 as per client email. CN 2024-11-01

Appendix D

D-4 QAQC Results

2024 Groundwater Sampling Quality Assurance and Quality Control (Spring)

Sample Description		RDL	MG-18-3R	MG-QAQC-GW1	Relative Percent Difference
Date Sampled			01-May-24	01-May-24	
Parameter	Unit				
Chloride	mg/L	0.1	<1	<1	NA
Nitrate as N	mg/L	0.05	0.12	0.13	NA
Sulphate	mg/L	0.1	6.8	7	3%
Calcium (diss)	mg/L	0.05	23	22	4%
Magnesium (diss)	mg/L	0.05	1.4	1.4	0%
Sodium (diss)	mg/L	0.05	3	3	0%
Alkalinity (as CaCO ₃)	mg/L	1	72	67	7%
Ammonia as N	mg/L	0.02	0.058	0.05	NA
Biochemical Oxygen Demand	mg/L	2	<2	<2	NA
Chemical Oxygen Demand	mg/L	4	<4	<4	NA
Dissolved Organic Carbon	mg/L	0.4	1.5	1.3	NA
Electrical Conductivity	uS/cm	1	140	140	0%
pH	pH units		7.35	7.36	0%
Total Dissolved Solids	mg/L	10	1040	1110	7%
Total Suspended Solids	mg/L	10	39000	37000	5%
Aluminum (diss)	mg/L	0.004	<0.0049	<0.0049	NA
Barium (diss)	mg/L	0.002	0.016	0.016	0%
Boron (diss)	mg/L	0.01	0.014	<0.01	NA
Cadmium (diss)	mg/L	0.0001	<0.00009	<0.00009	NA
Chromium (diss)	mg/L	0.002	<0.005	<0.005	NA
Cobalt (diss)	mg/L	0.0005	<0.0005	<0.0005	NA
Iron (diss)	mg/L	0.01	<0.1	<0.1	NA
Lead (diss)	mg/L	0.0005	<0.0005	<0.0005	NA
Manganese (diss)	mg/L	0.002	0.032	0.031	3%
Silver (diss)	mg/L	0.0001	<0.00009	<0.00009	NA
Zinc (diss)	mg/L	0.005	<0.005	<0.005	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.

2024 Groundwater Sampling Quality Assurance and Quality Control (Fall)

Sample Description		RDL	MG-18-1	MG-QAQC-GW1	Relative Percent Difference
Date Sampled			30-Oct-24	30-Oct-24	
Parameter	Unit				
Chloride	mg/L	1	74	82	10%
Nitrate as N	mg/L	0.1	<0.1	<0.1	NA
Sulphate	mg/L	0.1	19	19	0%
Calcium (diss)	mg/L	0.05	89	94	5%
Magnesium (diss)	mg/L	0.05	21	23	9%
Sodium (diss)	mg/L	0.05	27	29	7%
Alkalinity (as CaCO ₃)	mg/L	1	250	250	0%
Ammonia as N	mg/L	0.02	0.086	0.099	NA
Biochemical Oxygen Demand	mg/L	2	<2	<2	NA
Chemical Oxygen Demand	mg/L	4	<4	4.5	NA
Dissolved Organic Carbon	mg/L	0.4	6.6	7.4	11%
Electrical Conductivity	uS/cm	1	770	770	0%
pH	pH units		7.19	7.84	9%
Total Dissolved Solids	mg/L	10	535	535	0%
Total Suspended Solids	mg/L	10	4600	5600	20%
Aluminum (diss)	mg/L	0.0049	<0.0049	<0.0049	NA
Barium (diss)	mg/L	0.002	0.1	0.099	1%
Boron (diss)	mg/L	0.01	0.17	0.18	6%
Cadmium (diss)	mg/L	0.00009	0.00012	0.00009	NA
Chromium (diss)	mg/L	0.005	<0.005	<0.005	NA
Cobalt (diss)	mg/L	0.0005	0.03	0.032	6%
Iron (diss)	mg/L	0.1	0.53	0.57	7%
Lead (diss)	mg/L	0.0005	<0.0005	0.00082	NA
Manganese (diss)	mg/L	0.002	6.1	6.5	6%
Silver (diss)	mg/L	0.00009	<0.00009	<0.00009	NA
Zinc (diss)	mg/L	0.005	<0.005	<0.005	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.

**2024 Surface Water Sampling Quality Assurance and Quality Control
(Spring)**

Sample Description		RDL	MG-SW4A	MG-QAQC-SW1	Relative Percent Difference
Date Sampled			01-May-24	01-May-24	
Parameter	Unit				
Chloride	mg/L	0.1	3.6	2.9	22%
Nitrate as N	mg/L	0.05	<0.1	<0.1	NA
Nitrite as N	mg/L	0.05	<0.01	<0.01	NA
Sulphate	mg/L	0.1	9	8.1	11%
Calcium (tot)	mg/L	0.2	10	11	10%
Magnesium (tot)	mg/L	0.05	1.5	1.5	0%
Potassium (tot)	mg/L	0.2	0.93	0.95	NA
Sodium (tot)	mg/L	0.1	3.2	3.1	3%
Alkalinity (as CaCO3)	mg/L	1	48	28	53%
Ammonia as N	mg/L	0.02	<0.05	<0.05	NA
Biochemical Oxygen Demand	mg/L	2	<2	<2	NA
Chemical Oxygen Demand	mg/L	4	28	21	29%
Electrical Conductivity	uS/cm	1	120	79	41%
pH	pH units		34	33	3%
Phenols-4AAP	mg/L	0.001	8.32	7.36	12%
Total Dissolved Solids	mg/L	10	<0.001	<0.001	NA
Total Hardness (as CaCO3)	mg/L	0.5	60	55	9%
Total Kjeldahl Nitrogen	mg/L	0.1	0.44	0.37	NA
Total Phosphorus	mg/L	0.02	<0.02	<0.02	NA
Total Suspended Solids	mg/L	10	<10	<10	NA
Unionized Ammonia (Calc)	mg/L	2E-06	<0.00061	<0.00061	NA
Aluminum (diss, PWQO)	mg/L	0.004	0.06	0.06	0%
Barium (tot)	mg/L	0.002	0.012	0.012	0%
Boron (tot)	mg/L	0.01	<0.01	<0.01	NA
Cadmium (tot)	mg/L	0.0001	<0.00009	<0.00009	NA
Cobalt (tot)	mg/L	0.0005	<0.0005	<0.0005	NA
Copper (tot)	mg/L	0.001	<0.0009	<0.0009	NA
Iron (tot)	mg/L	0.01	0.23	0.23	0%
Lead (tot)	mg/L	0.001	<0.0005	<0.0005	NA
Manganese (tot)	mg/L	0.002	0.0096	0.0096	NA
Zinc (tot)	mg/L	0.02	<0.005	<0.005	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.

**2024 Surface Water Sampling Quality Assurance and Quality Control
(Fall)**

Sample Description		RDL	MG-SW4A	MG-QAQC-SW1	Relative Percent Difference
Date Sampled			30-Oct-24	30-Oct-24	
Parameter	Unit				
Chloride	mg/L	0.1	5.6	6.1	9%
Nitrate as N	mg/L	0.1	<0.1	<0.1	NA
Nitrite as N	mg/L	0.01	<0.01	<0.01	NA
Sulphate	mg/L	0.1	6.4	6.3	2%
Calcium (tot)	mg/L	0.2	16	16	0%
Magnesium (tot)	mg/L	0.05	2.1	2.2	5%
Potassium (tot)	mg/L	0.2	1.4	1.4	0%
Sodium (tot)	mg/L	0.1	3.6	3.8	5%
Alkalinity (as CaCO3)	mg/L	1	44	42	5%
Ammonia as N	mg/L	0.05	<0.05	<0.05	NA
Biochemical Oxygen Demand	mg/L	2	<2	<2	NA
Chemical Oxygen Demand	mg/L	4	12	7.2	NA
Electrical Conductivity	uS/cm	1	120	120	0%
pH	pH units		56	56	0%
Phenols-4AAP	mg/L	0.001	7.7	7.68	0%
Total Dissolved Solids	mg/L	10	<0.001	<0.001	NA
Total Hardness (as CaCO3)	mg/L	0.5	110	120	9%
Total Kjeldahl Nitrogen	mg/L	0.1	0.21	0.2	NA
Total Phosphorus	mg/L	0.02	<0.02	<0.02	NA
Total Suspended Solids	mg/L	10	<10	<10	NA
Unionized Ammonia (Calc)	mg/L	0.00052	<0.00061	<0.00061	NA
Aluminum (diss, PWQO)	mg/L	0.004	0.049	0.013	116%
Barium (tot)	mg/L	0.002	0.014	0.015	7%
Boron (tot)	mg/L	0.01	0.012	<0.01	NA
Cadmium (tot)	mg/L	0.00009	<0.00009	<0.00009	NA
Cobalt (tot)	mg/L	0.0005	<0.0005	<0.0005	NA
Copper (tot)	mg/L	0.0009	<0.0009	<0.0009	NA
Iron (tot)	mg/L	0.01	0.33	0.35	6%
Lead (tot)	mg/L	0.0005	<0.0005	<0.0005	NA
Manganese (tot)	mg/L	0.002	0.01	0.01	NA
Zinc (tot)	mg/L	0.005	<0.005	<0.005	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

Historical Chemistry Data

Appendix E

E-1 Historical Groundwater Data

Hastings Highlands Analytical Chemistry Results: Anions, Cations, GenChem, Met, VOCs in Well Screen						Site Name	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview
						Location	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-1
						Sample ID	MG-18-1	MG-18-1	MG-18-1-QAQC-S19 (MG-18-1)	MG-18-1	MG-18-1	MG-18-1-QAQC-S20 (MG-18-1)	MG-18-1	MG-18-1	MG-QAQC GW-S21 (MG-18-1)	MG-18-1	MG-QAQC GW-F21 (MG-18-1)	MG-18-1	MG-QAQC GW-S22 (MG-18-1)
						Sample Date	2019-Jan-10	2019-May-06	2019-May-06	2019-Oct-21	2020-May-05	2020-May-05	2020-Oct-08	2021-Apr-19	2021-Apr-19	2021-Oct-20	2021-Oct-20	2022-May-04	2022-May-04
						Lab Job Number								21T736297	21T736297	21T819614	21T819614	22P892059	22P892059
Parameter	Units	RUV-MG	ODWQS-ALL-MERGED	PWQO-GENERAL	PWQO-INTERIM	Lab Sample ID								2371831	2371833	3119248	3119422	3826238	3826240
Anions						Detection Limit													
Chloride	mg/L	125.3	250	-	-	0.1, 0.12, 0.2, 0.24, 0.5, 1	37.3	44.8	45	57.2	70.5	70.4	69.3	101	107	72.3	72.8	88.3	91
Nitrate + Nitrite	mg/L	-	-	-	-	0.1, 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	2.6	10	-	-	0.05, 0.07, 0.1, 0.25, 0.5	<0.05	<0.05	<0.05	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.05	<0.05	<0.05	<0.05
Nitrite as N	mg/L	-	1	-	-	0.01, 0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate	mg/L	253.6	500	-	-	0.1, 0.19, 0.2, 0.5, 1	8.55	11.1	11.2	13.1	23.3	22.9	20	16.3	16.4	20.5	20.4	17.6	15.5
Cations																			
Calcium (diss)	mg/L	-	-	-	-	0.05, 0.1, 0.2, 0.25	71.5	85.5	85.5	91.6	121	123	78.5	104	102	86.1	86.5	97.4	107
Magnesium (diss)	mg/L	-	-	-	-	0.05, 0.1, 0.25	13.6	17.1	17.1	19.5	24	24.7	14.8	22.1	21.6	17.6	17.8	21.2	23
Potassium (diss)	mg/L	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (diss)	mg/L	101.5	200	-	-	0.05, 0.1, 0.25	14	12.5	12.5	26.7	20	20.3	15.5	18.3	17.9	17.1	17.3	19.7	21.4
General Chemistry																			
Alkalinity (as CaCO3)	mg/L	47.8 - 282.8	30 - 500	See Factsheet	-	1, 5	231	305	310	310	381	384	216	248	250	233	252	290	290
Ammonia as N	mg/L	-	-	-	-	0.02, 0.03, 0.04, 0.05, 0.07	0.08	<0.02	<0.02	0.06	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	0.02	<0.02	<0.02
Biochemical Oxygen Demand	mg/L	-	-	-	-	2, 5, 6	<5	<5	<5	<5	<5	<5	<2	<2	<2	<2	<2	3	4
Chemical Oxygen Demand	mg/L	-	-	-	-	4, 5	7	11	10	<5	25	18	20	<5	9	8	7	18	23
Dissolved Organic Carbon	mg/L	3.6	5	-	-	0.4, 0.5	4.9	4	8.3	4.8	10.9	11.1	4.5	6	5.6	5.6	5.8	8.9	8.6
Electrical Conductivity	uS/cm	-	-	-	-	1, 2, 5	505	645	642	726	1170	1160	613	862	866	718	720	841	845
Hardness (as CaCO3)	mg/L	-	80 - 100	-	-		234.5	283.9	283.9	309	401	408.8	257	350.7	343.6	287.5	289.3	330.5	361.9
Lab Filtration DOC		-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-
pH	pH units	6.9 - 7.9	6.5 - 8.5	6.5 - 8.5	-		8.02	7.61	7.55	7.64	6.94	6.98	7.42	6.94	6.95	7.23	7.3	6.91	6.98
Total Dissolved Solids	mg/L	482.5	500	-	-	5, 10, 20	290	344	344	456	570	574	394	642	628	474	468	524	590
Total Suspended Solids	mg/L	-	-	-	-	10, 33, 50, 100, 200	68700	23500	33500	26500	5370	8860	15500	9410	10200	284	8890	7440	6370
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.1	-	0.0000092	0.0000092	-	-	-	-	-	-	-	-	-	-
Metals																			
Aluminum (diss, 0.45 µm)	mg/L	0.1	0.1	-	Calculated	0.004, 0.0049	0.006	<0.004	0.006	2.33	0.017	0.006	0.009	0.011	0.012	0.008	<0.004	0.009	0.013
Barium (diss)	mg/L	0.3	1	-	-	0.002	0.07	0.08	0.076	0.143	0.107	0.105	0.061	0.089	0.09	0.08	0.078	0.108	0.106
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (diss)	mg/L	1.3	5	-	0.2	0.01, 0.02, 0.1	0.093	0.082	0.079	0.147	0.172	0.186	0.136	0.133	0.141	0.142	0.14	0.165	0.173
Cadmium (diss)	mg/L	0	0.005	-	Calculated	0.00009, 0.0001	<0.002	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium (diss)	mg/L	0	0.05	-	-	0.002, 0.003, 0.005	<0.003	<0.003	<0.003	0.006	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0005, 0.005	0.011	0.0125	0.0121	0.031	0.0313	0.0312	0.0204	0.0291	0.0256	0.0275	0.0266	0.0358	0.0356
Copper (diss)	mg/L	-	1	-	Calculated	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (diss)	mg/L	0.2	0.3	0.3	-	0.01, 0.1, 0.5	<0.01	<0.01	<0.01	3.11	0.099	0.092	<0.01	0.095	0.064	0.28	0.311	0.458	0.441
Lead (diss)	mg/L	0	0.01	-	Calculated	0.0005, 0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese (diss)	mg/L	0	0.05	-	-	0.002, 0.004, 0.01	1.25	2.6	2.51	5.53	6.94	6.92	4.47	6.62	6.77	6.08	5.82	7.26	7.08
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	-	0.00009, 0.0001	<0.002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<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	2.5	5	-	0.02	0.005, 0.025, 0.05, 0.25, 2.5	<0.005	<0.005	<0.005	0.017	<0.005	<0.005	<0.005	<0.005	<0.005	0.008	<0.005	0.137	0.006

-LEGEND-	
Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds RUV-MG	Reasonable Use Values Musclow Greenview
Concentration exceeds ODWQS-ALL-MERGED	Ontario Drinking Water Quality Standards All Types Merged
Concentration exceeds PWQO-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PWQO-INTERIM	Provincial Water Quality Objectives Interim



Hastings Highlands Analytical Chemistry Results: Anions, Cations, GenChem, Met, VOCs in Well Screen						Site Name	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview
						Location	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-1
						Sample ID	MG-18-1	MG-18-1	MG-18-1-QAQC-S19 (MG-18-1)	MG-18-1	MG-18-1	MG-18-1-QAQC-S20 (MG-18-1)	MG-18-1	MG-18-1	MG-QAQC GW-S21 (MG-18-1)	MG-18-1	MG-QAQC GW-F21 (MG-18-1)	MG-18-1
						Sample Date	2019-Jan-10	2019-May-06	2019-May-06	2019-Oct-21	2020-May-05	2020-May-05	2020-Oct-08	2021-Apr-19	2021-Apr-19	2021-Oct-20	2021-Oct-20	2022-May-04
Parameter	Units	RUV-MG	ODWQS-ALL-MERGED	PWQO-GENERAL	PWQO-INTERIM	Lab Job Number								21T736297	21T736297	21T819614	21T819614	22P892059
						Lab Sample ID								2371831	2371833	3119248	3119422	3826238
Anions						Detection Limit												
Chloride	mg/L	125.3	250	-	-	0.1, 0.12, 0.2, 0.24, 0.5, 1	37.3	44.8	45	57.2	70.5	70.4	69.3	101	107	72.3	72.8	88.3
Nitrate + Nitrite	mg/L	-	-	-	-	0.1, 0.5	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	2.6	10	-	-	0.05, 0.07, 0.1, 0.25, 0.5	<0.05	<0.05	<0.05	<0.25	<0.25	<0.25	<0.1	<0.25	<0.25	<0.05	<0.05	<0.05
VOCs																		
1,1,1,2-Tetrachloroethane	mg/L	-	-	-	0.02	0.0001, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	mg/L	-	-	-	0.01	0.0002, 0.0003	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	mg/L	-	-	-	0.07	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	mg/L	-	-	-	0.8	0.0002, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	mg/L	-	-	-	0.2	0.0002, 0.0003	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethylene	mg/L	-	0.014	-	0.04	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/L	-	-	0.0005	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	mg/L	-	0.003	0.0025	-	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	mg/L	-	0.005	-	0.1	0.0002, 0.00049	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	mg/L	-	-	-	0.0007	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	mg/L	-	-	0.0025	-	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropene (Cis + Trans)	mg/L	-	-	-	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	mg/L	-	0.001	0.004	-	0.0001, 0.0002, 0.0004	-	-	-	<0.0001	-	-	<0.0001	-	-	<0.0002	-	<0.0001
2-Hexanone	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	mg/L	-	-	-	-	0.001, 0.01	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	mg/L	-	0.001	-	0.1	0.0002, 0.0004, 0.0008	-	-	-	0.00036	-	-	<0.0002	-	-	0.0004	-	<0.0002
Bromodichloromethane	mg/L	-	-	-	0.2	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	mg/L	-	-	-	0.06	0.0001, 0.001	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	mg/L	-	-	-	0.0009	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Tetrachloride	mg/L	-	0.002	-	-	0.00019, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	mg/L	-	-	0.015	-	0.0001, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	mg/L	-	-	-	0.7	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethylene	mg/L	-	-	-	-	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	mg/L	-	-	-	-	0.0002, 0.0003	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	mg/L	-	-	-	-	0.0001, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	mg/L	-	-	-	-	0.0004, 0.001	-	-	-	-	-	-	-	-	-	-	-	-
Dichloromethane	mg/L	-	0.05	-	-	0.0003, 0.0012, 0.002	-	-	-	-	-	-	-	-	-	-	-	<0.0003
Ethylbenzene	mg/L	-	0.0016	-	0.008	0.0001, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene Dibromide	mg/L	-	-	-	0.005	0.0001, 0.00019	-	-	-	-	-	-	-	-	-	-	-	-
Hexane	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-
m & p-Xylene	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	mg/L	-	-	-	0.1	0.0003, 0.0006, 0.0012	-	-	-	<0.0003	-	-	<0.0003	-	-	<0.0006	-	-
Methyl Ethyl Ketone	mg/L	-	-	-	0.4	0.001, 0.01	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Isobutyl Ketone	mg/L	-	-	-	-	0.001, 0.005	-	-	-	-	-	-	-	-	-	-	-	-
Methyl tertiary-butyl ether (MTBE)	mg/L	-	0.015	-	0.2	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-
n-Hexane	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	mg/L	-	-	-	0.04	0.0001, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	mg/L	-	-	-	0.004	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethylene	mg/L	-	0.01	-	0.05	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/L	-	0.024	-	0.0008	0.0002, 0.0004, 0.0008	-	-	-	<0.0002	-	-	<0.0002	-	-	<0.0004	-	<0.0002
trans-1,2-Dichloroethylene	mg/L	-	-	-	-	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	mg/L	-	-	-	-	0.0003, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethylene	mg/L	-	0.005	-	0.02	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	mg/L	-	-	-	-	0.0004, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	mg/L	-	0.001	-	0.6	0.00017, 0.0002, 0.00034, 0.00068	-	-	-	<0.00017	-	-	<0.00017	-	-	<0.00034	-	<0.00017
Xylene Mixture	mg/L	-	0.02	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, m+p	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, total	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-

-LEGEND-

Detection Limit

DL exceeds criteria

Concentration exceeds RUV-MG

Concentration exceeds ODWQS-ALL-MERGED

Concentration exceeds PWQO-GENERAL

Concentration exceeds PWQO-INTERIM

DL: May vary between sample locations and events

Reasonable Use Values Musclow Greenview

Ontario Drinking Water Quality Standards All Types Merged

Provincial Water Quality Objectives General

Provincial Water Quality Objectives Interim



Hastings Highlands Analytical Chemistry Results: Anions, Cations, GenChem, Met, VOCs in Well Screen						Site Name	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview
						Location	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-2	MG-18-2	MG-18-2	MG-18-2	MG-18-2	MG-18-2
						Sample ID	MG-18-1	MG-18-1	MG-QAQC- GW1 (MG-18-1)	MG-18-1	MG-18-1	MG-18-1	MG-QAQC- GW1 (MG-18-1)	MG-18-2	MG-18-2	MG-18-2	MG-18-2- QAQC- F19 (MG-18-2)	MG-18-2	MG-18-2
						Sample Date	2022-Oct-25	2023-May-02	2023-May-02	2023-Oct-18	2024-May-01	2024-Oct-30	2024-Oct-30	2019-Jan-10	2019-May-06	2019-Oct-21	2019-Oct-21	2020-May-05	2020-Oct-08
Parameter	Units	RUV-MG	ODWQS-ALL- MERGED	PWQO- GENERAL	PWQO- INTERIM	Lab Job Number	22T962553	23T021057	23T021057	C3W8341	C4D3558	C4Y5038	C4Y5038						
						Lab Sample ID	4461688	4961350	4961353	XJA306	ZBS438								
Anions						Detection Limit													
Chloride	mg/L	125.3	250	-	-	0.1, 0.12, 0.2, 0.24, 0.5, 1	72.9	145	134	87	110	74	82	160	111	108	105	111	93.1
Nitrate + Nitrite	mg/L	-	-	-	-	0.1, 0.5	-	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-
Nitrate as N	mg/L	2.6	10	-	-	0.05, 0.07, 0.1, 0.25, 0.5	<0.05	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.5	<0.25	<0.25	<0.25	<1	<0.5
Nitrite as N	mg/L	-	1	-	-	0.01, 0.05	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	-
Sulphate	mg/L	253.6	500	-	-	0.1, 0.19, 0.2, 0.5, 1	18	11.4	12.6	20	14	19	19	19.7	12.6	14.6	15.1	15.2	17.5
Cations																			
Calcium (diss)	mg/L	-	-	-	-	0.05, 0.1, 0.2, 0.25	62.8	116	121	92	120	89	94	329	291	269	273	269	296
Magnesium (diss)	mg/L	-	-	-	-	0.05, 0.1, 0.25	15.6	27.1	26	20	26	21	23	61.2	56.2	52.7	52	49.1	53.5
Potassium (diss)	mg/L	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (diss)	mg/L	101.5	200	-	-	0.05, 0.1, 0.25	17.8	21.7	21.1	26	29	27	29	62.7	70	71.4	71.5	70.2	87.7
General Chemistry																			
Alkalinity (as CaCO3)	mg/L	47.8 - 282.8	30 - 500	See Factsheet	-	1, 5	181	284	286	220	260	250	250	1190	1210	978	983	1010	1070
Ammonia as N	mg/L	-	-	-	-	0.02, 0.03, 0.04, 0.05, 0.07	0.03	<0.02	<0.02	0.073	0.11	0.086	0.099	<0.02	<0.02	0.03	0.04	<0.02	<0.02
Biochemical Oxygen Demand	mg/L	-	-	-	-	2, 5, 6	<2	<2	<2	2	<2	<2	<2	<5	<5	<5	<5	<5	2
Chemical Oxygen Demand	mg/L	-	-	-	-	4, 5	<5	11	23	16	17	<4	4.5	57	41	35	41	36	47
Dissolved Organic Carbon	mg/L	3.6	5	-	-	0.4, 0.5	3.7	8.9	8.8	5	7.9	6.6	7.4	14.7	17.1	14.7	17.2	17.8	19.5
Electrical Conductivity	uS/cm	-	-	-	-	1, 2, 5	591	949	958	760	890	770	770	2120	2010	1830	1830	2520	1880
Hardness (as CaCO3)	mg/L	-	80 - 100	-	-		221.1	-	-	-	-	-	-	1073.5	958.1	888.7	895.8	873.9	959.4
Lab Filtration DOC		-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-
pH	pH units	6.9 - 7.9	6.5 - 8.5	6.5 - 8.5	-		7.39	6.93	6.99	7.55	7.2	7.19	7.84	7.49	7.58	7.54	7.5	6.99	7.56
Total Dissolved Solids	mg/L	482.5	500	-	-	5, 10, 20	346	558	656	590	660	535	535	1190	1170	1190	1240	1200	1200
Total Suspended Solids	mg/L	-	-	-	-	10, 33, 50, 100, 200	8980	4940	5760	13000	3400	4600	5600	16500	12100	7460	5020	4780	2310
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	0.0000088	-	-	-	-
Metals																			
Aluminum (diss, 0.45 µm)	mg/L	0.1	0.1	-	Calculated	0.004, 0.0049	0.021	0.004	<0.004	<0.0049	<0.0049	<0.0049	<0.0049	<0.004	<0.004	0.084	0.097	0.005	0.011
Barium (diss)	mg/L	0.3	1	-	-	0.002	0.067	0.108	0.103	0.087	0.12	0.1	0.099	0.309	0.28	0.28	0.278	0.245	0.217
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (diss)	mg/L	1.3	5	-	0.2	0.01, 0.02, 0.1	0.132	0.148	0.14	0.19	0.16	0.17	0.18	0.49	0.509	0.761	0.76	0.762	1.03
Cadmium (diss)	mg/L	0	0.005	-	Calculated	0.00009, 0.0001	<0.0001	<0.0001	<0.0001	0.00011	0.0001	0.00012	0.00009	<0.002	<0.0001	<0.0001	<0.0001	0.0002	<0.0001
Chromium (diss)	mg/L	0	0.05	-	-	0.002, 0.003, 0.005	<0.002	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.003	0.008	<0.003	<0.003	0.004	0.003
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0005, 0.005	0.0208	0.0354	0.0348	0.025	0.042	0.03	0.032	0.028	0.0364	0.0399	0.0392	0.0387	0.0421
Copper (diss)	mg/L	-	1	-	Calculated	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (diss)	mg/L	0.2	0.3	0.3	-	0.01, 0.1, 0.5	0.182	0.354	0.357	0.36	0.72	0.53	0.57	3.02	10.1	16.7	16.5	7.29	11
Lead (diss)	mg/L	0	0.01	-	Calculated	0.0005, 0.001	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00082	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese (diss)	mg/L	0	0.05	-	-	0.002, 0.004, 0.01	4.19	7.46	7.33	5.2	7.6	6.1	6.5	5.97	8.15	8.92	8.69	8.08	9.96
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	-	0.00009, 0.0001	<0.0001	<0.0001	<0.0001	<0.00009	<0.00009	<0.00009	<0.00009	<0.002	<0.0001	<0.0001	<0.0001	<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	2.5	5	-	0.02	0.005, 0.025, 0.05, 0.25, 2.5	0.006	<0.005	<0.005	0.026	<0.005	<0.005	<0.005	0.009	0.007	0.006	0.005	<0.005	<0.005

- LEGEND-
- Detection Limit

DL exceeds criteria

Concentration exceeds RUV-MG

Concentration exceeds ODWQS-ALL-MERGED

Concentration exceeds PWQO-GENERAL

Concentration exceeds PWQO-INTERIM
- DL: May vary between sample locations and events

Reasonable Use Values Musclow Greenview

Ontario Drinking Water Quality Standards All Types Merged

Provincial Water Quality Objectives General

Provincial Water Quality Objectives Interim

Hastings Highlands Analytical Chemistry Results: Anions, Cations, GenChem, Met, VOCs in Well Screen						Site Name	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview
						Location	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-1	MG-18-2	MG-18-2	MG-18-2	MG-18-2	MG-18-2
						Sample ID	MG-18-1	MG-18-1	MG-QAQC- GW1 (MG-18-1)	MG-18-1	MG-18-1	MG-18-1	MG-QAQC- GW1 (MG-18-1)	MG-18-2	MG-18-2	MG-18-2	MG-18-2-QAQC- F19 (MG-18-2)	MG-18-2
						Sample Date	2022-Oct-25	2023-May-02	2023-May-02	2023-Oct-18	2024-May-01	2024-Oct-30	2024-Oct-30	2019-Jan-10	2019-May-06	2019-Oct-21	2019-Oct-21	2020-May-05
Parameter	Units	RUV-MG	ODWQS-ALL- MERGED	PWQO- GENERAL	PWQO- INTERIM	Lab Job Number	22T962553	23T021057	23T021057	C3W8341	C4D3558	C4Y5038	C4Y5038					
						Lab Sample ID	4461688	4961350	4961353	XJA306	ZBS438							
Anions						Detection Limit												
Chloride	mg/L	125.3	250	-	-	0.1, 0.12, 0.2, 0.24, 0.5, 1	72.9	145	134	87	110	74	82	160	111	108	105	111
Nitrate + Nitrite	mg/L	-	-	-	-	0.1, 0.5	-	-	-	-	-	<0.1	<0.1	-	-	-	-	-
Nitrate as N	mg/L	2.6	10	-	-	0.05, 0.07, 0.1, 0.25, 0.5	<0.05	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.5	<0.25	<0.25	<0.25	<1
VOCs																		
1,1,1,2-Tetrachloroethane	mg/L	-	-	-	0.02	0.0001, 0.0005	<0.0001	-	-	-	<0.0005	-	-	-	-	-	-	-
1,1,1-Trichloroethane	mg/L	-	-	-	0.01	0.0002, 0.0003	<0.0003	-	-	-	<0.0002	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	mg/L	-	-	-	0.07	0.0001, 0.0004	<0.0001	-	-	-	<0.0004	-	-	-	-	-	-	-
1,1,2-Trichloroethane	mg/L	-	-	-	0.8	0.0002, 0.0004	<0.0002	-	-	-	<0.0004	-	-	-	-	-	-	-
1,1-Dichloroethane	mg/L	-	-	-	0.2	0.0002, 0.0003	<0.0003	-	-	-	<0.0002	-	-	-	-	-	-	-
1,1-Dichloroethylene	mg/L	-	0.014	-	0.04	0.0002	<0.0002	-	-	-	<0.0002	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/L	-	-	0.0005	-	0.0003	<0.0003	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	mg/L	-	0.003	0.0025	-	0.0001, 0.0004	<0.0001	-	-	-	<0.0004	-	-	-	-	-	-	-
1,2-Dichloroethane	mg/L	-	0.005	-	0.1	0.0002, 0.00049	<0.0002	-	-	-	<0.00049	-	-	-	-	-	-	-
1,2-Dichloropropane	mg/L	-	-	-	0.0007	0.0002	<0.0002	-	-	-	<0.0002	-	-	-	-	-	-	-
1,3-Dichlorobenzene	mg/L	-	-	0.0025	-	0.0001, 0.0004	<0.0001	-	-	-	<0.0004	-	-	-	-	-	-	-
1,3-Dichloropropene (Cis + Trans)	mg/L	-	-	-	-	0.0003	<0.0003	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	mg/L	-	0.001	0.004	-	0.0001, 0.0002, 0.0004	<0.0001	-	-	-	<0.0004	-	-	-	<0.0004	-	-	<0.0004
2-Hexanone	mg/L	-	-	-	-	0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-
Acetone	mg/L	-	-	-	-	0.001, 0.01	<0.001	-	-	-	<0.01	-	-	-	-	-	-	-
Benzene	mg/L	-	0.001	-	0.1	0.0002, 0.0004, 0.0008	<0.0002	-	-	-	0.00022	-	-	-	0.0044	-	-	<0.0008
Bromodichloromethane	mg/L	-	-	-	0.2	0.0002, 0.0005	<0.0002	-	-	-	<0.0005	-	-	-	-	-	-	-
Bromoform	mg/L	-	-	-	0.06	0.0001, 0.001	<0.0001	-	-	-	<0.001	-	-	-	-	-	-	-
Bromomethane	mg/L	-	-	-	0.0009	0.0002, 0.0005	<0.0002	-	-	-	<0.0005	-	-	-	-	-	-	-
Carbon Tetrachloride	mg/L	-	0.002	-	-	0.00019, 0.0002	<0.0002	-	-	-	<0.00019	-	-	-	-	-	-	-
Chlorobenzene	mg/L	-	-	0.015	-	0.0001, 0.0002	<0.0001	-	-	-	<0.0002	-	-	-	-	-	-	-
Chloroethane	mg/L	-	-	-	-	0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-	-
Chloroform	mg/L	-	-	-	-	0.0002	<0.0002	-	-	-	<0.0002	-	-	-	-	-	-	-
Chloromethane	mg/L	-	-	-	0.7	0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethylene	mg/L	-	-	-	-	0.0002, 0.0005	0.001	-	-	-	<0.0005	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	mg/L	-	-	-	-	0.0002, 0.0003	<0.0002	-	-	-	<0.0003	-	-	-	-	-	-	-
Dibromochloromethane	mg/L	-	-	-	-	0.0001, 0.0005	<0.0001	-	-	-	<0.0005	-	-	-	-	-	-	-
Dichlorodifluoromethane	mg/L	-	-	-	-	0.0004, 0.001	<0.0004	-	-	-	<0.001	-	-	-	-	-	-	-
Dichloromethane	mg/L	-	0.05	-	-	0.0003, 0.0012, 0.002	-	-	-	-	<0.002	-	-	-	-	-	-	-
Ethylbenzene	mg/L	-	0.0016	-	0.008	0.0001, 0.0002	<0.0001	-	-	-	<0.0002	-	-	-	-	-	-	-
Ethylene Dibromide	mg/L	-	-	-	0.005	0.0001, 0.00019	<0.0001	-	-	-	<0.00019	-	-	-	-	-	-	-
Hexane	mg/L	-	-	-	-	0.001	-	-	-	-	<0.001	-	-	-	-	-	-	-
m & p-Xylene	mg/L	-	-	-	-	0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	mg/L	-	-	-	0.1	0.0003, 0.0006, 0.0012	<0.0003	-	-	-	-	-	-	-	<0.0012	-	-	<0.0012
Methyl Ethyl Ketone	mg/L	-	-	-	0.4	0.001, 0.01	<0.001	-	-	-	<0.01	-	-	-	-	-	-	-
Methyl Isobutyl Ketone	mg/L	-	-	-	-	0.001, 0.005	<0.001	-	-	-	<0.005	-	-	-	-	-	-	-
Methyl tertiary-butyl ether (MTBE)	mg/L	-	0.015	-	0.2	0.0002, 0.0005	<0.0002	-	-	-	<0.0005	-	-	-	-	-	-	-
n-Hexane	mg/L	-	-	-	-	0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	mg/L	-	-	-	0.04	0.0001, 0.0002	<0.0001	-	-	-	<0.0002	-	-	-	-	-	-	-
Styrene	mg/L	-	-	-	0.004	0.0001, 0.0004	<0.0001	-	-	-	<0.0004	-	-	-	-	-	-	-
Tetrachloroethylene	mg/L	-	0.01	-	0.05	0.0002	<0.0002	-	-	-	<0.0002	-	-	-	-	-	-	-
Toluene	mg/L	-	0.024	-	0.0008	0.0002, 0.0004, 0.0008	<0.0002	-	-	-	<0.0002	-	-	-	-	<0.0008	-	<0.0008
trans-1,2-Dichloroethylene	mg/L	-	-	-	-	0.0002, 0.0005	<0.0002	-	-	-	<0.0005	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	mg/L	-	-	-	-	0.0003, 0.0004	<0.0003	-	-	-	<0.0004	-	-	-	-	-	-	-
Trichloroethylene	mg/L	-	0.005	-	0.02	0.0002	<0.0002	-	-	-	<0.0002	-	-	-	-	-	-	-
Trichlorofluoromethane	mg/L	-	-	-	-	0.0004, 0.0005	<0.0004	-	-	-	<0.0005	-	-	-	-	-	-	-
Vinyl Chloride	mg/L	-	0.001	-	0.6	0.00017, 0.0002, 0.00034, 0.00068	<0.00017	-	-	-	<0.0002	-	-	-	<0.00068	-	-	<0.00068
Xylene Mixture	mg/L	-	0.02	-	-	0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-	-
Xylenes, m+p	mg/L	-	-	-	-	0.0002	-	-	-	-	<0.0002	-	-	-	-	-	-	-
Xylenes, total	mg/L	-	-	-	-	0.0002	-	-	-	-	<0.0002	-	-	-	-	-	-	-

-LEGEND-

Detection Limit

DL exceeds criteria

Concentration exceeds RUV-MG

Concentration exceeds ODWQS-ALL-MERGED

Concentration exceeds PWQO-GENERAL

Concentration exceeds PWQO-INTERIM

DL: May vary between sample locations and events

Reasonable Use Values Musclow Greenview

Ontario Drinking Water Quality Standards All Types Merged

Provincial Water Quality Objectives General

Provincial Water Quality Objectives Interim



Hastings Highlands Analytical Chemistry Results: Anions, Cations, GenChem, Met, VOCs in Well Screen						Site Name	Musclow Greenview MG-18-2	Musclow Greenview MG-18-2	Musclow Greenview MG-18-2	Musclow Greenview MG-18-2	Musclow Greenview MG-18-2	Musclow Greenview MG-18-2	Musclow Greenview MG-18-2	Musclow Greenview MG-18-2	Musclow Greenview MG-18-3	Musclow Greenview MG-18-3	Musclow Greenview MG-18-3R	Musclow Greenview MG-18-3R	Musclow Greenview MG-18-3R	Musclow Greenview MG-18-3R			
						Location	MG-18-2	MG-18-2	MG-18-2	MG-18-2	MG-18-2	MG-18-2	MG-18-2	MG-18-2	MG-18-3	MG-18-3	MG-18-3R	MG-18-3R	MG-18-3R	MG-18-3R	MG-18-3R	MG-18-3R	MG-18-3R
						Sample ID	MG-18-2-QAQC-F20 (MG-18-2)	MG-18-2	MG-18-2	MG-18-2	MG-18-2	MG-18-2	MG-18-2	MG-18-2	MG-18-2	MG-18-3	MG-18-3	MG-18-3R	MG-QAQC-GW1 (MG-18-3R)	MG-18-3R	MG-18-3R	MG-18-3R	MG-18-3R
						Sample Date	2020-Oct-08	2021-Apr-19	2021-Oct-20	2022-May-04	2022-Oct-25	2023-May-02	2023-Oct-18	2024-May-01	2019-May-06	2023-May-02	2023-Oct-18	2023-Oct-18	2023-Oct-18	2023-Oct-18	2024-May-01		
Parameter	Units	RUV-MG	ODWQS-ALL-MERGED	PWQO-GENERAL	PWQO-INTERIM	Lab Job Number		21T736297	21T819614	22P892059	22T962553	23T021057	C3W8341	C4D3558		23T021057	C3W8341	C3W8341	C4D3558				
						Lab Sample ID		2371832	3119360	3826239	4461744	4961351	XJA307	ZBS439		4961352	XJA308	XJA309	ZBS440				
Anions						Detection Limit																	
Chloride	mg/L	125.3	250	-	-	0.1, 0.12, 0.2, 0.24, 0.5, 1	90.2	94.1	93.8	96.2	102	117	97	130	5.19	1.36	<1	<1	<1				
Nitrate + Nitrite	mg/L	-	-	-	-	0.1, 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-				
Nitrate as N	mg/L	2.6	10	-	-	0.05, 0.07, 0.1, 0.25, 0.5	<0.5	<0.5	<0.07	<0.07	<0.07	<0.05	<0.1	<0.1	<0.05	3.18	<0.1	<0.1	0.12				
Nitrite as N	mg/L	-	1	-	-	0.01, 0.05	-	-	-	-	-	-	-	-	-	-	-	-	-				
Sulphate	mg/L	253.6	500	-	-	0.1, 0.19, 0.2, 0.5, 1	17.2	17.8	16.5	23.3	24.3	24.6	15	25	19.6	51.8	1.9	5.5	6.8				
Cations																							
Calcium (diss)	mg/L	-	-	-	-	0.05, 0.1, 0.2, 0.25	294	297	272	285	307	297	330	310	23.5	22.2	22	21	23				
Magnesium (diss)	mg/L	-	-	-	-	0.05, 0.1, 0.25	53.3	56.2	49	52	55.1	53	58	54	5.44	4.75	1.6	1.6	1.4				
Potassium (diss)	mg/L	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-				
Sodium (diss)	mg/L	101.5	200	-	-	0.05, 0.1, 0.25	87.5	82.3	80.8	82.6	91.5	75.6	86	87	21.8	12.5	3	3.1	3				
General Chemistry																							
Alkalinity (as CaCO3)	mg/L	47.8 - 282.8	30 - 500	See Factsheet	-	1, 5	1050	1020	976	940	954	963	970	1100	128	45	64	65	72				
Ammonia as N	mg/L	-	-	-	-	0.02, 0.03, 0.04, 0.05, 0.07	<0.02	<0.02	0.06	<0.02	0.17	0.08	0.46	0.57	<0.02	<0.02	0.059	0.052	0.058				
Biochemical Oxygen Demand	mg/L	-	-	-	-	2, 5, 6	<2	4	4	4	4	<2	<2	<2	<5	<2	<2	<2	<2				
Chemical Oxygen Demand	mg/L	-	-	-	-	4, 5	41	35	38	42	25	42	52	43	177	<5	8.2	<4	<4				
Dissolved Organic Carbon	mg/L	3.6	5	-	-	0.4, 0.5	18.9	18.7	17.9	16.8	16.9	15.2	16	15	31.6	2.4	2	1.5	1.5				
Electrical Conductivity	uS/cm	-	-	-	-	1, 2, 5	1850	2100	1920	1890	1830	1950	2100	2000	271	218	140	140	140				
Hardness (as CaCO3)	mg/L	-	80 - 100	-	-		953.6	973	881	925.8	993.5	-	-	-	81.1	-	-	-	-				
Lab Filtration DOC		-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-				
pH	pH units	6.9 - 7.9	6.5 - 8.5	6.5 - 8.5	-		7.54	7	7.47	7.1	7.16	7.03	7.47	7.18	7.18	7.42	7.59	7.66	7.35				
Total Dissolved Solids	mg/L	482.5	500	-	-	5, 10, 20	1190	1240	1140	1140	1130	1150	1250	1300	178	108	340	340	1040				
Total Suspended Solids	mg/L	-	-	-	-	10, 33, 50, 100, 200	2440	3100	4880	5210	2760	1500	11000	3400	4320	10500	38000	50000	39000				
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	0.0000725	-	-	-	-				
Metals																							
Aluminium (diss, 0.45 µm)	mg/L	0.1	0.1	-	Calculated	0.004, 0.0049	0.013	<0.004	<0.004	0.017	0.023	0.007	<0.0049	<0.0049	0.006	<0.004	<0.0049	<0.0049	<0.0049				
Barium (diss)	mg/L	0.3	1	-	-	0.002	0.217	0.176	0.248	0.261	0.253	0.237	0.28	0.25	0.018	0.015	0.022	0.022	0.016				
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-				
Boron (diss)	mg/L	1.3	5	-	0.2	0.01, 0.02, 0.1	1.11	0.833	1.21	1.11	1.33	1.22	1.2	1.3	0.011	0.015	0.01	<0.01	0.014				
Cadmium (diss)	mg/L	0	0.005	-	Calculated	0.00009, 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00048	0.00019	<0.0001	<0.0001	<0.00009	<0.00009	<0.00009				
Chromium (diss)	mg/L	0	0.05	-	-	0.002, 0.003, 0.005	<0.003	<0.003	<0.003	<0.003	<0.002	<0.002	<0.005	<0.005	<0.003	<0.002	<0.005	<0.005	<0.005				
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0005, 0.005	0.0424	0.0307	0.0508	0.0446	0.0654	0.0449	0.049	0.061	0.0006	<0.0005	0.0011	0.0011	<0.0005				
Copper (diss)	mg/L	-	1	-	Calculated	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-				
Iron (diss)	mg/L	0.2	0.3	0.3	-	0.01, 0.1, 0.5	10.9	3.85	10.7	4.2	11.2	6.15	6	9.2	<0.01	<0.01	<0.1	<0.1	<0.1				
Lead (diss)	mg/L	0	0.01	-	Calculated	0.0005, 0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005				
Manganese (diss)	mg/L	0	0.05	-	-	0.002, 0.004, 0.01	9.93	6.57	11.9	9.18	12.7	11.7	11	13	0.263	0.01	0.13	0.13	0.032				
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	-	0.00009, 0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.00009	<0.00009	<0.0001	<0.0001	<0.00009	<0.00009	<0.00009				
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	2.5	5	-	0.02	0.005, 0.025, 0.05, 0.25, 2.5	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005				

- LEGEND-

Detection Limit

DL exceeds criteria

Concentration exceeds RUV-MG

Concentration exceeds ODWQS-ALL-MERGED

Concentration exceeds PWQO-GENERAL

Concentration exceeds PWQO-INTERIM
- DL: May vary between sample locations and events

Reasonable Use Values Musclow Greenview

Ontario Drinking Water Quality Standards All Types Merged

Provincial Water Quality Objectives General

Provincial Water Quality Objectives Interim

Hastings Highlands Analytical Chemistry Results: Anions, Cations, GenChem, Met, VOCs in Well Screen						Site Name	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview
						Location	MG-18-2	MG-18-2	MG-18-2	MG-18-2	MG-18-2	MG-18-2	MG-18-2	MG-18-2	MG-18-3	MG-18-3	MG-18-3R	MG-18-3R
						Sample ID	MG-18-2-QAQC-F20 (MG-18-2)	MG-18-2	MG-18-2	MG-18-2	MG-18-2	MG-18-2	MG-18-2	MG-18-2	MG-18-3	MG-18-3	MG-18-3R	MG-QAQC-GW1 (MG-18-3R)
						Sample Date	2020-Oct-08	2021-Apr-19	2021-Oct-20	2022-May-04	2022-Oct-25	2023-May-02	2023-Oct-18	2024-May-01	2019-May-06	2023-May-02	2023-Oct-18	2023-Oct-18
Parameter	Units	RUV-MG	ODWQS-ALL-MERGED	PWQO-GENERAL	PWQO-INTERIM	Lab Job Number		21T736297	21T819614	22P892059	22T962553	23T021057	C3W8341	C4D3558		23T021057	C3W8341	C3W8341
						Lab Sample ID		2371832	3119360	3826239	4461744	4961351	XJA307	ZBS439		4961352	XJA308	XJA309
Anions						Detection Limit												
Chloride	mg/L	125.3	250	-	-	0.1, 0.12, 0.2, 0.24, 0.5, 1	90.2	94.1	93.8	96.2	102	117	97	130	5.19	1.36	<1	<1
Nitrate + Nitrite	mg/L	-	-	-	-	0.1, 0.5	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	2.6	10	-	-	0.05, 0.07, 0.1, 0.25, 0.5	<0.5	<0.5	<0.07	<0.07	<0.07	<0.05	<0.1	<0.1	<0.05	3.18	<0.1	<0.1
VOCs																		
1,1,1,2-Tetrachloroethane	mg/L	-	-	-	0.02	0.0001, 0.0005	-	-	-	-	<0.0001	-	-	<0.0005	-	-	-	-
1,1,1-Trichloroethane	mg/L	-	-	-	0.01	0.0002, 0.0003	-	-	-	-	<0.0003	-	-	<0.0002	-	-	-	-
1,1,2,2-Tetrachloroethane	mg/L	-	-	-	0.07	0.0001, 0.0004	-	-	-	-	<0.0001	-	-	<0.0004	-	-	-	-
1,1,2-Trichloroethane	mg/L	-	-	-	0.8	0.0002, 0.0004	-	-	-	-	<0.0002	-	-	<0.0004	-	-	-	-
1,1-Dichloroethane	mg/L	-	-	-	0.2	0.0002, 0.0003	-	-	-	-	0.00096	-	-	0.00064	-	-	-	-
1,1-Dichloroethylene	mg/L	-	0.014	-	0.04	0.0002	-	-	-	-	<0.0002	-	-	<0.0002	-	-	-	-
1,2,4-Trichlorobenzene	mg/L	-	-	0.0005	-	0.0003	-	-	-	-	<0.0003	-	-	-	-	-	-	-
1,2-Dichlorobenzene	mg/L	-	0.003	0.0025	-	0.0001, 0.0004	-	-	-	-	<0.0001	-	-	<0.0004	-	-	-	-
1,2-Dichloroethane	mg/L	-	0.005	-	0.1	0.0002, 0.00049	-	-	-	-	0.001	-	-	0.0011	-	-	-	-
1,2-Dichloropropane	mg/L	-	-	-	0.0007	0.0002	-	-	-	-	<0.0002	-	-	<0.0002	-	-	-	-
1,3-Dichlorobenzene	mg/L	-	-	0.0025	-	0.0001, 0.0004	-	-	-	-	<0.0001	-	-	<0.0004	-	-	-	-
1,3-Dichloropropene (Cis + Trans)	mg/L	-	-	-	-	0.0003	-	-	-	-	<0.0003	-	-	-	-	-	-	-
1,4-Dichlorobenzene	mg/L	-	0.001	0.004	-	0.0001, 0.0002, 0.0004	-	-	<0.0004	<0.0004	<0.0001	-	-	<0.0004	-	-	-	-
2-Hexanone	mg/L	-	-	-	-	0.001	-	-	-	-	<0.001	-	-	-	-	-	-	-
Acetone	mg/L	-	-	-	-	0.001, 0.01	-	-	-	-	<0.001	-	-	<0.01	-	-	-	-
Benzene	mg/L	-	0.001	-	0.1	0.0002, 0.0004, 0.0008	-	-	0.0039	0.00297	0.00515	-	-	0.0045	-	-	-	-
Bromodichloromethane	mg/L	-	-	-	0.2	0.0002, 0.0005	-	-	-	-	<0.0002	-	-	<0.0005	-	-	-	-
Bromoform	mg/L	-	-	-	0.06	0.0001, 0.001	-	-	-	-	<0.0001	-	-	<0.001	-	-	-	-
Bromomethane	mg/L	-	-	-	0.0009	0.0002, 0.0005	-	-	-	-	<0.0002	-	-	<0.0005	-	-	-	-
Carbon Tetrachloride	mg/L	-	0.002	-	-	0.00019, 0.0002	-	-	-	-	<0.0002	-	-	<0.00019	-	-	-	-
Chlorobenzene	mg/L	-	-	0.015	-	0.0001, 0.0002	-	-	-	-	<0.0001	-	-	<0.0002	-	-	-	-
Chloroethane	mg/L	-	-	-	-	0.0002	-	-	-	-	0.014	-	-	-	-	-	-	-
Chloroform	mg/L	-	-	-	-	0.0002	-	-	-	-	<0.0002	-	-	<0.0002	-	-	-	-
Chloromethane	mg/L	-	-	-	0.7	0.0002	-	-	-	-	<0.0002	-	-	-	-	-	-	-
cis-1,2-Dichloroethylene	mg/L	-	-	-	-	0.0002, 0.0005	-	-	-	-	0.018	-	-	0.02	-	-	-	-
cis-1,3-Dichloropropene	mg/L	-	-	-	-	0.0002, 0.0003	-	-	-	-	<0.0002	-	-	<0.0003	-	-	-	-
Dibromochloromethane	mg/L	-	-	-	-	0.0001, 0.0005	-	-	-	-	<0.0001	-	-	<0.0005	-	-	-	-
Dichlorodifluoromethane	mg/L	-	-	-	-	0.0004, 0.001	-	-	-	-	<0.0004	-	-	<0.001	-	-	-	-
Dichloromethane	mg/L	-	0.05	-	-	0.0003, 0.0012, 0.002	-	-	-	<0.0012	-	-	-	<0.002	-	-	-	-
Ethylbenzene	mg/L	-	0.0016	-	0.008	0.0001, 0.0002	-	-	-	-	<0.0001	-	-	<0.0002	-	-	-	-
Ethylene Dibromide	mg/L	-	-	-	0.005	0.0001, 0.00019	-	-	-	-	<0.0001	-	-	<0.00019	-	-	-	-
Hexane	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	<0.001	-	-	-	-
m & p-Xylene	mg/L	-	-	-	-	0.0002	-	-	-	-	<0.0002	-	-	-	-	-	-	-
Methylene Chloride	mg/L	-	-	-	0.1	0.0003, 0.0006, 0.0012	-	-	<0.0012	-	<0.0003	-	-	-	-	-	-	-
Methyl Ethyl Ketone	mg/L	-	-	-	0.4	0.001, 0.01	-	-	-	-	<0.001	-	-	<0.01	-	-	-	-
Methyl Isobutyl Ketone	mg/L	-	-	-	-	0.001, 0.005	-	-	-	-	<0.001	-	-	<0.005	-	-	-	-
Methyl tertiary-butyl ether (MTBE)	mg/L	-	0.015	-	0.2	0.0002, 0.0005	-	-	-	-	<0.0002	-	-	<0.0005	-	-	-	-
n-Hexane	mg/L	-	-	-	-	0.0002	-	-	-	-	<0.0002	-	-	-	-	-	-	-
o-Xylene	mg/L	-	-	-	0.04	0.0001, 0.0002	-	-	-	-	<0.0001	-	-	<0.0002	-	-	-	-
Styrene	mg/L	-	-	-	0.004	0.0001, 0.0004	-	-	-	-	<0.0001	-	-	<0.0004	-	-	-	-
Tetrachloroethylene	mg/L	-	0.01	-	0.05	0.0002	-	-	-	-	<0.0002	-	-	<0.0002	-	-	-	-
Toluene	mg/L	-	0.024	-	0.0008	0.0002, 0.0004, 0.0008	-	-	<0.0008	<0.0008	<0.0002	-	-	<0.0002	-	-	-	-
trans-1,2-Dichloroethylene	mg/L	-	-	-	-	0.0002, 0.0005	-	-	-	-	<0.0002	-	-	<0.0005	-	-	-	-
trans-1,3-Dichloropropene	mg/L	-	-	-	-	0.0003, 0.0004	-	-	-	-	<0.0003	-	-	<0.0004	-	-	-	-
Trichloroethylene	mg/L	-	0.005	-	0.02	0.0002	-	-	-	-	<0.0002	-	-	<0.0002	-	-	-	-
Trichlorofluoromethane	mg/L	-	-	-	-	0.0004, 0.0005	-	-	-	-	<0.0004	-	-	<0.0005	-	-	-	-
Vinyl Chloride	mg/L	-	0.001	-	0.6	0.00017, 0.0002, 0.00034, 0.00068	-	-	<0.00068	0.00211	0.00299	-	-	0.0014	-	-	-	-
Xylene Mixture	mg/L	-	0.02	-	-	0.0002	-	-	-	-	<0.0002	-	-	-	-	-	-	-
Xylenes, m+p	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	<0.0002	-	-	-	-
Xylenes, total	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	<0.0002	-	-	-	-

-LEGEND-	
Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds RUV-MG	Reasonable Use Values Musclow Greenview
Concentration exceeds ODWQS-ALL-MERGED	Ontario Drinking Water Quality Standards All Types Merged
Concentration exceeds PWQO-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PWQO-INTERIM	Provincial Water Quality Objectives Interim



Hastings Highlands Analytical Chemistry Results: Anions, Cations, GenChem, Met, VOCs in Well Screen						Site Name	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview
						Location	MG-18-3R	MG-18-3R	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1
						Sample ID	MG-QAQC- GW1 (MG-18-3R)	MG-18-3R	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1
						Sample Date	2024-May-01	2024-Oct-30	2016-Oct-25	2017-May-11	2017-Oct-25	2018-May-09	2019-May-06	2019-Oct-21	2020-May-05	2020-Oct-08	2021-Apr-19	2021-Oct-20	2022-May-04
						Lab Job Number	C4D3558	C4Y5038									21T736297	21T819614	22P892059
Parameter	Units	RUV-MG	ODWQS-ALL- MERGED	PWQO- GENERAL	PWQO- INTERIM	Lab Sample ID	ZBS441										2371822	3118873	3826150
Anions						Detection Limit													
Chloride	mg/L	125.3	250	-	-	0.1, 0.12, 0.2, 0.24, 0.5, 1	<1	<1	26.5	27.4	31.7	33.1	29.5	35.8	36.2	41.3	42.3	45.1	49.6
Nitrate + Nitrite	mg/L	-	-	-	-	0.1, 0.5	-	<0.1	-	-	-	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	2.6	10	-	-	0.05, 0.07, 0.1, 0.25, 0.5	0.13	<0.1	<0.25	<0.1	<0.1	<0.1	<0.25	<0.25	<0.25	<0.1	<0.1	<0.05	<0.05
Nitrite as N	mg/L	-	1	-	-	0.01, 0.05	-	0.011	-	-	-	-	-	-	-	-	-	-	-
Sulphate	mg/L	253.6	500	-	-	0.1, 0.19, 0.2, 0.5, 1	7	7.3	106	111	112	114	98.9	111	108	107	103	111	113
Cations																			
Calcium (diss)	mg/L	-	-	-	-	0.05, 0.1, 0.2, 0.25	22	19	126	123	135	126	122	120	122	128	131	120	130
Magnesium (diss)	mg/L	-	-	-	-	0.05, 0.1, 0.25	1.4	1.2	9.46	9.82	10.4	9.21	9.25	9.62	9.41	9.55	10.5	9.34	10.6
Potassium (diss)	mg/L	-	-	-	-	1	-	-	5.88	-	-	-	-	-	-	-	-	-	-
Sodium (diss)	mg/L	101.5	200	-	-	0.05, 0.1, 0.25	3	2.9	7.15	6.58	8.3	7.05	7.02	8.6	7.69	8.38	8.69	8.45	9
General Chemistry																			
Alkalinity (as CaCO3)	mg/L	47.8 - 282.8	30 - 500	See Factsheet	-	1, 5	67	55	253	230	248	252	281	238	230	247	226	224	218
Ammonia as N	mg/L	-	-	-	-	0.02, 0.03, 0.04, 0.05, 0.07	0.05	<0.05	0.22	0.17	0.17	0.17	0.15	0.24	0.13	0.15	0.18	0.06	0.14
Biochemical Oxygen Demand	mg/L	-	-	-	-	2, 5, 6	<2	<2	-	-	<5	<5	<5	<5	8	<2	<6	<2	<2
Chemical Oxygen Demand	mg/L	-	-	-	-	4, 5	<4	<4	9	10	30	13	25	14	17	15	7	11	23
Dissolved Organic Carbon	mg/L	3.6	5	-	-	0.4, 0.5	1.3	2.2	6.3	7.4	59.9	30	14.8	4.9	9.4	9.2	5.7	8.5	6.4
Electrical Conductivity	uS/cm	-	-	-	-	1, 2, 5	140	120	709	783	659	687	717	707	904	721	791	752	777
Hardness (as CaCO3)	mg/L	-	80 - 100	-	-		-	-	353.6	347.6	379.9	352.5	342.7	339.3	343.4	358.9	370.3	338.1	368.3
Lab Filtration DOC		-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-
pH	pH units	6.9 - 7.9	6.5 - 8.5	6.5 - 8.5	-		7.36	7.28	7.59	8.09	8.13	7.93	7.89	7.77	7.6	7.96	7.57	7.69	7.48
Total Dissolved Solids	mg/L	482.5	500	-	-	5, 10, 20	1110	590	472	-	466	462	432	492	460	490	498	508	508
Total Suspended Solids	mg/L	-	-	-	-	10, 33, 50, 100, 200	37000	33000	-	-	<10	<10	1180	82	12	10	11	48	<10
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.1	-	-	0.001276674	0.06324381	0.000692518	0.000763647	0.000284	-	-	-	-	-	-
Metals																			
Aluminum (diss, 0.45 µm)	mg/L	0.1	0.1	-	Calculated	0.004, 0.0049	<0.0049	0.022	<0.004	0.01	0.009	<0.004	0.006	0.022	0.008	0.013	0.021	0.012	0.013
Barium (diss)	mg/L	0.3	1	-	-	0.002	0.016	0.011	0.074	0.06	0.07	0.063	0.066	0.076	0.071	0.063	0.069	0.069	0.074
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	-	-	<0.001	-	-	-	-	-	-	-	-	-	-
Boron (diss)	mg/L	1.3	5	-	0.2	0.01, 0.02, 0.1	<0.01	<0.01	0.087	0.063	0.077	0.066	0.05	0.097	0.06	0.081	0.059	0.067	0.049
Cadmium (diss)	mg/L	0	0.005	-	Calculated	0.00009, 0.0001	<0.00009	<0.00009	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium (diss)	mg/L	0	0.05	-	-	0.002, 0.003, 0.005	<0.005	<0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0005, 0.005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Copper (diss)	mg/L	-	1	-	Calculated	0.001	-	-	<0.003	-	-	-	-	-	-	-	-	-	-
Iron (diss)	mg/L	0.2	0.3	0.3	-	0.01, 0.1, 0.5	<0.1	<0.1	0.158	0.675	0.239	0.125	0.226	<0.01	<0.01	<0.01	0.033	0.028	0.026
Lead (diss)	mg/L	0	0.01	-	Calculated	0.0005, 0.001	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese (diss)	mg/L	0	0.05	-	-	0.002, 0.004, 0.01	0.031	0.0071	0.138	0.161	0.134	0.134	0.141	0.149	0.166	0.13	0.163	0.144	0.163
Molybdenum (diss)	mg/L	-	-	-	0.04	0.005	-	-	<0.002	-	-	-	-	-	-	-	-	-	-
Nickel (diss)	mg/L	-	-	0.025	-	0.005	-	-	0.004	-	-	-	-	-	-	-	-	-	-
Silicon (diss)	mg/L	-	-	-	-	0.1	-	-	11.4	-	-	-	-	-	-	-	-	-	-
Silver (diss)	mg/L	-	-	0.0001	-	0.00009, 0.0001	<0.00009	<0.00009	<0.002	<0.002	<0.002	<0.002	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001
Strontium (diss)	mg/L	-	-	-	-	0.001	-	-	2.07	-	-	-	-	-	-	-	-	-	-
Thallium (diss)	mg/L	-	-	-	0.0003	0.0001	-	-	<0.006	-	-	-	-	-	-	-	-	-	-
Titanium (diss)	mg/L	-	-	-	-	0.002	-	-	<0.002	-	-	-	-	-	-	-	-	-	-
Vanadium (diss)	mg/L	-	-	-	0.006	0.001	-	-	<0.002	-	-	-	-	-	-	-	-	-	-
Zinc (diss)	mg/L	2.5	5	-	0.02	0.005, 0.025, 0.05, 0.25, 2.5	<0.005	<0.005	0.006	0.036	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

-LEGEND-	
Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds RUV-MG	Reasonable Use Values Musclow Greenview
Concentration exceeds ODWQS-ALL-MERGED	Ontario Drinking Water Quality Standards All Types Merged
Concentration exceeds PWQO-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PWQO-INTERIM	Provincial Water Quality Objectives Interim

Hastings Highlands Analytical Chemistry Results: Anions, Cations, GenChem, Met, VOCs in Well Screen						Site Name	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview			
						Location	MG-18-3R	MG-18-3R	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1
						Sample ID	MG-QAQC- GW1 (MG-18-3R)	MG-18-3R	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1
						Sample Date	2024-May-01	2024-Oct-30	2016-Oct-25	2017-May-11	2017-Oct-25	2018-May-09	2019-May-06	2019-Oct-21	2020-May-05	2020-Oct-08	2021-Apr-19	2021-Oct-20	2022-May-04			
Parameter	Units	RUV-MG	ODWQS-ALL- MERGED	PWQO- GENERAL	PWQO- INTERIM	Lab Job Number	C4D3558	C4Y5038									21T736297	21T819614	22P892059			
						Lab Sample ID	ZBS441															
Anions						Detection Limit																
Chloride	mg/L	125.3	250	-	-	0.1, 0.12, 0.2, 0.24, 0.5, 1	<1	<1	26.5	27.4	31.7	33.1	29.5	35.8	36.2	41.3	42.3	45.1	49.6			
Nitrate + Nitrite	mg/L	-	-	-	-	0.1, 0.5	-	<0.1	-	-	-	-	-	-	-	-	-	-	-			
Nitrate as N	mg/L	2.6	10	-	-	0.05, 0.07, 0.1, 0.25, 0.5	0.13	<0.1	<0.25	<0.1	<0.1	<0.1	<0.25	<0.25	<0.25	<0.1	<0.1	<0.05	<0.05			
VOCs																						
1,1,1,2-Tetrachloroethane	mg/L	-	-	-	0.02	0.0001, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,1,1-Trichloroethane	mg/L	-	-	-	0.01	0.0002, 0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,1,2,2-Tetrachloroethane	mg/L	-	-	-	0.07	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,1,2-Trichloroethane	mg/L	-	-	-	0.8	0.0002, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,1-Dichloroethane	mg/L	-	-	-	0.2	0.0002, 0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,1-Dichloroethylene	mg/L	-	0.014	-	0.04	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,2,4-Trichlorobenzene	mg/L	-	-	0.0005	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,2-Dichlorobenzene	mg/L	-	0.003	0.0025	-	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,2-Dichloroethane	mg/L	-	0.005	-	0.1	0.0002, 0.00049	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,2-Dichloropropane	mg/L	-	-	-	0.0007	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,3-Dichlorobenzene	mg/L	-	-	0.0025	-	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,3-Dichloropropene (Cis + Trans)	mg/L	-	-	-	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,4-Dichlorobenzene	mg/L	-	0.001	0.004	-	0.0001, 0.0002, 0.0004	-	-	-	-	-	<0.0000001	-	-	-	-	-	-	-			
2-Hexanone	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-			
Acetone	mg/L	-	-	-	-	0.001, 0.01	-	-	-	-	-	-	-	-	-	-	-	-	-			
Benzene	mg/L	-	0.001	-	0.1	0.0002, 0.0004, 0.0008	-	-	-	-	-	<0.0000002	-	-	-	-	-	-	-			
Bromodichloromethane	mg/L	-	-	-	0.2	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
Bromoform	mg/L	-	-	-	0.06	0.0001, 0.001	-	-	-	-	-	-	-	-	-	-	-	-	-			
Bromomethane	mg/L	-	-	-	0.0009	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
Carbon Tetrachloride	mg/L	-	0.002	-	-	0.00019, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Chlorobenzene	mg/L	-	-	0.015	-	0.0001, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Chloroethane	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Chloroform	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Chloromethane	mg/L	-	-	-	0.7	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
cis-1,2-Dichloroethylene	mg/L	-	-	-	-	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
cis-1,3-Dichloropropene	mg/L	-	-	-	-	0.0002, 0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-			
Dibromochloromethane	mg/L	-	-	-	-	0.0001, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
Dichlorodifluoromethane	mg/L	-	-	-	-	0.0004, 0.001	-	-	-	-	-	-	-	-	-	-	-	-	-			
Dichloromethane	mg/L	-	0.05	-	-	0.0003, 0.0012, 0.002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Ethylbenzene	mg/L	-	0.0016	-	0.008	0.0001, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Ethylene Dibromide	mg/L	-	-	-	0.005	0.0001, 0.00019	-	-	-	-	-	-	-	-	-	-	-	-	-			
Hexane	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-			
m & p-Xylene	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Methylene Chloride	mg/L	-	-	-	0.1	0.0003, 0.0006, 0.0012	-	-	-	-	-	<0.0000003	-	-	-	-	-	-	-			
Methyl Ethyl Ketone	mg/L	-	-	-	0.4	0.001, 0.01	-	-	-	-	-	-	-	-	-	-	-	-	-			
Methyl Isobutyl Ketone	mg/L	-	-	-	-	0.001, 0.005	-	-	-	-	-	-	-	-	-	-	-	-	-			
Methyl tertiary-butyl ether (MTBE)	mg/L	-	0.015	-	0.2	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
n-Hexane	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
o-Xylene	mg/L	-	-	-	0.04	0.0001, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Styrene	mg/L	-	-	-	0.004	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-			
Tetrachloroethylene	mg/L	-	0.01	-	0.05	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Toluene	mg/L	-	0.024	-	0.0008	0.0002, 0.0004, 0.0008	-	-	-	-	-	0.0000002	-	-	-	-	-	-	-			
trans-1,2-Dichloroethylene	mg/L	-	-	-	-	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
trans-1,3-Dichloropropene	mg/L	-	-	-	-	0.0003, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-			
Trichloroethylene	mg/L	-	0.005	-	0.02	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Trichlorofluoromethane	mg/L	-	-	-	-	0.0004, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
Vinyl Chloride	mg/L	-	0.001	-	0.6	0.00017, 0.0002, 0.00034, 0.00068	-	-	-	-	-	<0.0000002	-	-	-	-	-	-	-			
Xylene Mixture	mg/L	-	0.02	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Xylenes, m+p	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Xylenes, total	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			

-LEGEND-

Detection Limit

DL exceeds criteria

Concentration exceeds RUV-MG

Concentration exceeds ODWQS-ALL-MERGED

Concentration exceeds PWQO-GENERAL

Concentration exceeds PWQO-INTERIM

DL: May vary between sample locations and events

Reasonable Use Values Musclow Greenview

Ontario Drinking Water Quality Standards All Types Merged

Provincial Water Quality Objectives General

Provincial Water Quality Objectives Interim



Hastings Highlands Analytical Chemistry Results: Anions, Cations, GenChem, Met, VOCs in Well Screen						Site Name	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview			
						Location	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2
						Sample ID	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2
						Sample Date	2022-Oct-25	2023-May-02	2023-Oct-18	2024-May-01	2024-Oct-30	2016-Oct-25	2017-May-11	2017-Oct-25	2018-May-09	2018-Oct-24	2019-May-06	2019-Oct-21	2020-May-05			
Parameter	Units	RUV-MG	ODWQS-ALL- MERGED	PWQO- GENERAL	PWQO- INTERIM	Lab Job Number	22T962553	23T021057	C3W8341	C4D3558	C4Y5038											
						Lab Sample ID	4461600	4961342	XJA301	ZBS433												
Anions						Detection Limit																
Chloride	mg/L	125.3	250	-	-	0.1, 0.12, 0.2, 0.24, 0.5, 1	50.7	52.2	44	46	45	0.74	1.05	0.95	1.11	0.99	0.97	0.64	0.92			
Nitrate + Nitrite	mg/L	-	-	-	-	0.1, 0.5	-	-	-	-	<0.1	-	-	-	-	-	-	-	-			
Nitrate as N	mg/L	2.6	10	-	-	0.05, 0.07, 0.1, 0.25, 0.5	<0.05	<0.05	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			
Nitrite as N	mg/L	-	1	-	-	0.01, 0.05	-	-	-	-	<0.01	-	-	-	-	-	-	-	-			
Sulphate	mg/L	253.6	500	-	-	0.1, 0.19, 0.2, 0.5, 1	119	116	110	110	98	4.82	8.48	5.34	5.73	3.34	1.37	2.2	0.96			
Cations																						
Calcium (diss)	mg/L	-	-	-	-	0.05, 0.1, 0.2, 0.25	172	140	150	140	130	44.7	41.3	45.3	45.6	43.2	45.3	41.7	42.7			
Magnesium (diss)	mg/L	-	-	-	-	0.05, 0.1, 0.25	12	11.4	11	11	10	3.7	3.67	3.91	3.72	3.57	3.94	3.67	3.68			
Potassium (diss)	mg/L	-	-	-	-	1	-	-	-	-	-	2.33	-	-	-	-	-	-	-			
Sodium (diss)	mg/L	101.5	200	-	-	0.05, 0.1, 0.25	13.1	10	12	12	12	4.31	4.15	4.39	4.09	4.12	4.23	4.14	4.07			
General Chemistry																						
Alkalinity (as CaCO3)	mg/L	47.8 - 282.8	30 - 500	See Factsheet	-	1, 5	250	239	250	240	250	166	144	160	164	137	187	155	162			
Ammonia as N	mg/L	-	-	-	-	0.02, 0.03, 0.04, 0.05, 0.07	0.19	0.19	0.29	0.28	0.28	5.9	5.5	5.3	6.48	5.56	5.08	5.73	5.88			
Biochemical Oxygen Demand	mg/L	-	-	-	-	2, 5, 6	<2	<2	<2	<2	<2	-	6	<5	10	<5	9	<5	11			
Chemical Oxygen Demand	mg/L	-	-	-	-	4, 5	12	<5	17	17	15	18	20	59	27	25	32	18	20			
Dissolved Organic Carbon	mg/L	3.6	5	-	-	0.4, 0.5	5.9	4.8	6.4	6.4	5.9	11	13.1	60.4	34.5	20.2	10.9	30.2	23.1			
Electrical Conductivity	uS/cm	-	-	-	-	1, 2, 5	800	812	830	810	810	316	320	281	302	336	317	295	391			
Hardness (as CaCO3)	mg/L	-	80 - 100	-	-		478.9	-	-	-	-	126.9	118.2	129.2	129.2	122.6	129.3	119.2	121.8			
Lab Filtration DOC		-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-			
pH	pH units	6.9 - 7.9	6.5 - 8.5	6.5 - 8.5	-		7.86	7.65	8.02	7.82	7.79	6.85	7.69	7.68	7.67	7.74	7.48	7.5	7.09			
Total Dissolved Solids	mg/L	482.5	500	-	-	5, 10, 20	522	540	610	600	565	190	-	186	168	184	178	208	174			
Total Suspended Solids	mg/L	-	-	-	-	10, 33, 50, 100, 200	22	11	<10	<10	<10	-	-	70	<10	<10	<10	<10	<10			
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.1	-	-	-	-	-	0.006313934	0.002803349	0.00250746	0.005358495	-	0.00435	-	-			
Metals																						
Aluminum (diss, 0.45 µm)	mg/L	0.1	0.1	-	Calculated	0.004, 0.0049	0.016	<0.004	<0.0049	<0.0049	<0.0049	<0.004	0.011	0.007	0.006	0.018	0.006	0.008	0.008			
Barium (diss)	mg/L	0.3	1	-	-	0.002	0.083	0.069	0.085	0.074	0.079	0.039	0.043	0.04	0.03	0.04	0.031	0.03	0.034			
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	-	-	-	-	-	<0.001	-	-	-	-	-	-	-			
Boron (diss)	mg/L	1.3	5	-	0.2	0.01, 0.02, 0.1	0.078	0.061	0.072	0.058	0.064	0.063	0.576	0.258	0.09	0.073	0.05	0.065	0.036			
Cadmium (diss)	mg/L	0	0.005	-	Calculated	0.00009, 0.0001	<0.0001	<0.0001	<0.00009	<0.00009	<0.00009	<0.001	<0.001	<0.001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001			
Chromium (diss)	mg/L	0	0.05	-	-	0.002, 0.003, 0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.003	0.006	0.003	<0.003	<0.003	<0.003	<0.003	<0.003			
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0005, 0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005			
Copper (diss)	mg/L	-	1	-	Calculated	0.001	-	-	-	-	-	<0.003	-	-	-	-	-	-	-			
Iron (diss)	mg/L	0.2	0.3	0.3	-	0.01, 0.1, 0.5	0.04	0.016	<0.1	<0.1	<0.1	0.039	0.946	0.518	0.223	0.16	0.204	0.057	0.204			
Lead (diss)	mg/L	0	0.01	-	Calculated	0.0005, 0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001			
Manganese (diss)	mg/L	0	0.05	-	-	0.002, 0.004, 0.01	0.185	0.144	0.15	0.15	0.13	0.104	0.171	0.111	0.082	0.074	0.08	0.075	0.079			
Molybdenum (diss)	mg/L	-	-	-	0.04	0.005	-	-	-	-	-	<0.002	-	-	-	-	-	-	-			
Nickel (diss)	mg/L	-	-	0.025	-	0.005	-	-	-	-	-	0.004	-	-	-	-	-	-	-			
Silicon (diss)	mg/L	-	-	-	-	0.1	-	-	-	-	-	13	-	-	-	-	-	-	-			
Silver (diss)	mg/L	-	-	0.0001	-	0.00009, 0.0001	<0.0001	<0.0001	<0.00009	<0.00009	<0.00009	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0001	<0.0001	<0.0001			
Strontium (diss)	mg/L	-	-	-	-	0.001	-	-	-	-	-	0.379	-	-	-	-	-	-	-			
Thallium (diss)	mg/L	-	-	-	0.0003	0.0001	-	-	-	-	-	<0.006	-	-	-	-	-	-	-			
Titanium (diss)	mg/L	-	-	-	-	0.002	-	-	-	-	-	<0.002	-	-	-	-	-	-	-			
Vanadium (diss)	mg/L	-	-	-	0.006	0.001	-	-	-	-	-	<0.002	-	-	-	-	-	-	-			
Zinc (diss)	mg/L	2.5	5	-	0.02	0.005, 0.025, 0.05, 0.25, 2.5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.013	0.008	<0.005	<0.005			

- LEGEND-

Detection Limit

DL exceeds criteria

Concentration exceeds RUV-MG

Concentration exceeds ODWQS-ALL-MERGED

Concentration exceeds PWQO-GENERAL

Concentration exceeds PWQO-INTERIM
- DL: May vary between sample locations and events

Reasonable Use Values Musclow Greenview

Ontario Drinking Water Quality Standards All Types Merged

Provincial Water Quality Objectives General

Provincial Water Quality Objectives Interim

Hastings Highlands Analytical Chemistry Results: Anions, Cations, GenChem, Met, VOCs in Well Screen						Site Name	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview			
						Location	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2
						Sample ID	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP1	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2
						Sample Date	2022-Oct-25	2023-May-02	2023-Oct-18	2024-May-01	2024-Oct-30	2016-Oct-25	2017-May-11	2017-Oct-25	2018-May-09	2018-Oct-24	2019-May-06	2019-Oct-21	2020-May-05			
Parameter	Units	RUV-MG	ODWQS-ALL- MERGED	PWQO- GENERAL	PWQO- INTERIM	Lab Job Number	22T962553	23T021057	C3W8341	C4D3558	C4Y5038											
						Lab Sample ID	4461600	4961342	XJA301	ZBS433												
Anions						Detection Limit																
Chloride	mg/L	125.3	250	-	-	0.1, 0.12, 0.2, 0.24, 0.5, 1	50.7	52.2	44	46	45	0.74	1.05	0.95	1.11	0.99	0.97	0.64	0.92			
Nitrate + Nitrite	mg/L	-	-	-	-	0.1, 0.5	-	-	-	-	<0.1	-	-	-	-	-	-	-	-			
Nitrate as N	mg/L	2.6	10	-	-	0.05, 0.07, 0.1, 0.25, 0.5	<0.05	<0.05	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			
VOCs																						
1,1,1,2-Tetrachloroethane	mg/L	-	-	-	0.02	0.0001, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,1,1-Trichloroethane	mg/L	-	-	-	0.01	0.0002, 0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,1,2,2-Tetrachloroethane	mg/L	-	-	-	0.07	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,1,2-Trichloroethane	mg/L	-	-	-	0.8	0.0002, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,1-Dichloroethane	mg/L	-	-	-	0.2	0.0002, 0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,1-Dichloroethylene	mg/L	-	0.014	-	0.04	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,2,4-Trichlorobenzene	mg/L	-	-	0.0005	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,2-Dichlorobenzene	mg/L	-	0.003	0.0025	-	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,2-Dichloroethane	mg/L	-	0.005	-	0.1	0.0002, 0.00049	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,2-Dichloropropane	mg/L	-	-	-	0.0007	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,3-Dichlorobenzene	mg/L	-	-	0.0025	-	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,3-Dichloropropene (Cis + Trans)	mg/L	-	-	-	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,4-Dichlorobenzene	mg/L	-	0.001	0.004	-	0.0001, 0.0002, 0.0004	-	-	-	-	-	-	-	-	<0.0000001	<0.0000004	-	-	-			
2-Hexanone	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-			
Acetone	mg/L	-	-	-	-	0.001, 0.01	-	-	-	-	-	-	-	-	-	-	-	-	-			
Benzene	mg/L	-	0.001	-	0.1	0.0002, 0.0004, 0.0008	-	-	-	-	-	-	-	-	<0.0000002	<0.0000008	-	-	-			
Bromodichloromethane	mg/L	-	-	-	0.2	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
Bromoform	mg/L	-	-	-	0.06	0.0001, 0.001	-	-	-	-	-	-	-	-	-	-	-	-	-			
Bromomethane	mg/L	-	-	-	0.0009	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
Carbon Tetrachloride	mg/L	-	0.002	-	-	0.00019, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Chlorobenzene	mg/L	-	-	0.015	-	0.0001, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Chloroethane	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Chloroform	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Chloromethane	mg/L	-	-	-	0.7	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
cis-1,2-Dichloroethylene	mg/L	-	-	-	-	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
cis-1,3-Dichloropropene	mg/L	-	-	-	-	0.0002, 0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-			
Dibromochloromethane	mg/L	-	-	-	-	0.0001, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
Dichlorodifluoromethane	mg/L	-	-	-	-	0.0004, 0.001	-	-	-	-	-	-	-	-	-	-	-	-	-			
Dichloromethane	mg/L	-	0.05	-	-	0.0003, 0.0012, 0.002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Ethylbenzene	mg/L	-	0.0016	-	0.008	0.0001, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Ethylene Dibromide	mg/L	-	-	-	0.005	0.0001, 0.00019	-	-	-	-	-	-	-	-	-	-	-	-	-			
Hexane	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-			
m & p-Xylene	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Methylene Chloride	mg/L	-	-	-	0.1	0.0003, 0.0006, 0.0012	-	-	-	-	-	-	-	-	<0.0000003	<0.0000012	-	-	-			
Methyl Ethyl Ketone	mg/L	-	-	-	0.4	0.001, 0.01	-	-	-	-	-	-	-	-	-	-	-	-	-			
Methyl Isobutyl Ketone	mg/L	-	-	-	-	0.001, 0.005	-	-	-	-	-	-	-	-	-	-	-	-	-			
Methyl tertiary-butyl ether (MTBE)	mg/L	-	0.015	-	0.2	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
n-Hexane	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
o-Xylene	mg/L	-	-	-	0.04	0.0001, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Styrene	mg/L	-	-	-	0.004	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-			
Tetrachloroethylene	mg/L	-	0.01	-	0.05	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Toluene	mg/L	-	0.024	-	0.0008	0.0002, 0.0004, 0.0008	-	-	-	-	-	-	-	-	<0.0000002	<0.0000008	-	-	-			
trans-1,2-Dichloroethylene	mg/L	-	-	-	-	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
trans-1,3-Dichloropropene	mg/L	-	-	-	-	0.0003, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-			
Trichloroethylene	mg/L	-	0.005	-	0.02	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Trichlorofluoromethane	mg/L	-	-	-	-	0.0004, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
Vinyl Chloride	mg/L	-	0.001	-	0.6	0.00017, 0.0002, 0.00034, 0.00068	-	-	-	-	-	-	-	-	<0.0000002	<0.0000007	-	-	-			
Xylene Mixture	mg/L	-	0.02	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Xylenes, m+p	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Xylenes, total	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			

-LEGEND-

Detection Limit

DL exceeds criteria

Concentration exceeds RUV-MG

Concentration exceeds ODWQS-ALL-MERGED

Concentration exceeds PWQO-GENERAL

Concentration exceeds PWQO-INTERIM

DL: May vary between sample locations and events

Reasonable Use Values Musclow Greenview

Ontario Drinking Water Quality Standards All Types Merged

Provincial Water Quality Objectives General

Provincial Water Quality Objectives Interim



Hastings Highlands Analytical Chemistry Results: Anions, Cations, GenChem, Met, VOCs in Well Screen						Site Name	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview
						Location	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP3	MG-DP3	MG-DP3
						Sample ID	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP3	MG-DP3	MG-DP3
						Sample Date	2020-Oct-08	2021-Apr-19	2021-Oct-20	2022-May-04	2022-Oct-25	2023-May-02	2023-Oct-18	2024-May-01	2024-Oct-30	2016-Oct-25	2017-May-11	2017-Oct-25
Parameter	Units	RUV-MG	ODWQS-ALL- MERGED	PWQO- GENERAL	PWQO- INTERIM	Lab Job Number		21T736297	21T819614	22P892059	22T962553	23T021057	C3W8341	C4D3558	C4Y5038			
						Lab Sample ID		2371828	3119011	3826234	4461683	4961346	XJA302	ZBS434				
Anions						Detection Limit												
Chloride	mg/L	125.3	250	-	-	0.1, 0.12, 0.2, 0.24, 0.5, 1	0.86	1.06	0.68	0.63	1.07	1.04	<1	<1	<1	56.2	62.6	72
Nitrate + Nitrite	mg/L	-	-	-	-	0.1, 0.5	-	-	-	-	-	-	-	-	<0.1	-	-	-
Nitrate as N	mg/L	2.6	10	-	-	0.05, 0.07, 0.1, 0.25, 0.5	<0.05	<0.05	<0.05	0.11	<0.05	<0.05	<0.1	<0.1	<0.1	<0.25	<0.1	<0.25
Nitrite as N	mg/L	-	1	-	-	0.01, 0.05	-	-	-	-	-	-	-	-	<0.01	-	-	-
Sulphate	mg/L	253.6	500	-	-	0.1, 0.19, 0.2, 0.5, 1	5.84	1.78	3.29	1.12	1.05	3.09	<1	4.8	2.1	62.2	71.5	52.3
Cations																		
Calcium (diss)	mg/L	-	-	-	-	0.05, 0.1, 0.2, 0.25	41.6	43.1	42.6	43.4	49.3	47.4	47	50	46	121	132	152
Magnesium (diss)	mg/L	-	-	-	-	0.05, 0.1, 0.25	3.42	3.82	3.5	3.76	4.58	4.42	4	4.2	3.9	13.7	15.6	18.1
Potassium (diss)	mg/L	-	-	-	-	1	-	-	-	-	-	-	-	-	-	4.69	-	-
Sodium (diss)	mg/L	101.5	200	-	-	0.05, 0.1, 0.25	3.87	4.17	3.99	4.29	6.94	4.26	4.4	4.5	4.2	15.2	13.9	19.5
General Chemistry																		
Alkalinity (as CaCO3)	mg/L	47.8 - 282.8	30 - 500	See Factsheet	-	1, 5	160	159	158	154	171	158	160	160	170	279	323	352
Ammonia as N	mg/L	-	-	-	-	0.02, 0.03, 0.04, 0.05, 0.07	5.46	6.16	0.25	5.32	5.61	5.65	5.9	6	5.9	0.21	0.05	0.21
Biochemical Oxygen Demand	mg/L	-	-	-	-	2, 5, 6	<2	5	<2	<2	<2	<2	5	<2	<2	-	-	<5
Chemical Oxygen Demand	mg/L	-	-	-	-	4, 5	54	93	31	32	27	13	36	63	57	15	13	47
Dissolved Organic Carbon	mg/L	3.6	5	-	-	0.4, 0.5	53.9	13.7	44.7	21.3	54.2	7.6	17	7.9	9.1	26.3	8.1	185
Electrical Conductivity	uS/cm	-	-	-	-	1, 2, 5	296	333	308	316	321	306	330	320	330	776	915	828
Hardness (as CaCO3)	mg/L	-	80 - 100	-	-		118	123.4	120.8	123.9	142	-	-	-	-	358.6	393.8	454.1
Lab Filtration DOC		-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-
pH	pH units	6.9 - 7.9	6.5 - 8.5	6.5 - 8.5	-		7.64	7.14	7.48	7.12	7.45	7.25	7.71	7.32	7.66	6.72	7.97	7.78
Total Dissolved Solids	mg/L	482.5	500	-	-	5, 10, 20	174	188	186	172	172	184	190	190	200	494	-	570
Total Suspended Solids	mg/L	-	-	-	-	10, 33, 50, 100, 200	<10	<10	<10	<10	<10	<10	<10	<10	<10	-	-	<10
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	0.000156516	0.0000216	0.0000941
Metals																		
Aluminum (diss, 0.45 µm)	mg/L	0.1	0.1	-	Calculated	0.004, 0.0049	0.013	<0.004	0.011	0.013	0.014	0.006	<0.0049	<0.0049	<0.0049	<0.004	0.005	0.014
Barium (diss)	mg/L	0.3	1	-	-	0.002	0.026	0.028	0.029	0.032	0.032	0.031	0.031	0.03	0.031	0.124	0.106	0.137
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	-	-	-	-	-	-	-	-	-	<0.001	-	-
Boron (diss)	mg/L	1.3	5	-	0.2	0.01, 0.02, 0.1	0.043	0.029	0.034	0.017	0.037	0.038	0.045	0.028	0.027	0.158	0.155	0.239
Cadmium (diss)	mg/L	0	0.005	-	Calculated	0.00009, 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00009	<0.00009	<0.00009	<0.001	<0.001	<0.001
Chromium (diss)	mg/L	0	0.05	-	-	0.002, 0.003, 0.005	<0.003	<0.003	<0.003	<0.003	<0.002	<0.002	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0005, 0.005	<0.0005	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001	0.001	0.002
Copper (diss)	mg/L	-	1	-	Calculated	0.001	-	-	-	-	-	-	-	-	-	<0.003	-	-
Iron (diss)	mg/L	0.2	0.3	0.3	-	0.01, 0.1, 0.5	<0.01	0.215	0.106	0.098	0.05	0.018	<0.1	<0.1	<0.1	0.372	0.333	0.284
Lead (diss)	mg/L	0	0.01	-	Calculated	0.0005, 0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002
Manganese (diss)	mg/L	0	0.05	-	-	0.002, 0.004, 0.01	0.06	0.067	0.06	0.07	0.065	0.068	0.067	0.07	0.066	0.867	0.475	0.199
Molybdenum (diss)	mg/L	-	-	-	0.04	0.005	-	-	-	-	-	-	-	-	-	<0.002	-	-
Nickel (diss)	mg/L	-	-	0.025	-	0.005	-	-	-	-	-	-	-	-	-	0.006	-	-
Silicon (diss)	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	15.4	-	-
Silver (diss)	mg/L	-	-	0.0001	-	0.00009, 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00009	<0.00009	<0.00009	<0.002	<0.002	<0.002
Strontium (diss)	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	0.748	-	-
Thallium (diss)	mg/L	-	-	-	0.0003	0.0001	-	-	-	-	-	-	-	-	-	<0.006	-	-
Titanium (diss)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	<0.002	-	-
Vanadium (diss)	mg/L	-	-	-	0.006	0.001	-	-	-	-	-	-	-	-	-	<0.002	-	-
Zinc (diss)	mg/L	2.5	5	-	0.02	0.005, 0.025, 0.05, 0.25, 2.5	<0.005	<0.005	<0.005	<0.005	0.006	0.008	<0.005	<0.005	<0.005	<0.005	<0.005	0.005

-LEGEND-	
Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds RUV-MG	Reasonable Use Values Musclow Greenview
Concentration exceeds ODWQS-ALL-MERGED	Ontario Drinking Water Quality Standards All Types Merged
Concentration exceeds PWQO-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PWQO-INTERIM	Provincial Water Quality Objectives Interim

Hastings Highlands Analytical Chemistry Results: Anions, Cations, GenChem, Met, VOCs in Well Screen						Site Name	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview
						Location	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP3	MG-DP3	MG-DP3
						Sample ID	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP2	MG-DP3	MG-DP3	MG-DP3
						Sample Date	2020-Oct-08	2021-Apr-19	2021-Oct-20	2022-May-04	2022-Oct-25	2023-May-02	2023-Oct-18	2024-May-01	2024-Oct-30	2016-Oct-25	2017-May-11	2017-Oct-25
Parameter	Units	RUV-MG	ODWQS-ALL- MERGED	PWQO- GENERAL	PWQO- INTERIM	Lab Job Number		21T736297	21T819614	22P892059	22T962553	23T021057	C3W8341	C4D3558	C4Y5038			
						Lab Sample ID		2371828	3119011	3826234	4461683	4961346	XJA302	ZBS434				
Anions						Detection Limit												
Chloride	mg/L	125.3	250	-	-	0.1, 0.12, 0.2, 0.24, 0.5, 1	0.86	1.06	0.68	0.63	1.07	1.04	<1	<1	<1	56.2	62.6	72
Nitrate + Nitrite	mg/L	-	-	-	-	0.1, 0.5	-	-	-	-	-	-	-	-	<0.1	-	-	-
Nitrate as N	mg/L	2.6	10	-	-	0.05, 0.07, 0.1, 0.25, 0.5	<0.05	<0.05	<0.05	0.11	<0.05	<0.05	<0.1	<0.1	<0.1	<0.25	<0.1	<0.25
VOCs																		
1,1,1,2-Tetrachloroethane	mg/L	-	-	-	0.02	0.0001, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	mg/L	-	-	-	0.01	0.0002, 0.0003	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	mg/L	-	-	-	0.07	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	mg/L	-	-	-	0.8	0.0002, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	mg/L	-	-	-	0.2	0.0002, 0.0003	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethylene	mg/L	-	0.014	-	0.04	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/L	-	-	0.0005	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	mg/L	-	0.003	0.0025	-	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	mg/L	-	0.005	-	0.1	0.0002, 0.00049	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	mg/L	-	-	-	0.0007	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	mg/L	-	-	0.0025	-	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropene (Cis + Trans)	mg/L	-	-	-	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	mg/L	-	0.001	0.004	-	0.0001, 0.0002, 0.0004	-	-	-	-	-	-	-	-	-	-	-	<0.0000004
2-Hexanone	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	mg/L	-	-	-	-	0.001, 0.01	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	mg/L	-	0.001	-	0.1	0.0002, 0.0004, 0.0008	-	-	-	-	-	-	-	-	-	-	-	<0.0000008
Bromodichloromethane	mg/L	-	-	-	0.2	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	mg/L	-	-	-	0.06	0.0001, 0.001	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	mg/L	-	-	-	0.0009	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Tetrachloride	mg/L	-	0.002	-	-	0.00019, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	mg/L	-	-	0.015	-	0.0001, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	mg/L	-	-	-	0.7	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethylene	mg/L	-	-	-	-	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	mg/L	-	-	-	-	0.0002, 0.0003	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	mg/L	-	-	-	-	0.0001, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	mg/L	-	-	-	-	0.0004, 0.001	-	-	-	-	-	-	-	-	-	-	-	-
Dichloromethane	mg/L	-	0.05	-	-	0.0003, 0.0012, 0.002	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/L	-	0.0016	-	0.008	0.0001, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene Dibromide	mg/L	-	-	-	0.005	0.0001, 0.00019	-	-	-	-	-	-	-	-	-	-	-	-
Hexane	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-
m & p-Xylene	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	mg/L	-	-	-	0.1	0.0003, 0.0006, 0.0012	-	-	-	-	-	-	-	-	-	-	-	<0.0000012
Methyl Ethyl Ketone	mg/L	-	-	-	0.4	0.001, 0.01	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Isobutyl Ketone	mg/L	-	-	-	-	0.001, 0.005	-	-	-	-	-	-	-	-	-	-	-	-
Methyl tertiary-butyl ether (MTBE)	mg/L	-	0.015	-	0.2	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-
n-Hexane	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	mg/L	-	-	-	0.04	0.0001, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	mg/L	-	-	-	0.004	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethylene	mg/L	-	0.01	-	0.05	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/L	-	0.024	-	0.0008	0.0002, 0.0004, 0.0008	-	-	-	-	-	-	-	-	-	-	-	<0.0000008
trans-1,2-Dichloroethylene	mg/L	-	-	-	-	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	mg/L	-	-	-	-	0.0003, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethylene	mg/L	-	0.005	-	0.02	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	mg/L	-	-	-	-	0.0004, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	mg/L	-	0.001	-	0.6	0.00017, 0.0002, 0.00034, 0.00068	-	-	-	-	-	-	-	-	-	-	-	<0.0000007
Xylene Mixture	mg/L	-	0.02	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, m+p	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, total	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-

-LEGEND-

Detection Limit

DL exceeds criteria

Concentration exceeds RUV-MG

Concentration exceeds ODWQS-ALL-MERGED

Concentration exceeds PWQO-GENERAL

Concentration exceeds PWQO-INTERIM

DL: May vary between sample locations and events

Reasonable Use Values Musclow Greenview

Ontario Drinking Water Quality Standards All Types Merged

Provincial Water Quality Objectives General

Provincial Water Quality Objectives Interim



Hastings Highlands Analytical Chemistry Results: Anions, Cations, GenChem, Met, VOCs in Well Screen						Site Name	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview
						Location	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3
						Sample ID	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3
						Sample Date	2018-Oct-24	2019-May-06	2019-Oct-21	2020-May-05	2020-Oct-08	2021-Apr-19	2021-Oct-20	2022-May-04	2022-Oct-25	2023-May-02	2023-Oct-18	2024-May-01	2024-Oct-30
Parameter	Units	RUV-MG	ODWQS-ALL-MERGED	PWQO-GENERAL	PWQO-INTERIM	Lab Job Number						21T736297	21T819614	22P892059	22T962553	23T021057	C3W8341	C4D3558	C4Y5038
						Lab Sample ID						2371829	3119012	3826235	4461684	4961347	XJA303	ZBS435	
Anions						Detection Limit													
Chloride	mg/L	125.3	250	-	-	0.1, 0.12, 0.2, 0.24, 0.5, 1	77.2	82.5	76.7	85.5	74.7	77.6	73.6	75.2	77.3	77.7	57	69	70
Nitrate + Nitrite	mg/L	-	-	-	-	0.1, 0.5	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
Nitrate as N	mg/L	2.6	10	-	-	0.05, 0.07, 0.1, 0.25, 0.5	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.05	1.8	<0.05	<0.05	<0.1	<0.1	<0.1
Nitrite as N	mg/L	-	1	-	-	0.01, 0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Sulphate	mg/L	253.6	500	-	-	0.1, 0.19, 0.2, 0.5, 1	55.7	62.2	48.5	52.4	43.3	43.3	44.1	42.5	39.2	37	24	35	34
Cations																			
Calcium (diss)	mg/L	-	-	-	-	0.05, 0.1, 0.2, 0.25	158	193	183	212	223	234	225	231	279	250	260	260	240
Magnesium (diss)	mg/L	-	-	-	-	0.05, 0.1, 0.25	19	23	25.3	25	24.8	29.4	26.8	28.8	33.5	31.3	33	36	30
Potassium (diss)	mg/L	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (diss)	mg/L	101.5	200	-	-	0.05, 0.1, 0.25	22.3	22.3	28.6	36.3	43.4	49	52.2	58.2	76.2	48.6	71	59	52
General Chemistry																			
Alkalinity (as CaCO3)	mg/L	47.8 - 282.8	30 - 500	See Factsheet	-	1, 5	353	558	474	530	575	593	614	631	678	736	680	720	720
Ammonia as N	mg/L	-	-	-	-	0.02, 0.03, 0.04, 0.05, 0.07	0.27	0.09	0.36	0.08	0.22	0.07	5.28	<0.02	0.21	0.05	0.53	0.37	0.26
Biochemical Oxygen Demand	mg/L	-	-	-	-	2, 5, 6	<5	<5	<5	<5	2	<2	3	4	3	<2	<2	<2	<2
Chemical Oxygen Demand	mg/L	-	-	-	-	4, 5	122	61	23	56	34	52	15	47	41	25	54	62	76
Dissolved Organic Carbon	mg/L	3.6	5	-	-	0.4, 0.5	39	38.2	32.6	33.6	34.8	28.6	44.2	27.1	30.4	12.2	22	11	18
Electrical Conductivity	uS/cm	-	-	-	-	1, 2, 5	112	1180	1090	1580	1200	1440	1360	1410	1360	1480	1500	1500	1500
Hardness (as CaCO3)	mg/L	-	80 - 100	-	-		472.8	576.6	561.1	632.3	659	705.4	672.2	695.4	834.6	-	-	-	-
Lab Filtration DOC		-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-
pH	pH units	6.9 - 7.9	6.5 - 8.5	6.5 - 8.5	-		7.53	7.6	7.41	7.02	7.55	6.89	7.34	7.11	7.17	6.99	7.59	7.35	7.65
Total Dissolved Solids	mg/L	482.5	500	-	-	5, 10, 20	636	728	702	782	768	850	832	822	834	882	910	960	955
Total Suspended Solids	mg/L	-	-	-	-	10, 33, 50, 100, 200	<10	52	29	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.1	0.000045	0.0000304	-	-	-	-	-	-	-	-	-	-	-
Metals																			
Aluminum (diss, 0.45 µm)	mg/L	0.1	0.1	-	Calculated	0.004, 0.0049	<0.004	0.009	0.005	0.006	0.01	<0.004	0.011	0.024	0.01	<0.004	<0.0049	<0.0049	<0.0049
Barium (diss)	mg/L	0.3	1	-	-	0.002	0.198	0.182	0.221	0.23	0.204	0.219	0.22	0.234	0.254	0.172	0.25	0.18	0.19
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (diss)	mg/L	1.3	5	-	0.2	0.01, 0.02, 0.1	0.254	0.261	0.359	0.459	0.447	0.551	0.541	0.664	0.8	0.52	0.81	0.55	0.52
Cadmium (diss)	mg/L	0	0.005	-	Calculated	0.00009, 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00009	<0.00009	<0.00009
Chromium (diss)	mg/L	0	0.05	-	-	0.002, 0.003, 0.005	<0.003	0.006	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.002	<0.002	<0.005	<0.005	<0.005
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0005, 0.005	<0.002	0.0025	0.0025	0.0029	0.0025	0.003	0.0025	0.0039	0.0038	0.0038	0.0034	0.0042	0.0036
Copper (diss)	mg/L	-	1	-	Calculated	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (diss)	mg/L	0.2	0.3	0.3	-	0.01, 0.1, 0.5	0.453	0.84	0.428	0.229	0.314	0.288	0.448	0.628	0.498	0.796	0.57	0.8	0.68
Lead (diss)	mg/L	0	0.01	-	Calculated	0.0005, 0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Manganese (diss)	mg/L	0	0.05	-	-	0.002, 0.004, 0.01	0.203	0.292	0.163	0.139	0.133	0.151	0.166	0.201	0.169	0.343	0.19	0.36	0.36
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	-	0.00009, 0.0001	<0.002	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00009	<0.00009	<0.00009
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	2.5	5	-	0.02	0.005, 0.025, 0.05, 0.25, 2.5	0.018	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0062

- LEGEND-

Detection Limit

DL exceeds criteria

Concentration exceeds RUV-MG

Concentration exceeds ODWQS-ALL-MERGED

Concentration exceeds PWQO-GENERAL

Concentration exceeds PWQO-INTERIM
- DL: May vary between sample locations and events

Reasonable Use Values Musclow Greenview

Ontario Drinking Water Quality Standards All Types Merged

Provincial Water Quality Objectives General

Provincial Water Quality Objectives Interim

Hastings Highlands Analytical Chemistry Results: Anions, Cations, GenChem, Met, VOCs in Well Screen						Site Name	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview			
						Location	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3
						Sample ID	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3	MG-DP3
						Sample Date	2018-Oct-24	2019-May-06	2019-Oct-21	2020-May-05	2020-Oct-08	2021-Apr-19	2021-Oct-20	2022-May-04	2022-Oct-25	2023-May-02	2023-Oct-18	2024-May-01	2024-Oct-30			
Parameter	Units	RUV-MG	ODWQS-ALL- MERGED	PWQO- GENERAL	PWQO- INTERIM	Lab Job Number						21T736297	21T819614	22P892059	22T962553	23T021057	C3W8341	C4D3558	C4Y5038			
						Lab Sample ID						2371829	3119012	3826235	4461684	4961347	XJA303	ZB5435				
Anions						Detection Limit																
Chloride	mg/L	125.3	250	-	-	0.1, 0.12, 0.2, 0.24, 0.5, 1	77.2	82.5	76.7	85.5	74.7	77.6	73.6	75.2	77.3	77.7	57	69	70			
Nitrate + Nitrite	mg/L	-	-	-	-	0.1, 0.5	-	-	-	-	-	-	-	-	-	-	-	-	<0.1			
Nitrate as N	mg/L	2.6	10	-	-	0.05, 0.07, 0.1, 0.25, 0.5	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.05	1.8	<0.05	<0.05	<0.1	<0.1	<0.1			
VOCs																						
1,1,1,2-Tetrachloroethane	mg/L	-	-	-	0.02	0.0001, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,1,1-Trichloroethane	mg/L	-	-	-	0.01	0.0002, 0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,1,2,2-Tetrachloroethane	mg/L	-	-	-	0.07	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,1,2-Trichloroethane	mg/L	-	-	-	0.8	0.0002, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,1-Dichloroethane	mg/L	-	-	-	0.2	0.0002, 0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,1-Dichloroethylene	mg/L	-	0.014	-	0.04	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,2,4-Trichlorobenzene	mg/L	-	-	0.0005	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,2-Dichlorobenzene	mg/L	-	0.003	0.0025	-	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,2-Dichloroethane	mg/L	-	0.005	-	0.1	0.0002, 0.00049	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,2-Dichloropropane	mg/L	-	-	-	0.0007	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,3-Dichlorobenzene	mg/L	-	-	0.0025	-	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,3-Dichloropropene (Cis + Trans)	mg/L	-	-	-	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,4-Dichlorobenzene	mg/L	-	0.001	0.004	-	0.0001, 0.0002, 0.0004	<0.0000004	-	-	-	-	-	-	-	-	-	-	-	-			
2-Hexanone	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-			
Acetone	mg/L	-	-	-	-	0.001, 0.01	-	-	-	-	-	-	-	-	-	-	-	-	-			
Benzene	mg/L	-	0.001	-	0.1	0.0002, 0.0004, 0.0008	<0.0000008	-	-	-	-	-	-	-	-	-	-	-	-			
Bromodichloromethane	mg/L	-	-	-	0.2	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
Bromoform	mg/L	-	-	-	0.06	0.0001, 0.001	-	-	-	-	-	-	-	-	-	-	-	-	-			
Bromomethane	mg/L	-	-	-	0.0009	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
Carbon Tetrachloride	mg/L	-	0.002	-	-	0.00019, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Chlorobenzene	mg/L	-	-	0.015	-	0.0001, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Chloroethane	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Chloroform	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Chloromethane	mg/L	-	-	-	0.7	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
cis-1,2-Dichloroethylene	mg/L	-	-	-	-	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
cis-1,3-Dichloropropene	mg/L	-	-	-	-	0.0002, 0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-			
Dibromochloromethane	mg/L	-	-	-	-	0.0001, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
Dichlorodifluoromethane	mg/L	-	-	-	-	0.0004, 0.001	-	-	-	-	-	-	-	-	-	-	-	-	-			
Dichloromethane	mg/L	-	0.05	-	-	0.0003, 0.0012, 0.002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Ethylbenzene	mg/L	-	0.0016	-	0.008	0.0001, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Ethylene Dibromide	mg/L	-	-	-	0.005	0.0001, 0.00019	-	-	-	-	-	-	-	-	-	-	-	-	-			
Hexane	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-			
m & p-Xylene	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Methylene Chloride	mg/L	-	-	-	0.1	0.0003, 0.0006, 0.0012	<0.0000012	-	-	-	-	-	-	-	-	-	-	-	-			
Methyl Ethyl Ketone	mg/L	-	-	-	0.4	0.001, 0.01	-	-	-	-	-	-	-	-	-	-	-	-	-			
Methyl Isobutyl Ketone	mg/L	-	-	-	-	0.001, 0.005	-	-	-	-	-	-	-	-	-	-	-	-	-			
Methyl tertiary-butyl ether (MTBE)	mg/L	-	0.015	-	0.2	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
n-Hexane	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
o-Xylene	mg/L	-	-	-	0.04	0.0001, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Styrene	mg/L	-	-	-	0.004	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-			
Tetrachloroethylene	mg/L	-	0.01	-	0.05	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Toluene	mg/L	-	0.024	-	0.0008	0.0002, 0.0004, 0.0008	<0.0000008	-	-	-	-	-	-	-	-	-	-	-	-			
trans-1,2-Dichloroethylene	mg/L	-	-	-	-	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
trans-1,3-Dichloropropene	mg/L	-	-	-	-	0.0003, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-			
Trichloroethylene	mg/L	-	0.005	-	0.02	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Trichlorofluoromethane	mg/L	-	-	-	-	0.0004, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
Vinyl Chloride	mg/L	-	0.001	-	0.6	0.00017, 0.0002, 0.00034, 0.00068	<0.0000007	-	-	-	-	-	-	-	-	-	-	-	-			
Xylene Mixture	mg/L	-	0.02	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Xylenes, m+p	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Xylenes, total	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			

-LEGEND-

Detection Limit

DL exceeds criteria

Concentration exceeds RUV-MG

Concentration exceeds ODWQS-ALL-MERGED

Concentration exceeds PWQO-GENERAL

Concentration exceeds PWQO-INTERIM

DL: May vary between sample locations and events

Reasonable Use Values Musclow Greenview

Ontario Drinking Water Quality Standards All Types Merged

Provincial Water Quality Objectives General

Provincial Water Quality Objectives Interim



Hastings Highlands Analytical Chemistry Results: Anions, Cations, GenChem, Met, VOCs in Well Screen						Site Name	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview			
						Location	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4
						Sample ID	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4
						Sample Date	2016-Oct-25	2017-May-11	2017-Oct-25	2018-May-09	2018-Oct-24	2019-May-06	2019-Oct-21	2020-May-05	2020-Oct-08	2021-Apr-19	2021-Oct-20	2022-May-04	2022-Oct-25			
Parameter	Units	RUV-MG	ODWQS-ALL- MERGED	PWQO- GENERAL	PWQO- INTERIM	Lab Job Number										21T736297	21T819614	22P892059	22T962553			
						Lab Sample ID																
Anions						Detection Limit																
Chloride	mg/L	125.3	250	-	-	0.1, 0.12, 0.2, 0.24, 0.5, 1	2.01	3.19	1.78	1.82	1.64	2.16	1.52	1.9	1.73	2.89	2.46	3.36	4.2			
Nitrate + Nitrite	mg/L	-	-	-	-	0.1, 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-			
Nitrate as N	mg/L	2.6	10	-	-	0.05, 0.07, 0.1, 0.25, 0.5	<0.05	<0.05	0.08	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	0.12			
Nitrite as N	mg/L	-	1	-	-	0.01, 0.05	-	-	-	-	-	-	-	-	-	-	-	-	-			
Sulphate	mg/L	253.6	500	-	-	0.1, 0.19, 0.2, 0.5, 1	14.3	7.77	13.8	17.2	14.2	13.3	13.6	14	12.5	13.2	9.86	12.6	13.8			
Cations																						
Calcium (diss)	mg/L	-	-	-	-	0.05, 0.1, 0.2, 0.25	33.7	37.6	36.2	32.7	33.8	36.6	32	33.8	29.1	33.2	26.4	29.4	29.5			
Magnesium (diss)	mg/L	-	-	-	-	0.05, 0.1, 0.25	4.54	5.33	5.12	4.27	4.69	5.1	4.68	4.92	4.51	5.11	4.11	4.75	5.2			
Potassium (diss)	mg/L	-	-	-	-	1	2.83	-	-	-	-	-	-	-	-	-	-	-	-			
Sodium (diss)	mg/L	101.5	200	-	-	0.05, 0.1, 0.25	5.32	5.86	5.2	4.31	4.81	4.89	4.8	4.76	4.62	4.88	4.08	4.66	5.65			
General Chemistry																						
Alkalinity (as CaCO3)	mg/L	47.8 - 282.8	30 - 500	See Factsheet	-	1, 5	120	130	115	110	95	132	107	107	104	103	87	93	101			
Ammonia as N	mg/L	-	-	-	-	0.02, 0.03, 0.04, 0.05, 0.07	0.1	0.07	<0.02	0.04	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	0.15	<0.02	<0.02			
Biochemical Oxygen Demand	mg/L	-	-	-	-	2, 5, 6	-	-	6	<5	<5	<5	<5	<5	2	<2	<2	3	7			
Chemical Oxygen Demand	mg/L	-	-	-	-	4, 5	9	19	7	23	25	13	45	13	<5	62	70	14	7			
Dissolved Organic Carbon	mg/L	3.6	5	-	-	0.4, 0.5	7.4	4.4	7	23.3	15	3.9	3.9	10.1	18.9	24.5	37.6	18.3	28.8			
Electrical Conductivity	uS/cm	-	-	-	-	1, 2, 5	242	297	215	227	256	251	223	283	209	249	188	214	233			
Hardness (as CaCO3)	mg/L	-	80 - 100	-	-		102.8	115.8	111.5	99.2	103.7	112.4	99.2	104.7	91.2	103.9	82.8	93	95.1			
Lab Filtration DOC		-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-			
pH	pH units	6.9 - 7.9	6.5 - 8.5	6.5 - 8.5	-		7.41	7.92	7.65	7.4	7.49	7.43	7.41	7.74	7.23	7.85	7.67	7.48	7.96			
Total Dissolved Solids	mg/L	482.5	500	-	-	5, 10, 20	54	-	174	136	-	138	168	138	128	138	140	134	132			
Total Suspended Solids	mg/L	-	-	-	-	10, 33, 50, 100, 200	-	-	2360	40	-	134	204	59	<10	122	113	167	111			
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.1	0.001171107	0.000517427	0.000515454	-	-	-	-	-	-	-	-	-	-			
Metals																						
Aluminum (diss, 0.45 µm)	mg/L	0.1	0.1	-	Calculated	0.004, 0.0049	0.04	0.006	0.018	0.005	0.008	0.007	0.006	0.008	0.016	<0.004	0.01	0.013	0.086			
Barium (diss)	mg/L	0.3	1	-	-	0.002	0.025	0.013	0.013	0.013	0.015	0.015	0.013	0.014	0.011	0.012	0.011	0.012	0.011			
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-			
Boron (diss)	mg/L	1.3	5	-	0.2	0.01, 0.02, 0.1	0.086	0.137	0.024	0.026	0.026	0.016	0.042	0.022	0.045	0.018	0.03	<0.01	0.024			
Cadmium (diss)	mg/L	0	0.005	-	Calculated	0.00009, 0.0001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001			
Chromium (diss)	mg/L	0	0.05	-	-	0.002, 0.003, 0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.002			
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0005, 0.005	0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005			
Copper (diss)	mg/L	-	1	-	Calculated	0.001	<0.003	-	-	-	-	-	-	-	-	-	-	-	-			
Iron (diss)	mg/L	0.2	0.3	0.3	-	0.01, 0.1, 0.5	0.046	<0.01	<0.01	0.029	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.178	0.012	<0.01			
Lead (diss)	mg/L	0	0.01	-	Calculated	0.0005, 0.001	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0005			
Manganese (diss)	mg/L	0	0.05	-	-	0.002, 0.004, 0.01	0.254	0.036	0.023	0.007	0.005	0.011	<0.002	0.005	0.003	<0.002	0.009	0.004	<0.002			
Molybdenum (diss)	mg/L	-	-	-	0.04	0.005	0.003	-	-	-	-	-	-	-	-	-	-	-	-			
Nickel (diss)	mg/L	-	-	0.025	-	0.005	0.005	-	-	-	-	-	-	-	-	-	-	-	-			
Silicon (diss)	mg/L	-	-	-	-	0.1	11.1	-	-	-	-	-	-	-	-	-	-	-	-			
Silver (diss)	mg/L	-	-	0.0001	-	0.00009, 0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001			
Strontium (diss)	mg/L	-	-	-	-	0.001	0.228	-	-	-	-	-	-	-	-	-	-	-	-			
Thallium (diss)	mg/L	-	-	-	0.0003	0.0001	<0.006	-	-	-	-	-	-	-	-	-	-	-	-			
Titanium (diss)	mg/L	-	-	-	-	0.002	0.003	-	-	-	-	-	-	-	-	-	-	-	-			
Vanadium (diss)	mg/L	-	-	-	0.006	0.001	<0.002	-	-	-	-	-	-	-	-	-	-	-	-			
Zinc (diss)	mg/L	2.5	5	-	0.02	0.005, 0.025, 0.05, 0.25, 2.5	<0.005	<0.005	0.005	<0.005	0.013	0.011	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005			

- LEGEND-

Detection Limit

DL exceeds criteria

Concentration exceeds RUV-MG

Concentration exceeds ODWQS-ALL-MERGED

Concentration exceeds PWQO-GENERAL

Concentration exceeds PWQO-INTERIM
- DL: May vary between sample locations and events

Reasonable Use Values Musclow Greenview

Ontario Drinking Water Quality Standards All Types Merged

Provincial Water Quality Objectives General

Provincial Water Quality Objectives Interim

Hastings Highlands Analytical Chemistry Results: Anions, Cations, GenChem, Met, VOCs in Well Screen						Site Name	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview			
						Location	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4
						Sample ID	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP4
						Sample Date	2016-Oct-25	2017-May-11	2017-Oct-25	2018-May-09	2018-Oct-24	2019-May-06	2019-Oct-21	2020-May-05	2020-Oct-08	2021-Apr-19	2021-Oct-20	2022-May-04	2022-Oct-25			
Parameter	Units	RUV-MG	ODWQS-ALL-MERGED	PWQO-GENERAL	PWQO-INTERIM	Lab Job Number										21T736297	21T819614	22P892059	22T962553			
						Lab Sample ID																
Anions						Detection Limit										2371830	3119013	3826236	4461686			
Chloride	mg/L	125.3	250	-	-	0.1, 0.12, 0.2, 0.24, 0.5, 1	2.01	3.19	1.78	1.82	1.64	2.16	1.52	1.9	1.73	2.89	2.46	3.36	4.2			
Nitrate + Nitrite	mg/L	-	-	-	-	0.1, 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-			
Nitrate as N	mg/L	2.6	10	-	-	0.05, 0.07, 0.1, 0.25, 0.5	<0.05	<0.05	0.08	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	0.12			
VOCs																						
1,1,1,2-Tetrachloroethane	mg/L	-	-	-	0.02	0.0001, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,1,1-Trichloroethane	mg/L	-	-	-	0.01	0.0002, 0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,1,2,2-Tetrachloroethane	mg/L	-	-	-	0.07	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,1,2-Trichloroethane	mg/L	-	-	-	0.8	0.0002, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,1-Dichloroethane	mg/L	-	-	-	0.2	0.0002, 0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,1-Dichloroethylene	mg/L	-	0.014	-	0.04	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,2,4-Trichlorobenzene	mg/L	-	-	0.0005	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,2-Dichlorobenzene	mg/L	-	0.003	0.0025	-	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,2-Dichloroethane	mg/L	-	0.005	-	0.1	0.0002, 0.00049	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,2-Dichloropropane	mg/L	-	-	-	0.0007	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,3-Dichlorobenzene	mg/L	-	-	0.0025	-	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,3-Dichloropropene (Cis + Trans)	mg/L	-	-	-	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-			
1,4-Dichlorobenzene	mg/L	-	0.001	0.004	-	0.0001, 0.0002, 0.0004	-	-	-	<0.0000004	<0.0000004	-	-	-	-	-	-	-	-			
2-Hexanone	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-			
Acetone	mg/L	-	-	-	-	0.001, 0.01	-	-	-	-	-	-	-	-	-	-	-	-	-			
Benzene	mg/L	-	0.001	-	0.1	0.0002, 0.0004, 0.0008	-	-	-	<0.0000008	<0.0000008	-	-	-	-	-	-	-	-			
Bromodichloromethane	mg/L	-	-	-	0.2	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
Bromoform	mg/L	-	-	-	0.06	0.0001, 0.001	-	-	-	-	-	-	-	-	-	-	-	-	-			
Bromomethane	mg/L	-	-	-	0.0009	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
Carbon Tetrachloride	mg/L	-	0.002	-	-	0.00019, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Chlorobenzene	mg/L	-	-	0.015	-	0.0001, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Chloroethane	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Chloroform	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Chloromethane	mg/L	-	-	-	0.7	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
cis-1,2-Dichloroethylene	mg/L	-	-	-	-	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
cis-1,3-Dichloropropene	mg/L	-	-	-	-	0.0002, 0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-			
Dibromochloromethane	mg/L	-	-	-	-	0.0001, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
Dichlorodifluoromethane	mg/L	-	-	-	-	0.0004, 0.001	-	-	-	-	-	-	-	-	-	-	-	-	-			
Dichloromethane	mg/L	-	0.05	-	-	0.0003, 0.0012, 0.002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Ethylbenzene	mg/L	-	0.0016	-	0.008	0.0001, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Ethylene Dibromide	mg/L	-	-	-	0.005	0.0001, 0.00019	-	-	-	-	-	-	-	-	-	-	-	-	-			
Hexane	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-			
m & p-Xylene	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Methylene Chloride	mg/L	-	-	-	0.1	0.0003, 0.0006, 0.0012	-	-	-	<0.0000012	<0.0000012	-	-	-	-	-	-	-	-			
Methyl Ethyl Ketone	mg/L	-	-	-	0.4	0.001, 0.01	-	-	-	-	-	-	-	-	-	-	-	-	-			
Methyl Isobutyl Ketone	mg/L	-	-	-	-	0.001, 0.005	-	-	-	-	-	-	-	-	-	-	-	-	-			
Methyl tertiary-butyl ether (MTBE)	mg/L	-	0.015	-	0.2	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
n-Hexane	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
o-Xylene	mg/L	-	-	-	0.04	0.0001, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Styrene	mg/L	-	-	-	0.004	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-			
Tetrachloroethylene	mg/L	-	0.01	-	0.05	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Toluene	mg/L	-	0.024	-	0.0008	0.0002, 0.0004, 0.0008	-	-	-	<0.0000008	<0.0000008	-	-	-	-	-	-	-	-			
trans-1,2-Dichloroethylene	mg/L	-	-	-	-	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
trans-1,3-Dichloropropene	mg/L	-	-	-	-	0.0003, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-			
Trichloroethylene	mg/L	-	0.005	-	0.02	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Trichlorofluoromethane	mg/L	-	-	-	-	0.0004, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-			
Vinyl Chloride	mg/L	-	0.001	-	0.6	0.00017, 0.0002, 0.00034, 0.00068	-	-	-	<0.0000007	<0.0000007	-	-	-	-	-	-	-	-			
Xylene Mixture	mg/L	-	0.02	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Xylenes, m+p	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			
Xylenes, total	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-			

-LEGEND-

Detection Limit

DL exceeds criteria

Concentration exceeds RUV-MG

Concentration exceeds ODWQS-ALL-MERGED

Concentration exceeds PWQO-GENERAL

Concentration exceeds PWQO-INTERIM

DL: May vary between sample locations and events

Reasonable Use Values Musclow Greenview

Ontario Drinking Water Quality Standards All Types Merged

Provincial Water Quality Objectives General

Provincial Water Quality Objectives Interim



Hastings Highlands Analytical Chemistry Results: Anions, Cations, GenChem, Met, VOCs in Well Screen						Site Name	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview
						Location	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP5	MG-DP5	MG-DP5	MG-DP5	MG-DP5	MG-DP5	MG-DP5	MG-DP5
						Sample ID	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP5	MG-DP5	MG-DP5	MG-QAQC GW1-F22 (MG-DP5)	MG-DP5	MG-DP5	MG-DP5	MG-DP5
						Sample Date	2023-May-02	2023-Oct-18	2024-May-01	2024-Oct-30	2021-Oct-20	2022-May-04	2022-Oct-25	2022-Oct-25	2023-May-02	2023-Oct-18	2024-May-01	2024-Oct-30
Parameter	Units	RUV-MG	ODWQS-ALL-MERGED	PWQO-GENERAL	PWQO-INTERIM	Lab Job Number	23T021057	C3W8341	C4D3558	C4Y5038	21T819620	22P892059	22T962553	22T962553	23T021057	C3W8341	C4D3558	C4Y5038
						Lab Sample ID	4961348	XJA304	ZBS436		3118785	3826237	4461687	4461745	4961349	XJA305	ZBS437	
Anions						Detection Limit												
Chloride	mg/L	125.3	250	-	-	0.1, 0.12, 0.2, 0.24, 0.5, 1	4.94	2.8	4.2	4	53	80.1	64.4	64.7	66	63	56	65
Nitrate + Nitrite	mg/L	-	-	-	-	0.1, 0.5	-	-	-	<0.1	-	-	-	-	-	-	-	<0.5
Nitrate as N	mg/L	2.6	10	-	-	0.05, 0.07, 0.1, 0.25, 0.5	0.12	0.13	0.18	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1	<0.5
Nitrite as N	mg/L	-	1	-	-	0.01, 0.05	-	-	-	<0.01	-	-	-	-	-	-	-	<0.05
Sulphate	mg/L	253.6	500	-	-	0.1, 0.19, 0.2, 0.5, 1	13.2	11	12	16	78.9	79.7	74.5	74	52.3	53	30	42
Cations																		
Calcium (diss)	mg/L	-	-	-	-	0.05, 0.1, 0.2, 0.25	33.3	31	33	28	127	58.6	79.5	80.1	113	120	120	130
Magnesium (diss)	mg/L	-	-	-	-	0.05, 0.1, 0.25	4.79	4.6	5.1	4.5	10.2	6.02	6.84	6.69	11.3	9.8	11	11
Potassium (diss)	mg/L	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (diss)	mg/L	101.5	200	-	-	0.05, 0.1, 0.25	4.52	4.8	5.1	4.6	12.6	4.47	7.8	5.45	8.12	7.9	7.8	8.5
General Chemistry																		
Alkalinity (as CaCO3)	mg/L	47.8 - 282.8	30 - 500	See Factsheet	-	1, 5	103	96	100	92	332	276	255	254	305	230	220	250
Ammonia as N	mg/L	-	-	-	-	0.02, 0.03, 0.04, 0.05, 0.07	<0.02	<0.05	<0.05	<0.05	0.11	0.05	0.06	0.05	0.06	0.078	0.11	0.082
Biochemical Oxygen Demand	mg/L	-	-	-	-	2, 5, 6	<2	12	25	29	2	3	<2	2	<6	7	11	7
Chemical Oxygen Demand	mg/L	-	-	-	-	4, 5	18	29	37	38	10	27	9	<5	25	42	53	41
Dissolved Organic Carbon	mg/L	3.6	5	-	-	0.4, 0.5	1.7	11	3.8	5	9.5	11.4	7.3	7.1	7.1	9.7	11	11
Electrical Conductivity	uS/cm	-	-	-	-	1, 2, 5	229	230	230	220	899	892	758	749	791	750	690	740
Hardness (as CaCO3)	mg/L	-	80 - 100	-	-		-	-	-	-	359.1	171.1	226.7	227.6	-	-	-	-
Lab Filtration DOC		-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-
pH	pH units	6.9 - 7.9	6.5 - 8.5	6.5 - 8.5	-		7.85	7.96	8.23	7.82	7.29	6.9	7.33	7.19	6.87	7.06	6.98	7.06
Total Dissolved Solids	mg/L	482.5	500	-	-	5, 10, 20	102	155	180	150	572	690	548	546	490	625	505	655
Total Suspended Solids	mg/L	-	-	-	-	10, 33, 50, 100, 200	14	82	340	79	134	41	28	26	73	340	310	250
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-
Metals																		
Aluminum (diss, 0.45 µm)	mg/L	0.1	0.1	-	Calculated	0.004, 0.0049	<0.004	<0.0049	<0.0049	<0.0049	0.01	0.02	0.01	0.007	<0.004	<0.0049	<0.0049	<0.0049
Barium (diss)	mg/L	0.3	1	-	-	0.002	0.012	0.011	0.012	0.01	0.056	0.035	0.049	0.046	0.041	0.046	0.036	0.047
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Boron (diss)	mg/L	1.3	5	-	0.2	0.01, 0.02, 0.1	0.015	0.014	0.019	0.013	0.08	0.014	0.028	0.037	0.031	0.038	0.045	0.045
Cadmium (diss)	mg/L	0	0.005	-	Calculated	0.00009, 0.0001	<0.0001	<0.00009	<0.00009	<0.00009	<0.0001	<0.0001	0.0005	<0.0001	<0.0001	<0.00009	<0.00009	<0.00009
Chromium (diss)	mg/L	0	0.05	-	-	0.002, 0.003, 0.005	<0.002	<0.005	<0.005	<0.005	<0.003	<0.003	<0.002	<0.002	<0.002	<0.005	<0.005	<0.005
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0005, 0.005	<0.0005	<0.0005	<0.0005	<0.0005	0.0037	0.0122	0.0627	0.0557	0.068	0.1	0.037	0.046
Copper (diss)	mg/L	-	1	-	Calculated	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Iron (diss)	mg/L	0.2	0.3	0.3	-	0.01, 0.1, 0.5	<0.01	<0.1	<0.1	<0.1	0.568	3.9	10.7	10.4	27.3	120	200	140
Lead (diss)	mg/L	0	0.01	-	Calculated	0.0005, 0.001	<0.0005	<0.0005	<0.0005	<0.0005	0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Manganese (diss)	mg/L	0	0.05	-	-	0.002, 0.004, 0.01	<0.002	<0.002	0.0022	<0.002	0.95	0.864	1.41	1.27	2.79	3.9	2.9	2.8
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	-	0.00009, 0.0001	<0.0001	<0.00009	<0.00009	<0.00009	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00009	<0.00009	<0.00009
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	2.5	5	-	0.02	0.005, 0.025, 0.05, 0.25, 2.5	<0.005	<0.005	<0.005	<0.005	87.9	325	206	218	48.7	43	18	33

- LEGEND-

Detection Limit

DL exceeds criteria

Concentration exceeds RUV-MG

Concentration exceeds ODWQS-ALL-MERGED

Concentration exceeds PWQO-GENERAL

Concentration exceeds PWQO-INTERIM
- DL: May vary between sample locations and events

Reasonable Use Values Musclow Greenview

Ontario Drinking Water Quality Standards All Types Merged

Provincial Water Quality Objectives General

Provincial Water Quality Objectives Interim

Hastings Highlands Analytical Chemistry Results: Anions, Cations, GenChem, Met, VOCs in Well Screen						Site Name	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview	Musclow Greenview
						Location	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP5	MG-DP5	MG-DP5	MG-DP5	MG-DP5	MG-DP5	MG-DP5	MG-DP5
						Sample ID	MG-DP4	MG-DP4	MG-DP4	MG-DP4	MG-DP5	MG-DP5	MG-DP5	MG-QAQC GW1-F22 (MG-DP5)	MG-DP5	MG-DP5	MG-DP5	MG-DP5
						Sample Date	2023-May-02	2023-Oct-18	2024-May-01	2024-Oct-30	2021-Oct-20	2022-May-04	2022-Oct-25	2022-Oct-25	2023-May-02	2023-Oct-18	2024-May-01	2024-Oct-30
Parameter	Units	RUV-MG	ODWQS-ALL-MERGED	PWQO-GENERAL	PWQO-INTERIM	Lab Job Number	23T021057	C3W8341	C4D3558	C4Y5038	21T819620	22P892059	22T962553	22T962553	23T021057	C3W8341	C4D3558	C4Y5038
						Lab Sample ID	4961348	XJA304	ZBS436		3118785	3826237	4461687	4461745	4961349	XJA305	ZBS437	
Anions						Detection Limit												
Chloride	mg/L	125.3	250	-	-	0.1, 0.12, 0.2, 0.24, 0.5, 1	4.94	2.8	4.2	4	53	80.1	64.4	64.7	66	63	56	65
Nitrate + Nitrite	mg/L	-	-	-	-	0.1, 0.5	-	-	-	<0.1	-	-	-	-	-	-	-	<0.5
Nitrate as N	mg/L	2.6	10	-	-	0.05, 0.07, 0.1, 0.25, 0.5	0.12	0.13	0.18	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1	<0.5
VOCs																		
1,1,1,2-Tetrachloroethane	mg/L	-	-	-	0.02	0.0001, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	mg/L	-	-	-	0.01	0.0002, 0.0003	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	mg/L	-	-	-	0.07	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	mg/L	-	-	-	0.8	0.0002, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	mg/L	-	-	-	0.2	0.0002, 0.0003	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethylene	mg/L	-	0.014	-	0.04	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/L	-	-	0.0005	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	mg/L	-	0.003	0.0025	-	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	mg/L	-	0.005	-	0.1	0.0002, 0.00049	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	mg/L	-	-	-	0.0007	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	mg/L	-	-	0.0025	-	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropene (Cis + Trans)	mg/L	-	-	-	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	mg/L	-	0.001	0.004	-	0.0001, 0.0002, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-
2-Hexanone	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	mg/L	-	-	-	-	0.001, 0.01	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	mg/L	-	0.001	-	0.1	0.0002, 0.0004, 0.0008	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	mg/L	-	-	-	0.2	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	mg/L	-	-	-	0.06	0.0001, 0.001	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	mg/L	-	-	-	0.0009	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Tetrachloride	mg/L	-	0.002	-	-	0.00019, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	mg/L	-	-	0.015	-	0.0001, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	mg/L	-	-	-	0.7	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethylene	mg/L	-	-	-	-	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	mg/L	-	-	-	-	0.0002, 0.0003	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	mg/L	-	-	-	-	0.0001, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	mg/L	-	-	-	-	0.0004, 0.001	-	-	-	-	-	-	-	-	-	-	-	-
Dichloromethane	mg/L	-	0.05	-	-	0.0003, 0.0012, 0.002	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/L	-	0.0016	-	0.008	0.0001, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene Dibromide	mg/L	-	-	-	0.005	0.0001, 0.00019	-	-	-	-	-	-	-	-	-	-	-	-
Hexane	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-
m & p-Xylene	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	mg/L	-	-	-	0.1	0.0003, 0.0006, 0.0012	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Ethyl Ketone	mg/L	-	-	-	0.4	0.001, 0.01	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Isobutyl Ketone	mg/L	-	-	-	-	0.001, 0.005	-	-	-	-	-	-	-	-	-	-	-	-
Methyl tertiary-butyl ether (MTBE)	mg/L	-	0.015	-	0.2	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-
n-Hexane	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	mg/L	-	-	-	0.04	0.0001, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	mg/L	-	-	-	0.004	0.0001, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethylene	mg/L	-	0.01	-	0.05	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/L	-	0.024	-	0.0008	0.0002, 0.0004, 0.0008	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethylene	mg/L	-	-	-	-	0.0002, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	mg/L	-	-	-	-	0.0003, 0.0004	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethylene	mg/L	-	0.005	-	0.02	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	mg/L	-	-	-	-	0.0004, 0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	mg/L	-	0.001	-	0.6	0.00017, 0.0002, 0.00034, 0.00068	-	-	-	-	-	-	-	-	-	-	-	-
Xylene Mixture	mg/L	-	0.02	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, m+p	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, total	mg/L	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-

-LEGEND-

Detection Limit

DL exceeds criteria

Concentration exceeds RUV-MG

Concentration exceeds ODWQS-ALL-MERGED

Concentration exceeds PWQO-GENERAL

Concentration exceeds PWQO-INTERIM

DL: May vary between sample locations and events

Reasonable Use Values Musclow Greenview

Ontario Drinking Water Quality Standards All Types Merged

Provincial Water Quality Objectives General

Provincial Water Quality Objectives Interim



Appendix E

E-2 Historical Surface Water Data

LEGEND:	
Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds PQWQ-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PQWQ-INTERIM	Provincial Water Quality Objectives Interim
Concentration exceeds MECP-GD-TA	MECP Guidance Document Table A
Concentration exceeds MECP-GD-TB	MECP Guidance Document Table B

LEGEND	
Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds PWAQ-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PWAQ-INTERIM	Provincial Water Quality Objectives Interim
Concentration exceeds MECP-GD-TA	MECP Guidance Document Table A
Concentration exceeds MECP-GD-Ta	MECP Guidance Document Table B

Hastings Highlands Analytical Chemistry Results: Arsenic, Cadmium, Pb, Cu, Chromium, Met in Surface Water		Location	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow		
Site Name		Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow		
Sample ID		Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow		
Sample Date		2013-Apr-26	2013-Oct-15	2013-Apr-16	2013-Oct-29	2014-May-22	2014-Oct-15	2015-May-06	2015-Oct-26	2016-Apr-27	2016-Oct-26	2017-May-11	2017-Oct-25	2018-May-09	2018-Oct-24	2019-May-06	2020-May-05	2020-Oct-08	2021-Apr-19	2021-Oct-26	2022-May-04	2023-May-02	2023-May-01	2023-May-01	2023-May-01	2023-May-01	2023-May-01	2023-May-01	2023-May-01	2023-May-01	2023-May-01	2023-May-01		
Lab Job Number		2013-Apr-26	2013-Oct-15	2013-Apr-16	2013-Oct-29	2014-May-22	2014-Oct-15	2015-May-06	2015-Oct-26	2016-Apr-27	2016-Oct-26	2017-May-11	2017-Oct-25	2018-May-09	2018-Oct-24	2019-May-06	2020-May-05	2020-Oct-08	2021-Apr-19	2021-Oct-26	2022-May-04	2023-May-02	2023-May-01	2023-May-01	2023-May-01	2023-May-01	2023-May-01	2023-May-01	2023-May-01	2023-May-01	2023-May-01	2023-May-01		
Lab Sample ID		2013-Apr-26	2013-Oct-15	2013-Apr-16	2013-Oct-29	2014-May-22	2014-Oct-15	2015-May-06	2015-Oct-26	2016-Apr-27	2016-Oct-26	2017-May-11	2017-Oct-25	2018-May-09	2018-Oct-24	2019-May-06	2020-May-05	2020-Oct-08	2021-Apr-19	2021-Oct-26	2022-May-04	2023-May-02	2023-May-01	2023-May-01	2023-May-01	2023-May-01	2023-May-01	2023-May-01	2023-May-01	2023-May-01	2023-May-01	2023-May-01		
Parameter		Units	FWQO-GENERAL	FWQO-INTENSIVE	MECP-GD-1A	MECP-GD-1B	FWQO-GENERAL	FWQO-INTENSIVE	MECP-GD-1A	MECP-GD-1B	FWQO-GENERAL	FWQO-INTENSIVE	MECP-GD-1A	MECP-GD-1B	FWQO-GENERAL	FWQO-INTENSIVE	MECP-GD-1A	MECP-GD-1B	FWQO-GENERAL	FWQO-INTENSIVE	MECP-GD-1A	MECP-GD-1B	FWQO-GENERAL	FWQO-INTENSIVE	MECP-GD-1A	MECP-GD-1B	FWQO-GENERAL	FWQO-INTENSIVE	MECP-GD-1A	MECP-GD-1B	FWQO-GENERAL	FWQO-INTENSIVE		
Action			mg/L	-	-	180	128	1, 0.12, 0.2, 0.5	14	11	8.73	7.86	12.5	7.95	20	0.38	9.1	14.9	10.4	16.7	17.7	21.8	35.6	26.4	26.2	40.8	30.2	27.2	5.4	24	30	21	33	
Chloride			mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nitrate as Nitrogen			mg/L	-	-	-	-	0.05, 0.1, 0.25	<0.001	<0.1	0.06	<0.05	<0.05	<0.05	0.32	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	1.3	1.33	0.13	
Nitrate as N			mg/L	-	-	-	-	0.01, 0.05, 0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	
Copper			mg/L	-	-	100	-	0.1, 0.5, 1	9	25	2.66	2.43	1.96	0.82	1.37	0.85	25.2	2.42	0.81	1.94	2.71	0.36	6.52	0.29	7.71	0.22	2.99	4.45	9.3	108	49	11		
Calcium			mg/L	-	-	-	-	0.5, 0.16, 0.2, 0.5	26.8	13.4	21.7	24.2	20.8	33.3	29.6	29.9	45.1	27.7	14.5	35.6	24.7	33.9	17.9	18.32	35.31	26.7	44.8	22.3	6.5	22	64	55	72	
Magnesium (test)			mg/L	-	-	-	-	0.5, 0.1, 0.17, 0.5	3.17	3.02	3.73	3.08	2.45	4.65	3.59	4.8	7.67	4.14	1.65	5.13	2.97	4.77	1.82	2.17	5.05	3.16	7.17	3.29	1.11	2.8	15	8	34	
Potassium (test)			mg/L	-	-	-	-	0.2, 0.5, 0.58	1.74	1.73	1.17	1.05	1.37	2.51	1.68	2.93	8.89	2.92	0.93	2.59	2	2.44	1.13	1.38	2.33	1.3	2.84	1.46	<0.5	1.3	24	15	24	
Sodium (test)			mg/L	-	-	-	-	0.5, 0.1, 0.22, 0.4	8.41	5.54	5.01	6.92	7.17	6.23	9.85	6.63	10.6	6.63	6.07	6.62	6.55	7.6	14.7	13.98	10.17	10.1	8.54	11.8	6.15	15	41	26	36	
Field Parameters			mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
pH (Field)			mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Temp (C)			mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
General Chemistry			mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Alkalinity (as CaCO3)			mg/L	-	-	-	-	3, 5	63	57	45	67	52	95	82	94	153	86	99	108	74	89	44	50	94	51	124	56	34	60	136	151	289	
Arsenic as As			mg/L	-	-	-	-	0.02, 0.05	0.06	<0.01	0.32	<0.02	0.06	0.11	<0.02	0.04	1.58	0.48	<0.02	0.04	0.86	0.26	<0.02	<0.02	0.03	<0.02	0.27	<0.02	<0.02	<0.05	0.07	1.36	0.63	
Biochemical Oxygen Demand			mg/L	-	-	-	-	2, 5	8	3	<5	<5	7	<5	<5	48	<5	13	<5	21	<5	<5	<5	<2	<2	7	<2	<2	<2	<2	<2	<2	<2	
Chemical Oxygen Demand			mg/L	-	-	-	-	4, 5	117	54	<5	24	76	22	79	252	23	120	180	282	16	52	17	12	41	12	32	22	19	25	26	36	53	
Color			mg/L	-	-	-	-	2, 5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Electrical Conductivity			uS/cm	-	-	-	-	1, 2	210	200	141	165	162	220	227	212	333	213	141	232	192	280	198	244	245	266	331	208	94	210	621	479	676	
Hardness (as CaCO3)			mg/L	-	-	-	-	0.5, 1	80	45.9	61.3	72.9	62.4	102.3	88.7	94.4	144.2	86.2	43	109.9	73.9	104	52.2	55.2	109	79.7	145	69.2	20.8	68	205.1	170.3	237.4	
Lab Titration Aluminum (test)			mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
pH			mg/L	-	-	-	-	6.5 - 8.5	6 - 9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phosphorus			mg/L	-	-	-	-	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Total Dissolved Solids			mg/L	-	-	-	-	10, 20	194	88	102	106	162	146	134	208	160	70	169	100	176	120	120	170	156	218	114	74	110	409	311	439	-	-
Total Kjeldahl Nitrogen			mg/L	-	-	-	-	0.1	1.6	1	0.19	0.45	2.47	1.16	2.93	10.6	2.06	3.92	0.56	9.28	0.76	0.86	0.33	0.38	0.52	0.26	0.78	0.26	0.23	0.28	0.74	1.73	1.41	
Total Phosphorus			mg/L	-	-	-	-	0.01, 0.02	0.04	0.12	0.03	0.06	0.46	0.22	0.48	1.33	<0.01	0.47	0.51	1.07	0.35	0.27	0.23	0.03	0.04	<0.02	0.16	<0.02	<0.02	0.14	0.04	0.61	0.61	
Total Suspended Solids			mg/L	-	-	-	-	10	88	70	<10	60	79	35	20	580	14	560	116	535	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Turbidity			NTU	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Unreacted Arsenic (Calc)			mg/L	-	-	-	-	0.0001, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Metals			mg/L	-	-	-	-	0.004, 0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Aluminum (Bis, 0.2 µm)			mg/L	-	-	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Aluminum (Bis, 0.45 µm)			mg/L	-	-	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Aluminum (test)			mg/L	-	-	-	-	0.004, 0.01	0.007	0.027	0.0118	0.008	0.008	0.005	0.005	<0.004	0.011	0.01	0.015	0.008	0.008	0.006	-	-	-	-	-	-	-	-	-	-	-	
Arsenic (test)			mg/L	-	-	-	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Barium (test)			mg/L	-	-	-	-	2, 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Beryllium (test)			mg/L	-	-	-	-	0.001	0.0025	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Boron (test)			mg/L	-	-	-	-	0.2	1.55	1.5	0.31	0.05	0.03	<0.01	0.014	<0.01	0.027	0.166	0.026	<0.01	0.019	<0.01	0.012	<0.01	0.016	0.04	<0.01	0.022	0.084	0.018	0.011	<0.01	<0.01	
Cadmium (test)			mg/L	-	-	-	-	0.00005, 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium (test)			mg/L	-	-	-	-	0.0005, 0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001</																

Hastings Highlands Analytical Chemistry Results: Anions, Catons, Pp, GmChow, Met in Surface Water				Site Name	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow	Muscow Greenflow		
Location				MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	
Sample ID				MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	MS-SW3	
Sample Date				2009-Jun-04	2009-Oct-25	2010-May-18	2010-Oct-19	2011-May-29	2011-Nov-03	2012-Apr-16	2012-Oct-15	2013-Apr-26	2013-Oct-29	2014-May-12	2014-Oct-15	2015-May-06	2015-Oct-25	2016-Apr-27	2016-Oct-25	2017-May-11	2017-Oct-25	2018-May-09	2018-Oct-24	2019-May-06	2019-Oct-21	2020-May-05	2020-Oct-18	2020-Oct-18	2020-Oct-18	2020-Oct-18	2020-Oct-18	2020-Oct-18	
Parameter	Units	FWQO-GENERAL	FWQO-INTENS	MECP-GD-1A	MECP-GD-1B	Lab Job Number		Lab Sample ID		Detection Limit		Detection Limit		Detection Limit		Detection Limit		Detection Limit		Detection Limit		Detection Limit		Detection Limit		Detection Limit		Detection Limit		Detection Limit			
						Lab Job Number		Lab Sample ID		Detection Limit		Detection Limit		Detection Limit		Detection Limit		Detection Limit		Detection Limit		Detection Limit		Detection Limit		Detection Limit		Detection Limit		Detection Limit			
Anions																																	
Chloride	mg/L	-	-	180	128	3, 0.12, 0.2, 0.5	29	36	48	2	32	32	23	18	6.44	39.8	27.3	39.3	53.2	82.7	56	104	14.2	75.7	14.1	74.6	27	66.1	28.4	47			
Sulfate	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Nitrate as N	mg/L	-	-	-	-	0.05, 0.1, 0.25	2.03	-	-	-	0.1	0.54	-	0.1	0.2	0.14	0.07	0.7	0.11	-	0.19	-	0.25	0.41	-	0.05	-	0.25	-	-	-		
Nitrite as N	mg/L	-	-	-	-	0.01, 0.05, 0.25	-	0.1	-	-	0.01	-	0.1	-	0.08	-	0.05	-	0.25	-	0.05	-	0.05	-	0.1	-	0.05	-	0.25	-	-	-	
Sulfate	mg/L	-	-	100	-	0.1, 0.5, 1	19	7	57	-	62	5	63	50	9.57	8.12	64.8	7.59	54.7	15.2	48.2	15	26.6	20.1	8.8	28.5	10.8	-	-	-	-		
Cations																																	
Calcium	mg/L	-	-	-	-	0.5, 0.16, 0.2, 0.5	67	89	58	37	62	57	59.9	24.7	22.3	80.5	84	78.9	80.9	90.6	61	107	42.8	108	36.5	108	49.4	112	77.21	98.79			
Magnesium (tot)	mg/L	-	-	-	-	0.5, 0.1, 0.17, 0.5	11	15	9	2	19	9	10.4	6.17	2.30	14.2	11.7	11.4	12.9	14.2	9.27	16.2	6.01	20.3	4.89	19.6	6.45	20.2	12.82	19.46			
Potassium (tot)	mg/L	-	-	-	-	0.2, 0.5, 0.58	30	18	5	1	12	5	16.1	9.81	2.97	12.7	18.8	18.1	6.62	4.32	9.67	4.08	6.34	5.69	4.27	4.11	7.46	4.78	9.28	6.86			
Sodium (tot)	mg/L	-	-	-	-	0.5, 0.1, 0.22, 0.4	28	28	18	-	25	14	24.6	15.9	5.37	27	50.1	28.2	24.2	30.2	15.3	34.5	11.9	44.3	8.81	49.2	14.5	56.1	29.68	51			
Field Parameters																																	
pH (Field)	pH units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Temp. C	deg. C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
General Chemistry																																	
Alkalinity (as CaCO3)	mg/L	See FactSheet	-	-	-	1, 5	242	340	100	107	180	188	222	145	60	257	220	253	293	236	175	285	129	349	122	344	158	405	224	381			
Ammonia as N	mg/L	-	-	-	-	0.02, 0.05	0.37	1.84	0.06	0.36	0.05	0.37	0.38	0.15	0.11	0.34	0.55	0.18	0.36	0.22	0.79	0.62	0.42	0.11	0.77	0.4	0.55	0.47	-	0.06			
Biochemical Oxygen Demand	mg/L	-	-	-	-	2, 5	2	3	2	-	-	-	6	2	4	-	13	5	-	-	8	-	-	-	-	-	-	-	-	-	-		
Chemical Oxygen Demand	mg/L	-	-	-	-	4, 5	43	30	28	28	33	72	47	59	6	99	35	34	29	68	30	866	19	99	6	34	15	59	25	40			
Cobalt	mg/L	-	-	-	-	2, 5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Electrical Conductivity	uS/cm	-	-	-	-	1, 2	604	752	486	207	606	449	616	430	161	621	689	615	640	697	454	833	376	781	273	970	401	884	813	768			
Hardness (as CaCO3)	mg/L	-	-	-	-	0.5, 1	212.6	284	181.9	100.6	196	179.4	192.4	87.1	67.7	259.5	246.2	252.2	251.1	284.7	190.5	333.9	131.6	351.3	110	350	150	363	245	327			
Lab. Titration Aluminum (Std)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
pH	pH units	6.5 - 8.5	-	6 - 9	-	-	7.76	7.89	7.56	7.84	8.14	7.67	8.2	7.4	7.67	7.99	7.86	8.26	7.75	7.8	8.03	7.66	8.17	7.91	7.61	7.97	7.7	7.72	7.53	8.04			
Phosph	mg/L	0.001	-	0.04	0.004	0.001	-	0.002	-	0.001	-	0.001	-	0.001	-	0.001	-	0.001	-	0.001	-	0.001	-	0.001	-	0.001	-	0.001	-	0.001	-	0.001	
Total Dissolved Solids	mg/L	-	-	10, 20	193	489	316	135	394	292	467	287	94	160	426	406	374	396	258	406	190	496	186	532	198	548	198	446	466	466	466		
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	0.96	3.09	0.6	0.61	0.86	0.72	0.9	2.2	0.4	4.74	1.69	0.98	1.8	1.64	1.33	21	0.79	2.15	1.3	1.11	0.8	1.69	0.61	0.72	0.61		
Total Phosphorus	mg/L	0.03	-	0.04	-	0.01, 0.03	0.04	0.14	0.06	0.04	-	0.01	0.03	0.08	0.01	0.04	0.03	0.03	0.04	0.01	0.03	0.04	0.75	0.14	0.03	0.03	0.04	0.03	0.03	0.03	0.03		
Total Suspended Solids	mg/L	-	-	10	3	18	17	24	7	340	50	52	-	10	488	51	40	81	35	-	6330	-	10	210	-	-	200	-	-	-	-	-	
Turbidity	NTU	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Uncond. Ammonia (Calc)	mg/L	-	-	-	-	0.0001, 0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Metals																																	
Aluminum (Std. 0.2 ppm)	mg/L	-	-	-	-	0.004, 0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Aluminum (Std. 0.5 ppm)	mg/L	-	-	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Aluminum (tot)	mg/L	-	-	-	-	0.004, 0.01	-	0.01	0.05	0.02	0.02	0.02	2	0.093	0.235	0.025	0.012	0.006	0.006	0.007	0.005	0.007	0.006	0.01	0.006	0.005	-	0.008	0.007	0.006	0.005		
Antonie (tot)	mg/L	-	-	-	-	0.005	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Barium (tot)	mg/L	-	-	-	-	2, 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Beryllium (tot)	mg/L	Calculated	-	-	-	0.01	-	0.001	-	0.001	-	0.0005	-	0.01	-	0.0005	-	0.001	-	0.0005	-	0.001	-	0.0005	-	0.001	-	0.0005	-	0.001	-	0.001	
Boron (tot)	mg/L	-	-	0.2	1.58	1.5	0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
Cadmium (tot)	mg/L	Calculated	0.00023	0.000017	0.00009	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	
Chromium (tot)	mg/L	-	-	0.001, 0.003	0.002	0.002	-	0.001	-	0.001	-	0.002	-	0.01	0.004	-	0.001	-	0.001	-	0.001	-	0.001	-	0.001	-	0.001	-	0.001	-	0.001	-	0.001
Cobalt (tot)	mg/L	-	-	0.0009	-	0.0005	-	0.0003	-	0.0001	-	0.0004	-	0.0001	-	0.0005	-	0.0008	-	0.0005	-	0.0006	-	0.0005	-	0.0006	-	0.0005	-	0.0006	-	0.0005	
Copper (tot)	mg/L	Calculated	0.0009	-	0.0009, 0.001, 0.04	-	0.0001	-	0.001	-	0.001	-	0.001	-	0.001	-	0.0007	-	0.0018	-	0.002	-	0.002	-	0.002	-	0.002	-	0.002	-	0.002	-	0.002
Iron (tot)	mg/L	0.3	-	-	-	0.01, 0.1	-	0.03	1.17	0.14	0.11	0.13	6.3	0.703	1.43	0.59	2.76	0.21	0.11	2.87	0.45	0.28	21.9	0.39	3.49	0.81	2.71	0.9	4.73	0.537	0.56		
Manganese (tot)	mg/L	Calculated	0.002	-	0.002, 0.005	-	0.0001	-	0.001	-	0.001	-	0.001	-	0.001	-	0.0007	-	0.0018	-	0.002	-	0.002	-	0.002	-	0.002	-	0.002	-	0.002	-	0.002
Mercury (dilat)	mg/L	0.0002	-	-	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nickel (tot)	mg/L	0.025	-	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nickel (tot)	mg/L	-	-	-	-	0.001	-	0.005	-	0.005	-	0.005	-	0.001	-	0.0005	-	0.0005	-	0.0005	-	0.0005	-	0.0005	-	0.0005	-	0.0005	-	0.0005	-	0.0005	
Selenium (tot)	mg/L	0.1	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silver (tot)	mg/L	0.0001	-	-	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Vanadium (tot)	mg/L	-	-	-	-	0.0001, 0.0005	-	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	
Zinc (tot)	mg																																

LEGEND:	
Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds PQWO-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PQWO-INTERIM	Provincial Water Quality Objectives Interim
Concentration exceeds MEC-P-GD-TA	MECP Guidance Document Table A
Concentration exceeds MEC-P-GD-TA	MECP Guidance Document Table B

LEGEND:	
Detection limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds PQWO-GENERAL	Provincial Water Quality Objectives General
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Concentration exceeds MECP-GD-TA	MECP Guidance Document Table A
Concentration exceeds MECP-GD-TA	MECP Guidance Document Table B

Appendix F

Trigger Mechanisms and Contingency Plans

MUSCLOW GREENVIEW ROAD WASTE DISPOSAL SITE TRIGGER MECHANISMS (AUGUST 2019)

OBJECTIVE AND BACKGROUND

The objective of the trigger mechanisms and contingency plan for the Musclow-Greenview Road Waste Disposal Site (WDS) is to identify the off-site migration of leachate impacted surface water and groundwater, and to prevent and mitigate adverse impacts to the environment.

OBJECTIVE 1: SURFACE WATER IMPACTS

To identify migration of leachate impacted groundwater discharging to adjacent surface water bodies and to identify surface water run-off impacts to surface water bodies and ensure timely action to prevent and mitigate adverse impacts to the environment.

Further investigations at the Site were carried out in 2018 with very little new data obtained with which to re-assess the proposed triggers. The triggers are currently being revised based on the requests by the Technical surface water review (April 10, 2018 and July 16, 2019), the Technical groundwater review (July 26, 2019), and the spring 2019 sampling results.

North Property Boundary-Surface Water

Assessment Points- SW1

Assessment Criteria- Iron, Boron, Lead, Aluminum, Un-ionized Ammonia, and Zinc

Frequency-Sampling twice per year (Spring and Fall)

Contingency Plan is activated if two or more of the following triggers occur: —

- Aluminum exceeds the Provincial Water Quality Objectives (PWQOs) at the assessment point;
- Boron exceeds the PWQOs at the assessment point;
- Iron exceeds the PWQOs at the assessment point;
- Lead exceeds the PWQOs at the assessment point;
- Un-ionized Ammonia exceeds the PWQOs; and
- Zinc exceeds the PWQO at the assessment point;

West Property Boundary-Surface Water

Assessment Points- SW3

Trigger Parameter- Toxicity test (Single Concentration – Acute Lethality) collected from the assessment point.

Frequency-Sampling twice per year (Spring & Fall)



Contingency Plan is activated if test results are greater than 50% mortality and is deemed a “failure” of the test.

References:

1. Environment Canada, "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout", Environmental Technology Centre, Ottawa, Ontario, Report EPS 1/RM/13 Second Edition - December 2000, including May 2007 and February 2016 Amendments.
2. Environment Canada, "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Daphnia magna", Environmental Technology Centre, Ottawa, Ontario, Report EPS 1/RM/14 Second Edition - December 2000, including February 2016 Amendments.

Table 1 below provides the trigger values for Select Parameters for the comparison of surface water monitoring results.

Table 1: Surface Water Trigger Values for Select Parameters

Parameter	PWQO mg/L
Aluminum	0.075
Boron	0.20
Iron	0.30
Lead	0.001
Unionized Ammonia	0.02
Zinc	0.02



MUSCLOW GREENVIEW ROAD WASTE DISPOSAL SITE SURFACE WATER CONTINGENCY PLAN

Tier 1: The semi-annual toxicity test results at SW3 will serve as the first sampling event for the Tier 1 Contingency Plan for the SW1 assessment point in addition to the SW3 assessment points. If the semi-annual toxicity tests results fail at SW3, collect a second toxicity sample within two weeks of receiving the results. Upon receipt of two consecutive failing toxicity tests results at SW3 proceed with Tier 2 measures.

Tier 2: In the event of two consecutive toxicity test failures, follow the mitigation/remediation plan for measures to prevent further surface water impacts. Tier 2 of the Contingency Plan (in the event of two consecutive toxicity test failures) and are to include:

1. Benching of the north and west side slopes of the mound is recommended to allow heavy equipment to cover the steep slopes adjacent to the footprint with a minimum of 600 mm of low permeability material to minimize infiltration of precipitation immediately adjacent to the footprint. The placement of this capping material should be monitored to ensure the minimum thickness is met and to ensure the material is placed to a minimum 95% standard proctor density.
 - o Should Tier 2 Contingency Plans sampling results continue to result in two failed aquatic test results following the benching and installation of the capping material on the north and west side slopes as described in Item 1 above, then the following mitigation measures are recommended:
 - (a) The Municipality should proceed with the development of a Closure Plan for the Site closure prior to reaching the current approved capacity.
- Further remedial efforts to reduced groundwater impacts, or groundwater to surface impacts, may include the following in the future if deemed necessary. These types of systems are very costly and should only be considered if determined to be absolutely necessary.
 - o Design and install groundwater purge wells for the south, north, and west sides of Site. Water could be treated on-site and discharged to the wetland or collected and sent off-site for treatment.
2. The design, approval, and installation of purge wells and treatments systems would likely be over \$1,000,000 and would add several thousands of dollars to the Municipality's annual operations and maintenance cost. Thus this option is considered cost prohibitive for the Municipality to operate without provincial or federal government assistance.



OBJECTIVE 2: GROUND WATER IMPACTS TO GROUNDWATER

To identify migration of impacted groundwater downgradient impacts to potential potable groundwater to prevent and mitigate adverse impacts to the environment.

North and West Property Boundary-Groundwater

Assessment Point- Future Assessment Point to be determined if deemed necessary in consultation with the MECP

Trigger Parameters- Alkalinity, Aluminum, Boron, DOC, Iron, Lead, Manganese, TDS, Zinc
Frequency-Sampling twice per year (Spring and Fall)

Contingency Plan is activated if three or more of the following triggers occur: —

- Alkalinity exceeds the Reasonable Use Value (RUV) at the assessment point;
- Aluminum exceeds the RUV at the assessment point;
- Boron exceeds the PWQOs at the assessment point;
- DOC exceeds the RUV at the assessment point;
- Iron exceeds the RUV at the assessment point;
- Lead exceeds the RUV at the assessment point;
- Manganese exceeds the RUV at the assessment point;
- TDS exceeds the RUV; and
- Zinc exceeds the PWQO at the assessment point;

Table 2 below provides trigger criteria for future potential potable monitoring if deemed necessary in consultation with the MECP.

Table 2: Groundwater Trigger Values for Select Parameters

Parameter	RUV (mg/L)
Alkalinity	314
Aluminum	110.9
Boron	1.26
DOC	18.3
Iron	0.16
Lead	0.003
Manganese	0.003
TDS	339
Zinc	2.5



MUSCLOW GREENVIEW ROAD WASTE DISPOSAL SITE GROUNDWATER CONTINGENCY PLAN

Tier 1: If the triggers are exceeded, a second sample will be collected within two weeks of receiving the laboratory report under standard turnaround submission (typically seven days). If the re-sampling tests results fail, proceed with the Tier 2 measures identified under the Surface Water Contingency Plan.





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