Somerville Waste Disposal Site

2023 Annual Monitoring Report

Prepared for:
City of Kawartha Lakes

Prepared by:
Azimuth Environmental
Consulting, Inc.

May 2024

AEC 24-010

AZIMUTH ENVIRONMENTAL CONSULTING, INC.
Environmental Assessments & Approvals

May 29, 2024 AEC 24-010

City of Kawartha Lakes
Waste Management Department
322 Kent St. West
Lindsay, ON
K9V 4T7

Attention: Ms. Kayla Pantaleo Compliance Officer

Re: 2023 Annual Monitoring Report
Somerville Waste Disposal Site

Dear Kayla:

Azimuth Environmental Consulting, Inc. (Azimuth) is pleased to provide the 2023 Annual Monitoring Report (AMR) for the Somerville Waste Disposal Site (Site). The data and interpretation included provides a summary of the 2023 monitoring data with comparison to the historical data and accurate assessment of the current state of the landfill Site. This report has been prepared incompliance with the existing Environmental Compliance Approval (ECA) and applicable Provincial standards. This assessment also interprets the longer term trends at the Site such that an appropriate monitoring program assesses the current state of the landfill.

The environmental setting at the Somerville Landfill Site is well understood based on over 30 years of performance monitoring. The data trends over this monitoring period have yielded a relatively consistent geochemical signature such that it is reasonable to infer that the Site reflects a steady state condition. This is supported by the general consistency between the 2023 data with the historic data set.

If there are any questions regarding the content of the report, do not hesitate to contact the undersigned.

Yours truly,

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

PROFESSIONAL GEOSCIENTIST
COLIN ROSS
PRACTISING MEMBER
2055
ONTARIO

Colin Ross, B.Sc., P.Geo.
Senior Hydrogeologist

Table of Contents

List of In-Text Tables

List of Figures

List of Appendices

Executive Summary

The Somerville Landfill Site (Site) is located at 381 Ledge Hill Road, within the City of Kawartha Lakes (the "City"). The Site has operated as a waste disposal facility since 1972 and has a 13 ha landfilling area within the 61.6 hectare (ha) Site. The Site relies on natural attenuation to manage landfill leachate and gases produced by the wastes. The Site operates under Ministry of the Environment, Conservation & Parks (MECP) Environmental Compliance Approval (ECA) No.: A321604 which was amended on February 24, 2022 to reflect increases to daily waste and leaf/yard limits.

The geology of the Site is relatively simple, with a silty sand/sandy silt till overburden layer overlying fractured limestone bedrock. The landfill area itself is situated within a northeast-southwest oriented drumlin, which dominates the local topography and controls ground water flow such that there is both an easterly and westerly component on either side of this feature. The current fill area (Area 2) is located on the crown and west side of this feature such that leachate impacted ground water flows to the northwest. However, with the addition of a leachate well within the active waste area in 2016, ground water flow patterns have been refined and illustrate that a leachate mound is present that creates localized radial flow in proximity to this waste area. Despite this leachate mound, leachate seeps are not an issue at the Site. It is important to note that the radial flow pattern away from the waste mound is localized to just outside the edge of the waste mound, while the predominant regional flow in the overburden is toward the northwest as defined by the entire monitoring well network. There continues to be only a dilute leachate signature extending around the waste area to the northeast isolated to the City property. This indicates that attenuative processes are active and effective at the Site.

Exceedances with respect to Reasonable Use Policy (RUP) B-7-1 continued in 2023, with a number of elevated concentrations along the northeastern property boundary (MW11 &MW204). However, recently constructed MW204 ~50 m past MW11 and MW14 has shown to be represented by naturally mineralized water quality with an absence of more prominent leachate indicator parameters such as ammonia, DOC, iron and manganese which have been shown to be elevated at MW14 owing to leachate influence. This would indicate that the bedrock fracture plane targeted at MW14 is not laterally extensive such that migration of leachate impacts within the bedrock to the northeast is limited to within the road alignment. Similarly, more regional bedrock flow patterns are noted to be in a westerly direction which would limit the extent of eastern flow associated with the localized or radial patterns derived from the waste mound and drumlin feature. It is also noted that the current active area of the Site is in close proximity to MW2-I, MW2-II and MW3. As the progression of filling at the Site will continue towards the southern section of Area 2, with the current active fill area being capped, the leachate conditions will likely shift over the next few years with potential decreases in leachate mounding, lowering the horizontal gradients in this area. With lower gradients, the extent of radial flow in this area will be reduced over time.

Although MW11, which is the most north-easterly monitoring location in the overburden, has shown RUP exceedances, a new overburden compliance location could not be installed further northeast in the same location as MW204 due to limited overburden thickness (3 m) and unsaturated overburden conditions. This is mainly due to a topographic dip between MW11 and MW204 of approximately 3.7 m such that the shallow overburden aquifer is not present beyond the City road allowance. Given these conditions, it is determined that the Site meets RUP with respect to both overburden and bedrock quality at the north-eastern property boundary.

Although the leachate mound and associated radial flow would support a localized flow path to the northeast, it is noted that the active area of filling shifted in 2020 to the southern section of Area 2, with the northern fill area closed and capped in Fall 2020. It is interpreted that these activities will lower the leachate strength over time, while also potentially reducing the leachate mound, resulting in lower lateral gradients which will in turn reduce the extent of outward radial flow from the landfill. The limited radial flow extent is also supported by the fact that similar exceedances are not typically observed at MW16, which is further southeast on the Ledge Hill Road right-of-way.

As in previous years, surface water quality results did not indicate any leachate influence. The 2023 water quality results suggest that the Site is providing adequate attenuation of leachate within the property boundaries. While exceedances were observed for unionized ammonia in all surface water samples taken in 2023, this is believed to be indicative of a natural, localized source, given there is no correlation with other parameters that would be observed in leachate impacted water.

Landfill gas monitoring was completed in 2023, similar to previous years, and continues to yield data indicating that gas is present within / adjacent to the active and historic waste area. The majority of detections were trace in nature (<0.1% volume), with the exception of max readings (100% LEL) at monitors MW1-II and MW17, which is not unexpected as these wells are screened within or directly adjacent to waste. Historically, there have been more elevated and sporadic measurements observed at MW14, however, these are not viewed as landfill related given the screened depth within the bedrock and lack of similar elevations within the unsaturated soils in that location. Regardless, it is recommended that the gas monitoring program continue with the existing monitoring well network to refine the understanding of gas presence and migration at the Site. Given there are no surrounding developments within 750 m of the Site that would represent a sensitive receptor for landfill gas, no additional gas monitors are recommended to be installed, and if future monitoring indicates that there is no meaningful gas concentrations beyond the waste footprint, then the gas monitoring program could be reduced or eliminated. Of note, the updated D&O Plan for the Site (Archibald Engineering, 2016) had recommended that gas be monitored in the Site operations building using a handheld combustible gas meter. Azimuth agrees this specific monitoring represents good due diligence given the proximity of the building to the active waste area.

Overall, the monitoring data collected in 2023 is similar to what has been observed historically and would suggest that the Site is in a steady state condition with minimal evidence of a leachate plume extending beyond the waste footprint.

Revisions to the monitoring program have been established as part of the recent ECA amendment (2019) which included additional monitoring wells to address previously identified concerns by the MECP regarding Reasonable Use Policy (RUP) compliance at the northeastern and western property boundaries as well as to expand the monitoring well network to facilitate the active waste area further south into a new waste cell. Upon endorsement from the MECP, these recently added monitoring wells were constructed in October 2019 and have been incorporated in the regular annual monitoring program.

The current surface water monitoring network is sufficient for determining potential leachate impacts. It is noted that the stability of the ground and surface water quality at the Site would allow for continued semi-annual samples being collected in the spring and fall to reflect both the wet and dry periods of the year, while corresponding with the existing ground water monitoring program. As noted previously, the staff gauge monitoring has not yielded data that contributes to the Site understanding as the locations are routinely recorded as dry. As such, it is recommended that the staff gauge monitoring be removed from the monitoring program in 2024 as it is not part of the new ECA.

1.0 Introduction

The City of Kawartha Lakes (City) is responsible for the operation and maintenance of the Somerville Landfill Site (Site) in accordance with the Environmental Compliance Approval (ECA) (No. A321604) issued by the Ministry of the Environment, Conservation & Parks (MECP) in January 1980 and last amended August 2019.

The following report provides a summary of the 2023 monitoring data with comparison to the historical data set such that accurate assessment of the current state of the landfill Site is provided with respect to compliance with the existing ECA and applicable Provincial standards.

1.1 Site Background

For the purposes of efficiency and consistency, much of the background information provided within this report has been referenced from previous Site reports, all of which have been referenced in Section 9.0.

The Site is located at 381 Ledge Hill Road within the City of Kawartha Lakes (Figure 1). Waste deposition began at this 61.6 hectare (ha) Site in 1972 and continues to the present with a landfilling area of 13 ha. The waste fill areas are located within a drumlin which trends south-west to north-east through the Site (Figure 6). The silty sand till drumlin is ~20 m thick and the waste fill thickness is up to ~10 m thick in Area 2 of the Site which is the historical fill area. The Site relies on natural attenuation to manage landfill leachate or gas produced by the waste.

The Site, which can be subdivided by the various periods of activity and waste deposition (Figure 2), includes an area of active deposition, a compost pad, and various areas of historical deposition which are now closed (Area 1 & 3). Area 1 reportedly received approximately 60,000 m^3 of household waste prior to being closed and covered with clay in the spring of 2002. Area 3 received household, construction and demolition waste. The current cell development and landfilling is in Area 2. Waste types include residential, commercial, and construction/demolition. The northern portion of Area 2 was capped in Fall 2020. Landfilling is currently occurring in the southwest portion of Area 2 and cell development is progressing towards the southeast. The northern portion of Area 2 has received final cover and interim cover. As landfilling progresses in Area 2 the interim cover placed in the northern portion will be removed to connect to the south of Area 2.

Previous reporting (Azimuth, 2012) indicated that installation of the current monitoring network (Figure 2) was initiated in 1992, with the installation of monitoring wells MW1 (I and II), MW2 (I and II), MW3, MW4 (destroyed), MW5 (i.e. MW5-III), MW6, and

MW7. Additional perimeter wells were installed in 1996 (MW8 [I, II, III], MW9, MW10 [I, II]), 2006 (MW14 and MW15) and 2016 (MW16 [I, II, III] and MW17). Finally, additional perimeter wells were also added in 2019(MW201, MW201D, MW202, MW203 and MW204). Although well logs are not available for wells MW11, MW12, and MW13, their depth is known through sounding with the water level indicator. These wells were installed in 2001 and they continue to serve a useful purpose. MW13 was installed to provide a background monitoring location, MW12 serves as a distant downgradient monitoring location to the west and MW11 was added to the northeast corner of the Site.

The 2016 monitoring wells were installed to refine the ground water flow patterns within and surrounding the landfill (MW16) and provide a dedicated leachate monitor for the active area (MW17). The 2019 monitoring wells were installed to address previously identified concerns by the MECP regarding Reasonable Use Policy (RUP) compliance in the northeastern and western property boundaries as well as to expand the monitoring well network to facilitate the relocation of the active waste area further south into a new waste cell. The following table outlines each monitoring location including its target formation.

Table 1: Monitoring Well Network

Area/Purpose	Monitoring Well
Up-Gradient/Background	**Shallow Overburden:** MW13 **Bedrock**: MW5-I, MW5-II and MW202
Leachate – Area 1	**Shallow Overburden:** MW1-II **Deep Overburden:** MW1-I
Leachate – Area 2	**Waste:** MW17 **Shallow Overburden:** MW3
Downgradient	**Shallow Overburden:**MW2-II, MW7, MW11, MW12 **Deep Overburden:** MW2-I, MW8-II, MW5-III, MW10-II, MW16-III and MW201 **Bedrock:** MW8-I, MW8-III, MW9, MW10-I, MW14, MW15, MW16-I, MW16-II, MW201D, MW203 and MW204

While historical data exists for all of these wells, some of them have been discontinued from the monitoring program as they are consistently dry. These wells include: MW 2-I, MW3, MW5-II, MW5-III, MW8-II, and MW10-I. Surface water drainage at the Site is towards the low-lying area where a seasonal pond exists, that is partially located on the northern section of the landfill Site. The current surface water monitoring program consists of conducting semi-annual sampling at three sampling locations (Figure 3). Two surface water stations (SWA and SWB) are located near the northwest property boundary of the Site, and one background station (SWD) located near the south property boundary. SWA is located immediately adjacent to the Site property boundary. Note that the Site's south property boundary, as shown in Figure 6, is located approximately 750 m south of the waste area.

A landfill gas monitoring program is also conducted at the Site. The monitoring program consists of collecting gas measurements at all existing monitoring wells as well as two dedicated gas monitors.

2.0 Geology

The geology at the Site is described as consisting of sandy silt to silty till, which is underlain by weathered limestone bedrock (Azimuth, 2012). The Site is located on the edge of a drumlin feature, which trends southwest-northeast through the Site and across the waste storage areas (Figure 6). Based on the available borehole logs (Appendix F), the overburden thickness at the Site varies between 0 m (i.e. areas of bedrock outcrop) in the north, to as much as 20 m on the drumlin.

Chapman and Putnam (1984) indicate that the Site is located near the boundary of the Dummer Moraines and Georgian Bay Fringe physiographic regions. The Ontario Geological Survey (OGS) OGS Earth database[1] indicates that the surficial geology in the area of the Site consists of till deposits, comprised of a mixture of sand and silt, overlying Paleozoic bedrock. OGS Earth also indicates the presence of an area of organic deposits (*i.e.* peat) immediately northwest of the landfill. The uppermost bedrock unit is reported to be limestone of the Bobcaygeon Formation.

3.0 Hydrogeologic Interpretation

As noted previously, the current ground water monitoring network consists of 23 monitoring wells, including 5 wells in the shallow overburden, 6 wells in the deep overburden, 11 wells in the bedrock, and one leachate monitor (Figure 2). The available ground water elevation measurements are provided in Appendix C.

The water level in the leachate monitor (MW17) is at about 291 mASL. In contrast, most of the ground water monitoring wells report water levels below 282 mASL or in proximity to the bedrock contact. There are a few monitoring locations (*i.e.,* MW1-I, MW1-II, MW2-II, MW10-II & MW16-III) that report ground water levels above

---

[1] http://www.mndm.gov.on.ca/mines/ogs_earth_e.asp

286 mASL. It is noted that MW17 has shown a declining ground water elevation over the past several years from approximately 295 masl to 291 masl in 2023. This decline is likely attributable to the progressive closure and capping of the waste cell over this period reducing the amount of ground water infiltration in the area.

Several of the monitoring wells have typically been dry during monitoring events, and were generally not able to be sampled historically. The wells typically found to be dry or have insufficient water to collect a sample included MW1-II (286.1 mASL), MW2-I (280.2 mASL), MW5-II (279.4 mASL), MW5-III (281.6 mASL), MW8-I (277.5 mASL), MW8-II (281.7 mASL), and MW10-I (279.5 mASL)[2].For this reason, the wells routinely found dry have since been removed from the monitoring program (MW2-I, MW5-II, MW5-III, MW8-II and MW10-I). One of the new wells identified as MW201 (279.18 mASL) has also found to be dry (or very little water in the well) since its construction in 2019. With the exception of MW1-II, the rest are noted to be located in the deep overburden or shallow bedrock. It is likely that the lack of water within the deep overburden in these locations is a result of a lower water table which is in the bedrock as opposed to overburden.

The above noted dry wells may have been drilled during seasonally perched water conditions. However, they are not judged to be representative of true potentiometric / groundwater surface or water table within the drumlin feature. Although there is limited ground water elevation data within the deep overburden due to the unsaturated conditions observed throughout this feature, the data presented on Figure 4 would illustrate that the ground water flow patterns would likely match those of the shallow overburden with ground water elevations and flow direction being dictated by the topography associated with the drumlin, although results would show a more southeast flow path owing to a lack of locations at the northwest section of the Site. This is evident with the ground water elevations within the drumlin (MW1-I and MW16-III) being approximately 6-8 m higher than that observed at MW8-II (historic). The lower ground water elevation at MW201 is likely due to its proximity to the edge of the drumlin feature where groundwater discharge often occurs in a drumlinized area.

In order to simplify the hydrogeological interpretation, the ground water flow regime at the Site is considered to consist of two flow systems being the topographically controlled shallow overburden system and the shallow limestone bedrock system (Figures 3 & 5). These figures illustrate flow within the shallow overburden (Figure 5) to be east and northwest, originating from the peak of the drumlin feature / waste mound (MW17) that creates a ground water divide through the Site. The mounding would create localized

---

[2] Elevations in brackets represent the base of the monitoring well

radial flow from the active waste mound such that localized easterly flow towards the eastern property boundary is shown. The isolated bedrock flow pattern (Figure 3) shows ground water flow is generally in a south to west direction towards the Burnt River, the ultimate groundwater discharge zone, which is consistent with previous years. The newer wells installed in 2019 located around the periphery of the drumlin feature have helped to confirm this understanding of the bedrock ground water flow direction.

4.0 Site Conceptual Model

The geology of the Site is relatively simple, with a silty sand/sandy silt till overburden layer overlying fractured limestone bedrock. The landfill area itself is situated within a northeast-southwest oriented drumlin, which dominates the local topography (Figure 6).

Ground water measurements from selected overburden monitoring wells indicate that a perched ground water mound exists within the drumlin as well as the waste mound. It has been shown in previous reporting that a ground water divide is present and oriented along the long axis of the drumlin. It is expected the rainfall on the drumlin will percolate within the shallow overburden soils with flow then diverging either to the southeast or northwest, with more local radial flow to the east of the active waste area.

Based on the topographic contours (Figure 6), it is expected that all the current waste areas (Areas 1, 2, and 3) are located on the northwest side of the ground water divide, while the new waste cell at the south end of Area 2 may straddle the divide such that there is some potential flow from this waste area to the south / southeast. As such, ground water from the existing waste and compost areas (and by extension leachate and leachate affected ground water) would be expected to migrate away from the drumlin to the west and northwest, depending on the orientation of the topographic slope. Under these conditions, it is expected that ground water mounded within the drumlin would discharge, likely near the toe of the slope, and move as a component of overland drainage toward the pond/swamp area northwest of the Site or migrate downward into the bedrock and then migrate westward following the regional groundwater flow toward the Burnt River.

Ground water level measurements in the bedrock fracture system (*i.e.* deep system) indicate that the piezometric surface within the bedrock is relatively flat, and does not show evidence of influence from the perched ground water mound within the drumlin or waste mound likely due to a potentially higher flux in the bedrock relative to the overburden till unit. There also appears to be an unsaturated zone within areas of the shallow bedrock, which has lead to many of the bedrock monitors requiring deeper installation depths into this unit (~8 m into bedrock). This is not surprising as there is an exposed unsaturated bedrock outcrop further northwest along Ledge Hill Road. Based on this information it appears that the bedrock contact zone may have a low vertical permeability, and lacks a strong hydraulic connection with the overlying overburden. It is speculated that the various shallow bedrock ground water monitoring wells installed at the Site have not intersected permeable fracture zones or are above the true water table. This still suggests that the bedrock contact possesses a competent cap which is not vertically transmissive. The surrounding wetland environment attests to this possibility where surface waters are trapped on top of the bedrock contact (as opposed to be easily drained into the underlying rock).

It is expected that the geochemical composition of natural overburden ground water in this type of environment will be characterized by relatively low concentrations of major ion parameters. Bedrock ground water geochemistry is anticipated to be controlled by laterally continuous bedding plane fractures within the layered limestone setting. Water quality will likely be dependent on the permeability (*i.e.* fracturing) of the rock, the depth to bedrock, and the bedrock composition. In areas where the bedrock is relatively permeable and occurs at a shallow depth, the bedrock geochemistry may closely resemble the overburden ground water geochemistry. In deeper zones, or zones of lower permeability the ground water may be more mineralized due to prolonged water-rock interactions. This is most evident at MW203 and MW204, which are noted to have very slow recoveries following purging during monitoring events relative to the remaining new well constructions. As a result, the water quality at these locations are different than the remaining locations indicating a much more mineralized water quality with elevated strontium, boron, magnesium, potassium, sodium and chloride concentrations above those observed at MW14, which is in closer proximity to the landfill and screened at a similar elevation in the bedrock. It is also noted that the water quality at MW203 and MW204 are notably absent of elevations for a number of more prominent leachate indicator parameters such as ammonia, DOC, iron and manganese which have been shown to be elevated at MW14 owing to leachate influence. This would indicate that the bedrock fracture plane targeted at MW14 is not laterally extensive such that migration of leachate impacts within the bedrock to the northeast is limited to within the City owned road alignment. Similar mineralized water quality may also be present at MW202 based on more subtle elevations of the same parameters as MW204.

The dominant water quality signature for all ground water monitoring samples is calcium carbonate. This is anticipated in a limestone environment including the overlying till which is a limestone based material. On a dissolved mineral percentage basis the calcium carbonate in solution represents at least 75% of major ion chemistry and in most cases over 90% of the major ion chemistry even for leachate samples. The elevated calcium content will translate to a hard water signature (*i.e.*, naturally elevated hardness concentration).

The strongest leachate geochemical signature is represented by ground water samples from MW17. This well was installed in September 2016 and screened within the most current wastes. It provides an accurate representation of leachate conditions within the active area of the landfill. The water quality at this location has significantly elevated leachate parameter concentrations above all other monitoring locations, indicating that attenuative processes are active a short distance from the waste mound. The more mature and weaker leachate signature is represented by the MW1 samples.

Based on the inferred ground water flow pattern in the area (*i.e.* the presence of an overburden ground water divide), ground water from MW13, located about 250 m south of the Site, is most representative of background ground water conditions, at least for the overburden profile. The ground water at MW13 has relatively low mineralization, with all measured parameters present at concentrations below their respective ODWQS guidelines. The most representative background bedrock water quality has historically been considered to be from MW5 given the equally dilute concentrations and location on the north side of the drumlin feature, although with newly constructed wells MW201, MW202 and MW203, there are additional background reference locations now. Although MW5-I is close to the area currently being developed, the MECP has indicated that it is adequate as a background well. MW202 would also represent an additional background bedrock monitor.

Of the wells in the downgradient monitoring network, only MW1-I, MW1-II, MW10-II & MW11 (overburden) and MW8-III and MW14 (bedrock) are potentially detecting a weak leachate signature, while MW2-II has begun to show leachate influence over the past two years with increasing trends for most indicator parameters. This trend is expected given it is immediately adjacent to the current waste area. As well, weak and inconsistent leachate influence is noted at MW12 during fall sampling.

In general, the leachate impacts are assumed to be indicated by the presence of general chemistry parameters (*i.e.* leachate indicators) above the concentrations measured at the applicable background well (either MW13 for overburden or MW5 / MW16-I for bedrock). The geochemical signature at MW14 is considered to be leachate influenced with elevated iron, manganese, DOC, alkalinity, hardness, chloride, and barium concentrations in comparison to background concentrations.

Barium is not very mobile in most soil systems, due to the formation of water-insoluble salts and an inability of the barium ion to form soluble complexes with fulvic and humic acids (WHO, 2001). Barium complexes with fatty acids (e.g., in acidic landfill leachate) will be much more mobile in the soil due to the lower charge of these complexes and subsequent reduction in adsorption capacity (Lagas *et al*, 1984). Thus, barium has been used as an indicator parameter for leachate migration at this Site.

The ground water geochemistry results indicate that leachate impacts are detected at several locations. However, in general it appears that the leachate impacts are relatively minor, relative to the leachate quality observed at MW17. As well and based on the available data, influences are largely limited to increased concentrations of various parameters which are not considered a concern to human health (based on the ODWQS). In addition, several of the parameters which are attributed to leachate impacts are commonly found to be elevated above the ODWQS in natural ground water (*e.g.* iron, manganese, hardness), and tend to be mitigated by natural processes which will limit the potential for migration (*i.e.,* chemical oxidation).

Given the presence of a ground water mound within the drumlin, and the relatively steep slope on the northwest side of the Site, there is the potential for leachate affected ground water to discharge via surface seeps to the ponded area in the northwest. However, previous inspections in the area have not noted any seeps. Also surface water chemistry in the ponded area is consistent with that measured at the background location, suggesting that landfill operations are having a negligible effect on surface water quality. It is further noted that surface flow at the Site is towards the toe of the landfill from the pond to the north during wetter periods in the spring, which likely provides increased dilution potential.

Finally, there has been a decline in the elevation of the leachate mound measured at MW17 over the past several years. This reduction in mound elevation will reduce the lateral hydraulic gradient which will help to reduce the radial ground water flow path to the northeast.

5.0 Summary of 2023 Monitoring Program

The 2023 monitoring program for the Site was undertaken by Azimuth Environmental Consulting (Azimuth). Azimuth completed all gas, ground and surface water monitoring which occurred in April and October.

This program, which includes 23 ground water monitoring wells and 3 surface water locations represented a scaled back program with the removal of a number of locations due to their routinely dry conditions where sample collection has not been possible historically. More recently, monitoring wells were installed in October 2019 (MW201, MW201D, MW202, MW203 and MW204) such that the ground water monitoring network would better characterize ground water quality within the new waste area at the south end of Area 2, as well as assist with Reasonable Use compliance assessment at the northeastern property boundary. For reference, the locations are summarized in Section 1.1 and illustrated on Figure 2 (Appendix A).

Prior to sampling at ground water monitors, static water levels were measured. Ground water samples were then collected following purging of at least three well volumes of water from each monitor using dedicated check valve pumps and tubing or until the monitor was dry and sufficient recovery allowed for a sample collection. Ground water samples for metals and DOC analysis were also field-filtered using disposable 0.45 μm filters.

Surface water samples were collected at a depth about equal to half of the surface water features total depth, while minimizing the potential for sediment entrainment and were not filtered.

In 2023, the analytical testing was completed by Caduceon Environmental Laboratories (Caduceon) of Kingston or Richmond Hill, Ontario. Caduceon is accredited by the Canadian Association of Laboratory Accreditation (CALA). Unabbreviated Laboratory Certificates of Analyses for all testing are presented in Appendix I, while the data has also been summarized with the historical data in Appendix B. Also, for a more detailed description of the field protocols employed for all monitoring activities associated with the 2023 monitoring program, the City's standard field protocols have been included in Appendix H.

5.1 2023 QA/QC Samples

As part of the routine sampling program for the Site, duplicate samples were collected and analyzed for quality assurance purposes. In 2023, a total of four QA/QC samples were collected out of the 39 ground/surface water samples collected. The laboratory was not advised of the sample duplication prior to analysis of these samples. Results are provided in Appendix B and were found to be generally within acceptable limits with the exception of ammonia, which indicated more significant variance at all locations in 2023 of up to 127%. This inconsistency may also relate to deviations in ammonia concentrations at several locations, which were noted in April 2023 and 2022. These deviations indicated elevated ammonia concentrations above the historical ranges for most locations during these monitoring events, including background location MW13 which is a distant background location. It is also noted that these deviations are independent of other leachate indicator parameter concentrations for most locations indicating the source is not likely landfill derived. As such, the ammonia concentrations over this period should be reviewed carefully and in relation to other leachate indicator parameters.

5.2 Ground Water & Leachate

5.2.1 Ground Water & Leachate Flow

Water level measurements were obtained prior to any disturbance of the static piezometric surface using an electronic water level meter (accuracy of +/- 0.2 cm). The water level data collected during monitoring events in 2023 was generally consistent with the historical data set.

Contouring of the water level data demonstrates the direction and rate of the shallow ground water flow in the vicinity of the waste (Figures 5a and 5b). The flow in the area of the current and historic waste is generally to the northwest. The ground water elevation data from MW17 also indicates a leachate mound is present which would create radial flow resulting in a localized eastern flow path in the area of MW11 and MW14. Ground water flow beyond the waste area to the south indicates a southern flow path following the local topography of the drumlin.

In contrast, the shallow bedrock ground water flow direction (Figure 3) aligns with the direction of the regional bedrock dip being westward and southwestward. This is also the same direction from the landfill to the Burnt River and the likely discharge location for deep groundwater from the Site. Therefore, the leachate-influenced water entering the bedrock in proximity to MW14 is then travelling back under the landfill Site in a westward and southwestward direction. This has been confirmed with the ground water elevation data collected from the new more distant bedrock monitoring wells installed in 2019.

It is noted that the flow patterns for both the overburden and bedrock follow those observed in previous years.

5.2.2 Background Ground Water Quality

The background ground water chemistry is currently and has historically been monitored at an upgradient bedrock location (MW5-I) and overburden location (MW13) which are both located south of the current fill area (Figure 2). Two additional upgradient bedrock monitoring wells (MW201D & MW202) were installed in October 2019 and are included in the interpretation. MW201 was also installed but a sample has yet to be taken due to dry or insufficient water conditions.

The water quality can be characterized by a low to moderate level of mineralization in both the overburden and bedrock. Ontario Drinking Water Quality Standards (ODWQS, 2006) are consistently exceeded for hardness within both the bedrock and overburden. Dissolved organic carbon (DOC) is noted to exceed on occasion in both of the units, albeit mostly in the overburden horizon. The wetland environment present around the

Site could account for the enhanced DOC concentrations being vegetation decay (*i.e.,* lignins and tannins).Water quality for MW202 is consistent with the description provided above for the other background monitors. MW201D has shown exceedances for hardness, iron, DOC and manganese in all of the Fall samples taken. The 2023 analytical data is generally consistent with historical data (Appendix D).

5.2.3 Leachate Quality

Leachate quality is controlled by the availability of soluble contaminants in the waste pile, the residence time of infiltrating water in the waste, and the physical conditions (*i.e.,* temperature, redox potential, and pH) of the solution. Compared to natural waters, leachate that is produced from landfilled waste typically possesses elevated concentrations of calcium, magnesium, sodium, potassium, iron, zinc, chloride, sulphate, alkalinity, ammonia, total kjeldahl nitrogen (TKN), conductivity, total dissolved solids, dissolved organic carbon, and/or phenols (Jones, 2001). Aluminum, boron, barium, cobalt, nickel, strontium, titanium, vanadium and phosphorus species are also typically enriched in leachate, although to a lesser degree. Leachate quality changes over time as a result of continued leaching of the waste pile, which preferentially removes more soluble compounds first. The valence of certain species (*i.e.,* nitrogen, sulphur) can also be used to evaluate differences between leachate impacted and non-impacted waters, specifically the oxidation state which tends to be depleted in leachate. Inherent difficulties arise when selecting leachate related parameters in a limestone bedrock environment. Typically, elements such as calcium, magnesium, alkalinity and sulphate can be elevated in natural limestone bedrock ground waters, thus reducing their effectiveness to be used as leachate indicator parameters.

Presently, the best available estimate of leachate quality at the Site is the analytical data obtained from MW17, which is screened within the waste of the active area (Area 2). Given this well is within the active waste area, it provides the best representation of current leachate conditions at the Site, although it is noted that MW1-II is immediately downgradient of the historic cell for the Site (Area 1), such that this also provides a reference for the more historic and mature leachate signature at the Site.

For the Site, the leachate strength is relatively high in the north end of Area 2 as the Site has been active in this area (MW17) most recently. One of the most significant deviations noted between the leachate and natural levels is with respect to nitrogen species (*i.e.,* TKN and total ammonia [as N]), although other notable elevations include boron, chloride, alkalinity, hardness, TDS, as well as a number of other parameters. Elevated concentration of both ammonia and TKN is indicative of a geochemically reducing environment, as is typical of ground water conditions in the immediate vicinity of any landfill site. This is primarily due to the consumption of available dissolved oxygen within the subsurface by bacteriological activity, which is catalyzed by the large quantity of organic matter (organic carbon source for energy-producing reactions) occurring within the waste mass. The microbial activity is limited by the available oxygen which is often depleted within the landfill mass and hence the use of alternative sources of oxygen by facilitative bacteria (*i.e.,* reduction of oxygenated species [$NO_3 \rightarrow NO_2 \rightarrow NO \rightarrow NH_3$ and $SO_4 \rightarrow SO_2 \rightarrow H_2S$] dissolved in the leachate).

These geochemically reducing conditions will also allow for valence changes in many metal species which tends to increased dissolution potential of metal ions. This is evident at this Site with the significantly elevated iron concentrations (see Table 2 overleaf).

The historic leachate signature for Area 1 as evidenced by the water quality at MW1-I/II, shows a more depleted / mature signature that is absent of the significant ammonia / TKN elevations observed at MW17 as expected since this portion of the landfill is older. Elevated concentrations remain for the majority of leachate indicator parameters; however, their concentrations have shown to be stable for the period of record, as illustrated in the temporal graphs included in Appendix D.

Based on the leachate quality derived at MW17 as well as previous MECP comments, the leachate indicator parameters (LIPs) identified for this Site in 2023 are listed below. It is noted that these are similar to last year:

-Alkalinity
-Chloride
-Dissolved Organic Carbon (DOC)
-Barium
-Ammonia
-Hardness
-Potassium
-Total Dissolved Solids (TDS)
-Chemical Oxygen Demand (COD)
-Calcium
-Iron
-Boron
- Total Kjeldahl Nitrogen (TKN)
-Manganese
-Sodium

5.2.4 Downgradient Ground Water Quality

In 2023, the ground water quality downgradient of the Site was monitored via seven (7) overburden and ten (10) shallow bedrock monitoring well locations, although as noted above some of the newer bedrock monitors installed to the south of the landfill area in 2019 may more likely represent background locations. The potential horizontal migration of the leachate plume beneath the Site was evaluated by looking at average concentrations for numerous typical leachate indicator parameters. Averages are used for the previous five years of sampling as this is the most current and relevant data. This average concentration data is provided in the following tables.

The total concentrations of leachate parameters in ground water are relatively low for locations outside of the immediate vicinity of the waste mound (e.g. chloride levels are generally less than 25 mg/L, except for MW203 & MW204). The following sections describe the surrounding locations where low levels of leachate are observed.

The concentrations provided for the overburden indicate a subtle leachate influence that is evident in some downgradient monitors, albeit concentrations are largely reduced from MW17. The most impacted locations include MW1-I, MW1-II and to a lesser extent MW11. The elevated concentrations at MW1-I and MW1-II are not surprising as these are located within the former waste footprint of Area 1. MW11 shows elevations of certain leachate indicator parameters and to a much lesser extent MW10-II. The most notable parameters include: alkalinity, ammonia, calcium, DOC, iron, manganese and TDS.

These elevated concentrations are not unexpected as the ground water elevations at MW17 indicate that a ground water mound is present that would create localized radial flow such that leachate migration would be expected at these locations, only a short distance from the waste mound. However, the lack of detections at MW16-III would indicate that this easterly flow path within the overburden is localized and likely limited a short distance beyond MW11.

Beyond the localized easterly flow path from the waste mound, the ultimate downgradient area of the landfill is towards the west and northwest of the current waste area with MW7 representing the downgradient location. Given that the water quality at this location shows a very similar signature to MW13, there is no evidence to suggest a leachate plume extending within the overburden from the landfill in this area. Very subtle and seasonal leachate influence is observed at MW12 indicating that leachate migration is to the west, albeit attenuative processes are active limiting the strength and extent in that direction.

Table 2: Average Leachate Indicator Parameter Concentrations – Overburden

Parameters	ODWQS	Background	Leachate	Downgradient Monitoring Wells							
		MW13	MW-17	MW1-I	MW1-II	MW2-II	MW7	MW10-II	MW11	MW12	MW16-III
Alkalinity	500	193	**2242**	**509**	**557**	222	197	281	309	243	208
Ammonia		0.3	182	0	4	0.4	0.3	0.4	0.2	1	0.3
Barium	1	0.04	1	0.2	0.2	0.1	0.03	0.1	0.2	0.03	0.1
Boron	5	0.01	**10**	0.01	0.1	0.1	0.01	0.2	0.04	0.1	0.01
Calcium		89	462	195	197	83	84	90	132	101	72
Chloride	250	35	**368**	1	3	10	2	11	13	9	11
DOC	5	4	**91**	**5**	**15**	**3**	5	2	**8**	4	2
Iron	0.3	0.01	**21**	**5**	**42**	**0.01**	0.02	0.01	0.1	0.03	0.01
COD		16	744	41	184	27	14	7	39	10	80
Hardness	500	232	**1417**	**533**	**532**	261	218	309	352	266	233
Manganese	0.05	0.003	**2**	**2**	**2**	**0.00**	0.01	0.001	**0.2**	0.02	0.001
Potassium		0.4	190	3	5	2	0.3	4	3	1	2
Sodium	200	4	**375**	2	4	4	1	12	6	4	4
TDS	500	252	**3058**	**523**	**567**	266	211	322	355	272	236
TKN		1	214	1	7	0.5	1	1	1	2	1

Average concentrations between 2019 and 2023

Bold and highlighting indicates ODWQS exceedance

All results in mg/L

Table 3: Average Leachate Indicator Parameter Concentrations – Bedrock

Parameters	ODWQS	Background		Leachate	Downgradient Monitoring Wells									
		MW5-I	MW202	MW-17	MW8-I	MW8-III	MW9	MW14	MW15	MW16-I	MW16-II	MW201D	MW203	MW204
Alkalinity	500	239	196	**2242**	449	379	293	**578**	237	193	182	232	151	159
Ammonia		0.2	1	182	0.4	1	0.4	0.4	0.2	0.4	1	1	1	1
Barium	1	0.1	0.02	1	0.1	0.1	0.03	0.3	0.04	0.03	0.04	0.04	0.04	0.03
Boron	5	0.1	0.5	**10**	0.03	0.1	0.1	0.03	0.1	0.01	0.01	0.1	3	2
Calcium		101	83	462	174	146	120	245	103	81	74	100	145	194
Chloride	250	8	38	**368**	2	8	12	44	2	8	4	16	**613**	151
DOC	5	5	3	**91**	4	**6**	**6**	**6**	3	4	4	5	1	1
Iron	0.3	0.1	0.1	**21**	**5**	**2**	0.05	**7**	0.02	0.3	0.02	**0.5**	0.2	0.1
COD		14	11	744	9	11	45	16	6	137	10	20	15	6
Hardness	500	270	282	**1417**	494	403	313	**665**	275	214	196	278	**710**	**679**
Manganese	0.05	**0.1**	0.01	**2**	**1**	**0.4**	0.005	**2**	0.004	**0.1**	0.002	**0.1**	0.03	0.02
Potassium		1	3	190	2	2	0.5	2	1	0.4	0.4	1	13	7
Sodium	200	6	23	**375**	4	7	6	22	1	5	3	12	**534**	106
TDS	500	272	376	**3058**	481	408	321	**709**	273	217	197	316	**2383**	**1193**
TKN		1	1	214	1	0.7	2	1	0.3	1	1	1	1	1

Average concentrations between 2019 and 2023

Bold and highlighting indicates ODWQS exceedance

All results in mg/L

Similar to the overburden monitoring wells, Table 3 summarizes the average concentrations at the bedrock monitoring wells for the defined leachate indicator parameters. The leachate signature is most readily observed at MW8-I, MW8-III, MW14 & possibly MW9 with elevated alkalinity, calcium, iron and manganese concentrations. The water quality at MW14, is likely reflective of the localized 'halo' of radial flow from the leachate mound noted within the shallow water table, which is estimated to be approximately 5 to 10 m above the surrounding shallow water table along the western slope of the drumlin feature in the overburden. With the establishment of a new bedrock monitoring well (MW204) approximately 100 m northeast of MW14 in 2019, a better understanding of the water quality and migration in this area has been established. The water quality at this location is much different than the remaining locations indicating a much more mineralized water quality with elevated strontium, boron, magnesium, potassium, sodium and chloride concentrations above those observed at MW14, which is in closer proximity to the landfill and screened at a similar elevation in the bedrock. It is also noted that the water quality at MW204 is notably absent of high levels of leachate indicator parameters such as DOC, iron and manganese. These parameters have been shown to be elevated at MW14 owing to leachate influence. Ammonia concentrations are elevated at MW204; however, similarly elevated concentrations are also noted at other new bedrock wells which indicate similar natural mineralization as MW204 (MW202 & MW203) indicating the ammonia, as well as other parameters (boron, fluoride, selenium and sulphate) are naturally sourced within the bedrock. This differential in quality would indicate that the bedrock fracture plane targeted at MW14 is not laterally extensive such that migration of leachate impacts within the bedrock to the north east is likely limited to within the road alignment. This lack of laterally extensive bedrock fracture plane is further supported by the fact MW204 had a much slower response following purging indicating it is likely not hydraulically connected to the same bedrock fracture plane as that at MW14.

Given the leachate impacts are found to be quite diluted at MW14 relative to MW17 and not observed further northeast of MW14 at MW204, the horizontal extent of leachate in this direction does not extend beyond the City owned lands (i.e. road allowance).

Graphs illustrating the concentrations of a few select leachate indicator parameters over time have been provided for all monitoring locations with a sufficient data set in Appendix D. For reference purposes, the entire geochemical database has been appended in Appendix B. As indicated above, both the calcium and bicarbonate (*i.e.,* alkalinity) dominate the graphical depictions.

As can be observed in these graphs, the ground water chemistry has remained relatively consistent for the period of record; especially for the monitors with background chemistry. Some variability is noted; however, the concentrations generally fall within a predictable range over time at all locations. Some exceptions have been noted historically including slight increasing trends for chloride, calcium, alkalinity, barium, COD, DOC at MW10-II, although many of these parameters have begun to stabilize or decrease recently. It is possible that the slight increasing trends were the result of increased mounding in the active area, which has become more evident since the construction of MW17 in 2016. MW11 showed increasing trends for COD, DOC, manganese, potassium, and TKN in 2011, however, have since subsided or remained consistent since then. Similarly, these trends may be related to the leachate mounding, which may have increased leading up to 2011 with the increase in elevation of the waste mound. As well, the active waste area may have extended closer to MW11 during the similar period. With the more recent stabilized water quality, it would indicate that the leachate mound has stabilized or is possibly decreasing due to the areas being capped. This is evident in the ground water elevation data collected at MW17 since its installation in 2016.

More recent trends are noted at MW2-II, which indicated increasing concentrations for most leachate indicator parameters starting in 2022. These increases are attributable to the growing waste area immediately adjacent to this location which was developed over the past few years.

Finally, nitrate has been noted to be elevated at a few locations at the Site, although the concentrations have been found to be variable over time as well across the Site. However, these conditions have been observed in both leachate (MW1-I, MW2-I & MW11) and non leachate impacted (MW10-II & MW203) locations, such that it is not a defined leachate indicator parameter. More recently, concentrations have become more elevated at MW10-II (~3.5 mg/L). Given the presence in non leachate impacted wells and its historical variability, it is not viewed as a concern or an indicator of an overall shift in leachate conditions at the Site. Concentrations at these two locations will continue to be tracked in 2024 to assess any further development in trends.

Overall, although short term variance is still observed at the Site, no definite trends are observed in 2023 that would indicate there is an increasing contribution of leachate to the surrounding environment or any significant impact to the environment off site.

In addition to the above assessment, all 2023 values were compared to ODWQS in the 2023 chemistry summary tables (Appendix B) and indicated relatively similar results to previous years. These exceedances included alkalinity, aluminum, chloride, DOC, hardness, boron, iron, lead, manganese, nitrate, sodium, sulphate and TDS. With the exception of MW8-III, MW1-II, MW11, MW17 and MW14, which have been shown to have varying degrees of leachate impacts, the majority of these exceedances are most likely natural in source as evidenced by a number of these parameters observed to exceed in the background locations. This is most evident at MW203 and MW204, which indicated a naturally mineralized water quality resulting in the high sodium, chloride and sulphate exceedances in 2023.

5.3 Surface Water

5.3.1 Surface Water Flow

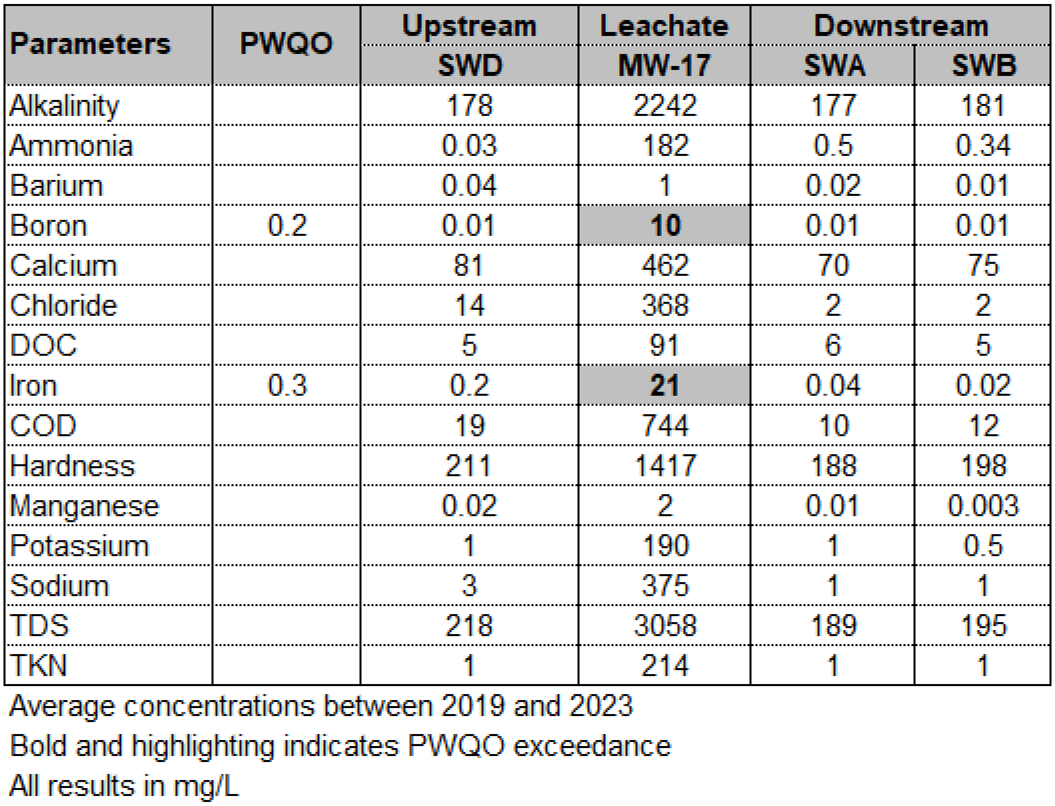
The monitoring program as it exists is in place to assess potential leachate influence in the downgradient area to the northwest of the waste mound and includes three monitoring locations: SWD (upstream), SWA & SWB (downstream). These monitoring points are used to assess whether there is any impacts to the wetland area and associated pond immediately north of the waste mound.

5.3.2 Surface Water Quality

Table 4 summarizes average concentrations of leachate indicator parameters for the last five years between up and downstream monitoring locations that surround the landfill. Given SWD was not sampled over this period, a similar deviation in concentrations is note observed. It is noted that the SWD data did not include any values between 2018 - 2023 as this location was noted to be dry during all monitoring events of this period. As such, the average represents the last 5 year period recorded (2011-2016). It is assumed that the culvert which conveys surface water to the west side of Ledge Hill Road at this location has been altered or blocked, as surface water has not been observed at SWD since 2015.

As can be observed in this summary table as well as the 2023 results (Appendix B), there is not any discernible difference between the up- and downstream locations beyond ammonia. However, these concentrations were noted previously to be potentially unrepresentative given isolated elevations in many locations, including background over the past two years.

Table 4: Average Leachate Indicator Parameter Concentrations – Surface Water



Parameters	PWQO	Upstream	Leachate	Downstream	
		SWD	MW-17	SWA	SWB
Alkalinity		178	2242	177	181
Ammonia		0.03	182	0.5	0.34
Barium		0.04	1	0.02	0.01
Boron	0.2	0.01	**10**	0.01	0.01
Calcium		81	462	70	75
Chloride		14	368	2	2
DOC		5	91	6	5
Iron	0.3	0.2	**21**	0.04	0.02
COD		19	744	10	12
Hardness		211	1417	188	198
Manganese		0.02	2	0.01	0.003
Potassium		1	190	1	0.5
Sodium		3	375	1	1
TDS		218	3058	189	195
TKN		1	214	1	1

Average concentrations between 2019 and 2023
Bold and highlighting indicates PWQO exceedance
All results in mg/L

The 2023 results were also compared to PWQO as is standard for surface water quality evaluations. Only two surface water exceedances of PWQO were noted in 2023, which were total phosphorus (0.06 mg/L) in the May sampling event at SWA, and unionized ammonia (0.03 mg/L) in the May sampling event at SWB. Historically, total phosphorus has exceeded the PWQO standard at locations, including historical background such that it is more likely due to decay of organic matter within the water feature or through sediment entrainment during sample collection. As noted previously, the ammonia concentrations in 2023 may not be representative, such that the unionized ammonia exceedance may not be sourced to the landfill. This is supported by the fact that the remaining parameter concentrations do not support leachate influence.

Given the consistency in water quality between the upstream and downstream locations, as well as the lack of PWQO exceedances directly attributable to the landfill operations, the surface water downgradient of the landfill is un-impacted by the landfill operations.

5.3.3 Staff Gauge Levels

As completed in previous years, water level measurements were collected at three staff gauges within the wetland west of the active waste area. The purpose of these locations is to relate surface water levels to ground water levels to establish a potential hydraulic connection. All three staff gauges were noted to be dry at surface in 2023.

It is noted that the conditions observed in 2023 are generally consistent to historical measurements at STF-1 and STF-2, as both are routinely dry even during the spring monitoring events. STF-3 occasionally has measureable water during the spring, however has been dry in the past as well. This manual surface water monitoring has been proposed to be removed from the program due to the gauges typically being dry and the program has confirmed a connection between the surface and ground water such that additional monitoring is unwarranted.

5.4 Organic Sampling Results

As part of the monitoring program in 2023, volatile organic compounds (VOC) samples were to be collected from all monitoring wells during the fall monitoring events. As such, in 2023 samples were collected from MW1-I, MW2-II, MW8-III, MW9, MW10-II, MW13, MW14, MW15, MW16-III & MW17, MW201D, MW202, MW203 & MW204. As with previous years, detections were limited to trace concentrations at MW17, for mostly BTEX parameters at similar concentrations over time. As such, there is a weak organic presence within the landfill which is not unexpected. However, as the Site is not permitted to accept hazardous wastes, the source of these organic detections is likely associated with the presence of many small-scale historical sources (such as HHW) within the waste.

Table 5: 2023 VOC Detections

Parameter	ODWQS	MDL	Monitoring Location
			MW17
Benzene	1	0.5	**9.1 (Oct)**
Chlorobenzene			5.4 (Oct)
Ethylbenzene	2.4	0.5	**32.8 (Oct)**
Styrene		0.5	<0.5 (Oct)
Toluene	24	0.5	1.3 (Oct)
Xylenes	300	1.1	85.7 (Oct)

MDL - minimum detection limit
All measurements in µg/L
bold indicates ODWQS exceedance

Although there is a weak organic presence within the leachate, the historic sporadic and trace detections in the downgradient monitoring wells would suggest that there is not a significant organic source and therefore no organic plume extending beyond the waste footprint. Despite this, continued VOC monitoring at the Site would be prudent.

5.5 Graphical Analysis

An alternate evaluation technique (to identify unique waters) is to compare the major ion chemistry of different waters or waters that have been mixed with two or more sources (*i.e.* leachate, ground water, surface water). A comparison was done of the ratios of major ion constituents to historical ratios throughout the monitoring programs from the more recent data. The assessment of ratios and plotting on a Piper diagram will show the consistency of the geochemical signatures and trends that demonstrate mixing or chemical reactions over time. As a result, the annual data tends to cluster in one location on the diagram for most monitors. Any deviation from this cluster can be readily observed and evaluated as a possible trend or influence from an alternate source (Appendix K).

The data indicates consistency across the monitoring network with a carbonate dominated water signature. No meaningful temporal trends have been observed over the past five years beyond some minor seasonal shifts noted at a number of locations and chloride influence during the October monitoring event at MW13, which could be anomolous or sourced to road salt influence as it is along the roadway adjacent to the monitor. The most notable deviation is at MW17, which indicates a much different signature given it is the leachate monitor with significant elevations in most leachate indicator parameters. The signature at MW14 is noted to show a background signature during spring monitoring events, while the seasonal shift is not towards that found at MW17 which would indicate it is being influenced by leachate. The overall ground water quality assessment supports this potential influence, although it is noted to be relatively minor, which is why it is only observed seasonally. Finally, the new monitoring wells indicate much different signatures to both the background and leachate signatures. Based on the overall water quality results from these locations, it would appear they are influenced by a naturally mineralized bedrock water source. This is most evident at MW203 and MW204, although more subtle signature shifts are also noted at MW202. The surface water shows a similar carbonate water quality signature, very similar to that from the ground water indicating the surface water is connected to the ground water. Overall, the lack of trending and lack of significant leachate influence at the remaining monitoring wells is consistent with the overall geochemical interpretation which is leachate is not causing an impact off site.

5.6 Reasonable Use Policy

Calculations with respect to MECP's Reasonable Use Policy (RUP) B–7 were performed using the 2023 monitoring program results at MW13 for the overburden and MW5-I for the bedrock as the background monitors.

The MECP's Reasonable Use Policy states that, in accordance with the appropriate criteria for particular uses, a change in quality of the groundwater on an adjacent property will be accepted only as follows:

> *The quality cannot be degraded by an amount in excess of 50% of the difference between background and the Ontario Drinking Water Standards for non-health related parameters and in excess of 25% of the difference between background and the ODWS for health related parameters. Background is considered to be the quality of the groundwater prior to any man made contamination.*
> *MOE Procedure B-7-1.(MOE, 1994a)*

The maximum concentration of a particular contaminant that is considered acceptable in the ground water beneath an adjacent property is calculated in accordance with the following relationship:

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

where:

C_m = maximum concentration accepted
C_b = background concentration
C_r = Maximum concentration permitted in accordance with the Ontario Drinking Water Quality Standards
x = a constant that reduces the contamination to a level that is considered by the MECP to have a negligible effect on water use. *i.e.* 0.5 for non-health related parameters
0.25 for health related parameters.

In 2023, the RUP values were calculated using the values of the background concentration (C_b). The maximum allowable concentration (C_m) of any particular parameter was calculated using the background concentration of that parameter from a monitor upgradient of the Site, the designated ODWQS value for that parameter, and a constant that reflects whether the parameter is health or aesthetic-related as defined by the ODWQS. Where background concentrations were less than the laboratory method detection limit, the method detection limit was used as the background value. The calculated C_m values for the Site were set as the RUP values.

As this assessment is based on compliance at the downgradient property boundaries, MW10-II, MW11, MW204 and MW16-I/II/III were used for compliance to the north and east, MW15 was used for compliance with the north and MW12 and MW203 were used for compliance to the west. It is noted that with MW204 now constructed, it replaces MW14 as the compliance well for the northeast corner of the Site. Specific exceedances for RUP are illustrated in the summary chemistry tables (Appendix B).

As with previous years, a number of parameters have exceeded RUP and are summarized in the following table.

Table 7: Reasonable Use Exceedance Summary Table

Location	Boundary	Screened Unit	Parameter	ODWQS	RUP	Concentrations Exceeding RUP*	
						Spring 2023	Fall 2023
MW10-II	East	Overburden	Nitrate	10	2.6	**3.21**	**3.4**
MW11	Northeast	Overburden	DOC	5	4.7	**7.5**	Dry
			Manganese	0.05	0.03	**0.422**	
			Hardness	500	366	**407**	
			TDS	500	359	**435**	
			Alkalinity	500	344	**381**	
MW12	West	Overburden	None				
MW15	North	Bedrock	None				
MW16-I	East	Bedrock	DOC	5	4.9	**5.2**	Dry
MW16-II	East	Bedrock	None				
MW16-III	East	Overburden	None				
MW203	West	Bedrock	Boron	5	1.3	**3.92**	**4.17**
			Chloride	250	129	**724**	**900**
			Hardness	500	385	**752**	**845**
			Fluoride	1.5	0.5	**1.5**	<1.8
			Iron	0.3	0.2	**0.258**	**0.483**
			Sodium	200	103	**575**	**673**
			Sulphate	500	256	**1,150**	**1,340**
			TDS	500	395	**2,789**	**2,510**
MW204	Northeast	Bedrock	Hardness	500	395	389	**814**
			Boron	5	1.3	**1.89**	**1.6**
			Chloride	250	129	93.6	**248**
			Fluoride	1.5	0.5	**1.8**	**1.3**
			Selenium	0.01	0.003	**0.004**	**0.004**
			Sodium	200	103	97.3	**116**
			Sulphate	500	255	**448**	**923**
			TDS	500	395	**942**	**1400**

Notes: All values are in mg/L
* - Concentrations in bold exceed RUP and Underline for ODWQS

The majority of these parameters are not directly related to the landfill and most likely represent the presence of naturally mineralized bedrock water quality in the area. This is This is most evident at MW203 and MW204, which have significant elevations of the most parameters of any downgradient location at concentrations for some parameters that exceed leachate concentrations (*i.e.* fluoride and sulphate), along with other parameters such as strontium which would suggest a natural brine water quality. It is further noted that the water quality at these locations are notably absent of elevations for a number of more prominent leachate indicator parameter such as DOC and manganese which have been shown to be elevated at MW14, located closer to the waste mound. This would indicate that the bedrock fracture plane targeted at MW14 is not laterally extensive such that migration of leachate impacts within the bedrock to the north east is likely limited to within the road alignment. Given MW203 and MW204 have much slower responses following purging would indicate they are likely not hydraulically connected to a similar bedrock fracture plane as that at MW14. As such, the RUP exceedances noted at MW203 and MW204 are not attributable to the landfill.

Although MW11, which is the most northeasterly monitoring location in the overburden has shown RUP exceedances, a new overburden compliance location could not be installed further northeast in the same location as MW204 due to limited thickness (3 m) and unsaturated overburden conditions. This is mainly due to a topographic dip between MW11 and MW204 of approximately 3.7 m such that the shallow overburden aquifer is not present beyond the City Road allowance. Given these conditions, it is determined that the Site meets RUP with respect to both overburden and bedrock quality at the northeast property boundary. Furthermore, given the more regional flow patterns in the shallow overburden are towards the west and northwest, the impact is likely localized in the area of MW11. Monitoring well nest MW16 only indicates marginal RUP exceedances for DOC which are noted at consistent concentrations over time and within the range observed in the background bedrock monitors with no other leachate parameter concentrations which would indicate influence at this location. As such, it is not determined to be directly related to landfill related.

Nitrate has been exceeded the past few years at MW10-II; however, it is only marginally above the RUP value. It is unlikely that these nitrate trends are related to the landfill given similar elevations are not observed for other more defined leachate indicator parameters. Similarly, elevated concentrations are not observed at MW16-III, which is also along the southeastern side of the waste mound, in closer proximity than MW10-II. It is uncertain as to the source for this elevated parameter; however, no remedial actions are proposed at this time, while concentrations of this parameter should continue to be monitored in 2024 for any developing trends.

Finally, the MECP has indicated that the current bedrock background location (MW5-I) is currently adequate, but this location is located adjacent to the new waste cell. As such, the defined background bedrock location will be adjusted as needed and likely could utilize one or more of the new wells or older monitoring wells (such as MW16-I), if this location continues to show background water quality (*i.e.* no leachate influence).

5.7 Revised Trigger Mechanism Program

The old Trigger Mechanism & Contingency Plan were developed as part of the historical design and operations (D&O) Plan (Golder, 1998), which only provided "conceptual level" trigger. Similarly, if RUP exceedances were identified within 100 m of a property boundary the ground water monitoring frequency would be increased and appropriate contingency actions would be assessed and implemented.

Since historically the RUP exceedances were determined to at least be partially natural in source the trigger mechanism at the time was not deemed to be entirely appropriate. A revised trigger program was proposed as part of the revised D&O Plan submitted in 2016 (Archibald, 2016), which has been deemed as inadequate by the MECP with respect to the ground water triggers in their review comments. As such, the following revised trigger mechanism and contingency plan were approved by the MECP in 2020 as part of the recent ECA amendment.

Similar to the previously proposed program, the revised trigger criteria will include both ground water and surface water components, which are as follows.

5.7.1 Trigger Locations

Ground water flow patterns at the Site are understood to be controlled by the local overburden and bedrock topography, which is defined by the large drumlin feature that intersects the Site and is oriented along a northeast / southwest alignment. This drumlin overlies limestone bedrock that is likely hydraulically connected to the major groundwater discharge zone in the area which is likely the Burnt River. As such, ground water flow within the shallow overburden has locally shown to be east and southeast and northwest, originating from the peak of the drumlin feature that creates a local ground water divide through the Site (Azimuth, 2018). Although the current waste placement is situated along the northern and western slopes of the drumlin, directing leachate impacted ground water to the north and west, the new waste cell at the south end of Area 2 could create a southern leachate impacted flow path. Despite the effect would likely be very local and revert to the dominant regional flow path would remain towards the north / northwest.

Given these flow patterns, monitoring locations in these directions from the waste mound were selected for ground water trigger locations and include MW16-I/II/III, as well as a new well (MW204) located northeast of the current Site property boundary to assess compliance to the northeast. MW15 was established as a compliance location for the northern property boundary and MW12 for the western property boundary. Also, the new monitoring well locations have been established to the southwest (MW203), south (MW202), as well as to the southeast (MW201) within the current Site boundaries to assess the potential for off-Site leachate migration southeast and southwest of the new waste cell area. These locations are shown in Figure 2.

Surface water trigger locations were established to assess potential surface water flow through potential migration pathways that surround the Site. SWA is the closest monitoring location to the northwest of the waste mound within the pond that potentially represents a local ground water discharge point for leachate impacted flow. As per Conditions 40 & 41 of the amended ECA for the Site, additional surface water locations were requested to be established south and possibly west of the new waste area. However, during a Site walk completed during April 2018, there were no areas west or south of the waste area that would represent surface water features. The closest location to the southeast that could be targeted for sampling would be at SWD, which is an existing surface water location which regularly has insufficient water for sample collection. Similarly, the local topography in the area to the west of the new waste area and the historic waste area (Area 1) are such that there is no standing water present. The local topography in this area is expected to direct any surficial flow to the north where the pond is located such that SWA and SWB already represent optimum surface water monitoring locations.

Given these conditions, SWA is being assigned as the surface water trigger location as it would be the most representative location where leachate impacts would be first detected.

5.7.2 Trigger Parameters

Trigger parameters were chosen by comparing water quality data with that of the leachate quality data. The following concepts were considered when selecting the suite of trigger parameters:

- Trigger parameters are those typically found at low concentrations in background (un-impacted) surface and ground water and in elevated concentrations in leachate;

- Ideally, the difference in the compliance criteria, such as reasonable use, Ontario Drinking Water Quality Standards (ODWQS), Provincial Water Quality

Objectives (PWQO), and / or Canadian Water Quality Guidelines (CWQG) for the selected trigger parameter and the background concentrations should be sufficient enough to enable the determination of upward trends with confidence by identifying a sustained increasing trend in concentrations which is not simply due to the inherent and / or seasonal fluctuation in the data. Under ideal conditions, the trend is detectable well before the parameter approaches compliance limit which then would permit effective mitigation if warranted; and

- The suitability of the parameter to serve as an indicator parameter is also considered (*i.e.,* its mobility, persistence, and presence or absence relative to compliance value). The reader is referred to the MECP's February 1994 document that describes attenuation mechanisms (MOE, 1994). Adequacy of available data and the degree of fluctuation in analytical results were considered in selecting the trigger parameters.

In part to this criteria, all parameters with an associated RUP value were included as trigger parameters for ground water, although for a trigger exceedance to apply, it must be found to be attributable to leachate versus natural sources or that an upward trend is observed supporting a non-natural source. Surface water parameters have been established through communication with the MECP surface water reviewer such that the parameters included were those proposed by the MECP in their May 30, 2019 correspondence and include alkalinity, ammonia (un-ionized), zinc, chemical oxygen demand (COD) and dissolved organic carbon (DOC). Although some of these parameters do not have an associated PWQO, their inclusion was based on their perceived presence within leachate and potential for variance owing to leachate rather than natural sources.

5.7.3 Tier I – Routine Monitoring

The Reasonable Use Policy (RUP) was used to calculate a trigger concentration for the ground water. RUP values are typically derived from the Ontario Drinking Water Quality Standards (ODWQS) (MOE, 2003). The RUP guideline limits the concentration increase of ground water leaving the property to be 50% of the difference between background concentrations and the ODWQS for non-health related parameters, while health related parameters cannot exceed 25% of the difference. For reference and in keeping with background reference locations utilized historically at the Site, MW13 is utilized for the overburden and MW5-I for the bedrock background reference locations.

In order to trigger action prior to a RUP non-compliance situation (landfill derived), the trigger values have been set to 75% of RUP for all boundary locations (MW15& MW204 – north, MW16 – east and proposed well constructions), while any location (*i.e.,* MW202, MW203 and MW12), where a more significant setback is present (~200 m), then 100% RUP values would be utilized. It is noted that these trigger values have been included in the appended chemistry summary tables for both overburden and bedrock locations.

For surface water, the approach is more specific and is based on average concentrations at SWA with a 2x standard deviation (MECP generated) applied to establish the trigger concentration. The exceptions are for un-ionized ammonia which is just related to 50% of the PWQO value, while the proposed zinc value is equivalent to PWQO. These values as proposed by the MECP surface water reviewer are presented in the following table.

Table 8: Surface Water Trigger Concentrations

Trigger Parameter	Trigger Concentration (mg/L)
Alkalinity	235
Un-Ionized Ammonia	0.01
Zinc	0.02
Chemical Oxygen Demand (COD)	30
Dissolved Organic Carbon (DOC)	13

5.7.4 Tier II – Confirmatory Monitoring

The trigger mechanism for the ground water is designed such that any parameter trigger exceedance with an upward trend noted over three consecutive events would lead to a data review to assess whether the exceedance is related to landfill or natural sources / variation. In the event the exceedance is not attributed to the landfill, no actions are required beyond summarizing these exceedances in the annual report. If the trigger exceedance and upward trend (3 consecutive events) are determined to be directly related to the landfill, this would represent an action level.

The trigger mechanism for surface water is designed such that when any two trigger parameters exceed the associated criteria in two consecutive sampling events. All singular trigger exceedances would not require any action beyond a cursory review the overall data to assess any potential leachate trends present beyond the remaining trigger parameters. All trigger parameter exceedances should be discussed in the annual report even if the criteria for action have not been triggered.

If triggers are exceeded for either ground or surface water, the confirmatory monitoring program will be comprised of collecting samples from the monitoring location in question on two separate occasions over the following two-month period to further confirm the trending and potential leachate source. It is recommended that the samples being analyzed for the routine analytical package trigger in duplicate such that both the trigger parameters and other leachate indicator parameters can be assessed.

5.7.5 Assessment of Trigger Mechanism for 2023 Data

In 2023, trigger parameter exceedances within the ground water that had three consecutive increasing concentrations were limited to DOC at MW16-I & MW16-II, as well as sodium at MW204. However, it is noted that the exceedances at MW204 are interpreted to be sourced to natural mineralization associated with the deeper bedrock water quality. They are not considered sourced to the landfill. Similarly, the DOC exceedances at MW16-I and MW16-II were mostly below ODWQS (4.1 - 5.2 mg/L), which is within the background range for this parameter observed at MW5-I and MW202 such that they are not readily attributable to leachate. This is also supported by the overall water quality at these locations which does not indicate any leachate influence. As such, no further action is required at this time, while concentrations will be reviewed as part of the 2024 monitoring program.

The surface water trigger program indicated parameter exceedances for unionized ammonia in May 2023 at SWA (0.02 mg/L) and SWB (0.03 mg/L); however, it was only a single parameter exceedance at SWB, while SWA only had a single previous exceedance such that it does not represent trigger actions. It is further noted that the ammonia concentrations for May 2023 are not considered representative given presence of elevated ammonia concentrations across the monitoring network, including the background locations. This is supported by the fact the overall water quality at both these locations does not indicate any leachate influence. As such, no further action is required at this time, while concentrations will be reviewed as part of the 2024 monitoring program.

5.8 Landfill Gas Monitoring

Landfill gas measurements were collected from all available monitoring wells during Site visits completed on May 10th and October 18th, 2023, as well as daily within the Site operations building when in use. Detections were limited to the following locations.

Table 9: 2023 Gas Detections

Location	Date	Concentration	
		% Volume	%LEL
MW1-II	10-May-23	>5	100
MW17	10-May-23	>5	100
	18-Oct-23	>5	100

LEL – lower explosive limits

The results indicate detections, with explosive limits only exceeded within the leachate well MW17 and MW1-II, which is not unexpected as these wells are screened within or immediately adjacent to waste.

Given the presence of landfill gas within the leachate well and the previous inconsistency in concentrations across the Site, it is recommended that the gas monitoring program continue with the existing monitoring well network to further refine the understanding of gas concentrations at the Site. Given there are no surrounding developments within 750 m of the Site that would represent a sensitive receptor for landfill gas, no additional gas monitors are recommended to be installed and if future monitoring indicates that there is no meaningful gas concentrations sourced to the landfill beyond the waste footprints, then the gas monitoring program could be reduced or eliminated. Of note, the updated D&O Plan for the Site (Archibald Engineering, 2016) had recommended that gas be monitored in the Site operations building when in use by a handheld combustible gas meter, which represents a good due diligence measure given the proximity of the building to the active waste area.

For reference, gas measurement data has been compiled for the past five years and included in Appendix M.

6.0 Site Operations

As the Site is active, it is accessed by the public at the main entrance gate and information signage exists which states the hours of operation, permitted users, and types of waste accepted at the Site.

The hours of operation for the Site in 2023 were:

Winter – October 16 to April 30
Monday, Friday, Saturday and Holiday Mondays: 9:00 AM to 5:00 PM
Summer – May 1 to October 15
Monday, Friday, Saturday and Holiday Mondays: 11:00 AM to 5:00 PM

6.1 2023 Site Maintenance & Activities

The Site inspection logs are included in Appendix J, which were completed by Azimuth as part of the semi-annual monitoring events (April and October). These reports did not identify any concerns requiring action or mitigation measures. Finally, according to City records, there were no complaints or incidents related to the Site in 2023.

6.2 2023 Waste Volumes / Site Capacity

The estimate for current and remaining capacity was done using an annual historical average of 4,500 m^3, which is based on the previous five-year average annual volume. Based on the estimated 2023 annual fill volume, as well as previous estimates of volumes, the current estimate for total waste volume is 220,832 m^3, which includes all waste and interim cover material.

Condition 26 of the new ECA for the Site states that the total Site capacity including regular (interim) cover is 637,100 m^3 (which includes approval of a minor capacity expansion). Given that ~220,832 m^3 of waste and cover material is present at the Site as of December 2023, the remaining capacity of the Site is estimated to be 416,268 m^3. Based on this remaining capacity and predicted annual fill rate of ~7,000 m^3(Archibald Engineering, 2016), the Site has approximately 60 years of capacity left, assuming no changes to current Site operations or annual fill rates.

6.3 Recyclable Materials Summary

The Site operates as a waste disposal and recycling transfer site. According to City records, the following amounts of recyclable materials were received at the Site in 2022.

Table 10: Summary of Recyclable Materials Received in 2023

Item	Number of Units	Units
Paper	21.5	Tonnes
Containers	10.9	Tonnes
Leaf and Yard Waste	252.7	Tonnes
Electronics	11.6	Tonnes
Scrap Metal	73.8	Tonnes
Textiles	1.7	Tonnes

Based on the diversion quantities listed above, and 3,230 tonnes of waste received in 2023, the total divertible material received at the Site in 2023 was approximately 698 tonnes. Of the material received at the Somerville WDS, approximately 22% of the material was diverted.

6.4 Compost Operations

Compostable material (leaf and yard waste, tree trunks, stumps, branches, leaves and brush) is utilized as alternative daily cover at the Site. As in previous years, compostable material was deposited on designated clay fill pads in Area 3 where this material is passed through a grinder when a sufficient material is present or at least once per year.

The current ECA was amended on February 24, 2022 to reflect changes to increase the limits of daily and annual leaf and yard waste. The ECA was amended for the Site to not exceed 150 tonnes in any given day and not to exceed 2,000 tonnes annually. The Site may now also receive up to 400 tonnes of leaf and yard waste for 20 days (non-consecutive) in a calendar year without exceeding the total annual amount of 2000 tonnes. It is noted that the daily and annual leaf and yard waste volumes for 2023 did not exceed the acceptable limits with the annual total being 253 tonnes and the total maximum daily amount received being 20.76 tonnes (Appendix N).

7.0 Conclusions

Based on the interpretation presented in the above sections, the environmental setting at the Somerville Landfill Site is well understood based on over 20 years of performance monitoring. The data trends over this monitor period have yielded a relatively consistent geochemical signature such that it is reasonable to infer that the Site reflects a steady state condition. This is supported by the general consistency between the 2023 data with the historic data set.

Ground water flow patterns also indicate similar conditions as previous years with an overall northwesterly flow direction in the overburden and a southwestern flow in the underlying limestone formation. Despite this overall flow path, MW17 drilled into the active waste area and the MW16 nest east of Ledge Hill Road along the drumlin would indicate that there is a localized amount of radial flow from the waste mound that is responsible for some elevated leachate indicator parameters along the northeastern property boundary (MW11 & MW14). Although these concentrations and flow patterns would suggest the potential for off-Site impacts, as illustrated by a number of RUP exceedances in these areas, the lack of leachate impacts observed at MW16 would indicate this eastern migration is localized with minimal lateral extent in a northern direction beyond MW11 and MW14. More recently constructed MW204, which is 100 m past MW11 and MW14 has shown to be represented by naturally mineralized water quality with an absence of more prominent leachate indicator parameter such as DOC, iron and manganese which have been shown to be elevated at MW14 owing to leachate influence. This would indicate that the bedrock fracture plane targeted at MW14 is not laterally extensive such that migration of leachate impacts within the bedrock to the north east is likely limited to within the road alignment. Similarly, more regional bedrock flow patterns are noted to be in a westerly direction which would limit the extent of eastern flow associated with the localized or radial patterns derived from the waste mound and drumlin feature. It is also noted that the largest and relatively recent waste area of the Site is in close proximity to MW11, MW14 and MW204. As the progression of filling at the Site will continue to the southern section of Area 2 in 2023, with the current active fill area being partially capped, the leachate conditions will likely shift over the next few years with potential decreases in leachate mounding, which has been declining consistently over the past several years lowering the horizontal gradients in this area. With lower gradients, the extent of radial flow in this area is expected to be reduced over time.

Although MW11, which is the most northeasterly monitoring location in the overburden has shown RUP exceedances, a new overburden compliance location could not be installed further northeast in the same location as MW204 due to limited thickness (3 m) and unsaturated overburden conditions (i.e. no shallow overburden aquifer present). This is mainly due to a topographic dip between MW11 and MW204 of approximately 3.7 m such that the shallow overburden aquifer is not present beyond the City Road allowance. Given these conditions, it is determined that the Site meets RUP with respect to both overburden and bedrock quality at the northeastern property boundary.

Similar mineralized water quality seems to also be present at MW203 based on similar elevations of the same parameters as MW204, although given there has only been five monitoring events at these new locations, further monitoring events will help refine the understanding of the potential natural mineralization with the bedrock at this Site.

Beyond the northeastern end of the Site, Reasonable Use parameters continue to exceed at some of the locations along the eastern and western extents of the monitoring well network, although they are generally related to natural sources (iron, manganese, hardness) and highly mineralized waters unrelated to the landfill or have a sufficient lands to achieve attenuation (i.e. distance from MW12 to western property boundary ~200 m) such that the exceedances do not warrant any further study or mitigation measures. Under the trigger mechanism program commenced in 2019 which included all the newly drilled wells, no monitoring locations were identified as exceeding due to an upward trend from related leachate impacts.

Surface water quality at the Site continues to show no difference between historical upstream and current downstream locations therefore there is no indication of any leachate impact. Isolated unionized ammonia PWQO and trigger exceedances were noted in 2023, but did not represent continuous upward trends on three occasions such that trigger program was not activated. It was also noted that these exceedances are not considered landfill related as anomolous ammonia data has been observed across the monitoring network, including background locations in spring 2022 and 2023. Some inconsistencies with respect to ammonia concentrations in the QA/QC samples could indicate some issues with the laboratory data. This will be monitored in 2024 to assess any potential continued issues with lab data.

The gas monitoring program indicates the presence of methane within and immediately adjacent to the waste areas; however, only trace concentrations (with the exception of MW1-II) not related to the landfill were observed in the distant locations. Gas monitoring should continue at the Site within the existing monitoring well network as well as the equipment shed to further evaluate the potential for explosive concentrations within and surrounding the waste areas. If this monitoring indicates that concentrations are minimal and well below lower explosive limits, a reduction in the program should be considered.

8.0 Recommendations

The monitoring program recommended for 2024 is identified in Table 10 and is based on the current data set and Site understanding, previous Site assessments and the newly drilled well locations. The following represents the proposed 2024 monitoring program.

With the movement of the active waste area from the north end to the south end of the Site (area or material excavation – Figure 1), the recently drilled monitoring wells from 2019 are included to assess compliance with any potential leachate migration in south, southwest and west directions, which was not covered previously in the monitoring network. It is noted that these locations are targeted based on inferred ground water flow directions as controlled by the drumlin feature which intersects the Site and waste area along a northeast / southwest alignment. Regional flow is westward toward the Burnt River, the ultimate groundwater discharge location. Northeast leachate migration is also analyzed by a new well drilled to the northeast of the current active waste area.

Given the inclusion of these new monitoring wells, the following provides a summary of the proposed monitoring program. It is noted that the staff gauge monitoring has not yielded data that contributes to the Site understanding as the locations are routinely recorded as dry. As such, it is recommended that the staff gauge monitoring be removed from the monitoring program in 2024.

The following table outlines the proposed monitoring program for 2024.

Table 11: Proposed 2024 Monitoring Program

Monitoring Station	Frequency	Parameters
Ground Water MW1-I, MW1-II, MW2-II, MW5-I, MW7, MW8-I, MW8-III, MW9, MW10-II, MW11, MW12, MW13, MW14, MW15, MW16-I, MW16-II, MW16-III, MW17, MW201, MW201D, MW202, MW203 & MW204	Semi-Annual (April / May & September / October)	Biochemical Oxygen Demand (BOD), Volatile Organic Compounds (VOCs**), Dissolved Organic Carbon (DOC), alkalinity, ammonia, chloride, hardness, nitrate, sulfate, Total Kjeldahl Nitrogen (TKN), barium, boron, calcium, iron, magnesium, sodium, potassium, manganese, pH, conductivity, Total Dissolved Solids (TDS), Total Suspended Solids (TSS) (leachate only), Chemical Oxygen Demand (COD) ** VOCs – annual during Fall event Water Level Measurements Combustible Gas Measurements
Surface Water SWA, SWB & SWD	Semi-Annual (April / May & September / October)	BOD, phenols, Free cyanide, Total Organic Carbon (TOC), TKN, nitrate, nitrite, ammonia (total), alkalinity, hardness, chloride, phosphorous, sulphate, aluminum, arsenic, barium, boron, cadmium, calcium, chromium, copper, iron, lead, magnesium, mercury, nickel, potassium, selenium, silver, sodium, zinc, pH, conductivity, TSS, COD, colour, turbidity

9.0 References

Archibald Engineering, 2016
Somerville Landfill Site Design and Operations Report – 2016 Update

Armstrong D.K., and Rheaume P., 1994
Paleozoic Geology of the Fenelon Falls Area – Southern Ontario
Ontario Geological Survey Ontario, Open File Map 235, Scale 1:50,000

Azimuth Environmental Consulting Inc., 2017.Somerville Waste Disposal Site – 2016 Annual Monitoring Report.

Azimuth Environmental Consulting Inc., 2018.Somerville Waste Disposal Site – 2017 Annual Monitoring Report.

Azimuth Environmental Consulting Inc., 2019.Somerville Waste Disposal Site – 2018 Annual Monitoring Report.

Azimuth Environmental Consulting Inc., 2020.Somerville Waste Disposal Site – 2019 Annual Monitoring Report.

Azimuth Environmental Consulting Inc., 2021. Somerville Waste Disposal Site – 2020 Annual Monitoring Report.

Azimuth Environmental Consulting Inc., 2022. Somerville Waste Disposal Site – 2021 Annual Monitoring Report.

Azimuth Environmental Consulting Inc., 2023. Somerville Waste Disposal Site – 2022 Annual Monitoring Report.

Azimuth Environmental Consulting Inc., 2012
Performance Monitoring Program Efficiency Evaluation, Somerville Landfill Site

ASTDR, 2007
Toxicological Profile for Barium and Barium Compounds
US Dept of Health and Human Services, Public Health Service
Agency for Toxic Substances and Disease Registry
https://www.atsdr.cdc.gov/toxprofiles/tp24.pdf, p. 231

Boyce, J., 1990
An integrated outcrop and subsurface investigation of drumlins in Peterborough, Ontario
Bachelor's of science thesis, McMaster University

Cambium Environmental Inc., 2010
2009 Annual Status Report - Somverville Waste Disposal Site

Chapman, L.J. and D.F. Putnam, 1984
The Physiography of Southern Ontario
3rd Edition, OGS Special Volume 2, MNR, ISBN 0-7743-9422-6

Exp Services Inc., 2016
Somerville Waste Disposal Site, 2015 Annual Monitoring Report

Finamore P.F., and Bajc A.F., 1981
Quaternary Geology of the Fenelon Falls Area – Southern Ontario
Preliminary Map P. 2596, Ontario Geological Survey Ontario, Scale 1:50,000.

Jones, M.G. 2001
Factors Controlling Leachate Quality and Quantity
Technical Lecture for the MOE Landfill Design Course

Lagas P., Loch J.P.G., Bom C.M., Gerringa, L.J.A., 1984
The behavior of barium in a landfill and the underlying soil
Water, Air, Soil Pollut., 22(2), pp. 121-129

Ministry of the Environment and Energy, 1994
Provincial Water Quality Objectives
Queen's Printer for Ontario

Ministry of the Environment, 2003
Technical Support Document for Ontario Drinking Water Standards, Objectives, and Guidelines
Queen's Printer for Ontario

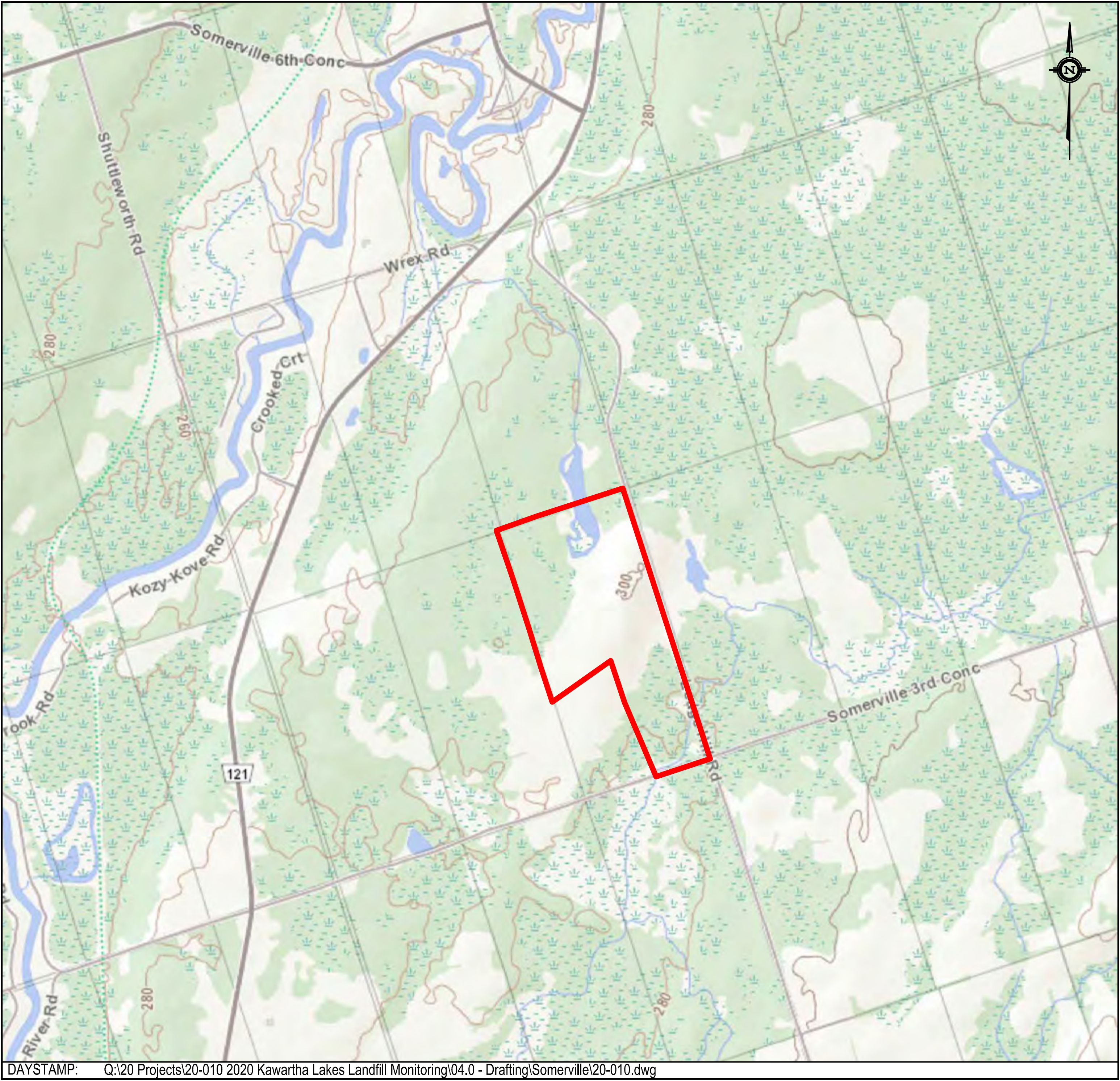
World Health Organization, 2001
Barium and barium compounds
Concise International Chemical Assessment Document 33
Geneva, Switzerland
http://www.inchem.org/documents/ehc/ehc/ehc221.htm, April 01, 2005, p. 57

APPENDICES

Appendix A:	**Figures**
Appendix B:	**Chemistry Summary Tables**
Appendix C:	**Ground Water Elevation Tables**
Appendix D:	**Chemistry Over Time Graphs**
Appendix E:	**MECP Landfill Reporting Submission Forms**
Appendix F:	**Borehole Logs**
Appendix G:	**Amended Environmental Compliance Approval**
Appendix H:	**Sampling Protocols**
Appendix I:	**Laboratory Certificate of Analysis**
Appendix J:	**Site Inspection Forms**
Appendix K:	**Piper Diagrams**
Appendix L:	**Surface Water Photos**
Appendix M:	**Landfill Gas Monitoring Summary Table**
Appendix N:	**2023 Leaf & Yard Waste Quantities**

APPENDIX A

Figures



DAYSTAMP: Q:\20 Projects\20-010 2020 Kawartha Lakes Landfill Monitoring\04.0 - Drafting\Somerville\20-010.dwg

Plotted by: ALIU on March 18, 2024 at 12:28pm
File: Q:\21 projects\21-010 2021 kawartha lakes landfill monitoring\04.0 – drafting\Somerville\21-010.dwg Layout: Figure 1 Plotscale: 0.25

LEGEND:

🟥 *Approx. Property Boundary*

REG MAP

250m 0 750m

HORIZONTAL SCALE 1: 25,000

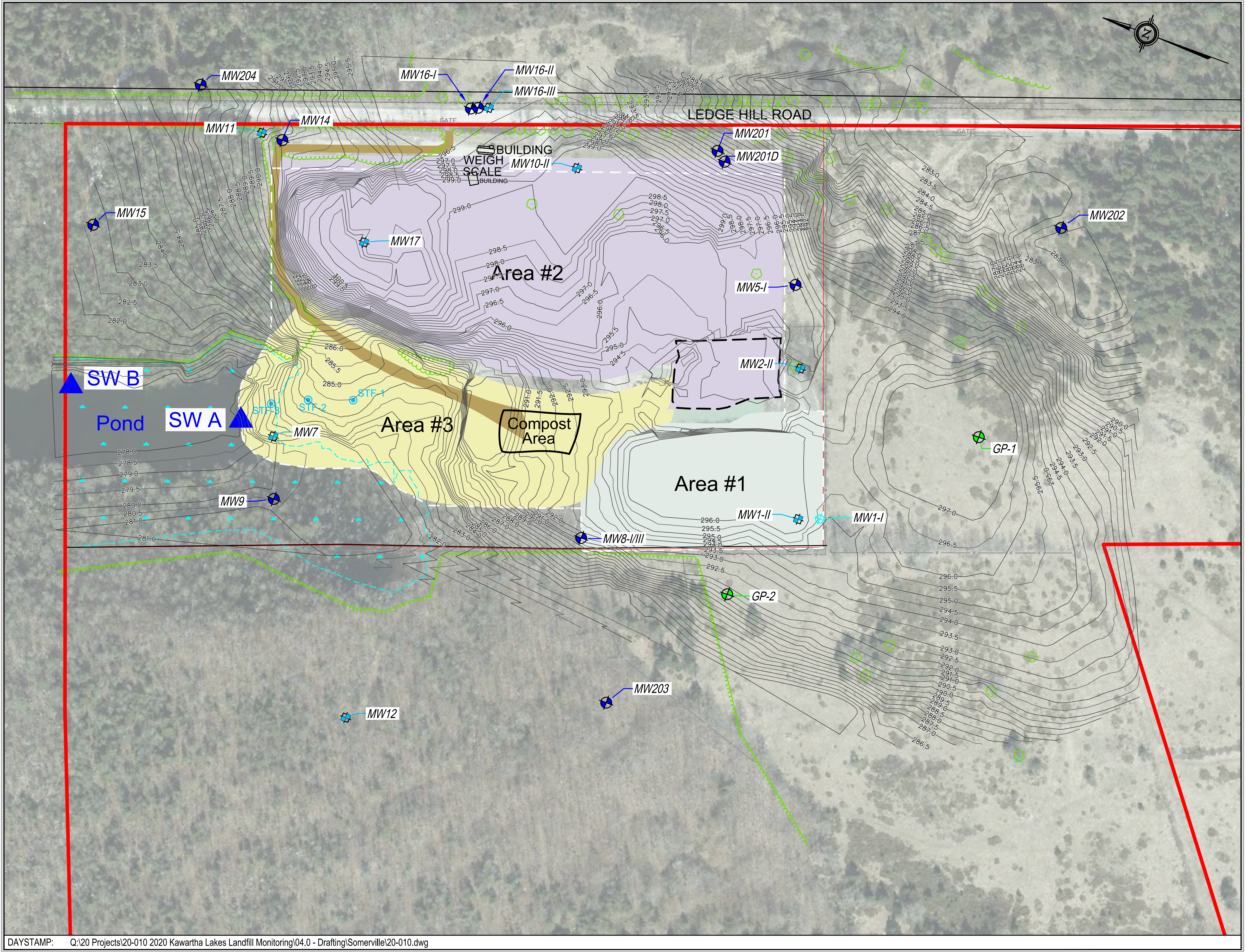
AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Study Area Location

Somerville Landfill,
City of Kawartha Lakes, ON

DATE ISSUED: *March 2024*
CREATED BY: *JLM*
PROJECT NO.: *24-010*
REFERENCE: *MNRF*

Figure No.
1



LEGEND:
- Approx. Property Boundary
- Approx. Active Waste Area
- 100 — 1m Contours
- Bedrock Monitoring Well Location
- Deep Overburden Multi-Level Monitoring Well Location
- Shallow Overburden Monitoring Well Location
- ▲ Surface Water Locations
- ◎ Staff Gauge Location
- New Well Locations
- Gas Probe Locations
- Approved Waste Disposal Area (White)
- Limit of Ponding

25m 0 75m
HORIZONTAL SCALE 1: 2,500

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

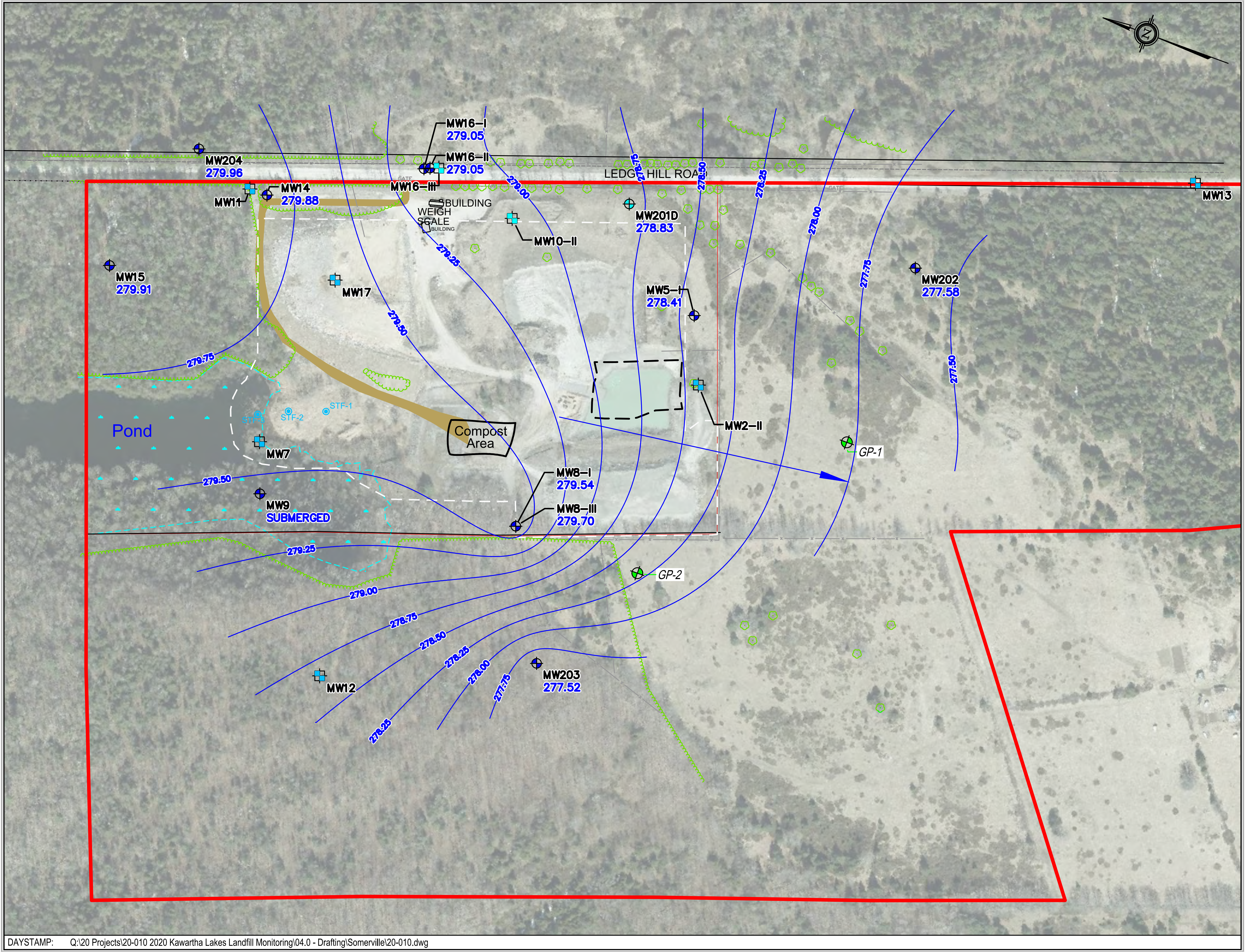
Site Layout

Somerville Landfill,
Kawartha Lakes, ON

DATE ISSUED:	May 2024	Figure No.
CREATED BY:	JLM	2
PROJECT NO.:	24-010	
REFERENCE:		

DAYSTAMP: Q:\20 Projects\20-010 2020 Kawartha Lakes Landfill Monitoring\04.0 - Drafting\Somerville\20-010.dwg

Plotted by: ALIU on May 3, 2024 at 3:23pm
File: \\Azimuthsrvr\data3\Projects3\21 projects\21-010 2021 kawartha lakes landfill monitoring\04.0 – drafting\Somerville\21-010.dwg Layout: HYD2 Plotscale: 0.25



LEGEND:

- Approx. Property Boundary
- Approx. Active Waste Area
- Bedrock Monitoring Well Location
- Deep Overburden Multi-Level Monitoring Well Location
- Shallow Overburden Monitoring Well Location
- Staff Gauge Location
- Gas Probe Locations
- Approved Waste Disposal Area (White)
- Limit of Ponding
- 275.00 0.25m Bedrock Ground Water Contours (May 2023)
- Inferred Direction of Bedrock Ground Water Flow

50m 0 100m

HORIZONTAL SCALE 1:3,000

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

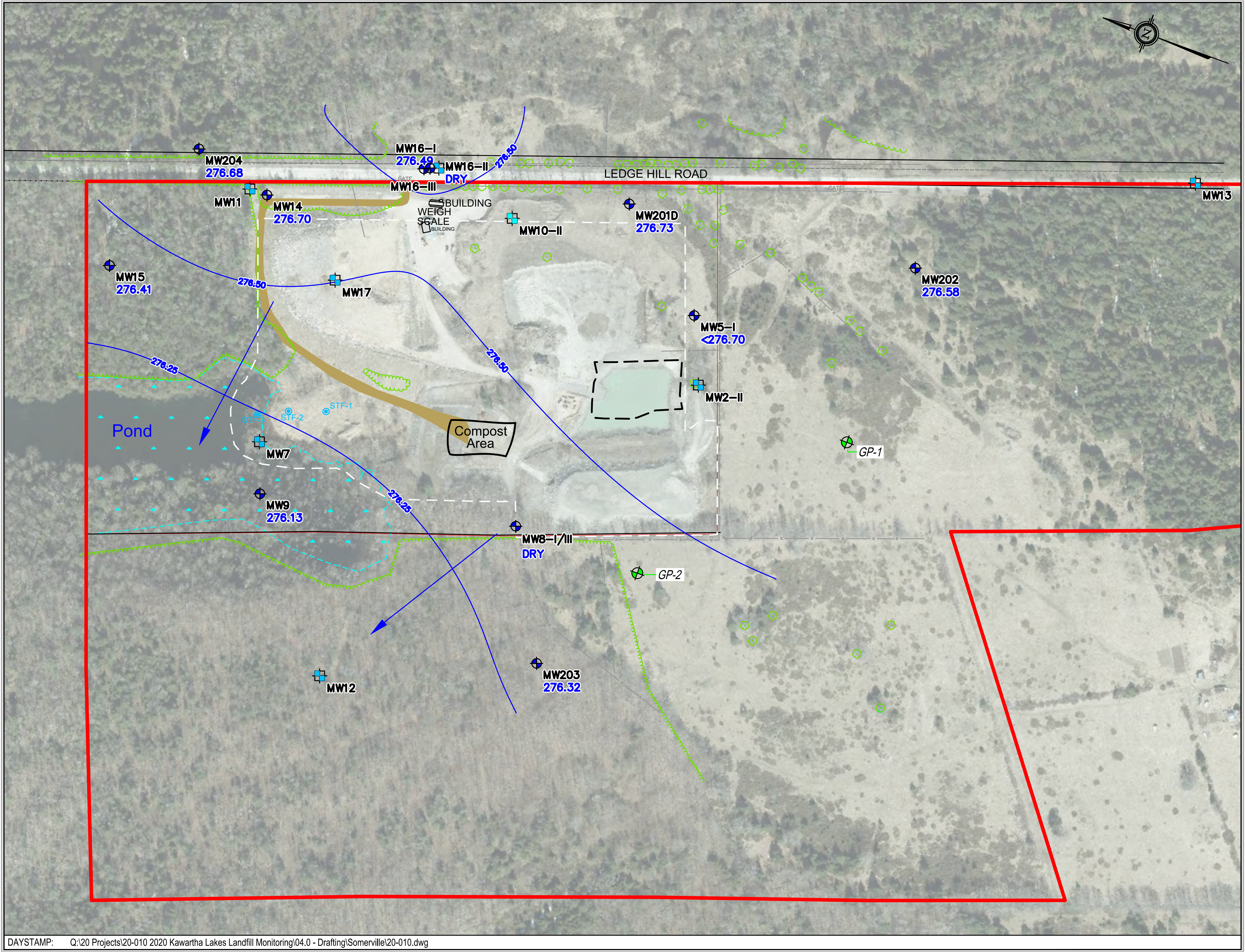
Bedrock Ground Water Elevations
(May 2023)

Somerville Landfill,
Kawartha Lakes, ON

DATE ISSUED:	May 2024	Figure No.
CREATED BY:	JLM	3
PROJECT NO.:	24-010	
REFERENCE:		

DAYSTAMP: Q:\20 Projects\20-010 2020 Kawartha Lakes Landfill Monitoring\04.0 - Drafting\Somerville\20-010.dwg

Plotted by: AJU on May 3, 2024 at 3:23pm Layout: HYD3 Plotscale: 0.25
File: \\Azimutherv\data3\Projects\21 projects\21-010 2021 kawartha lakes landfill monitoring\04.0 – drafting\Somerville\21-010.dwg



LEGEND:

- Approx. Property Boundary
- Approx. Active Waste Area
- Bedrock Monitoring Well Location
- Deep Overburden Multi-Level Monitoring Well Location
- Shallow Overburden Monitoring Well Location
- Staff Gauge Location
- Gas Probe Locations
- Approved Waste Disposal Area (White)
- Limit of Ponding
- 275.00 0.25m Bedrock Ground Water Contours (October 2023)
- Inferred Direction of Bedrock Ground Water Flow

50m 0 100m

HORIZONTAL SCALE 1: 3,000

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

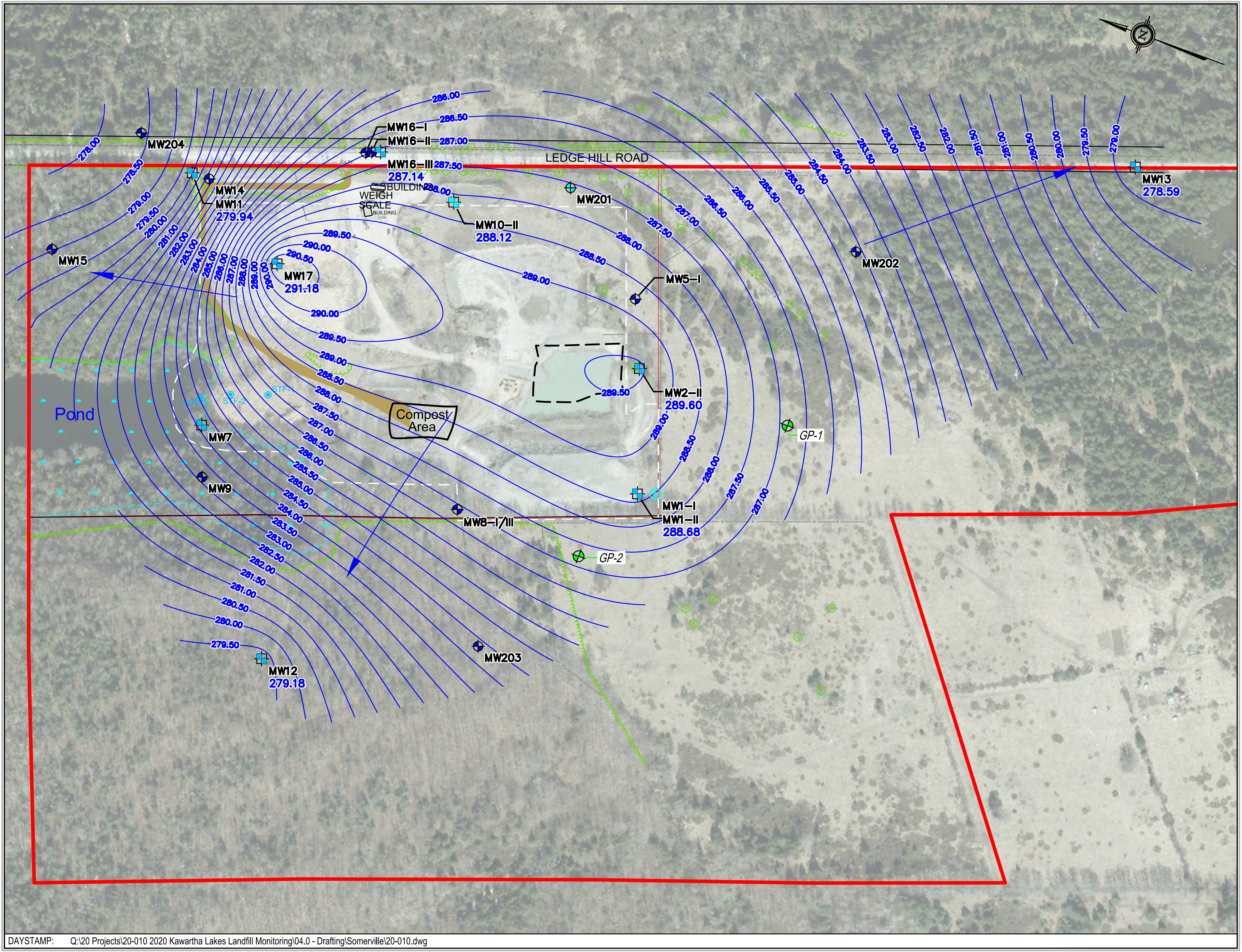
Bedrock Ground Water Elevations
(October 2023)

Somerville Landfill,
Kawartha Lakes, ON

DATE ISSUED:	May 2024	Figure No.
CREATED BY:	JLM	4
PROJECT NO.:	24-010	
REFERENCE:		

DAYSTAMP: Q:\20 Projects\20-010 2020 Kawartha Lakes Landfill Monitoring\04.0 - Drafting\Somerville\20-010.dwg

Plotted by: AJU on May 3, 2024 at 3:23pm Layout: HYD3 (2) Plotscale: 0.25
File: \\azimuthserv\data3\projects3\21 projects\21-010 2021 kawartha lakes landfill monitoring\04.0 - drafting\Somerville\21-010.dwg



LEGEND:

- Approx. Property Boundary
- Bedrock Monitoring Well Location
- Deep Overburden Multi-Level Monitoring Well Location
- Shallow Overburden Monitoring Well Location
- Staff Gauge Location
- Gas Probe Locations
- Approved Waste Disposal Area (White)
- Limit of Ponding
- 275.00 0.50m Shallow Overburden Ground Water Contours (May 2023)
- Inferred Direction of Bedrock Ground Water Flow

50m 0 100m

HORIZONTAL SCALE 1: 3,000

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

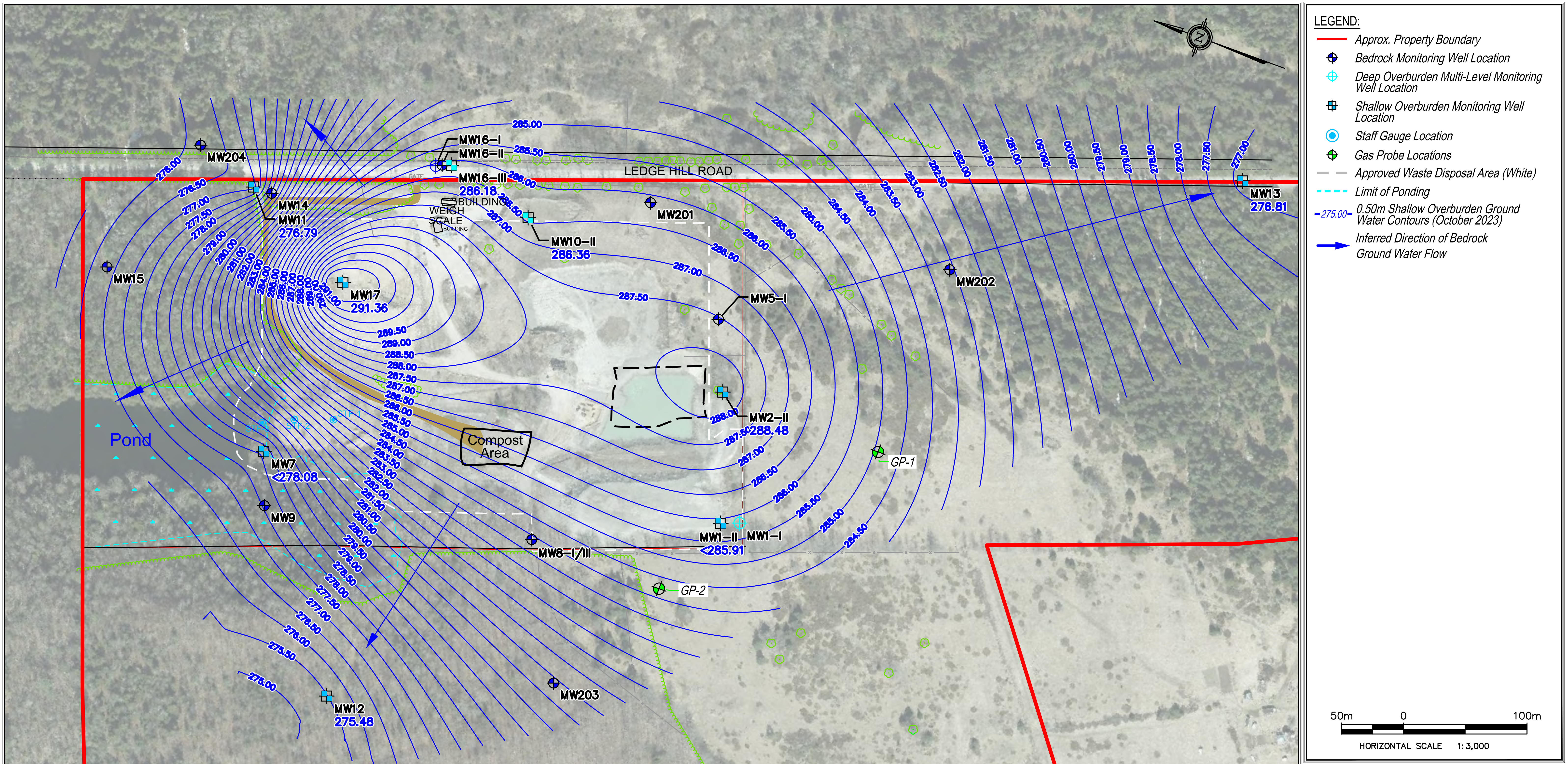
Shallow Overburden Ground Water Elevations (May 2023)

Somerville Landfill, Kawartha Lakes, ON

DATE ISSUED:	May 2024	Figure No.
CREATED BY:	JLM	5a
PROJECT NO.:	23-010	
REFERENCE:		

DAYSTAMP: Q:\20 Projects\20-010 2020 Kawartha Lakes Landfill Monitoring\04.0 - Drafting\Somerville\20-010.dwg

Plotted by: ALIU on May 3, 2024 at 3:23pm Layout: SHALLOW OVERBURDEN GROUND WATER ELEVATIONS (MAY 2023) Plotscale: 0.25
File: \\Azimuthsrv\data3\Projects3\21 projects\21-010 2021 kawartha lakes landfill monitoring\04.0 – drafting\Somerville\21-010.dwg



LEGEND:

- Approx. Property Boundary
- Bedrock Monitoring Well Location
- Deep Overburden Multi-Level Monitoring Well Location
- Shallow Overburden Monitoring Well Location
- Staff Gauge Location
- Gas Probe Locations
- Approved Waste Disposal Area (White)
- Limit of Ponding
- 275.00 0.50m Shallow Overburden Ground Water Contours (October 2023)
- Inferred Direction of Bedrock Ground Water Flow

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

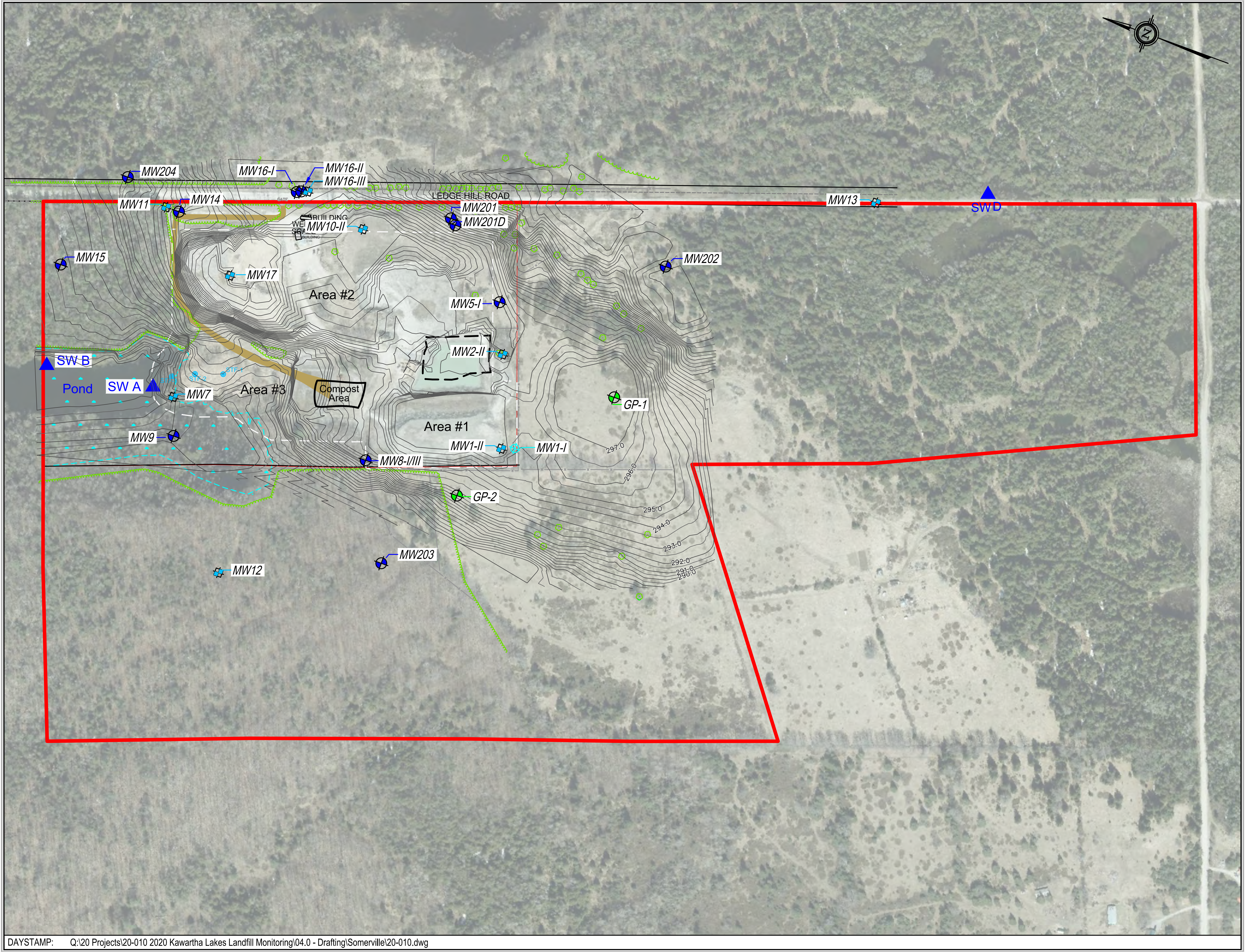
Shallow Overburden Ground Water Elevations (October 2023)

Somerville Landfill,
Kawartha Lakes, ON

DATE ISSUED:	May 2024	Figure No.
CREATED BY:	JLM	5b
PROJECT NO.:	24-010	
REFERENCE:		

DAYSTAMP: Q:\20 Projects\20-010 2020 Kawartha Lakes Landfill Monitoring\04.0 - Drafting\Somerville\20-010.dwg

Plotted by: AUU on May 3, 2024 at 3:24pm File: \\Azimuthsrv\data3\Projects3\21 projects\21-010 2021 kawartha lakes landfill monitoring\04.0 – drafting\Somerville\21-010.dwg Layout: SHALLOW OVERBURDEN GROUND WATER ELEVATIONS (OCTOBER 2023) Plotscale: 0.25



LEGEND:

🟥	Approx. Property Boundary
- - -	Approx. Active Waste Area
⊕	Bedrock Monitoring Well Location
⊕	Deep Overburden Multi-Level Monitoring Well Location
⊞	Shallow Overburden Monitoring Well Location
▲	Surface Water Locations
◎	Staff Gauge Location
⊕	Gas Probe Locations
— —	Approved Waste Disposal Area (White)
- - -	Limit of Ponding

60m 0 120m

HORIZONTAL SCALE 1: 4,000

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

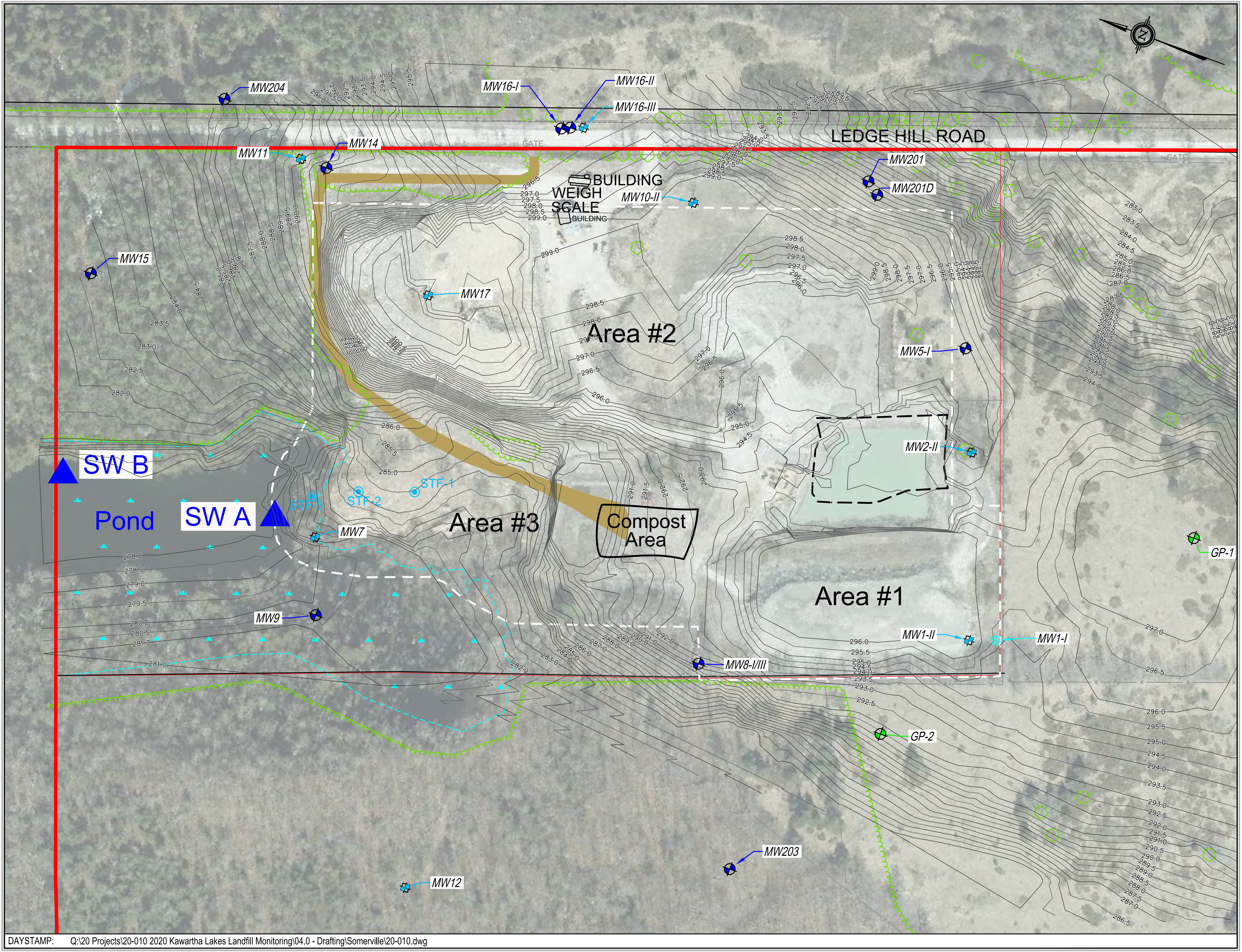
Local Topography

Somerville Landfill,
Kawartha Lakes, ON

DATE ISSUED:	May 2024	Figure No.
CREATED BY:	JLM	6
PROJECT NO.:	24-010	
REFERENCE:		

DAYSTAMP: Q:\20 Projects\20-010 2020 Kawartha Lakes Landfill Monitoring\04.0 - Drafting\Somerville\20-010.dwg

Plotted by: ALIU on May 3, 2024 at 3:24pm
File: \\Azimuthsrvr\data3\Projects3\21 projects\21-010 2021 kawartha lakes landfill monitoring\04.0 – drafting\Somerville\21-010.dwg Layout: HYD6 Plotscale: 0.25



LEGEND:

- Approx. Property Boundary
- Approx. Active Waste Area
- 5m Contours
- 1m Contours
- Bedrock Monitoring Well Location
- Deep Overburden Multi-Level Monitoring Well Location
- Shallow Overburden Monitoring Well Location
- ▲ Surface Water Locations
- ◎ Staff Gauge Location
- Gas Probe Locations
- Approved Waste Disposal Area (White)
- Limit of Ponding

30m 0 60m

HORIZONTAL SCALE 1:2,000

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

2022 Site Survey

Somerville Landfill,
Kawartha Lakes, ON

DATE ISSUED:	May 2024	Figure No.
CREATED BY:	JLM	7
PROJECT NO.:	24-010	
REFERENCE:		

DAYSTAMP: Q:\20 Projects\20-010 2020 Kawartha Lakes Landfill Monitoring\04.0 - Drafting\Somerville\20-010.dwg

Plotted by: AUU on May 3, 2024 at 3:24pm Plotscale: 0.25
File: \\Azimuthenv\data3\Projects\21 projects\21-010 2021 kawartha lakes landfill monitoring\04.0 - drafting\Somerville\21-010.dwg Layout: 2022 SITE SURVEY

APPENDIX B

Chemistry Summary Tables

Table 1 - Ground Water Quality Data - Overburden

Parameters	ODWQS[3]	RUC[4]	Trigger	MW1-I	MW1-I	MW1-I	MW1-I	MW1-I	MW1-I	MW1-I	MW1-I	MW1-I	MW1-I	MW1-I	MW1-I
			(75% RUC)	29-May-12	04-Oct-12	21-May-13	30-Sep-13	28-Apr-14	22-Sep-14	16-Jun-15	16-Sep-15	01-Jun-16	18-Oct-16	20-Apr-17	23-Oct-17
Alkalinity	500	344	258	**560**	**540**	**598**	**588**	**556**	**556**	**587**	**577**	**598**	**587**	**608**	**621**
Aluminum	0.1	0.08	0.060	<0.0050	<0.0050	**0.48**	0.08	0.04	0.05	0.05	0.06	0.05	**0.09**	0.06	**0.09**
Ammonia, Total	NV	NV	NV	0.07	0.15	< 0.01	< 0.01	0.04	< 0.1	0.02	0.07	0.04	0.07	< 0.01	0.04
Antimony	0.006	0.002	0.002	0.00058	0.00076	< 0.0001	0.0002	0.0004	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	0.0001
Arsenic	0.01	0.003	0.002	0.001	0.001	0.0029	**0.0033**	0.001	0.0018	0.0003	0.0007	0.001	0.0007	0.0014	0.0015
Barium	1	0.3	0.23	0.2	0.18	**0.315**	0.2	0.2	0.2	0.178	0.196	0.191	0.163	0.219	0.211
Beryllium	NV	NV	NV	<0.00050	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	5	1	0.8	<0.010	<0.010	0.012	< 0.005	0.011	0.013	0.007	0.005	0.02	0.011	< 0.005	0.016
Cadmium	0.005	0.001	0.001	<0.00010	<0.00010	< 0.00002	< 0.00002	0.0001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.000014	< 0.000014
Calcium	NV	NV	NV	180	190	245	239	211	222	228	229	216	204	235	227
Chloride	250	131	98	1	<1	1.9	1.8	0.6	< 0.5	2.5	0.7	1.9	< 0.5	0.9	0.9
Chromium	0.05	0.01	0.01	<0.0050	<0.0050	0.003	< 0.0002	< 0.0002	< 0.0002	0.0052	< 0.0002	0.0026	**0.0111**	< 0.001	< 0.001
Chromium (VI)	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	NV	NV	NV	0.0062	0.0058	0.01	0.007	0.008	0.008	0.006	0.007	0.008	0.007	0.009	0.009
Chemical Oxygen Demand	NV	NV	NV	70	62	165	113	5	147	79	141	17	10	79	44
Conductivity (uS/cm)	NV	NV	NV	950	940	1080	1050	997	1010	1050	1030	1070	1060	1070	1110
Copper	1	0.5	0.38	<0.0010	<0.0010	0.0025	0.0006	0.0007	0.0043	< 0.0001	< 0.0001	< 0.0001	0.0003	0.0006	0.0005
Dissolved Organic Carbon	5	4.7	3.5	1.9	1.9	**8.6**	**11**	**6**	**7**	**12.3**	2.4	2.6	2.9	**5.5**	3.1
Flouride	1.5	0.5	0.38	<0.10	<0.10	0.2	< 0.1	0.1	0.12	0.2	< 0.1	0.1	< 0.1	< 0.1	< 0.1
Hardness	500	366	275	**500**	**510**	**670**	**650**	**576**	**603**	**621**	**628**	**590**	**562**	**640**	**620**
Iron	0.3	0.2	0.15	**2.8**	**4.6**	**6.6**	**6.99**	**3.85**	**6.52**	**1.51**	**3.88**	**7**	0.046	**7.17**	**8.04**
Lead	0.01	0.003	0.002	<0.00050	<0.00050	0.00051	0	0	0	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00005
Magnesium	NV	NV	NV	10	11	14	13	12	12	12.7	13.3	12.2	12.5	13.1	12.8
Manganese	0.05	0.03	0.02	**1.4**	**1.3**	**2.03**	**1.91**	**1.63**	**1.83**	**1.84**	**1.83**	**1.87**	**1.34**	**1.96**	**2.02**
Mercury	0.001	0.0003	0.0002	<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	NV	NV	NV	0.0016	0.0011	0.0009	0.0009	0.0012	0.002	0.0005	0.0006	0.0004	0.0021	0.0007	0.0005
Nickel	NV	NV	NV	0.0017	0.0017	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nitrate	10	2.6	2.0	<0.10	<0.10	< 0.1	0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.05
Nitrite	1	0.3	0.2	<0.010	<0.010	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05
pH (unit)	6.5 - 8.5	NV	NV	7.37	7.24	7.21	7.54	7.41	7.35	7.23	7.48	7.31	7.26	7.09	7.5
Phenols	NV	NV	NV	<0.0010	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.005
Dissolved Phosphorous	NV	NV	NV	<0.10	<0.10	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Phosphorous	NV	NV	NV	-	-	-	-	< 0.01	3.62	1.49	1.47	2.44	1.12	2.32	2.23
Potassium	NV	NV	NV	2.6	2.6	3.3	2.9	3.1	2.7	2.9	2.8	2.6	2.9	2.5	2.9
Selenium	0.01	0.003	0.002	<0.0020	<0.0020	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Silver	NV	NV	NV	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00002	< 0.00002	< 0.00002
Sodium	200	101	76	2	2	3	2	2	2	2	3	2.4	2.4	2.1	2.2
Strontium	NV	NV	NV	0.38	0.41	0.53	-	-	0.495	0.507	0.492	0.493	0.479	0.496	0.475
Sulphate	500	252	189	5	6	4	3	4	3	3	3	3	3	3	3
Total Dissolved Solids	500	359	269	**567**	**562**	**638**	**624**	**572**	**584**	**606**	**604**	**605**	**578**	**630**	**631**
Total Kjeldahl Nitrogen	NV	NV	NV	1.3	2.3	1.35	1.37	0.2	0.4	0.4	0.4	0.4	0.5	0.5	0.4
Thallium	NV	NV	NV	0.000054	0.00005	< 0.00005	< 0.00005	0.00007	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.00011	< 0.00005	0.00005
Vanadium	NV	NV	NV	<0.00050	<0.00050	< 0.005	0.0087	0.0057	0.0107	0.0053	0.0004	0.001	0.0045	0.0053	0.0023
Zinc	5	NV	NV	0.011	<0.0050	0.011	0.007	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.007
Conductivity (µs/cm) [9]	NV	NV	NV	-	890	990	1103	-	-	839	893	868	925	817	920
pH (units) [9]	6.5 - 8.5	NV	NV	-	7.1	6.69	6.76	-	-	6.83	6.79	6.29	7.15	7.4	7.21
Temperature (°C) [9]	NV	NV	NV	-	14.2	9.7	12	-	-	12.03	12.15	10.49	12	7.7	12.7
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	-	59	2	27	-	-	-	-	-	-	-	-
Dissolved Oxygen [9]	NV	NV	NV	-	4.14	5.64	7.92	-	-	-	-	-	-	-	-

Notes:

1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 1 - Ground Water Quality Data - Overburden

Parameters	ODWQS[3]	RUC[4]	Trigger (75% RUC)	MW1-I 25-Apr-18	MW1-I 27-Sep-18	MW1-I 16-Apr-19	MW1-I 24-Oct-19	MW1-I 20-Apr-20	MW1-I 08-Oct-20	MW1-I 14-Apr-21	MW1-I 20-Oct-21	MW1-I 13-Apr-22	MW1-I 23-Oct-22	MW1-I 10-May-23	MW1-I 18-Oct-23
Alkalinity	500	344	258	**585**	**542**	**530**	**513**	**480**	**477**	**426**	**383**	**525**	**549**	**589**	**621**
Aluminum	0.1	0.08	0.060	**0.1**	**0.1**	0.08	**0.09**	**0.09**	**0.1**	**0.12**	0.03	0.07	**0.11**	0.06	**0.11**
Ammonia, Total	NV	NV	NV	0.11	0.05	0.06	0.07	0.02	0.07	0.03	0.06	1.28	0.02	0.68	1.05
Antimony	0.006	0.002	0.002	0.0002	0.00016	0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0002	<0.0001
Arsenic	0.01	0.003	0.002	0.0016	0.00127	0.0009	0.0008	0.0004	0.0009	0.0007	0.0008	0.0004	0.0006	0.0003	0.0006
Barium	1	0.3	0.23	0.25	0.216	0.205	0.183	0.186	0.191	0.178	0.082	0.176	0.193	0.171	0.193
Beryllium	NV	NV	NV	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001
Boron	5	1	0.8	0.015	0.021	0.014	0.015	0.012	0.023	0.013	0.005	0.013	0.013	0.01	0.014
Cadmium	0.005	0.001	0.001	0.000067	0.000008	< 0.000015	< 0.000015	0.000017	< 0.000015	0.000026	< 0.000015	< 0.000015	< 0.000012	< 0.000012	<0.000015
Calcium	NV	NV	NV	235	211	208	195	198	192	190	142	197	217	188	220
Chloride	250	131	98	< 0.5	1.5	0.9	1.2	1.3	1.4	1	1.6	0.9	< 0.5	0.7	0.8
Chromium	0.05	0.01	0.01	< 0.001	0.00033	< 0.001	< 0.001	0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001
Chromium (VI)	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	< 0.001	<0.01
Cobalt	NV	NV	NV	0.011	0.00767	0.009	0.007	0.005	0.007	0.007	< 0.005	< 0.005	0.005	0.008	0.0086
Chemical Oxygen Demand	NV	NV	NV	71	93	34	40	54	70	7	86	10	39	54	20
Conductivity (uS/cm)	NV	NV	NV	1110	1060	1020	958	920	884	856	674	981	1020	1070	1090
Copper	1	0.5	0.38	0.0003	0.00056	0.0005	0.0001	0.0024	0.0003	0.0021	0.0011	0.0004	0.0006	0.0008	0.0004
Dissolved Organic Carbon	5	4.7	3.5	**5.9**	**6.4**	4.1	4.6	**5.2**	3	**5.8**	3.8	3.9	3.8	4.1	**8.4**
Flouride	1.5	0.5	0.38	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1
Hardness	500	366	275	**643**	**581**	**566**	**533**	**540**	**524**	**519**	**397**	**539**	**592**	**517**	**599**
Iron	0.3	0.2	0.15	**6.66**	**10**	**3.44**	**8.72**	**2.9**	**7.21**	**6.11**	< 0.005	**2.46**	**5.64**	**2.76**	**6.26**
Lead	0.01	0.003	0.002	< 0.00002	0.00005	0.00004	0.00004	0.00009	0.00002	0.00012	0.00025	0.00003	0.00006	< 0.00004	<0.00004
Magnesium	NV	NV	NV	13.4	12.9	11.1	11.1	11	10.7	10.6	10.2	11.4	12.1	11.7	11.9
Manganese	0.05	0.03	0.02	**2.06**	**1.97**	**2**	**1.82**	**1.83**	**1.69**	**1.73**	**0.104**	**1.45**	**1.79**	**1.49**	**2.05**
Mercury	0.001	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002
Molybdenum	NV	NV	NV	0.0007	< 0.00004	0.0007	0.0005	0.0004	0.0005	0.0005	0.0005	0.0006	0.0006	0.0007	0.0004
Nickel	NV	NV	NV	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.002
Nitrate	10	2.6	2.0	< 0.05	< 0.05	< 0.05	0.07	< 0.05	< 0.05	< 0.05	< 0.05	0.08	< 0.05	0.1	<0.05
Nitrite	1	0.3	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
pH (unit)	6.5 - 8.5	NV	NV	7.56	7.61	7.43	7.41	7.56	7.3	7.38	7.93	7.67	7.44	7.56	7.36
Phenols	NV	NV	NV	< 0.001	0.012	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001
Dissolved Phosphorous	NV	NV	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1
Total Phosphorous	NV	NV	NV	7.51	3.63	4.08	1.01	2.18	1.91	0.92	3.59	1.15	0.97	0.78	0.58
Potassium	NV	NV	NV	3	3	2.7	2.7	2.7	2.7	2.7	3.1	2.8	2.8	2.9	2.9
Selenium	0.01	0.003	0.002	< 0.001	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	<0.001
Silver	NV	NV	NV	< 0.00002	< 0.00002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001
Sodium	200	101	76	2.4	2.2	2	1.8	1.9	2	1.9	1.9	2.1	2	2	2
Strontium	NV	NV	NV	0.507	0.496	0.451	0.416	0.408	0.417	0.401	0.315	0.431	0.46	0.461	0.469
Sulphate	500	252	189	2	3	3	2	2	2	3	4	3	4	4	4
Total Dissolved Solids	500	359	269	**616**	**571**	**551**	**533**	**510**	**506**	**473**	**393**	**538**	**575**	**566**	**586**
Total Kjeldahl Nitrogen	NV	NV	NV	1	0.7	0.6	0.4	0.3	0.4	0.2	1	1.7	0.6	0.7	1.2
Thallium	NV	NV	NV	0.00006	< 0.000004	0.00006	0.00007	< 0.00005	< 0.005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	<0.00005
Vanadium	NV	NV	NV	0.0044	< 0.00007	0.0005	0.0005	0.0003	0.0005	0.0004	0.0007	0.0002	0.0003	0.0002	0.0003
Zinc	5	NV	NV	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005
Conductivity (µs/cm) [9]	NV	NV	NV	1040	920		685	940	675	980	920	765	750	850	710
pH (units) [9]	6.5 - 8.5	NV	NV	7	7.01		6.9	7.05	7.4	7.24	7.15	7.22	7.18	6.52	7.36
Temperature (°C) [9]	NV	NV	NV	7.2	11.3		9.1	8	8.4	11	10.8	9.5	10.5	12.2	8.7
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen [9]	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 1 - Ground Water Quality Data - Overburden

Parameters	**ODWQS[3]**	**RUC[4]**	**Trigger**	**MW1-II**	**MW1-II**	**MW1-II**	**MW1-II**	**MW1-II**	**MW1-II**	**MW1-II**	**MW1-II**	**MW1-II**	**MW1-II**	**MW1-II**	**MW1-II**
			(75% RUC)	**29-May-12**	**21-May-13**	**28-Apr-14**	**01-Jun-16**	**18-Oct-16**	**20-Apr-17**	**23-Oct-17**	**25-Apr-18**	**27-Sep-18**	**16-Apr-19**	**24-Oct-19**	**20-Apr-20**
Alkalinity	500	344	258	**780**	**709**	**658**	**770**	Dry	**732**	Dry	**610**	Dry	**417**	Dry	**538**
Aluminum	0.1	0.08	0.060	0.006	0.08	0.05	0.07		**0.17**		**0.13**		**0.09**		**0.1**
Ammonia, Total	NV	NV	NV	2.5	1.8	4.12	1.77		0.68		4.61		4.3		5.31
Antimony	0.006	0.002	0.002	<0.00050	< 0.0001	0.0001	< 0.0001		0.0002		0.0002		0.0002		< 0.0001
Arsenic	0.01	0.003	0.002	0.002	**0.0035**	0.0019	0.0023		0.0029		0.0013		0.0015		0.0012
Barium	1	0.3	0.23	0.2	0.2	0.2	0.218		0.184		0.249		0.206		0.211
Beryllium	NV	NV	NV	<0.00050	< 0.002	< 0.002	< 0.002		< 0.002		< 0.002		< 0.002		< 0.002
Boron	5	1	0.8	0.017	0.047	0.046	0.048		< 0.005		0.09		0.081		0.128
Cadmium	0.005	0.001	0.001	<0.00010	< 0.00002	< 0.00002	< 0.00002		0.000015		0.000622		< 0.000015		< 0.000015
Calcium	NV	NV	NV	280	283	244	292		271		244		140		217
Chloride	250	131	98	5	8.9	5.1	3.8		1.6		1.8		2.2		2.2
Chromium	0.05	0.01	0.01	<0.0050	< 0.002	< 0.0002	0.0045		< 0.001		0.002		0.001		0.001
Chromium (VI)	NV	NV	NV	-	-	-	-		-		-		-		-
Cobalt	NV	NV	NV	0.027	0.035	0.029	0.029		0.01		0.028		0.016		0.016
Chemical Oxygen Demand	NV	NV	NV	570	337	40	420		413		191		165		96
Conductivity (uS/cm)	NV	NV	NV	1400	1290	1190	1370		1260		1080		785		1030
Copper	1	0.5	0.38	0.0012	0.0016	0.0006	0.0004		0.0003		0.0026		0.0007		0.0003
Dissolved Organic Carbon	5	4.7	3.5	**96**	**67**	**29**	**56**		**33.6**		**19**		**20.9**		**17.3**
Flouride	1.5	0.5	0.38	0.1	0.2	0.2	0.2		**2.9**		< 0.1		0.4		< 0.1
Hardness	500	366	275	**740**	**759**	**655**	**782**		**735**		**659**		**378**		**582**
Iron	0.3	0.2	0.15	**63**	**69.9**	< 0.05	**69.1**		**7.93**		**82.8**		**39.5**		**61.5**
Lead	0.01	0.003	0.002	<0.00050	0	0	0.00018		0.00101		0.00115		0.00021		0.00009
Magnesium	NV	NV	NV	11	13	11	13		13.9		12		6.79		9.5
Manganese	0.05	0.03	0.02	**4.2**	**4.18**	**3.23**	**3.14**		**2.83**		**2.48**		**2.25**		**1.97**
Mercury	0.001	0.0003	0.0002	<0.00001	< 0.00002	< 0.00002	< 0.00002		< 0.00002		< 0.00002		< 0.00002		< 0.00002
Molybdenum	NV	NV	NV	<0.00050	< 0.0001	0.0002	< 0.0001		0.0003		0.0003		0.0003		0.0004
Nickel	NV	NV	NV	0.0074	< 0.01	< 0.01	< 0.01		< 0.01		< 0.01		< 0.01		< 0.01
Nitrate	10	2.6	2.0	<0.10	0.2	0.2	0.2		< 0.1		< 0.05		< 0.05		< 0.05
Nitrite	1	0.3	0.2	<0.010	< 0.1	< 0.1	< 0.1		< 0.1		< 0.05		< 0.05		< 0.05
pH (unit)	6.5 - 8.5	NV	NV	6.75	6.76	6.94	6.89		6.96		7.13		7.21		7.35
Phenols	NV	NV	NV	0.022	0.003	< 0.001	< 0.001		< 0.001		0.002		< 0.002		< 0.002
Dissolved Phosphorous	NV	NV	NV	<0.10	-	< 0.1	< 0.1		< 0.1		< 0.1		< 0.1		< 0.1
Total Phosphorous	NV	NV	NV	-	-	< 0.01	0.4		0.63		0.59		0.25		0.16
Potassium	NV	NV	NV	4.1	5	5.2	4		3.2		5.4		4.9		4.7
Selenium	0.01	0.003	0.002	<0.0020	< 0.001	< 0.001	< 0.001		< 0.001		< 0.001		< 0.001		< 0.001
Silver	NV	NV	NV	<0.00010	< 0.00002	< 0.00002	< 0.00002		< 0.00002		< 0.00002		< 0.0001		< 0.0001
Sodium	200	101	76	4	8	4	5		2.8		5.8		4.2		3.7
Strontium	NV	NV	NV	0.64	0.692	-	0.717		0.618		0.598		0.482		0.493
Sulphate	500	252	189	<1	3	2	< 1		< 1		< 1		< 1		< 1
Total Dissolved Solids	500	359	269	**872**	**751**	**676**	**784**		**747**		**644**		**416**		**569**
Total Kjeldahl Nitrogen	NV	NV	NV	15	10.6	7.1	8.8		7.3		10.4		7.7		8
Thallium	NV	NV	NV	<0.000050	< 0.00005	< 0.00005	< 0.00005		0.00007		< 0.00005		< 0.00005		< 0.00005
Vanadium	NV	NV	NV	0.00056	< 0.005	0.0094	0.0016		0.0137		0.0045		0.0004		0.0009
Zinc	5	NV	NV	0.014	0.013	0.036	0.006		< 0.005		0.016		0.005		< 0.005
Conductivity (µs/cm) [9]	NV	NV	NV	1577	1408	-	1270		1025		1220		1220		1245
pH (units) [9]	6.5 - 8.5	NV	NV	6.56	6.44	-	6.07		6.9		6.55		6.55		6.78
Temperature (°C) [9]	NV	NV	NV	15.8	10.2	-	12.33		7.5		7.1		7.1		8.9
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	-73	9	-	-		-		-		-		-
Dissolved Oxygen [9]	NV	NV	NV	1.22	4.25	-	-		-		-		-		-

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 1 - Ground Water Quality Data - Overburden

Parameters	ODWQS[3]	RUC[4]	Trigger (75% RUC)	MW1-II	MW1-II	MW1-II	MW1-II	MW1-II	MW1-II	MW1-II	MW2-II	MW2-II	MW2-II	MW2-II	MW2-II
				08-Oct-20	14-Apr-21	20-Oct-21	13-Apr-22	23-Oct-22	10-May-23	18-Oct-23	29-May-12	04-Oct-12	21-May-13	30-Sep-13	28-Apr-14
Alkalinity	500	344	258	Dry	Dry	Dry	Dry	Dry	**716**	Dry	240	230	222	227	225
Aluminum	0.1	0.08	0.060						0.08		<0.0050	<0.0050	0.03	0.05	0.02
Ammonia, Total	NV	NV	NV						3		<0.01	0.08	< 0.01	< 0.01	0.04
Antimony	0.006	0.002	0.002						0.0002		<0.00050	<0.00050	< 0.0001	< 0.0001	< 0.0001
Arsenic	0.01	0.003	0.002						0.0013		<0.0010	<0.0010	0.0002	0.0002	0.0002
Barium	1	0.3	0.23						0.186		0.1	0.11	0.122	0.118	0.1
Beryllium	NV	NV	NV						< 0.002		<0.00050	<0.00050	< 0.002	< 0.002	< 0.002
Boron	5	1	0.8						0.024		<0.010	<0.010	< 0.005	< 0.005	< 0.005
Cadmium	0.005	0.001	0.001						< 0.000012		<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002
Calcium	NV	NV	NV						233		73	74	78.9	81.8	79
Chloride	250	131	98						3.1		<1	<1	0.8	0.8	0.8
Chromium	0.05	0.01	0.01						< 0.001		<0.0050	<0.0050	< 0.002	< 0.0002	< 0.0002
Chromium (VI)	NV	NV	NV						< 0.001		-	-	-	-	-
Cobalt	NV	NV	NV						0.018		0.001	0.0014	< 0.005	< 0.005	< 0.005
Chemical Oxygen Demand	NV	NV	NV						290		24	13	54	7	< 5
Conductivity (uS/cm)	NV	NV	NV						1300		460	460	451	457	457
Copper	1	0.5	0.38						0.0008		<0.0010	<0.0010	0.0013	0.0004	0.0006
Dissolved Organic Carbon	5	4.7	3.5						**6.9**		0.75	0.67	3	3	3
Flouride	1.5	0.5	0.38						**4.1**		<0.10	<0.10	0.2	< 0.1	< 0.1
Hardness	500	366	275						**635**		230	240	249	253	247
Iron	0.3	0.2	0.15						**24**		<0.10	<0.10	0.011	< 0.005	0.01
Lead	0.01	0.003	0.002						0.00004		<0.00050	<0.00050	< 0.00002	< 0.00002	< 0.00002
Magnesium	NV	NV	NV						12.6		12	12	12.6	12	12
Manganese	0.05	0.03	0.02						**2.28**		<0.0020	0	< 0.001	0	< 0.001
Mercury	0.001	0.0003	0.0002						< 0.00002		<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002
Molybdenum	NV	NV	NV						0.0001		0.00063	0.00066	0.0004	0.0005	0.0006
Nickel	NV	NV	NV						< 0.01		<0.0010	<0.0010	< 0.01	< 0.01	< 0.01
Nitrate	10	2.6	2.0						0.1		0.52	0.55	0.6	0.5	0.6
Nitrite	1	0.3	0.2						< 0.05		<0.010	<0.010	< 0.1	< 0.1	< 0.1
pH (unit)	6.5 - 8.5	NV	NV						7.23		7.79	7.76	7.89	8.03	8
Phenols	NV	NV	NV						< 0.001		<0.0010	<0.0010	< 0.001	0.001	< 0.001
Dissolved Phosphorous	NV	NV	NV						< 0.1		<0.10	<0.10	-	< 0.1	< 0.1
Total Phosphorous	NV	NV	NV						0.17		-	-	-	-	< 0.01
Potassium	NV	NV	NV						3.9		2.3	2.3	2.4	2.3	2.4
Selenium	0.01	0.003	0.002						0.001		<0.0020	<0.0020	< 0.001	< 0.001	< 0.001
Silver	NV	NV	NV						< 0.0001		<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002
Sodium	200	101	76						2.6		4	4	4	4	4
Strontium	NV	NV	NV						0.592		0.18	0.18	0.193	-	-
Sulphate	500	252	189						< 1		14	13	15	13	15
Total Dissolved Solids	500	359	269						**716**		266	264	249	252	250
Total Kjeldahl Nitrogen	NV	NV	NV						6.1		0.45	0.84	0.39	0.4	0.1
Thallium	NV	NV	NV						< 0.00005		<0.000050	<0.000050	< 0.00005	< 0.00005	< 0.00005
Vanadium	NV	NV	NV						0.0002		0.0014	0.0014	< 0.005	0.0052	0.003
Zinc	5	NV	NV						< 0.005		0.0063	<0.0050	< 0.005	< 0.005	0.023
Conductivity (µs/cm) [9]	NV	NV	NV						720		455	440	633	463	-
pH (units) [9]	6.5 - 8.5	NV	NV						6.68		7.78	8.3	7.78	7.53	-
Temperature (°C) [9]	NV	NV	NV						11.7		11.3	14.4	12.2	10.3	-
Oxidation Reduction Potential (mV)[9]	NV	NV	NV						-		110	30	64	162	-
Dissolved Oxygen [9]	NV	NV	NV						-		8.23	7.34	7.85	10.72	-

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 1 - Ground Water Quality Data - Overburden

Parameters	ODWQS^3	RUC^4	Trigger	MW2-II	MW2-II	MW2-II	MW2-II	MW2-II	MW2-II	MW2-II	MW2-II	MW2-II	MW2-II	MW2-II	MW2-II
			(75% RUC)	22-Sep-14	16-Jun-15	15-Sep-15	01-Jun-16	18-Oct-16	20-Apr-17	13-Oct-17	15-Apr-18	27-Sep-18	01-Apr-19	24-Oct-19	20-Apr-20
Alkalinity	500	344	258	227	231	230	226	220	225	223	220	208	206	208	202
Aluminum	0.1	0.08	0.060	**0.14**	0.02	0.02	0.02	0.06	0.02	0.04	0.06	0.05	0.05	0.04	0.05
Ammonia, Total	NV	NV	NV	< 0.1	0.05	< 0.01	< 0.01	0.03	< 0.01	< 0.01	0.05	0.03	0.04	0.05	0.03
Antimony	0.006	0.002	0.002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0003	< 0.0001	< 0.0001	< 0.0001	0.00006	< 0.0001	0.0001	< 0.0001
Arsenic	0.01	0.003	0.002	0.0002	0.0001	0.0001	< 0.0001	0.0002	0.0001	0.0002	0.0002	0.00011	0.0001	0.0001	0.0001
Barium	1	0.3	0.23	0.1	0.1	0.11	0.106	0.106	0.11	0.107	0.113	0.106	0.093	0.103	0.106
Beryllium	NV	NV	NV	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	5	1	0.8	0.006	< 0.005	< 0.005	0.015	0.005	< 0.005	0.006	0.006	< 0.005	0.006	0.007	0.006
Cadmium	0.005	0.001	0.001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.000014	< 0.000014	0.000208	0.000006	< 0.000015	< 0.000015	< 0.000015
Calcium	NV	NV	NV	82	77	79.8	74.9	76.9	77.1	74.7	77.5	70.6	72.4	74	75.1
Chloride	250	131	98	0.7	0.7	1	1	< 0.5	0.7	0.8	< 0.5	1.6	0.8	1.2	1.2
Chromium	0.05	0.01	0.01	0.0026	0.0034	0.0016	0.0021	0.0024	0.003	< 0.001	0.002	0.0016	0.002	0.002	0.002
Chromium (VI)	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	NV	NV	NV	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.005	0.002	0.012	< 0.005	< 0.005
Chemical Oxygen Demand	NV	NV	NV	< 5	61	58	10	< 5	6	7	< 5	35	18	33	102
Conductivity (uS/cm)	NV	NV	NV	467	460	459	461	449	453	454	442	445	454	449	443
Copper	1	0.5	0.38	0.001	< 0.0001	0.0001	0.0001	< 0.0001	0.0004	0.0005	0.0006	0.00071	0.0006	0.0003	0.0018
Dissolved Organic Carbon	5	4.7	3.5	**7**	5	1	0.8	2.7	1.9	1.1	1.6	1.8	2.2	2.7	2.3
Flouride	1.5	0.5	0.38	0.06	0.1	0.2	0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hardness	500	366	275	256	245	254	235	242	246	236	245	227	229	232	237
Iron	0.3	0.2	0.15	0.178	< 0.005	< 0.005	< 0.005	0.031	< 0.005	0.006	0.022	0.006	0.025	< 0.005	< 0.005
Lead	0.01	0.003	0.002	0	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00002	0.00002	< 0.00002	0.00004
Magnesium	NV	NV	NV	12	13	13.3	11.7	12.2	13	11.9	12.5	12.4	11.6	11.5	12.1
Manganese	0.05	0.03	0.02	0.01	< 0.001	< 0.001	< 0.001	0.003	< 0.001	< 0.001	0.001	0.001	< 0.001	< 0.001	< 0.001
Mercury	0.001	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	NV	NV	NV	0.0006	0.0005	0.0007	0.0004	0.0005	0.0006	0.0006	0.0005	0.00042	0.0005	0.0005	0.0005
Nickel	NV	NV	NV	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nitrate	10	2.6	2.0	0.5	0.6	0.6	0.9	0.9	0.9	0.97	0.97	1.15	1.05	1.01	1.12
Nitrite	1	0.3	0.2	< 0.1	< 0.1	0.2	< 0.1	0.2	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
pH (unit)	6.5 - 8.5	NV	NV	8.01	7.86	8.03	7.96	8.05	7.89	8.16	8.09	8.09	7.98	7.95	7.94
Phenols	NV	NV	NV	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002
Dissolved Phosphorous	NV	NV	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Phosphorous	NV	NV	NV	1.98	1.37	0.58	0.4	0.79	0.71	0.72	0.61	4.39	3.42	3.46	13.7
Potassium	NV	NV	NV	2.5	2.6	2.5	2.2	2.3	2.2	2.3	2.3	2.3	2.2	2.2	2.3
Selenium	0.01	0.003	0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.0003	< 0.001	< 0.001	< 0.001
Silver	NV	NV	NV	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00002	0.00004	< 0.0001	< 0.0001	< 0.0001
Sodium	200	101	76	4	4	4	3.9	3.9	3.5	3.6	4	3.9	3.6	3.5	3.6
Strontium	NV	NV	NV	0.207	0.203	0.194	0.186	0.194	0.189	0.173	0.182	0.189	0.173	0.17	0.171
Sulphate	500	252	189	15	15	15	13	14	15	12	15	15	15	15	15
Total Dissolved Solids	500	359	269	255	253	258	246	246	250	239	244	230	229	232	231
Total Kjeldahl Nitrogen	NV	NV	NV	< 0.1	0.7	0.3	0.1	0.6	0.2	0.1	0.2	0.3	0.3	0.3	0.4
Thallium	NV	NV	NV	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.000004	< 0.00005	< 0.00005	< 0.00005
Vanadium	NV	NV	NV	0.0048	0.003	0.0015	0.0012	0.0016	0.0023	0.0018	0.0027	0.00147	0.0015	0.0013	0.0017
Zinc	5	NV	NV	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Conductivity (µs/cm) ^{9}	NV	NV	NV	-	363	395	399	410	375	440	510	400		355	450
pH (units) ^{9}	6.5 - 8.5	NV	NV	-	7.85	7.54	6.67	7.91	8.05	8.01	7.84	7.18		7.92	7.92
Temperature (°C) ^{9}	NV	NV	NV	-	11.74	9.31	9.71	12.3	7.5	11	8.8	11		7.9	8.6
Oxidation Reduction Potential (mV)^9	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen ^{9}	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 1 - Ground Water Quality Data - Overburden

Parameters	**ODWQS[3]**	**RUC[4]**	**Trigger (75% RUC)**	**MW2-II 08-Oct-20**	**MW2-II 14-Apr-21**	**MW2-II 13-Apr-22**	**MW2-II 23-Oct-22**	**MW2-II 10-May-23**	**MW2-II 18-Oct-23**	**MW7 29-May-12**	**MW7 21-May-13**	**MW7 30-Sep-13**	**MW7 16-Jun-15**	**MW7 16-Sep-15**	**MW7 01-Jun-16**
Alkalinity	500	344	258	206	197	216	233	248	286	220	180	228	223	254	190
Aluminum	0.1	0.08	0.060	0.06	0.06	0.04	0.05	0.03	0.06	0.0059	0.04	0.05	0.03	0.03	0.02
Ammonia, Total	NV	NV	NV	0.01	0.01	0.87	0.01	1.71	0.49	0.02	< 0.01	< 0.01	< 0.01	< 0.01	0.07
Antimony	0.006	0.002	0.002	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	0.0001	<0.00050	< 0.0001	0.0002	0.0002	0.0001	< 0.0001
Arsenic	0.01	0.003	0.002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	<0.0010	0.0003	0.0003	0.0002	0.0003	0.0002
Barium	1	0.3	0.23	0.111	0.116	0.122	0.14	0.118	0.169	0	0	0	0.038	0.047	0.03
Beryllium	NV	NV	NV	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	5	1	0.8	0.005	0.005	0.054	0.115	0.107	0.236	0.011	0.014	< 0.005	0.009	0.005	0.024
Cadmium	0.005	0.001	0.001	< 0.000015	< 0.000015	< 0.000015	0.000013	< 0.000010	<0.000015	<0.00010	0	0.0001	0.00009	0.00016	< 0.00002
Calcium	NV	NV	NV	77.2	79.2	84	93.6	80.7	114	79	77	96	92.6	109	74.9
Chloride	250	131	98	1.4	1.2	6.6	20.8	20.5	37.9	2	0.9	2.6	1.5	2.8	1
Chromium	0.05	0.01	0.01	0.001	0.001	0.001	0.001	< 0.001	<0.001	<0.0050	< 0.002	< 0.0002	0.0027	0.0003	0.0008
Chromium (VI)	NV	NV	NV	-	-	-	-	< 0.001	<0.01	-	-	-	-	-	-
Cobalt	NV	NV	NV	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.006	<0.00050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Chemical Oxygen Demand	NV	NV	NV	< 5	40	< 5	7	11	25	100	106	25	19	8	103
Conductivity (uS/cm)	NV	NV	NV	430	448	500	570	579	673	400	348	450	433	499	372
Copper	1	0.5	0.38	0.0004	0.0016	0.0006	0.0016	0.0011	0.0009	0.001	0.0053	0.0037	0.0031	0.0053	0.0011
Dissolved Organic Carbon	5	4.7	3.5	1.3	2.6	2	2.9	3.8	**7.6**	4	**6**	**7**	**4.9**	4.1	4.7
Flouride	1.5	0.5	0.38	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	<0.10	0.2	< 0.1	0.1	0.1	0.2
Hardness	500	366	275	239	247	265	292	258	352	210	200	250	241	284	195
Iron	0.3	0.2	0.15	< 0.005	< 0.005	0.005	0.007	< 0.005	0.007	<0.10	0.016	< 0.005	< 0.005	< 0.005	0.012
Lead	0.01	0.003	0.002	< 0.00002	0.00005	< 0.00002	0.00002	< 0.00002	<0.00002	<0.00050	0	0	0.00041	0.00035	0.00045
Magnesium	NV	NV	NV	11.1	11.9	13.3	14.1	13.8	16.4	2	2	2	2.39	2.97	1.91
Manganese	0.05	0.03	0.02	< 0.001	< 0.001	< 0.001	< 0.001	0.002	0.02	**0.11**	0.01	0.01	< 0.001	< 0.001	0.018
Mercury	0.001	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002	<0.00001	< 0.00002	< 0.00002	< 0.00002	0.00003	0.00015
Molybdenum	NV	NV	NV	0.0004	0.0004	0.0004	0.0005	0.0005	0.0004	<0.00050	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel	NV	NV	NV	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.0021	<0.0010	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nitrate	10	2.6	2.0	1.45	1.25	1.3	1.44	1.21	0.89	<0.10	0.1	0.2	0.4	0.8	0.1
Nitrite	1	0.3	0.2	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.05	<0.010	< 0.1	< 0.1	< 0.1	0.3	< 0.1
pH (unit)	6.5 - 8.5	NV	NV	7.95	7.94	7.84	7.84	7.8	7.53	7.75	7.95	7.75	7.68	7.55	7.8
Phenols	NV	NV	NV	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Phosphorous	NV	NV	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	<0.10	-	< 0.1	< 0.1	< 0.1	< 0.1
Total Phosphorous	NV	NV	NV	1.27	2.11	0.88	0.47	0.29	0.3	-	-	-	0.26	0.12	1.54
Potassium	NV	NV	NV	2.2	2.2	2.4	2.4	2.5	2.7	0.73	0.6	0.5	0.6	0.4	0.5
Selenium	0.01	0.003	0.002	< 0.001	< 0.001	< 0.001	0.001	< 0.001	<0.001	<0.0020	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Silver	NV	NV	NV	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Sodium	200	101	76	3.6	3.6	4	4.2	4.3	6.3	1	1	1	1	2	0.9
Strontium	NV	NV	NV	0.18	0.182	0.206	0.222	0.219	0.269	0.15	0.144	-	0.185	0.199	0.145
Sulphate	500	252	189	13	16	28	40	34	38	<1	3	3	3	4	1
Total Dissolved Solids	500	359	269	232	233	269	315	304	350	221	193	243	236	278	195
Total Kjeldahl Nitrogen	NV	NV	NV	0.1	0.2	0.1	0.2	2	0.8	4	1.36	1.05	0.7	0.4	3.6
Thallium	NV	NV	NV	< 0.005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	<0.00005	<0.000050	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	NV	NV	NV	0.0014	0.0017	0.0016	0.0016	0.0015	0.0015	<0.00050	< 0.005	0.0046	0.0022	0.0005	0.0003
Zinc	5	NV	NV	0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	0.028	0.037	0.052	0.07	0.095	0.039
Conductivity (µs/cm) [9]	NV	NV	NV	435	540	425	455	430	470	400	344	458	352	435	326
pH (units) [9]	6.5 - 8.5	NV	NV	7.88	7.97	7.8	7.8	7.05	7.77	7.26	7.85	7.01	7.44	6.88	6.46
Temperature (°C) [9]	NV	NV	NV	7.1	9.3	9.3	10.3	10.8	8.7	17.6	17.5	15.6	15.88	14.05	15.49
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	-	-	-	-	-	-	-1	70	27	-	-	-
Dissolved Oxygen [9]	NV	NV	NV	-	-	-	-	-	-	1.15	8.04	4.34	-	-	-

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 1 - Ground Water Quality Data - Overburden

Parameters	ODWQS^{3}	RUC^{4}	Trigger (75% RUC)	MW7	MW7	MW7	MW7	MW7	MW7	MW7	MW7	MW7	MW7	MW7	MW7
				18-Oct-16	20-Apr-17	23-Oct-17	25-Apr-18	27-Sep-18	16-Apr-19	24-Oct-19	20-Apr-20	08-Oct-20	14-Apr-21	20-Oct-21	13-Apr-22
Alkalinity	500	344	258	Dry	171	248	168	Dry	Submerged	Dry	166	Dry	Submerged	246	180
Aluminum	0.1	0.08	0.060		0.02	0.06	0.05				0.05			0.06	0.04
Ammonia, Total	NV	NV	NV		< 0.01	0.02	0.02				< 0.01			0.09	0.8
Antimony	0.006	0.002	0.002		0.0001	0.0002	0.0002				0.0003			0.0001	0.0003
Arsenic	0.01	0.003	0.002		0.0001	0.0002	0.0001				0.0001			0.0002	0.0001
Barium	1	0.3	0.23		0.023	0.037	0.022				0.024			0.039	0.028
Beryllium	NV	NV	NV		< 0.002	< 0.002	< 0.002				< 0.002			< 0.002	< 0.002
Boron	5	1	0.8		< 0.005	0.017	0.007				0.007			0.014	0.015
Cadmium	0.005	0.001	0.001		0.000056	0.000078	0.000045				0.000059			< 0.000015	0.000063
Calcium	NV	NV	NV		71.1	100	75				72.6			103	75
Chloride	250	131	98		1	2.9	< 0.5				1.2			3.2	1.6
Chromium	0.05	0.01	0.01		0.001	< 0.001	< 0.001				< 0.001			< 0.001	< 0.001
Chromium (VI)	NV	NV	NV		-	-	-				-			-	-
Cobalt	NV	NV	NV		< 0.005	< 0.005	< 0.005				< 0.005			< 0.005	< 0.005
Chemical Oxygen Demand	NV	NV	NV		15	42	12				15			22	< 5
Conductivity (uS/cm)	NV	NV	NV		334	488	349				340			444	358
Copper	1	0.5	0.38		0.0026	0.0039	0.003				0.0049			0.0015	0.0051
Dissolved Organic Carbon	5	4.7	3.5		4.4	**5.5**	3.5				4.6			**6.7**	5
Flouride	1.5	0.5	0.38		< 0.1	< 0.1	< 0.1				< 0.1			< 0.1	< 0.1
Hardness	500	366	275		185	261	196				189			268	196
Iron	0.3	0.2	0.15		< 0.005	< 0.005	< 0.005				0.006			0.052	0.005
Lead	0.01	0.003	0.002		0.00025	0.00047	0.00021				0.00038			0.00019	0.00033
Magnesium	NV	NV	NV		1.87	2.69	1.96				1.81			2.56	2.02
Manganese	0.05	0.03	0.02		< 0.001	0.001	< 0.001				< 0.001			0.016	< 0.001
Mercury	0.001	0.0003	0.0002		< 0.00002	< 0.00002	< 0.00002				< 0.00002			< 0.00002	< 0.00002
Molybdenum	NV	NV	NV		0.0001	< 0.0001	< 0.0001				0.0001			< 0.0001	0.0001
Nickel	NV	NV	NV		< 0.01	< 0.01	< 0.01				< 0.01			< 0.01	< 0.01
Nitrate	10	2.6	2.0		< 0.1	0.21	< 0.05				0.07			< 0.05	0.08
Nitrite	1	0.3	0.2		< 0.1	< 0.05	< 0.05				< 0.05			< 0.05	< 0.05
pH (unit)	6.5 - 8.5	NV	NV		7.83	7.8	8.1				7.88			8.27	7.74
Phenols	NV	NV	NV		< 0.001	< 0.001	< 0.001				< 0.002			< 0.002	< 0.001
Dissolved Phosphorous	NV	NV	NV		< 0.1	< 0.1	< 0.1				< 0.1			< 0.1	< 0.1
Total Phosphorous	NV	NV	NV		0.08	0.48	0.05				0.06			0.26	0.03
Potassium	NV	NV	NV		0.3	0.4	0.2				0.3			0.4	0.3
Selenium	0.01	0.003	0.002		< 0.001	< 0.001	< 0.001				< 0.001			< 0.001	< 0.001
Silver	NV	NV	NV		< 0.00002	< 0.00002	< 0.00002				< 0.0001			< 0.0001	< 0.0001
Sodium	200	101	76		0.6	1.6	0.8				0.6			1.2	0.8
Strontium	NV	NV	NV		0.123	0.174	0.122				0.116			0.184	0.128
Sulphate	500	252	189		5	3	2				3			3	3
Total Dissolved Solids	500	359	269		182	259	181				179			260	195
Total Kjeldahl Nitrogen	NV	NV	NV		0.3	1	0.4				< 0.01			0.9	0.9
Thallium	NV	NV	NV		< 0.00005	< 0.00005	< 0.00005				< 0.00005			< 0.00005	< 0.00005
Vanadium	NV	NV	NV		0.0012	0.0011	0.0013				0.0002			0.0001	0.0002
Zinc	5	NV	NV		0.04	0.045	0.035				0.038			0.042	0.039
Conductivity (µs/cm) ^{9}	NV	NV	NV		252	450	430				405			430	4.3
pH (units) ^{9}	6.5 - 8.5	NV	NV		7.82	7.41	7.92				7.93			7.53	8.55
Temperature (°C) ^{9}	NV	NV	NV		6.5	13.6	4.2				5.8			15.3	4.8
Oxidation Reduction Potential (mV)^{9}	NV	NV	NV		-	-	-				-			-	-
Dissolved Oxygen ^{9}	NV	NV	NV		-	-	-				-			-	-

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 1 - Ground Water Quality Data - Overburden

Parameters	ODWQS[3]	RUC[4]	Trigger	MW7	MW7	MW7	MW10-II	MW10-II	MW10-II	MW10-II	MW10-II	MW10-II	MW10-II	MW10-II	MW10-II
			(75% RUC)	23-Oct-22	10-May-23	18-Oct-23	29-May-12	04-Oct-12	21-May-13	30-Sep-13	28-Apr-14	22-Sep-14	16-Jun-15	16-Sep-15	01-Jun-16
Alkalinity	500	344	258	Dry	Submerged	Dry	290	250	248	240	252	264	246	254	269
Aluminum	0.1	0.08	0.060				<0.0050	0.009	0.03	0.03	0.02	0.02	0.02	0.02	0.02
Ammonia, Total	NV	NV	NV				<0.01	0.07	< 0.01	< 0.01	0.06	< 0.1	0.03	< 0.01	0.03
Antimony	0.006	0.002	0.002				<0.00050	<0.00050	< 0.0001	< 0.0001	< 0.0001	0.0002	0.0001	< 0.0001	< 0.0001
Arsenic	0.01	0.003	0.002				<0.0010	<0.0010	0.0004	0.0004	0.0003	0.0003	0.0003	0.0003	0.0001
Barium	1	0.3	0.23				0.1	0.1	0.1	0.119	0.121	0.114	0.11	0.114	0.123
Beryllium	NV	NV	NV				<0.00050	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	5	1	0.8				0.15	0.28	0.372	0.325	0.257	0.318	0.288	0.272	0.233
Cadmium	0.005	0.001	0.001				<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Calcium	NV	NV	NV				78	68	77	73.8	80.1	76.8	74.6	76.1	80.4
Chloride	250	131	98				4	3	3.9	3.8	4.7	5.7	6.1	5.9	7.5
Chromium	0.05	0.01	0.01				<0.0050	<0.0050	< 0.002	< 0.0002	< 0.0002	0.0011	0.0033	0.001	0.0014
Chromium (VI)	NV	NV	NV				-	-	-	-	-	-	-	-	-
Cobalt	NV	NV	NV				<0.00050	<0.00050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Chemical Oxygen Demand	NV	NV	NV				7	20	53	< 5	< 5	< 5	145	168	99
Conductivity (uS/cm)	NV	NV	NV				520	510	515	503	524	563	517	537	572
Copper	1	0.5	0.38				<0.0010	<0.0010	0.0011	0.0005	0.0007	0.0006	< 0.0001	0.0002	0.0001
Dissolved Organic Carbon	5	4.7	3.5				1	1	3	3.1	1.7	1.8	4.1	0.4	0.9
Flouride	1.5	0.5	0.38				<0.10	<0.10	0.1	< 0.1	0.1	0.12	0.1	0.2	0.1
Hardness	500	366	275				260	240	260	253	269	264	261	271	272
Iron	0.3	0.2	0.15				<0.10	<0.10	0.013	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.005
Lead	0.01	0.003	0.002				<0.00050	<0.00050	< 0.00002	< 0.00002	0.00004	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Magnesium	NV	NV	NV				16	17	17	16.8	16.7	17.5	18	19.6	17.3
Manganese	0.05	0.03	0.02				<0.0020	<0.0020	< 0.001	0	< 0.001	< 0.001	< 0.001	0	< 0.001
Mercury	0.001	0.0003	0.0002				<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	NV	NV	NV				0.0011	0.0013	0.0012	0.0013	0.0011	0.001	0.001	0.0014	0.0007
Nickel	NV	NV	NV				<0.0010	<0.0010	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nitrate	10	2.6	2.0				2.1	1.5	1.9	1.6	1.9	2.3	2.2	2.2	**2.7**
Nitrite	1	0.3	0.2				<0.010	<0.010	0	< 0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.1
pH (unit)	6.5 - 8.5	NV	NV				7.91	7.71	7.97	8.03	8.06	7.95	8	8.01	8
Phenols	NV	NV	NV				<0.0010	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Phosphorous	NV	NV	NV				<0.10	<0.10	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Phosphorous	NV	NV	NV				-	-	-	-	0.07	1.75	1.36	0.92	0.4
Potassium	NV	NV	NV				3	3.3	3.4	3.6	3.5	3.6	3.7	3.8	3.1
Selenium	0.01	0.003	0.002				<0.0020	<0.0020	< 0.001	0.001	< 0.001	0.001	0.001	< 0.001	< 0.001
Silver	NV	NV	NV				<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Sodium	200	101	76				8	12	18	15	12	13	14	13	11.4
Strontium	NV	NV	NV				0.21	0.2	0.215	-	-	0.231	0.232	0.228	0.239
Sulphate	500	252	189				12	14	14	15	14	14	15	16	14
Total Dissolved Solids	500	359	269				323	292	291	279	291	300	290	298	308
Total Kjeldahl Nitrogen	NV	NV	NV				0.5	0.6	0.81	0.5	0.2	0.2	1.1	0.9	0.6
Thallium	NV	NV	NV				<0.000050	<0.000050	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	NV	NV	NV				0.0016	0.0015	< 0.005	0.0049	0.0029	0.0048	0.0035	0.0019	0.0015
Zinc	5	NV	NV				<0.0050	<0.0050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Conductivity (µs/cm) [9]	NV	NV	NV				540	450	658	511	-	-	430	466	486
pH (units) [9]	6.5 - 8.5	NV	NV				7.78	8.1	8.23	7.47	-	-	8.92	7.71	6.8
Temperature (°C) [9]	NV	NV	NV				10.1	13.4	9.8	9.3	-	-	13.01	12.85	10.82
Oxidation Reduction Potential (mV)[9]	NV	NV	NV				165	48	44	157	-	-	-	-	-
Dissolved Oxygen [9]	NV	NV	NV				9.95	6.1	8.83	6.1	-	-	-	-	-

Notes:

1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 1 - Ground Water Quality Data - Overburden

Parameters	ODWQS[3]	RUC[4]	Trigger (75% RUC)	MW10-II 18-Oct-16	MW10-II 20-Apr-17	MW10-II 23-Oct-17	MW10-II 25-Apr-18	MW10-II 27-Sep-18	MW10-II 16-Apr-19	MW10-II 24-Oct-19	MW10-II 20-Apr-20	MW10-II 08-Oct-20	MW10-II 14-Apr-21	MW10-II 20-Oct-21	MW10-II 13-Apr-22
Alkalinity	500	344	258	296	274	285	289	294	277	293	298	282	262	241	282
Aluminum	0.1	0.08	0.060	0.08	0.02	0.07	0.06	0.06	0.05	0.05	0.06	0.06	0.06	0.02	0.05
Ammonia, Total	NV	NV	NV	0.73	< 0.01	0.02	0.07	0.22	0.04	0.04	0.01	< 0.01	< 0.01	0.02	0.36
Antimony	0.006	0.002	0.002	0.0003	< 0.0001	< 0.0001	< 0.0001	0.00008	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Arsenic	0.01	0.003	0.002	0.0007	0.0002	0.0002	0.0003	0.00014	0.0001	0.0001	0.0001	0.0001	0.0003	0.0001	0.0002
Barium	1	0.3	0.23	0.129	0.129	0.143	0.164	0.164	0.139	0.15	0.161	0.157	0.15	0.15	0.152
Beryllium	NV	NV	NV	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	5	1	0.8	0.261	0.251	0.209	0.193	0.154	0.2	0.178	0.168	0.168	0.189	0.166	0.18
Cadmium	0.005	0.001	0.001	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000006	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015
Calcium	NV	NV	NV	84.2	83.5	91.4	98.4	93.6	91.6	89.6	103	96.3	93.3	77.4	96.6
Chloride	250	131	98	8.8	9.3	8.3	11.8	10.2	9.3	9.7	11.1	10.7	10.1	11.2	10.8
Chromium	0.05	0.01	0.01	0.002	0.001	< 0.001	0.001	0.00064	< 0.001	0.001	< 0.001	0.001	< 0.001	< 0.001	0.001
Chromium (VI)	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	NV	NV	NV	< 0.005	< 0.005	< 0.005	0.012	0.000152	0.009	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Chemical Oxygen Demand	NV	NV	NV	8	8	22	11	8	12	< 5	8	< 5	< 5	< 5	< 5
Conductivity (uS/cm)	NV	NV	NV	629	584	609	641	633	632	643	628	608	627	518	628
Copper	1	0.5	0.38	< 0.0001	0.0012	0.0007	0.0003	0.00048	0.002	0.0009	0.0022	0.0006	0.003	0.0003	0.0004
Dissolved Organic Carbon	5	4.7	3.5	1.3	1.5	0.9	1.9	2.1	2.2	2.3	2.3	1.9	3.4	1.8	1.8
Flouride	1.5	0.5	0.38	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hardness	500	366	275	286	288	309	329	317	309	306	343	323	322	281	328
Iron	0.3	0.2	0.15	0.091	< 0.005	< 0.005	0.016	0.063	0.01	0.007	< 0.005	< 0.005	0.008	< 0.005	0.033
Lead	0.01	0.003	0.002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00003	0.00002	0.00005	< 0.00002	0.0001	0.00002	0.00006
Magnesium	NV	NV	NV	18.5	19.2	19.5	20.2	20.2	19.4	20	20.8	20.1	21.6	21.4	21.1
Manganese	0.05	0.03	0.02	**0.043**	< 0.001	0.001	0.004	0.009	0.003	0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.002
Mercury	0.001	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	NV	NV	NV	0.0009	0.001	0.0007	0.0007	< 0.00004	0.0008	0.0008	0.0005	0.0006	0.0009	0.0007	0.0009
Nickel	NV	NV	NV	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nitrate	10	2.6	2.0	2.6	**3.2**	**3.78**	**3.95**	**3.5**	**3.56**	**3.27**	**3.7**	**3.65**	**3.29**	**3.51**	**3.38**
Nitrite	1	0.3	0.2	0.3	< 0.1	< 0.05	< 0.05	0.08	0.08	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
pH (unit)	6.5 - 8.5	NV	NV	7.93	7.92	8.08	8.08	7.82	7.95	7.9	7.8	7.84	7.85	8.05	7.97
Phenols	NV	NV	NV	0.007	< 0.001	0.002	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.003	< 0.002	< 0.001
Dissolved Phosphorous	NV	NV	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Phosphorous	NV	NV	NV	1.07	0.96	0.51	0.33	0.41	0.38	0.5	0.51	0.22	0.17	0.11	0.1
Potassium	NV	NV	NV	3.7	3.3	3.6	3.7	3.8	3.6	3.7	3.7	3.9	4.1	4.2	4
Selenium	0.01	0.003	0.002	< 0.001	< 0.001	< 0.001	< 0.001	0.0004	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001
Silver	NV	NV	NV	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00003	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	200	101	76	12.9	15.7	11.1	12.4	10.5	12.6	11.4	11.3	12	13.2	12.1	15.6
Strontium	NV	NV	NV	0.259	0.244	0.252	0.27	0.292	0.264	0.254	0.272	0.281	0.271	0.283	0.28
Sulphate	500	252	189	14	14	11	14	14	17	14	15	16	17	16	16
Total Dissolved Solids	500	359	269	333	324	316	334	330	319	325	344	328	316	287	336
Total Kjeldahl Nitrogen	NV	NV	NV	1.6	0.2	0.3	0.4	0.7	0.4	0.4	0.2	0.2	0.1	0.1	0.5
Thallium	NV	NV	NV	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.000004	< 0.00005	< 0.00005	< 0.00005	< 0.005	< 0.00005	< 0.00005	< 0.00005
Vanadium	NV	NV	NV	0.002	0.0026	0.002	0.0029	< 0.00007	0.0016	0.0017	0.0017	0.0017	0.0017	0.0017	0.002
Zinc	5	NV	NV	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.013	< 0.005	< 0.005	< 0.005
Conductivity (μs/cm) [9]	NV	NV	NV	505	520	560	680	552	710	465	665	505	680	650	520
pH (units) [9]	6.5 - 8.5	NV	NV	7.88	8.47	8.03	8.1	7.98	7.57	8.16	7.66	7.85	7.82	7.55	7.61
Temperature (°C) [9]	NV	NV	NV	13.5	7.4	11	9	11	7.6	8.6	9.4	9.5	9.9	14	12.8
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen [9]	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 1 - Ground Water Quality Data - Overburden

Parameters	ODWQS[3]	RUC[4]	Trigger (75% RUC)	MW10-II 23-Oct-22	MW10-II 10-May-23	MW10-II 18-Oct-23
Alkalinity	500	344	258	295	291	288
Aluminum	0.1	0.08	0.060	0.06	0.02	0.06
Ammonia, Total	NV	NV	NV	0.01	3.16	0.18
Antimony	0.006	0.002	0.002	< 0.0001	< 0.0001	0.0001
Arsenic	0.01	0.003	0.002	0.0001	0.0002	0.0001
Barium	1	0.3	0.23	0.154	0.111	0.129
Beryllium	NV	NV	NV	< 0.002	< 0.002	<0.0001
Boron	5	1	0.8	0.144	0.136	0.126
Cadmium	0.005	0.001	0.001	< 0.000010	< 0.000010	<0.000015
Calcium	NV	NV	NV	95.2	71.7	83.2
Chloride	250	131	98	14.9	12	12.7
Chromium	0.05	0.01	0.01	< 0.001	< 0.001	<0.001
Chromium (VI)	NV	NV	NV	-	< 0.001	<0.01
Cobalt	NV	NV	NV	< 0.005	< 0.005	0.0002
Chemical Oxygen Demand	NV	NV	NV	< 5	9	12
Conductivity (uS/cm)	NV	NV	NV	631	622	586
Copper	1	0.5	0.38	0.0009	0.0003	0.0005
Dissolved Organic Carbon	5	4.7	3.5	2.3	1.5	3
Flouride	1.5	0.5	0.38	< 0.1	< 0.1	<0.1
Hardness	500	366	275	325	260	289
Iron	0.3	0.2	0.15	0.015	< 0.005	<0.005
Lead	0.01	0.003	0.002	0.00005	< 0.00002	<0.00002
Magnesium	NV	NV	NV	21.2	19.7	19.7
Manganese	0.05	0.03	0.02	0.001	< 0.001	0.001
Mercury	0.001	0.0003	0.0002	< 0.00002	< 0.00002	<0.00002
Molybdenum	NV	NV	NV	0.0007	0.0011	0.0009
Nickel	NV	NV	NV	< 0.01	< 0.01	0.0004
Nitrate	10	2.6	2.0	**3.95**	**3.21**	**3.4**
Nitrite	1	0.3	0.2	< 0.05	< 0.05	<0.05
pH (unit)	6.5 - 8.5	NV	NV	7.85	7.93	7.55
Phenols	NV	NV	NV	< 0.001	< 0.001	<0.001
Dissolved Phosphorous	NV	NV	NV	< 0.1	< 0.1	<0.1
Total Phosphorous	NV	NV	NV	0.06	0.16	0.1
Potassium	NV	NV	NV	3.9	4.1	3.9
Selenium	0.01	0.003	0.002	0.001	< 0.001	<0.001
Silver	NV	NV	NV	< 0.0001	< 0.0001	<0.0001
Sodium	200	101	76	10.9	12	10.8
Strontium	NV	NV	NV	0.276	0.255	0.252
Sulphate	500	252	189	20	20	20
Total Dissolved Solids	500	359	269	343	314	304
Total Kjeldahl Nitrogen	NV	NV	NV	0.2	8	0.4
Thallium	NV	NV	NV	< 0.00005	< 0.00005	<0.00005
Vanadium	NV	NV	NV	0.0018	0.0017	0.0018
Zinc	5	NV	NV	0.005	< 0.005	<0.005
Conductivity (µs/cm) [9]	NV	NV	NV	490	540	435
pH (units) [9]	6.5 - 8.5	NV	NV	7.67	7.42	7.75
Temperature (°C) [9]	NV	NV	NV	13	13.5	8.7
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	-	-	-
Dissolved Oxygen [9]	NV	NV	NV	-	-	-

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 1 - Ground Water Quality Data - Overburden

Parameters	ODWQS[3]	RUC[4]	Trigger (75% RUC)	MW11	MW11	MW11	MW11	MW11	MW11	MW11	MW11	MW11	MW11	MW11	MW11	MW11	MW11
				29-May-12	04-Oct-12	21-May-13	30-Sep-13	28-Apr-14	22-Sep-14	16-Jun-15	16-Sep-15	22-Mar-16	01-Jun-16	18-Oct-16	20-Apr-17	23-Oct-17	25-Apr-18
Alkalinity	500	344	258	**680**	**680**	**546**	**514**	241	**450**	**454**	**439**	250	**565**	Dry	232	Dry	248
Aluminum	0.1	0.08	0.060	0.017	<0.0050	0.08	0.08	0.03	0.04	0.04	0.05	0.03	0.05		0.03		0.07
Ammonia, Total	NV	NV	NV	<0.01	0.11	0.09	< 0.01	0.11	0.2	0.09	0.1	0.05	0.04		< 0.01		0.06
Antimony	0.006	0.002	0.002	<0.00050	<0.00050	< 0.0001	< 0.0001	0.0001	0.0002	0.0001	< 0.0001	0.0001	< 0.0001		< 0.0001		0.0001
Arsenic	0.01	0.003	0.002	<0.0010	<0.0010	0.0024	0.002	0.0004	0.0011	0.0014	0.0009	0.0008	0.0005		0.0002		0.0004
Barium	1	0.3	0.23	**0.4**	**0.4**	**0.539**	**0.358**	0.171	**0.39**	**0.391**	**0.389**	0.164	0.286		0.151		0.184
Beryllium	NV	NV	NV	<0.00050	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002		< 0.002		< 0.002
Boron	5	1	0.8	0.028	0.031	0.057	0.009	0.023	0.119	0.094	0.108	0.019	0.05		< 0.005		0.054
Cadmium	0.005	0.001	0.001	<0.00010	<0.00010	< 0.00002	< 0.00002	0.00008	< 0.00002	< 0.00002	< 0.00002	0.00003	< 0.00002		0.000026		0.000019
Calcium	NV	NV	NV	270	260	240	246	105	162	163	168	110	207		101		113
Chloride	250	131	98	70	16	105	48.2	13	18.5	17.4	12	11.2	11.1		9.7		5.6
Chromium	0.05	0.01	0.01	<0.0050	<0.0050	0.004	< 0.0002	< 0.0002	< 0.0002	0.0049	0.0004	0.0008	0.0025		0.001		0.001
Chromium (VI)	NV	NV	NV	-	-	-	-	-	-	-	-	-	-		-		-
Cobalt	NV	NV	NV	0.0024	0.016	0.014	0.011	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.009		< 0.005		0.011
Chemical Oxygen Demand	NV	NV	NV	90	75	80	92	27	82	147	302	14	39		26		32
Conductivity (uS/cm)	NV	NV	NV	1500	1300	1320	1160	515	956	919	855	524	1070		486		556
Copper	1	0.5	0.38	0.0018	<0.0010	0.0011	0.0006	0.0008	0.001	0.0006	0.0008	0.0006	0.0002		0.0029		0.011
Dissolved Organic Carbon	5	4.7	3.5	4	5	**12**	**13.3**	**6.2**	**12.3**	**13.9**	**9.6**	3.3	5		**5.2**		**12.4**
Flouride	1.5	0.5	0.38	<0.10	<0.10	0.2	< 0.1	< 0.1	0.2	0.1	0.2	< 0.1	0.1		< 0.1		< 0.1
Hardness	500	366	275	**700**	**700**	**643**	**652**	279	**439**	**443**	**457**	291	**546**		268		305
Iron	0.3	0.2	0.15	**0.47**	<0.10	4	**1.33**	0.181	0.076	**0.313**	0.145	0.036	**0.896**		0.006		0.031
Lead	0.01	0.003	0.002	0.001	<0.00050	0.00003	0.00008	0.00003	0.00003	< 0.00002	0.00004	< 0.00002	< 0.00002		< 0.00002		< 0.00002
Magnesium	NV	NV	NV	10	10	10.3	8.74	3.84	8.52	8.56	8.75	3.83	7.06		3.68		5.56
Manganese	0.05	0.03	0.02	**0.41**	**1.7**	**2.91**	**1.14**	**0.45**	**0.47**	**0.35**	**0.76**	**0.192**	**0.81**		**0.149**		**0.05**
Mercury	0.001	0.0003	0.0002	<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00003	< 0.00002	< 0.00002		0.00003		< 0.00002
Molybdenum	NV	NV	NV	<0.00050	<0.00050	0.0008	0.0003	0.0006	0.0013	0.0015	0.0017	0.0008	0.0001		0.0005		0.0007
Nickel	NV	NV	NV	0.0041	0.0059	0.01	< 0.01	< 0.01	0.01	0.02	0.01	< 0.01	< 0.01		< 0.01		< 0.01
Nitrate	10	2.6	2.0	<0.10	<0.10	0.2	< 0.1	0.1	0.1	0.3	< 0.1	0.1	0.1		0.3		**3.7**
Nitrite	1	0.3	0.2	<0.010	<0.010	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.1		< 0.05
pH (unit)	6.5 - 8.5	NV	NV	7.33	7.32	7.3	7.36	7.73	7.25	7.15	7.28	7.49	7.2		7.64		8
Phenols	NV	NV	NV	<0.0010	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001		< 0.001
Dissolved Phosphorous	NV	NV	NV	<0.10	<0.10	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.1		< 0.1
Total Phosphorous	NV	NV	NV	-	-	-	-	0.14	0.87	0.31	0.47	0.04	0.11		0.08		0.17
Potassium	NV	NV	NV	1.6	1.5	10.2	2.7	4.9	20.8	16.9	16.1	2.6	1.1		2.8		5.8
Selenium	0.01	0.003	0.002	<0.0020	<0.0020	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001		< 0.001
Silver	NV	NV	NV	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002		< 0.00002		< 0.00002
Sodium	200	101	76	21	14	24	21	8	17	17	16	8.9	14		6		6.5
Strontium	NV	NV	NV	0.46	0.45	0.568	-	-	0.6	0.621	0.559	0.225	0.362		0.204		0.257
Sulphate	500	252	189	25	14	20	19	7	12	13	10	8	12		11		8
Total Dissolved Solids	500	359	269	**820**	**745**	**746**	**656**	288	**509**	**511**	**496**	296	**593**		275		294
Total Kjeldahl Nitrogen	NV	NV	NV	3.6	3.6	2.33	2.94	1.5	0.9	3.4	3.7	0.4	0.9		0.8		1.5
Thallium	NV	NV	NV	<0.000050	<0.000050	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.0001	< 0.00005		0.0001		< 0.00005
Vanadium	NV	NV	NV	0.0012	<0.00050	< 0.005	0.013	0.0034	0.0087	0.0053	0.0009	0.0024	0.0015		0.0018		0.0021
Zinc	5	NV	NV	0.017	0.015	< 0.005	< 0.005	0.016	0.007	< 0.005	< 0.005	< 0.005	< 0.005		< 0.005		< 0.005
Conductivity (µs/cm) [9]	NV	NV	NV	1318	1150	873	1199	-	-	750	762	-	879		420		650
pH (units) [9]	6.5 - 8.5	NV	NV	6.7	7.2	6.83	6.71	-	-	7.15	6.86	-	6.62		7.4		7.31
Temperature (°C) [9]	NV	NV	NV	16.1	15.4	12	10.5	-	-	18.61	16.38	-	10.91		6.4		7.8
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	32	-75	41	185	-	-	-	-	-	-		-		-
Dissolved Oxygen [9]	NV	NV	NV	6.3	7.8	8.22	2.5	-	-	-	-	-	-		-		-

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 1 - Ground Water Quality Data - Overburden

Parameters	ODWQS^3	RUC^4	Trigger (75% RUC)	MW11	MW11	MW11	MW11	MW11	MW11	MW11	MW11	MW11	MW11	MW11	MW12	MW12	MW12
				27-Sep-18	**16-Apr-19**	**24-Oct-19**	**20-Apr-20**	**08-Oct-20**	**14-Apr-21**	**20-Oct-21**	**13-Apr-22**	**23-Oct-22**	**25-May-23**	**18-Oct-23**	**29-May-12**	**04-Oct-12**	**21-May-13**
Alkalinity	500	344	258	Dry	211	Dry	245	Dry	**374**	Dry	335	Dry	**381**	Dry	230	**370**	199
Aluminum	0.1	0.08	0.060		0.05		0.06		**0.1**		0.04		0.05		<0.0050	<0.0050	0.04
Ammonia, Total	NV	NV	NV		0.04		0.01		0.11		0.75		< 0.01		<0.01	0.2	< 0.01
Antimony	0.006	0.002	0.002		0.0001		0.0002		0.0002		< 0.0001		0.0001		<0.00050	<0.00050	< 0.0001
Arsenic	0.01	0.003	0.002		0.0002		0.0002		0.0003		0.0003		0.0002		<0.0010	<0.0010	0.0003
Barium	1	0.3	0.23		0.113		0.134		0.228		0.168		0.228		0	0.043	0.021
Beryllium	NV	NV	NV		< 0.002		< 0.002		< 0.002		< 0.002		< 0.002		<0.00050	<0.00050	< 0.002
Boron	5	1	0.8		0.037		0.027		0.046		0.036		0.044		<0.010	0.12	0.01
Cadmium	0.005	0.001	0.001		< 0.000015		< 0.000015		0.000018		0.000023		< 0.000010		<0.00010	<0.00010	< 0.00002
Calcium	NV	NV	NV		87.8		107		172		141		151		83	170	87.3
Chloride	250	131	98		5.5		9.2		9.5		9.3		29.2		2	26	1.4
Chromium	0.05	0.01	0.01		< 0.001		< 0.001		< 0.001		< 0.001		< 0.001		<0.0050	<0.0050	< 0.002
Chromium (VI)	NV	NV	NV		-		-		-		-		< 0.001		-	-	-
Cobalt	NV	NV	NV		0.009		< 0.005		< 0.005		< 0.005		0.006		<0.00050	<0.00050	< 0.005
Chemical Oxygen Demand	NV	NV	NV		35		25		73		47		15		22	15	10
Conductivity (uS/cm)	NV	NV	NV		466		531		820		701		806		440	790	397
Copper	1	0.5	0.38		0.0063		0.0068		0.0125		0.0047		0.0071		0.0012	0.0049	0.0022
Dissolved Organic Carbon	5	4.7	3.5		**7.3**		**5.5**		**10.4**		**8**		**7.5**		3	***3.7***	**5.4**
Flouride	1.5	0.5	0.38		< 0.1		< 0.1		< 0.1		< 0.1		< 0.1		<0.10	<0.10	0.2
Hardness	500	366	275		237		284		**459**		**374**		**407**		220	**440**	227
Iron	0.3	0.2	0.15		0.01		0.031		**0.476**		< 0.005		0.104		<0.10	<0.10	0.044
Lead	0.01	0.003	0.002		0.00003		0.00005		0.00008		0.00009		< 0.00002		<0.00050	<0.00050	< 0.00002
Magnesium	NV	NV	NV		4.17		3.96		7.01		5.64		6.98		2	5.8	2.23
Manganese	0.05	0.03	0.02		**0.145**		0.028		**0.289**		< 0.001		**0.422**		0.01	0.02	0.01
Mercury	0.001	0.0003	0.0002		< 0.00002		< 0.00002		< 0.00002		< 0.00002		< 0.00002		<0.00001	<0.00001	< 0.00002
Molybdenum	NV	NV	NV		0.0005		0.0005		0.0005		0.0007		0.0005		<0.00050	<0.00050	< 0.0001
Nickel	NV	NV	NV		< 0.01		< 0.01		< 0.01		< 0.01		< 0.01		<0.0010	0.0044	< 0.01
Nitrate	10	2.6	2.0		0.58		0.4		0.96		0.22		0.1		<0.10	0.19	0.1
Nitrite	1	0.3	0.2		< 0.05		< 0.05		< 0.05		< 0.05		< 0.05		<0.010	<0.010	< 0.1
pH (unit)	6.5 - 8.5	NV	NV		7.81		7.85		7.47		7.57		7.62		7.76	7.33	7.79
Phenols	NV	NV	NV		< 0.002		< 0.002		< 0.002		< 0.001		< 0.001		<0.0010	<0.0010	< 0.001
Dissolved Phosphorous	NV	NV	NV		< 0.1		< 0.1		< 0.1		< 0.1		< 0.1		<0.10	<0.10	-
Total Phosphorous	NV	NV	NV		0.17		0.17		0.48		0.27		0.06		-	-	-
Potassium	NV	NV	NV		4.2		2.3		3.1		2.1		3.3		0.58	1.4	0.6
Selenium	0.01	0.003	0.002		< 0.001		< 0.001		< 0.001		< 0.001		< 0.001		<0.0020	<0.0020	< 0.001
Silver	NV	NV	NV		< 0.0001		< 0.0001		< 0.0001		< 0.0001		< 0.0001		<0.00010	<0.00010	0.00003
Sodium	200	101	76		5		4.8		6.7		5.6		6.9		1	11	1
Strontium	NV	NV	NV		0.193		0.197		0.33		0.251		0.314		0.15	0.31	0.154
Sulphate	500	252	189		7		10		16		9		8		4	21	4
Total Dissolved Solids	500	359	269		240		285		**440**		**377**		**435**		232	**464**	217
Total Kjeldahl Nitrogen	NV	NV	NV		1.1		0.7		2.5		1.7		0.6		1	0.59	0.24
Thallium	NV	NV	NV		< 0.00005		< 0.00005		< 0.00005		0.00005		< 0.00005		<0.000050	<0.000050	< 0.00005
Vanadium	NV	NV	NV		0.0003		0.0002		0.0003		0.0003		0.0002		<0.00050	<0.00050	< 0.005
Zinc	5	NV	NV		< 0.005		< 0.005		< 0.005		< 0.005		< 0.005		<0.0050	0.019	0.006
Conductivity (µs/cm) ^{9}	NV	NV	NV		510		560		730		720		450		447	500	499
pH (units) ^{9}	6.5 - 8.5	NV	NV		7		7.46		7.8		7.13		7.11		7.68	7.56	8.06
Temperature (°C) ^{9}	NV	NV	NV		7.7		6.9		9.3		7.7		12		7.6	9.1	8.5
Oxidation Reduction Potential (mV)^9	NV	NV	NV		-		-		-		-		-		181	50	77
Dissolved Oxygen ^{9}	NV	NV	NV		-		-		-		-		-		5.31	3.21	4.27

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 1 - Ground Water Quality Data - Overburden

Parameters	ODWQS[3]	RUC[4]	Trigger (75% RUC)	MW12 30-Sep-13	MW12 28-Apr-14	MW12 22-Sep-14	MW12 16-Jun-15	MW12 25-Aug-15	MW12 15-Sep-15	MW12 01-Jun-16	MW12 22-Aug-16	MW12 18-Oct-16	MW12 20-Apr-17	MW12 23-Oct-17	MW12 25-Apr-18	MW12 27-Sep-18	MW12 16-Apr-19
Alkalinity	500	344	258	***281***	166	**389**	225	***315***	***316***	207	**363**	**363**	flooded, not accessible	**346**	flooded, not accessible	Dry	175
Aluminum	0.1	0.08	0.060	0.04	0.02	0.04	0.02	0.04	0.04	0.02	0.05	0.06		0.06			0.05
Ammonia, Total	NV	NV	NV	< 0.01	0.04	0.2	< 0.01	0.03	< 0.01	< 0.01	0.1	0.07		0.04			0.02
Antimony	0.006	0.002	0.002	< 0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	0.0001		< 0.0001			< 0.0001
Arsenic	0.01	0.003	0.002	0.0002	0.0001	0.0005	0.0001	0.0002	0.0002	< 0.0001	0.0002	0.0004		0.0003			< 0.0001
Barium	1	0.3	0.23	0.032	0.018	0.052	0.02	0.028	0	0.017	0.048	0.027		0.042			0.018
Beryllium	NV	NV	NV	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.002	< 0.002		< 0.002			< 0.002
Boron	5	1	0.8	0.015	< 0.005	0.144	0.013	0.043	0.054	0.019	0.114	0.11		0.112			< 0.005
Cadmium	0.005	0.001	0.001	< 0.00002	0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002	< 0.00002		0.000014			< 0.000015
Calcium	NV	NV	NV	121	69.3	164	93.6	112	133	82	169	139		138			72.9
Chloride	250	131	98	6.3	1.3	19.8	2.5	6.6	15.1	1.6	16.2	17.5		16.4			1.2
Chromium	0.05	0.01	0.01	< 0.0002	< 0.0002	< 0.0002	0.0033	< 0.0002	0.0004	0.0009	0.001	0.0071		< 0.001			< 0.001
Chromium (VI)	NV	NV	NV	-	-	-	-	-	-	-	-	-		-			-
Cobalt	NV	NV	NV	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	< 0.005		< 0.005			0.007
Chemical Oxygen Demand	NV	NV	NV	12	6	10	27	20	< 5	19	9	9		25			5
Conductivity (uS/cm)	NV	NV	NV	562	328	830	442	619	648	409	762	765		726			361
Copper	1	0.5	0.38	0.0026	0.0011	0.0016	0.0021	0.0018	0.0033	0.0011	0.0026	0.0012		0.0025			0.001
Dissolved Organic Carbon	5	4.7	3.5	**6.7**	**22.1**	**8.7**	***3.7***	***3.9***	3	3.3	***3.8***	***4.4***		***4.7***			2.8
Flouride	1.5	0.5	0.38	0.3	0.1	0.27	0.1	0.1	0.1	0.1	0.1	0.1		< 0.1			< 0.1
Hardness	500	366	275	***316***	180	**441**	244	***301***	***350***	214	**402**	**375**		***363***			189
Iron	0.3	0.2	0.15	0.036	< 0.005	**0.643**	< 0.005	< 0.005	< 0.005	< 0.005	0.012	0.034		0.014			< 0.005
Lead	0.01	0.003	0.002	< 0.00002	0.00004	< 0.00002	< 0.00002	0.00005	0	< 0.00002	<0.00002	< 0.00002		0.00006			0.00003
Magnesium	NV	NV	NV	3.35	1.57	7.34	2.51	5	4	2.19	7.63	6.6		4.48			1.64
Manganese	0.05	0.03	0.02	0.01		**0.2**	< 0.001	***0.03***	< 0.001	< 0.001	0.015	0.005		**0.039**			< 0.001
Mercury	0.001	0.0003	0.0002	0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00006	< 0.00002		< 0.00002			< 0.00002
Molybdenum	NV	NV	NV	< 0.0001	< 0.0001	0.0002	0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	0.0003		< 0.0001			< 0.0001
Nickel	NV	NV	NV	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.01	< 0.01		< 0.01			< 0.01
Nitrate	10	2.6	2.0	0.3	0.2	< 0.1	0.2	0.1	0.4	0.1	0.5	0.2		< 0.05			0.08
Nitrite	1	0.3	0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	< 0.1		< 0.05			< 0.05
pH (unit)	6.5 - 8.5	NV	NV	7.89	8.03	7.46	7.7	7.45	7.51	7.83	7.47	7.81		7.73			7.95
Phenols	NV	NV	NV	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	< 0.001		0.002			< 0.002
Dissolved Phosphorous	NV	NV	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	< 0.1		< 0.1			< 0.1
Total Phosphorous	NV	NV	NV	-	0.08	0.04	0.28	0.02	0.1	0.11	0.02	0.11		0.03			0.02
Potassium	NV	NV	NV	0.8	0.4	1.6	0.5	1.1	0.8	0.4	1.4	1		0.9			0.3
Selenium	0.01	0.003	0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	< 0.001		< 0.001			< 0.001
Silver	NV	NV	NV	0.00004	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002	0.00005		< 0.00002			< 0.0001
Sodium	200	101	76	4	1	13	2	7	7	1.2	13.3	10.8		11			0.6
Strontium	NV	NV	NV	-	-	0.358	0.177	0.211	0.252	0.153	0.344	0.369		0.264			0.111
Sulphate	500	252	189	6	3	17	4	8	9	5	18	18		7			3
Total Dissolved Solids	500	359	269	***312***	177	**458**	241	***329***	**360**	217	**446**	**412**		**386**			184
Total Kjeldahl Nitrogen	NV	NV	NV	0.39	0.5	0.7	1.2	0.3	0.4	0.4	0.3	1.2		0.4			0.2
Thallium	NV	NV	NV	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	<0.00005	< 0.00005		< 0.00005			< 0.00005
Vanadium	NV	NV	NV	0.0048	0.0012	0.0066	0.0024	0.0037	0.0002	0.0003	0.0021	0.0029		0.001			< 0.0001
Zinc	5	NV	NV	0.006	< 0.005	< 0.005	< 0.005	0.018	0.006	< 0.005	0.019	< 0.005		0.006			< 0.005
Conductivity (µs/cm) [9]	NV	NV	NV	572	-	-	351	423.9	529	360	528	675		620			380
pH (units) [9]	6.5 - 8.5	NV	NV	7.14	-	-	7.69	7.44	6.96	6.99	7.11	8.33		7.34			7.95
Temperature (°C) [9]	NV	NV	NV	9.1	-	-	11.65	9.3	11.33	8.01	7.8	13		13.5			5.3
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	17	-	-	-	-	-	-	-	-		-			-
Dissolved Oxygen [9]	NV	NV	NV	1.15	-	-	-	-	-	-	-	-		-			-

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 1 - Ground Water Quality Data - Overburden

Parameters	ODWQS[3]	RUC[4]	Trigger (75% RUC)	MW12 24-Oct-19	MW12 20-Apr-20	MW12 08-Oct-20	MW12 14-Apr-21	MW12 20-Oct-21	MW12 13-Apr-22	MW12 23-Oct-22	MW12 10-May-23	MW12 18-Oct-23	MW13 29-May-12	MW13 04-Oct-12	MW13 21-May-13	MW13 30-Sep-13	MW13 28-Apr-14
Alkalinity	500	344	258	**370**	156	***325***	162	***268***	182	**370**	183	**Dry**	210	240	191	204	155
Aluminum	0.1	0.08	0.060	***0.08***	0.05	***0.08***	0.05	0.06	0.04	***0.08***	0.02		<0.0050	<0.0050	0.04	0.05	0.02
Ammonia, Total	NV	NV	NV	0.14	< 0.01	< 0.01	0.24	0.05	0.84	0.12	3.64		<0.01	0.08	< 0.01	< 0.01	0.06
Antimony	0.006	0.002	0.002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001		<0.00050	<0.00050	< 0.0001	< 0.0001	< 0.0001
Arsenic	0.01	0.003	0.002	0.0002	< 0.0001	< 0.0001	0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001		<0.0010	<0.0010	0.0003	0.0003	0.0002
Barium	1	0.3	0.23	0.045	0.018	0.037	0.019	0.027	0.023	0.049	0.016		0.038	0.054	0.04	0.04	0.021
Beryllium	NV	NV	NV	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002		<0.00050	<0.00050	< 0.002	< 0.002	< 0.002
Boron	5	1	0.8	0.158	< 0.005	0.115	< 0.005	0.025	< 0.005	0.134	0.005		<0.010	0.012	0.009	< 0.005	< 0.005
Cadmium	0.005	0.001	0.001	0.000016	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000010	< 0.000010		<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002
Calcium	NV	NV	NV	152	71.1	140	75.7	108	76.5	152	61.9		82	99	86.6	90.9	65.9
Chloride	250	131	98	22.6	1.3	18	1.6	4.9	1.6	28.5	1.4		13	26	11.2	13.2	4.3
Chromium	0.05	0.01	0.01	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001		<0.0050	<0.0050	< 0.002	**0.159**	< 0.0002
Chromium (VI)	NV	NV	NV	-	-	-	-	-	-	-	< 0.001		-	-	-	-	-
Cobalt	NV	NV	NV	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005		<0.00050	<0.00050	< 0.005	< 0.005	< 0.005
Chemical Oxygen Demand	NV	NV	NV	10	14	7	8	6	< 5	5	29		24	19	57	19	18
Conductivity (uS/cm)	NV	NV	NV	809	326	704	350	489	358	781	351		430	540	417	450	320
Copper	1	0.5	0.38	0.0021	0.0063	0.002	0.003	0.002	0.0031	0.0032	0.0012		<0.0010	<0.0010	0.0032	0.0003	0.0007
Dissolved Organic Carbon	5	4.7	3.5	**5.5**	***3.8***	**4.9**	**4.8**	**5.8**	3.5	**4.8**	***4.3***		2.9	3.3	4.8	**6**	**5.7**
Flouride	1.5	0.5	0.38	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		<0.10	<0.10	0.2	< 0.1	0.1
Hardness	500	366	275	**406**	184	**369**	197	***282***	198	**407**	161		210	260	226	238	172
Iron	0.3	0.2	0.15	***0.161***	0.005	< 0.005	< 0.005	0.053	0.017	0.006	0.035		<0.10	<0.10	0.008	< 0.005	< 0.005
Lead	0.01	0.003	0.002	0.00044	0.00005	0.00002	0.00006	0.00008	< 0.00002	0.00004	0.00007		<0.00050	<0.00050	0.00016	< 0.00002	< 0.00002
Magnesium	NV	NV	NV	6.34	1.63	4.67	1.82	2.95	1.76	6.45	1.62		2.4	3	2.36	2.5	2
Manganese	0.05	0.03	0.02	**0.072**	< 0.001	0.002	< 0.001	0.015	0.001	**0.048**	0.001		<0.0020	<0.0020	0	0.01	< 0.001
Mercury	0.001	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002		<0.00001	<0.00001	< 0.00002	0.00005	< 0.00002
Molybdenum	NV	NV	NV	< 0.0001	0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001		<0.00050	<0.00050	< 0.0001	< 0.0001	< 0.0001
Nickel	NV	NV	NV	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.0010	<0.0010	< 0.01	< 0.01	< 0.01
Nitrate	10	2.6	2.0	0.16	0.05	0.21	< 0.05	< 0.05	0.07	0.3	< 0.05		0.21	0.25	0.2	0.3	0.1
Nitrite	1	0.3	0.2	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		<0.010	<0.010	< 0.1	< 0.1	< 0.1
pH (unit)	6.5 - 8.5	NV	NV	7.63	7.95	7.56	7.81	8.33	7.63	7.48	7.71		7.81	7.49	7.84	7.93	8.04
Phenols	NV	NV	NV	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001		<0.0010	<0.0010	< 0.001	< 0.001	< 0.001
Dissolved Phosphorous	NV	NV	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		<0.10	<0.10	-	< 0.1	< 0.1
Total Phosphorous	NV	NV	NV	0.02	0.07	0.02	0.03	0.04	< 0.01	< 0.01	0.04		-	-	-	-	< 0.01
Potassium	NV	NV	NV	1.3	0.3	0.8	0.3	0.5	0.2	1.2	0.3		0.63	0.59	0.6	0.6	0.6
Selenium	0.01	0.003	0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001		<0.0020	<0.0020	< 0.001	< 0.001	< 0.001
Silver	NV	NV	NV	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001		<0.00010	<0.00010	< 0.00002	0.00003	< 0.00002
Sodium	200	101	76	13.6	0.6	9.5	0.8	2.2	0.7	9.7	0.6		3	5	3	3	2
Strontium	NV	NV	NV	0.308	0.102	0.264	0.121	0.202	0.118	0.311	0.112		0.16	0.19	0.156	-	-
Sulphate	500	252	189	15	3	14	4	5	3	18	3		3	9	4	4	3
Total Dissolved Solids	500	359	269	**433**	172	**382**	181	***284***	194	**438**	178		234	291	224	238	171
Total Kjeldahl Nitrogen	NV	NV	NV	0.4	0.2	0.3	0.2	0.3	12	1.4	3.8		0.71	0.64	0.34	0.54	0.3
Thallium	NV	NV	NV	< 0.00005	< 0.00005	< 0.005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005		<0.000050	<0.000050	< 0.00005	< 0.00005	< 0.00005
Vanadium	NV	NV	NV	0.0004	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001		<0.00050	<0.00050	< 0.005	0.0003	0.0012
Zinc	5	NV	NV	0.008	< 0.005	0.008	< 0.005	< 0.005	< 0.005	0.006	< 0.005		0.0096	<0.0050	0.011	< 0.005	0.005
Conductivity (μs/cm) [9]	NV	NV	NV	625	370	595	440	480	315	590	310		423	470	619	444	-
pH (units) [9]	6.5 - 8.5	NV	NV	7.2	7.78	7.22	8.13	7.6	8.26	7.42	7.84		8.03	7.9	7.27	7.19	-
Temperature (°C) [9]	NV	NV	NV	9.4	6.1	7.8	7.6	12.6	6.2	10.5	7.9		8.3	14.3	10	10.1	-
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	-	-	-	-	-	-	-	-		138	39	76	14	-
Dissolved Oxygen [9]	NV	NV	NV	-	-	-	-	-	-	-	-		7	3.3	4.65	2.61	-

Notes:

1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 1 - Ground Water Quality Data - Overburden

Parameters	ODWQS[3]	RUC[4]	Trigger (75% RUC)	MW13	MW13	MW13	MW13	MW13	MW13	MW13	MW13	MW13	MW13	MW13	MW13	MW13	MW13
				22-Sep-14	16-Jun-15	16-Sep-15	01-Jun-16	18-Oct-16	20-Apr-17	23-Oct-17	25-Apr-18	27-Sep-18	16-Apr-19	24-Oct-19	20-Apr-20	08-Oct-20	14-Apr-21
Alkalinity	500	344	258	210	184	213	189	229	166	211	158	237	139	216	165	201	168
Aluminum	0.1	0.08	0.060	0.02	0.02	0.02	0.02	0.05	0.06	0.06	0.06	0.06	0.04	0.06	0.05	0.06	0.05
Ammonia, Total	NV	NV	NV	0.2	< 0.01	0.04	0.02	0.03	< 0.01	0.02	0.03	0.02	0.04	0.03	0.01	0.01	0.07
Antimony	0.006	0.002	0.002	0.0002	< 0.0001	< 0.0001	< 0.0001	0.0003	< 0.0001	< 0.0001	< 0.0001	0.00005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Arsenic	0.01	0.003	0.002	0.0003	0.0002	0.0003	0.0001	0.0002	0.0002	0.0003	< 0.0001	0.00012	0.0001	0.0001	< 0.0001	0.0001	0.0001
Barium	1	0.3	0.23	0	0	0	0.027	0.043	0.036	0.039	0.025	0.041	0.017	0.044	0.024	0.041	0.03
Beryllium	NV	NV	NV	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	5	1	0.8	0.012	0.006	0.005	0.015	0.011	< 0.005	0.014	0.011	0.012	0.006	0.013	0.01	0.011	0.01
Cadmium	0.005	0.001	0.001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.000016	< 0.000014	< 0.000015	0.00001	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015
Calcium	NV	NV	NV	90	78	95	74.4	103	71.7	88.1	71.6	97.8	58.8	95.2	71.9	94.5	79
Chloride	250	131	98	5	4.8	8.2	6.6	24.2	4.1	7.1	4.4	25	3.2	14.1	4.3	20.5	6.8
Chromium	0.05	0.01	0.01	0.0003	0.002	0.0003	0.0009	0.0015	< 0.001	< 0.001	< 0.001	0.00017	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (VI)	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	NV	NV	NV	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.006	0.000027	0.005	< 0.005	< 0.005	< 0.005	< 0.005
Chemical Oxygen Demand	NV	NV	NV	12	15	32	30	5	16	30	11	< 5	19	6	39	13	12
Conductivity (uS/cm)	NV	NV	NV	438	378	442	394	529	340	433	338	541	298	489	346	469	381
Copper	1	0.5	0.38	0.0003	< 0.0001	0.0005	< 0.0001	< 0.0001	0.0002	0.0006	0.0003	0.00146	0.0015	0.0005	0.0017	0.0003	0.0019
Dissolved Organic Carbon	5	4.7	3.5	**6**	5	4	3.4	3.4	4.3	**5.2**	3.7	3.8	4.8	4.2	4.2	**5.2**	**5.4**
Flouride	1.5	0.5	0.38	0.05	< 0.1	0.2	0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hardness	500	366	275	236	204	250	195	270	188	230	187	257	154	249	188	247	207
Iron	0.3	0.2	0.15	< 0.005	< 0.005	0.007	< 0.005	0.011	0.153	0.059	0.017	0.005	0.007	0.01	0.006	< 0.005	0.011
Lead	0.01	0.003	0.002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00012	0.00011	< 0.00002	0.00006	0.00007	0.00009	0.00005	< 0.00002	0.00006
Magnesium	NV	NV	NV	3	2	3	2.16	2.97	2.04	2.47	2.06	3.13	1.66	2.73	1.98	2.64	2.22
Manganese	0.05	0.03	0.02	0.01	< 0.001	0	< 0.001	0.017	**0.074**	0.034	0.006	0.019	0.002	0.013	0.001	< 0.001	0.002
Mercury	0.001	0.0003	0.0002	< 0.00002	< 0.00002	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	NV	NV	NV	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.00004	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel	NV	NV	NV	< 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
Nitrate	10	2.6	2.0	0.2	0.3	0.3	0.2	0.1	< 0.1	0.09	0.09	0.1	< 0.05	0.26	0.09	0.2	0.09
Nitrite	1	0.3	0.2	< 0.1	< 0.1	0	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
pH (unit)	6.5 - 8.5	NV	NV	7.86	7.83	7.88	7.96	7.94	7.88	7.98	8.15	7.75	8	7.78	7.96	7.82	7.82
Phenols	NV	NV	NV	< 0.001	< 0.001	< 0.001	< 0.001	0.005	< 0.001	0.004	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Dissolved Phosphorous	NV	NV	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Phosphorous	NV	NV	NV	0.11	0.12	0.25	0.6	0.14	0.19	0.24	0.16	0.08	0.09	0.1	0.31	0.11	0.13
Potassium	NV	NV	NV	0.4	0.4	0.4	0.3	0.5	0.3	0.4	0.3	0.5	0.3	0.5	0.4	0.4	0.4
Selenium	0.01	0.003	0.002	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	0.0003	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Silver	NV	NV	NV	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	200	101	76	2	2	3	2.1	4.8	1.5	2.3	2	5.2	1.9	3.5	1.5	4.5	1.9
Strontium	NV	NV	NV	0.176	0.152	0.182	0.142	0.205	0.127	0.159	0.12	0.207	0.1	0.175	0.118	0.177	0.137
Sulphate	500	252	189	3	2	3	3	7	5	3	1	6	2	6	3	7	4
Total Dissolved Solids	500	359	269	229	201	243	203	280	185	230	176	280	152	252	182	250	195
Total Kjeldahl Nitrogen	NV	NV	NV	0.5	0.4	0.8	0.6	0.5	0.7	0.7	0.4	0.4	0.5	0.4	0.9	0.4	0.3
Thallium	NV	NV	NV	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.000004	< 0.00005	< 0.00005	< 0.00005	< 0.005	< 0.00005
Vanadium	NV	NV	NV	0.0029	0.0015	0.0002	0.0002	0.0006	0.001	0.0006	0.0011	< 0.00007	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Zinc	5	NV	NV	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Conductivity (µs/cm) [9]	NV	NV	NV	-	293	376	346	470	285	405	420	470	340	390	360	460	460
pH (units) [9]	6.5 - 8.5	NV	NV	-	7.82	7.26	7.01	7.6	8.45	7.82	7.77	7.64	8.13	7.68	7.88	7.83	8.18
Temperature (°C) [9]	NV	NV	NV	-	11.16	10.4	8.21	9.4	6.8	12.2	5	9	4	8.2	5.5	7.7	6.4
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen [9]	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 1 - Ground Water Quality Data - Overburden

								DUP		DUP							
Parameters	**ODWQS[3]**	**RUC[4]**	**Trigger**	**MW13**	**MW13**	**MW13**	**MW13**	**MW13**	**MW13**	**MW13**	**MW16-III**	**MW16-III**	**MW16-III**	**MW16-III**	**MW16-III**	**MW16-III**	**MW16-III**
			(75% RUC)	**20-Oct-21**	**13-Apr-22**	**23-Oct-22**	**10-May-23**	**10-May-23**	**18-Oct-23**	**18-Oct-23**	**18-Oct-16**	**20-Apr-17**	**23-Oct-17**	**25-Apr-18**	**27-Sep-18**	**16-Apr-19**	**24-Oct-19**
Alkalinity	500	344	258	225	172	221	183	180	241	239	212	225	215	220	221	208	207
Aluminum	0.1	0.08	0.060	0.06	0.04	0.08	0.02	0.02	0.07	0.06	**0.11**	0.03	0.05	0.05	0.06	0.05	0.05
Ammonia, Total	NV	NV	NV	0.04	0.58	0.03	1.68	0.74	0.37	0.78	0.08	< 0.01	0.03	0.09	0.02	0.03	0.04
Antimony	0.006	0.002	0.002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	<0.0001	0.0004	< 0.0001	< 0.0001	< 0.0001	0.00005	< 0.0001	0.0001
Arsenic	0.01	0.003	0.002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	< 0.0001	0.00013	0.0001	0.0001
Barium	1	0.3	0.23	0.05	0.027	0.09	0.027	0.027	0.094	0.096	0.097	0.112	0.088	0.088	0.087	0.077	0.084
Beryllium	NV	NV	NV	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	<0.0001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	5	1	0.8	0.012	0.006	0.016	0.009	0.01	0.013	0.013	0.006	< 0.005	0.007	0.006	0.005	0.007	0.008
Cadmium	0.005	0.001	0.001	< 0.000015	< 0.000015	< 0.000010	< 0.000010	< 0.000010	<0.000015	<0.000015	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000006	< 0.000015	< 0.000015
Calcium	NV	NV	NV	105	73.9	122	65.5	64.5	120	121	80.2	85.1	75.4	77.6	70.4	74	72.6
Chloride	250	131	98	20.9	7.7	119	15.6	17.6	133	103	11.1	16	10.5	11.3	11.1	9.2	11.5
Chromium	0.05	0.01	0.01	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	0.0028	0.002	< 0.001	0.003	0.00239	0.002	0.003
Chromium (VI)	NV	NV	NV	-	-	-	< 0.001	< 0.001	<0.01	<0.01	-	-	-	-	-	-	-
Cobalt	NV	NV	NV	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.0003	0.0003	< 0.005	< 0.005	< 0.005	< 0.005	0.000077	0.005	< 0.005
Chemical Oxygen Demand	NV	NV	NV	8	11	16	14	15	22	25	< 5	128	87	63	42	34	360
Conductivity (uS/cm)	NV	NV	NV	466	365	729	395	400	812	721	459	493	466	475	460	466	465
Copper	1	0.5	0.38	0.0003	0.0003	0.0004	0.0002	0.0004	0.0006	0.0002	< 0.0001	0.0012	0.0003	0.0007	0.00078	0.0011	0.0015
Dissolved Organic Carbon	5	4.7	3.5	**6.3**	4.2	2	2.9	4.4	3.9	3.8	1	1.8	0.3	1.2	1.6	1.9	1.9
Flouride	1.5	0.5	0.38	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	<0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hardness	500	366	275	274	194	319	172	169	314	317	250	261	242	250	230	239	232
Iron	0.3	0.2	0.15	0.027	0.005	0.006	0.008	< 0.005	<0.005	<0.005	0.083	< 0.005	< 0.005	< 0.005	0.037	< 0.005	0.009
Lead	0.01	0.003	0.002	0.00005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002	<0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00002	< 0.00002	0.00005
Magnesium	NV	NV	NV	2.89	2.13	3.52	1.98	1.93	3.48	3.49	12.2	11.7	13	13.7	13.2	13.2	12.3
Manganese	0.05	0.03	0.02	0.007	0.001	0.002	0.002	< 0.001	0.001	0.001	**0.046**	0.009	0.005	< 0.001	0.002	< 0.001	< 0.001
Mercury	0.001	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002	<0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	NV	NV	NV	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	0.0012	0.0004	0.0004	0.0003	< 0.00004	0.0003	0.0004
Nickel	NV	NV	NV	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.0003	0.0003	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nitrate	10	2.6	2.0	0.09	0.08	0.46	0.07	0.07	0.49	0.45	0.4	0.4	0.32	0.37	0.39	0.34	0.36
Nitrite	1	0.3	0.2	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.05	<0.05	0.2	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
pH (unit)	6.5 - 8.5	NV	NV	8.33	7.58	7.63	7.73	7.77	7.61	7.62	8.06	7.95	8.14	8.21	7.92	8.09	8.03
Phenols	NV	NV	NV	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	< 0.001	< 0.002	0.003	< 0.001	0.004	< 0.002	< 0.002
Dissolved Phosphorous	NV	NV	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Phosphorous	NV	NV	NV	0.13	0.08	0.08	0.11	0.11	0.11	0.08	11.5	7.89	13.5	13.2	4.2	5.78	30.2
Potassium	NV	NV	NV	0.4	0.3	0.5	0.4	0.4	0.5	0.5	2.4	1.5	2.1	2.2	2.3	2.1	2
Selenium	0.01	0.003	0.002	< 0.001	< 0.001	0.002	< 0.001	< 0.001	0.002	0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.0002	< 0.001	< 0.001
Silver	NV	NV	NV	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.0001	< 0.0001
Sodium	200	101	76	3.6	1.9	8.8	2	1.9	10	10.2	5	5	4	4.3	4.4	4.2	4
Strontium	NV	NV	NV	0.199	0.132	0.246	0.141	0.14	0.266	0.267	0.192	0.187	0.177	0.182	0.19	0.181	0.168
Sulphate	500	252	189	4	2	9	2	2	10	8	11	10	9	10	11	10	10
Total Dissolved Solids	500	359	269	272	192	396	198	197	427	375	252	266	243	252	245	238	237
Total Kjeldahl Nitrogen	NV	NV	NV	0.4	0.8	0.4	1.8	1.1	0.5	0.5	1	0.9	1.7	0.5	0.4	0.4	1.2
Thallium	NV	NV	NV	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	<0.00005	<0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.000004	< 0.00005	< 0.00005
Vanadium	NV	NV	NV	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	0.0016	0.0027	0.0019	0.0026	< 0.00007	0.0022	0.002
Zinc	5	NV	NV	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	<0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.006
Conductivity (µs/cm) [9]	NV	NV	NV	510	310	510	305	305	490	490	415	403	410	510	405	460	380
pH (units) [9]	6.5 - 8.5	NV	NV	7.28	8.1	7.6	7.25	7.25	7.75	7.75	7.7	7.72	7.35	7.74	7.85	7.45	7.73
Temperature (°C) [9]	NV	NV	NV	9.7	8.1	9.3	8.8	8.8	8.8	8.8	12.6	7.5	11.1	7.7	10.3	7.9	7.9
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen [9]	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 1 - Ground Water Quality Data - Overburden

Parameters	ODWQS^3	RUC^4	Trigger (75% RUC)	MW16-III 20-Apr-20	MW16-III 08-Oct-20	MW16-III 14-Apr-21	MW16-III 20-Oct-21	MW16-III 13-Apr-22	MW16-III 23-Oct-22	MW16-III 10-May-23	MW16-III 18-Oct-23	MW17 18-Oct-16	MW17 20-Apr-17	MW17 23-Oct-17	MW17 25-Apr-18	MW17 27-Sep-18	MW17 16-Apr-19
Alkalinity	500	344	258	202	210	194	184	210	215	216	232	**2540**	**2540**	**2680**	**2500**	**2390**	**2440**
Aluminum	0.1	0.08	0.060	0.05	0.06	0.06	0.02	0.04	0.05	0.02	0.01	**0.11**	**0.15**	**0.42**	**0.19**	**0.17**	**0.17**
Ammonia, Total	NV	NV	NV	0.02	0.04	0.07	0.03	0.13	0.01	0.82	2.23	212	176	116	180	162	173
Antimony	0.006	0.002	0.002	< 0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	0.0017	0.001	< 0.0001	0.0006	0.00084	0.0011
Arsenic	0.01	0.003	0.002	0.0001	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0045	0.0067	0.0004	0.0041	0.00204	0.0019
Barium	1	0.3	0.23	0.082	0.084	0.087	0.076	0.082	0.085	0.069	0.083	0.38	0.526	0.576	0.62	0.522	0.703
Beryllium	NV	NV	NV	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	5	1	0.8	0.005	0.005	0.005	< 0.005	0.005	< 0.005	< 0.005	0.006	**5.38**	**9.49**	**9.29**	**9.67**	**8.19**	**10.4**
Cadmium	0.005	0.001	0.001	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000010	< 0.000010	<0.000015	< 0.00002	0.000025	< 0.000014	0.00002	0.000011	< 0.000029
Calcium	NV	NV	NV	73.8	76	78	66.1	75.4	75.7	61	71.7	467	478	469	473	393	496
Chloride	250	131	98	10.1	11.2	10.5	11.4	9.3	18.1	9	13.4	**390**	**337**	**259**	**396**	**355**	**348**
Chromium	0.05	0.01	0.01	0.002	0.002	0.002	< 0.001	0.002	0.002	0.001	0.002	0.0331	0.007	0.011	0.008	0.00766	0.008
Chromium (VI)	NV	NV	NV	-	-	-	-	-	-	< 0.001	<0.01	-	-	-	-	-	-
Cobalt	NV	NV	NV	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.0002	0.01	0.006	0.005	0.008	0.00376	0.006
Chemical Oxygen Demand	NV	NV	NV	74	161	45	50	< 5	21	37	12	1210	1170	767	637	788	713
Conductivity (uS/cm)	NV	NV	NV	430	450	454	385	454	470	440	458	5490	5220	5340	5330	5250	5520
Copper	1	0.5	0.38	0.0018	0.0008	0.0015	0.0005	0.0005	0.0005	0.0005	0.0006	0.0019	0.0026	0.0001	0.0021	0.00038	0.0002
Dissolved Organic Carbon	5	4.7	3.5	1.8	1.5	2.5	1.9	1.7	0.6	1.5	2.2	**587**	**130**	**27.5**	**120**	**117**	**107**
Flouride	1.5	0.5	0.38	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	< 1	< 1	< 0.1	< 1	< 1	< 1
Hardness	500	366	275	235	244	251	219	242	241	198	232	**1460**	**1520**	**1490**	**1500**	**1250**	**1560**
Iron	0.3	0.2	0.15	0.019	< 0.005	0.009	< 0.005	0.014	0.005	< 0.005	0.009	**19.9**	**12.1**	**39.9**	**38.8**	**28.3**	**28.1**
Lead	0.01	0.003	0.002	0.00005	0.00005	0.00002	0.00002	0.00003	< 0.00002	< 0.00002	<0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00008	< 0.00009
Magnesium	NV	NV	NV	12.3	13.2	13.6	13.1	13	12.7	11.1	12.8	70.2	78.1	76.4	76.9	66.1	78
Manganese	0.05	0.03	0.02	0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	<0.001	**2.67**	**2.39**	**2.32**	**2.02**	**1.79**	**1.9**
Mercury	0.001	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	NV	NV	NV	0.0003	0.0003	0.0003	0.0003	0.0004	0.0004	0.0007	0.0004	0.0006	0.0003	< 0.0001	0.0003	< 0.00004	0.0005
Nickel	NV	NV	NV	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.0007	0.02	0.01	0.03	0.02	0.02	0.02
Nitrate	10	2.6	2.0	0.38	0.31	0.33	0.3	0.34	0.36	0.33	0.36	< 1	< 1	< 0.05	< 0.5	< 0.5	< 0.5
Nitrite	1	0.3	0.2	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 1	< 1	< 0.05	< 0.5	< 0.5	< 0.5
pH (unit)	6.5 - 8.5	NV	NV	7.92	7.96	8	8.03	7.92	7.91	7.94	8.12	7.06	7.01	7.05	7.43	7.45	7.48
Phenols	NV	NV	NV	0.015	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001	0.038	0.126	0.069	0.03	0.044	0.01
Dissolved Phosphorous	NV	NV	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	0.1	< 0.1	0.4	0.3	0.3	0.2
Total Phosphorous	NV	NV	NV	13.3	10.7	4.1	4.79	1.93	1.51	2.15	1.3	11.4	1.3	0.96	1.75	2.96	2.55
Potassium	NV	NV	NV	2	2.1	2.2	2.3	2	2	2	2.1	147	150	180	192	174	197
Selenium	0.01	0.003	0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	0.01	0.005	< 0.001	0.003	0.0049	0.006
Silver	NV	NV	NV	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	0.00004	< 0.00002	< 0.00002	0.00101	0.00009	< 0.0001
Sodium	200	101	76	4.1	4.4	4.5	4.4	4.6	4.3	4.2	4.7	**395**	**386**	**361**	**377**	**324**	**387**
Strontium	NV	NV	NV	0.163	0.184	0.185	0.178	0.18	0.178	0.165	0.181	2.28	2.31	2.36	2.61	2.47	2.85
Sulphate	500	252	189	9	10	10	10	10	11	9	10	< 10	26	9	< 10	< 10	12
Total Dissolved Solids	500	359	269	232	243	235	218	241	253	226	237	**3300**	**2990**	**3219**	**3288**	**2993**	**3233**
Total Kjeldahl Nitrogen	NV	NV	NV	0.4	0.5	0.2	0.4	0.3	0.2	0.9	2	257	66.5	210	185	169	191
Thallium	NV	NV	NV	< 0.00005	< 0.005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	<0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.000004	< 0.00005
Vanadium	NV	NV	NV	0.0021	0.0024	0.0023	0.0024	0.0026	0.0023	0.0023	0.0021	0.0115	0.0242	0.0011	0.0107	< 0.00007	0.0071
Zinc	5	NV	NV	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.005	< 0.005	<0.005	< 0.005	< 0.005	0.012	< 0.005	0.036	0.02
Conductivity (µs/cm) ^{9}	NV	NV	NV	505	460	540	480	390	390	370	365	>40000	>4000	>4000	3700	>4000	5440
pH (units) ^{9}	6.5 - 8.5	NV	NV	7.85	7.25	8.04	7.81	7.93	7.95	7.15	7.7	6.71	6.77	6.69	6.76	6.92	6.87
Temperature (°C) ^{9}	NV	NV	NV	6.6	7.7	8.3	9.6	7.4	9.1	9.9	9.1	16.3	9.1	14.1	10.8	12.3	12.1
Oxidation Reduction Potential (mV)^9	NV	NV	NV	-		-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen ^{9}	NV	NV	NV	-		-	-	-	-	-	-	-	-	-	-	-	-

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 1 - Ground Water Quality Data - Overburden

Parameters	ODWQS[3]	RUC[4]	Trigger	MW17	MW17	MW17	MW17	MW17	MW17	MW17	MW17	MW17	MW201	MW201	MW201	MW201	MW201
			(75% RUC)	24-Oct-19	20-Apr-20	23-Sep-20	14-Apr-21	20-Oct-21	13-Apr-22	23-Oct-22	10-May-23	18-Oct-23	04-Nov-19	20-Apr-20	08-Oct-20	14-Apr-21	20-Oct-21
Alkalinity	500	344	258	**2420**	**2230**	**2170**	**2150**	**2040**	**2450**	**1980**	**2460**	**2080**	**Dry**	**Dry**	**Dry**	**Dry**	**Dry**
Aluminum	0.1	0.08	0.060	**0.18**	**0.19**	**0.18**	**0.19**	**0.15**	**0.14**	**0.19**	**0.14**	**0.13**					
Ammonia, Total	NV	NV	NV	212	169	160	189	187	22.2	210	235	260					
Antimony	0.006	0.002	0.002	0.0004	0.0007	0.0008	0.0008	0.001	0.0008	0.0009	0.0011	0.0008					
Arsenic	0.01	0.003	0.002	0.0011	0.0017	0.0018	0.0017	0.005	0.0022	0.0019	0.0024	0.0021					
Barium	1	0.3	0.23	0.711	0.647	0.373	0.6	0.435	0.694	0.621	0.367	0.571					
Beryllium	NV	NV	NV	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001					
Boron	5	1	0.8	**10.2**	**10.2**	**9.53**	**10**	**11.5**	**10.5**	**8.06**	**7.9**	**7.68**					
Cadmium	0.005	0.001	0.001	< 0.000059	< 0.000059	< 0.000059	< 0.000059	0.000391	< 0.000059	< 0.000059	< 0.000059	<0.000030					
Calcium	NV	NV	NV	477	535	464	470	477	467	408	428	397					
Chloride	250	131	98	**345**	**319**	**319**	**306**	**350**	**417**	**487**	**450**	**340**					
Chromium	0.05	0.01	0.01	0.015	0.011	0.005	0.007	0.002	0.007	0.006	0.003	0.006					
Chromium (VI)	NV	NV	NV	-	-	-	-	-	-	-	< 0.001	<0.01					
Cobalt	NV	NV	NV	0.007	0.007	0.008	0.007	0.016	0.011	0.007	0.025	0.0077					
Chemical Oxygen Demand	NV	NV	NV	613	554	470	738	1090	972	830	802	657					
Conductivity (uS/cm)	NV	NV	NV	5420	4940	4810	5090	5040	5530	5510	5720	5300					
Copper	1	0.5	0.38	< 0.0003	0.004	0.0009	0.0006	0.0229	0.0013	0.0015	0.0004	0.0039					
Dissolved Organic Carbon	5	4.7	3.5	**32.4**	**105**	**124**	**109**	**123**	**90.2**	**78**	**34.3**	**104**					
Flouride	1.5	0.5	0.38	< 1	< 1	< 1	< 0.1	< 1	< 1	< 3	< 1	<0.7					
Hardness	500	366	275	**1530**	**1640**	**1440**	**1470**	**1510**	**1480**	**1310**	**948**	**1280**					
Iron	0.3	0.2	0.15	**43**	**31.9**	**0.735**	**32.7**	**0.348**	**34.7**	**32.9**	**0.47**	**3.91**					
Lead	0.01	0.003	0.002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	**0.0126**	< 0.0002	< 0.0002	0.00031	<0.00009					
Magnesium	NV	NV	NV	81.9	74.1	67.8	71.6	76.4	75.1	71.1	78	70.4					
Manganese	0.05	0.03	0.02	**1.98**	**1.97**	**1.79**	**1.75**	**1.45**	**1.75**	**1.46**	**1.48**	**1.48**					
Mercury	0.001	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00004	< 0.00002	< 0.00002	< 0.00002	<0.00002					
Molybdenum	NV	NV	NV	< 0.0004	< 0.0004	< 0.0004	0.0005	0.0013	< 0.0004	0.0011	0.0007	0.0002					
Nickel	NV	NV	NV	0.03	0.02	0.02	0.02	0.03	0.02	0.02	0.04	0.0261					
Nitrate	10	2.6	2.0	0.62	< 0.5	0.78	< 0.05	< 0.5	0.54	< 1	< 0.5	<0.40					
Nitrite	1	0.3	0.2	< 0.5	< 0.5	< 0.5	< 0.05	< 0.5	< 0.5	< 1	< 0.5	<0.40					
pH (unit)	6.5 - 8.5	NV	NV	7.34	7.46	7.31	7.05	7.58	7.23	7.05	7.27	7.45					
Phenols	NV	NV	NV	0.01	< 0.002	0.02	0.015	0.012	0.011	0.017	0.015	0.014					
Dissolved Phosphorous	NV	NV	NV	0.4	0.3	< 0.1	0.3	< 0.1	0.3	0.3	< 0.1	<0.1					
Total Phosphorous	NV	NV	NV	1.96	1.62	1.15	2.74	5.27	3.46	1.86	1.06	1.57					
Potassium	NV	NV	NV	204	162	154	160	200	233	193	231	163					
Selenium	0.01	0.003	0.002	0.007	0.006	0.004	0.006	0.007	0.01	<0.02	< 0.002	<0.001					
Silver	NV	NV	NV	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0006	0.0015	<0.0001					
Sodium	200	101	76	**387**	**347**	**319**	**348**	**366**	**402**	**376**	**432**	**381**					
Strontium	NV	NV	NV	2.77	2.77	2.68	2.71	2.71	2.67	2.36	2.32	2.41					
Sulphate	500	252	189	31	14	11	13	22	< 10	< 30	22	35					
Total Dissolved Solids	500	359	269	**3295**	**3040**	**2847**	**2907**	**2960**	**3130**	**3045**	**3118**	**3000**					
Total Kjeldahl Nitrogen	NV	NV	NV	207	184	155	196	210	231	222	260	280					
Thallium	NV	NV	NV	< 0.00005	< 0.00005	< 0.005	0.00011	0.00011	< 0.00005	0.0001	0.00009	0.00012					
Vanadium	NV	NV	NV	0.0021	0.0054	0.0102	0.0118	0.017	0.0105	0.0114	0.0109	0.013					
Zinc	5	NV	NV	0.016	0.025	< 0.005	< 0.005	0.031	< 0.005	< 0.005	0.005	<0.005					
Conductivity (µs/cm) [9]	NV	NV	NV	2590	5380	5102	3300	5450	3360	2910	2810	2320					
pH (units) [9]	6.5 - 8.5	NV	NV	6.8	6.91	6.55	7.01	7.1	7	6.85	6.78	7.12					
Temperature (°C) [9]	NV	NV	NV	10.6	10.4	12.2	13.6	14.2	8.8	13.8	14	11.5					
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	-	-	-	-	-	-	-	-	-					
Dissolved Oxygen [9]	NV	NV	NV	-	-	-	-	-	-	-	-	-					

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 1 - Ground Water Quality Data - Overburden

Parameters	ODWQS[3]	RUC[4]	Trigger (75% RUC)	MW201	MW201	MW201	MW201
				13-Apr-22	23-Oct-22	10-May-23	18-Oct-23
Alkalinity	500	344	258	**Dry**	**Dry**	**Dry**	**Dry**
Aluminum	0.1	0.08	0.060				
Ammonia, Total	NV	NV	NV				
Antimony	0.006	0.002	0.002				
Arsenic	0.01	0.003	0.002				
Barium	1	0.3	0.23				
Beryllium	NV	NV	NV				
Boron	5	1	0.8				
Cadmium	0.005	0.001	0.001				
Calcium	NV	NV	NV				
Chloride	250	131	98				
Chromium	0.05	0.01	0.01				
Chromium (VI)	NV	NV	NV				
Cobalt	NV	NV	NV				
Chemical Oxygen Demand	NV	NV	NV				
Conductivity (uS/cm)	NV	NV	NV				
Copper	1	0.5	0.38				
Dissolved Organic Carbon	5	4.7	3.5				
Flouride	1.5	0.5	0.38				
Hardness	500	366	275				
Iron	0.3	0.2	0.15				
Lead	0.01	0.003	0.002				
Magnesium	NV	NV	NV				
Manganese	0.05	0.03	0.02				
Mercury	0.001	0.0003	0.0002				
Molybdenum	NV	NV	NV				
Nickel	NV	NV	NV				
Nitrate	10	2.6	2.0				
Nitrite	1	0.3	0.2				
pH (unit)	6.5 - 8.5	NV	NV				
Phenols	NV	NV	NV				
Dissolved Phosphorous	NV	NV	NV				
Total Phosphorous	NV	NV	NV				
Potassium	NV	NV	NV				
Selenium	0.01	0.003	0.002				
Silver	NV	NV	NV				
Sodium	200	101	76				
Strontium	NV	NV	NV				
Sulphate	500	252	189				
Total Dissolved Solids	500	359	269				
Total Kjeldahl Nitrogen	NV	NV	NV				
Thallium	NV	NV	NV				
Vanadium	NV	NV	NV				
Zinc	5	NV	NV				
Conductivity (μs/cm) [9]	NV	NV	NV				
pH (units) [9]	6.5 - 8.5	NV	NV				
Temperature (°C) [9]	NV	NV	NV				
Oxidation Reduction Potential (mV)[9]	NV	NV	NV				
Dissolved Oxygen [9]	NV	NV	NV				

Notes:

1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 2 - Ground Water Quality Data - Bedrock

Parameters	ODWQS[3]	RUC[4]	Trigger (75% RUC)	MW5-I 29-May-12	MW5-I 04-Oct-12	MW5-I 21-May-13	MW5-I 30-Sep-13	MW5-I 30-Apr-14	MW5-I 22-Sep-14	MW5-I 16-Jun-15	MW5-I 16-Sep-15	MW5-I 22-Mar-16	MW5-I 01-Jun-16	MW5-I 22-Aug-16	MW5-I 18-Oct-16	MW5-I 20-Apr-17
Alkalinity	500	377	283	230	260	256	269	236	274	280	315	255	308	312	297	267
Aluminum	0.1	0.08	0.060	<0.0050	<0.0050	0.04	0.06	0.03	0.03	0.03	0.04	0.03	0.03	0.04	0.07	0.03
Ammonia, Total	NV	NV	NV	<0.01	0.12	< 0.01	< 0.01	0.1	< 0.1	0.03	< 0.01	0.04	0.08	0.1	0.12	< 0.01
Antimony	0.006	0.002	0.002	<0.00050	<0.00050	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001	0.0003	< 0.0001	0.0002	0.0002	< 0.0001
Arsenic	0.025	0.006	0.005	<0.0010	<0.0010	0.0008	0.0004	0.0002	0.0002	0.0002	0.0002	0.0003	0.0004	0.0003	0.0004	0.0002
Barium	1	0.3	0.23	0.046	0.057	0.068	0.065	0.052	0.059	0.055	0.076	0.058	0.074	0.089	0.053	0.061
Beryllium	NV	NV	NV	<0.00050	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.002	< 0.002	< 0.002
Boron	5	1.3	1.0	0.02	0.018	0.06	0.007	0.05	0.042	0.039	0.052	0.046	0.068	0.054	0.055	0.03
Cadmium	0.005	0.001	0.001	<0.00010	<0.00010	< 0.00002	0.00007	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00002	< 0.00002	0.00002	< 0.00002	0.00003
Calcium	NV	NV	NV	88	100	116	116	101	115	107	132	105	117	142	113	113
Chloride	250	129	97	9	10	5.2	11.9	5.1	13.2	11.3	19.1	8	12.4	9.8	9.3	8.3
Chromium	0.05	0.01	0.01	<0.0050	<0.0050	**0.011**	< 0.0002	< 0.0002	0.001	0.0025	0.0006	0.0007	0.0012	0.0009	0.0055	< 0.001
Chromium (VI)	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	NV	NV	NV	<0.00050	<0.00050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	< 0.005	< 0.005
Chemical Oxygen Demand	NV	NV	NV	16	31	14	13	23	< 5	24	18	31	34	6	< 5	17
Conductivity (uS/cm)	NV	NV	NV	470	550	553	572	500	594	585	666	526	651	643	624	556
Copper	1	0.5	0.38	<0.0010	<0.0010	0.0009	0.0007	0.0006	0.0008	< 0.0001	0.0005	0.0009	< 0.0001	0.0006	< 0.0001	0.0006
Dissolved Organic Carbon	5	4.9	3.7	2.4	2.5	**5.3**	**5.4**	4.6	1.8	**7.1**	**4**	3.1	4.3	2.5	0.9	**5.1**
Flouride	1.5	0.5	0.38	<0.10	<0.10	0.2	< 0.1	< 0.01	0.05	< 0.1	0.2	0.2	0.1	0.1	0.1	< 0.1
Hardness	500	385	289	230	270	311	310	270	310	288	357	282	321	**386**	309	305
Iron	0.3	0.2	0.15	**0.96**	**0.23**	**0.541**	0.042	< 0.005	0.097	< 0.005	0.056	0.027	**1.04**	0.087	0.197	0.018
Lead	0.01	0.003	0.002	<0.00050	<0.00050	0.00007	0.00008	0.00004	< 0.00002	< 0.00002	0.00005	0.00006	< 0.00002	<0.00002	< 0.00002	0.00003
Magnesium	NV	NV	NV	3.6	4.4	5.35	4.77	4.4	5.19	5.08	6.67	4.85	6.68	7.63	6.41	5.23
Manganese	0.05	0.1	0.08	**0.3**	**0.11**	**0.52**	**0.08**	**0.07**	0.01	< 0.001	0.05	0.024	**0.438**	**0.114**	**0.213**	**0.149**
Mercury	0.001	0.0003	0.0002	<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00003	< 0.00002	< 0.00002
Molybdenum	NV	NV	NV	<0.00050	0.00051	< 0.0001	0.0002	0.0001	0.0003	0.0002	< 0.0001	0.0002	< 0.0001	0.0002	0.0003	0.0001
Nickel	NV	NV	NV	<0.0010	0.0018	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.01	< 0.01	< 0.01
Nitrate	10	2.6	2.0	<0.10	0.33	< 0.1	0.2	0.1	0.3	0.2	0.3	0.2	0.1	0.2	0.2	< 0.1
Nitrite	1	0.3	0.2	<0.010	<0.010	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	0.3	< 0.1
pH (unit)	6.5 - 8.5	NV	NV	7.64	7.36	7.54	7.7	7.79	7.69	7.47	7.6	7.67	7.57	7.49	7.85	7.5
Phenols	NV	NV	NV	<0.0010	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	< 0.001	< 0.001
Dissolved Phosphorous	NV	NV	NV	<0.10	<0.10	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	< 0.1	< 0.1
Total Phosphorous	NV	NV	NV	-	-	-	-	0.58	0.03	0.21	0.12	0.09	0.16	0.03	0.07	0.05
Potassium	NV	NV	NV	0.66	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.7	0.9	1	0.9	0.6
Selenium	0.01	0.003	0.002	<0.0020	<0.0020	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	< 0.001	< 0.001
Silver	NV	NV	NV	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002	0.00008	< 0.00002
Sodium	200	103	77	3	4	5	5	4	6	6	11	6.6	7.5	7.5	7.1	5.8
Strontium	NV	NV	NV	0.17	0.2	0.223	-	-	0.239	0.224	0.263	0.206	0.256	0.294	0.247	0.218
Sulphate	500	255	191	6	15	29	8	20	10	9	8	10	16	14	16	18
Total Dissolved Solids	500	395	296	256	299	315	310	278	316	307	369	289	347	370	334	312
Total Kjeldahl Nitrogen	NV	NV	NV	0.59	1.4	0.49	0.49	0.2	0.3	0.8	0.5	0.5	0.7	0.2	0.5	0.4
Thallium	NV	NV	NV	<0.000050	0.00007	< 0.00005	0.00008	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	<0.00005	< 0.00005	< 0.00005
Vanadium	NV	NV	NV	<0.00050	<0.00050	< 0.005	0.0048	0.0029	0.0046	0.0019	0.0002	0.0005	0.0004	0.0019	0.0023	0.0014
Zinc	5	NV	NV	<0.0050	<0.0050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.006	< 0.005	0.008	< 0.005	< 0.005
Conductivity (µs/cm) [9]	NV	NV	NV	493	470	671	580	-	-	452	572	348	545	455	545	457
pH (units) [9]	6.5 - 8.5	NV	NV	7.42	7.7	7.65	6.97	-	-	7.73	7.05	7.17	7.44	7.5	7.44	7.91
Temperature (°C) [9]	NV	NV	NV	9.2	12.9	9.6	9.4	-	-	12.01	9.19	7.2	16.5	8.4	16.5	6.8
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	124	-10	56	171	-	-	-	-	-	-	-	-	-
Dissolved Oxygen [9]	NV	NV	NV	3.34	7.02	4	4.15	-	-	-	-	-	-	-	-	-

Notes:

1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 2 - Ground Water Quality Data - Bedrock

Parameters	ODWQS[3]	RUC[4]	Trigger	MW5-I	MW5-I	MW5-I	MW5-I	MW5-I	MW5-I	MW5-I	MW5-I	MW5-I	MW5-I	MW5-I	MW5-I	MW5-I
			(75% RUC)	23-Oct-17	25-Apr-18	27-Sep-18	16-Apr-19	24-Oct-19	20-Apr-20	08-Oct-20	14-Apr-21	20-Oct-21	13-Apr-22	23-Oct-22	10-May-23	18-Oct-23
Alkalinity	500	377	283	314	242	Dry	207	Dry	236	Dry	218	296	252	Dry	223	Dry
Aluminum	0.1	0.08	0.060	0.06	0.06		0.06		0.05		0.06	0.08	0.06		0.02	
Ammonia, Total	NV	NV	NV	0.03	0.09		0.04		0.05		0.01	0.05	0.4		0.37	
Antimony	0.006	0.002	0.002	0.0001	< 0.0001		< 0.0001		< 0.0001		0.0001	< 0.0001	< 0.0001		< 0.0001	
Arsenic	0.025	0.006	0.005	0.0002	0.0003		0.0001		0.0001		0.0001	0.0002	< 0.0001		< 0.0001	
Barium	1	0.3	0.23	0.072	0.058		0.044		0.059		0.056	0.079	0.062		0.038	
Beryllium	NV	NV	NV	< 0.002	< 0.002		< 0.002		< 0.002		< 0.002	< 0.002	< 0.002		< 0.002	
Boron	5	1.3	1.0	0.065	0.057		0.053		0.071		0.066	0.099	0.07		0.04	
Cadmium	0.005	0.001	0.001	0.000121	0.000063		< 0.000015		0.000023		< 0.000015	0.000022	< 0.000015		< 0.000010	
Calcium	NV	NV	NV	121	98.2		87.4		105		100	130	106		75.2	
Chloride	250	129	97	9.3	8.2		7.4		6.6		6.3	15.6	6.9		5.9	
Chromium	0.05	0.01	0.01	< 0.001	< 0.001		< 0.001		< 0.001		< 0.001	< 0.001	< 0.001		< 0.001	
Chromium (VI)	NV	NV	NV	-	-		-		-		-	-	-		< 0.001	
Cobalt	NV	NV	NV	< 0.005	0.012		0.007		< 0.005		< 0.005	< 0.005	< 0.005		< 0.005	
Chemical Oxygen Demand	NV	NV	NV	17	17		14		20		24	9	< 5		10	
Conductivity (uS/cm)	NV	NV	NV	639	501		454		524		488	580	526		444	
Copper	1	0.5	0.38	0.0014	0.0009		0.0011		0.0028		0.0018	0.001	0.0008		0.0006	
Dissolved Organic Carbon	5	4.9	3.7	3.4	4.4		4.2		**5.4**		**6.1**	**5.4**	**5.2**		3	
Flouride	1.5	0.5	0.38	< 0.1	< 0.1		< 0.1		< 0.1		< 0.1	< 0.1	< 0.1		< 0.1	
Hardness	500	385	289	327	264		234		282		267	349	285		201	
Iron	0.3	0.2	0.15	0.02	0.044		0.157		0.031		0.03	**0.341**	0.018		0.009	
Lead	0.01	0.003	0.002	0.0001	< 0.00002		0.00052		0.00007		0.00005	0.00041	0.00002		< 0.00002	
Magnesium	NV	NV	NV	5.93	4.59		3.68		4.68		4.24	5.87	4.78		3.2	
Manganese	0.05	0.1	0.08	**0.058**	**0.1**		0.008		**0.14**		0.01	**0.098**	0.04		0.004	
Mercury	0.001	0.0003	0.0002	< 0.00002	< 0.00002		< 0.00002		< 0.00002		< 0.00002	< 0.00002	< 0.00002		< 0.00002	
Molybdenum	NV	NV	NV	0.0001	0.0001		0.0001		0.0003		0.0001	0.0001	0.0001		0.0002	
Nickel	NV	NV	NV	< 0.01	< 0.01		< 0.01		< 0.01		< 0.01	< 0.01	< 0.01		< 0.01	
Nitrate	10	2.6	2.0	0.33	< 0.05		0.28		< 0.05		0.21	0.16	0.19		0.08	
Nitrite	1	0.3	0.2	< 0.05	< 0.05		< 0.05		< 0.05		< 0.05	< 0.05	< 0.05		< 0.05	
pH (unit)	6.5 - 8.5	NV	NV	7.78	7.93		7.78		7.83		7.65	8.18	7.67		7.6	
Phenols	NV	NV	NV	< 0.001	< 0.001		< 0.002		< 0.002		< 0.002	< 0.002	< 0.001		0.004	
Dissolved Phosphorous	NV	NV	NV	< 0.1	< 0.1		< 0.1		< 0.1		< 0.1	< 0.1	< 0.1		< 0.1	
Total Phosphorous	NV	NV	NV	0.03	0.06		0.03		0.09		0.16	0.04	0.04		0.04	
Potassium	NV	NV	NV	0.9	0.8		0.7		0.9		0.8	1.1	0.8		0.6	
Selenium	0.01	0.003	0.002	< 0.001	< 0.001		< 0.001		< 0.001		< 0.001	< 0.001	< 0.001		< 0.001	
Silver	NV	NV	NV	< 0.00002	< 0.00002		< 0.0001		< 0.0001		< 0.0001	< 0.0001	< 0.0001		< 0.0001	
Sodium	200	103	77	6.5	5.8		5.1		5.4		5.1	8.9	5.7		2.9	
Strontium	NV	NV	NV	0.231	0.192		0.165		0.191		0.185	0.251	0.207		0.157	
Sulphate	500	255	191	7	7		5		13		9	7	9		9	
Total Dissolved Solids	500	395	296	339	270		234		277		257	346	285		230	
Total Kjeldahl Nitrogen	NV	NV	NV	0.2	0.4		0.4		0.6		0.6	0.4	0.7		0.6	
Thallium	NV	NV	NV	< 0.00005	< 0.00005		< 0.00005		< 0.00005		< 0.00005	< 0.00005	< 0.00005		< 0.00005	
Vanadium	NV	NV	NV	0.0011	0.0015		0.0002		< 0.0001		< 0.0001	0.0001	< 0.0001		< 0.0001	
Zinc	5	NV	NV	< 0.005	< 0.005		< 0.005		< 0.005		< 0.005	0.005	< 0.005		< 0.005	
Conductivity (μs/cm) [9]	NV	NV	NV	570	590		510		545		570	650	445		360	
pH (units) [9]	6.5 - 8.5	NV	NV	7.85	7.47		8.1		7.33		7.68	7.26	7.53		7.1	
Temperature (°C) [9]	NV	NV	NV	10.7	8		9.1		8.3		8.4	9.4	9.4		9.7	
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	-	-		-		-		-	-	-		-	
Dissolved Oxygen [9]	NV	NV	NV	-	-		-		-		-	-	-		-	

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 2 - Ground Water Quality Data - Bedrock

Parameters	ODWQS[3]	RUC[4]	Trigger	MW8-I	MW8-I	MW8-I	MW8-I	MW8-I	MW8-I	MW8-I	MW8-I	MW8-I	MW8-I	MW8-I	MW8-I	MW8-I
			(75% RUC)	30-Sep-13	28-Apr-14	22-Mar-16	01-Jun-16	18-Oct-16	20-Apr-17	23-Oct-17	25-Apr-18	27-Sep-18	16-Apr-19	24-Oct-19	20-Apr-20	08-Oct-20
Alkalinity	500	377	283	-	**390**	**485**	Dry	Dry	**396**	Dry	**484**	Dry	**432**	Dry	**452**	Dry
Aluminum	0.1	0.08	0.060	0.06	0.03	0.04			0.04		**0.1**		0.08		0.08	
Ammonia, Total	NV	NV	NV	-	0.1	0.07			0.03		0.05		0.07		0.04	
Antimony	0.006	0.002	0.002	0.0005	< 0.0001	< 0.0001			< 0.0001		< 0.0001		< 0.0001		< 0.0001	
Arsenic	0.025	0.006	0.005	0.0003	0.0009	0.0012			0.0009		0.001		0.0005		0.0007	
Barium	1	0.3	0.23	0.129	0.112	0.151			0.116		0.172		0.133		0.149	
Beryllium	NV	NV	NV	< 0.002	< 0.002	< 0.002			< 0.002		< 0.002		< 0.002		< 0.002	
Boron	5	1.3	1.0	0.031	0.021	0.025			< 0.005		0.03		0.03		0.022	
Cadmium	0.005	0.001	0.001	< 0.00002	< 0.00002	< 0.00002			< 0.000014		< 0.000015		< 0.000015		< 0.000015	
Calcium	NV	NV	NV	162	145	177			152		194		159		181	
Chloride	250	129	97	-	4	2.8			1.5		< 0.5		1.4		2	
Chromium	0.05	0.01	0.01	< 0.0002	< 0.0002	0.0015			0.001		< 0.001		< 0.001		< 0.001	
Chromium (VI)	NV	NV	NV	-	-	-			-		-		-		-	
Cobalt	NV	NV	NV	< 0.005	< 0.005	< 0.005			< 0.005		0.006		0.005		< 0.005	
Chemical Oxygen Demand	NV	NV	NV	125	16	20			11		14		14		7	
Conductivity (uS/cm)	NV	NV	NV	-	731	899			733		941		845		889	
Copper	1	0.5	0.38	0.0006	0.0004	0.0002			0.0004		0.0002		0.0009		0.0012	
Dissolved Organic Carbon	5	4.9	3.7	**11.5**	**5.6**	2			4.1		4.7		4.2		3.3	
Flouride	1.5	0.5	0.38	-	< 0.1	0.2			< 0.1		< 0.1		< 0.1		< 0.1	
Hardness	500	385	289	**483**	**407**	**503**			**429**		**554**		**453**		**513**	
Iron	0.3	0.2	0.15	0.036	**3.59**	**3.66**			**2.83**		**3.83**		**2.67**		**4.91**	
Lead	0.01	0.003	0.002	< 0.00002	0.00004	< 0.00002			< 0.00002		< 0.00002		0.00002		0.00005	
Magnesium	NV	NV	NV	18.9	10.7	15.1			11.7		16.9		13.4		14.8	
Manganese	0.05	0.1	0.08	**0.07**	**0.41**	**0.53**			**0.482**		**0.632**		**0.471**		**0.615**	
Mercury	0.001	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002			< 0.00002		< 0.00002		< 0.00002		< 0.00002	
Molybdenum	NV	NV	NV	0.0007	0.0001	0.0002			0.0002		< 0.0001		0.0001		0.0002	
Nickel	NV	NV	NV	< 0.01	< 0.01	< 0.01			< 0.01		< 0.01		< 0.01		< 0.01	
Nitrate	10	2.6	2.0	-	0.1	< 0.1			< 0.1		< 0.05		< 0.05		< 0.05	
Nitrite	1	0.3	0.2	-	< 0.1	< 0.1			< 0.1		< 0.05		< 0.05		< 0.05	
pH (unit)	6.5 - 8.5	NV	NV	-	7.4	7.15			7.34		7.63		7.42		7.65	
Phenols	NV	NV	NV	< 0.001	< 0.001	< 0.001			< 0.001		< 0.001		< 0.002		< 0.002	
Dissolved Phosphorous	NV	NV	NV	< 0.1	< 0.1	< 0.1			< 0.1		< 0.1		< 0.1		< 0.1	
Total Phosphorous	NV	NV	NV	-	< 0.01	0.05			0.02		0.07		0.04		0.03	
Potassium	NV	NV	NV	2	1.4	1.6			1.1		1.8		1.6		1.7	
Selenium	0.01	0.003	0.002	< 0.001	< 0.001	< 0.001			< 0.001		< 0.001		< 0.001		< 0.001	
Silver	NV	NV	NV	< 0.00002	< 0.00002	< 0.00002			< 0.00002		< 0.00002		< 0.0001		< 0.0001	
Sodium	200	103	77	6	3	4.5			2.4		4.7		4.7		3.2	
Strontium	NV	NV	NV	-	-	0.364			0.29		0.389		0.326		0.337	
Sulphate	500	255	191	-	8	9			9		8		8		9	
Total Dissolved Solids	500	395	296	-	**411**	**505**			**419**		**520**		**451**		**489**	
Total Kjeldahl Nitrogen	NV	NV	NV	2.81	0.3	0.4			0.3		0.3		0.4		0.2	
Thallium	NV	NV	NV	<0.00005	< 0.00005	< 0.00005			< 0.00005		< 0.00005		< 0.00005		< 0.00005	
Vanadium	NV	NV	NV	0.0077	0.0041	0.001			0.003		0.003		0.0001		0.0001	
Zinc	5	NV	NV	< 0.005	< 0.005	< 0.005			< 0.005		< 0.005		< 0.005		< 0.005	
Conductivity (µs/cm) [9]	NV	NV	NV	-	-	596			586		930		930		980	
pH (units) [9]	6.5 - 8.5	NV	NV	-	-	6.76			7.61		6.85		6.85		7.01	
Temperature (°C) [9]	NV	NV	NV	-	-	6.9			6.8		8		8		8	
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	-	-	-			-		-		-		-	
Dissolved Oxygen [9]	NV	NV	NV	-	-	-			-		-		-		-	

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 2 - Ground Water Quality Data - Bedrock

Parameters	ODWQS[3]	RUC[4]	Trigger (75% RUC)	MW8-I	MW8-I	MW8-I	MW8-I	MW8-I	MW8-I	MW8-III	MW8-III	MW8-III	MW8-III	MW8-III	MW8-III	MW8-III
				14-Apr-21	20-Oct-21	13-Apr-22	23-Oct-22	10-May-23	18-Oct-23	29-May-12	04-Oct-12	21-May-13	30-Sep-13	28-Apr-14	22-Sep-14	16-Jun-15
Alkalinity	500	377	283	Dry	Dry	**464**	Dry	Dry	Dry	**410**	**580**	250	**511**	271	**660**	**574**
Aluminum	0.1	0.08	0.060			0.08				0.0051	<0.0050	<0.01	0.07	0.03	0.05	0.04
Ammonia, Total	NV	NV	NV			1.02				1.3	2	0.2	0.99	0.56	< 0.1	0.3
Antimony	0.006	0.002	0.002			< 0.0001				<0.00050	<0.00050	-	0.0001	< 0.0001	0.0005	< 0.0001
Arsenic	0.025	0.006	0.005			0.0008				<0.0010	<0.0010	0.0012	0.0022	0.0008	0.0026	0.0017
Barium	1	0.3	0.23			0.158				0.13	0.2	0.0636	0.184	0.072	0.206	0.148
Beryllium	NV	NV	NV			< 0.002				<0.00050	<0.00050	<0.00002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	5	1.3	1.0			0.025				0.15	0.23	0.0218	0.145	0.061	0.096	0.056
Cadmium	0.005	0.001	0.001			< 0.000015				<0.00010	<0.00010	<0.000003	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Calcium	NV	NV	NV			181				150	200	112	199	103	253	222
Chloride	250	129	97			3.8				23	61	1.8	32	5.4	5.2	5.2
Chromium	0.05	0.01	0.01			< 0.001				<0.0050	<0.0050	0.0005	< 0.0002	< 0.0002	< 0.0002	0.0071
Chromium (VI)	NV	NV	NV			-				-	-	-	-	-	-	-
Cobalt	NV	NV	NV			< 0.005				<0.00050	0.0077	0.000951	< 0.005	< 0.005	< 0.005	< 0.005
Chemical Oxygen Demand	NV	NV	NV			< 5				22	35	<8	21	10	15	25
Conductivity (uS/cm)	NV	NV	NV			900				840	1300	521	1070	548	1210	1050
Copper	1	0.5	0.38			0.0002				<0.0010	<0.0010	<0.0005	0.0005	0.0004	0.0004	< 0.0001
Dissolved Organic Carbon	5	4.9	3.7			4.1				**6.7**	**12**	3.2	**14.9**	**5.3**	**9.9**	**12.5**
Flouride	1.5	0.5	0.38			< 0.1				<0.10	<0.10	0.07	0.2	0.1	**0.68**	< 0.1
Hardness	500	385	289			**517**				**410**	**570**	299	**553**	280	**707**	**615**
Iron	0.3	0.2	0.15			**6.23**				**6.4**	**7.7**	**1.38**	**8.46**	**3.22**	**15.7**	**6.78**
Lead	0.01	0.003	0.002			< 0.00002				<0.00050	<0.00050	0.00003	0.00008	0.00005	< 0.00002	0.00003
Magnesium	NV	NV	NV			15.7				9.3	19	4.71	13.5	5.41	17.9	14.3
Manganese	0.05	0.1	0.08			**0.649**				**0.57**	**0.85**	**0.31**	**0.74**	**0.33**	**1.08**	**0.77**
Mercury	0.001	0.0003	0.0002			< 0.00002				<0.00001	<0.00001	0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	NV	NV	NV			0.0002				<0.00050	0.0006	0.00025	0.0002	0.0003	0.0004	0.0002
Nickel	NV	NV	NV			< 0.01				0.0018	0.0069	0.0014	< 0.01	< 0.01	< 0.01	< 0.01
Nitrate	10	2.6	2.0			< 0.05				<0.10	<0.10	<0.06	0.1	< 0.1	0.1	< 0.1
Nitrite	1	0.3	0.2			< 0.05				<0.010	<0.010	<0.03	< 0.1	< 0.1	< 0.1	< 0.1
pH (unit)	6.5 - 8.5	NV	NV			7.52				7.56	7.11	7.85	7.37	7.6	7.28	7.17
Phenols	NV	NV	NV			< 0.001				<0.0010	0.0024	0.001	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Phosphorous	NV	NV	NV			< 0.1				<0.10	<0.10	0.011	< 0.1	< 0.1	< 0.1	< 0.1
Total Phosphorous	NV	NV	NV			0.03				-	-	-	-	< 0.01	0.05	0.11
Potassium	NV	NV	NV			1.8				2.7	3.7	1.26	3.3	1.8	3.2	2.2
Selenium	0.01	0.003	0.002			< 0.001				<0.0020	<0.0020	-	< 0.001	< 0.001	< 0.001	< 0.001
Silver	NV	NV	NV			< 0.0001				<0.00010	<0.00010	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Sodium	200	103	77			4				18	36	2	27	6	12	8
Strontium	NV	NV	NV			0.371				0.32	0.51	0.214	-	-	0.614	0.498
Sulphate	500	255	191			7				13	11	8	12	10	10	7
Total Dissolved Solids	500	395	296			**502**				**478**	**708**	279	**604**	299	**716**	**611**
Total Kjeldahl Nitrogen	NV	NV	NV			1.2				1.7	2.7	-	1.72	0.6	1	0.7
Thallium	NV	NV	NV			< 0.00005				<0.000050	<0.000050	<0.5	<0.000050	< 0.00005	< 0.00005	< 0.00005
Vanadium	NV	NV	NV			0.0001				<0.00050	0.00081	0.00032	0.0129	0.0024	0.0125	0.0068
Zinc	5	NV	NV			< 0.005				<0.0050	<0.0050	<0.002	< 0.005	< 0.005	< 0.005	< 0.005
Conductivity (µs/cm) [9]	NV	NV	NV			730				865	1070	563	1111	-	-	871
pH (units) [9]	6.5 - 8.5	NV	NV			7.18				6.94	7.2	7.22	6.75	-	-	6.57
Temperature (°C) [9]	NV	NV	NV			7.8				10.7	12.5	10.3	10.8	-	-	11.73
Oxidation Reduction Potential (mV)[9]	NV	NV	NV			-				86	56	81	-5	-	-	-
Dissolved Oxygen [9]	NV	NV	NV			-				3.41	2.48	3.18	6.32	-	-	-

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 2 - Ground Water Quality Data - Bedrock

Parameters	ODWQS[3]	RUC[4]	Trigger (75% RUC)	MW8-III	MW8-III	MW8-III	MW8-III	MW8-III	MW8-III	MW8-III	MW8-III	MW8-III	MW8-III	MW8-III	MW8-III	MW8-III
				16-Sep-15	**22-Mar-16**	**01-Jun-16**	**22-Aug-16**	**18-Oct-16**	**20-Apr-17**	**23-Oct-17**	**25-Apr-18**	**27-Sep-18**	**16-Apr-19**	**24-Oct-19**	**20-Apr-20**	**08-Oct-20**
Alkalinity	500	377	283	**630**	221	**549**	**468**	**538**	196	**546**	236	**457**	207	**524**	223	**589**
Aluminum	0.1	0.08	0.060	0.06	0.03	0.05	0.05	0.05	0.02	**0.09**	0.06	**0.09**	0.05	0.08	0.05	**0.1**
Ammonia, Total	NV	NV	NV	0.95	0.21	0.32	0.27	0.32	0.02	0.58	0.2	0.21	0.14	0.14	0.03	0.9
Antimony	0.006	0.002	0.002	< 0.0001	0.0004	< 0.0001	0.0004	0.0002	< 0.0001	0.0001	< 0.0001	0.0001	0.0001	0.0001	0.0002	< 0.0001
Arsenic	0.025	0.006	0.005	0.0011	0.0043	0.001	0.0006	0.0008	0.0004	0.0011	0.0006	0.00063	0.0005	0.0005	0.0003	0.0009
Barium	1	0.3	0.23	0.207	0.051	0.125	0.126	0.135	0.049	0.15	0.053	0.104	0.04	0.122	0.041	0.185
Beryllium	NV	NV	NV	< 0.002	< 0.002	< 0.002	<0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	5	1.3	1.0	0.166	0.022	0.064	0.067	0.069	< 0.005	0.148	0.021	0.048	0.022	0.048	0.011	0.169
Cadmium	0.005	0.001	0.001	< 0.00002	< 0.00002	< 0.00002	0.00005	< 0.00002	0.000015	0.000026	< 0.000015	0.000053	< 0.000015	0.000024	0.000043	0.000038
Calcium	NV	NV	NV	236	91	192	185	197	81.3	203	96.7	160	85.6	200	94.9	236
Chloride	250	129	97	23.5	2.1	9.8	3.9	6.3	1.3	27.7	0.7	2.3	2	2	1.4	18.4
Chromium	0.05	0.01	0.01	0.0009	0.0007	0.0026	0.0013	0.0042	< 0.001	< 0.001	< 0.001	0.0003	< 0.001	< 0.001	< 0.001	0.001
Chromium (VI)	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	NV	NV	NV	< 0.005	< 0.005	0.008	0.008	0.009	< 0.005	< 0.005	0.008	0.00646	< 0.005	0.005	< 0.005	0.01
Chemical Oxygen Demand	NV	NV	NV	39	16	29	10	5	12	29	14	< 5	< 5	5	8	19
Conductivity (uS/cm)	NV	NV	NV	1200	441	1030	905	1020	392	1100	472	870	433	1010	455	1150
Copper	1	0.5	0.38	< 0.0001	0.0002	< 0.0001	0.0007	< 0.0001	< 0.0001	0.0006	0.0018	0.00067	0.0009	< 0.0001	0.0022	0.0004
Dissolved Organic Carbon	5	4.9	3.7	**7.1**	2.3	**6.2**	3.4	4.4	3.7	**8.1**	4.8	4.4	3.8	**5.1**	4.3	**8.5**
Flouride	1.5	0.5	0.38	0.1	0.2	0.1	0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hardness	500	385	289	**662**	243	**524**	**526**	**553**	215	**569**	259	**460**	228	**561**	252	**652**
Iron	0.3	0.2	0.15	**15**	**1.23**	**1.55**	**1.51**	**4.07**	0.173	**4.78**	**0.857**	**0.885**	**0.299**	**1.32**	0.101	**10.3**
Lead	0.01	0.003	0.002	0.00003	< 0.00002	0.00006	< 0.00002	< 0.00002	< 0.00002	0.00012	0.00009	0.00004	0.00009	0.00011	0.00014	0.00016
Magnesium	NV	NV	NV	17.9	3.9	10.6	15.1	14.7	2.93	14.9	4.19	14.6	3.39	14.9	3.55	15.2
Manganese	0.05	0.1	0.08	**0.99**	**0.165**	**0.635**	**0.383**	**0.608**	**0.051**	**0.643**	**0.207**	**0.338**	**0.09**	**0.599**	**0.091**	**0.92**
Mercury	0.001	0.0003	0.0002	0.00003	< 0.00002	< 0.00002	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	NV	NV	NV	< 0.0001	0.0008	< 0.0001	0.0009	0.0002	0.0004	0.0002	0.0002	0.00047	0.0002	0.0003	0.0002	0.0002
Nickel	NV	NV	NV	< 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
Nitrate	10	2.6	2.0	0.1	0.1	0.1	0.7	< 0.1	< 0.1	< 0.05	< 0.05	0.05	< 0.05	0.06	< 0.05	< 0.05
Nitrite	1	0.3	0.2	< 0.1	< 0.1	< 0.1	<0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
pH (unit)	6.5 - 8.5	NV	NV	7.34	7.64	7.33	7.31	7.54	7.75	7.43	7.91	7.63	7.81	7.45	7.84	7.14
Phenols	NV	NV	NV	< 0.001	< 0.001	< 0.001	<0.001	< 0.001	< 0.001	0.002	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Dissolved Phosphorous	NV	NV	NV	< 0.1	< 0.1	< 0.1	<0.01	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Phosphorous	NV	NV	NV	0.08	0.14	0.07	0.03	0.02	0.04	0.02	0.04	0.03	0.03	0.03	< 0.01	0.03
Potassium	NV	NV	NV	3.3	0.9	1.6	2.1	2	0.5	2.7	0.9	1.7	0.8	1.8	0.7	3.5
Selenium	0.01	0.003	0.002	< 0.001	< 0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.001
Silver	NV	NV	NV	< 0.00002	< 0.00002	< 0.00002	<0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	200	103	77	27	2.3	8.6	10.2	10.1	1.1	22.9	2	8.1	2.2	6.1	1.3	20.5
Strontium	NV	NV	NV	0.553	0.175	0.402	0.435	0.46	0.143	0.43	0.178	0.383	0.158	0.419	0.157	0.528
Sulphate	500	255	191	7	8	6	28	19	8	8	5	17	5	14	5	9
Total Dissolved Solids	500	395	296	**710**	243	**561**	**530**	**577**	214	**613**	253	**480**	224	**555**	241	**667**
Total Kjeldahl Nitrogen	NV	NV	NV	1.5	0.5	0.8	0.4	0.5	0.3	1	0.6	0.3	0.4	0.4	0.2	1.2
Thallium	NV	NV	NV	< 0.00005	< 0.00005	< 0.00005	0.00009	0.00006	< 0.00005	0.00009	< 0.00005	0.000074	< 0.00005	0.00011	0.00006	< 0.005
Vanadium	NV	NV	NV	0.0009	0.0006	0.0011	0.0031	0.0019	0.0012	0.0027	0.0015	0.00018	0.0002	0.0003	0.0002	0.0005
Zinc	5	NV	NV	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Conductivity (μs/cm) [9]	NV	NV	NV	1020	291	735	613	855	333	885	540	760	470	695	475	740
pH (units) [9]	6.5 - 8.5	NV	NV	6.7	7.33	6.27	6.89	7.27	7.77	7.19	7.27	7.51	7.83	7.1	7.48	7.19
Temperature (°C) [9]	NV	NV	NV	9.56	6.7	9.6	8.18	10.5	6.4	14.9	8.3	10.3	8.3	7.4	8.5	7.8
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen [9]	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 2 - Ground Water Quality Data - Bedrock

Parameters	ODWQS[3]	RUC[4]	Trigger (75% RUC)	MW8-III 14-Apr-21	MW8-III 20-Oct-21	MW8-III 13-Apr-22	MW8-III 23-Oct-22	MW8-III 10-May-23	MW8-III 18-Oct-23	MW9 29-May-12	MW9 04-Oct-12	MW9 21-May-13	MW9 30-Sep-13	MW9 16-Jun-15	MW9 24-Aug-15	MW9 16-Sep-15
Alkalinity	500	377	283	234	357	252	**591**	232	**581**	220	270	Dry	234	222	269	269
Aluminum	0.1	0.08	0.060	0.07	0.08	0.04	**0.1**	0.02	**0.1**	<0.0050	<0.0050	0.03	0.05	0.02	0.03	0.03
Ammonia, Total	NV	NV	NV	0.12	1.01	2.94	0.9	0.85	0.55	<0.01	0.05	< 0.01	< 0.01	< 0.01	0.02	0.04
Antimony	0.006	0.002	0.002	0.0002	< 0.0001	< 0.0001	0.0002	< 0.0001	0.0002	<0.00050	<0.00050	< 0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001
Arsenic	0.025	0.006	0.005	0.0008	0.0004	0.0006	0.0005	0.0005	0.0003	<0.0010	<0.0010	0.0003	0.0002	0.0002	0.0002	0.0002
Barium	1	0.3	0.23	0.055	0.115	0.058	0.17	0.036	0.14	0.019	0.03	0.019	0.024	0.02	0.027	0.028
Beryllium	NV	NV	NV	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	<0.00050	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	5	1.3	1.0	0.023	0.127	0.025	0.125	0.013	0.061	<0.010	0.012	0.008	< 0.005	0.009	0.014	0.006
Cadmium	0.005	0.001	0.001	0.000042	< 0.000015	< 0.000015	0.000035	< 0.000010	0.000158	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Calcium	NV	NV	NV	107	150	102	220	76.8	190	81	110	83.6	99	92.7	114	115
Chloride	250	129	97	2.2	12.8	2.7	23.8	1.7	10.1	2	7	1	2.4	1.6	6.4	3.5
Chromium	0.05	0.01	0.01	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.0050	<0.0050	< 0.002	< 0.0002	0.0022	< 0.0002	0.0003
Chromium (VI)	NV	NV	NV	-	-	-	-	< 0.001	<0.01	-	-	-	-	-	-	-
Cobalt	NV	NV	NV	0.005	< 0.005	< 0.005	0.006	< 0.005	0.0075	<0.00050	<0.00050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Chemical Oxygen Demand	NV	NV	NV	5	10	< 5	27	12	18	37	21	23	48	26	7	7
Conductivity (uS/cm)	NV	NV	NV	506	678	497	1130	452	1060	410	560	377	460	439	535	525
Copper	1	0.5	0.38	0.0018	0.0007	0.0002	0.0009	0.0003	0.0007	<0.0010	<0.0010	0.0027	0.0005	< 0.0001	0.0004	0.0005
Dissolved Organic Carbon	5	4.9	3.7	4.6	**7.8**	4.3	**7.7**	4.6	**7.3**	3.5	3.8	**5.5**	**7.1**	3.9	4.1	3.2
Flouride	1.5	0.5	0.38	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	<0.10	<0.10	0.2	< 0.1	0.1	0.1	0.2
Hardness	500	385	289	285	**408**	274	**620**	206	**542**	210	280	218	258	242	298	300
Iron	0.3	0.2	0.15	**0.315**	**4.71**	**1.04**	**4.6**	**0.519**	**1.55**	<0.10	<0.10	0.059	0.008	0.091	0.052	0.068
Lead	0.01	0.003	0.002	0.00015	0.00019	0.00011	0.00014	0.00009	0.00004	<0.00050	<0.00050	0.00015	0.00003	< 0.00002	0.00005	0.00002
Magnesium	NV	NV	NV	4.34	7.98	4.59	17.1	3.4	16.3	2.2	3	2.19	2.48	2.52	2.96	3.16
Manganese	0.05	0.1	0.08	**0.228**	**0.446**	**0.218**	**0.676**	**0.126**	**0.759**	0.02	0.02	0.01	0.01	0.01	0.01	0.01
Mercury	0.001	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002	<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	NV	NV	NV	0.0002	< 0.0001	0.0002	0.0002	0.0002	0.0004	<0.00050	<0.00050	< 0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001
Nickel	NV	NV	NV	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.0041	<0.0010	<0.0010	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nitrate	10	2.6	2.0	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	<0.10	0.12	0.3	0.2	0.3	< 0.1	0.4
Nitrite	1	0.3	0.2	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.05	<0.010	<0.010	0.2	< 0.1	< 0.1	< 0.1	0.3
pH (unit)	6.5 - 8.5	NV	NV	7.59	8.16	7.64	7.39	7.7	7.44	7.74	7.41	7.83	7.79	7.68	7.51	7.5
Phenols	NV	NV	NV	< 0.002	< 0.002	< 0.001	0.003	< 0.001	<0.001	<0.0010	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Phosphorous	NV	NV	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	<0.10	<0.10	-	< 0.1	< 0.1	< 0.1	< 0.1
Total Phosphorous	NV	NV	NV	0.03	0.03	0.03	0.02	0.02	0.02	-	-	-	-	0.19	0.01	0.06
Potassium	NV	NV	NV	0.9	2.8	1.1	2.9	0.8	2.3	0.71	0.66	0.6	0.5	0.5	0.4	0.5
Selenium	0.01	0.003	0.002	< 0.001	< 0.001	< 0.001	0.002	< 0.001	<0.001	<0.0020	<0.0020	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Silver	NV	NV	NV	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Sodium	200	103	77	2.2	12.2	2.5	15.7	1.3	9	1	2	1	1	1	3	2
Strontium	NV	NV	NV	0.191	0.317	0.194	0.493	0.162	0.426	0.14	0.2	0.144	-	0.179	0.224	0.213
Sulphate	500	255	191	6	9	5	7	4	10	1	8	3	4	3	3	4
Total Dissolved Solids	500	395	296	264	**415**	274	**648**	228	**567**	220	300	209	250	235	291	292
Total Kjeldahl Nitrogen	NV	NV	NV	0.3	1.3	1.1	0.4	1.1	0.3	1.1	0.89	0.61	1.91	0.9	0.3	0.5
Thallium	NV	NV	NV	0.00007	< 0.00005	< 0.00005	0.00016	< 0.00005	0.00014	<0.000050	<0.000050	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	NV	NV	NV	0.0002	0.0003	0.0001	0.0005	0.0002	0.0002	<0.00050	<0.00050	< 0.005	0.0049	0.002	0.0022	0.0003
Zinc	5	NV	NV	< 0.005	0.005	< 0.005	0.006	< 0.005	<0.005	<0.0050	<0.0050	0.012	< 0.005	< 0.005	< 0.005	< 0.005
Conductivity (µs/cm) [9]	NV	NV	NV	580	780	435	805	370	650	432	510	430	473	352	NA	456
pH (units) [9]	6.5 - 8.5	NV	NV	7.77	7.05	7.45	7.1	7.2	7.44	7.51	7.7	7.95	7.05	7.51	NA	7.17
Temperature (°C) [9]	NV	NV	NV	8.4	8.4	7.5	10.2	9.5	8.5	15.1	15	9.2	15.1	16.71	NA	16.72
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	-	-	-	-	-	-	103	16	80	21	-	-	-
Dissolved Oxygen [9]	NV	NV	NV	-	-	-	-	-	-	4.5	4.42	4.6	3.7	-	-	-

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 2 - Ground Water Quality Data - Bedrock

Parameters	ODWQS[3]	RUC[4]	Trigger (75% RUC)	MW9 01-Jun-16	MW9 22-Aug-16	MW9 18-Oct-16	MW9 20-Apr-17	MW9 23-Oct-17	MW9 25-Apr-18	MW9 27-Sep-18	MW9 16-Apr-19	MW9 24-Oct-19	MW9 20-Apr-20	MW9 08-Oct-20	MW9 14-Apr-21	MW9 20-Oct-21
Alkalinity	500	377	283	199	326	284	Dry	277	flooded, not accessible	303	flooded, not accessible	323	flooded, not accessible	263	flooded, not accessible	236
Aluminum	0.1	0.08	0.060	0.02	0.04	0.04		0.06		0.08		0.06		0.08		0.06
Ammonia, Total	NV	NV	NV	< 0.01	0.1	0.12		0.05		0.07		0.03		0.12		0.18
Antimony	0.006	0.002	0.002	< 0.0001	<0.0001	0.0002		0.0001		0.00013		< 0.0001		< 0.0001		< 0.0001
Arsenic	0.025	0.006	0.005	< 0.0001	0.0003	0.0002		0.0002		0.0001		0.0001		< 0.0001		0.0002
Barium	1	0.3	0.23	0.016	0.041	0.029		0.027		0.034		0.037		0.029		0.022
Beryllium	NV	NV	NV	< 0.002	<0.002	< 0.002		< 0.002		< 0.002		< 0.002		< 0.002		< 0.002
Boron	5	1.3	1.0	0.018	0.075	0.047		0.023		0.074		0.12		0.06		0.013
Cadmium	0.005	0.001	0.001	< 0.00002	<0.00002	< 0.00002		< 0.000014		0.000013		0.000019		< 0.000015		< 0.000015
Calcium	NV	NV	NV	77.2	153	118		112		119		133		116		99
Chloride	250	129	97	1	24.2	12.8		3.5		16.9		21.7		8.1		3.2
Chromium	0.05	0.01	0.01	0.0007	0.0008	0.0023		< 0.001		0.00023		< 0.001		0.001		< 0.001
Chromium (VI)	NV	NV	NV	-	-	-		-		-		-		-		-
Cobalt	NV	NV	NV	< 0.005	<0.005	< 0.005		< 0.005		0.000087		< 0.005		< 0.005		< 0.005
Chemical Oxygen Demand	NV	NV	NV	24	9	6		12		6		6		82		54
Conductivity (uS/cm)	NV	NV	NV	381	710	598		546		627		725		549		424
Copper	1	0.5	0.38	0.0002	0.0011	< 0.0001		0.0008		0.00039		0.0002		0.0005		0.0004
Dissolved Organic Carbon	5	4.9	3.7	4	3.3	3.7		3.6		**5.7**		4.8		4.8		6
Flouride	1.5	0.5	0.38	0.2	0.1	0.1		< 0.1		< 0.1		< 0.1		< 0.1		< 0.1
Hardness	500	385	289	202	**402**	311		292		315		348		303		258
Iron	0.3	0.2	0.15	0.049	**0.254**	**0.293**		0.027		0.169		0.008		0.052		0.071
Lead	0.01	0.003	0.002	< 0.00002	<0.00002	< 0.00002		0.00003		0.00009		0.00004		0.00002		0.00006
Magnesium	NV	NV	NV	2.05	4.36	3.87		2.89		4.22		3.79		3.21		2.45
Manganese	0.05	0.1	0.08	0.007	0.02	0.018		0.004		0.009		0.001		0.003		0.016
Mercury	0.001	0.0003	0.0002	< 0.00002	<0.00002	< 0.00002		< 0.00002		< 0.00002		< 0.00002		< 0.00002		< 0.00002
Molybdenum	NV	NV	NV	< 0.0001	<0.00001	< 0.0001		< 0.0001		< 0.00004		< 0.0001		< 0.0001		< 0.0001
Nickel	NV	NV	NV	< 0.01	<0.01	< 0.01		< 0.01		< 0.01		< 0.01		< 0.01		< 0.01
Nitrate	10	2.6	2.0	0.1	0.4	0.4		0.21		0.13		1.18		0.3		< 0.05
Nitrite	1	0.3	0.2	< 0.1	<0.1	< 0.1		< 0.05		< 0.05		< 0.05		< 0.05		< 0.05
pH (unit)	6.5 - 8.5	NV	NV	7.91	7.43	7.77		7.84		7.65		7.59		7.64		8.21
Phenols	NV	NV	NV	< 0.001	<0.001	< 0.001		0.004		0.003		< 0.002		< 0.002		< 0.002
Dissolved Phosphorous	NV	NV	NV	< 0.1	<0.1	< 0.1		< 0.1		< 0.1		< 0.1		< 0.1		< 0.1
Total Phosphorous	NV	NV	NV	0.08	0.08	0.61		0.05		0.04		0.05		0.62		0.39
Potassium	NV	NV	NV	0.4	0.7	0.5		0.4		0.6		0.6		0.4		0.4
Selenium	0.01	0.003	0.002	< 0.001	<0.0001	< 0.001		< 0.001		0.0003		< 0.001		< 0.001		< 0.001
Silver	NV	NV	NV	< 0.00002	<0.00002	< 0.00002		< 0.00002		< 0.00002		< 0.0001		< 0.0001		< 0.0001
Sodium	200	103	77	0.9	13.7	7		2.4		9.1		12.5		5.3		1.1
Strontium	NV	NV	NV	0.146	0.288	0.236		0.195		0.248		0.242		0.207		0.177
Sulphate	500	255	191	2	9	7		4		6		8		8		3
Total Dissolved Solids	500	395	296	203	**403**	322		292		338		373		299		251
Total Kjeldahl Nitrogen	NV	NV	NV	0.5	9	3.4		0.3		0.4		0.4		2.6		1.7
Thallium	NV	NV	NV	< 0.00005	<0.00005	< 0.00005		< 0.00005		< 0.000004		< 0.00005		< 0.005		< 0.00005
Vanadium	NV	NV	NV	0.0003	0.0019	0.001		0.0011		< 0.00007		0.0002		0.0001		< 0.0001
Zinc	5	NV	NV	< 0.005	0.008	< 0.005		< 0.005		< 0.005		< 0.005		0.005		< 0.005
Conductivity (µs/cm) [9]	NV	NV	NV	342	591	535		885		550		555		485		470
pH (units) [9]	6.5 - 8.5	NV	NV	6.59	7.03	7.29		7.19		7.35		7.34		7.55		7.59
Temperature (°C) [9]	NV	NV	NV	13.36	14	13.1		14.9		14.9		12.8		11.5		15.1
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	-	-	-		-		-		-		-		-
Dissolved Oxygen [9]	NV	NV	NV	-	-	-		-		-		-		-		-

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 2 - Ground Water Quality Data - Bedrock

Parameters	ODWQS^3	RUC^4	Trigger (75% RUC)	MW9	MW9	MW9	MW9	MW14	MW14	MW14	MW14	MW14	MW14	MW14	MW14	MW14
				13-Apr-22	23-Oct-22	10-May-23	18-Oct-23	29-May-12	04-Oct-12	21-May-13	30-Sep-13	28-Apr-14	22-Sep-14	16-Jun-15	25-Aug-15	16-Sep-15
Alkalinity	500	377	283	flooded, not accessible	302	flooded, not accessible	343	**740**	**710**	**625**	**862**	260	**798**	**746**	**840**	**869**
Aluminum	0.1	0.08	0.060		0.04		0.06	0.0063	0.0062	0.08	0.07	0.03	0.06	0.06	0.07	0.08
Ammonia, Total	NV	NV	NV		0.07		1.81	0.01	0.13	< 0.01	< 0.01	0.03	< 0.1	0.05	0.08	0.04
Antimony	0.006	0.002	0.002		< 0.0001		0.0001	<0.00050	<0.00050	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Arsenic	0.025	0.006	0.005		0.0001		0.0001	0.0012	0.0012	**0.0067**	0.0047	0.0005	0.0032	0.0048	0.0037	0.0023
Barium	1	0.3	0.23		0.035		0.034	**0.4**	**0.42**	**0.394**	**0.458**	0.099	**0.45**	**0.415**	**0.379**	**0.477**
Beryllium	NV	NV	NV		< 0.002		<0.0001	<0.00050	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	5	1.3	1.0		0.068		0.076	0.12	0.062	0.042	0.054	0.01	0.035	0.032	0.035	0.035
Cadmium	0.005	0.001	0.001		< 0.000010		<0.000015	<0.00010	<0.00010	< 0.00002	< 0.00002	0.00005	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Calcium	NV	NV	NV		126		125	320	330	288	371	107	373	342	327	378
Chloride	250	129	97		13.8		14.3	97	**140**	58.8	18.8	9.5	**144**	**136**	91.8	107
Chromium	0.05	0.01	0.01		0.001		<0.001	<0.0050	<0.0050	0.003	< 0.0002	< 0.0002	< 0.0002	0.01	< 0.0002	0.0056
Chromium (VI)	NV	NV	NV		-		<0.01	-	-	-	-	-	-	-	-	-
Cobalt	NV	NV	NV		< 0.005		0.0003	<0.0010 (1)	<0.0010	0.007	< 0.005	< 0.005	0.006	0.005	< 0.005	< 0.005
Chemical Oxygen Demand	NV	NV	NV		33		48	21	13	18	14	12	< 5	8	19	< 5
Conductivity (uS/cm)	NV	NV	NV		610		665	1600	1800	1440	1780	545	1890	1760	1750	1790
Copper	1	0.5	0.38		0.0023		0.0006	<0.0010	<0.0010	0.0015	0.0006	0.0006	0.0005	< 0.0001	0.0005	0.0001
Dissolved Organic Carbon	5	4.9	3.7		4.8		**10.8**	3.2	2.3	**10**	**13.3**	**5.4**	**7.3**	**11.7**	2.3	1.5
Flouride	1.5	0.5	0.38		< 0.1		<0.1	<0.10	<0.10	0.2	< 0.1	0.1	0.1	0.2	0.1	0.2
Hardness	500	385	289		329		327	**870**	**920**	**771**	**1010**	282	**1010**	**921**	**890**	**1030**
Iron	0.3	0.2	0.15		0.024		0.078	**15**	**16**	**11.8**	**13.3**	0.017	**7.36**	**6.17**	**7.89**	**9.39**
Lead	0.01	0.003	0.002		0.00004		0.00002	<0.00050	<0.00050	0.00005	0.00008	0.00026	< 0.00002	< 0.00002	0.00008	0.00008
Magnesium	NV	NV	NV		3.49		3.48	19	20	12.4	19.3	3.42	19	15.9	17.8	20.4
Manganese	0.05	0.1	0.08		0.001		0.003	**1.2**	**1.4**	**1.01**	**1.34**	**0.1**	**1.25**	**1.19**	**1.18**	**1.49**
Mercury	0.001	0.0003	0.0002		< 0.00002		<0.00002	<0.00001	<0.00001	< 0.00002	0	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	NV	NV	NV		< 0.0001		<0.0001	<0.00050	<0.00050	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	< 0.0001
Nickel	NV	NV	NV		< 0.01		0.0011	0.0051	<0.0020	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nitrate	10	2.6	2.0		0.88		0.3	<0.10	<0.10	< 0.1	0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrite	1	0.3	0.2		< 0.05		0.1	<0.010	<0.010	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
pH (unit)	6.5 - 8.5	NV	NV		7.53		7.51	7.3	7	7.09	7.21	7.66	7.25	6.97	6.91	6.95
Phenols	NV	NV	NV		< 0.001		0.004	<0.0010	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Phosphorous	NV	NV	NV		< 0.1		<0.1	<0.10	<0.10	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Phosphorous	NV	NV	NV		0.22		0.2	-	-	-	-	0.01	0.04	0.05	0.05	0.03
Potassium	NV	NV	NV		0.5		0.5	1.8	1.8	1.4	1.9	0.7	2	1.9	1.9	1.9
Selenium	0.01	0.003	0.002		< 0.001		<0.001	<0.0020	<0.0020	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Silver	NV	NV	NV		< 0.0001		<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Sodium	200	103	77		5.7		7	23	25	31	26	5	34	39	28	35
Strontium	NV	NV	NV		0.225		0.222	0.64	0.65	0.547	-	-	0.72	0.68	0.577	0.728
Sulphate	500	255	191		5		5	38	41	22	42	7	35	29	32	31
Total Dissolved Solids	500	395	296		336		345	**977**	**1030**	**802**	**1010**	288	**1090**	**1020**	**1010**	**1110**
Total Kjeldahl Nitrogen	NV	NV	NV		1.3		2.3	0.67	0.48	0.48	0.3	0.2	0.3	0.7	0.4	0.4
Thallium	NV	NV	NV		< 0.00005		<0.00005	<0.000050	<0.000050	< 0.00005	< 0.00005	0.00013	< 0.00005	< 0.00005	0.00012	0.00016
Vanadium	NV	NV	NV		0.0002		0.0001	0.0021	0.0013	< 0.005	0.0229	0.0028	0.017	0.0099	0.0164	0.003
Zinc	5	NV	NV		< 0.005		<0.005	<0.0050	<0.0050	0.006	< 0.005	0.008	< 0.005	< 0.005	0.014	< 0.005
Conductivity (µs/cm) ^{9}	NV	NV	NV		500		490	1676	1550	1559	1816	-	-	1330	1185	1990
pH (units) ^{9}	6.5 - 8.5	NV	NV		7.71		7.68	6.72	6.8	6.73	6.38	-	-	6.43	6.74	6.33
Temperature (°C) ^{9}	NV	NV	NV		14.2		12.2	13.5	14	10.8	9.9	-	-	13.63	9.8	10.92
Oxidation Reduction Potential (mV)^9	NV	NV	NV		-		-	76	48	64	186	-	-	-	-	-
Dissolved Oxygen ^{9}	NV	NV	NV		-		-	4.1	3.6	3.59	2.15	-	-	-	-	-

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 2 - Ground Water Quality Data - Bedrock

Parameters	ODWQS^3	RUC^4	Trigger (75% RUC)	MW14 22-Mar-16	MW14 01-Jun-16	MW14 22-Aug-16	MW14 18-Oct-16	MW14 20-Apr-17	MW14 23-Oct-17	MW14 25-Apr-18	MW14 27-Sep-18	MW14 16-Apr-19	MW14 24-Oct-19	MW14 20-Apr-20	MW14 08-Oct-20	MW14 14-Apr-21
Alkalinity	500	377	283	362	**794**	**832**	**815**	298	**800**	185	**756**	176	**800**	311	**774**	**448**
Aluminum	0.1	0.08	0.060	0.04	0.07	**0.09**	0.08	0.04	**0.13**	0.07	**0.14**	0.05	**0.12**	0.08	**0.14**	**0.11**
Ammonia, Total	NV	NV	NV	0.04	0.08	0.13	0.08	< 0.01	0.07	0.01	0.07	0.02	0.08	< 0.01	0.04	0.03
Antimony	0.006	0.002	0.002	< 0.0001	< 0.0001	<0.0001	0.0002	< 0.0001	< 0.0001	< 0.0001	0.00004	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Arsenic	0.025	0.006	0.005	0.0008	0.0052	0.0036	0.0018	0.0004	0.0035	0.0001	0.0017	0.0002	0.0014	0.0002	0.0012	0.0004
Barium	1	0.3	0.23	0.164	**0.38**	**0.501**	**0.445**	0.12	**0.433**	0.054	**0.427**	0.051	**0.431**	0.125	**0.453**	0.24
Beryllium	NV	NV	NV	< 0.002	< 0.002	<0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	5	1.3	1.0	0.015	0.053	0.038	0.03	< 0.005	0.033	0.009	0.037	0.006	0.029	0.03	0.036	0.043
Cadmium	0.005	0.001	0.001	< 0.00002	< 0.00002	<0.00002	< 0.00002	0.000019	< 0.000014	< 0.000015	< 0.000006	< 0.000015	< 0.000015	< 0.000015	< 0.000015	0.000034
Calcium	NV	NV	NV	143	311	407	357	124	341	78	325	73.7	342	136	344	208
Chloride	250	129	97	7.7	81.6	118	**138**	12	82.4	2.2	90.3	3.3	86.2	9.3	63	10.8
Chromium	0.05	0.01	0.01	0.0013	0.0057	0.0007	0.0076	< 0.001	< 0.001	0.001	0.00059	< 0.001	0.001	< 0.001	0.001	< 0.001
Chromium (VI)	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	NV	NV	NV	0.009	0.011	0.008	0.009	< 0.005	0.009	0.009	0.00881	0.006	0.009	< 0.005	0.015	0.011
Chemical Oxygen Demand	NV	NV	NV	18	24	<5	6	24	25	15	6	15	< 5	16	8	11
Conductivity (uS/cm)	NV	NV	NV	708	1660	1820	1890	609	1730	377	1710	377	1750	660	1600	952
Copper	1	0.5	0.38	0.0006	< 0.0001	<0.0001	< 0.0001	0.0006	0.0007	0.0006	0.00054	0.001	< 0.0001	0.0025	0.0002	0.0025
Dissolved Organic Carbon	5	4.9	3.7	3.1	3.4	2	2	**5.5**	3.1	3.7	**6.5**	4	**6**	**6.4**	3	**9.8**
Flouride	1.5	0.5	0.38	< 0.1	0.1	0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hardness	500	385	289	379	**847**	**1110**	**974**	328	**929**	205	**894**	193	**936**	359	**942**	**555**
Iron	0.3	0.2	0.15	**0.419**	**7.55**	**7.76**	**5.84**	0.019	**6.86**	0.081	**6.13**	0.04	**6.81**	0.18	**7.72**	**1.69**
Lead	0.01	0.003	0.002	0.00005	< 0.00002	<0.00002	< 0.00002	< 0.00002	0.00013	0.00026	0.00007	0.00007	0.00017	0.00007	0.00007	0.00009
Magnesium	NV	NV	NV	5.25	16.7	21.1	19.9	4.21	18.6	2.35	19.8	2.22	19.7	4.63	19.9	8.48
Manganese	0.05	0.1	0.08	**0.595**	**1.49**	**1.75**	**1.68**	**0.311**	**1.74**	0.011	**1.8**	0.014	**1.95**	**0.288**	**2.11**	**1.97**
Mercury	0.001	0.0003	0.0002	< 0.00002	< 0.00002	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	NV	NV	NV	0.0002	0.0003	0.0002	0.0002	0.0002	0.0002	0.0001	< 0.00004	0.0001	0.0003	0.0002	0.0003	0.0003
Nickel	NV	NV	NV	< 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
Nitrate	10	2.6	2.0	< 0.1	0.1	0.1	< 0.1	< 0.1	< 0.05	0.08	< 0.05	< 0.05	0.06	0.08	< 0.05	0.09
Nitrite	1	0.3	0.2	< 0.1	< 0.1	<0.1	< 0.1	< 0.1	< 0.05	< 0.05	0.06	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
pH (unit)	6.5 - 8.5	NV	NV	7.22	7.07	7	7.32	7.35	7.14	8.01	7.38	7.88	7.3	7.7	7.08	7.26
Phenols	NV	NV	NV	< 0.001	< 0.001	<0.001	< 0.001	< 0.001	0.005	< 0.001	0.006	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Dissolved Phosphorous	NV	NV	NV	< 0.1	< 0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Phosphorous	NV	NV	NV	0.03	0.02	0.04	0.02	0.3	0.09	0.1	0.03	0.05	0.04	0.03	0.01	0.07
Potassium	NV	NV	NV	0.8	1.5	2	1.9	0.5	1.9	0.4	2	0.4	2	0.8	2.2	1.4
Selenium	0.01	0.003	0.002	< 0.001	< 0.001	**0.004**	**0.007**	< 0.001	0.002	< 0.001	0.0012	< 0.001	0.002	< 0.001	0.001	< 0.001
Silver	NV	NV	NV	< 0.00002	< 0.00002	<0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001
Sodium	200	103	77	8.6	26.3	38.5	40.2	6.8	35.2	2.1	39.1	2.1	37.4	6.1	34.9	9.2
Strontium	NV	NV	NV	0.254	0.593	0.777	0.737	0.21	0.632	0.128	0.709	0.125	0.652	0.223	0.645	0.354
Sulphate	500	255	191	6	26	32	36	10	23	2	31	4	29	11	27	20
Total Dissolved Solids	500	395	296	390	**950**	**1130**	**1090**	337	**991**	198	**968**	191	**1005**	355	**965**	**530**
Total Kjeldahl Nitrogen	NV	NV	NV	0.3	0.4	0.1	0.3	1	0.3	0.4	0.3	0.4	0.3	0.3	0.2	0.4
Thallium	NV	NV	NV	0.00011	< 0.00005	<0.00005	< 0.00005	0.00008	< 0.00005	< 0.00005	< 0.000004	< 0.00005	0.00006	< 0.00005	< 0.005	0.0001
Vanadium	NV	NV	NV	0.0011	0.0025	0.0054	0.0034	0.0026	0.0043	0.0015	< 0.00007	0.0003	0.0006	0.0002	0.0004	0.0006
Zinc	5	NV	NV	< 0.005	< 0.005	0.009	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.005
Conductivity (μs/cm) ^{9}	NV	NV	NV	454	1210	1392	1580	487	1395	420	1430	410	1140	740	880	1000
pH (units) ^{9}	6.5 - 8.5	NV	NV	6.72	6.12	6.41	6.66	7.33	7.11	7.71	6.67	7.16	6.77	7.08	6.66	7.07
Temperature (°C) ^{9}	NV	NV	NV	6.5	9.59	9.9	10.2	6.5	9.9	8	9	6.5	8	8.1	8	9.4
Oxidation Reduction Potential (mV)^9	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen ^{9}	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 2 - Ground Water Quality Data - Bedrock

Parameters	**ODWQS^3**	**RUC^4**	**Trigger (75% RUC)**	**MW14 20-Oct-21**	**MW14 13-Apr-22**	**MW14 23-Oct-22**	**MW14 10-May-23**	**MW14 18-Oct-23**
Alkalinity	500	377	283	**755**	**458**	**763**	**530**	**764**
Aluminum	0.1	0.08	0.060	**0.12**	0.07	**0.14**	0.06	**0.13**
Ammonia, Total	NV	NV	NV	0.08	0.57	0.3	2.54	0.4
Antimony	0.006	0.002	0.002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001
Arsenic	0.025	0.006	0.005	0.0015	0.0004	0.0012	0.0016	0.0013
Barium	1	0.3	0.23	**0.438**	0.177	**0.481**	0.252	**0.453**
Beryllium	NV	NV	NV	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001
Boron	5	1.3	1.0	0.046	0.025	0.033	0.062	0.026
Cadmium	0.005	0.001	0.001	< 0.000015	< 0.000015	< 0.000012	< 0.000010	<0.000015
Calcium	NV	NV	NV	335	153	355	177	329
Chloride	250	129	97	72.5	15.7	**158**	4.5	17.8
Chromium	0.05	0.01	0.01	< 0.001	< 0.001	< 0.001	< 0.001	<0.001
Chromium (VI)	NV	NV	NV	-	-	-	< 0.001	<0.01
Cobalt	NV	NV	NV	0.009	0.007	0.017	0.01	0.0165
Chemical Oxygen Demand	NV	NV	NV	7	14	18	44	19
Conductivity (uS/cm)	NV	NV	NV	1500	947	1800	992	1810
Copper	1	0.5	0.38	0.0003	0.0008	0.0006	0.0004	0.0003
Dissolved Organic Carbon	5	4.9	3.7	**7.8**	**6.8**	1.2	**9.1**	**7.3**
Flouride	1.5	0.5	0.38	< 0.1	< 0.1	< 1	< 0.1	<0.1
Hardness	500	385	289	**910**	**408**	**967**	**483**	**896**
Iron	0.3	0.2	0.15	**14**	**3.15**	**13.1**	**15.6**	**9.87**
Lead	0.01	0.003	0.002	0.00021	0.00036	0.00066	0.00019	0.00004
Magnesium	NV	NV	NV	17.6	6.21	19.4	9.69	17.8
Manganese	0.05	0.1	0.08	**2.42**	**1.3**	**2.3**	**1.72**	**2.15**
Mercury	0.001	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002
Molybdenum	NV	NV	NV	0.0004	0.0003	0.0003	0.0007	0.0004
Nickel	NV	NV	NV	< 0.01	< 0.01	< 0.01	< 0.01	0.0068
Nitrate	10	2.6	2.0	< 0.05	< 0.05	< 0.5	< 0.05	<0.05
Nitrite	1	0.3	0.2	0.06	< 0.05	< 0.5	< 0.05	<0.05
pH (unit)	6.5 - 8.5	NV	NV	7.51	7.44	7.17	7.39	7.22
Phenols	NV	NV	NV	< 0.002	< 0.001	< 0.001	< 0.001	<0.001
Dissolved Phosphorous	NV	NV	NV	< 0.1	< 0.1	< 0.1	< 0.1	<0.1
Total Phosphorous	NV	NV	NV	0.05	0.06	0.07	0.28	0.06
Potassium	NV	NV	NV	2.2	1.1	2.2	2	2.2
Selenium	0.01	0.003	0.002	0.002	0.001	**0.004**	< 0.001	**0.004**
Silver	NV	NV	NV	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001
Sodium	200	103	77	31.9	6.2	42.3	7.7	45.7
Strontium	NV	NV	NV	0.625	0.264	0.671	0.367	0.639
Sulphate	500	255	191	23	12	23	11	3
Total Dissolved Solids	500	395	296	**952**	**475**	**1074**	**548**	**996**
Total Kjeldahl Nitrogen	NV	NV	NV	0.5	0.9	0.4	3.6	0.6
Thallium	NV	NV	NV	0.00008	0.00006	0.00008	0.00006	0.00007
Vanadium	NV	NV	NV	0.0006	0.0006	0.0005	0.0009	0.0003
Zinc	5	NV	NV	0.005	< 0.005	0.006	< 0.005	<0.005
Conductivity (µs/cm) ^{9}	NV	NV	NV	1690	603	1190	730	1050
pH (units) ^{9}	6.5 - 8.5	NV	NV	6.69	7.07	6.87	6.84	6.92
Temperature (°C) ^{9}	NV	NV	NV	8.9	7.8	9.2	10.5	8.7
Oxidation Reduction Potential (mV)^9	NV	NV	NV	-	-	-	-	-
Dissolved Oxygen ^{9}	NV	NV	NV	-	-	-	-	-

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 2 - Ground Water Quality Data - Bedrock

Parameters	**ODWQS[3]**	**RUC[4]**	**Trigger (75% RUC)**	**MW15 29-May-12**	**MW15 04-Oct-12**	**MW15 21-May-13**	**MW15 30-Sep-13**	**MW15 28-Apr-14**	**MW15 22-Sep-14**	**MW15 16-Jun-15**	**MW15 16-Sep-15**	**MW15 22-Mar-16**	**MW15 01-Jun-16**	**MW15 18-Oct-16**	**MW15 20-Apr-17**	**MW15 23-Oct-17**	**MW15 25-Apr-18**
Alkalinity	500	377	283	***300***	***290***	246	266	239	256	237	252	260	268	258	230	248	238
Aluminum	0.1	0.08	0.060	<0.0050	<0.0050	0.04	0.06	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.06	0.06
Ammonia, Total	NV	NV	NV	<0.01	0.05	< 0.01	< 0.01	0.04	0.3	< 0.01	< 0.01	0.03	0.01	0.01	< 0.01	< 0.01	0.02
Antimony	0.006	0.002	0.002	<0.00050	<0.00050	< 0.0001	< 0.0001	< 0.0001	0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0004	< 0.0001	< 0.0001	< 0.0001
Arsenic	0.025	0.006	0.005	<0.0010	<0.0010	0.0002	0.0003	0.0001	0.0003	0.0002	0.0002	< 0.0001	< 0.0001	0.0003	< 0.0001	0.0002	< 0.0001
Barium	1	0.3	0.23	0.032	0.026	0.049	0.031	0.044	0.028	0.031	0.025	0.05	0.031	0.029	0.043	0.027	0.048
Beryllium	NV	NV	NV	<0.00050	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	5	1.3	1.0	0.082	0.1	0.03	0.162	0.01	0.23	0.064	0.44	0.011	0.061	0.227	< 0.005	0.167	0.023
Cadmium	0.005	0.001	0.001	<0.00010	<0.00010	< 0.00002	< 0.00002	0.00004	0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015
Calcium	NV	NV	NV	110	110	108	113	100	114	99	113	111	102	111	97.6	100	103
Chloride	250	129	97	2	1	1.7	2.5	2.4	2.3	1.7	1.9	1.6	1.7	2.1	1.4	1.6	< 0.5
Chromium	0.05	0.01	0.01	<0.0050	<0.0050	< 0.002	< 0.0002	< 0.0002	0.0006	0.0035	0.0005	0.0008	0.0011	0.0019	< 0.001	< 0.001	< 0.001
Chromium (VI)	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	NV	NV	NV	<0.00050	<0.00050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.011
Chemical Oxygen Demand	NV	NV	NV	10	5.6	< 5	8	5	7	< 5	< 5	< 5	16	< 5	5	13	8
Conductivity (uS/cm)	NV	NV	NV	600	600	501	596	476	573	486	558	515	533	560	450	540	479
Copper	1	0.5	0.38	<0.0010	<0.0010	0.0009	0.0004	0.0005	0.0006	< 0.0001	0.0002	0.0006	0.0002	< 0.0001	0.0007	0.0008	0.0002
Dissolved Organic Carbon	5	4.9	3.7	1.4	1.4	3.4	***4.2***	3	***4.8***	1.9	1.1	1	1.5	1.4	2.1	1.4	2.5
Flouride	1.5	0.5	0.38	0.15	0.19	0.2	***0.4***	0.1	0.06	0.1	0.2	< 0.1	0.2	0.2	< 0.1	< 0.1	< 0.1
Hardness	500	385	289	***310***	***310***	280	***311***	259	***315***	265	***321***	287	274	***306***	253	275	266
Iron	0.3	0.2	0.15	<0.10	<0.10	< 0.005	0.072	< 0.005	0.026	0.006	0.008	< 0.005	< 0.005	0.011	0.015	< 0.005	< 0.005
Lead	0.01	0.003	0.002	<0.00050	<0.00050	< 0.00002	0.00003	0.00004	< 0.00002	< 0.00002	0.00005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00002	< 0.00002
Magnesium	NV	NV	NV	6.4	7.3	2.38	6.98	1.91	7.16	4.3	9.48	2.19	4.46	6.89	2.17	6.03	2.17
Manganese	0.05	0.1	0.08	0.01	0.01	< 0.001	0.02	< 0.001	0.01	< 0.001	0	< 0.001	< 0.001	0.005	< 0.001	0.001	< 0.001
Mercury	0.001	0.0003	0.0002	<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	NV	NV	NV	0.0011	0.0016	< 0.0001	0.001	< 0.0001	0.0015	0.0004	0.0012	< 0.0001	0.0004	0.0009	0.0001	0.001	< 0.0001
Nickel	NV	NV	NV	0.0014	<0.0010	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nitrate	10	2.6	2.0	0.17	0.19	0.2	0.2	0.1	0.2	0.4	0.2	0.1	0.2	0.2	< 0.1	0.16	< 0.05
Nitrite	1	0.3	0.2	<0.010	<0.010	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	***0.3***	< 0.1	< 0.1	***0.3***	< 0.1	< 0.05	< 0.05
pH (unit)	6.5 - 8.5	NV	NV	7.77	7.42	7.7	7.88	7.86	7.86	7.72	7.74	7.74	7.93	8.03	7.76	8	8.03
Phenols	NV	NV	NV	<0.0010	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.007	< 0.001	0.003	< 0.001
Dissolved Phosphorous	NV	NV	NV	<0.10	<0.10	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Phosphorous	NV	NV	NV	-	-	-	-	< 0.01	0.03	0.1	0.02	0.01	0.05	0.02	0.02	0.03	0.03
Potassium	NV	NV	NV	1.6	1.8	0.6	1.8	0.6	1.8	1.1	2	0.6	1.1	1.6	0.4	1.7	0.5
Selenium	0.01	0.003	0.002	<0.0020	<0.0020	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Silver	NV	NV	NV	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Sodium	200	103	77	2	2	1	9	1	2	2	3	1.5	1.7	1.9	0.9	1.7	1.2
Strontium	NV	NV	NV	0.88	0.97	0.255	-	-	1.5	0.492	1.33	0.232	0.597	1.09	0.246	0.826	0.214
Sulphate	500	255	191	21	27	15	49	7	41	17	18	7	13	38	9	25	9
Total Dissolved Solids	500	395	296	***335***	***337***	277	***344***	257	***323***	269	***300***	281	286	***318***	250	285	259
Total Kjeldahl Nitrogen	NV	NV	NV	0.38	0.53	0.06	0.17	0.3	0.2	0.3	< 0.1	0.3	0.2	1.1	0.1	0.2	0.1
Thallium	NV	NV	NV	<0.000050	<0.000050	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	NV	NV	NV	<0.00050	<0.00050	< 0.005	0.0045	0.0017	0.0039	0.0025	0.0003	0.0005	0.0003	0.0008	0.0015	0.0007	0.0015
Zinc	5	NV	NV	0.012	<0.0050	< 0.005	< 0.005	< 0.005	0.007	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Conductivity (µs/cm) [9]	NV	NV	NV	589	530	519	580	-	-	382	443	321	462	495	378	440	550
pH (units) [9]	6.5 - 8.5	NV	NV	7.8	7.71	7.59	7.43	-	-	7.62	7.28	7.21	6.97	7.46	8.15	7.88	7.67
Temperature (°C) [9]	NV	NV	NV	11.2	16.3	7.6	16.1	-	-	11.45	10.39	5.7	9.21	11.9	5.9	11.2	3.5
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	152	5	89	23	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen [9]	NV	NV	NV	8.52	8.2	10.04	6.11	-	-	-	-	-	-	-	-	-	-

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 2 - Ground Water Quality Data - Bedrock

Parameters	**ODWQS[3]**	**RUC[4]**	**Trigger (75% RUC)**	**MW15 27-Sep-18**	**MW15 16-Apr-19**	**MW15 24-Oct-19**	**MW15 20-Apr-20**	**MW15 08-Oct-20**	**MW15 14-Apr-21**	**MW15 20-Oct-21**	**MW15 13-Apr-22**	**MW15 23-Oct-22**	**MW15 10-May-23**	**MW15 18-Oct-23**	**MW16-I 18-Oct-16**	**MW16-I 20-Apr-17**	**MW16-I 23-Oct-17**
Alkalinity	500	377	283	271	204	232	228	232	224	221	254	252	249	272	***290***	200	Dry
Aluminum	0.1	0.08	0.060	***0.08***	0.05	0.05	0.06	***0.07***	***0.08***	0.06	0.05	0.06	0.02	0.06	**0.96**	0.01	
Ammonia, Total	NV	NV	NV	0.04	0.01	0.04	< 0.01	< 0.01	< 0.01	0.02	0.07	< 0.01	0.47	0.85	0.36	0.39	
Antimony	0.006	0.002	0.002	0.00014	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0002	0.0007	0.0001	
Arsenic	0.025	0.006	0.005	0.00015	< 0.0001	0.0001	< 0.0001	0.0001	0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	0.0001	0.0005	0.0003	
Barium	1	0.3	0.23	0.03	0.036	0.032	0.047	0.03	0.048	0.037	0.055	0.034	0.041	0.031	0.114	0.033	
Beryllium	NV	NV	NV	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	< 0.002	< 0.002	
Boron	5	1.3	1.0	0.347	0.014	0.257	0.013	0.212	0.012	0.104	0.012	0.164	0.013	0.144	0.023	< 0.005	
Cadmium	0.005	0.001	0.001	< 0.000006	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000010	< 0.000010	<0.000015	< 0.00002	0.000021	
Calcium	NV	NV	NV	102	87.2	108	104	107	105	111	110	109	86.7	102	110	61.3	
Chloride	250	129	97	2.1	1.1	1.8	1.7	2.1	1.3	2.3	1.2	1.2	1.8	2.1	33.3	5.1	
Chromium	0.05	0.01	0.01	0.00007	< 0.001	< 0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.001	0.001	< 0.001	<0.001	0.0058	< 0.001	
Chromium (VI)	NV	NV	NV	-	-	-	-	-	-	-	-	-	< 0.001	<0.01	-	-	
Cobalt	NV	NV	NV	0.000016	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.0002	0.012	< 0.005	
Chemical Oxygen Demand	NV	NV	NV	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	17	< 5	116	
Conductivity (uS/cm)	NV	NV	NV	574	422	542	466	530	482	459	522	556	481	551	670	401	
Copper	1	0.5	0.38	0.00026	0.0006	0.0002	0.0001	0.0004	0.0019	0.0005	0.0006	0.0011	0.0003	0.0005	0.0037	0.0027	
Dissolved Organic Carbon	5	4.9	3.7	2.6	2.2	2.3	2.4	2.2	3.4	2.3	2.4	2.1	2.1	3.6	1.6	3.6	
Flouride	1.5	0.5	0.38	0.2	< 0.1	0.3	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	0.1	< 0.1	
Hardness	500	385	289	288	225	***299***	269	***295***	271	***298***	284	***300***	225	280	***297***	165	
Iron	0.3	0.2	0.15	0.031	< 0.005	0.021	< 0.005	0.038	< 0.005	0.007	< 0.005	0.149	0.006	0.006	**1.73**	0.08	
Lead	0.01	0.003	0.002	< 0.00002	< 0.00002	0.00005	< 0.00002	< 0.00002	0.00007	< 0.00002	< 0.00002	0.00003	< 0.00002	<0.00002	0.00177	0.00007	
Magnesium	NV	NV	NV	8.06	1.75	7.02	2.08	6.65	2.15	4.89	2.22	6.6	2.01	6.04	5.66	2.91	
Manganese	0.05	0.1	0.08	0.008	< 0.001	0.002	< 0.001	0.01	< 0.001	< 0.001	< 0.001	0.021	< 0.001	0.001	**0.226**	**0.075**	
Mercury	0.001	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002	< 0.00002	< 0.00002	
Molybdenum	NV	NV	NV	< 0.00004	< 0.0001	0.0014	< 0.0001	0.0011	0.0001	0.0005	< 0.0001	0.0012	0.0003	0.001	0.0078	0.0056	
Nickel	NV	NV	NV	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.0008	< 0.01	< 0.01	
Nitrate	10	2.6	2.0	0.08	0.14	0.18	0.11	0.13	0.19	0.13	< 0.05	< 0.05	0.09	0.22	0.3	0.1	
Nitrite	1	0.3	0.2	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.09	0.14	< 0.05	<0.05	< 0.1	< 0.1	
pH (unit)	6.5 - 8.5	NV	NV	7.73	7.95	7.84	7.91	7.79	7.84	7.93	7.75	7.7	7.75	7.68	7.99	8	
Phenols	NV	NV	NV	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001	< 0.001	< 0.001	
Dissolved Phosphorous	NV	NV	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	0.1	< 0.1	
Total Phosphorous	NV	NV	NV	< 0.01	0.02	0.02	< 0.01	0.03	0.06	0.04	0.01	0.03	0.12	0.02	19.4	0.75	
Potassium	NV	NV	NV	2.2	0.5	1.7	0.6	1.7	0.6	1.3	0.5	1.6	0.6	1.6	0.6	0.3	
Selenium	0.01	0.003	0.002	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	0.001	< 0.001	
Silver	NV	NV	NV	0.00005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	< 0.00002	< 0.00002	
Sodium	200	103	77	2.6	0.9	1.8	1	1.7	1.1	1.5	1.1	1.6	1	1.6	47.8	21.6	
Strontium	NV	NV	NV	1.96	0.179	1.55	0.201	1.48	0.209	0.699	0.226	1.53	0.213	1.23	0.341	0.183	
Sulphate	500	255	191	52	6	39	7	40	11	31	9	41	9	36	9	6	
Total Dissolved Solids	500	395	296	***332***	220	***299***	253	***298***	256	284	276	***312***	250	286	***384***	218	
Total Kjeldahl Nitrogen	NV	NV	NV	0.2	0.2	0.2	<0.1	0.2	>0.1	0.2	0.2	0.2	0.5	0.8	3	0.2	
Thallium	NV	NV	NV	< 0.000004	< 0.00005	< 0.00005	< 0.00005	< 0.005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	<0.00005	< 0.00005	< 0.00005	
Vanadium	NV	NV	NV	< 0.00007	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	0.0001	0.0024	0.0011	
Zinc	5	NV	NV	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.005	< 0.005	<0.005	0.007	< 0.005	
Conductivity (µs/cm) [9]	NV	NV	NV	490	480	420	555	545	580	520	450	435	385	410	585	340	
pH (units) [9]	6.5 - 8.5	NV	NV	7.8	6.78	7.7	7.53	7.21	7.81	7.53	7.74	7.7	7.44	7.45	7.33	7.8	
Temperature (°C) [9]	NV	NV	NV	9.1	5.5	8.9	4.4	7.3	6.5	10.6	6.2	9.4	6.6	9.2	12	5.4	
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	
Dissolved Oxygen [9]	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	

Notes:

1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 2 - Ground Water Quality Data - Bedrock

Parameters	ODWQS[3]	RUC[4]	Trigger	MW16-I	MW16-I	MW16-I	MW16-I	MW16-I	MW16-I	MW16-I	MW16-I	MW16-I	MW16-I	MW16-I	MW16-II	MW16-II	MW16-II
			(75% RUC)	25-Apr-18	27-Sep-18	16-Apr-19	24-Oct-19	20-Apr-20	08-Oct-20	14-Apr-21	20-Oct-21	13-Apr-22	10-May-23	18-Oct-23	18-Oct-16	20-Apr-17	23-Oct-17
Alkalinity	500	377	283	174	Dry	149	253	171	Dry	170	235	186	185	Dry	Dry	184	Dry
Aluminum	0.1	0.08	0.060	0.04		**0.16**	0.06	0.05		0.06	0.06	0.04	0.02			0.02	
Ammonia, Total	NV	NV	NV	0.61		0.34	0.29	0.01		< 0.01	0.06	0.71	1.03			0.05	
Antimony	0.006	0.002	0.002	0.0001		0.0003	0.0002	< 0.0001		0.0001	< 0.0001	0.0001	0.0001			< 0.0001	
Arsenic	0.025	0.006	0.005	0.0003		0.0005	0.0004	< 0.0001		0.0001	< 0.0001	0.0002	0.0001			0.0001	
Barium	1	0.3	0.23	0.034		0.024	0.047	0.031		0.035	0.042	0.033	0.024			0.041	
Beryllium	NV	NV	NV	< 0.002		< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002	< 0.002			< 0.002	
Boron	5	1.3	1.0	0.011		0.008	0.02	0.009		0.01	0.016	0.011	0.008			< 0.005	
Cadmium	0.005	0.001	0.001	0.000024		< 0.000015	< 0.000015	< 0.000015		< 0.000015	< 0.000015	< 0.000015	< 0.000010			< 0.000014	
Calcium	NV	NV	NV	56.8		56.6	110	73.5		81.2	101	79.5	62.3			75.6	
Chloride	250	129	97	2.8		2.3	35.3	2.9		2.4	9.8	3.2	2.8			3.1	
Chromium	0.05	0.01	0.01	< 0.001		< 0.001	0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001			< 0.001	
Chromium (VI)	NV	NV	NV	-		-	-	-		-	-	-	< 0.001			-	
Cobalt	NV	NV	NV	0.014		< 0.005	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005			< 0.005	
Chemical Oxygen Demand	NV	NV	NV	65		839	58	15		6	9	25	8			38	
Conductivity (uS/cm)	NV	NV	NV	352		317	633	356		368	455	379	360			369	
Copper	1	0.5	0.38	0.0003		0.0009	0.0008	0.0003		0.0021	0.0003	0.0036	0.0005			0.0015	
Dissolved Organic Carbon	5	4.9	3.7	3.6		***3.8***	2.4	***3.8***		**5.3**	***4.6***	4.8	**5.2**			***3.8***	
Flouride	1.5	0.5	0.38	< 0.1		< 0.1	< 0.1	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1			< 0.1	
Hardness	500	385	289	153		152	***295***	193		213	267	211	164			199	
Iron	0.3	0.2	0.15	0.026		**0.249**	**0.64**	0.007		0.016	0.107	**1.3**	0.007			< 0.005	
Lead	0.01	0.003	0.002	< 0.00002		0.00107	0.00022	0.00002		0.00007	0.00012	0.00005	< 0.00002			< 0.00002	
Magnesium	NV	NV	NV	2.56		2.46	4.75	2.17		2.4	3.48	2.9	1.97			2.39	
Manganese	0.05	0.1	0.08	**0.088**		**0.086**	**0.143**	0.003		0.001	0.024	**0.097**	< 0.001			< 0.001	
Mercury	0.001	0.0003	0.0002	< 0.00002		< 0.00002	< 0.00002	< 0.00002		< 0.00002	< 0.00002	< 0.00002	< 0.00002			< 0.00002	
Molybdenum	NV	NV	NV	0.0037		0.0022	0.0018	0.0001		0.0001	0.0002	0.0009	0.0001			0.0004	
Nickel	NV	NV	NV	< 0.01		< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01			< 0.01	
Nitrate	10	2.6	2.0	0.25		0.1	0.69	0.05		< 0.05	0.25	0.06	< 0.05			< 0.1	
Nitrite	1	0.3	0.2	< 0.05		< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05			< 0.1	
pH (unit)	6.5 - 8.5	NV	NV	8.2		8.09	7.82	7.93		7.84	8.23	7.72	7.73			7.89	
Phenols	NV	NV	NV	< 0.001		< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.001	< 0.001			< 0.001	
Dissolved Phosphorous	NV	NV	NV	< 0.1		< 0.1	< 0.1	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1			< 0.1	
Total Phosphorous	NV	NV	NV	6.65		4.51	3.72	0.07		0.04	0.23	0.94	0.05			0.34	
Potassium	NV	NV	NV	0.1		0.3	0.6	0.4		0.4	0.5	0.4	0.3			0.4	
Selenium	0.01	0.003	0.002	< 0.001		< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001			< 0.001	
Silver	NV	NV	NV	< 0.00002		< 0.0001	< 0.0001	< 0.0001		< 0.0001	< 0.0001	< 0.0001	< 0.0001			< 0.00002	
Sodium	200	103	77	13.9		7.7	11.8	1.4		1.4	3.4	4.8	1.1			1.7	
Strontium	NV	NV	NV	0.144		0.131	0.237	0.119		0.137	0.184	0.142	0.126			0.129	
Sulphate	500	255	191	4		4	8	3		4	4	3	2			6	
Total Dissolved Solids	500	395	296	186		163	***323***	186		194	264	210	182			200	
Total Kjeldahl Nitrogen	NV	NV	NV	2.7		3.3	0.6	0.2		0.2	0.2	0.9	1.1			0.4	
Thallium	NV	NV	NV	< 0.00005		< 0.00005	< 0.00005	< 0.00005		< 0.00005	< 0.00005	< 0.00005	< 0.00005			< 0.00005	
Vanadium	NV	NV	NV	0.001		0.0003	0.0002	< 0.0001		< 0.0001	< 0.0001	< 0.0001	< 0.0001			0.001	
Zinc	5	NV	NV	< 0.005		< 0.005	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005			< 0.005	
Conductivity (µs/cm) [9]	NV	NV	NV	390		360	505	420		460	500	335	370			305	
pH (units) [9]	6.5 - 8.5	NV	NV	7.96		7.43	7.36	7.61		8.05	7.35	7.99	7.05			7.85	
Temperature (°C) [9]	NV	NV	NV	8.2		7.9	7.5	4.7		7.2	10.6	6	9.4			5.4	
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	-		-	-	-		-	-	-	-			-	
Dissolved Oxygen [9]	NV	NV	NV	-		-	-	-		-	-	-	-			-	

Notes:

1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 2 - Ground Water Quality Data - Bedrock

Parameters	ODWQS[3]	RUC[4]	Trigger	MW16-II	MW16-II	MW16-II	MW16-II	MW16-II	MW16-II	MW16-II	MW16-II	MW16-II	MW16-II	MW16-II	MW16-II	MW201D	MW201D
			(75% RUC)	25-Apr-18	27-Sep-18	16-Apr-19	24-Oct-19	20-Apr-20	08-Oct-20	14-Apr-21	20-Oct-21	13-Apr-22	23-Oct-22	10-May-23	18-Oct-23	04-Nov-19	20-Apr-20
Alkalinity	500	377	283	181	Dry	177	Dry	172	Dry	Dry	Dry	182	Dry	195	Dry	248	216
Aluminum	0.1	0.08	0.060	0.05		0.06		0.05				0.04		0.02		***0.07***	0.05
Ammonia, Total	NV	NV	NV	0.05		0.03		< 0.01				0.29		2.68		0.1	0.04
Antimony	0.006	0.002	0.002	< 0.0001		< 0.0001		< 0.0001				< 0.0001		< 0.0001		0.0007	0.0002
Arsenic	0.025	0.006	0.005	< 0.0001		< 0.0001		< 0.0001				< 0.0001		0.0001		0.0012	0.0005
Barium	1	0.3	0.23	0.052		0.047		0.039				0.043		0.039		0.061	0.036
Beryllium	NV	NV	NV	< 0.002		< 0.002		< 0.002				< 0.002		< 0.002		< 0.002	< 0.002
Boron	5	1.3	1.0	0.008		0.009		0.009				0.006		0.008		0.083	0.06
Cadmium	0.005	0.001	0.001	< 0.000015		< 0.000015		< 0.000015				< 0.000015		0.000212		0.00002	< 0.000015
Calcium	NV	NV	NV	76.8		71.6		77.9				79.5		67.1		109	94.7
Chloride	250	129	97	5.4		5		3.9				3.3		5.6		17.6	8.8
Chromium	0.05	0.01	0.01	< 0.001		< 0.001		< 0.001				< 0.001		< 0.001		< 0.001	< 0.001
Chromium (VI)	NV	NV	NV	-		-		-				-		< 0.001		-	-
Cobalt	NV	NV	NV	< 0.005		0.005		< 0.005				< 0.005		< 0.005		0.001	< 0.005
Chemical Oxygen Demand	NV	NV	NV	13		11		16				< 5		6		66	23
Conductivity (uS/cm)	NV	NV	NV	389		376		361				379		388		601	483
Copper	1	0.5	0.38	0.0017		0.0015		0.0019				0.0008		0.0007		0.0009	0.0009
Dissolved Organic Carbon	5	4.9	3.7	1.1		***4.1***		4.1				4.2		4.7		**5.2**	***4.8***
Flouride	1.5	0.5	0.38	< 0.1		< 0.1		< 0.1				< 0.1		< 0.1		< 0.1	< 0.1
Hardness	500	385	289	204		191		205				209		178		***306***	254
Iron	0.3	0.2	0.15	0.019		0.041		0.006				0.012		< 0.005		**1.34**	***0.195***
Lead	0.01	0.003	0.002	0.00005		0.0001		0.00004				< 0.00002		< 0.00002		0.00009	0.00006
Magnesium	NV	NV	NV	2.86		2.8		2.48				2.58		2.53		8.07	4.09
Manganese	0.05	0.1	0.08	0.005		0.003		< 0.001				0.001		< 0.001		**0.063**	0.038
Mercury	0.001	0.0003	0.0002	< 0.00002		< 0.00002		< 0.00002				< 0.00002		< 0.00002		0.00006	< 0.00002
Molybdenum	NV	NV	NV	0.0013		0.001		0.0002				0.0002		0.0003		0.0093	0.0017
Nickel	NV	NV	NV	< 0.01		< 0.01		< 0.01				< 0.01		< 0.01		< 0.01	< 0.01
Nitrate	10	2.6	2.0	< 0.05		< 0.05		< 0.05				0.07		< 0.05		0.12	0.08
Nitrite	1	0.3	0.2	< 0.05		< 0.05		< 0.05				< 0.05		< 0.05		< 0.05	< 0.05
pH (unit)	6.5 - 8.5	NV	NV	8.13		7.98		7.92				7.65		7.75		7.95	7.86
Phenols	NV	NV	NV	< 0.001		< 0.002		< 0.002				< 0.001		< 0.001		< 0.002	< 0.002
Dissolved Phosphorous	NV	NV	NV	< 0.1		< 0.1		< 0.1				< 0.1		< 0.1		< 0.1	< 0.1
Total Phosphorous	NV	NV	NV	0.06		0.08		0.02				0.07		0.07		1.22	0.47
Potassium	NV	NV	NV	0.4		0.5		0.4				0.3		0.5		1.6	0.8
Selenium	0.01	0.003	0.002	< 0.001		< 0.001		< 0.001				< 0.001		< 0.001		< 0.001	< 0.001
Silver	NV	NV	NV	< 0.00002		< 0.0001		< 0.0001				< 0.0001		< 0.0001		< 0.0001	< 0.0001
Sodium	200	103	77	6.3		5.4		2.1				1.7		2.8		10.2	5.7
Strontium	NV	NV	NV	0.133		0.126		0.122				0.133		0.137		1.05	0.637
Sulphate	500	255	191	2		3		3				3		3		60	19
Total Dissolved Solids	500	395	296	203		195		194				200		199		***357***	263
Total Kjeldahl Nitrogen	NV	NV	NV	0.2		0.3		0.2				0.5		2.6		1.1	0.4
Thallium	NV	NV	NV	< 0.00005		< 0.00005		< 0.00005				< 0.00005		< 0.00005		< 0.00005	< 0.00005
Vanadium	NV	NV	NV	0.0012		0.0001		< 0.0001				< 0.0001		< 0.0001		0.0001	0.0002
Zinc	5	NV	NV	< 0.005		< 0.005		< 0.005				< 0.005		< 0.005		0.009	< 0.005
Conductivity (µs/cm) [9]	NV	NV	NV	440		420		410				330		335		576	515
pH (units) [9]	6.5 - 8.5	NV	NV	7.7		7.5		7.63				8		7.22		8.25	7.65
Temperature (°C) [9]	NV	NV	NV	7.6		7.4		5.8				5.9		8.7		5.3	8.7
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	-		-		-				-		-		-	-
Dissolved Oxygen [9]	NV	NV	NV	-		-		-				-		-		-	-

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 2 - Ground Water Quality Data - Bedrock

Parameters	ODWQS[3]	RUC[4]	Trigger	MW201D	MW201D	MW201D	MW201D	MW201D	MW201D	MW201D	MW202	MW202	MW202	MW202	MW202	MW202	MW202
			(75% RUC)	08-Oct-20	14-Apr-21	20-Oct-21	13-Apr-22	23-Oct-22	10-May-23	18-Oct-23	04-Nov-19	20-Apr-20	08-Oct-20	14-Apr-21	20-Oct-21	13-Apr-22	23-Oct-22
Alkalinity	500	377	283	228	177	237	262	241	219	261	184	183	187	216	187	197	193
Aluminum	0.1	0.08	0.060	0.05	0.06	***0.07***	**0.09**	0.06	0.05	0.03	0.06	0.05	0.05	***0.07***	0.06	0.05	0.05
Ammonia, Total	NV	NV	NV	0.04	0.45	0.07	1.02	0.09	1.55	1.24	0.43	0.31	0.25	0.04	0.28	1.22	0.25
Antimony	0.006	0.002	0.002	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001	<0.0001	0.0004	< 0.0001	< 0.0001	0.0002	< 0.0001	< 0.0001	< 0.0001
Arsenic	0.025	0.006	0.005	0.0009	0.0004	0.0009	0.0011	0.0019	0.0004	0.0019	0.001	0.001	0.0004	0.0006	0.0002	0.0002	0.0003
Barium	1	0.3	0.23	0.038	0.014	0.044	0.047	0.048	0.03	0.043	0.056	0.018	0.016	0.043	0.017	0.014	0.016
Beryllium	NV	NV	NV	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	5	1.3	1.0	0.067	0.58	0.082	0.1	0.075	0.049	0.063	0.547	0.569	0.521	0.066	0.493	0.587	0.52
Cadmium	0.005	0.001	0.001	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000010	< 0.000010	<0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000010
Calcium	NV	NV	NV	102	85.3	112	112	108	75.4	102	85.2	82.3	81.9	106	83.6	82.6	80.8
Chloride	250	129	97	10.3	46.4	11.8	13.4	16.9	7.5	13.3	67.6	37.7	34.7	10.3	29.6	39.5	49.8
Chromium	0.05	0.01	0.01	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
Chromium (VI)	NV	NV	NV	-	-	-	-	-	< 0.001	<0.01	-	-	-	-	-	-	-
Cobalt	NV	NV	NV	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.0004	0.0001	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Chemical Oxygen Demand	NV	NV	NV	< 5	< 5	< 5	16	18	31	13	44	6	< 5	< 5	< 5	< 5	11
Conductivity (uS/cm)	NV	NV	NV	523	756	497	581	582	459	556	736	674	655	512	588	691	678
Copper	1	0.5	0.38	0.0003	0.0014	0.0004	0.0009	0.0004	0.0009	0.0003	0.0003	0.0018	0.0002	0.0027	0.0001	0.0002	0.0009
Dissolved Organic Carbon	5	4.9	3.7	***4.5***	3.6	**7.4**	**6.4**	**5.5**	3.2	**6.9**	1.3	1.9	2.1	**5.7**	2.9	2	1.5
Flouride	1.5	0.5	0.38	< 0.1	**0.8**	< 0.1	< 0.1	< 0.1	0.1	<0.1	**0.6**	***0.4***	**0.7**	< 0.1	< 0.1	***0.4***	***0.5***
Hardness	500	385	289	275	***299***	***300***	***301***	***290***	201	273	***300***	***290***	282	283	***289***	***291***	282
Iron	0.3	0.2	0.15	**0.437**	0.067	**0.339**	**0.324**	**0.79**	0.047	**0.532**	< 0.005	0.068	0.06	***0.19***	0.092	0.042	0.053
Lead	0.01	0.003	0.002	0.00005	0.00007	0.00011	0.00034	0.00004	0.00012	0.00004	0.00004	0.00006	< 0.00002	0.00013	0.00003	0.00006	0.00005
Magnesium	NV	NV	NV	4.82	20.9	4.8	5.02	4.83	3.15	4.37	21.1	20.5	18.9	4.35	19.4	20.6	19.5
Manganese	0.05	0.1	0.08	**0.091**	0.006	**0.136**	**0.092**	**0.165**	0.014	**0.087**	0.013	0.007	0.006	0.039	0.006	0.005	0.006
Mercury	0.001	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002	0.00005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	NV	NV	NV	0.001	0.0001	0.0005	0.0005	0.0008	0.0005	0.0009	0.0012	0.0004	0.0002	0.0008	0.0004	0.0002	0.0005
Nickel	NV	NV	NV	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.0028	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nitrate	10	2.6	2.0	0.07	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.05	< 0.05	< 0.05	0.13	0.06	0.1	< 0.05	0.11
Nitrite	1	0.3	0.2	< 0.05	0.07	< 0.05	< 0.05	0.14	< 0.05	0.08	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
pH (unit)	6.5 - 8.5	NV	NV	7.82	7.79	8	7.75	7.66	7.85	7.9	8.03	7.96	7.91	7.79	8.07	7.79	7.88
Phenols	NV	NV	NV	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001
Dissolved Phosphorous	NV	NV	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Phosphorous	NV	NV	NV	0.19	0.07	0.12	0.15	0.09	0.2	0.13	0.78	0.17	0.09	0.17	0.09	0.07	0.05
Potassium	NV	NV	NV	0.9	3.8	0.9	0.9	1	0.8	0.9	3.8	3.8	3.8	0.8	3.7	3.8	3.6
Selenium	0.01	0.003	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	0.001	0.001
Silver	NV	NV	NV	< 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
Sodium	200	103	77	8.8	25.1	9.4	12.5	16.7	6.4	10.6	35.6	27.4	25.3	7.6	19.6	27.2	19.8
Strontium	NV	NV	NV	0.865	8.94	0.789	0.786	0.802	0.467	0.749	8.24	8.6	8.62	0.672	7.73	8.85	7.97
Sulphate	500	255	191	32	130	23	24	54	17	32	136	104	97	21	83	97	118
Total Dissolved Solids	500	395	296	296	**419**	***305***	***328***	***347***	242	288	**464**	***386***	***375***	280	***352***	***391***	**409**
Total Kjeldahl Nitrogen	NV	NV	NV	0.3	0.5	0.3	1.1	0.4	1.7	1.7	1	0.5	0.4	0.3	0.4	1.2	1.6
Thallium	NV	NV	NV	< 0.005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	<0.00005	< 0.00005	< 0.00005	< 0.005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	NV	NV	NV	0.0002	< 0.0001	< 0.0001	0.0003	0.0002	0.0002	0.0002	0.0003	< 0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001
Zinc	5	NV	NV	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Conductivity (µs/cm) [9]	NV	NV	NV	500	600	580	495	490	370	418	693	685	580	590	625	475	475
pH (units) [9]	6.5 - 8.5	NV	NV	7.6	7.85	7.55	7.83	7.72	7.22	7.78	8.9	8.1	8.1	8.2	7.35	7.94	7.94
Temperature (°C) [9]	NV	NV	NV	7.6	9.2	8.9	11.5	11	9.2	7.8	4.7	8.7	8.5	7.9	9.4	9.3	11.8
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen [9]	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 2 - Ground Water Quality Data - Bedrock

						DUP										
Parameters	**ODWQS[3]**	**RUC[4]**	**Trigger**	**MW202**	**MW202**	**MW202**	**MW203**	**MW203**	**MW203**	**MW203**	**MW203**	**MW203**	**MW203**	**MW203**	**MW203**	**MW204**	**MW204**
			(75% RUC)	**10-May-23**	**18-Oct-23**	**18-Oct-23**	**04-Nov-19**	**20-Apr-20**	**08-Oct-20**	**14-Apr-21**	**20-Oct-21**	**13-Apr-22**	**23-Oct-22**	**10-May-23**	**18-Oct-23**	**04-Nov-19**	**20-Apr-20**
Alkalinity	500	377	283	207	208	206	195	144	145	138	159	147	142	144	148	158	181
Aluminum	0.1	0.08	0.060	0.03	**0.35**	***0.07***	0.04	0.08	**0.09**	**0.09**	0.08	0.06	**0.09**	0.04	0.05	***0.08***	0.06
Ammonia, Total	NV	NV	NV	4.26	1.25	0.78	0.44	1.74	1.13	1.46	0.8	0.8	1.77	1.52	3.42	1.07	0.6
Antimony	0.006	0.002	0.002	< 0.0001	<0.0001	<0.0001	0.0006	0.0014	0.0003	0.0003	0.0003	0.0006	0.0001	0.0003	<0.0001	0.0008	0.0003
Arsenic	0.025	0.006	0.005	0.0001	0.0003	0.0003	0.0011	0.0022	0.0025	0.0028	0.0012	0.0028	0.0033	0.0042	0.0048	0.0045	0.0015
Barium	1	0.3	0.23	0.012	0.013	0.012	0.043	0.063	0.049	0.037	0.031	0.032	0.024	0.02	0.022	0.059	0.02
Beryllium	NV	NV	NV	< 0.002	<0.0001	<0.0001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	< 0.002	< 0.002
Boron	5	1.3	1.0	0.478	0.534	0.639	0.414	**3.43**	**3.51**	**3.73**	**3.77**	**3.71**	**4.08**	**3.92**	**4.17**	**1.87**	**2.19**
Cadmium	0.005	0.001	0.001	< 0.000010	<0.000015	<0.000015	0.000073	0.000037	< 0.000029	< 0.000029	< 0.000059	< 0.000029	< 0.000029	< 0.000029	<0.000030	< 0.000015	< 0.000015
Calcium	NV	NV	NV	66	80.6	82.9	51.8	140	155	159	166	157	172	141	167	202	108
Chloride	250	129	97	33.9	43.2	51.7	40	**574**	**612**	**552**	**659**	**623**	**834**	**724**	**900**	**177**	30.9
Chromium	0.05	0.01	0.01	< 0.001	<0.001	<0.001	0.003	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	< 0.001	< 0.001
Chromium (VI)	NV	NV	NV	< 0.001	<0.01	<0.01	-	-	-	-	-	-	-	< 0.001	<0.01	-	-
Cobalt	NV	NV	NV	< 0.005	0.0002	0.0002	0.0005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.0003	< 0.0001	< 0.005
Chemical Oxygen Demand	NV	NV	NV	8	7	13	46	22	7	7	< 5	13	21	5	9	5	< 5
Conductivity (uS/cm)	NV	NV	NV	647	704	747	613	3590	3720	3880	4020	4130	4280	4270	4450	1710	1040
Copper	1	0.5	0.38	0.0003	0.0003	<0.0001	0.0016	0.0067	0.0002	0.0018	0.0051	< 0.0002	0.0003	< 0.0002	0.0002	0.004	0.0005
Dissolved Organic Carbon	5	4.9	3.7	2	***3.8***	3.6	1.8	1.2	0.3	1	1.3	0.3	< 0.2	< 0.2	0.7	0.8	2.5
Flouride	1.5	0.5	0.38	**0.9**	1	1	< 0.1	< 1	< 1	**1.3**	< 1	**1.2**	< 3	**1.5**	<1.8	< 0.1	**0.7**
Hardness	500	385	289	237	285	***295***	196	**672**	**729**	**762**	**809**	**769**	**857**	**752**	**845**	**750**	**398**
Iron	0.3	0.2	0.15	0.023	0.142	0.044	**0.202**	< 0.005	0.104	0.148	0.103	0.173	**0.303**	**0.258**	**0.483**	< 0.005	< 0.005
Lead	0.01	0.003	0.002	0.00004	<0.00002	<0.00002	0.00006	< 0.00009	< 0.00009	0.00012	< 0.0002	< 0.00009	< 0.00009	< 0.00009	<0.00009	0.00006	< 0.00004
Magnesium	NV	NV	NV	17.5	20.3	21.4	16.2	78.4	83.1	88.6	95.9	91.7	104	97.2	104	59.5	31.1
Manganese	0.05	0.1	0.08	0.003	0.004	0.002	0.03	0.021	0.032	0.033	0.043	0.012	**0.057**	0.031	0.024	0.015	0.01
Mercury	0.001	0.0003	0.0002	< 0.00002	<0.00002	<0.00002	0.00005	0.00005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002	0.00005	< 0.00002
Molybdenum	NV	NV	NV	0.0002	0.0002	0.0002	0.0361	0.028	0.0117	0.0144	0.02	0.0154	0.0021	0.0046	0.0012	0.0042	0.0011
Nickel	NV	NV	NV	< 0.01	0.0008	0.0003	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.0016	< 0.01	< 0.01
Nitrate	10	2.6	2.0	< 0.05	<0.05	0.08	< 0.05	0.62	1.45	0.83	0.63	< 0.05	< 1	0.29	<0.05	< 0.05	< 0.05
Nitrite	1	0.3	0.2	< 0.05	0.06	<0.05	< 0.05	< 0.5	< 0.5	**0.35**	**0.69**	< 0.05	< 1	< 0.05	<0.05	< 0.05	< 0.05
pH (unit)	6.5 - 8.5	NV	NV	7.97	8.11	7.62	8.18	7.94	7.86	7.86	8.16	7.91	7.76	7.86	7.96	7.91	7.95
Phenols	NV	NV	NV	< 0.001	<0.001	<0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001	< 0.002	< 0.002
Dissolved Phosphorous	NV	NV	NV	< 0.1	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	< 0.1	< 0.1
Total Phosphorous	NV	NV	NV	0.03	0.03	0.05	0.34	0.71	0.03	0.09	0.08	0.15	0.04	0.03	0.03	0.12	0.11
Potassium	NV	NV	NV	3.5	3.8	4	5	13.5	13.2	13.2	13.9	13	14	13.9	14.7	8.4	6.6
Selenium	0.01	0.003	0.002	< 0.001	<0.001	<0.001	< 0.001	**0.013**	**0.011**	**0.013**	<0.02	**0.014**	<0.02	< 0.001	<0.001	< 0.001	< 0.001
Silver	NV	NV	NV	< 0.0001	<0.0001	<0.0001	< 0.0001	< 0.0001	0.0007	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0001	<0.0001	< 0.0001	< 0.0001
Sodium	200	103	77	16.2	29	35.8	67.2	**555**	**520**	**585**	**592**	**608**	**631**	**575**	**673**	**132**	***92.4***
Strontium	NV	NV	NV	7.04	9.1	9.86	0.631	5.54	7.65	7.16	8.78	8.34	9.29	9.19	8.84	4.97	2.56
Sulphate	500	255	191	102	123	142	84	**964**	**1020**	< 1	**1110**	**1020**	**1230**	**1150**	**1340**	**521**	**332**
Total Dissolved Solids	500	395	296	***364***	***366***	***390***	***380***	**2414**	**2493**	**2434**	**2739**	**2608**	**3077**	**2789**	**2510**	**1196**	**711**
Total Kjeldahl Nitrogen	NV	NV	NV	4.4	1.1	0.9	0.7	2.3	1.4	1.6	1	1.2	0.02	1.6	3.3	1.3	0.8
Thallium	NV	NV	NV	< 0.00005	<0.00005	<0.00005	< 0.00005	0.00016	< 0.005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	<0.00005	< 0.00005	< 0.00005
Vanadium	NV	NV	NV	< 0.0001	<0.0001	<0.0001	0.0002	< 0.0004	< 0.0004	< 0.0004	< 0.0007	< 0.0004	< 0.0004	< 0.0004	<0.0004	0.0005	0.0004
Zinc	5	NV	NV	< 0.005	<0.005	0.005	0.021	< 0.005	< 0.005	< 0.005	0.005	< 0.005	< 0.005	< 0.005	<0.005	< 0.005	< 0.005
Conductivity (μs/cm) [9]	NV	NV	NV	405	388	388	580	3570	1145	3000	4220	2530	2380	1130	2011	825	730
pH (units) [9]	6.5 - 8.5	NV	NV	7.05	7.95	7.95	8.49	7.94	7.5	7.99	7.84	7.55	7.72	7.31	7.75	8.12	7.94
Temperature (°C) [9]	NV	NV	NV	9.2	8.3	8.3	4.7	8.6	8.9	11.1	9.6	7.7	10	9.9	9.1	5.9	4.6
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen [9]	NV	NV	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 2 - Ground Water Quality Data - Bedrock

Parameters	ODWQS[3]	RUC[4]	Trigger	MW204	MW204	MW204	MW204	MW204	MW204	MW204
			(75% RUC)	08-Oct-20	14-Apr-21	20-Oct-21	13-Apr-22	23-Oct-22	10-May-23	18-Oct-23
Alkalinity	500	377	283	142	169	144	166	137	179	151
Aluminum	0.1	0.08	0.060	**0.11**	***0.08***	***0.07***	***0.08***	***0.08***	0.04	0.06
Ammonia, Total	NV	NV	NV	0.95	0.2	0.63	0.73	0.93	0.81	1.51
Antimony	0.006	0.002	0.002	0.0001	0.0001	< 0.0001	0.0001	0.0002	0.0002	0.0001
Arsenic	0.025	0.006	0.005	0.0031	0.002	0.0014	0.0009	0.0012	0.0007	0.0018
Barium	1	0.3	0.23	0.045	0.038	0.023	0.028	0.043	0.016	0.031
Beryllium	NV	NV	NV	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001
Boron	5	1.3	1.0	**1.65**	***1.05***	**2.38**	**1.7**	***1.23***	**1.89**	**1.6**
Cadmium	0.005	0.001	0.001	< 0.000029	< 0.000015	< 0.000029	< 0.000015	< 0.000029	< 0.000012	<0.000015
Calcium	NV	NV	NV	240	139	290	179	212	146	226
Chloride	250	129	97	**190**	47.1	**229**	***114***	**229**	93.6	**248**
Chromium	0.05	0.01	0.01	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001
Chromium (VI)	NV	NV	NV	-	-	-	-	-	< 0.001	<0.01
Cobalt	NV	NV	NV	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.0005
Chemical Oxygen Demand	NV	NV	NV	< 5	< 5	< 5	5	17	< 5	<5
Conductivity (uS/cm)	NV	NV	NV	2140	927	2420	1510	2580	1440	2520
Copper	1	0.5	0.38	0.0002	0.0016	0.0007	0.0003	0.001	0.0005	0.0013
Dissolved Organic Carbon	5	4.9	3.7	0.8	2.5	1	0.9	< 0.2	0.8	1.7
Flouride	1.5	0.5	0.38	**0.7**	***0.4***	0.2	***0.4***	< 1	**1.8**	**1.3**
Hardness	500	385	289	**860**	**471**	**1080**	**645**	**708**	**389**	**814**
Iron	0.3	0.2	0.15	**0.327**	0.034	< 0.005	0.052	0.106	< 0.005	0.104
Lead	0.01	0.003	0.002	< 0.00009	0.00004	0.00023	< 0.00004	0.0001	< 0.00004	<0.00004
Magnesium	NV	NV	NV	63.3	30.1	86.1	48	47.2	42.1	60.5
Manganese	0.05	0.1	0.08	0.025	0.006	0.02	0.012	0.026	0.008	0.027
Mercury	0.001	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002
Molybdenum	NV	NV	NV	0.0007	0.0006	0.0006	0.0006	0.0005	0.0005	0.0004
Nickel	NV	NV	NV	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.0004
Nitrate	10	2.6	2.0	< 0.05	0.38	0.12	0.34	< 0.5	< 0.5	<0.40
Nitrite	1	0.3	0.2	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5	<0.40
pH (unit)	6.5 - 8.5	NV	NV	7.77	7.9	8.1	7.82	7.7	7.91	7.95
Phenols	NV	NV	NV	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001
Dissolved Phosphorous	NV	NV	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1
Total Phosphorous	NV	NV	NV	0.05	0.08	0.08	0.04	0.03	0.07	0.06
Potassium	NV	NV	NV	8	4.9	10.1	7	5.9	6.8	7.4
Selenium	0.01	0.003	0.002	***0.003***	0.001	**0.004**	**0.004**	**0.005**	0.002	<0.001
Silver	NV	NV	NV	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001
Sodium	200	103	77	**113**	52.5	**163**	***101***	***85.1***	***97.3***	**116**
Strontium	NV	NV	NV	5.47	2.59	7.09	3.99	4.2	3.59	5.36
Sulphate	500	255	191	**829**	***239***	**930**	**464**	**873**	**448**	**923**
Total Dissolved Solids	500	395	296	**1530**	**615**	**1796**	**1015**	**1536**	**942**	**1400**
Total Kjeldahl Nitrogen	NV	NV	NV	1.1	0.3	0.7	1.1	1.2	1.2	1.6
Thallium	NV	NV	NV	< 0.005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	<0.00005
Vanadium	NV	NV	NV	< 0.0004	0.0004	< 0.0004	0.0003	0.0005	0.0006	0.0003
Zinc	5	NV	NV	0.013	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005
Conductivity (µs/cm) [9]	NV	NV	NV	950	1120	1870	980	970	795	790
pH (units) [9]	6.5 - 8.5	NV	NV	7.15	7.93	7.7	7.75	7.64	6.95	7.48
Temperature (°C) [9]	NV	NV	NV	6.3	7.2	12.5	6.6	9.4	7.9	7.6
Oxidation Reduction Potential (mV)[9]	NV	NV	NV	-	-	-	-	-	-	-
Dissolved Oxygen [9]	NV	NV	NV	-	-	-	-	-	-	-

Notes:

1. Water quality data provided by the City of Kawartha Lakes.
2. All results are expressed in mg/L unless otherwise stated.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. RUC means Reasonable Use Criteria.
5. Bold text and shading indicates values exceeding ODWQS.
6. Bold text indicates values exceeding the RUC.
7. NV indicates no value.
8. "-" indicates parameter not analyzed.
9. Results obtained from field analysis.
10. Bold & red text indicate trigger parameter exceedance

Table 3 - Ground Water Quality Data - VOC's

		MW1-I	MW1-I	MW1-I	MW1-I	MW1-I	MW1-I	MW1-I	MW1-I	MW1-I	MW1-I	MW1-I	MW1-I	MW1-I	MW1-I
Parameters	**ODWQS^1**	**11-May-11**	**13-Sep-11**	**29-May-12**	**04-Oct-12**	**21-May-13**	**30-Sep-13**	**28-Apr-14**	**22-Sep-14**	**22-Sep-14**	**16-Jun-15**	**16-Sep-15**	**01-Jun-16**	**18-Oct-16**	**20-Apr-17**
Acetone	NV	<10	<10	<10	<10	< 30	< 30	< 30	< 2	-	< 30	< 30	< 30	< 30	< 30
1,1,1-Trichloroethane	NV	<0.1	<0.1	<0.10	<0.10	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2,2-Tetrachloroethane	NV	<0.2	<0.2	<0.20	<0.20	< 0.5	< 0.5	< 0.5	< 0.4	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2-Trichloroethane	NV	<0.2	<0.2	<0.20	<0.20	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1-Dichloroethane	NV	<0.1	<0.1	<0.10	<0.10	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1-Dichloroethylene	NV	<0.1	<0.1	<0.10	<0.10	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichlorobenzene	200	<0.2	<0.2	<0.20	<0.20	< 0.5	< 0.5	< 0.5	< 0.1	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichloroethane	5	<0.2	<0.2	<0.20	<0.20	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis-1,2-Dichloro-ethylene	NV	<0.1	<0.1	<0.10	<0.10	< 0.5	< 0.5	< 0.5	< 0.1	< 0.2	-	-	< 0.5	< 0.5	< 0.5
1,2-Dichloropropane	NV	<0.1	<0.1	<0.10	<0.10	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,3-Dichlorobenzene	NV	<0.2	<0.2	<0.20	<0.20	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,4-Dichlorobenzene	5	<0.2	<0.2	<0.20	<0.20	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzene	1	**0.4**	**0.2**	**0.27**	**0.18**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane	NV	<0.1	<0.1	<0.10	<0.10	< 2	< 2	< 2	< 0.1	< 0.5	< 2	< 2	< 2	< 2	< 2
Bromoform	NV	<0.2	<0.2	<0.20	<0.20	< 5	< 5	< 5	< 0.1	< 0.5	< 5	< 5	< 5	< 5	< 5
1,2,4-Trichloro-benzene	NV	-	-	-	-	< 0.5	< 0.5	< 0.5	< 0.2	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	NV	<0.5	<0.5	<0.50	<0.50	< 0.5	< 0.5	< 0.5	< 0.3	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon tetrachloride	2	<0.1	<0.1	<0.10	<0.10	< 0.2	< 0.2	< 0.2	< 0.2	-	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorobenzene	NV	<0.1	<0.1	<0.10	<0.10	< 0.5	< 0.5	< 0.5	< 0.2	-	-	-	< 0.5	< 0.5	< 0.5
Chloroethane	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	NV	<0.1	<0.1	<0.10	<0.10	< 1	< 1	< 1	< 0.3	< 0.5	< 1	< 1	< 1	< 1	< 1
Chloromethane	NV	-	-	-	-	-	-	< 2	< 0.1	< 0.5	-	-	-	-	-
cis-1,3-Dichloropropene	NV	<0.2	<0.2	<0.20	<0.20	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane	NV	<0.2	<0.2	<0.20	<0.20	< 2	< 2	-	-	-	< 2	< 2	< 2	< 2	< 2
Dichloromethane	50	<0.5	<0.5	<0.50	<0.50	< 5	< 5	< 5	< 0.3	< 0.5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	2.4	<0.1	<0.1	<0.10	<0.10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylenedibromide	NV	<0.2	<0.2	<0.20	<0.20	< 0.2	< 0.2	< 0.2	< 0.1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Methyl Ethyl Ketone	NV	<5	<5	<5.0	<5.0	< 20	< 20	< 20	< 1	-	< 20	< 20	< 20	< 20	< 20
Methyl-tert-butyl-ether	NV	<0.2	<0.2	<0.20	<0.20	< 2	< 2	< 2	< 1	-	< 2	< 2	< 2	< 2	< 2
Methyl-isobutyl-ketone	NV	<5	<5	<5.0	<5.0	< 20	< 20	< 20	< 1	-	< 20	< 20	< 20	< 20	< 20
Methyl Chloride	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
m-p-xylene	NV	<0.1	<0.1	<0.10	<0.10	< 1.0	< 1.0	< 1.0	< 0.4	< 0.5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	NV	<0.1	<0.1	<0.10	<0.10	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Styrene	NV	<0.2	<0.2	<0.20	<0.20	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,1,2-Tetrachloro-ethane	NV	<0.1	<0.1	<0.20	<0.20	< 0.5	< 0.5	< 0.5	< 0.1	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethene	NV	<0.1	<0.1	<0.10	<0.10	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5	-	-	< 0.5	< 0.5	< 0.5
Toluene	24	<0.2	<0.2	<0.20	<0.20	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans-1,2-Dichloroethene	NV	<0.1	<0.1	<0.10	<0.10	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans-1,3-Dichloropropene	NV	<0.2	<0.2	<0.20	<0.20	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	50	<0.1	<0.1	<0.10	<0.10	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	NV	<0.2	<0.2	<0.20	<0.20	< 5	< 5	< 5	< 0.1	< 5	< 5	< 5	< 5	< 5	< 5
Trihalomethanes	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	1	<0.2	<0.2	<0.20	<0.20	< 0.5	< 0.5	< 0.5	< 0.2	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylene; total	300	<0.1	<0.1	<0.10	0.12	< 1.1	< 1.1	< 1.1	< 0.4	< 0.5	< 0.5	< 0.5	< 1.1	< 1.1	< 1.1
2-Chloroethyvinyl Ether	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1. All results in µg/L unless otherwise stated.
2. Water quality data provided by the City of Kawartha Lakes.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. Bold text and shading indicates values exceeding the ODWQS.
5. Bold text indicates detection
6. NV indicates no value.
7. "-" indicates parameter not analyzed.

Table 3 - Ground Water Quality Data - VOC's

Parameters	ODWQS^1	MW1-I 23-Oct-17	MW1-I 27-Sep-18	MW1-I 24-Oct-19	MW1-I 08-Oct-20	MW1-I 20-Oct-21	MW1-I 23-Oct-22	MW1-I 18-Oct-23	MW1-II 01-Jun-16	MW1-II 20-Apr-17	MW2-II 15-Jun-10	MW2-II 22-Oct-10	MW2-II 11-May-11	MW2-II 13-Sep-11	MW2-II 29-May-12
Acetone	NV	< 30	< 30	<2	< 30	< 30	< 30	<30	150	180	< 10	< 10	<10	<10	<10
1,1,1-Trichloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.1	<0.1	<0.10
1,1,2,2-Tetrachloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.3	< 0.3	<0.2	<0.2	<0.20
1,1,2-Trichloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.4	< 0.4	<0.2	<0.2	<0.20
1,1-Dichloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.1	<0.1	<0.10
1,1-Dichloroethylene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.3	< 0.3	<0.1	<0.1	<0.10
1,2-Dichlorobenzene	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.4	< 0.4	<0.2	<0.2	<0.20
1,2-Dichloroethane	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.4	< 0.4	<0.2	<0.2	<0.20
cis-1,2-Dichloro-ethylene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.1	<0.1	<0.10
1,2-Dichloropropane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.4	< 0.4	<0.1	<0.1	<0.10
1,3-Dichlorobenzene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.3	< 0.3	<0.2	<0.2	<0.20
1,4-Dichlorobenzene	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.4	< 0.4	<0.2	<0.2	<0.20
Benzene	1	< 0.5	< 0.5	**0.5**	< 0.5	< 0.5	< 0.5	<0.5	**0.9**	< 0.5	< 0.2	< 0.2	<0.1	<0.1	<0.10
Bromodichloromethane	NV	< 2	< 2	< 2	< 2	< 2	< 2	<2	< 2	< 2	< 0.3	< 0.3	<0.1	<0.1	<0.10
Bromoform	NV	< 5	< 5	< 5	< 5	< 5	< 5	<5	< 5	< 5	< 0.3	< 0.3	<0.2	<0.2	<0.20
1,2,4-Trichloro-benzene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	-	-	-
Bromomethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.4	< 0.4	<0.5	<0.5	<0.50
Carbon tetrachloride	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.1	<0.1	<0.10
Chlorobenzene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.3	< 0.3	<0.1	<0.1	<0.10
Chloroethane	NV	-	-	-	-	-	-	-	-	-	< 0.4	< 0.4	-	-	-
Chloroform	NV	< 1	< 1	< 1	< 1	< 1	< 1	<1	< 1	< 1	< 0.5	< 0.5	<0.1	<0.1	<0.10
Chloromethane	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.4	< 0.4	<0.2	<0.2	<0.20
Dibromochloromethane	NV	< 2	< 2	< 2	< 2	< 2	< 2	<2	< 2	< 2	< 0.4	< 0.4	<0.2	<0.2	<0.20
Dichloromethane	50	< 5	-	-	-	-	-	< 5	< 5	< 5	-	-	<0.5	<0.5	<0.50
Ethylbenzene	2.4	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.2	< 0.2	<0.1	<0.1	<0.10
Ethylenedibromide	NV	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.2	<0.20
Methyl Ethyl Ketone	NV	< 20	< 20	< 20	< 20	< 20	< 20	<20	< 20	< 20	< 10	< 10	<5	<5	<5.0
Methyl-tert-butyl-ether	NV	< 2	< 2	< 2	< 2	< 2	< 2	<2	< 2	< 2	< 0.5	< 0.5	<0.2	<0.2	<0.20
Methyl-isobutyl-ketone	NV	< 20	< 20	< 20	< 20	< 20	< 20	<20	< 20	< 20	< 10	< 10	<5	<5	<5.0
Methyl Chloride	NV	-	< 0.3	< 0.3	< 5	< 5	< 5	<2	-	-	< 0.3	< 0.3	-	-	-
m-p-xylene	NV	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1	< 1.0	< 1.0	< 0.4	< 0.4	0.1	<0.1	<0.10
o-xylene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.2	< 0.2	<0.1	<0.1	<0.10
Styrene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.2	< 0.2	<0.2	<0.2	<0.20
1,1,1,2-Tetrachloro-ethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.3	< 0.3	<0.1	<0.1	<0.20
Tetrachloroethene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.3	< 0.3	<0.1	<0.1	<0.10
Toluene	24	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	0.5	< 0.5	2.1	0.6	0.2	<0.2	0.52
trans-1,2-Dichloroethene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.2	< 0.2	<0.1	<0.1	<0.10
trans-1,3-Dichloropropene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.3	< 0.3	<0.2	<0.2	<0.20
Trichloroethylene	50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.4	< 0.4	<0.1	<0.1	<0.10
Trichlorofluoromethane	NV	< 5	< 5	< 5	< 5	< 5	< 5	<5	< 5	< 5	< 0.3	<0.2	<0.2	<0.20	<0.20
Trihalomethanes	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	1	< 0.5	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5	< 0.2	<0.2	<0.2	<0.20	<0.20
Xylene; total	300	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.5	< 1.1	< 1.1	-	0.1	<0.1	<0.10	<0.10
2-Chloroethyvinyl Ether	NV	-	-	-	-	-	-	-	-	-	< 10	-	-	-	-

Notes:

1. All results in µg/L unless otherwise stated.
2. Water quality data provided by the City of Kawartha Lakes.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. Bold text and shading indicates values exceeding the ODWQS.
5. Bold text indicates detection
6. NV indicates no value.
7. "-" indicates parameter not analyzed.

Table 3 - Ground Water Quality Data - VOC's

		MW2-II	MW2-II	MW2-II	MW2-II	MW2-II	MW2-II	MW2-II	MW2-II	MW2-II	MW2-II	MW2-II	MW2-II	MW2-II	MW2-II
Parameters	**ODWQS[1]**	**04-Oct-12**	**21-May-13**	**30-Sep-13**	**28-Apr-14**	**22-Sep-14**	**16-Jun-15**	**16-Sep-15**	**01-Jun-16**	**18-Oct-16**	**20-Apr-17**	**23-Oct-17**	**27-Sep-18**	**24-Oct-19**	**08-Oct-20**
Acetone	NV	<10	< 30	< 30	< 30	< 2	< 30	< 30	< 30	< 30	< 30	< 30	< 30	<2	< 30
1,1,1-Trichloroethane	NV	<0.10	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2,2-Tetrachloroethane	NV	<0.20	< 0.5	< 0.5	< 0.5	< 0.4	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2-Trichloroethane	NV	<0.20	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1-Dichloroethane	NV	<0.10	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1-Dichloroethylene	NV	<0.10	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichlorobenzene	200	<0.20	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichloroethane	5	<0.20	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis-1,2-Dichloro-ethylene	NV	<0.10	< 0.5	< 0.5	< 0.5	< 0.1	-	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichloropropane	NV	<0.10	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,3-Dichlorobenzene	NV	<0.20	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,4-Dichlorobenzene	5	<0.20	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzene	1	<0.10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane	NV	<0.10	< 2	< 2	< 2	< 0.1	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Bromoform	NV	<0.20	< 5	< 5	< 5	< 0.1	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2,4-Trichloro-benzene	NV	-	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	NV	<0.50	< 0.5	< 0.5	< 0.5	< 0.3	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon tetrachloride	2	<0.10	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorobenzene	NV	<0.10	< 0.5	< 0.5	< 0.5	< 0.2	-	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	NV	<0.10	< 1	< 1	< 1	< 0.3	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloromethane	NV	-	-	-	< 2	< 0.1	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	NV	<0.20	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane	NV	<0.20	< 2	< 2	-	-	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dichloromethane	50	<0.50	< 5	< 5	< 5	< 0.3	< 5	< 5	< 5	< 5	< 5	< 5	-	-	-
Ethylbenzene	2.4	<0.10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylenedibromide	NV	<0.20	< 0.2	< 0.2	< 0.2	< 0.1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Methyl Ethyl Ketone	NV	<5.0	< 20	< 20	< 20	< 1	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl-tert-butyl-ether	NV	<0.20	< 2	< 2	< 2	< 1	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Methyl-isobutyl-ketone	NV	<5.0	< 20	< 20	< 20	< 1	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl Chloride	NV	-	-	-	-	-	-	-	-	-	-	-	< 0.3	< 0.3	< 5
m-p-xylene	NV	<0.10	< 1.0	< 1.0	< 1.0	< 0.4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	NV	<0.10	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Styrene	NV	<0.20	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,1,2-Tetrachloro-ethane	NV	<0.20	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethene	NV	<0.10	< 0.5	< 0.5	< 0.5	< 0.2	-	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	24	<0.20	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans-1,2-Dichloroethene	NV	<0.10	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans-1,3-Dichloropropene	NV	<0.20	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	50	<0.10	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	NV	< 5	< 5	-	< 5	< 0.1	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Trihalomethanes	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	1	< 0.5	< 0.5	-	< 0.5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
Xylene; total	300	< 1.1	< 1.1	-	< 1.1	< 0.4	< 0.5	< 0.5	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
2-Chloroethyvinyl Ether	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1. All results in µg/L unless otherwise stated.
2. Water quality data provided by the City of Kawartha Lakes.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. Bold text and shading indicates values exceeding the ODWQS.
5. Bold text indicates detection
6. NV indicates no value.
7. "-" indicates parameter not analyzed.

Table 3 - Ground Water Quality Data - VOC's

Parameters	ODWQS^1	MW2-II	MW2-II	MW2-II	MW3	MW3	MW3	MW3	MW3	MW3	MW3	MW3	MW3	MW3	MW3
		20-Oct-21	23-Oct-22	18-Oct-23	15-Jun-10	21-Oct-10	11-May-11	13-Sep-11	29-May-12	04-Oct-12	21-May-13	21-May-13	30-Sep-13	30-Apr-14	30-Apr-14
Acetone	NV	< 30	< 30	<30	< 10	< 10	<10	<10	<10	<10	-	< 30	< 30	< 30	< 30
1,1,1-Trichloroethane	NV	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	<0.1	<0.1	<0.10	<0.10	<0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2,2-Tetrachloroethane	NV	< 0.5	< 0.5	<0.5	< 0.3	< 0.3	<0.2	<0.2	<0.20	<0.20	<0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2-Trichloroethane	NV	< 0.5	< 0.5	<0.5	< 0.4	< 0.4	<0.2	<0.2	<0.20	<0.20	<0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1-Dichloroethane	NV	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	<0.1	<0.1	<0.10	<0.10	<0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1-Dichloroethylene	NV	< 0.5	< 0.5	<0.5	< 0.3	< 0.3	<0.1	<0.1	<0.10	<0.10	<0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichlorobenzene	200	< 0.5	< 0.5	<0.5	< 0.4	< 0.4	<0.2	<0.2	<0.20	<0.20	<0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichloroethane	5	< 0.5	< 0.5	0.7	< 0.4	< 0.4	<0.2	<0.2	<0.20	<0.20	<0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis-1,2-Dichloro-ethylene	NV	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	<0.1	<0.1	<0.10	<0.10	-	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichloropropane	NV	< 0.5	< 0.5	<0.5	< 0.4	< 0.4	<0.1	<0.1	<0.10	<0.10	<0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,3-Dichlorobenzene	NV	< 0.5	< 0.5	<0.5	< 0.3	< 0.3	<0.2	<0.2	<0.20	<0.20	<0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,4-Dichlorobenzene	5	< 0.5	< 0.5	<0.5	< 0.4	< 0.4	<0.2	<0.2	<0.20	<0.20	<0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzene	1	< 0.5	< 0.5	<0.5	< 0.2	< 0.2	<0.1	<0.1	<0.10	<0.10	<0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane	NV	< 2	< 2	<2	< 0.3	< 0.3	<0.1	<0.1	<0.10	<0.10	<0.5	< 2	< 2	< 2	< 2
Bromoform	NV	< 5	< 5	<5	< 0.3	< 0.3	<0.2	<0.2	<0.20	<0.20	<0.5	< 5	< 5	< 5	< 5
1,2,4-Trichloro-benzene	NV	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	-	-	-	-	-	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	NV	< 0.5	< 0.5	<0.5	< 0.4	< 0.4	<0.5	<0.5	<0.50	<0.50	<0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon tetrachloride	2	< 0.2	< 0.2	<0.2	< 0.2	< 0.2	<0.1	<0.1	<0.10	<0.10	<0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorobenzene	NV	< 0.5	< 0.5	<0.5	< 0.3	< 0.3	<0.1	<0.1	<0.10	<0.10	<0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	NV	-	-	-	< 0.4	< 0.4	-	-	-	-	<5	-	-	-	-
Chloroform	NV	< 1	< 1	<1	< 0.5	< 0.5	<0.1	<0.1	<0.10	<0.10	<0.5	< 1	< 1	< 1	< 1
Chloromethane	NV	-	-	-	-	-	-	-	-	-	<5	-	-	< 2	< 2
cis-1,3-Dichloropropene	NV	< 0.5	< 0.5	<0.5	< 0.4	< 0.4	<0.2	<0.2	<0.20	<0.20	<0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane	NV	< 2	< 2	<2	< 0.4	< 0.4	<0.2	<0.2	<0.20	<0.20	<0.5	< 2	< 2	-	-
Dichloromethane	50	-	-	<5	-	-	<0.5	<0.5	<0.50	<0.50	<0.5	< 5	< 5	< 5	< 5
Ethylbenzene	2.4	< 0.5	< 0.5	<0.5	< 0.2	< 0.2	<0.1	<0.1	<0.10	<0.10	<0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylenedibromide	NV	< 0.2	< 0.2	<0.2	< 0.2	< 0.2	<0.2	<0.2	<0.20	<0.20	<0.2	< 0.2	< 0.2	< 0.2	< 0.2
Methyl Ethyl Ketone	NV	< 20	< 20	<20	< 10	< 10	<5	<5	<5.0	<5.0	-	< 20	< 20	< 20	< 20
Methyl-tert-butyl-ether	NV	< 2	< 2	<2	< 0.5	< 0.5	<0.2	<0.2	<0.20	<0.20	-	< 2	< 2	< 2	< 2
Methyl-isobutyl-ketone	NV	< 20	< 20	<20	< 10	< 10	<5	<5	<5.0	<5.0	-	< 20	< 20	< 20	< 20
Methyl Chloride	NV	< 5	< 5	<2	< 0.3	< 0.3	-	-	-	-	-	-	-	-	-
m-p-xylene	NV	< 1.0	< 1.0	<1	< 0.4	< 0.4	<0.1	0.1	<0.10	<0.10	<0.5	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	NV	< 0.5	< 0.5	<0.5	< 0.2	< 0.2	<0.1	<0.1	<0.10	<0.10	<0.5	< 0.5	-	< 0.5	< 0.5
Styrene	NV	< 0.5	< 0.5	<0.5	< 0.2	< 0.2	<0.2	<0.2	<0.20	<0.20	<0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,1,2-Tetrachloro-ethane	NV	< 0.5	< 0.5	<0.5	< 0.3	< 0.3	<0.1	<0.1	<0.20	<0.20	-	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethene	NV	< 0.5	< 0.5	<0.5	< 0.3	< 0.3	<0.1	<0.1	<0.10	<0.10	<0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	24	< 0.5	< 0.5	<0.5	**0.4**	**2.6**	**0.3**	**0.5**	<0.20	<0.20	<0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans-1,2-Dichloroethene	NV	< 0.5	< 0.5	<0.5	< 0.2	< 0.2	<0.1	<0.1	<0.10	<0.10	<0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans-1,3-Dichloropropene	NV	< 0.5	< 0.5	<0.5	< 0.3	< 0.3	<0.2	<0.2	<0.20	<0.20	<0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	50	< 0.5	< 0.5	<0.5	< 0.4	< 0.4	<0.1	<0.1	<0.10	<0.10	<0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	NV	< 5	< 5	<5	< 0.3	<0.2	<0.2	<0.20	<0.20	<5	< 5	< 5	< 5	< 5	< 5
Trihalomethanes	100	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-
Vinyl Chloride	1	< 0.2	< 0.2	<0.2	< 0.2	<0.2	<0.2	<0.20	<0.20	<0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylene; total	300	< 1.1	< 1.1	< 1.5	-	<0.1	**0.1**	<0.10	0.13	<0.5	< 1.1	-	< 1.1	< 1.1	< 1.1
2-Chloroethyvinyl Ether	NV	-	-	-	< 10	-	-	-	-	-	-	-	-	-	-

Notes:

1. All results in µg/L unless otherwise stated.
2. Water quality data provided by the City of Kawartha Lakes.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. Bold text and shading indicates values exceeding the ODWQS.
5. Bold text indicates detection
6. NV indicates no value.
7. "-" indicates parameter not analyzed.

Table 3 - Ground Water Quality Data - VOC's

		MW3	MW3	MW3	MW3	MW3	MW5-I	MW5-I	MW7	MW7	MW8-III	MW8-III	MW8-III	MW8-III	MW8-III
Parameters	**ODWQS[1]**	**22-Sep-14**	**16-Sep-15**	**01-Jun-16**	**20-Apr-17**	**23-Oct-17**	**30-Sep-13**	**20-Oct-21**	**30-Sep-13**	**20-Oct-21**	**15-Jun-10**	**21-Oct-10**	**11-May-11**	**13-Sep-11**	**29-May-12**
Acetone	NV	< 2	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 10	< 10	<10	<10	<25
1,1,1-Trichloroethane	NV	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.1	<0.1	<0.25
1,1,2,2-Tetrachloroethane	NV	< 0.4	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.3	< 0.3	<0.2	<0.2	<0.50
1,1,2-Trichloroethane	NV	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.4	< 0.4	<0.2	<0.2	<0.50
1,1-Dichloroethane	NV	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.1	**0.1**	<0.25
1,1-Dichloroethylene	NV	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.3	< 0.3	<0.1	<0.1	<0.25
1,2-Dichlorobenzene	200	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.4	< 0.4	<0.2	<0.2	<0.50
1,2-Dichloroethane	5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.4	< 0.4	<0.2	<0.2	<0.50
cis-1,2-Dichloro-ethylene	NV	< 0.1	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.1	<0.1	<0.25
1,2-Dichloropropane	NV	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.4	< 0.4	<0.1	<0.1	<0.25
1,3-Dichlorobenzene	NV	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.3	< 0.3	<0.2	<0.2	<0.50
1,4-Dichlorobenzene	5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.4	< 0.4	<0.2	<0.2	<0.50
Benzene	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**0.3**	< 0.2	<0.1	**0.2**	<0.25
Bromodichloromethane	NV	< 0.1	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 0.3	< 0.3	<0.1	<0.1	<0.25
Bromoform	NV	< 0.1	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.3	< 0.3	<0.2	<0.2	<0.50
1,2,4-Trichloro-benzene	NV	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-	-	-
Bromomethane	NV	< 0.3	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.4	< 0.4	<0.5	<0.5	<1.3
Carbon tetrachloride	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.1	<0.1	<0.25
Chlorobenzene	NV	< 0.2	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.3	< 0.3	<0.1	**0.1**	<0.25
Chloroethane	NV	-	-	-	-	-	-	-	-	-	**2**	**1.3**	-	-	-
Chloroform	NV	< 0.3	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	<0.1	<0.1	<0.25
Chloromethane	NV	< 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	NV	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.4	< 0.4	<0.2	<0.2	<0.50
Dibromochloromethane	NV	-	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 0.4	< 0.4	<0.2	<0.2	<0.50
Dichloromethane	50	< 0.3	< 5	< 5	< 5	< 5	< 5	-	< 5	-	-	-	<0.5	<0.5	<1.3
Ethylbenzene	2.4	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.2	<0.1	<0.1	<0.25
Ethylenedibromide	NV	< 0.1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.2	<0.50
Methyl Ethyl Ketone	NV	< 1	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 10	< 10	<5	<5	<13
Methyl-tert-butyl-ether	NV	< 1	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 0.5	< 0.5	<0.2	<0.2	<0.50
Methyl-isobutyl-ketone	NV	< 1	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 10	< 10	<5	<5	<13
Methyl Chloride	NV	-	-	-	-	-	-	< 5	-	< 5	< 0.3	< 0.3	-	-	-
m-p-xylene	NV	< 0.4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.4	< 0.4	<0.1	<0.1	<0.25
o-xylene	NV	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.2	<0.1	<0.1	<0.25
Styrene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.2	<0.2	<0.2	<0.50
1,1,1,2-Tetrachloro-ethane	NV	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.3	< 0.3	<0.1	<0.1	<0.50
Tetrachloroethene	NV	< 0.2	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.3	< 0.3	<0.1	<0.1	<0.25
Toluene	24	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.2	<0.2	<0.2	<0.50
trans-1,2-Dichloroethene	NV	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.2	<0.1	<0.1	<0.25
trans-1,3-Dichloropropene	NV	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.3	< 0.3	<0.2	<0.2	<0.50
Trichloroethylene	50	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.4	< 0.4	<0.1	<0.1	<0.25
Trichlorofluoromethane	NV	< 0.1	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.3	<0.2	<0.2	<0.50	<0.2
Trihalomethanes	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	1	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5	< 0.2	< 0.2	<0.2	<0.2	<0.50	<0.2
Xylene; total	300	< 0.4	< 0.5	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	-	<0.1	<0.1	<0.25	<0.1
2-Chloroethyvinyl Ether	NV	-	-	-	-	-	-	-	-	-	< 10	-	-	-	-

Notes:

1. All results in µg/L unless otherwise stated.
2. Water quality data provided by the City of Kawartha Lakes.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. Bold text and shading indicates values exceeding the ODWQS.
5. Bold text indicates detection
6. NV indicates no value.
7. "-" indicates parameter not analyzed.

Table 3 - Ground Water Quality Data - VOC's

		MW8-III	MW8-III	MW8-III	MW8-III	MW8-III	MW8-III	MW8-III	MW8-III	MW8-III	MW8-III	MW8-III	MW8-III	MW8-III	MW8-III
Parameters	**ODWQS^1**	**04-Oct-12**	**21-May-13**	**30-Sep-13**	**28-Apr-14**	**28-Apr-14**	**22-Sep-14**	**16-Jun-15**	**16-Sep-15**	**22-Mar-16**	**20-Apr-17**	**23-Oct-17**	**01-Jun-16**	**22-Aug-16**	**18-Oct-16**
Acetone	NV	<10	< 30	< 30	< 30	-	< 2	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
1,1,1-Trichloroethane	NV	<0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2,2-Tetrachloroethane	NV	<0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.4	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2-Trichloroethane	NV	<0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1-Dichloroethane	NV	0.1	< 0.5	< 0.5	< 0.5	< 0.5	**0.4**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1-Dichloroethylene	NV	<0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichlorobenzene	200	<0.2	< 0.5	< 0.5	< 0.5	-	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichloroethane	5	<0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis-1,2-Dichloro-ethylene	NV	<0.1	< 0.5	< 0.5	< 0.5	< 0.2	< 0.1	-	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichloropropane	NV	<0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,3-Dichlorobenzene	NV	<0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,4-Dichlorobenzene	5	<0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzene	1	**0.77**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane	NV	<0.1	< 2	< 2	< 2	< 0.5	< 0.1	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Bromoform	NV	<0.2	< 5	< 5	< 5	< 0.5	< 0.1	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2,4-Trichloro-benzene	NV	-	< 0.5	< 0.5	< 0.5	-	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	NV	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.3	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon tetrachloride	2	<0.1	< 0.2	< 0.2	< 0.2	-	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorobenzene	NV	**0.1**	< 0.5	< 0.5	< 0.5	-	< 0.2	-	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	NV	<0.1	< 1	< 1	< 1	< 0.5	< 0.3	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloromethane	NV	-	-	-	< 2	< 0.5	< 0.1	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	NV	<0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane	NV	<0.2	< 2	< 2	-	-	-	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dichloromethane	50	<0.5	< 5	< 5	< 5	< 0.5	< 0.3	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	2.4	<0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylenedibromide	NV	<0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Methyl Ethyl Ketone	NV	<5	< 20	< 20	< 20	-	< 1	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl-tert-butyl-ether	NV	<0.2	< 2	< 2	< 2	-	< 1	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Methyl-isobutyl-ketone	NV	<5	< 20	< 20	< 20	-	< 1	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl Chloride	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
m-p-xylene	NV	<0.1	< 1.0	< 1.0	< 1.0	< 0.5	< 0.4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	NV	<0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Styrene	NV	<0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,1,2-Tetrachloro-ethane	NV	<0.1	< 0.5	< 0.5	< 0.5	-	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethene	NV	<0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	-	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	24	<0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans-1,2-Dichloroethene	NV	<0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans-1,3-Dichloropropene	NV	<0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	50	<0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	NV	-	< 5	< 5	< 5	< 5	< 0.1	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Trihalomethanes	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	1	-	< 0.5	< 0.5	< 0.5	< 0.2	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylene; total	300	-	< 1.1	< 1.1	< 1.1	< 0.5	< 0.4	< 0.5	< 0.5	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
2-Chloroethyvinyl Ether	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1. All results in µg/L unless otherwise stated.
2. Water quality data provided by the City of Kawartha Lakes.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. Bold text and shading indicates values exceeding the ODWQS.
5. Bold text indicates detection
6. NV indicates no value.
7. "-" indicates parameter not analyzed.

Table 3 - Ground Water Quality Data - VOC's

		MW8-III	MW8-III	MW8-III	MW8-III	MW8-III	MW8-III	MW9	MW9	MW9	MW9	MW9	MW9	MW9	MW10-II
Parameters	**ODWQS[1]**	**27-Sep-18**	**24-Oct-19**	**08-Oct-20**	**20-Oct-21**	**23-Oct-22**	**18-Oct-23**	**30-Sep-13**	**27-Sep-18**	**24-Oct-19**	**08-Oct-20**	**20-Oct-21**	**23-Oct-22**	**18-Oct-23**	**30-Sep-13**
Acetone	NV	< 30	<2	<2	< 30	< 30	<30	< 30	< 30	<2	< 30	< 30	< 30	<30	< 30
1,1,1-Trichloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
1,1,2,2-Tetrachloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
1,1,2-Trichloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
1,1-Dichloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
1,1-Dichloroethylene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
1,2-Dichlorobenzene	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
1,2-Dichloroethane	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
cis-1,2-Dichloro-ethylene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
1,2-Dichloropropane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
1,3-Dichlorobenzene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
1,4-Dichlorobenzene	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
Benzene	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
Bromodichloromethane	NV	< 2	< 2	< 2	< 2	< 2	<2	< 2	< 2	< 2	< 2	< 2	< 2	<2	< 2
Bromoform	NV	< 5	< 5	< 5	< 5	< 5	<5	< 5	< 5	< 5	< 5	< 5	< 5	<5	< 5
1,2,4-Trichloro-benzene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
Bromomethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
Carbon tetrachloride	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	< 0.2
Chlorobenzene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
Chloroethane	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	NV	< 1	< 1	< 1	< 1	< 1	<1	< 1	< 1	< 1	< 1	< 1	< 1	<1	< 1
Chloromethane	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
Dibromochloromethane	NV	< 2	< 2	< 2	< 2	< 2	<2	< 2	< 2	< 2	< 2	< 2	< 2	<2	< 2
Dichloromethane	50	-	-	-	-	-	<5	< 5	-	-	-	-	-	<5	< 5
Ethylbenzene	2.4	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
Ethylenedibromide	NV	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	< 0.2
Methyl Ethyl Ketone	NV	< 20	< 20	< 20	< 20	< 20	<20	< 20	< 20	< 20	< 20	< 20	< 20	<20	< 20
Methyl-tert-butyl-ether	NV	< 2	< 2	< 2	< 2	< 2	<2	< 2	< 2	< 2	< 2	< 2	< 2	<2	< 2
Methyl-isobutyl-ketone	NV	< 20	< 20	< 20	< 20	< 20	<20	< 20	< 20	< 20	< 20	< 20	< 20	<20	< 20
Methyl Chloride	NV	< 0.3	< 0.3	< 0.3	< 5	< 5	<2	-	< 0.3	< 0.3	< 5	< 5	< 5	<2	-
m-p-xylene	NV	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1	< 1.0
o-xylene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
Styrene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
1,1,1,2-Tetrachloro-ethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
Tetrachloroethene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
Toluene	24	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	2.4	< 0.5
trans-1,2-Dichloroethene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
trans-1,3-Dichloropropene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
Trichloroethylene	50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
Trichlorofluoromethane	NV	< 5	< 5	< 5	< 5	< 5	<5	< 5	< 5	< 5	< 5	< 5	< 5	<5	< 5
Trihalomethanes	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	1	< 0.5	< 0.5	< 0.5	< 0.2	< 0.2	<0.2	< 0.5	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	<0.2	< 0.5
Xylene; total	300	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	-	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
2-Chloroethyvinyl Ether	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1. All results in µg/L unless otherwise stated.
2. Water quality data provided by the City of Kawartha Lakes.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. Bold text and shading indicates values exceeding the ODWQS.
5. Bold text indicates detection
6. NV indicates no value.
7. "-" indicates parameter not analyzed.

Table 3 - Ground Water Quality Data - VOC's

		MW10-II	MW10-II	MW10-II	MW10-II	MW10-II	MW10-II	MW11	MW11	MW11	MW11	MW11	MW11	MW12	MW12
Parameters	**ODWQS[1]**	**27-Sep-18**	**24-Oct-19**	**08-Oct-20**	**20-Oct-21**	**23-Oct-22**	**18-Oct-23**	**30-Sep-13**	**16-Jun-15**	**15-Sep-15**	**22-Mar-16**	**01-Jun-16**	**20-Apr-17**	**30-Sep-13**	**24-Oct-19**
Acetone	NV	< 30	<2	< 30	< 30	< 30	<30	< 30	**40**	< 30	< 30	< 30	< 30	< 30	<2
1,1,1-Trichloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2,2-Tetrachloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2-Trichloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1-Dichloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1-Dichloroethylene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichlorobenzene	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichloroethane	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis-1,2-Dichloro-ethylene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	-	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichloropropane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,3-Dichlorobenzene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,4-Dichlorobenzene	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzene	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane	NV	< 2	< 2	< 2	< 2	< 2	<2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Bromoform	NV	< 5	< 5	< 5	< 5	< 5	<5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2,4-Trichloro-benzene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon tetrachloride	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorobenzene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	-	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	NV	< 1	< 1	< 1	< 1	< 1	<1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloromethane	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane	NV	< 2	< 2	< 2	< 2	< 2	<2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dichloromethane	50	-	-	-	-	-	<5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	2.4	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylenedibromide	NV	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Methyl Ethyl Ketone	NV	< 20	< 20	< 20	< 20	< 20	<20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl-tert-butyl-ether	NV	< 2	< 2	< 2	< 2	< 2	<2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Methyl-isobutyl-ketone	NV	< 20	< 20	< 20	< 20	< 20	<20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl Chloride	NV	< 0.3	< 0.3	< 5	< 5	< 5	<2	-	-	-	-	-	-	-	-
m-p-xylene	NV	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Styrene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,1,2-Tetrachloro-ethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	-	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	24	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans-1,2-Dichloroethene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans-1,3-Dichloropropene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	NV	< 5	< 5	< 5	< 5	< 5	<5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Trihalomethanes	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	1	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	<0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylene; total	300	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 0.5	< 0.5	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
2-Chloroethyvinyl Ether	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1. All results in µg/L unless otherwise stated.
2. Water quality data provided by the City of Kawartha Lakes.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. Bold text and shading indicates values exceeding the ODWQS.
5. Bold text indicates detection
6. NV indicates no value.
7. "-" indicates parameter not analyzed.

Table 3 - Ground Water Quality Data - VOC's

											DUP			
		MW12	**MW12**	**MW12**	**MW13**	**MW13**	**MW13**	**MW13**	**MW13**	**MW13**	**MW13**	**MW13**	**MW14**	**MW14**	**MW14**
Parameters	**ODWQS**[1]	**08-Oct-20**	**20-Oct-21**	**23-Oct-22**	**30-Sep-13**	**27-Sep-18**	**24-Oct-19**	**08-Oct-20**	**20-Oct-21**	**23-Oct-22**	**18-Oct-23**	**18-Oct-23**	**30-Sep-13**	**16-Jun-15**	**25-Aug-15**
Acetone	NV	< 30	< 30	< 30	< 30	< 30	<2	< 30	< 30	< 30	<30	<30	< 30	< 30	< 30
1,1,1-Trichloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5
1,1,2,2-Tetrachloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5
1,1,2-Trichloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5
1,1-Dichloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	**0.5**
1,1-Dichloroethylene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5
1,2-Dichlorobenzene	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5
1,2-Dichloroethane	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5
cis-1,2-Dichloro-ethylene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	-	-
1,2-Dichloropropane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5
1,3-Dichlorobenzene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5
1,4-Dichlorobenzene	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5
Benzene	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane	NV	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	<2	<2	< 2	< 2	< 2
Bromoform	NV	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	<5	<5	< 5	< 5	< 5
1,2,4-Trichloro-benzene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5
Bromomethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5
Carbon tetrachloride	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.2	< 0.2	< 0.2	< 0.2
Chlorobenzene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	-	-
Chloroethane	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	NV	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	<1	<1	< 1	< 1	< 1
Chloromethane	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane	NV	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	<2	<2	< 2	< 2	< 2
Dichloromethane	50	-	-	-	< 5	-	-	-	-	-	<5	<5	< 5	< 5	< 5
Ethylbenzene	2.4	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5
Ethylenedibromide	NV	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.2	< 0.2	< 0.2	< 0.2
Methyl Ethyl Ketone	NV	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	<20	<20	< 20	< 20	< 20
Methyl-tert-butyl-ether	NV	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	<2	<2	< 2	< 2	< 2
Methyl-isobutyl-ketone	NV	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	<20	<20	< 20	< 20	< 20
Methyl Chloride	NV	< 5	< 5	< 5	-	< 0.3	< 0.3	< 5	< 5	< 5	<2	<2	-	-	-
m-p-xylene	NV	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1	<1	< 1.0	< 1.0	< 1.0
o-xylene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5
Styrene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5
1,1,1,2-Tetrachloro-ethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	-	-
Toluene	24	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5
trans-1,2-Dichloroethene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5
trans-1,3-Dichloropropene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	NV	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	<5	<5	< 5	< 5	< 5
Trihalomethanes	100	-	-	-	-	-	-	-	-		-	-	-	-	-
Vinyl Chloride	1	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	<0.2	<0.2	< 0.5	< 0.5	< 0.5
Xylene; total	300	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 0.5	< 0.5
2-Chloroethyvinyl Ether	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1. All results in µg/L unless otherwise stated.
2. Water quality data provided by the City of Kawartha Lakes.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. Bold text and shading indicates values exceeding the ODWQS.
5. Bold text indicates detection
6. NV indicates no value.
7. "-" indicates parameter not analyzed.

Table 3 - Ground Water Quality Data - VOC's

		MW14	MW14	MW14	MW14	MW14	MW14	MW14	MW14	MW14	MW14	MW14	MW14	MW14	MW15
Parameters	**ODWQS^1**	**15-Sep-15**	**22-Mar-16**	**01-Jun-16**	**22-Aug-16**	**18-Oct-16**	**20-Apr-17**	**23-Oct-17**	**27-Sep-18**	**24-Oct-19**	**08-Oct-20**	**20-Oct-21**	**23-Oct-22**	**18-Oct-23**	**30-Sep-13**
Acetone	NV	< 30	< 30	< 30	-	< 30	< 30	< 30	< 30	<2	< 30	< 30	< 30	<30	< 30
1,1,1-Trichloroethane	NV	< 0.5	< 0.5	< 0.5	**0.9**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
1,1,2,2-Tetrachloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
1,1,2-Trichloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
1,1-Dichloroethane	NV	**0.5**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
1,1-Dichloroethylene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
1,2-Dichlorobenzene	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
1,2-Dichloroethane	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
cis-1,2-Dichloro-ethylene	NV	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
1,2-Dichloropropane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
1,3-Dichlorobenzene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
1,4-Dichlorobenzene	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
Benzene	1	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
Bromodichloromethane	NV	< 2	< 2	< 2	< 0.5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	<2	< 2
Bromoform	NV	< 5	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	<5	< 5
1,2,4-Trichloro-benzene	NV	< 0.5	< 0.5	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
Bromomethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
Carbon tetrachloride	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	< 0.2
Chlorobenzene	NV	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
Chloroethane	NV	-	-	-	< 5	-	-	-	-	-	-	-	-	-	-
Chloroform	NV	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	<1	< 1
Chloromethane	NV	-	-	-	< 5	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	NV	< 0.5	< 0.5	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
Dibromochloromethane	NV	< 2	< 2	< 2	< 0.5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	<2	< 2
Dichloromethane	50	< 5	< 5	< 5	< 0.5	< 5	< 5	< 5	-	-	-	-	-	<5	< 5
Ethylbenzene	2.4	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
Ethylenedibromide	NV	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	< 0.2
Methyl Ethyl Ketone	NV	< 20	< 20	< 20	-	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	<20	< 20
Methyl-tert-butyl-ether	NV	< 2	< 2	< 2	-	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	<2	< 2
Methyl-isobutyl-ketone	NV	< 20	< 20	< 20	-	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	<20	< 20
Methyl Chloride	NV	-	-	-	-	-	-	-	< 0.3	< 0.3	< 5	< 5	< 5	<2	-
m-p-xylene	NV	< 1.0	< 1.0	< 1.0	< 0.5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1	< 1.0
o-xylene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
Styrene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
1,1,1,2-Tetrachloro-ethane	NV	< 0.5	< 0.5	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
Tetrachloroethene	NV	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
Toluene	24	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
trans-1,2-Dichloroethene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
trans-1,3-Dichloropropene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
Trichloroethylene	50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5
Trichlorofluoromethane	NV	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	<5	<5
Trihalomethanes	100	-	-	-	< 0.5	-	-	-	-	-	-	-	-	-	<0.5
Vinyl Chloride	1	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	<0.2	<0.2
Xylene; total	300	< 0.5	< 1.1	< 1.1	< 0.5	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	<0.5
2-Chloroethyvinyl Ether	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1. All results in µg/L unless otherwise stated.
2. Water quality data provided by the City of Kawartha Lakes.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. Bold text and shading indicates values exceeding the ODWQS.
5. Bold text indicates detection
6. NV indicates no value.
7. "-" indicates parameter not analyzed.

Table 3 - Ground Water Quality Data - VOC's

		MW15	MW15	MW15	MW15	MW15	MW15	MW15	MW15	MW15	MW15	MW15	MW15	MW16-I	MW16-I
Parameters	**ODWQS^1**	**15-Sep-15**	**22-Mar-16**	**01-Jun-16**	**18-Oct-16**	**20-Apr-17**	**23-Oct-17**	**27-Sep-18**	**24-Oct-19**	**08-Oct-20**	**20-Oct-21**	**23-Oct-22**	**18-Oct-23**	**18-Oct-16**	**20-Apr-17**
Acetone	NV	< 30	< 30	< 30	< 30	< 30	< 30	< 30	<2	< 30	< 30	< 30	<30	< 30	< 30
1,1,1-Trichloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
1,1,2,2-Tetrachloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
1,1,2-Trichloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
1,1-Dichloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
1,1-Dichloroethylene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
1,2-Dichlorobenzene	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
1,2-Dichloroethane	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
cis-1,2-Dichloro-ethylene	NV	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
1,2-Dichloropropane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
1,3-Dichlorobenzene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
1,4-Dichlorobenzene	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
Benzene	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
Bromodichloromethane	NV	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	<2	< 2	< 2
Bromoform	NV	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	<5	< 5	< 5
1,2,4-Trichloro-benzene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
Bromomethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
Carbon tetrachloride	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	< 0.2	< 0.2
Chlorobenzene	NV	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
Chloroethane	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	NV	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	<1	< 1	< 1
Chloromethane	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
Dibromochloromethane	NV	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	<2	< 2	< 2
Dichloromethane	50	< 5	< 5	< 5	< 5	< 5	< 5	-	-	-	-	-	<5	< 5	< 5
Ethylbenzene	2.4	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
Ethylenedibromide	NV	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	< 0.2	< 0.2
Methyl Ethyl Ketone	NV	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	<20	< 20	< 20
Methyl-tert-butyl-ether	NV	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	<2	< 2	< 2
Methyl-isobutyl-ketone	NV	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	<20	< 20	< 20
Methyl Chloride	NV	-	-	-	-	-	-	< 0.3	< 0.3	< 5	< 5	< 5	<2	-	-
m-p-xylene	NV	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1	< 1.0	< 1.0
o-xylene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
Styrene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
1,1,1,2-Tetrachloro-ethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
Tetrachloroethene	NV	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
Toluene	24	< 0.5	< 0.5	< 0.5	0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
trans-1,2-Dichloroethene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
trans-1,3-Dichloropropene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
Trichloroethylene	50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
Trichlorofluoromethane	NV	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	<5	< 5	< 5
Trihalomethanes	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	<0.2	< 0.5	< 0.5
Xylene; total	300	< 0.5	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
2-Chloroethyvinyl Ether	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1. All results in µg/L unless otherwise stated.
2. Water quality data provided by the City of Kawartha Lakes.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. Bold text and shading indicates values exceeding the ODWQS.
5. Bold text indicates detection
6. NV indicates no value.
7. "-" indicates parameter not analyzed.

Table 3 - Ground Water Quality Data - VOC's

		MW16-I	MW16-I	MW16-II	MW16-III	MW16-III	MW16-III	MW16-III	MW16-III	MW16-III	MW16-III	MW16-III	MW16-III	MW17	MW17
Parameters	**ODWQS^1**	**24-Oct-19**	**20-Oct-21**	**20-Apr-17**	**18-Oct-16**	**20-Apr-17**	**23-Oct-17**	**27-Sep-18**	**24-Oct-19**	**08-Oct-20**	**20-Oct-21**	**23-Oct-22**	**18-Oct-23**	**18-Oct-16**	**20-Apr-17**
Acetone	NV	<2	< 30	< 30	< 30	< 30	< 30	< 30	<2	< 30	< 30	< 30	<30	**170**	**50**
1,1,1-Trichloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 1	< 0.5
1,1,2,2-Tetrachloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 1	< 0.5
1,1,2-Trichloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 1	< 0.5
1,1-Dichloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 1	< 0.5
1,1-Dichloroethylene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 1	< 0.5
1,2-Dichlorobenzene	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 1	< 0.5
1,2-Dichloroethane	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 1	< 0.5
cis-1,2-Dichloro-ethylene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 1	< 0.5
1,2-Dichloropropane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 1	< 0.5
1,3-Dichlorobenzene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 1	< 0.5
1,4-Dichlorobenzene	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 1	< 0.5
Benzene	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	**6.2**	**7.6**
Bromodichloromethane	NV	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	<2	< 4	< 2
Bromoform	NV	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	<5	< 10	< 5
1,2,4-Trichloro-benzene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 1	< 0.5
Bromomethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 1	< 0.5
Carbon tetrachloride	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	< 0.4	< 0.2
Chlorobenzene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 1	< 0.5
Chloroethane	NV	-	-	-	-	-	-	-	-	-	-	-		-	-
Chloroform	NV	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	<1	< 2	< 1
Chloromethane	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 1	< 0.5
Dibromochloromethane	NV	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	<2	< 4	< 2
Dichloromethane	50	< 5	-	< 5	< 5	< 5	< 5	-	-	-	-	-	<5	< 10	< 5
Ethylbenzene	2.4	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	**38.8**	**27.6**
Ethylenedibromide	NV	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	< 0.4	< 0.2
Methyl Ethyl Ketone	NV	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	<20	**260**	< 20
Methyl-tert-butyl-ether	NV	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	<2	< 4	< 2
Methyl-isobutyl-ketone	NV	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	<20	< 40	< 20
Methyl Chloride	NV	-	< 5	-	-	-	-	< 0.3	< 0.3	< 5	< 5	< 5	<2	-	-
m-p-xylene	NV	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1	**111**	**64.8**
o-xylene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	**29.9**	**15.3**
Styrene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	**1.8**	< 0.5
1,1,1,2-Tetrachloro-ethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 1	< 0.5
Tetrachloroethene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 1	< 0.5
Toluene	24	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	**222**	**185**
trans-1,2-Dichloroethene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 1	< 0.5
trans-1,3-Dichloropropene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 1	< 0.5
Trichloroethylene	50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 1	< 0.5
Trichlorofluoromethane	NV	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	<5	< 10	< 5
Trihalomethanes	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	1	< 0.5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	<0.2	< 1	< 0.5
Xylene; total	300	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	-	**141**	**80**
2-Chloroethyvinyl Ether	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1. All results in µg/L unless otherwise stated.
2. Water quality data provided by the City of Kawartha Lakes.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. Bold text and shading indicates values exceeding the ODWQS.
5. Bold text indicates detection
6. NV indicates no value.
7. "-" indicates parameter not analyzed.

Table 3 - Ground Water Quality Data - VOC's

		MW17	MW17	MW17	MW17	MW17	MW17	MW17	MW201D	MW201D	MW201D	MW201D	MW201D	MW202	MW202
Parameters	**ODWQS^1**	**23-Oct-17**	**27-Sep-18**	**24-Oct-19**	**08-Oct-20**	**20-Oct-21**	**23-Oct-22**	**18-Oct-23**	**04-Nov-19**	**08-Oct-20**	**20-Oct-21**	**23-Oct-22**	**18-Oct-23**	**04-Nov-19**	**08-Oct-20**
Acetone	NV	< 30	< 30	<2	**40**	< 30	< 30	70	<2	<2	< 30	< 30	<30	<2	<2
1,1,1-Trichloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
1,1,2,2-Tetrachloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
1,1,2-Trichloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
1,1-Dichloroethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
1,1-Dichloroethylene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
1,2-Dichlorobenzene	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
1,2-Dichloroethane	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
cis-1,2-Dichloro-ethylene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
1,2-Dichloropropane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
1,3-Dichlorobenzene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
1,4-Dichlorobenzene	5	< 0.5	< 0.5	< 0.5	< 0.5	**0.6**	< 0.5	0.6	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
Benzene	1	**3.3**	**7.1**	**9.3**	**5.6**	**7.3**	**2.1**	**9.1**	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
Bromodichloromethane	NV	< 2	< 2	< 2	< 2	< 2	< 2	<2	< 2	< 2	< 2	< 2	<2	< 2	< 2
Bromoform	NV	< 5	< 5	< 5	< 5	< 5	< 5	<5	< 5	< 5	< 5	< 5	<5	< 5	< 5
1,2,4-Trichloro-benzene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
Bromomethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
Carbon tetrachloride	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	< 0.2	< 0.2
Chlorobenzene	NV	< 0.5	< 0.5	**4.1**	**4.7**	**7.2**	**2.5**	**5.4**	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
Chloroethane	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	NV	< 1	< 1	< 1	< 1	< 1	< 1	<1	< 1	< 1	< 1	< 1	<1	< 1	< 1
Chloromethane	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
Dibromochloromethane	NV	< 2	< 2	< 2	< 2	< 2	< 2	<2	< 2	< 2	< 2	< 2	<2	< 2	< 2
Dichloromethane	50	< 5	-	-	-	-	-	<5	-	-	-	-	<5	-	-
Ethylbenzene	2.4	**5.1**	**21.1**	**48.6**	**36.3**	**49.8**	**14.4**	**32.8**	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
Ethylenedibromide	NV	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	< 0.2	< 0.2
Methyl Ethyl Ketone	NV	< 20	< 20	< 20	< 20	< 20	< 20	<20	< 20	< 20	< 20	< 20	<20	< 20	< 20
Methyl-tert-butyl-ether	NV	< 2	< 2	< 2	< 2	< 2	< 2	<2	< 2	< 2	< 2	< 2	<2	< 2	< 2
Methyl-isobutyl-ketone	NV	< 20	< 20	< 20	< 20	< 20	< 20	<20	< 20	< 20	< 20	< 20	<20	< 20	< 20
Methyl Chloride	NV	-	< 0.3	< 0.3	< 5	< 5	< 5	<2	< 0.3	< 0.3	< 5	< 5	<2	< 0.3	< 0.3
m-p-xylene	NV	**12.8**	**56.3**	**80.7**	**45**	**60**	**26**	**81**	< 1.0	< 1.0	< 1.0	< 1.0	<1	< 1.0	< 1.0
o-xylene	NV	**2.7**	**8.4**	**11.9**	**3.5**	**2.6**	< 0.5	4.7	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
Styrene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**1.1**	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
1,1,1,2-Tetrachloro-ethane	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
Tetrachloroethene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
Toluene	24	**13.5**	**6**	**9**	**2**	**1.7**	**0.6**	**1.3**	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
trans-1,2-Dichloroethene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
trans-1,3-Dichloropropene	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
Trichloroethylene	50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5
Trichlorofluoromethane	NV	< 5	< 5	< 5	< 5	< 5	< 5	<5	< 5	< 5	< 5	< 5	<5	< 5	< 5
Trihalomethanes	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	1	< 0.5	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	<0.2	< 0.5	< 0.5	< 0.2	< 0.2	<0.2	< 0.5	< 0.5
Xylene; total	300	**15.5**	**64.7**	**92.6**	**48.5**	**62.6**	**26**	**85.7**	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
2-Chloroethyvinyl Ether	NV	-	-	-	-	-		-	-	-	-	-	-	-	-

Notes:

1. All results in µg/L unless otherwise stated.
2. Water quality data provided by the City of Kawartha Lakes.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. Bold text and shading indicates values exceeding the ODWQS.
5. Bold text indicates detection
6. NV indicates no value.
7. "-" indicates parameter not analyzed.

Table 3 - Ground Water Quality Data - VOC's

					DUP										
		MW202	MW202	MW202	MW202	MW203	MW203	MW203	MW203	MW203	MW204	MW204	MW204	MW204	MW204
Parameters	**ODWQS^1**	**20-Oct-21**	**23-Oct-22**	**18-Oct-23**	**18-Oct-23**	**04-Nov-19**	**08-Oct-20**	**20-Oct-21**	**23-Oct-22**	**18-Oct-23**	**04-Nov-19**	**08-Oct-20**	**20-Oct-21**	**23-Oct-22**	**18-Oct-23**
Acetone	NV	< 30	< 30	<30	<30	<2	<2	< 30	< 30	<30	<2	<2	< 30	< 30	<30
1,1,1-Trichloroethane	NV	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
1,1,2,2-Tetrachloroethane	NV	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
1,1,2-Trichloroethane	NV	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
1,1-Dichloroethane	NV	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
1,1-Dichloroethylene	NV	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
1,2-Dichlorobenzene	200	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
1,2-Dichloroethane	5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
cis-1,2-Dichloro-ethylene	NV	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
1,2-Dichloropropane	NV	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
1,3-Dichlorobenzene	NV	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
1,4-Dichlorobenzene	5	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
Benzene	1	< 0.5	< 0.5	<0.5	<0.5	**1.4**	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
Bromodichloromethane	NV	< 2	< 2	<2	<2	< 2	< 2	< 2	< 2	<2	< 2	< 2	< 2	< 2	<2
Bromoform	NV	< 5	< 5	<5	<5	< 5	< 5	< 5	< 5	<5	< 5	< 5	< 5	< 5	<5
1,2,4-Trichloro-benzene	NV	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
Bromomethane	NV	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
Carbon tetrachloride	2	< 0.2	< 0.2	<0.2	<0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2
Chlorobenzene	NV	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
Chloroethane	NV	-	-	-	-	-	-	-	-		-	-	-	-	-
Chloroform	NV	< 1	< 1	<1	<1	< 1	< 1	< 1	< 1	<1	< 1	< 1	< 1	< 1	<1
Chloromethane	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	NV	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
Dibromochloromethane	NV	< 2	< 2	<2	<2	< 2	< 2	< 2	< 2	<2	< 2	< 2	< 2	< 2	<2
Dichloromethane	50	-	-	<5	<5	-	-		-	<5	-	-	-	-	<5
Ethylbenzene	2.4	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
Ethylenedibromide	NV	< 0.2	< 0.2	<0.2	<0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2
Methyl Ethyl Ketone	NV	< 20	< 20	<20	<20	< 20	< 20	< 20	< 20	<20	< 20	< 20	< 20	< 20	<20
Methyl-tert-butyl-ether	NV	< 2	< 2	<2	<2	< 2	< 2	< 2	< 2	<2	< 2	< 2	< 2	< 2	<2
Methyl-isobutyl-ketone	NV	< 20	< 20	<20	<20	< 20	< 20	< 20	< 20	<20	< 20	< 20	< 20	< 20	<20
Methyl Chloride	NV	< 5	< 5	<2	<2	< 0.3	< 0.3	< 5	< 5	5	< 0.3	< 0.3	< 5	< 5	<2
m-p-xylene	NV	< 1.0	< 1.0	<1	<1	< 1.0	< 1.0	< 1.0	< 1.0	<1	< 1.0	< 1.0	< 1.0	< 1.0	<1
o-xylene	NV	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
Styrene	NV	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
1,1,1,2-Tetrachloro-ethane	NV	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
Tetrachloroethene	NV	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
Toluene	24	< 0.5	< 0.5	<0.5	<0.5	**1.6**	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
trans-1,2-Dichloroethene	NV	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
trans-1,3-Dichloropropene	NV	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
Trichloroethylene	50	< 0.5	< 0.5	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5
Trichlorofluoromethane	NV	< 5	< 5	<5	<5	< 5	< 5	< 5	< 5	<5	< 5	< 5	< 5	< 5	<5
Trihalomethanes	100	-	-	-		-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	1	< 0.2	< 0.2	<0.2	<0.2	< 0.5	< 0.5	< 0.2	< 0.2	<0.2	< 0.5	< 0.5	< 0.2	< 0.2	<0.2
Xylene; total	300	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
2-Chloroethyvinyl Ether	NV	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1. All results in µg/L unless otherwise stated.
2. Water quality data provided by the City of Kawartha Lakes.
3. ODWQS means Ontario Drinking Water Quality Standards.
4. Bold text and shading indicates values exceeding the ODWQS.
5. Bold text indicates detection
6. NV indicates no value.
7. "-" indicates parameter not analyzed.

Table 4 - Surface Water Quality Data

Parameters	PWQO	Trigger Limit	SW A	SW A	SW A	SW A	SW A	SW A	SW A	SW A	SW A	SW A	SW A	SW A	SW A	SW A	SW A
			29-May-12	21-May-13	13-Aug-13	30-Sep-13	28-Apr-14	22-Sep-14	16-Jun-15	15-Sep-15	01-Jun-16	22-Aug-16	18-Oct-16	20-Apr-17	17-Jul-17	23-Oct-17	25-Apr-18
Alkalinity (as CaCO3)	decrease >25% of bkgd.	235	170	177	200	221	158	231	185	212	150	Dry	Dry	158	198	Dry	160
Aluminum	0.075	NV	0.0063	0.05	0.04	**0.09**	0.02	0.05	0.03	0.03	0.02			0.02	0.03		0.04
Ammonia, total	NV	NV	<0.01	< 0.01	0.03	< 0.01	0.02	0.37	< 0.01	< 0.01	0.01			< 0.01	0.02		0.02
Antimony	0.02	NV	<0.00050	< 0.0001	< 0.0001	1/0/1900	0.0001	< 0.0001	< 0.0001	0.0003	0.0001			< 0.0001	0.0002		< 0.0001
Arsenic	0.005	NV	<0.0010	0.0002	0.0002	0.0008	0.0002	0.0005	0.0001	0.0002	< 0.0001			0.0001	0.0002		0.0004
Barium	NV	NV	0.011	0.012	0.018	0.022	0.014	0.026	0.012	0.018	0.008			0.012	0.015		0.012
Beryllium	0.011	NV	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002			< 0.002	< 0.002		< 0.002
Boron	0.2	NV	<0.010	0.011	0.009	< 0.005	< 0.005	0.014	0.029	0.184	0.031			< 0.005	0.011		< 0.005
Cadmium	0.0001	NV	<0.00010	< 0.00002	0.00008	< 0.00002	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.00002			< 0.000014	< 0.000014		< 0.000014
Calcium	NV	NV	68	73.5	81.9	98.9	69.5	104	70.5	92.2	56.3			60.7	75.7		61.8
Chloride	NV	NV	<1	0.9	0.9	2.6	1.3	3.8	1.3	2.5	1			1	1.3		1.4
Chromium	0.001	NV	<0.0050	< 0.002	0.0008	< 0.0002	< 0.0002	0.0006	< 0.0002	< 0.0002	0.0006			**0.003**	< 0.001		< 0.001
Chromium (VI)	NV	NV	-	-	-	-	-	-	-	-	-			-	-		-
Cobalt	0.0009	NV	<0.00050	< 0.0001	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005			< 0.0001	< 0.0001		< 0.0001
Chemical Oxygen Demand	NV	30	27	11	13	11	9	15	18	10	25			14	20		12
Conductivity (uS/cm)	NV	NV	330	344	386	441	316	484	355	413	293			314	390		312
Copper	0.005	NV	0.0016	0.002	0.004	0.0009	0.0003	0.0007	< 0.0001	< 0.0001	< 0.0001			< 0.0001	0.0004		< 0.0001
Dissolved Organic Carbon	NV	13	6.6	5.8	9.7	7.4	5.2	8.5	7.5	7.1	6.2			4.5	7.7		4.2
Fluoride	NV	NV	<0.10	0.2	0.2	0.2	1	< 0.1	0.1	0.2	0.1			< 0.1	< 0.1		< 0.1
Hardness	NV	NV	180	192	213	257	181	271	184	241	149			172	197		162
Iron	0.3	NV	<0.10	0.047	0.046	0.046	< 0.005	0.085	0.134	0.016	0.008			< 0.005	0.031		0.006
Lead	0.003	NV	<0.00050	0.0001	0.00015	0.00011	0.00003	0.00014	< 0.00002	< 0.00002	< 0.00002			< 0.00002	0.00004		< 0.00002
Magnesium	NV	NV	2	1.88	2.05	2.42	1.7	2.79	1.84	2.48	1.97			1.57	1.92		1.72
Manganese	NV	NV	0.0031	0.003	0.01	0.019	0.001	0.047	< 0.001	0.002	< 0.001			0.003	0.004		0.001
Mercury	0.0002	NV	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002			< 0.00002	< 0.00002		< 0.00002
Molybdenum	0.04	NV	<0.00050	< 0.0001	< 0.0001	0.0001	0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001			0.0001	< 0.0001		< 0.0001
Nickel	0.025	NV	<0.0010	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			< 0.01	< 0.01		< 0.01
Nitrate	NV	NV	<0.10	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1	0.2	< 0.1			< 0.1	< 0.05		< 0.05
Nitrite	NV	NV	<0.010	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1			< 0.1	< 0.05		< 0.05
pH (units)	6.5 - 8.5	NV	8.01	8.16	8.07	7.98	8.16	7.81	8.08	8.04	8.2			8.05	8.02		7.99
Phenols	0.001	NV	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001			**0.015**	**0.006**		< 0.001
Dissolved Phosphorus	-	NV	-	-	-	-	-	-	-	-	< 0.1			0.03	0.03		< 0.1
Total Phosphorus	0.03	NV	0.02	< 0.01	**0.05**	< 0.01	< 0.01	**0.1**	0.02	0.03	**0.81**			< 0.1	< 0.1		0.02
Potassium	NV	NV	0.62	0.5	0.4	0.5	0.6	2.9	0.6	0.8	0.2			0.2	0.3		0.6
Selenium	0.1	NV	<0.0020	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001			< 0.001	< 0.001		< 0.001
Silver	0.0001	NV	<0.00010	< 0.00002	< 0.00002	< 0.00002	0.00002	0.00009	< 0.00002	< 0.00002	< 0.00002			0.00003	< 0.00002		< 0.00002
Sodium	NV	NV	0.63	0.7	0.6	1.1	0.9	1.6	0.8	1	0.7			0.6	0.7		0.7
Strontium	NV	NV	0.14	-	-	-	-	0.196	0.138	0.17	0.121			0.105	0.147		0.1
Sulphate	NV	NV	<1	3	< 1	4	4	8	1	2	1			5	< 1		2
Total Dissolved Solids	NV	NV	179	187	207	243	174	262	187	229	151			163	199		164
Total Kjeldahl Nitrogen	NV	NV	0.2	0.7	0.6	0.3	0.2	1.2	0.3	0.3	0.4			0.2	0.4		0.3
Thallium	0.0003	NV	<0.000050	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005			< 0.00005	< 0.00005		< 0.00005
Vanadium	0.006	NV	<0.00050	< 0.005	0.0002	0.0002	< 0.0001	0.0002	< 0.0001	0.0002	0.0003			< 0.0001	0.0001		0.0002
Zinc	0.02	0.02	<0.0050	< 0.005	< 0.005	0.006	0.006	< 0.005	< 0.005	< 0.005	< 0.005			< 0.005	< 0.005		< 0.005
Ammonia, unionized	0.02	0.01	<0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			< 0.01	< 0.01		< 0.01
Biological Oxygen Demand	NV	NV	<2.0	< 3	< 3	< 3	< 3	< 3	< 2	2	< 2			< 3	< 3		< 3
Cyanide - Free (µg/L)	5	NV	<0.0020	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005			< 0.005	< 0.005		< 0.005
Colour (TCU)	NV	NV	14	12	21	14	10	19	17	22	17			13	21		8
Total Suspended Solids	NV	NV	2	3	14	3	< 3	6	3	< 3	3			< 3	82		< 3
Turbidity	NV	NV	0.8	1	2.8	1	0.6	1.1	1.2	0.6	1.3			0.3	2.1		0.3
Conductivity (µs/cm) [7]	NV	NV	335	365	340.4	448	370	550	305	368	-			257	297		390
pH (units) [7]	6.5 - 8.5	NV	8.13	7.89	7.42	7.21	8.21	7.91	7.91	7.73	-			8.02	7.9		7.97
Temperature (°C) [7]	NV	NV	25.3	18.5	18	16.2	8.6	10.2	25.52	20.1	-			7	22.3		3.8
Oxidation Reduction Potential [7]	NV	NV	-	76	-	2	-	-	-	-	-			-	-		-
Dissolved Oxygen [7]	NV	NV	8.6	9.61	9.65	6.71	4.32	3.24	7.29	8.55	-			7.94	4.92		6.81

Notes:

1. Results provided by the City
2. Results in mg/L unless otherwise stated.
3. PWQO means Provincial Water Quality Objectives.
4. Bold & shading indicates PWQO exceedance.
5. NV indicates no value.
6. "-" indicates parameter not analysed.
7. Results obtained from field analysis.

Table 4 - Surface Water Quality Data

													DUP				
Parameters	**PWQO**	**Trigger Limit**	**SW A**	**SW A**	**SW A**	**SW A**	**SW A**	**SW A**	**SW A**	**SW A**	**SW A**	**SW A**	**SW A**	**SW A**	**SW B**	**SW B**	**SW B**
			27-Sep-18	**16-Apr-19**	**24-Oct-19**	**20-Apr-20**	**08-Oct-20**	**14-Apr-21**	**20-Oct-21**	**13-Apr-22**	**23-Oct-22**	**10-May-23**	**10-May-23**	**18-Oct-23**	**29-May-12**	**21-Aug-12**	**04-Oct-12**
Alkalinity (as CaCO3)	decrease >25% of bkgd.	235	Dry	149	240	158	Dry	176	Dry	169	Dry	167	170	Dry	250	240	220
Aluminum	0.075	NV		0.05	0.07	0.05		0.02		0.06		0.03	0.03		0.042	0.035	0.016
Ammonia, total	NV	NV		0.03	0.07	0.02		0.11		0.72		1.81	2.26		<0.01	0.02	0.05
Antimony	0.02	NV		0.0002	0.0004	0.0002		0.0002		0.0003		0.0001	0.0004		<0.00050	<0.00050	<0.00050
Arsenic	0.005	NV		< 0.0001	0.0002	< 0.0001		0.0001		0.0001		0.0001	0.0001		<0.0010	<0.0010	<0.0010
Barium	NV	NV		0.014	0.03	0.012		0.012		0.014		0.012	0.012		0.026	0.02	0.017
Beryllium	0.011	NV		< 0.002	< 0.002	< 0.002		< 0.002		< 0.002		< 0.002	< 0.002		<0.00050	<0.00050	<0.00050
Boron	0.2	NV		0.006	0.012	0.007		0.006		< 0.005		0.006	0.007		0.011	0.019	0.014
Cadmium	0.0001	NV		< 0.000015	< 0.000015	< 0.000015		< 0.000015		< 0.000015		< 0.000015	< 0.000015		<0.00010	<0.00010	<0.00010
Calcium	NV	NV		62	91.8	66.8		68.3		72.3		59.7	60		110	100	90
Chloride	NV	NV		1.4	4.9	1.9		1.5		3.3		1.1	1		<1	2	2
Chromium	0.001	NV		< 0.001	**0.014**	0.001		< 0.001		< 0.001		< 0.001	< 0.001		<0.0050	<0.0050	<0.0050
Chromium (VI)	NV	NV		-	-	-		-		-		0.003	< 0.001		-	-	-
Cobalt	0.0009	NV		0.0001	< 0.0001	< 0.0001		< 0.0001		< 0.0001		< 0.0001	< 0.0001		<0.00050	<0.00050	<0.00050
Chemical Oxygen Demand	NV	30		< 5	13	10		8		16		5	12		15	9	22
Conductivity (uS/cm)	NV	NV		306	490	328		341		338		339	336		470	460	430
Copper	0.005	NV		0.0002	0.0007	0.0005		0.0003		0.0006		0.0005	0.0007		0.002	<0.0010	<0.0010
Dissolved Organic Carbon	NV	13		4	6.4	4.5		6.2		5.8		6.3	6.6		3.6	31	6.3
Fluoride	NV	NV		< 0.1	< 0.1	< 0.1		< 0.1		< 0.1		< 0.1	< 0.1		<0.10	<0.10	<0.10
Hardness	NV	NV		157	242	189		197		189		156	156		250	250	230
Iron	0.3	NV		0.025	0.089	0.039		0.006		0.049		0.028	0.021		<0.10	<0.10	<0.10
Lead	0.003	NV		< 0.00002	0.00005	0.00005		< 0.00002		0.00005		0.00005	0.00004		<0.00050	<0.00050	<0.00050
Magnesium	NV	NV		1.71	3.03	1.62		1.7		2.03		1.59	1.57		2.3	2.9	2.5
Manganese	NV	NV		0.002	0.02	0.004		0.001		0.003		0.003	0.002		0.054	0.051	0.015
Mercury	0.0002	NV		< 0.00002	< 0.00002	< 0.00002		< 0.00002		< 0.00002		< 0.00002	< 0.00002		<0.00001	<0.00001	<0.00001
Molybdenum	0.04	NV		< 0.0001	0.0003	< 0.0001		0.0001		< 0.0001		< 0.0001	< 0.0001		<0.00050	<0.00050	<0.00050
Nickel	0.025	NV		< 0.01	0.01	< 0.01		< 0.01		< 0.01		< 0.01	< 0.01		<0.0010	<0.0010	<0.0010
Nitrate	NV	NV		< 0.05	1.38	< 0.05		< 0.05		0.07		0.18	< 0.05		<0.10	<0.10	<0.10
Nitrite	NV	NV		< 0.05	< 0.05	0.06		< 0.05		< 0.05		< 0.05	< 0.05		<0.010	<0.010	<0.010
pH (units)	6.5 - 8.5	NV		7.85	7.97	7.97		7.78		7.39		7.78	8.05		8.05	7.89	7.87
Phenols	0.001	NV		< 0.002	< 0.002	< 0.002		< 0.002		< 0.001		< 0.001	< 0.001		<0.0010	<0.0010	<0.0010
Dissolved Phosphorus	-	NV		< 0.1	< 0.1	< 0.1		< 0.1		< 0.1		< 0.1	< 0.1		-	-	-
Total Phosphorus	0.03	NV		**0.24**	**0.09**	< 0.01		< 0.01		**0.09**		0.06	0.02		**0.08**	**0.07**	0.02
Potassium	NV	NV		0.6	4.2	0.4		0.3		0.5		0.4	0.4		1.5	1.6	0.74
Selenium	0.1	NV		< 0.001	< 0.001	< 0.001		< 0.001		< 0.001		< 0.001	< 0.001		<0.0020	<0.0020	<0.0020
Silver	0.0001	NV		< 0.0001	< 0.0001	< 0.0001		< 0.0001		< 0.0001		< 0.0001	< 0.0001		<0.00010	<0.00010	<0.00010
Sodium	NV	NV		1	2.5	1		1.1		1		1.1	1.1		1.1	1	0.95
Strontium	NV	NV		0.103	0.169	0.103		0.116		0.117		0.115	0.116		0.17	0.18	0.18
Sulphate	NV	NV		3	13	5		4		3		3	2		<1	3	4
Total Dissolved Solids	NV	NV		159	266	171		182		184		173	174		259	258	229
Total Kjeldahl Nitrogen	NV	NV		0.2	0.7	0.2		0.2		0.9		2.6	2.6		0.4	1.2	0.5
Thallium	0.0003	NV		< 0.00005	< 0.00005	< 0.00005		< 0.00005		< 0.00005		< 0.00005	< 0.00005		<0.000050	<0.000050	<0.000050
Vanadium	0.006	NV		< 0.0001	0.0004	0.0001		< 0.0001		0.0001		< 0.0001	0.0001		<0.00050	<0.00050	<0.00050
Zinc	0.02	0.02		0.011	**0.023**	0.013		< 0.005		< 0.005		< 0.005	< 0.005		0.0068	0.0059	<0.0050
Ammonia, unionized	0.02	0.01		< 0.01	< 0.01	< 0.01		< 0.01		0.02		0.02	0.06		<0.02	<0.02	<0.02
Biological Oxygen Demand	NV	NV		< 3	< 3	< 3		< 3		< 3		< 3	< 3		<2.0	4	<2.0
Cyanide - Free (µg/L)	5	NV		< 0.005	< 0.005	< 0.005		< 0.005		< 0.005		< 0.005	< 0.005		<0.0020	<0.0020	<0.0020
Colour (TCU)	NV	NV		14	24	8		14		11		16	13		11	24	17
Total Suspended Solids	NV	NV		< 3	< 3	< 3		< 3		14		< 3	< 3		2	11	4
Turbidity	NV	NV		0.5	0.9	0.9		1.5		0.8		0.9	1.1		1.9	3.4	1
Conductivity (µs/cm) [7]	NV	NV		350	365	410		440		305		275	275		369	-	400
pH (units) [7]	6.5 - 8.5	NV		7.8	8.2	7.94		8.15		8.34		7.58	7.58		8.31	-	7.98
Temperature (°C) [7]	NV	NV		7.8	9.6	9.3		12.9		7		15.5	15.5		22.2	-	15.4
Oxidation Reduction Potential [7]	NV	NV		-	-	-		-		-		-	-		104	-	6
Dissolved Oxygen [7]	NV	NV		10.01	6.81	-		14.21		-		6.75	6.75		9.37	-	7.07

Notes:

1. Results provided by the City
2. Results in mg/L unless otherwise stated.
3. PWQO means Provincial Water Quality Objectives.
4. Bold & shading indicates PWQO exceedance.
5. NV indicates no value.
6. "-" indicates parameter not analysed.
7. Results obtained from field analysis.

Table 4 - Surface Water Quality Data

Parameters	PWQO	Trigger Limit	SW B	SW B	SW B	SW B	SW B	SW B	SW B	SW B	SW B	SW B	SW B	SW B	SW B	SW B	SW B
			21-May-13	13-Aug-13	30-Sep-13	28-Apr-14	13-Aug-14	22-Sep-14	16-Jun-15	25-Aug-15	15-Sep-15	01-Jun-16	22-Aug-16	18-Oct-16	20-Apr-17	17-Jul-17	23-Oct-17
Alkalinity (as CaCO3)	decrease >25% of bkgd.	235	177	209	206	158	190	225	185	197	209	171	222	Dry	159	202	213
Aluminum	0.075	NV	0.04	0.04	0.04	0.02	0.03	0.03	0.02	0.02	**0.23**	0.02	0.03		0.02	0.03	0.06
Ammonia, total	NV	NV	< 0.01	0.02	< 0.01	0.01	0.14	0.06	< 0.01	0.02	0.03	< 0.01	0.07		< 0.01	0.03	0.63
Antimony	0.02	NV	0.0001	< 0.0001	< 0.0001	< 0.0001	0.0003	< 0.0001	< 0.0001	0.0001	0.0001	< 0.0001	0.0004		< 0.0001	0.0002	< 0.0001
Arsenic	0.005	NV	0.0001	0.0002	0.0004	0.0001	0.0002	0.0002	0.0001	0.0002	0.0003	0.0001	0.0002		0.0001	0.0001	0.0002
Barium	NV	NV	0.011	0.022	0.018	0.013	0.049	0.023	0.014	0.034	0.052	0.011	0.028		0.011	0.013	0.025
Beryllium	0.011	NV	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002
Boron	0.2	NV	0.01	0.012	< 0.005	< 0.005	0.015	0.01	0.026	< 0.005	0.159	0.03	0.017		< 0.005	0.011	0.012
Cadmium	0.0001	NV	0.00002	< 0.00002	< 0.00002	< 0.00002	**0.00578**	< 0.00002	< 0.00002	< 0.00002	**0.00012**	< 0.00002	< 0.00002		< 0.000014	0.000041	< 0.000014
Calcium	NV	NV	77.1	84.1	87.6	66.3	82.3	87.3	71.5	68.1	106	68.7	103		60.6	68.9	84.3
Chloride	NV	NV	1	3.1	1.4	1.3	10.6	1.4	1.4	2.7	2	1	2		1	1.1	1.6
Chromium	0.001	NV	< 0.002	0.0006	0.0007	< 0.0002	**0.0017**	< 0.0002	< 0.0002	< 0.0002	0.0007	0.0005	0.0005		< 0.001	< 0.001	< 0.001
Chromium (VI)	NV	NV	-	-	-	-	-	-	-	-	-	-	-		-	-	-
Cobalt	0.0009	NV	< 0.0001	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005		< 0.0001	< 0.0001	< 0.0001
Chemical Oxygen Demand	NV	30	12	10	11	9	50	10	15	26	11	19	18		13	14	28
Conductivity (uS/cm)	NV	NV	358	411	402	313	371	445	359	386	408	325	455		311	386	410
Copper	0.005	NV	0.005	0.0004	0.0008	0.0002	0.0002	0.0003	< 0.0001	< 0.0001	0.0045	< 0.0001	< 0.0001		< 0.0001	**0.0062**	0.0001
Dissolved Organic Carbon	NV	13	6.2	7.9	9.1	5	13.8	8.9	7	8.4	6.7	5.5	8.7		4.3	7.3	8
Fluoride	NV	NV	0.2	0.2	0.1	0.1	< 0.1	0.2	0.1	0.1	0.2	0.1	0.1		< 0.1	< 0.1	< 0.1
Hardness	NV	NV	201	219	228	172	220	227	186	180	279	180	269		172	179	224
Iron	0.3	NV	0.025	0.027	0.014	0.006	0.211	0.022	0.024	0.058	**0.457**	0.01	0.009		< 0.005	0.013	0.024
Lead	0.003	NV	0.00022	< 0.00002	0.00009	0.00004	0.00009	0.00003	< 0.00002	< 0.00002	**0.00322**	< 0.00002	< 0.00002		0.00004	0.00042	< 0.00002
Magnesium	NV	NV	1.95	2.18	2.18	1.56	3.46	2.16	1.81	2.35	3.13	2.04	2.47		1.54	1.71	3.16
Manganese	NV	NV	0.004	0.032	0.006	< 0.001	0.158	0.004	0.002	0.007	0.093	0.003	0.009		< 0.001	0.003	0.008
Mercury	0.0002	NV	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002		< 0.00002	< 0.00002	< 0.00002
Molybdenum	0.04	NV	< 0.0001	< 0.0001	0.0002	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001		< 0.0001	0.0002	< 0.0001
Nickel	0.025	NV	< 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
Nitrate	NV	NV	0.2	0.1	0.1	0.1	< 0.1	< 0.1	0.1	< 0.1	0.1	< 0.1	< 0.1		< 0.1	< 0.05	< 0.05
Nitrite	NV	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0	< 0.1	< 0.1		< 0.1	< 0.05	< 0.05
pH (units)	6.5 - 8.5	NV	7.47	8.03	8.15	8.2	7.77	8.01	8.01	7.78	7.81	8.32	7.82		8.1	8.22	8.15
Phenols	0.001	NV	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001		**0.005**	**0.004**	**0.008**
Dissolved Phosphorus	-	NV	-	-	-	-	-	-	-	-	-	< 0.1	< 0.1		< 0.01	< 0.01	0.03
Total Phosphorus	0.03	NV	< 0.01	0.01	0.02	< 0.01	**0.1**	0.02	< 0.01	**0.05**	**0.2**	**1.11**	**0.04**		< 0.1	< 0.1	< 0.1
Potassium	NV	NV	0.7	0.6	0.6	0.5	6.7	0.6	0.4	1.3	0.7	0.1	0.7		0.2	0.2	0.5
Selenium	0.1	NV	< 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
Silver	0.0001	NV	**0.00015**	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00009	< 0.00002	< 0.00002	0.00003	< 0.00002	< 0.00002		0.00002	< 0.00002	< 0.00002
Sodium	NV	NV	0.8	1.1	0.8	0.7	2.1	0.7	0.8	1.2	1.5	0.7	0.8		0.4	0.6	1.9
Strontium	NV	NV	-	-	-	-	0.194	0.168	0.141	0.145	0.216	0.139	0.189		0.104	0.134	0.176
Sulphate	NV	NV	6	2	2	4	2	1	3	< 1	1	1	11		5	< 1	2
Total Dissolved Solids	NV	NV	195	219	219	169	222	229	190	195	242	177	254		164	194	221
Total Kjeldahl Nitrogen	NV	NV	0.7	0.4	0.7	0.2	1.31	0.3	0.3	0.5	0.9	0.3	0.5		0.2	0.3	0.7
Thallium	0.0003	NV	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.00005	< 0.00005	< 0.00005
Vanadium	0.006	NV	< 0.005	0.0002	0.0002	< 0.0001	0.0016	< 0.0001	< 0.0001	< 0.0001	0.0008	0.0002	0.0003		< 0.0001	< 0.0001	< 0.0001
Zinc	0.02	0.02	0.011	< 0.005	< 0.005	0.006	0.006	< 0.005	< 0.005	< 0.005	**0.021**	< 0.005	< 0.005		< 0.005	< 0.005	**0.024**
Ammonia, unionized	0.02	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	**0.05**
Biological Oxygen Demand	NV	NV	< 3	< 3	< 3	< 3	5	< 3	< 2	3	< 2	< 2	< 3		< 3	< 3	3
Cyanide - Free (µg/L)	5	NV	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005
Colour (TCU)	NV	NV	13	17	15	11	24	15	14	17	15	12	17		14	15	13
Total Suspended Solids	NV	NV	6	4	10	< 3	7	4	5	24	14	6	4		< 3	< 3	20
Turbidity	NV	NV	1.2	0.8	2.4	0.4	3.1	0.5	1.8	2	0.8	0.8	0.9		0.4	0.6	1.6
Conductivity (µs/cm) [7]	NV	NV	341	385.4	280	680	331.9	450	304	315.3	366	299	385		266	300	370
pH (units) [7]	6.5 - 8.5	NV	7.6	7.54	7.68	8.1	7.16	7.76	7.8	7.67	7.4	7.17	7.83		8.12	7.77	7.8
Temperature (°C) [7]	NV	NV	19.4	18	17.6	8.5	18.2	9.6	21.12	16.1	18.44	20.87	15.4		6.2	23.1	12.6
Oxidation Reduction Potential [7]	NV	NV	72	-	11	-	-	-	-	-	-	-	-		-	-	-
Dissolved Oxygen [7]	NV	NV	9.39	9.34	7.21	4.71	-	3.82	8.45	5.3	6.44	12.01	4.01		7.21	5.24	4.91

Notes:

1. Results provided by the City
2. Results in mg/L unless otherwise stated.
3. PWQO means Provincial Water Quality Objectives.
4. Bold & shading indicates PWQO exceedance.
5. NV indicates no value.
6. "-" indicates parameter not analysed.
7. Results obtained from field analysis.

Table 4 - Surface Water Quality Data

Parameters	PWQO	Trigger Limit	SW B	SW B	SW B	SW B	SW B	SW B	SW B	SW B	SW B	SW B	SW B	SW B	SW D	SW D	SW D
			25-Apr-18	27-Sep-18	16-Apr-19	24-Oct-19	20-Apr-20	08-Oct-20	14-Apr-21	20-Oct-21	13-Apr-22	23-Oct-22	10-May-23	18-Oct-23	29-May-12	04-Oct-12	21-May-13
Alkalinity (as CaCO3)	decrease >25% of bkgd.	235	**32**	Dry	137	193	154	214	175	234	168	Dry	172	Dry	190	160	171
Aluminum	0.075	NV	0.01		0.05	0.06	0.05	0.06	0.02	0.06	0.04		0.02		<0.0050	0.026	0.04
Ammonia, total	NV	NV	0.11		0.03	0.04	0.01	0.05	0.02	0.03	0.04		2.48		<0.01	0.12	0.02
Antimony	0.02	NV	< 0.0001		0.0003	0.0004	< 0.0001	0.0003	0.0003	0.0002	0.0004		0.0003		<0.00050	<0.00050	< 0.0001
Arsenic	0.005	NV	0.0002		< 0.0001	0.0002	< 0.0001	0.0001	0.0001	0.0002	< 0.0001		0.0001		<0.0010	<0.0010	0.0002
Barium	NV	NV	0.003		0.012	0.023	0.012	0.019	0.011	0.018	0.012		0.011		0.017	0.053	0.02
Beryllium	0.011	NV	< 0.002		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002		< 0.002		<0.00050	<0.00050	< 0.002
Boron	0.2	NV	< 0.005		0.005	0.01	0.005	0.008	0.006	0.009	< 0.005		0.006		<0.010	0.015	0.011
Cadmium	0.0001	NV	< 0.000014		< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015		< 0.000015		<0.00010	<0.00010	< 0.00002
Calcium	NV	NV	12.8		56.4	82.6	70	97.7	65.4	96.3	69.5		59.1		77	79	77.8
Chloride	NV	NV	0.6		1.4	2.2	2	2.8	1.4	2.6	3.2		1		<1	20	1.5
Chromium	0.001	NV	< 0.001		< 0.001	**0.002**	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001		<0.0050	<0.0050	< 0.002
Chromium (VI)	NV	NV	-		-	-	-	-	-	-	-		< 0.001		-	-	-
Cobalt	0.0009	NV	< 0.0001		0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001		< 0.0001		<0.00050	<0.00050	< 0.0001
Chemical Oxygen Demand	NV	30	12		13	12	9	6	10	4	26		15		20	48	7
Conductivity (uS/cm)	NV	NV	65		285	426	324	422	341	422	333		335		370	430	339
Copper	0.005	NV	< 0.0001		0.0002	0.0005	0.0002	0.0006	0.0002	0.0002	0.0008		0.0005		0.0012	<0.0010	0.003
Dissolved Organic Carbon	NV	13	2.2		4.4	6.9	3.7	5.6	6.1	6	5.3		3.8		5.6	`	7.3
Fluoride	NV	NV	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.1		<0.10	<0.10	0.2
Hardness	NV	NV	34		147	217	184	240	205	254	186		154		200	200	204
Iron	0.3	NV	< 0.005		0.027	0.029	0.013	0.023	< 0.005	0.014	0.025		0.01		<0.10	<0.10	0.041
Lead	0.003	NV	0.00004		0.00006	0.00005	< 0.00002	0.00003	< 0.00002	0.00002	0.00021		0.00003		<0.00050	**0.0036**	0.00021
Magnesium	NV	NV	0.38		1.56	2.6	1.69	2.09	1.64	2.39	1.91		1.57		2.1	2.7	2.25
Manganese	NV	NV	0.002		0.002	0.012	0.001	0.002	0.001	0.001	0.004		0.003		0.0085	0.025	0.011
Mercury	0.0002	NV	< 0.00002		< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002		< 0.00002		<0.00001	<0.00001	< 0.00002
Molybdenum	0.04	NV	< 0.0001		< 0.0001	0.0004	< 0.0001	0.0001	< 0.0001	0.0002	< 0.0001		< 0.0001		<0.00050	<0.00050	< 0.0001
Nickel	0.025	NV	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		< 0.01		<0.0010	<0.0010	< 0.01
Nitrate	NV	NV	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.07		< 0.05		<0.10	<0.10	< 0.1
Nitrite	NV	NV	< 0.05		< 0.05	< 0.05	0.08	< 0.05	< 0.05	< 0.05	<0.05		< 0.05		<0.010	<0.010	< 0.1
pH (units)	6.5 - 8.5	NV	7.75		7.79	8.01	7.92	8	8	8.2	7.43		8.03		8.05	7.9	7.98
Phenols	0.001	NV	< 0.001		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001		< 0.001		<0.0010	<0.0010	< 0.001
Dissolved Phosphorus	-	NV	< 0.1		< 0.1	< 0.1	< 0.1	0.3	< 0.1	< 0.1	< 0.1		< 0.1		-	-	-
Total Phosphorus	0.03	NV	0.02		**0.25**	**0.04**	< 0.01	**0.23**	0.03	**0.08**	0.03		0.02		0.02	**0.07**	0.03
Potassium	NV	NV	0.4		0.4	1.3	0.3	0.5	0.3	0.5	0.4		0.4		0.65	1.4	1
Selenium	0.1	NV	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001		<0.0020	<0.0020	< 0.001
Silver	0.0001	NV	< 0.00002		< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001		< 0.0001		<0.00010	<0.00010	< 0.00002
Sodium	NV	NV	0.2		1	1.1	0.9	1.2	1	0.9	0.9		1		0.74	5.9	1.1
Strontium	NV	NV	0.021		0.094	0.149	0.106	0.156	0.11	0.164	0.112		0.113		0.14	0.2	-
Sulphate	NV	NV	< 1		2	15	3	6	4	2	3		2		<1	31	3
Total Dissolved Solids	NV	NV	34		145	225	170	239	179	245	180		174		198	236	190
Total Kjeldahl Nitrogen	NV	NV	0.3		0.3	0.4	0.2	2.1	0.8	1.3	0.4		2.4		0.2	2.1	0.9
Thallium	0.0003	NV	< 0.00005		< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.00005		<0.000050	<0.000050	< 0.00005
Vanadium	0.006	NV	0.0001		< 0.0001	0.0002	< 0.0001	0.0002	< 0.0001	< 0.0001	< 0.0001		< 0.0001		0.0017	<0.00050	< 0.005
Zinc	0.02	0.02	0.007		0.009	0.007	< 0.005	0.008	**0.12**	0.017	< 0.005		< 0.005		<0.0050	<0.0050	0.01
Ammonia, unionized	0.02	0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		0.03		<0.02	<0.02	< 0.01
Biological Oxygen Demand	NV	NV	< 3		< 3	< 3	< 3	< 3	< 3	7.1	< 3		< 3		<2.0	5	< 3
Cyanide - Free (µg/L)	5	NV	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005		< 0.005		<0.0020	<0.0020	< 0.005
Colour (TCU)	NV	NV	10		10	22	7	14	13	17	10		11		13	30	17
Total Suspended Solids	NV	NV	< 3		< 3	< 3	< 3	17	< 3	16	14		< 3		3	9	10
Turbidity	NV	NV	0.3		0.7	0.6	0.3	1.1	1.6	0.5	5.2		0.4		0.4	2.6	2.6
Conductivity (µs/cm) [7]	NV	NV	150		350	355	375	420	450	455	295		280		467	410	682
pH (units) [7]	6.5 - 8.5	NV	7.95		7.15	7.88	7.85	7.43	8.03	8.22	8		7.58		7.9	8.09	7.26
Temperature (°C) [7]	NV	NV	2.8		1	8.4	4.6	7.9	8.8	12.1	5.9		10.4		19.7	23.3	17.1
Oxidation Reduction Potential [7]	NV	NV	-		-	-	-	-	-	-	-		-		139	46	56
Dissolved Oxygen [7]	NV	NV	6.92		9.2	5.79	-	-	11.32	2.69	-		7.9		8.81	14.36	8.68

Notes:
1. Results provided by the City
2. Results in mg/L unless otherwise stated.
3. PWQO means Provincial Water Quality Objectives.
4. Bold & shading indicates PWQO exceedance.
5. NV indicates no value.
6. "-" indicates parameter not analysed.
7. Results obtained from field analysis.

Table 4 - Surface Water Quality Data

Parameters	PWQO	Trigger Limit	SW D	SW D	SW D	SW D	SW D	SW D	SW D	SW D	SW D	SW D	SW D	SW D	SW D	SW D	SW D
			28-Apr-14	16-Jun-15	15-Sep-15	01-Jun-16	22-Aug-16	18-Oct-16	20-Apr-17	17-Jul-17	23-Oct-17	25-Apr-18	27-Sep-18	16-Apr-19	24-Oct-19	20-Apr-20	08-Oct-20
Alkalinity (as CaCO3)	decrease >25% of bkgd.	235	158	175	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
Aluminum	0.075	NV	0.02	**0.08**													
Ammonia, total	NV	NV	0.03	0.03													
Antimony	0.02	NV	< 0.0001	< 0.0001													
Arsenic	0.005	NV	0.0001	0.0008													
Barium	NV	NV	0.017	0.112													
Beryllium	0.011	NV	< 0.002	< 0.002													
Boron	0.2	NV	< 0.005	0.039													
Cadmium	0.0001	NV	0.00003	< 0.00002													
Calcium	NV	NV	68.6	105													
Chloride	NV	NV	1.2	70.2													
Chromium	0.001	NV	< 0.0002	< 0.0002													
Chromium (VI)	NV	NV	-	-													
Cobalt	0.0009	NV	< 0.005	< 0.005													
Chemical Oxygen Demand	NV	30	8	21													
Conductivity (uS/cm)	NV	NV	314	596													
Copper	0.005	NV	0.0002	0.0007													
Dissolved Organic Carbon	NV	13	5	5.1													
Fluoride	NV	NV	0.1	< 0.1													
Hardness	NV	NV	179	272													
Iron	0.3	NV	< 0.005	**0.757**													
Lead	0.003	NV	0.00004	0.00003													
Magnesium	NV	NV	1.74	2.61													
Manganese	NV	NV	< 0.001	0.029													
Mercury	0.0002	NV	< 0.00002	< 0.00002													
Molybdenum	0.04	NV	0.0001	0.0002													
Nickel	0.025	NV	< 0.01	< 0.01													
Nitrate	NV	NV	< 0.1	0.2													
Nitrite	NV	NV	< 0.1	< 0.1													
pH (units)	6.5 - 8.5	NV	8.18	7.85													
Phenols	0.001	NV	< 0.001	< 0.001													
Dissolved Phosphorus	-	NV	-	-													
Total Phosphorus	0.03	NV	< 0.01	**0.06**													
Potassium	NV	NV	0.6	3.6													
Selenium	0.1	NV	< 0.001	0.002													
Silver	0.0001	NV	< 0.00002	< 0.00002													
Sodium	NV	NV	0.9	10.2													
Strontium	NV	NV	-	0.47													
Sulphate	NV	NV	3	11													
Total Dissolved Solids	NV	NV	171	309													
Total Kjeldahl Nitrogen	NV	NV	0.2	0.7													
Thallium	0.0003	NV	< 0.00005	< 0.00005													
Vanadium	0.006	NV	0.0001	0.0001													
Zinc	0.02	0.02	0.012	< 0.005													
Ammonia, unionized	0.02	0.01	< 0.01	< 0.01													
Biological Oxygen Demand	NV	NV	< 3	< 2													
Cyanide - Free (µg/L)	5	NV	< 0.005	< 0.005													
Colour (TCU)	NV	NV	9	27													
Total Suspended Solids	NV	NV	< 3	8													
Turbidity	NV	NV	0.4	3.7													
Conductivity (µs/cm) [7]	NV	NV	370	541													
pH (units) [7]	6.5 - 8.5	NV	8.03	7.52													
Temperature (°C) [7]	NV	NV	9.5	23.84													
Oxidation Reduction Potential [7]	NV	NV	-	-													
Dissolved Oxygen [7]	NV	NV	3.9	3.1													

Notes:

1. Results provided by the City
2. Results in mg/L unless otherwise stated.
3. PWQO means Provincial Water Quality Objectives.
4. Bold & shading indicates PWQO exceedance.
5. NV indicates no value.
6. "-" indicates parameter not analysed.
7. Results obtained from field analysis.

Table 4 - Surface Water Quality Data

Parameters	PWQO	Trigger Limit	SW D	SW D	SW D	SW D	SW D	SW D
			14-Apr-21	20-Oct-21	13-Apr-22	23-Oct-22	10-May-23	18-Oct-23
Alkalinity (as CaCO3)	decrease >25% of bkgd.	235	Dry	Dry	Dry	Dry	Dry	Dry
Aluminum	0.075	NV						
Ammonia, total	NV	NV						
Antimony	0.02	NV						
Arsenic	0.005	NV						
Barium	NV	NV						
Beryllium	0.011	NV						
Boron	0.2	NV						
Cadmium	0.0001	NV						
Calcium	NV	NV						
Chloride	NV	NV						
Chromium	0.001	NV						
Chromium (VI)	NV	NV						
Cobalt	0.0009	NV						
Chemical Oxygen Demand	NV	30						
Conductivity (uS/cm)	NV	NV						
Copper	0.005	NV						
Dissolved Organic Carbon	NV	13						
Fluoride	NV	NV						
Hardness	NV	NV						
Iron	0.3	NV						
Lead	0.003	NV						
Magnesium	NV	NV						
Manganese	NV	NV						
Mercury	0.0002	NV						
Molybdenum	0.04	NV						
Nickel	0.025	NV						
Nitrate	NV	NV						
Nitrite	NV	NV						
pH (units)	6.5 - 8.5	NV						
Phenols	0.001	NV						
Dissolved Phosphorus	-	NV						
Total Phosphorus	0.03	NV						
Potassium	NV	NV						
Selenium	0.1	NV						
Silver	0.0001	NV						
Sodium	NV	NV						
Strontium	NV	NV						
Sulphate	NV	NV						
Total Dissolved Solids	NV	NV						
Total Kjeldahl Nitrogen	NV	NV						
Thallium	0.0003	NV						
Vanadium	0.006	NV						
Zinc	0.02	0.02						
Ammonia, unionized	0.02	0.01						
Biological Oxygen Demand	NV	NV						
Cyanide - Free (µg/L)	5	NV						
Colour (TCU)	NV	NV						
Total Suspended Solids	NV	NV						
Turbidity	NV	NV						
Conductivity (µs/cm) [7]	NV	NV						
pH (units) [7]	6.5 - 8.5	NV						
Temperature (°C) [7]	NV	NV						
Oxidation Reduction Potential [7]	NV	NV						
Dissolved Oxygen [7]	NV	NV						

Notes:

1. Results provided by the City
2. Results in mg/L unless otherwise stated.
3. PWQO means Provincial Water Quality Objectives.
4. Bold & shading indicates PWQO exceedance.
5. NV indicates no value.
6. "-" indicates parameter not analysed.
7. Results obtained from field analysis.

APPENDIX C

Ground Water Elevation Tables

Somerville Landfill
Ground Water Elevations

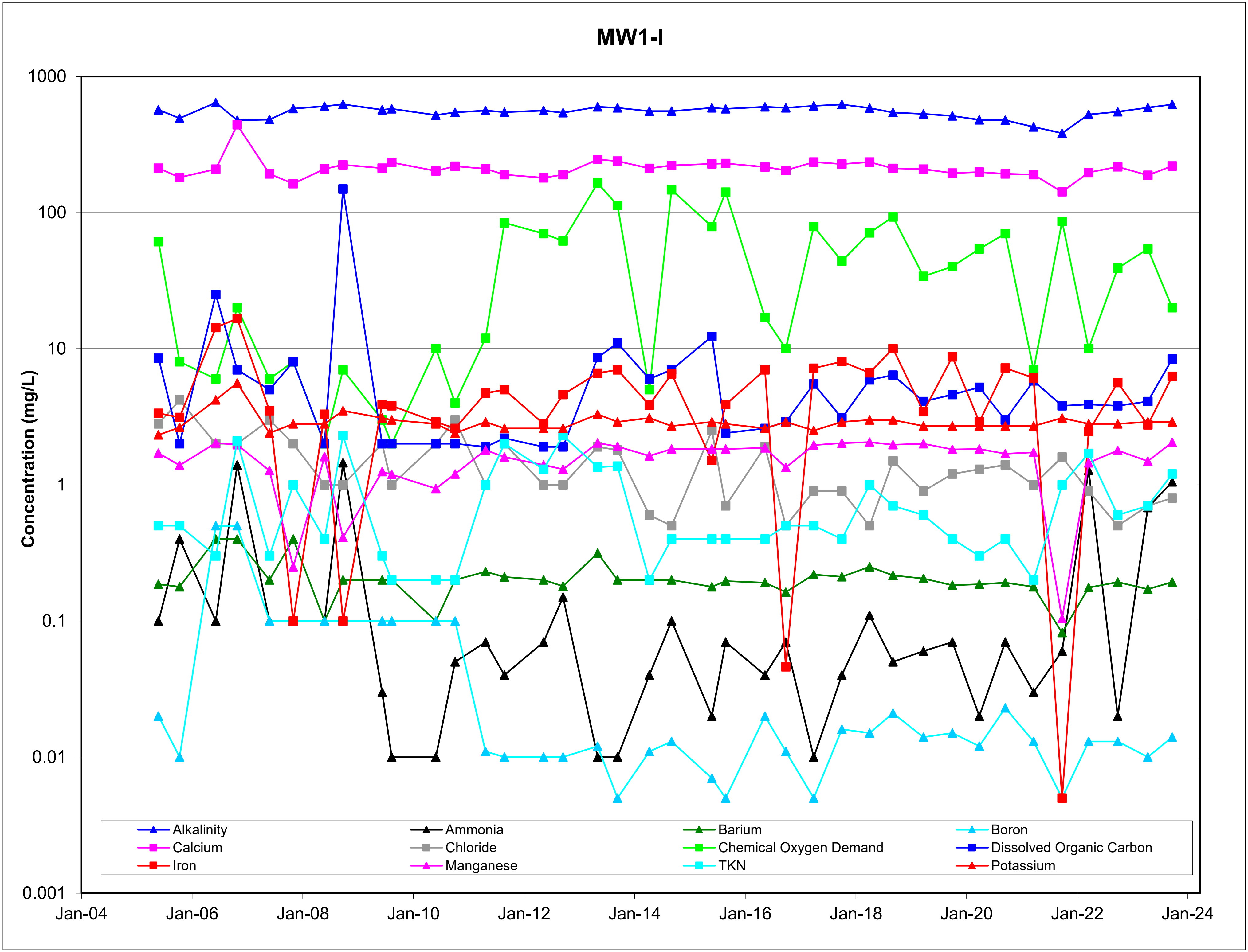
Monitor No.	Ground Elevation (mASL)	Total Depth (mbgl)	Top of Pipe Elevation (mASL)	Ground Water Elevations (masl)												
				21-Oct-10	11-May-11	12-Sep-11	29-May-12	21-May-13	30-Sep-13	28-Apr-14	22-Sep-14	16-Jun-15	21-Mar-16	01-Jun-16	22-Aug-16	18-Oct-16
1-I	295.15	12.71	296.10	286.11	287.59	286.14	286.68	287.69	285.80	289.55	286.28	286.22		288.05	286.25	285.63
1-II	295.28	9.10	295.88	286.18	288.24	286.51	287.10	288.17	286.28	289.30	286.20	286.66		288.61	286.69	286.28
2-II	296.24	11.38	297.08	288.50	288.66	288.39	288.64	288.97	288.32	289.84	288.78	288.38		289.67	288.84	288.31
5-I	293.11	17.22	293.93	277.93	278.77	277.30	279.86	277.88	277.31	280.59	277.01	277.53	279.16	277.43	276.92	276.56
7	280.64	4.23	281.39	278.22	280.33	276.92		278.44	277.11		276.78	277.64		277.26	276.56	276.46
8-I	291.67	13.38	292.44	278.29	280.16	278.29	278.22	278.44	278.17	281.69	278.09	278.24	280.93	278.24	278.07	278.17
8-III	291.55	16.83	292.27	277.77	280.12	276.66	277.12	277.52	276.98	281.67	276.33	277.29	281.03	277.09	276.37	275.77
9	278.98	3.97	279.98	278.11		277.94	277.63	278.82	277.08		276.67	277.56		277.17	276.46	275.81
10-II	299.72	16.16	300.27	286.17	286.83	285.88	286.82	287.34	286.31	288.77	286.55	286.09		287.12	286.55	286.23
11	289.65	12.49	290.47	279.62	281.05	278.17	278.53	279.23	278.35	282.77	278.32	278.00	282.09	277.73	277.05	277.07
12	283.66	8.33	284.37	277.33	274.59	276.61	276.81	277.73	276.66	281.18	276.06	276.97		276.82	276.14	275.71
13	282.28	9.63	283.02	278.27	278.74	277.37	277.67	278.10	277.45	278.99	277.20	277.76		277.55		276.65
14	290.25	18.20	291.06	278.59	280.24	277.41	277.72	278.56	277.47	281.89	277.24	277.92	281.24	277.68	276.03	276.49
15	283.12	8.80	283.98	278.56	280.35	277.58	277.67	278.52	277.52	281.86	277.00	277.90	281.30	277.59	276.78	276.18
16-I	297.50	22.26	298.33													276.56
16-II	297.57	20.00	298.45													277.72
16-III	297.62	15.25	298.48													286.23
17	302.14	10.67	303.21													294.60
201	295.43	16.20	296.27													
201D	295.53	25.30	296.41													
202	283.61	16.30	284.50													
203	281.80	16.30	282.82													
204	285.71	13.60	286.62													

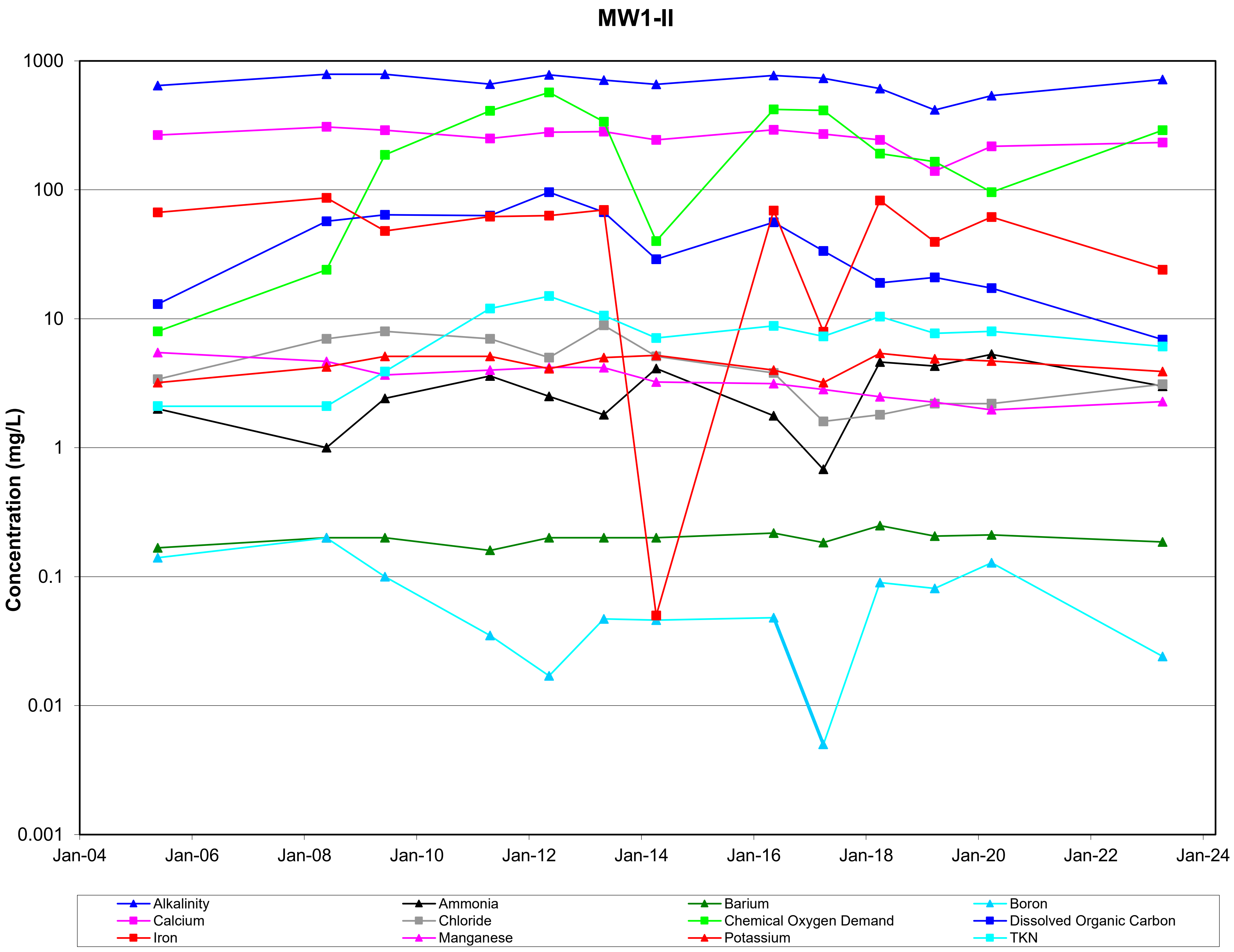
Somerville Landfill
Ground Water Elevations

Monitor No.	Ground Elevation (mASL)	Total Depth (mbgl)	Top of Pipe Elevation (mASL)	Ground Water Elevations (masl)													
				20-Apr-17	23-Oct-17	25-Apr-18	27-Sep-18	16-Apr-19	24-Oct-19	20-Apr-20	08-Oct-20	14-Apr-21	20-Oct-21	13-Apr-22	23-Oct-22	10-May-23	18-Oct-23
1-I	295.15	12.71	296.10	287.45	286.47	288.44	285.87	289.69	286.04	289.15	285.80	286.11	285.72	286.88	285.70	288.50	282.78
1-II	295.28	9.10	295.88	287.52	286.75	289.12	286.33	291.42	286.41	289.38	286.28	Dry	Dry	286.28	Dry	288.68	Dry
2-II	296.24	11.38	297.08	289.42	288.31	289.07	288.33	288.86	288.46	289.84	288.72	288.54	288.25	288.86	288.29	289.60	288.48
5-I	293.11	17.22	293.93	278.88	277.09	279.74	276.43	279.74	276.90	278.56	277.03	278.33	277.11	278.82	Dry	278.41	Dry
7	280.64	4.23	281.39	281.29	276.87	281.05	276.43	Inaccessible	276.59	280.75	276.66	Inaccessible	277.00	280.87	Dry	Inaccessible	Dry
8-I	291.67	13.38	292.44	281.09	278.21	280.84	278.19	281.17	278.74	280.60	278.22	278.64	278.15	280.64	Dry	279.54	Dry
8-III	291.55	16.83	292.27	281.03	276.73	280.80	275.69	281.11	276.37	280.54	276.54	279.57	276.87	280.59	276.29	279.70	276.23
9	278.98	3.97	279.98	Inaccessible	276.79	Inaccessible	275.71	Inaccessible	276.44		276.61	Inaccessible	276.90	Inaccessible	276.32	Inaccessible	276.13
10-II	299.72	16.16	300.27	287.94	286.67	287.19	286.32	286.27	286.34	288.58	286.32	286.61	286.36	287.35	285.36	288.12	286.35
11	289.65	12.49	290.47	282.17	277.67	282.24	276.92	282.27	278.02	281.52	277.63	279.73	277.37	281.05	276.95	279.94	276.79
12	283.66	8.33	284.37		276.45		275.53	280.54	276.12	280.03	276.28	279.01	276.59	280.00	276.04	279.18	275.48
13	282.28	9.63	283.02	278.76	274.49	279.21	276.50	279.18	277.06	278.60	277.21	278.48	277.25	278.78	276.89	278.59	276.81
14	290.25	18.20	291.06	281.22	277.24	281.42	276.28	281.68	277.06	280.67	277.21	279.70	277.29	280.93	276.82	279.88	276.70
15	283.12	8.80	283.98	281.34	277.03	281.18	276.18	281.46	276.40	280.79	276.90	279.75	277.51	280.94	276.47	279.91	276.41
16-I	297.50	22.26	298.33	279.85	276.59	281.33	276.37	281.45	277.05	279.48	277.18	278.95	277.26	279.80	276.68	279.05	276.49
16-II	297.57	20.00	298.45	279.87	277.57	281.30	277.73	281.45	277.73	278.48		278.65	Dry	279.80	Dry	279.05	Dry
16-III	297.62	15.25	298.48	286.57	286.78	286.41	286.20	285.38	286.21	287.51	286.16	285.68	285.89	285.98	286.06	287.14	286.18
17	302.14	10.67	303.21	295.01	293.57	293.66	293.57	293.98	291.61	293.20	292.92	292.11	291.68	291.09	290.79	291.18	291.36
201	295.43	16.20	296.27						279.18	279.24		279.25	279.26	279.47	Dry	Dry	Dry
201D	295.53	25.30	296.41						276.98	-	277.11	278.76	277.20	279.40	276.83	278.83	276.73
202	283.61	16.30	284.50						276.60	277.80	276.86	277.59	277.00	277.75	276.59	277.58	276.58
203	281.80	16.30	282.82						276.15	277.60	276.04	277.26	277.07	277.52	276.47	277.52	276.32
204	285.71	13.60	286.62						277.75	280.81	277.26	279.80	277.32	281.11	276.80	279.96	276.68

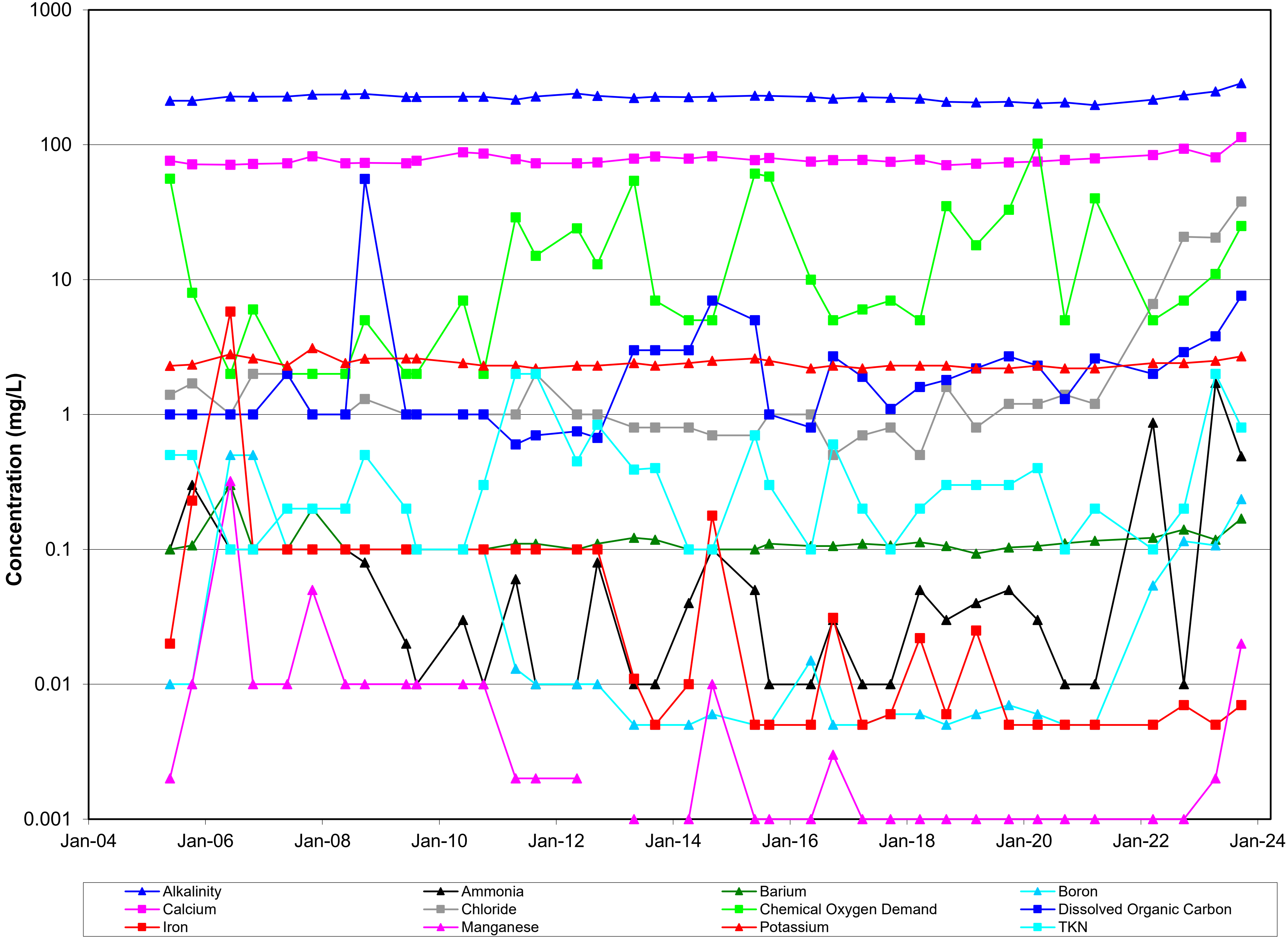
APPENDIX D

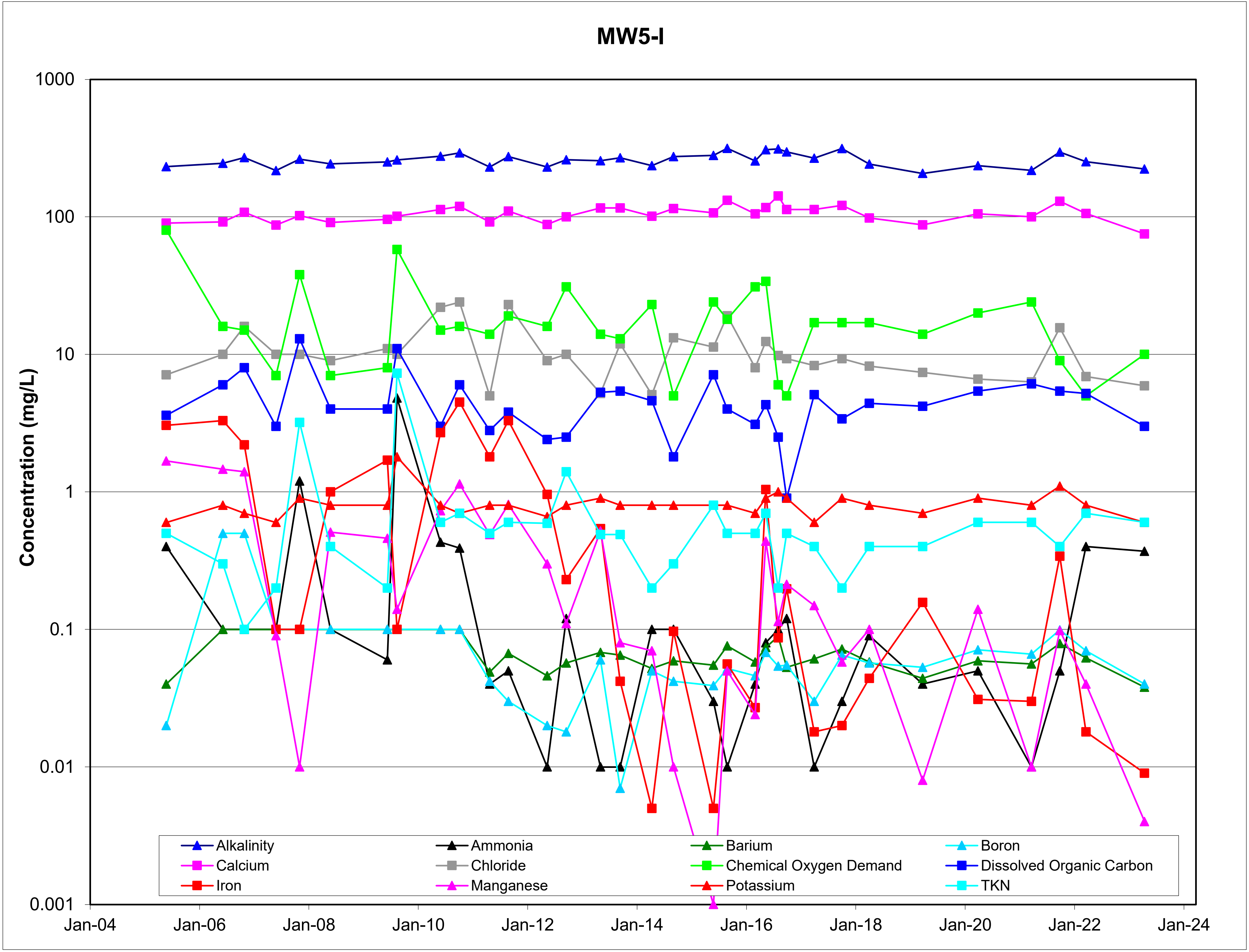
Chemistry Over Time Graphs

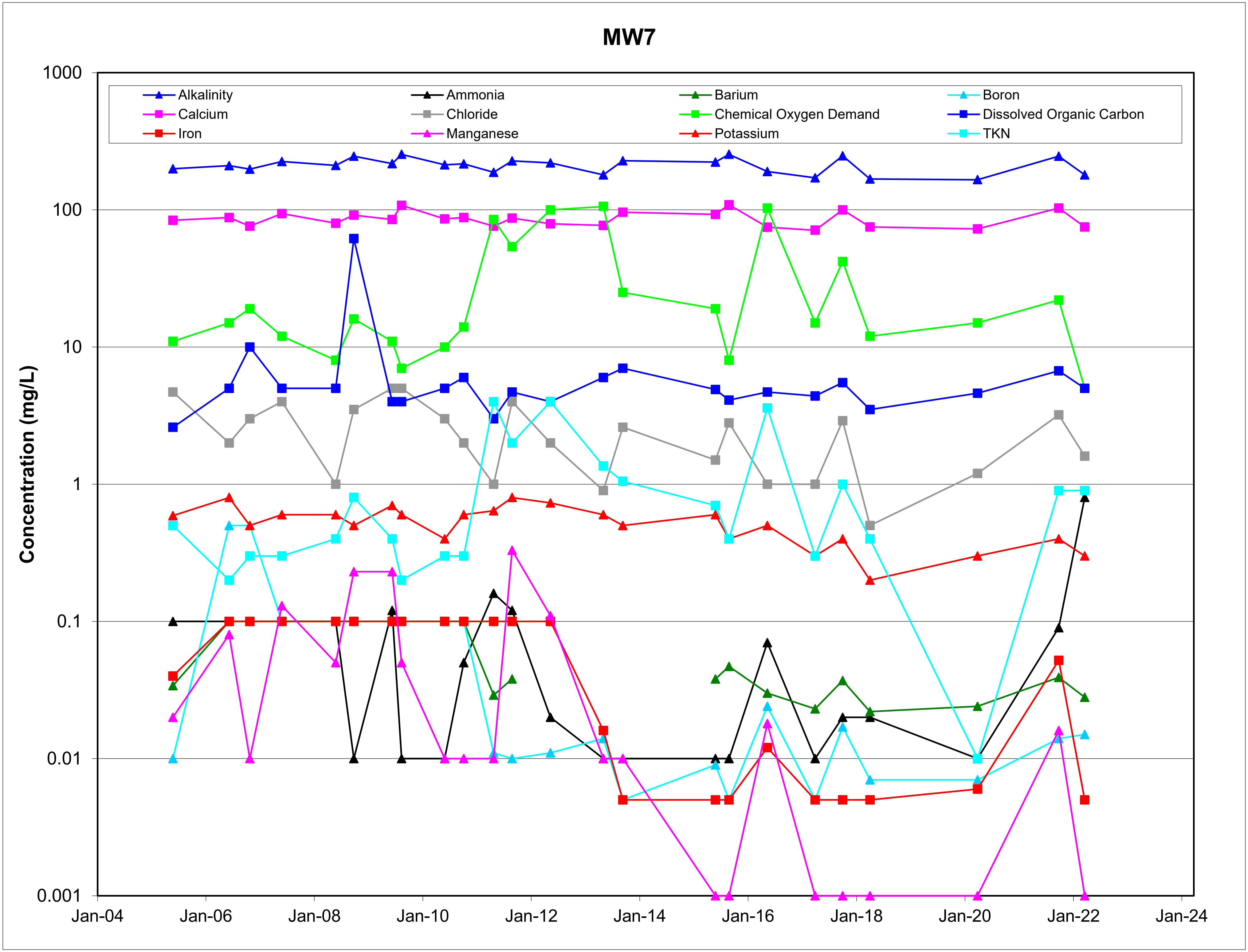

MW1-I
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Jan-04
Jan-06
Jan-08
Jan-10
Jan-12
Jan-14
Jan-16
Jan-18
Jan-20
Jan-22
Jan-24
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
TKN
Potassium

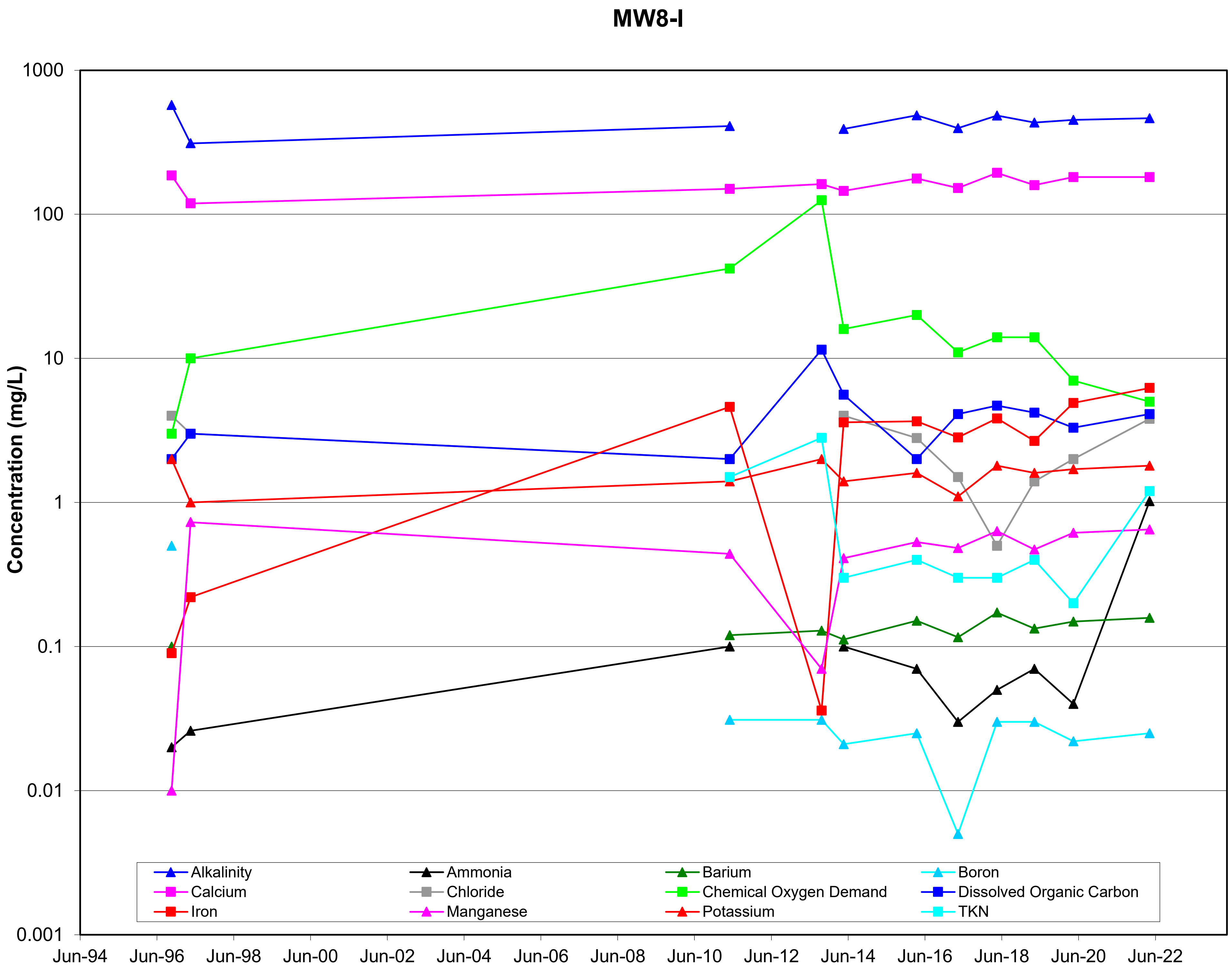

MW1-II
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Jan-04
Jan-06
Jan-08
Jan-10
Jan-12
Jan-14
Jan-16
Jan-18
Jan-20
Jan-22
Jan-24
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
Potassium
TKN

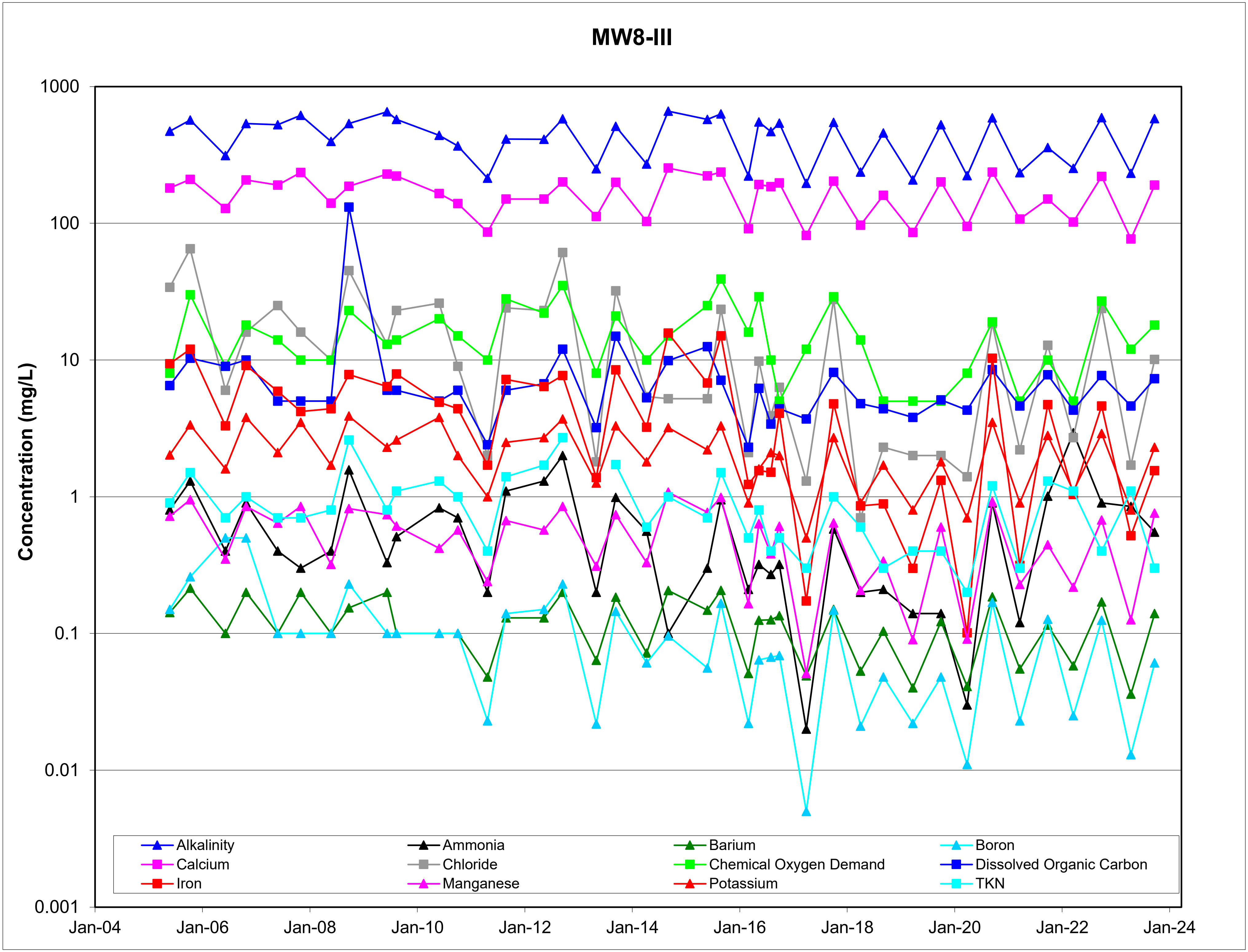
MW2-II

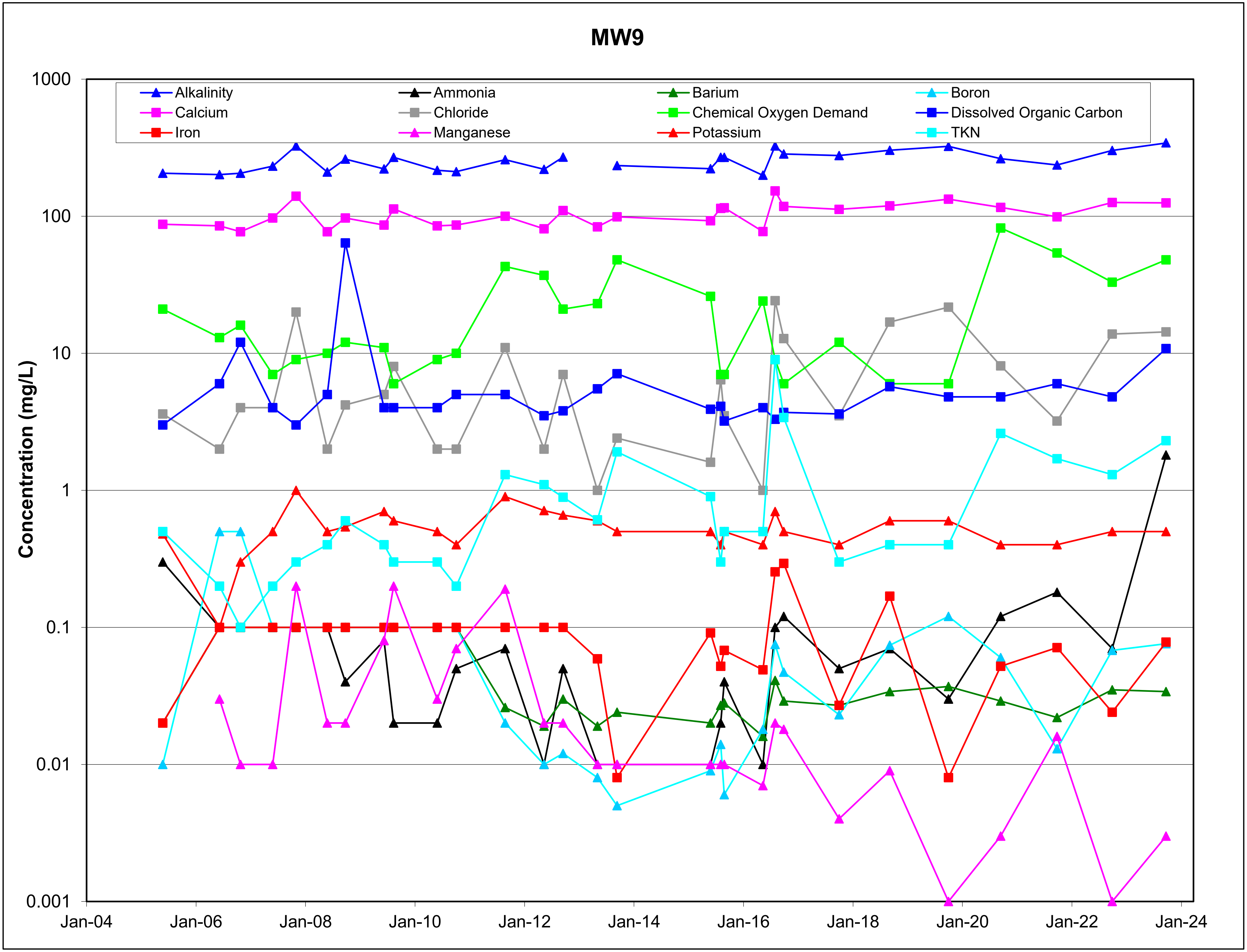

1000
100
10
1
0.1
0.01
0.001
Concentration (mg/L)
Jan-04
Jan-06
Jan-08
Jan-10
Jan-12
Jan-14
Jan-16
Jan-18
Jan-20
Jan-22
Jan-24
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
Potassium
TKN

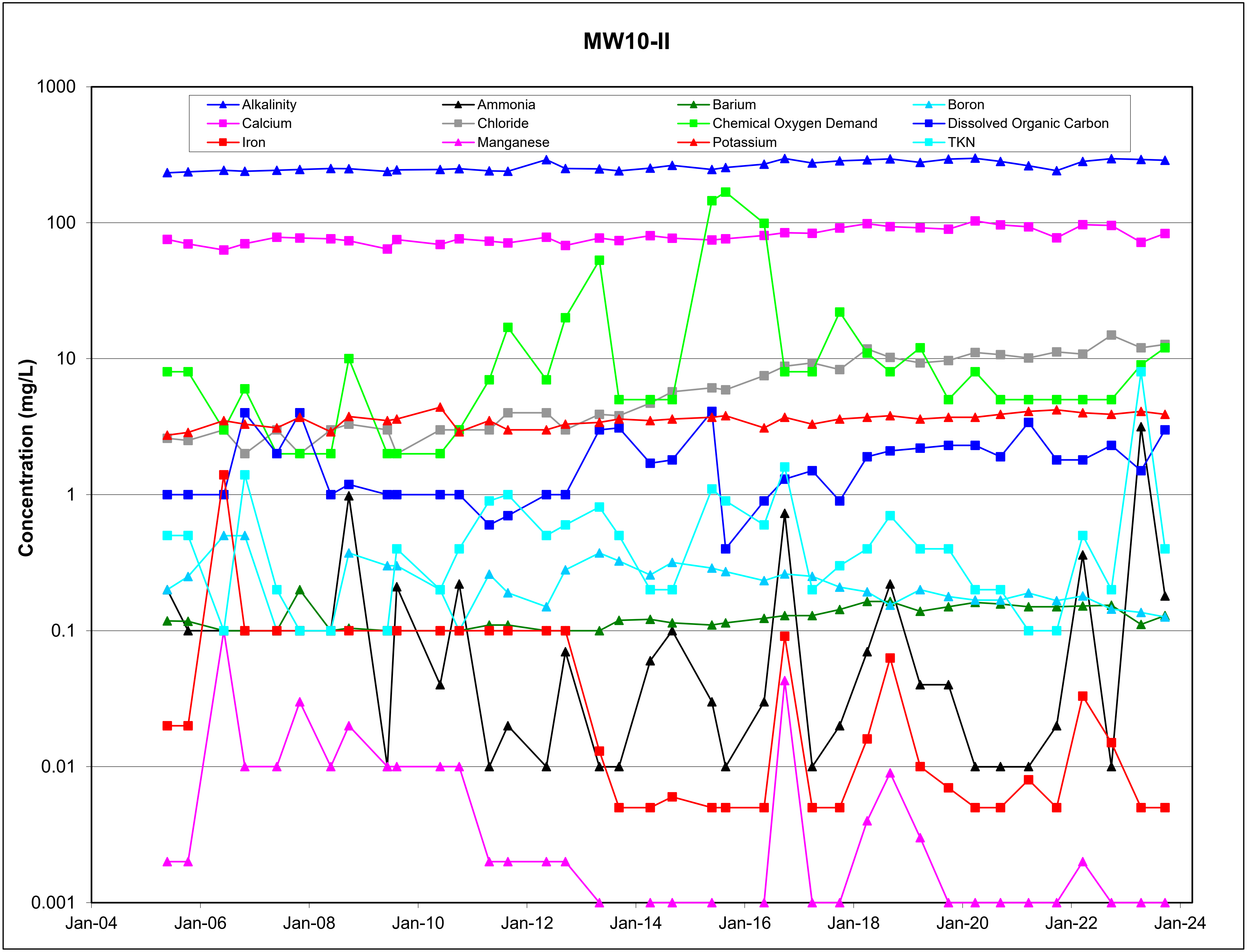

MW5-I
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Jan-04
Jan-06
Jan-08
Jan-10
Jan-12
Jan-14
Jan-16
Jan-18
Jan-20
Jan-22
Jan-24
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
Potassium
TKN


MW7
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Jan-04
Jan-06
Jan-08
Jan-10
Jan-12
Jan-14
Jan-16
Jan-18
Jan-20
Jan-22
Jan-24
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
Potassium
TKN

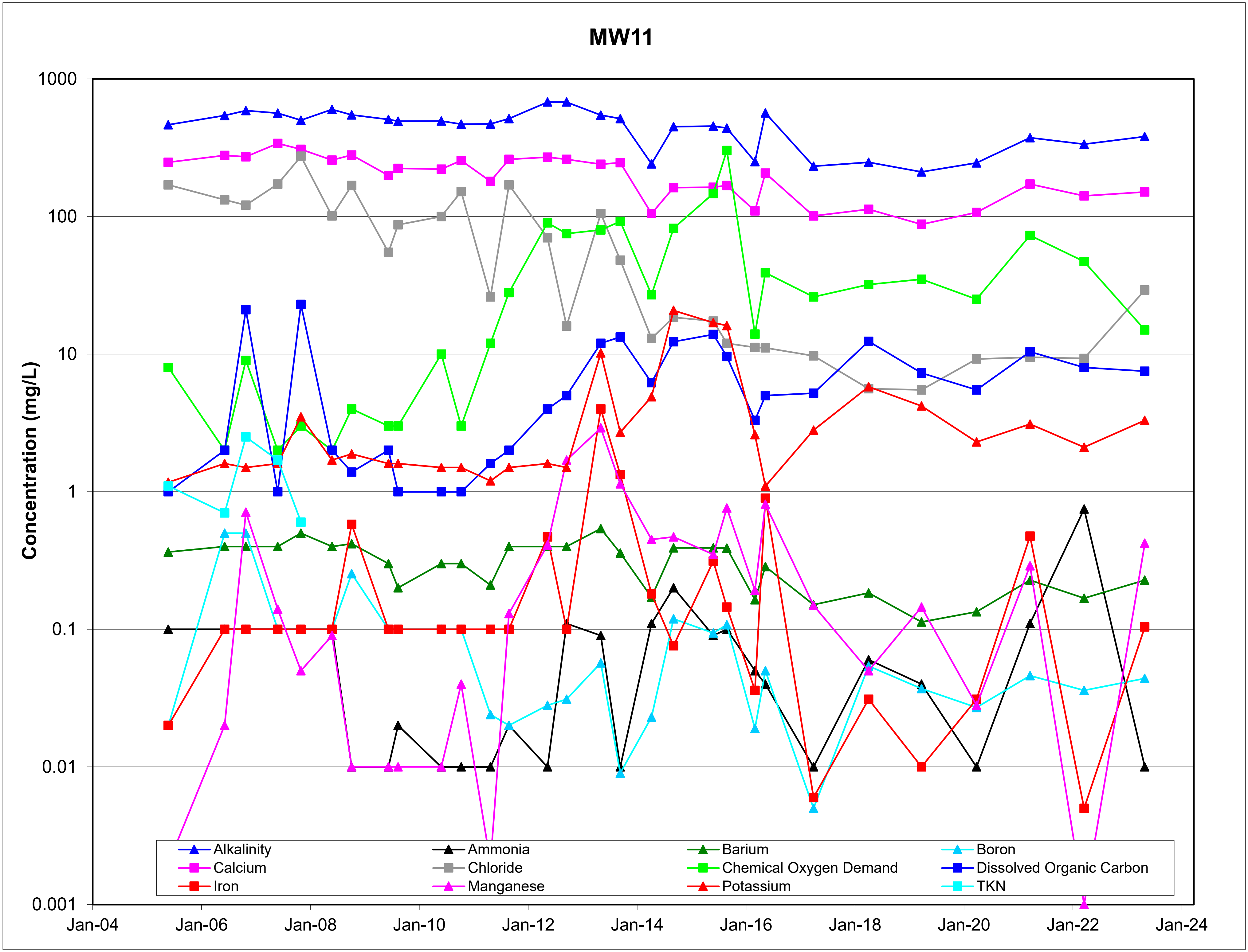

MW8-I
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Jun-94
Jun-96
Jun-98
Jun-00
Jun-02
Jun-04
Jun-06
Jun-08
Jun-10
Jun-12
Jun-14
Jun-16
Jun-18
Jun-20
Jun-22
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
Potassium
TKN

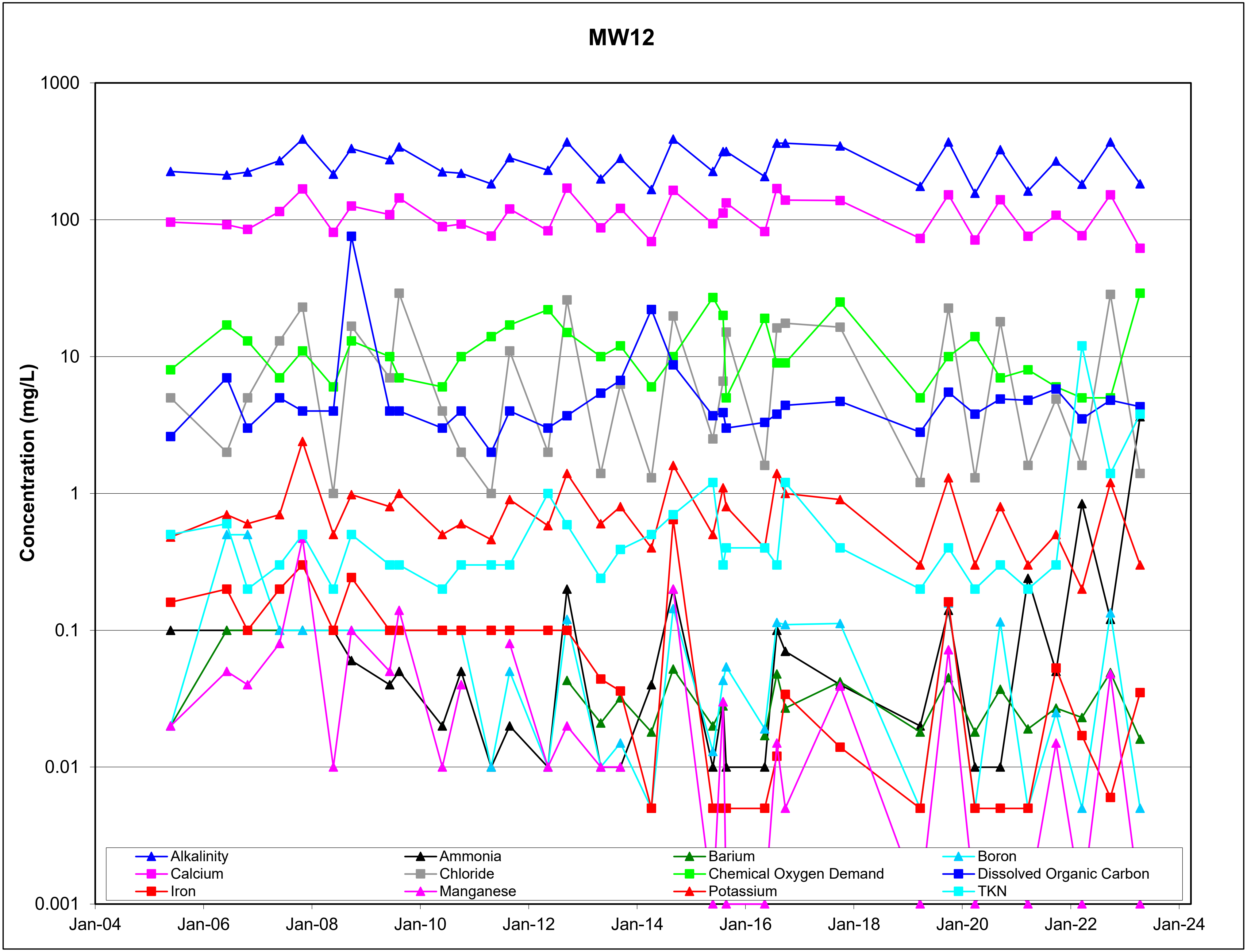

MW8-III
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Jan-04
Jan-06
Jan-08
Jan-10
Jan-12
Jan-14
Jan-16
Jan-18
Jan-20
Jan-22
Jan-24
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
Potassium
TKN

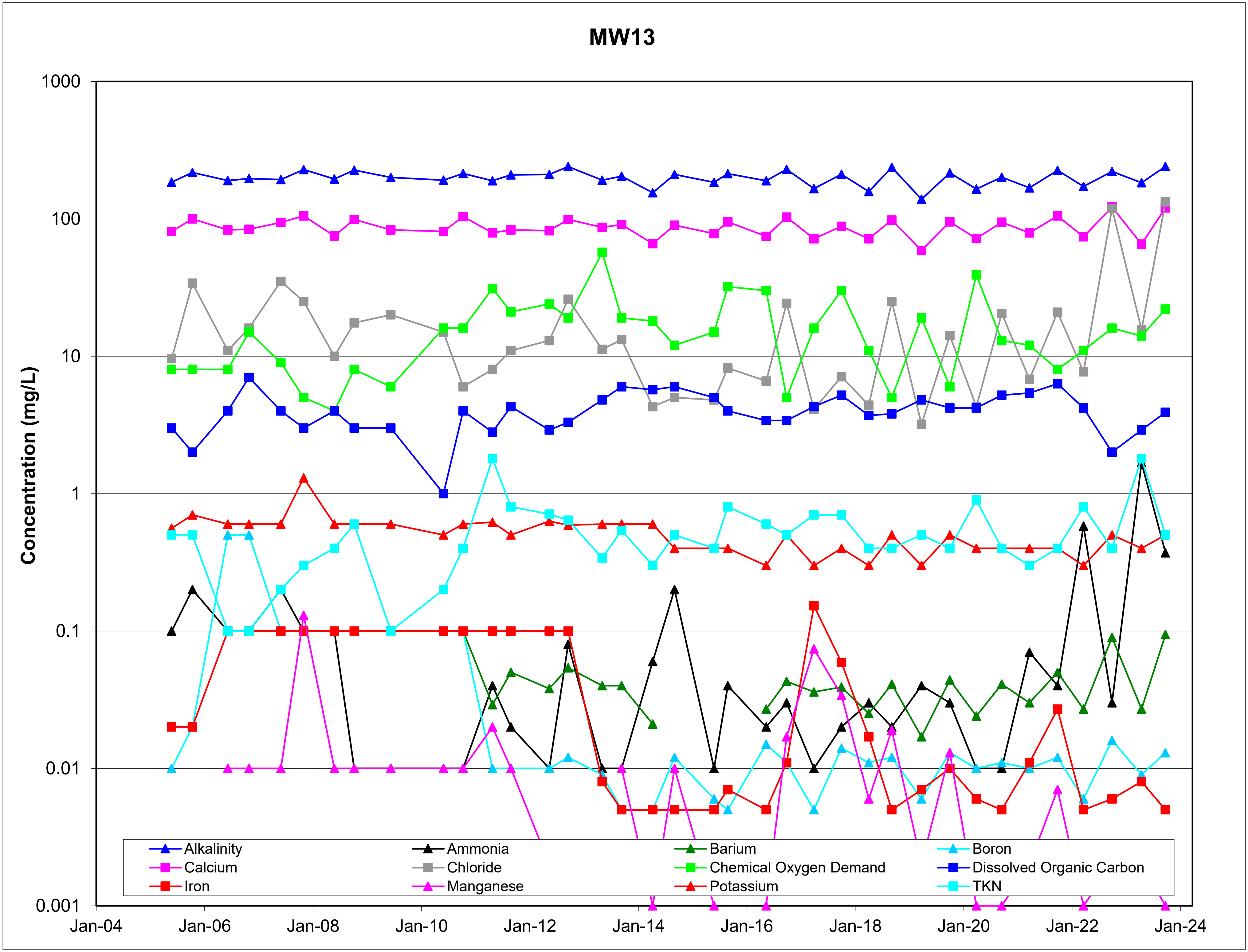

MW9
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
Potassium
TKN
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Jan-04
Jan-06
Jan-08
Jan-10
Jan-12
Jan-14
Jan-16
Jan-18
Jan-20
Jan-22
Jan-24

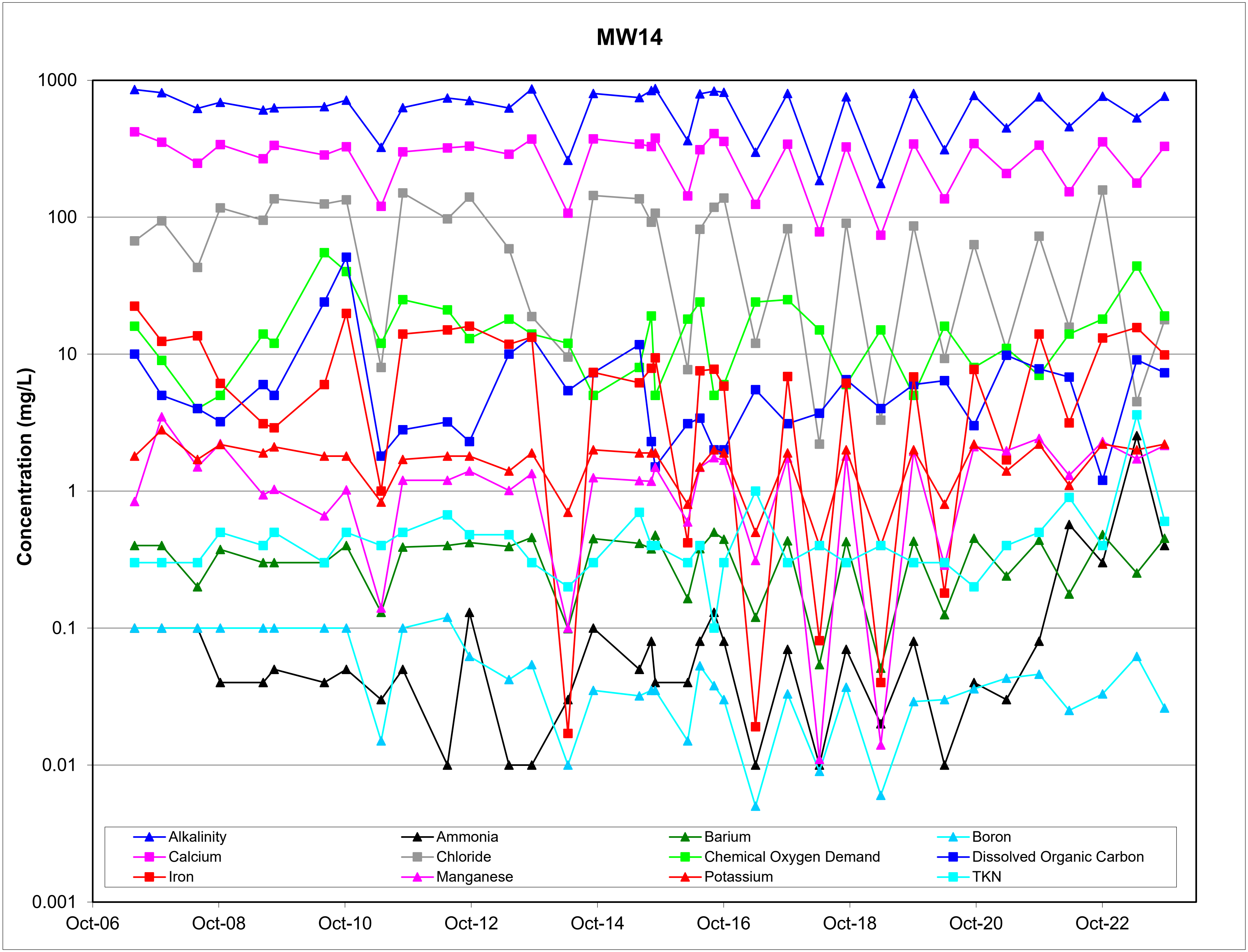


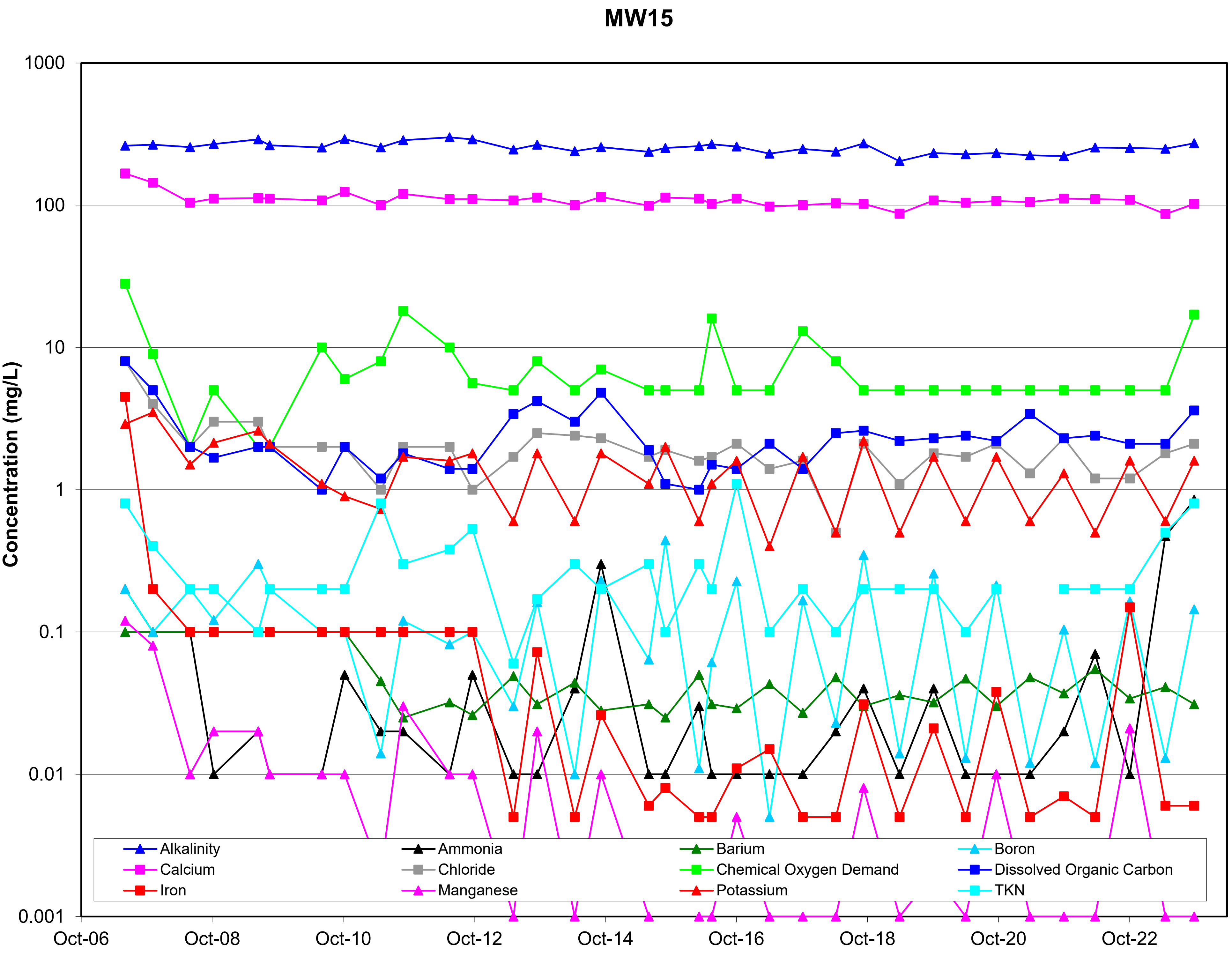
MW10-II
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Jan-04
Jan-06
Jan-08
Jan-10
Jan-12
Jan-14
Jan-16
Jan-18
Jan-20
Jan-22
Jan-24
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
Potassium
TKN


MW11
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Jan-04
Jan-06
Jan-08
Jan-10
Jan-12
Jan-14
Jan-16
Jan-18
Jan-20
Jan-22
Jan-24
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
Potassium
TKN

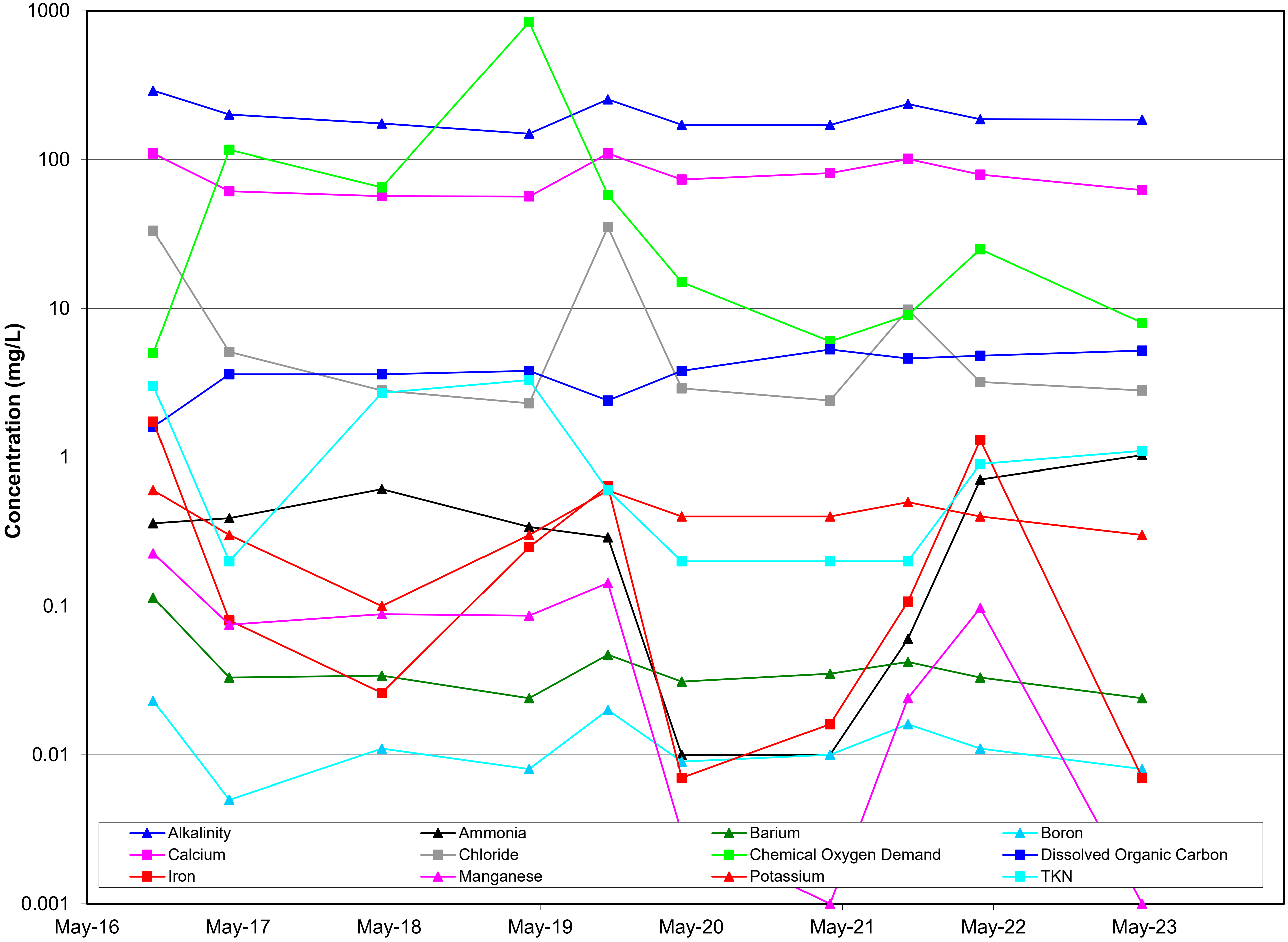

MW12
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Jan-04
Jan-06
Jan-08
Jan-10
Jan-12
Jan-14
Jan-16
Jan-18
Jan-20
Jan-22
Jan-24
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
Potassium
TKN


MW13
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Jan-04
Jan-06
Jan-08
Jan-10
Jan-12
Jan-14
Jan-16
Jan-18
Jan-20
Jan-22
Jan-24
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
Potassium
TKN

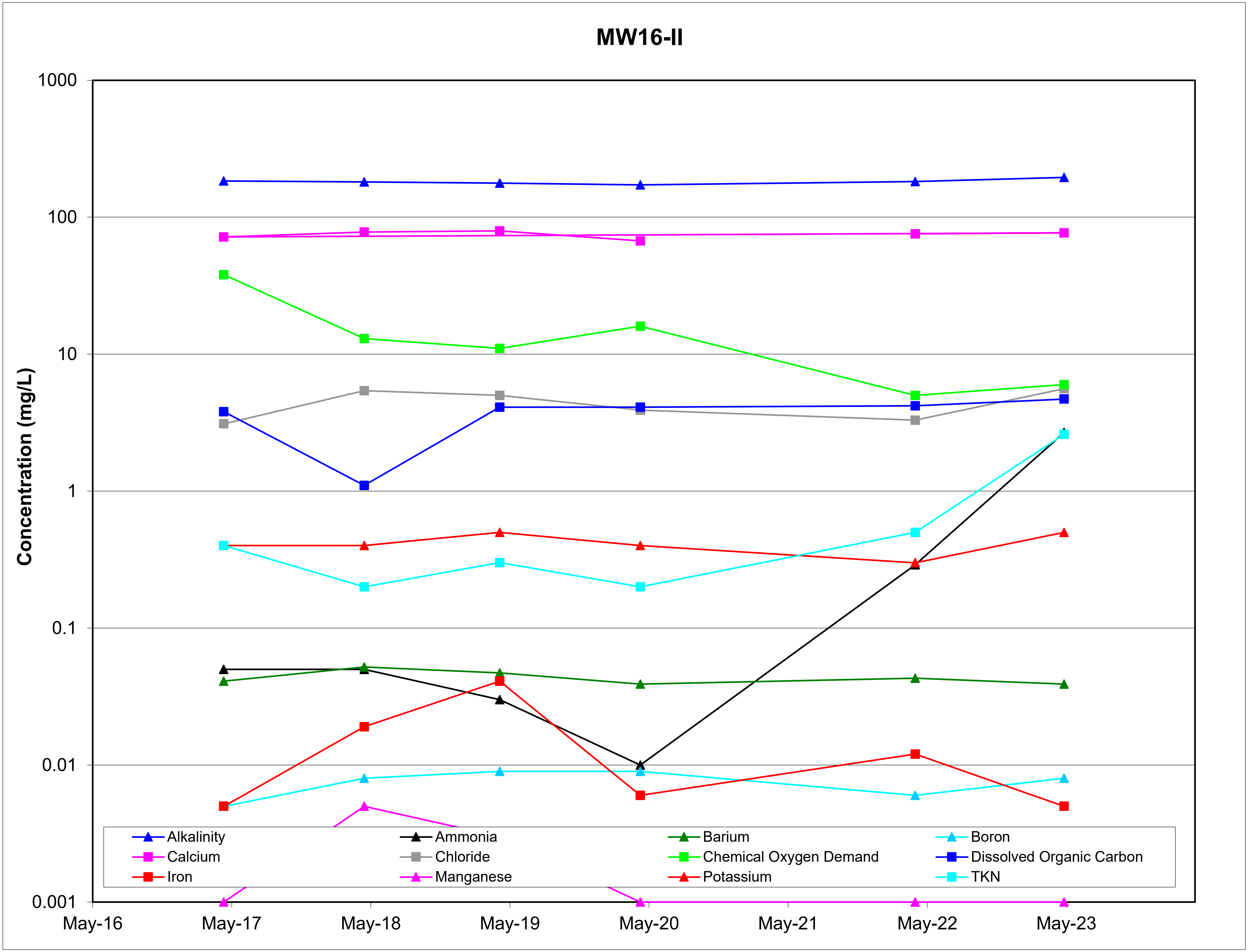

MW14
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Oct-06
Oct-08
Oct-10
Oct-12
Oct-14
Oct-16
Oct-18
Oct-20
Oct-22
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
Potassium
TKN

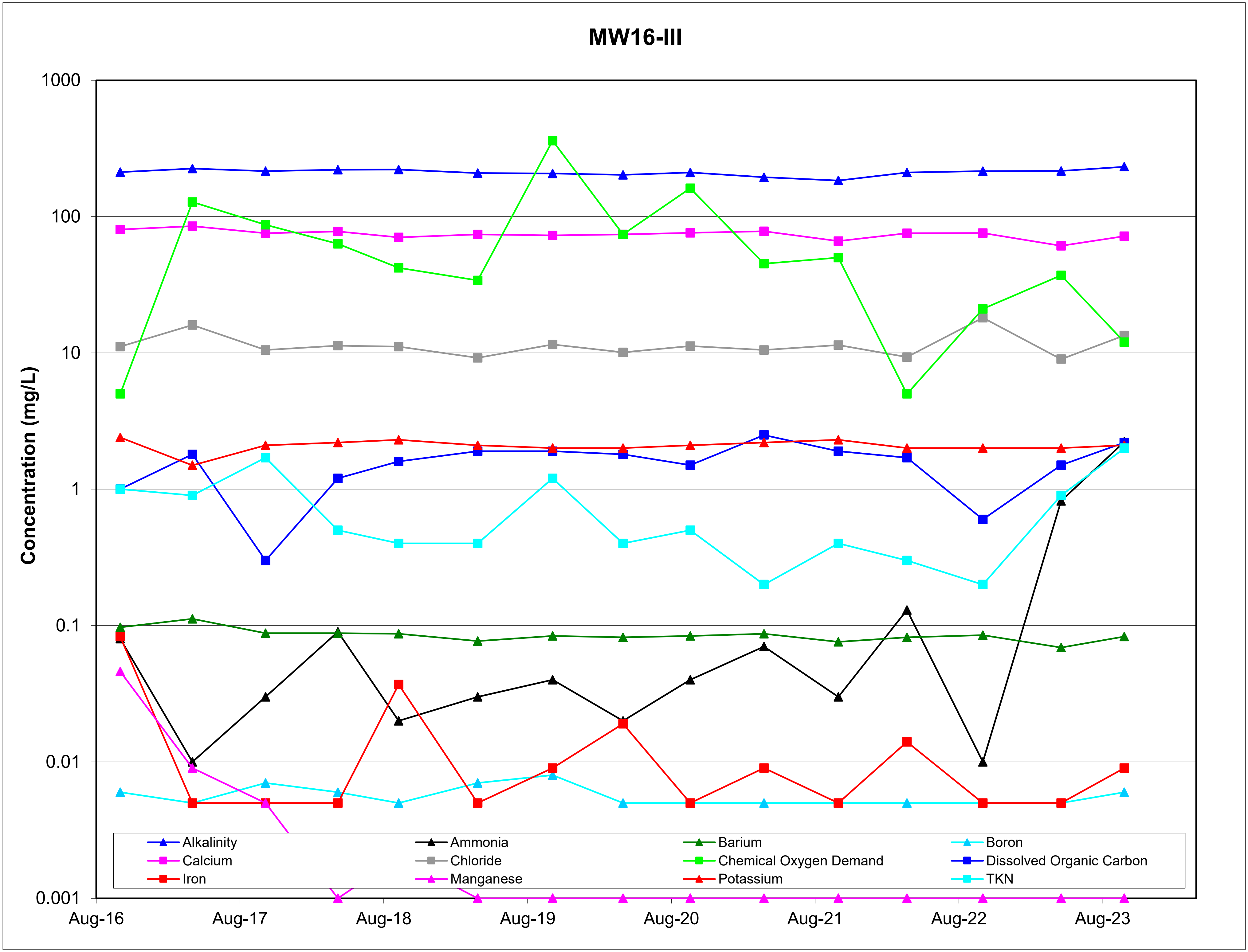

MW15
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Oct-06
Oct-08
Oct-10
Oct-12
Oct-14
Oct-16
Oct-18
Oct-20
Oct-22
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
Potassium
TKN

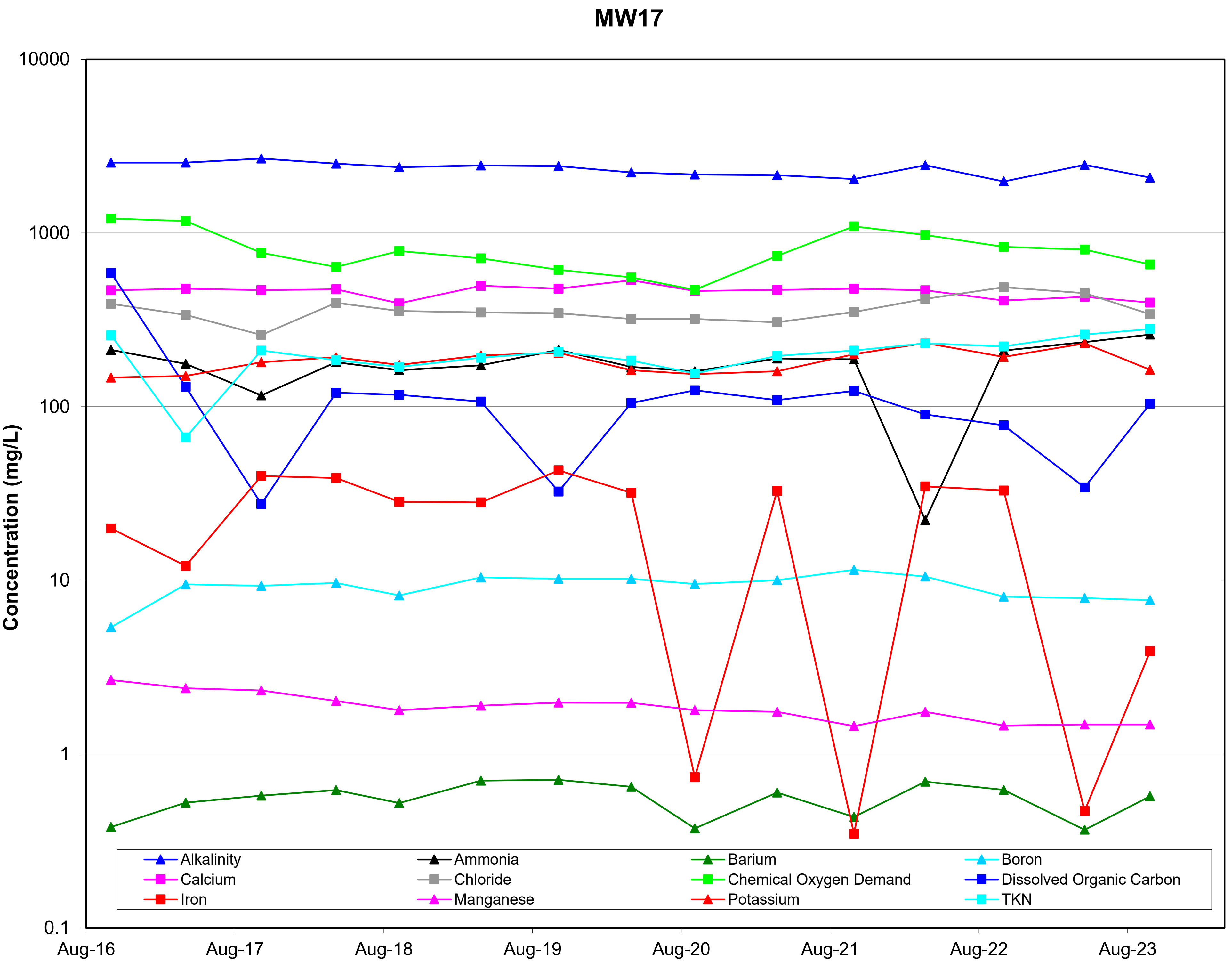
MW16-I

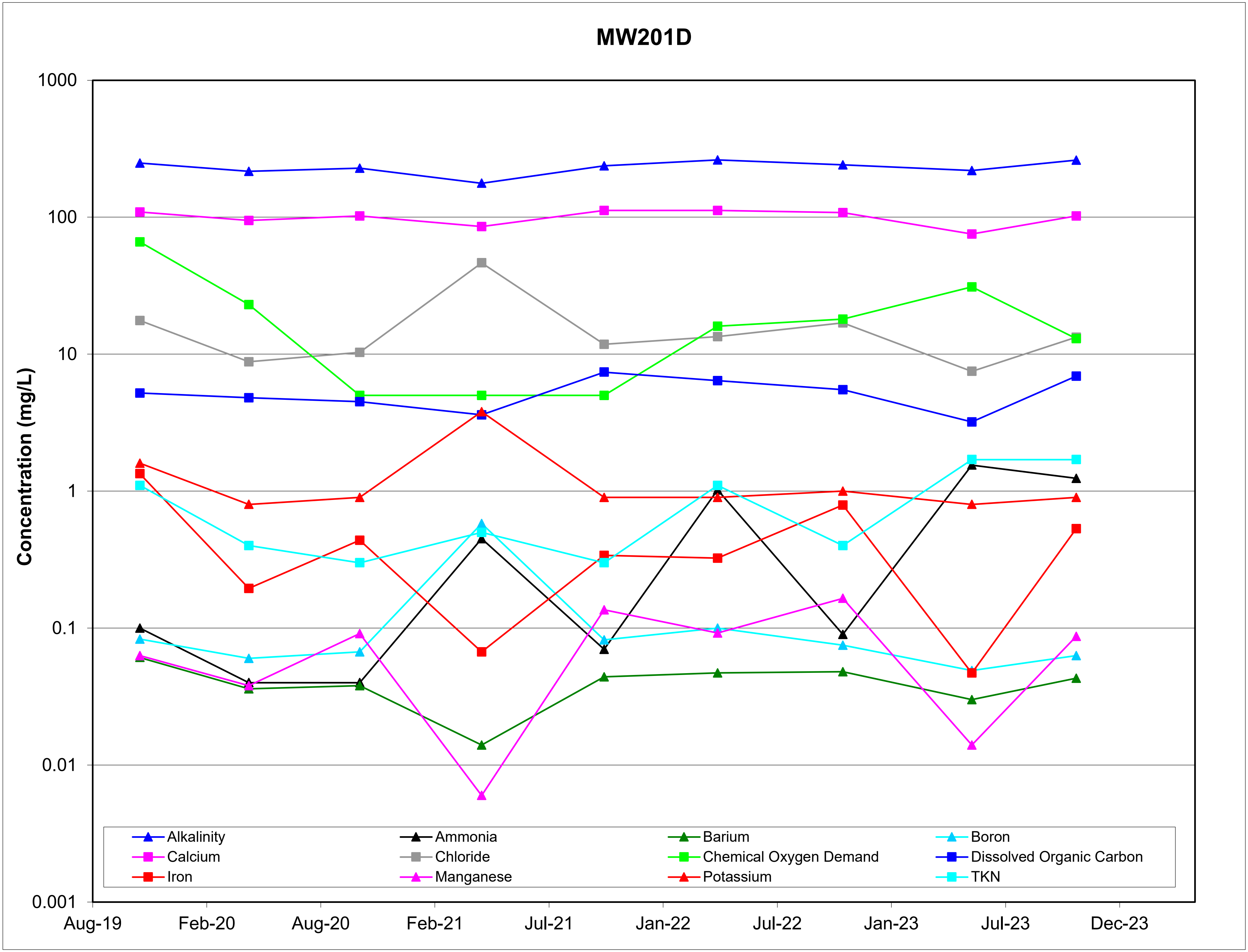


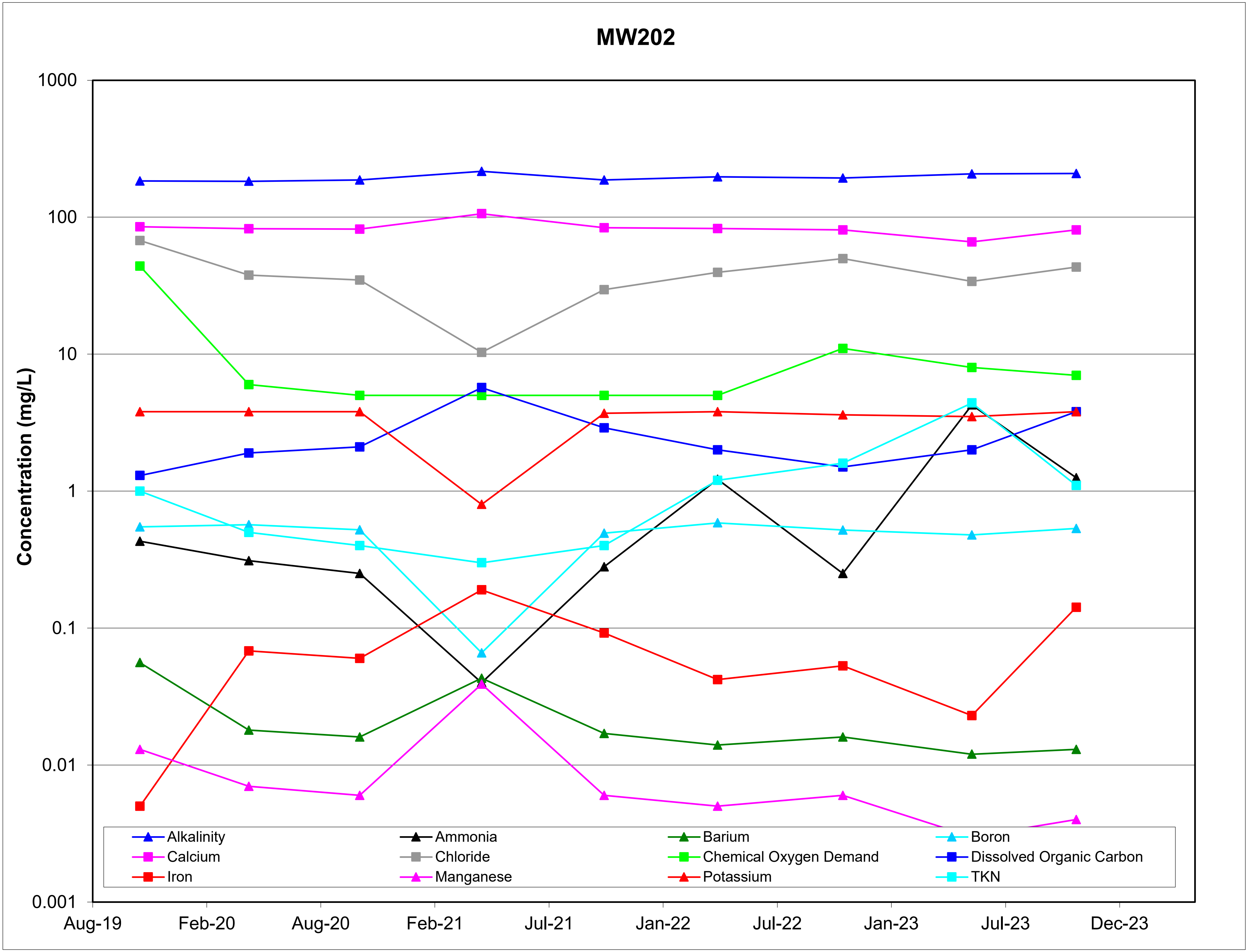
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
May-16
May-17
May-18
May-19
May-20
May-21
May-22
May-23
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
Potassium
TKN


MW16-II
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
May-16
May-17
May-18
May-19
May-20
May-21
May-22
May-23
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
Potassium
TKN

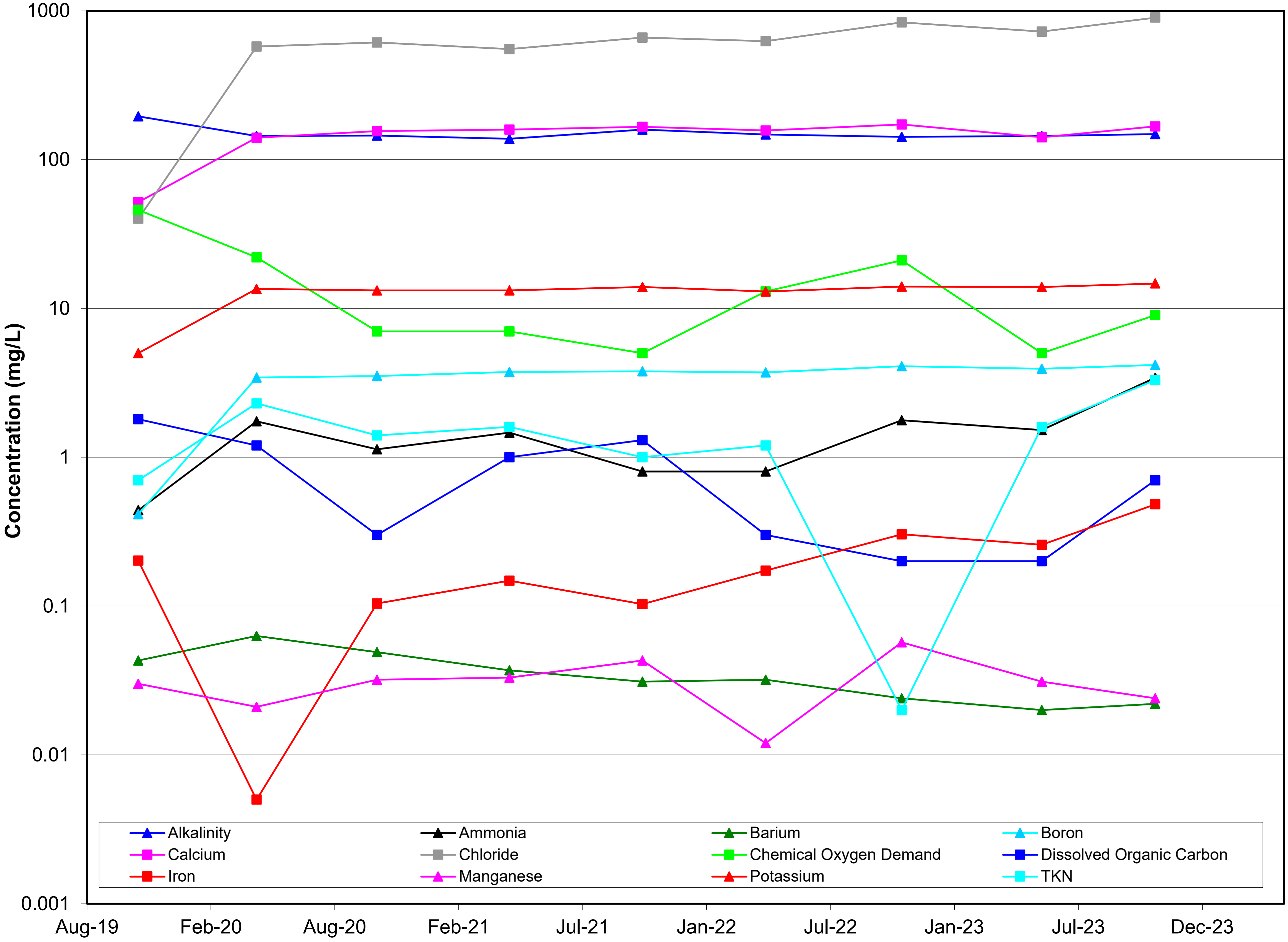

MW16-III
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Aug-16
Aug-17
Aug-18
Aug-19
Aug-20
Aug-21
Aug-22
Aug-23
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
Potassium
TKN


MW17
Concentration (mg/L)
10000
1000
100
10
1
0.1
Aug-16
Aug-17
Aug-18
Aug-19
Aug-20
Aug-21
Aug-22
Aug-23
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
Potassium
TKN

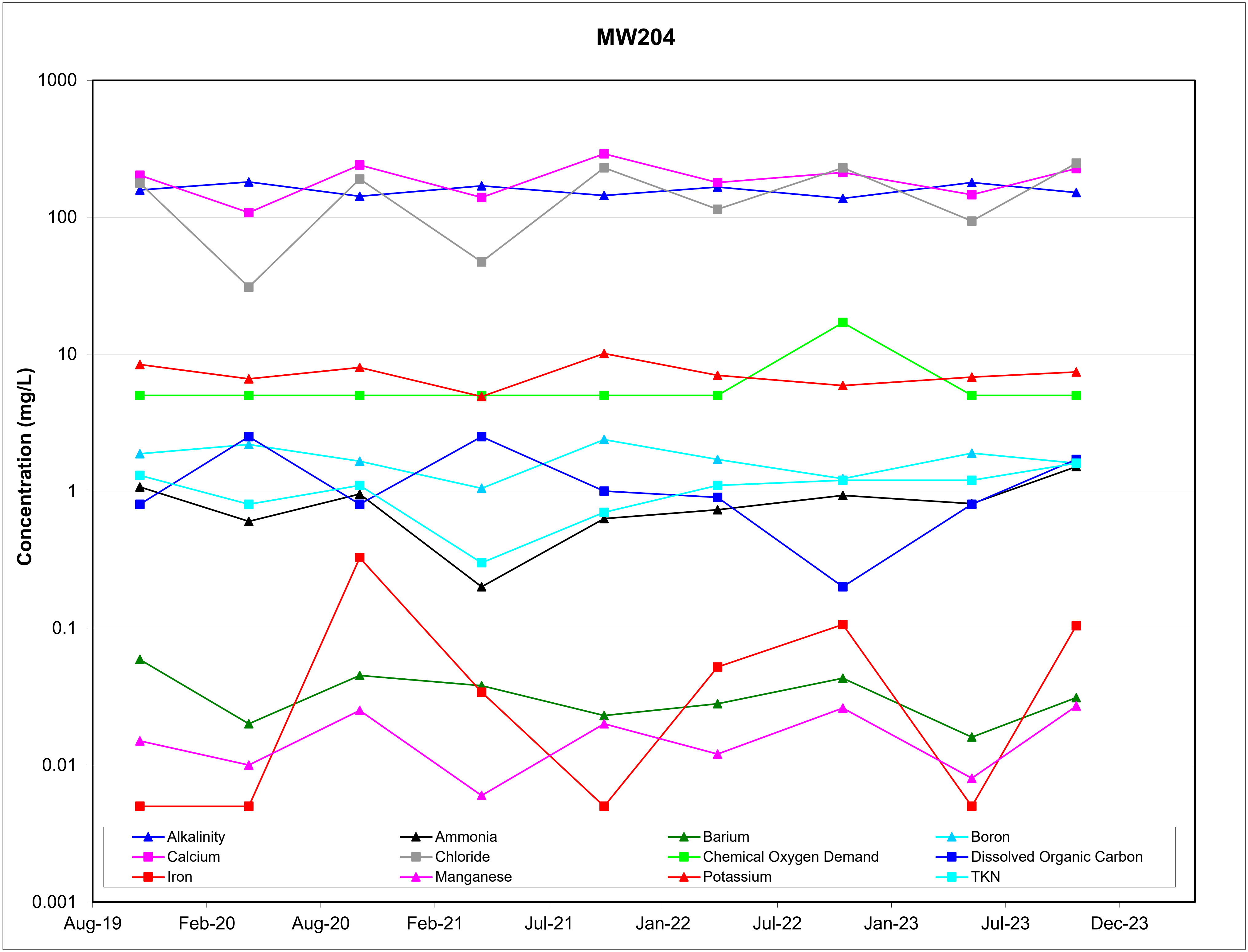

MW201D
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Aug-19
Feb-20
Aug-20
Feb-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
Dec-23
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
Potassium
TKN

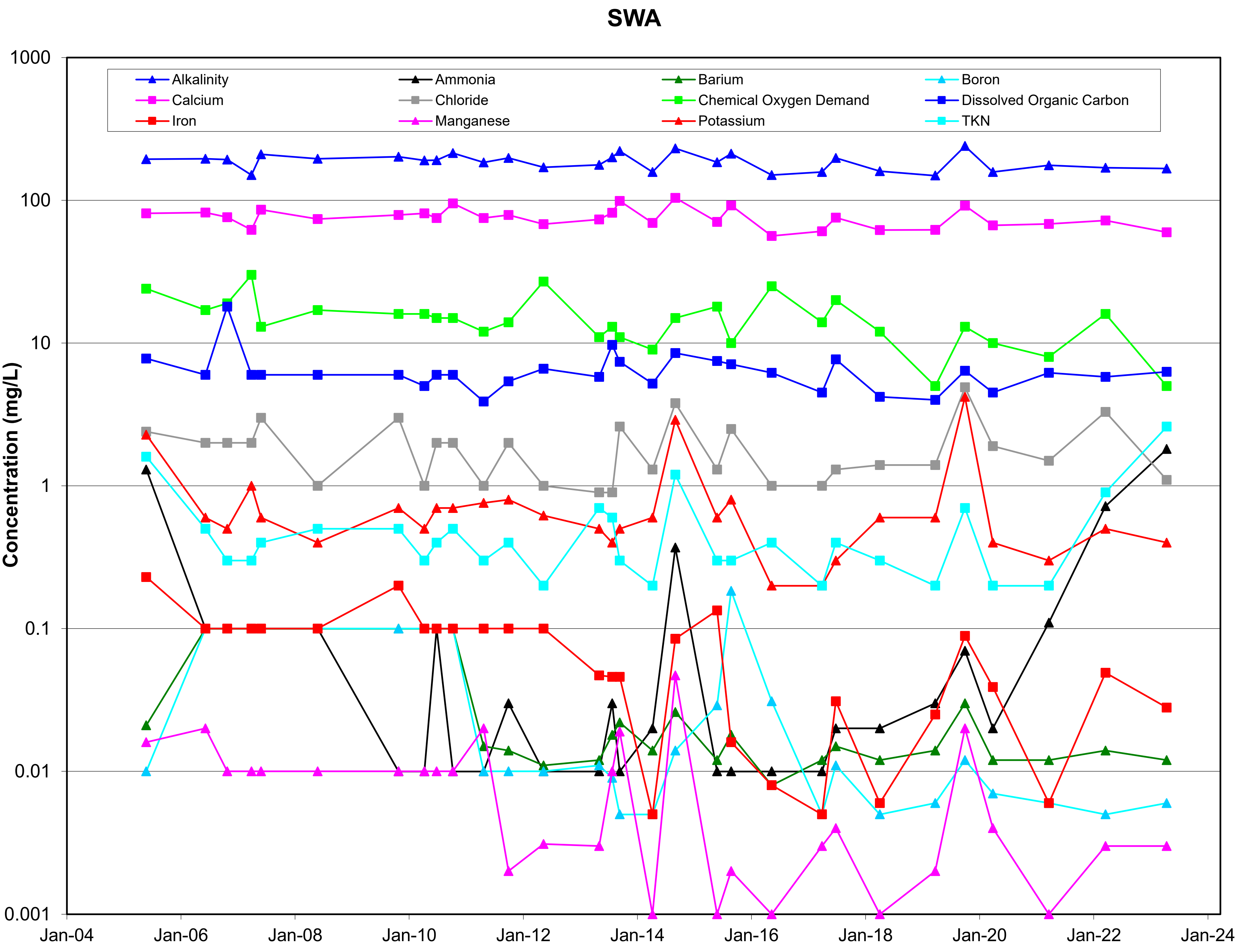

MW202
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Aug-19
Feb-20
Aug-20
Feb-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
Dec-23
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
Potassium
TKN

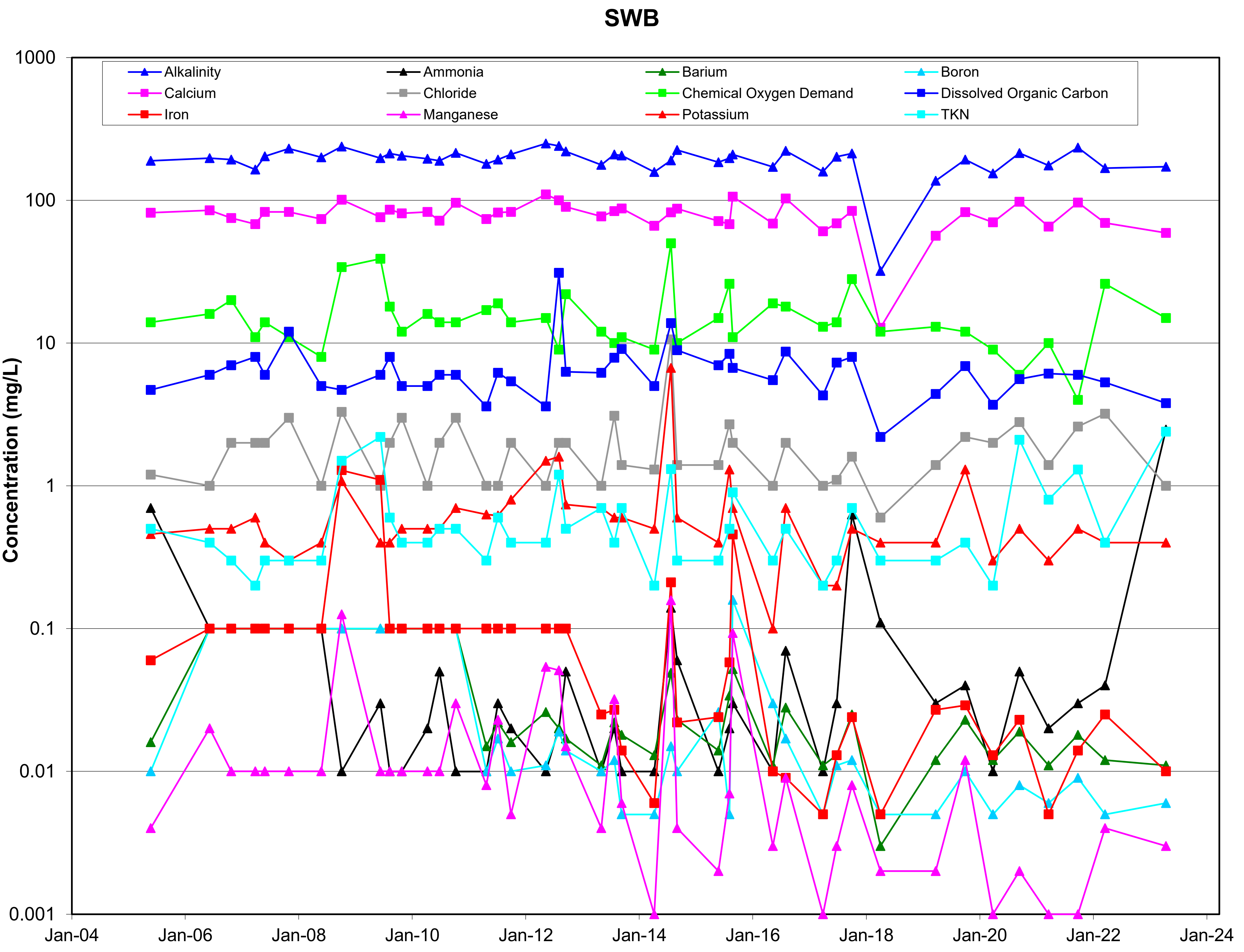
MW203



Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Aug-19
Feb-20
Aug-20
Feb-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
Dec-23
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
Potassium
TKN


MW204
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Aug-19
Feb-20
Aug-20
Feb-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
Dec-23
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
Potassium
TKN


SWA
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Jan-04
Jan-06
Jan-08
Jan-10
Jan-12
Jan-14
Jan-16
Jan-18
Jan-20
Jan-22
Jan-24
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
Potassium
TKN


SWB
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Jan-04
Jan-06
Jan-08
Jan-10
Jan-12
Jan-14
Jan-16
Jan-18
Jan-20
Jan-22
Jan-24
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
Potassium
TKN


SWD
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Alkalinity
Ammonia
Barium
Boron
Calcium
Chloride
Chemical Oxygen Demand
Dissolved Organic Carbon
Iron
Manganese
Potassium
TKN

APPENDIX E

MECP Landfill Reporting Submission Forms

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	Somerville Landfill Site
Location (e.g. street address, lot, concession)	381 Ledge Hill Road within the City of Kawartha Lakes
GPS Location (taken within the property boundary at front gate/ front entry)	683628 / 4945666
Municipality	City of Kawartha Lakes
Client and/or Site Owner	City of Kawartha Lakes
Monitoring Period (Year)	2023
This Monitoring Report is being submitted under the following:	
Certificate of Approval No.:	A321604
Director's Order No.:	Type Here
Provincial Officer's Order No.:	Type Here
Other:	Type Here

Report Submission Frequency	● **Annual** ○ **Other**	Specify (Type Here):
The site is:	● **Active** ○ **Inactive** ○ **Closed**	
If closed, specify C of A, control or authorizing document closure date:		
Has the nature of the operations at the site changed during this monitoring period?	○ **Yes** ● **No**	
If yes, provide details:	Type Here	
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**	
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**
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date

3) a) Some or all groundwater, leachate and WDS gas sampling and monitoring requirements have been established or defined outside of a ministry C of A, authorizing, or control document.	○ **Yes** ● **No** ○ **Not Applicable**	
b) If yes, 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**
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date

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

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**		
6) The site meets compliance and assessment criteria.	● **Yes** ○ **No**		
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**	If no, list exceptions and explain reason for increase/change (Type Here):	
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.*The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and** ***ii.*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:

11-Mar-2024

Recommendations:

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

● **No changes to the monitoring program are recommended** ○ **The following change(s) to the monitoring program is/are recommended:**	
● **No Changes to site design and operation are recommended** ○ **The following change(s) to the site design and operation is/ are recommended:**	Type Here

Name:	Colin Ross, B.Sc., P.Geo.		
Seal:	Add Image PROFESSIONAL GEOSCIENTIST COLIN ROSS PRACTISING MEMBER 2055 ONTARIO		
Signature:		**Date:**	11-Mar-2024
CEP Contact Information:	Colin Ross		
Company:	Azimuth Environmental Consulting Inc.		
Address:	642 Welham Road, Barrie, ON L4N 9A1		
Telephone No.:	705-721-8451	Fax No. :	705-721-8926
E-mail Address:	colin@azimuthenvironmental.com		
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)	Burnt River
Distance(s)	1.5km

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	If no, identify issues (Type Here):
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
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date

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
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select 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**	If no, specify (Type Here):

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
Total Phosphorus Unionized Ammonia	0.03 mg/L 0.03 mg/L	>100% >100%
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**	isolated detections during october monitoring event and concentrations in line with detections observed at background location historically. not other parameters indicated leachate influence in the downstream SW locations

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**	
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	If yes, provide details and whether remedial measures are necessary (Type Here) There is no trending that would suggest further actions are required.
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	○ **Yes** ● **No** ○ **Not Applicable**	If yes, list value(s) that are/have been exceeded and follow-up action taken (Type Here)

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:

11-Mar-2024

Recommendations:

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

● **No Changes to the monitoring program are recommended** ○ **The following change(s) to the monitoring program is/are recommended:**	
● **No changes to the site design and operation are recommended** ○ **The following change(s) to the site design and operation is/are recommended:**	Type Here

CEP Signature	
Relevant Discipline	Hydrogeology
Date:	11-Mar-2024
CEP Contact Information:	Colin Ross
Company:	Azimuth Environmental Consulting Inc.
Address:	642 Welham Road, Barrie, ON L4N 9A1
Telephone No.:	705-721-8451 x 205
Fax No. :	705-721-8926
E-mail Address:	colin@azimuthenvironmental.com

Save As **Print Form**

APPENDIX F

Borehole Logs

TABLE 1
MONITOR WELL DETAILS

BOREHOLE		MONITOR DETAILS						INSTALLATION DETAILS		
No.	Diameter (mm)	Diameter (mm)	Material	Elevations		Screened Interval		Depth Below Ground (m)	Elevation (m)	Material
				Ground (m)	Top of pipe (m)	Elevation (m)	Hydrostatic Unit			
1-I	150	50	PVC	295.49	296.43	283.0 to 284.5	Overburden/ Bedrock	0.0 to 0.1	295.5 to 295.4	bentonite
								0.1 to 9.5	295.4 to 286.0	native backfill
								9.5 to 9.9	286.0 to 285.6	bentonite
								9.9 to 12.5	285.6 to 283.0	sand
1-II	150	50	PVC	295.49	296.34	288.4 to 289.4	Overburden	0.0 to 0.4	295.5 to 295.1	bentonite
								0.4 to 5.7	295.1 to 289.8	native backfill
								5.7 to 6.1	289.8 to 289.4	bentonite
								6.1 to 9.1	289.4 to 286.4	sand
2-I	150	50	PVC	296.18	296.66	280.2 to 281.7	Overburden/ Bedrock	0.0 to 0.3	296.2 to 295.9	bentonite
								0.3 to 6.2	295.9 to 290.0	native backfill
								6.2 to 6.5	290.0 to 289.7	bentonite
								6.5 to 12.1	289.7 to 284.1	native backfill
								12.1 to 12.4	284.1 to 283.8	bentonite
								12.4 to 13.6	283.8 to 282.6	native backfill
								13.6 to 14.2	282.6 to 282.0	bentonite
								14.2 to 16.0	282.0 to 280.2	sand
2-II	150	50	PVC	296.40	297.27	284.2 to 287.3	Overburden	0.0 to 8.2	296.4 to 288.2	native backfill
								8.2 to 8.5	288.2 to 287.9	bentonite
								8.5 to 12.2	287.9 to 284.2	sand
3	150	50	PVC	300.23	301.19	282.6 to 285.6	Overburden	0.0 to 13.3	300.2 to 287.0	native backfill
								13.3 to 13.8	286.9 to 286.5	bentonite
								13.8 to 17.7	286.5 to 282.6	sand
4	150	50	PVC	284.51	285.46	282.4 to 283.9	Overburden/ Bedrock	0.0 to 0.3	284.5 to 284.2	benonite
								0.3 to 2.1	284.2 to 282.4	sand
5-III	150	50	PVC	293.64	294.52	281.6 to 283.1	Overburden/ Bedrock	0.0 to 9.6	293.6 to 284.0	native backfill
								9.6 to 10.1	284.0 to 283.6	bentonite
								10.1 to 12.0	283.6 to 281.6	sand
6	150	50	PVC	279.27	279.89	276.8 to 278.3	Overburden/ Bedrock	0.0 to 0.3	279.3 to 279.0	native backfill
								0.3 to 0.6	279.0 to 278.7	bentonite
								0.6 to 2.4	278.7 to 276.8	sand
7	150	50	PVC	280.88	281.86	276.6 to 278.1	Refuse	0.0 to 1.5	280.9 to 279.4	native backfill
								1.5 to 2.1	279.4 to 278.8	benonite
								2.1 to 4.2	278.8 to 276.6	sand

H:\E03\WM_34\SOMMON.WB2 08/27/97

BOREHOLE NUMBER 1 FIGURE F-1

Project	Somerville Landfill	**Drill Type**	CME	**Ground Elevation**	295.49
Location	lot 13, con 3, Somerville	**Technician**	D. Hamilton	**Static Water Elevation**	-
Date	September 9, 1992	**Contractor**	Eastern	**Elevation Datum**	assumed

DEPTH (m)	INFERRED STRATIGRAPHY Description	Symbol	MONITOR	SAMPLE #	type	N'	REMARKS
0	TOPSOIL						
	REFUSE & FILL (cover)			1	AS	-	
1							
				2	SS	6	
2							
3							
				3	SS	6	
4							
				4	SS	6	
5							
	Till						
6	Fine sandy silt to silty fine sand till trace gravel trace to some clay occasional sand seams grey			5	SS	37	
7	dense to very dense						
				6	SS	99	grain size analysis
8	- soils becoming saturated						
9			1-II				
	- sand seams			7	SS	93	
	continued next page		continued next page				

BOREHOLE NUMBER 1 **FIGURE F-1**

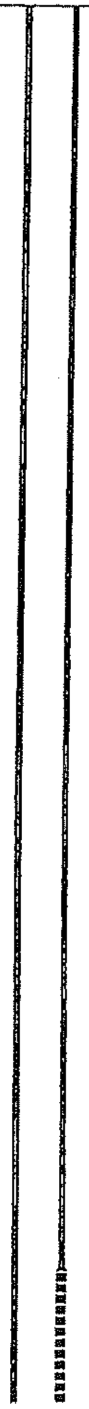
Project	Somerville Landfill	**Drill Type**	CME	**Ground Elevation**	295.49
Location	lot 13, con 3, Somerville	**Technician**	D. Hamilton	**Static Water Elevation**	-
Date	September 9, 1992	**Contractor**	Eastern	**Elevation Datum**	assumed

DEPTH (m)	INFERRED STRATIGRAPHY Description	INFERRED STRATIGRAPHY Symbol	MONITOR	SAMPLE #	SAMPLE type	SAMPLE N'	REMARKS
10						-	
11				8	SS	73	
12	ASSUMED BEDROCK		1-I	9	SS	100 for 200 mm	
13							
14							
15							
16							
17							
18							
19			See Table 1 for installation details				

29-Aug-96 somlog

BOREHOLE NUMBER **2** **FIGURE F-2** page 1 of 2

Project	Somerville Landfill	**Drill Type**	CME	**Ground Elevation**	296.18
Location	lot 13, con 3, Somerville	**Technician**	D. Hamilton	**Static Water Elevation**	-
Date	September 8-9, 1992	**Contractor**	Eastern	**Elevation Datum**	assumed



DEPTH (m)	INFERRED STRATIGRAPHY Description	Symbol	MONITOR	SAMPLE #	type	N'	REMARKS
0	TOPSOIL						
	Till Fine sandy silt to silty fine sand till trace gravel, clay occasional sand seams grey to blue-grey compact to very dense			1	SS	5	
1							
2				2	SS	25	
3	- sand seam			3	SS	54	
4							
5				4	SS	41	grain size analysis
6	- sand seam			5	SS	37	
7							
8				6	SS	108	
9				7	SS	88	
	continued next page		continued next page				

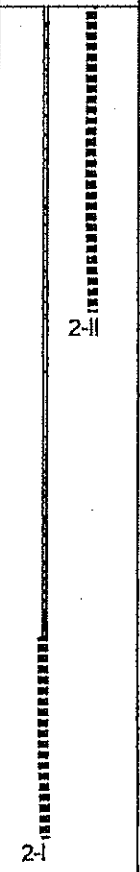
29-Aug-96 somlog

COUNTY OF VICTORIA

TRANSPORTATION AND PUBLIC WORKS DEPARTMENT

BOREHOLE NUMBER **2** **FIGURE F-1** page 2 of 2

Project	Somerville Landfill	Drill Type	CME	Ground Elevation	296.18
Location	lot 13, con 3, Somerville	Technician	D. Hamilton	Static Water Elevation	-
Date	September 8-9, 1992	Contractor	Eastern	Elevation Datum	assumed

DEPTH (m)	INFERRED STRATIGRAPHY Description	Symbol	MONITOR	SAMPLE #	type	N'	REMARKS
10							
	- sandy silt seam, saturated			8	SS	80	grain size analysis
11							
12			2-II				
	-cobbles/boulders to bedrock			9	SS	89	
13							
				10	SS	90 for 150 mm, refusal	
14							
15							
				11	SS	94, refusal	
	ASSUMED BEDROCK						
16			2-I				
17							
18							
19			See Table 1 for installation details				

29-Aug-96 somlog

COUNTY OF VICTORIA TRANSPORTATION AND PUBLIC WORKS DEPARTMENT

BOREHOLE NUMBER **3** **FIGURE F-3** page 1 of 2

Project	Somerville Landfill	**Drill Type**	CME	**Ground Elevation**	300.23
Location	lot 13, con 3, Somerville	**Technician**	D. Hamilton	**Static Water Elevation**	-
Date	September 10, 1992	**Contractor**	Eastern	**Elevation Datum**	assumed

DEPTH	INFERRED STRATIGRAPHY		MONITOR	SAMPLE			REMARKS
(m)	Description	Symbol		#	type	N'	
0	TOPSOIL						
	Till Fine sandy silt to silty fine sand till trace gravel			1	SS	5	
1	trace to some clay occasional sand seams grey to blue-grey compact to very dense						
				2	SS	19	grain size analysis
2							
3	- cobbles						
				3	SS	34	
4							
				4	SS	-	
5							
6							
				5	SS	107	mantled, slight cementations
7							
				6	SS	95	
8							
9							
				7	SS	76	
	continued next page		continued next page				

BOREHOLE NUMBER 3 **FIGURE F-3**

Project	Somerville Landfill	Drill Type	CME	Ground Elevation	300.23
Location	lot 13, con 3, Somerville	Technician	D. Hamilton	Static Water Elevation	-
Date	September 10, 1992	Contractor	Eastern	Elevation Datum	assumed

DEPTH	INFERRED STRATIGRAPHY		MONITOR	SAMPLE			REMARKS
(m)	Description	Symbol		#	type	N'	
10							
				8	SS	108	
11							
12							
				9	SS	120	
13							
				10	SS	104	wet at tip of sample
14							
15							
	- sand seam, saturated			11	SS	96	
16							
17				12	SS	52 for 15 cm	
			3				
18							
				13	SS	73 for 15 cm	
19							
			See Table 1 for installation details	14	SS	refusal	
20	ASSUMED BEDROCK						

BOREHOLE NUMBER 4 **FIGURE F-4** page 1 of 1

Project	Somerville Landfill	**Drill Type**	CME	**Ground Elevation**	284.51
Location	lot 13, con 3, Somerville	**Technician**	D. Hamilton	**Static Water Elevation**	-
Date	September 11, 1992	**Contractor**	Eastern	**Elevation Datum**	assumed

DEPTH (m)	INFERRED STRATIGRAPHY Description	Symbol	MONITOR	SAMPLE #	type	N'	REMARKS
0	Till Cobbly fine sandy silt to silty fine sand till trace gravel occasional sand seams grey to blue-grey dense to very dense						
1							
2				1	SS	36	
	ASSUMED BEDROCK		4				
3							
4							
5							
6							
7							
8							
9			See Table 1 for Installation details				

29-Aug-96 somlog

COUNTY OF VICTORIA TRANSPORTATION AND PUBLIC WORKS DEPARTMENT

BOREHOLE NUMBER 5 **FIGURE F-5** page 1 of 2

Project	Somerville Landfill	Drill Type	CME	Ground Elevation	293.64
Location	lot 13, con 3, Somerville	Technician	D. Hamilton	Static Water Elevation	-
Date	September 14, 1992	Contractor	Eastern	Elevation Datum	assumed

DEPTH	INFERRED STRATIGRAPHY		MONITOR	SAMPLE			REMARKS
(m)	Description	Symbol		#	type	N'	
0	TOPSOIL						
	SAND Silty fine sandy trace gravel brown loose to compact			1	SS	6	
1							
				2	SS	9	
2							
	- cobble (?)						
3				3	SS	26	
4	Till Fine sandy silt to silty fine sand till trace gravel trace to some clay occasional sand seams light grey to grey compact to very dense						
				4	SS	34	
5							
6				5	SS	50	
7							
				6	SS	100 for 150 mm	
8							
9							
				7	SS	125 for 100 mm	grain size analysis
	continued next page		continued next page				

BOREHOLE NUMBER 5 FIGURE F-5

Project	Somerville Landfill	**Drill Type**	CME	**Ground Elevation**	293.64
Location	lot 13, con 3, Somerville	**Technician**	D. Hamilton	**Static Water Elevation**	-
Date	September 14, 1992	**Contractor**	Eastern	**Elevation Datum**	assumed

DEPTH (m)	INFERRED STRATIGRAPHY Description	Symbol	MONITOR	SAMPLE #	type	N'	REMARKS
10							
11				8	SS	130	
12							
	ASSUMED BEDROCK			9	SS	75 for 25 mm	
13							
14							
15							
16							
17							
18							
19			See Table 1 for installation details				
20							

BOREHOLE NUMBER 6 FIGURE F-6

Project	Somerville Landfill	**Drill Type**	CME	**Ground Elevation**	279.27
Location	lot 13, con 3, Somerville	**Technician**	D. Hamilton	**Static Water Elevation**	-
Date	September 11, 1992	**Contractor**	Eastern	**Elevation Datum**	assumed

DEPTH (m)	INFERRED STRATIGRAPHY Description	Symbol	MONITOR	SAMPLE #	type	N'	REMARKS
0	HUMUS, organic						
	Till Cobbly fine sandy silt to silty fine sand till trace gravel grey to blue-grey dense to very dense			1	SS	4	
1							
				2	SS	68	
2							
	ASSUMED BEDROCK						
3							
4							
5							
6							
7							
8							
9			See Table 1 for installation details				

BOREHOLE NUMBER 7 **FIGURE F-7** page 1 of 1

Project	Somerville Landfill	**Drill Type**	CME	**Ground Elevation**	280.88
Location	lot 13, con 3, Somerville	**Technician**	D. Hamilton	**Static Water Elevation**	-
Date	September 11, 1992	**Contractor**	Eastern	**Elevation Datum**	assumed

DEPTH (m)	INFERRED STRATIGRAPHY Description	Symbol	MONITOR	SAMPLE #	type	N'	REMARKS
0	REFUSE & FILL (cover)			1	SS	7	
1							
2				2	SS	10	
	Till Silty sand till some gravel trace clay brown loose						
3				3	SS	7	
4	ASSUMED BEDROCK		7				
5							
6							
7							
8							
9			See Table 1 for installation details				

29-Aug-96 somlog

COUNTY OF VICTORIA

TRANSPORTATION AND PUBLIC WORKS DEPARTMENT

L1626©5A.BHR

PROJECT: 961-1626

RECORD OF DRILLHOLE: BH 5a

SHEET 1 OF 2

LOCATION: SEE BOREHOLE LOCATION PLAN

INCLINATION: -90 AZIMUTH: N/A

DRILLING DATE: FEB.20&21/97

DRILL RIG: NODWELL CME 75

DRILLING CONTRACTOR: ALL TERRAIN LTD.

DATUM: GEODETIC

FR-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH COLOUR % RETURN	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.25	DISCONTINUITY DATA DIP w.r.t. CORE AXIS	DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY k, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
		GROUND SURFACE		293.84												
0	108mm I.D. HOLLOW STEM AUGERS	OVERBURDEN Soil description based on auger cuttings.		0.00												CEMENT
1																BENTONITE SEAL
2		Brownish grey, fine to coarse silty SAND, some gravel, some clay, few cobbles, dry to moist. (TILL)														
3																CAVED MATERIAL
4																
5																
				287.85 5.79												
6		Grey COBBLES and BOULDERS, some sand, some gravel, wet.														
				286.83 7.01												
7																BENTONITE SEAL
8		Grey sandy SILT to silty SAND, some to little gravel, some to little cobbles, dry. (TILL)														
9																
10		CONTINUED ON NEXT PAGE														

DATA INPUT: PS SEPT.16/97

RUCKMV3

DEPTH SCALE:
1 to 50

Golder Associates

LOGGED: DH
DATE:
CHECKED: DH

L162605A BHR

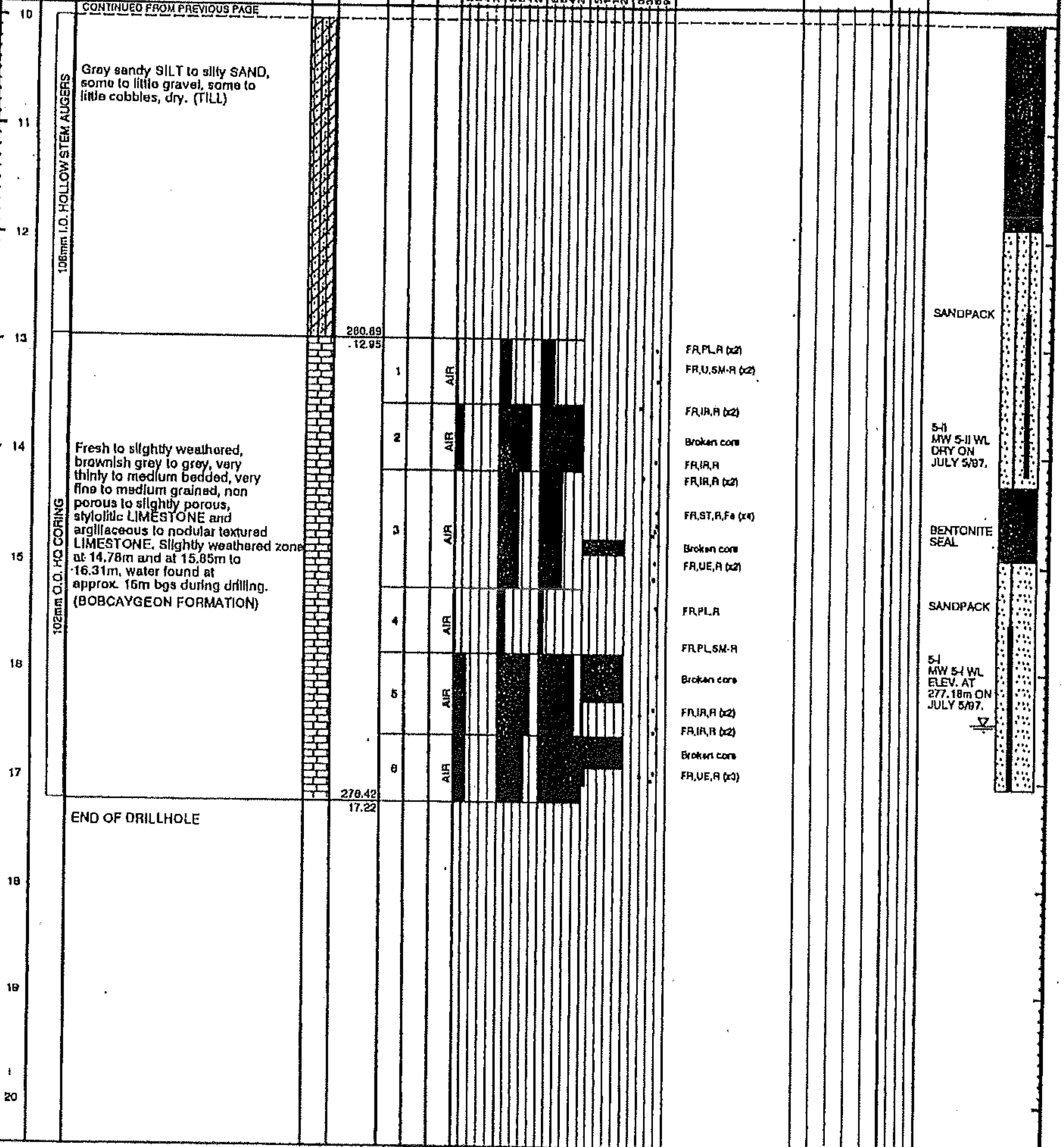
PROJECT: 961-1626
LOCATION: SEE BOREHOLE LOCATION PLAN
INCLINATION: -90 AZIMUTH: N/A

RECORD OF DRILLHOLE: BH 5a

DRILLING DATE: FEB.20&21/97
DRILL RIG: NODWELL CME 75
DRILLING CONTRACTOR: ALL TERRAIN LTD.

SHEET 2 OF 2
DATUM: GEODETIC

FR-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED



DEPTH SC. METRES	DRILLING RECORD	DESCRIPTION	ELEV. DEPTH (m)	RUN No.	FLUSH	DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION	NOTES WATER LEVELS INSTRUMENTATION
10		CONTINUED FROM PREVIOUS PAGE					
10 – 12.95	108mm I.D. HOLLOW STEM AUGERS	Grey sandy SILT to silty SAND, some to little gravel, some to little cobbles, dry. (TILL)					SANDPACK
12.95 – 17.22	102mm O.D. HQ CORING	Fresh to slightly weathered, brownish grey to grey, very thinly to medium bedded, very fine to medium grained, non porous to slightly porous, stylolitic LIMESTONE and argillaceous to nodular textured LIMESTONE. Slightly weathered zone at 14.78m and at 15.85m to 16.31m, water found at approx. 16m bgs during drilling. (BOBCAYGEON FORMATION)	280.89 12.95	1	AIR	FR,PL,R (x2) FR,U,SM-R (x2)	
				2	AIR	FR,IR,R (x2) Broken core FR,IR,R	5-II MW 5-II WL DRY ON JULY 5/97.
				3	AIR	FR,IR,R (x2) FR,ST,R,Fe (x4) Broken core FR,UE,R (x2)	BENTONITE SEAL
				4	AIR	FR,PL,R FR,PL,SM-R	SANDPACK
				5	AIR	Broken core FR,IR,R (x2) FR,IR,R (x2)	5-I MW 5-I WL ELEV. AT 277.18m ON JULY 5/97.
			276.42 17.22	6	AIR	Broken core FR,UE,R (x3)	
17.22		END OF DRILLHOLE					
20							

DEPTH SCALE:
1 to 50

Golder Associates

LOGGED: DH
DATE:
CHECKED: DH

L1625004 BHS

PROJECT: 901-1626

RECORD OF BOREHOLE BH-8-II

SHEET 1 OF 3

LOCATION: REFER TO PLAN

BORING DATE: SEPT.11-12/96

DATUM: GEODETIC

SAMPLER HAMMER, 63.5kg; DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa nat V · + Q · ● rem V · ⊕ U · O	HYDRAULIC CONDUCTIVITY, k, cm/s / WATER CONTENT, PERCENT Wp ├──O W──┤ Wl 5 10 15 20	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		291.83							
		Compact, dark brown, moist, silty TOPSOIL, some sand, rootlets.		0.00							
				0.13							
		Compact, brown, moist silty SAND.		0.25	1	60 DO	17				CONCRETE & CASING
1											
					2	60 DO	48				
2											
3											GROUT
4											
					4	60 DO	87/.26				
5	NODWELL MOUNTED CME-75 108mm I.D. HOLLOW STEM AUGERS	Compact to very dense, grey, moist SAND and SILT, some gravel, trace clay, occ. cobbles, occ. very thin sand partings. (TILL)									
6					5	60 DO	88/.25				
7											
					6	60 DO	50/.10				BENTONITE SEAL
8											
											SAND
9					7	60 DO	50/.05		O	M	
10		CONTINUED ON NEXT PAGE									

DATA INPUT: pe sept.15/97

DEPTH SCALE
1 to 50

Golder Associates

LOGGED: TDM
CHECKED: PMM

L1526005 BHS

PROJECT: 961-1626

RECORD OF BOREHOLE BH-8 -II

SHEET 2 OF 3

LOCATION: REFER TO PLAN

BORING DATE: SEPT.11-12/96

DATUM: GEODETIC

SAMPLER HAMMER, 63.5kg; DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE DESCRIPTION	SOIL PROFILE STRATA PLOT	SOIL PROFILE ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m SHEAR STRENGTH Cu, kPa nat V - + Q - ● rem V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s WATER CONTENT, PERCENT Wp ├──○W──┤ Wl 5 10 15 20	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		CONTINUED FROM PREVIOUS PAGE									
10		BEDROCK INFERRED		281.47 10.38							BENTONITE SEAL ▨ Monitoring well at BH 8-II Dry on July 15, 1997.
		CONTINUED ON DRILLHOLE									
11											
12											
13											
14											
15											
16											
17											
18											
19											
20		CONTINUED ON NEXT PAGE									

DATA INPUT: ps sept.16/97

SDCMG -

DEPTH SCALE
1 to 50

Golder Associates

LOGGED: TDM
CHECKED: PMM

L1626005.BHR

PROJECT: 961-1626

RECORD OF DRILLHOLE: BH-8-I

SHEET 3 OF 3

LOCATION: REFER TO PLAN

INCLINATION: AZIMUTH:

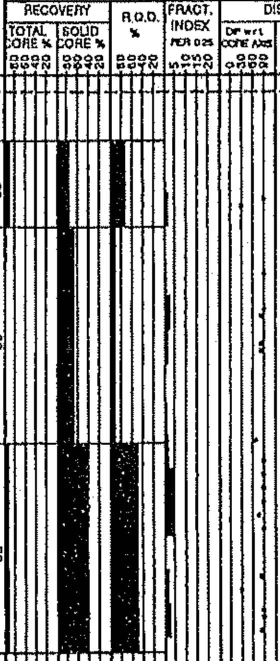
DRILLING DATE: SEPT,11-12/96

DRILL RIG: CME-75

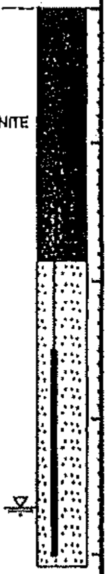
DRILLING CONTRACTOR: ALL-TERRAIN DRILLING LTD.

DATUM: GEODETIC

FR-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED



DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	ELEV. DEPTH (m)	RUN No.	PENETRATION RATE (m/min.)	FLUSH COLOUR % RETURN	DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY k, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
		CONTINUED FROM PREVIOUS PAGE								
10		CONTINUED FROM BOREHOLE BH-8	281.47 10.38							
				1	0.091	90				BENTONITE SEAL
11		Fresh to slightly weathered, brownish grey to grey, thin to medium bedded, fine to medium grained, stylolitic LIMESTONE and argillaceous to nodular textured LIMESTONE.		2	0.12	90	IRON STAINING WEATHERED			
12										SAND
13	SEPT.12/96			3	0.08	90	IRON STAINING WEATHERED IRON STAINING MB MB IRON STAINING			8-I
14		END OF DRILLHOLE	277.73 14.10							Water level in BH 8-I at elevation 278.18m on July 5, 1997.
15										
16										
17										
18										
19										
20										



DATA INPUT: PS SEPT.16/97

ROCKNVS

DEPTH SCALE:
1 to 50

Golder Associates

LOGGED: TDM
DATE:
CHECKED: PMM

PROJECT: 961-1628

RECORD OF BOREHOLE BH-9

SHEET 1 OF 2

LOCATION: REFER TO PLAN

BORING DATE: SEPT.12/96

DATUM: GEODETIC

SAMPLER HAMMER, 63.5kg; DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg; DROP, 760mm

L1625009.BHS

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m SHEAR STRENGTH Cu, kPa nat V - + Q - ● rem V - ⊕ U - O	HYDRAULIC CONDUCTIVITY, k, cm/s WATER CONTENT, PERCENT Wp ├──O W──┤ Wl	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m				
0		GROUND SURFACE		279.28 0.00							
		Loose, dark brown, moist silty TOPSOIL, trace to some clay, roots.		279.00 0.28	1	50 DO	50/ .13				CONCRETE & CASING
		BEDROCK INFERRED		0.38							
		CONTINUED ON DRILLHOLE									
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

CONTINUED ON NEXT PAGE

PS SEPT.18/97

DEPTH SCALE

1 to 50

Golder Associates

LOGGED: TDM

CHECKED: PMM

SOILMS

L1525009.BHR

PROJECT: 961-1026

LOCATION: REFER TO PLAN

INCLINATION: AZIMUTH:

RECORD OF DRILLHOLE: BH-9

DRILLING DATE: SEPT.12/96

DRILL RIG: CME-75

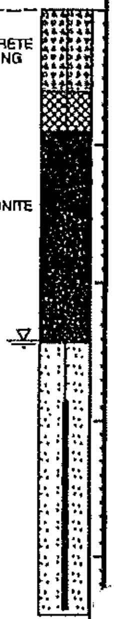
DRILLING CONTRACTOR: ALL-TERRAIN DRILLING LTD.

SHEET 2 OF 2

DATUM: GEODETIC

FR-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	PENETRATION RATE (m/min.)	FLUSH COLOUR % RETURN	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.25	DISCONTINUITY DATA DIP w.r.t. CORE AXIS	DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY k, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
0		CONTINUED FROM PREVIOUS PAGE														
		CONTINUED FROM BOREHOLE BH-9														CONCRETE & CASING
				278.90 0.38												CAVE
1	SEPT.12/96	Fresh to slightly weathered, brownish grey to grey, thin to medium bedded, stylolitic LIMESTONE and argillaceous to nodular textured LIMESTONE. Broken slightly weathered core from bedrock surface to 3.79m, some iron staining.			1	0.21							BROKEN CORE FROM 0.38-3.79m			BENTONITE SEAL
2					2	0.097										
3					3	0.084										
					4	0.077							IRON STAINING			SILICA SAND
4					5	0.078							IRON STAINING			
		END OF DRILLHOLE		274.84 4.44												Water level elevation at 276.88m on July 5, 1997.
5																
6																
7																
8																
9																
10																



DATA INPUT: SEPT.16/97

DEPTH SCALE:

1 to 50

Golder Associates

LOGGED: TDM

DATE:

CHECKED: PMM

L1626010.BHS

PROJECT: 961-1626

RECORD OF BOREHOLE BH-10-II

SHEET 1 OF 3

LOCATION: REFER TO PLAN

BORING DATE: SEPT.10/96

DATUM: GEODETIC

SAMPLER HAMMER, 63.5kg; DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE DESCRIPTION	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat V - + Q - ● rem V - ⊕ U - ○)	HYDRAULIC CONDUCTIVITY, k, cm/s / WATER CONTENT, PERCENT Wp ├──○W──┤ Wl (5 10 15 20)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE	299.58							
		Loose, dark brown, moist, silty TOPSOIL, some sand, rootlets.	0.00							
		Dense, brown, moist sandy SILT.	299.35 0.23	1	50 DO	5				
1			298.82 0.78	2	50 DO	34				
2				3	50 DO	54				
				4	50 DO	99				
3				5	50 DO	76				
4	HOOWELL MOUNTED CME-75 108mm I.D. HOLLOW STEM AUGERS	Dense to very dense, grey, moist SAND and SILT, some gravel, trace clay, occ. cobbles, occ. silt seams up to 1cm thick, occ. very thin sand partings. (TILL)								
5				6	50 DO	84/.15				GROUT
6				7	50 DO	105/.2				
7										
8				8	50 DO	50/.05		O	M	
9		Fine sand, some silt at 9.22m to 9.37m.. Clayey silt, some sand at 9.37m to 9.50m.		9	50 DO	74/.25				
10		CONTINUED ON NEXT PAGE								

DEPTH SCALE

1 to 50

Golder Associates

LOGGED: TDM

CHECKED: PMM

PROJECT: 961-1626

RECORD OF BOREHOLE BH-10-II

SHEET 2 OF 3

LOCATION: REFER TO PLAN

BORING DATE: SEPT.10/96

DATUM: GEODETIC

SAMPLER HAMMER, 63.5kg; DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg; DROP, 760mm

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m

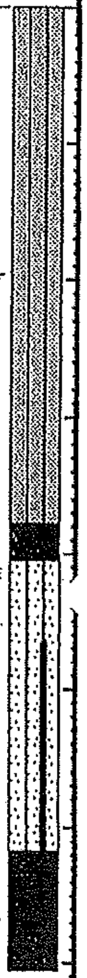
HYDRAULIC CONDUCTIVITY, k, cm/s

SHEAR STRENGTH Cu, kPa — nat V - + Q - ● / rem V - ⊕ U - ○

WATER CONTENT, PERCENT — Wp ├──○W──┤ Wl — 5 10 15 20

BORING METHOD: NODWELL MOUNTED CME-75 / 108mm I.D. HOLLOW STEM AUGERS

DEPTH SCALE METRES	SOIL PROFILE DESCRIPTION	ELEV. DEPTH (m)	SAMPLES NUMBER	TYPE	BLOWS/0.3m	WATER CONTENT, PERCENT	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	CONTINUED FROM PREVIOUS PAGE							
11			10	50 DO	87/ .20			GROUT
12								▽
	Silty fine sand, occ. very thin medium sand seams at 12.34m to 12.59m.		11	50 DO	81/ .23			
13								
14			12	50 DO	50/ .05	○	M	
	Silt and fine sand, trace medium sand, trace clay at 13.84m to 13.92m.							BENTONITE SEAL
15			13	50 DO	113 /.2	○	M	SILICA SAND
								10-II
16								
17	BEDROCK INFERRED		14	50 DO	50/ .08			BENTONITE SEAL
	CONTINUED ON DRILLHOLE	282.51 17.07						
18								Water level elevation in monitoring well BH 10-II at 287.62m on July 5, 1997.
19								
20	CONTINUED ON NEXT PAGE							



DEPTH SCALE

1 to 50

Golder Associates

LOGGED: TDM

CHECKED: PMM

L1626010.BHR

PROJECT: 961-1626

RECORD OF DRILLHOLE: BH-10-I

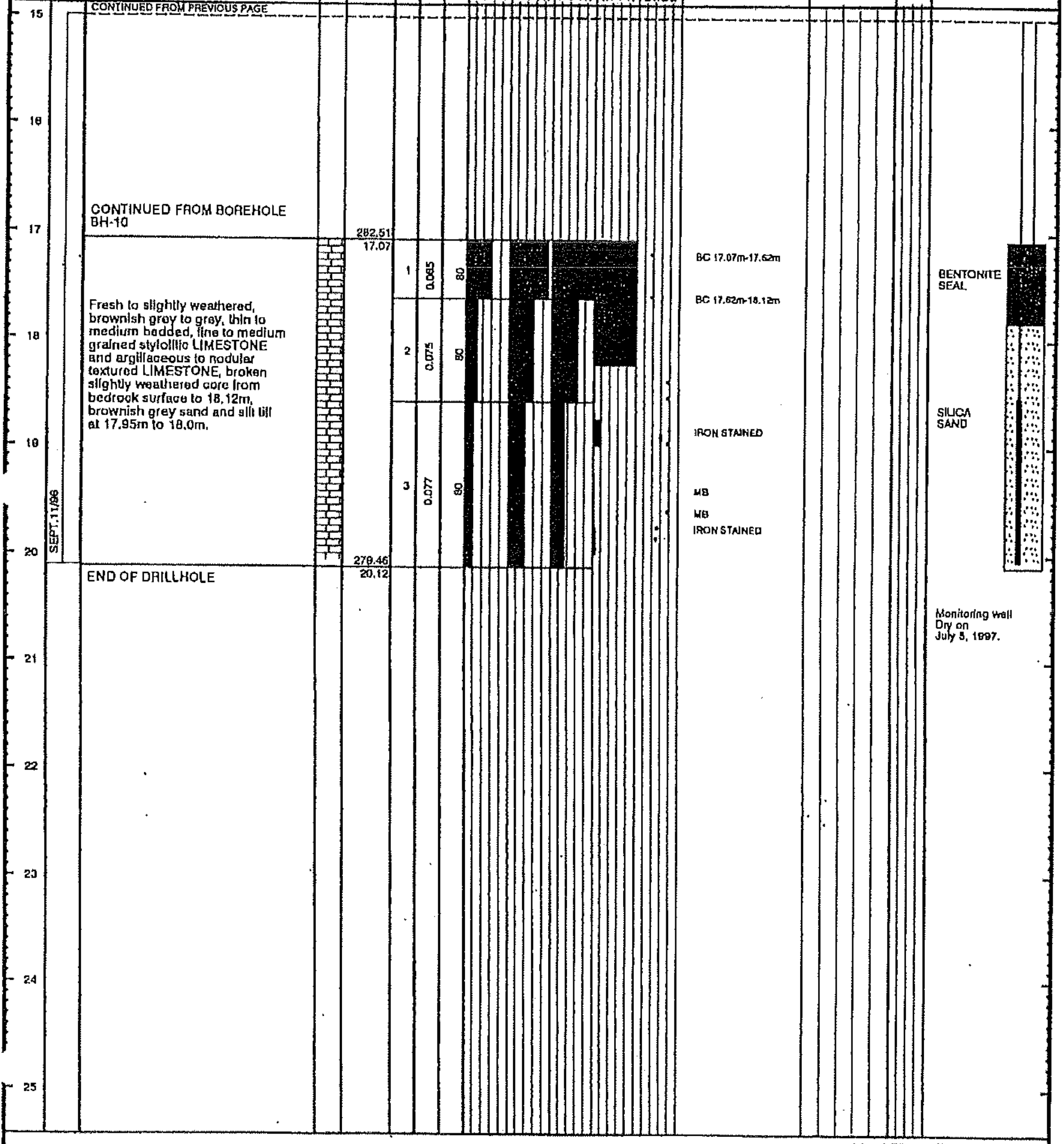
SHEET 3 OF 3

LOCATION: REFER TO PLAN
INCLINATION: AZIMUTH:

DRILLING DATE: SEPT.10/96
DRILL RIG: CME-75
DRILLING CONTRACTOR: ALL-TERRAIN DRILLING LTD.

DATUM: GEODETIC

FR-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED



DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	ELEV. DEPTH (m)	RUN No.	PENETRATION RATE (m/min.)	FLUSH COLOUR % RETURN	DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION	NOTES WATER LEVELS INSTRUMENTATION
15		CONTINUED FROM PREVIOUS PAGE						
17		CONTINUED FROM BOREHOLE BH-10	282.51 17.07					
		Fresh to slightly weathered, brownish grey to grey, thin to medium bedded, fine to medium grained stylolitic LIMESTONE and argillaceous to nodular textured LIMESTONE, broken slightly weathered core from bedrock surface to 18.12m, brownish grey sand and silt till at 17.95m to 18.0m.		1	0.065	80	BC 17.07m-17.62m	BENTONITE SEAL
18				2	0.075	80	BC 17.62m-18.12m	
19							IRON STAINED	SILICA SAND
	SEPT.11/96			3	0.077	80	MB MB IRON STAINED	
20		END OF DRILLHOLE	279.46 20.12					Monitoring well Dry on July 5, 1997.
21								
22								
23								
24								
25								

DATA INPUT: PS SEPT.15/97

ROCKHVS

DEPTH SCALE:
1 to 50

Golder Associates

LOGGED: TDM
DATE:
CHECKED: PMM

Ontario Ministry of the Environment

Well Tag Number (Place sticker and print number below)
ABANDONMENT

Well Record

Regulation 903 Ontario Water Resources Act

page 1 of 1

Instructions for Completing Form

- For use in the Province of Ontario only. This document is a permanent legal document. Please retain for future reference.
- All Sections must be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Help Desk (Toll Free) at 1-888-396-9355.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only		
MUN	CON	LOT

Well Owner's Information and Location of Well Information

First Name / Last Name: City of Kawartha Lakes
Mailing Address (Street Number/Name, RR, Lot, Concession): 50 Wolfe St.
County/District/Municipality:
Township/City/Town/Village: Lindsay
Province: Ontario
Postal Code: K9V 2J2
Telephone Number (include area code):
Address of Well Location (County/District/Municipality): Somerville Landfill Site
Township: Somerville
Lot: 13
Concession: 3
RR#/Street Number/Name: 381 Ledgehill Road
City/Town/Village: Kawartha Lakes
Site/Compartment/Block/Tract etc.:
GPS Reading: NAD 83 Zone 17 Easting 683412 Northing 4946141
Unit Make/Model: Magellan
Mode of Operation: ☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth Metres From	To
	2" Monitoring Well pulled. Borehole overdrilled with 4 1/4 HSA to 10ft (3.04m). Backfilled with Bentonite to surface.				

Hole Diameter

Depth Metres From	To	Diameter Centimetres

Water Record

Water found at ___ Metres / Kind of Water
☐ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:
☐ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:
☐ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:
After test of well yield, water was
☐ Clear and sediment free
☐ Other, specify
Chlorinated ☐ Yes ☒ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth Metres From	To
Casing				
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	Slot No.		
No Casing or Screen				
	☐ Open hole			

Test of Well Yield

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

Plugging and Sealing Record ☐ Annular space ☒ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	3.04	Bentonite	

Method of Construction

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

Water Use

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

Final Status of Well

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

Well Contractor/Technician Information

Name of Well Contractor: All-Terrain Drilling Ltd.
Well Contractor's Licence No.: 1129
Business Address (street name, number, city etc.): 3-661 Colby Dr. Waterloo, ON N2V 1C2
Name of Well Technician (last name, first name): Grant, Don Pollice, Mike
Well Technician's Licence No.: 268
Signature of Technician/Contractor:
Date Submitted YYYY MM DD: 2007 01 15

Location of Well

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

- Abandoned well listed as MW-4 on attached map.

Audit No. Z 73956
Date Well Completed: 2006 12 08
Was the well owner's information package delivered? ☐ Yes ☒ No
Date Delivered YYYY MM DD

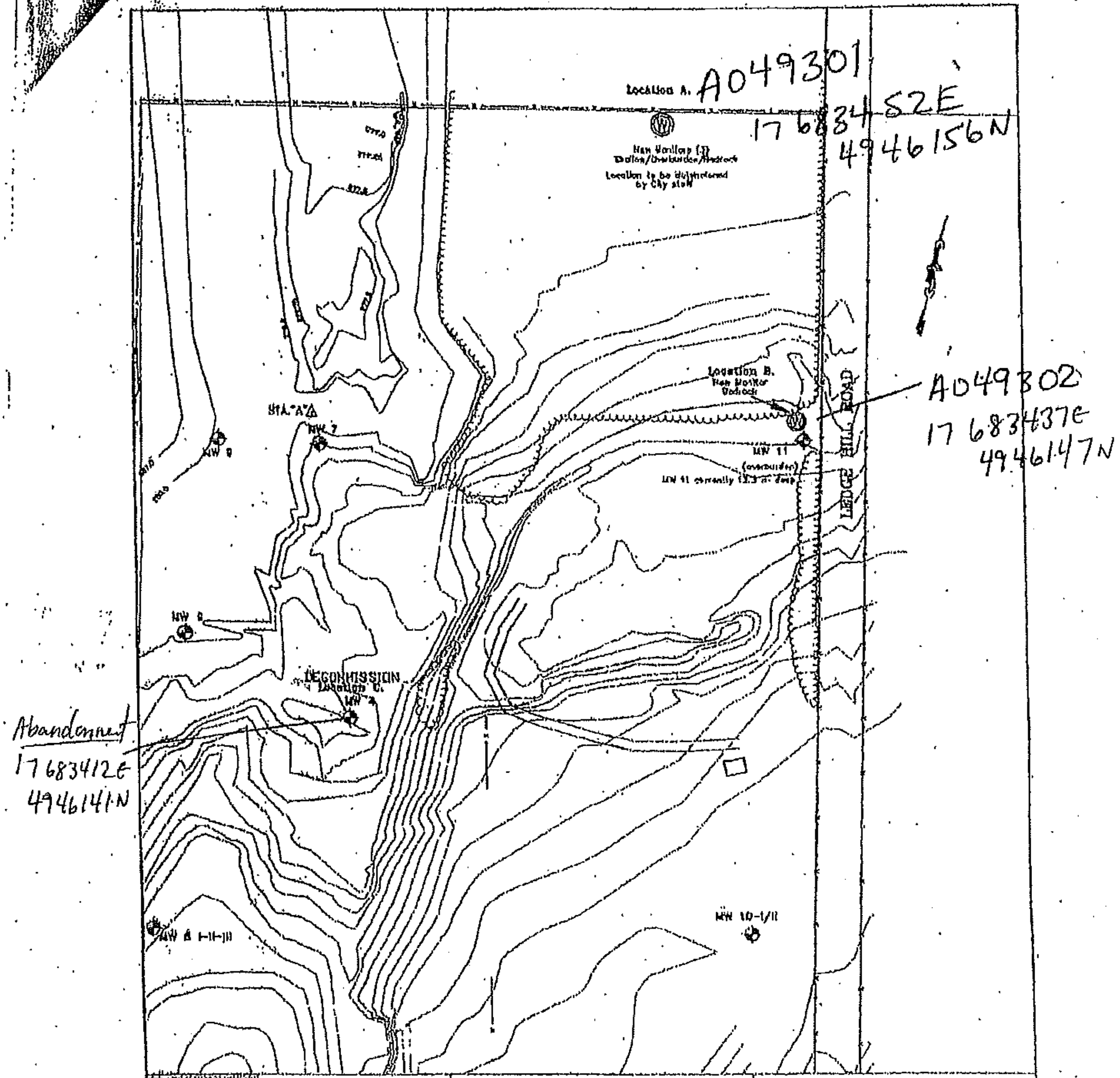
Ministry Use Only

Data Source
Contractor
Date Received YYYY MM DD
Date of Inspection YYYY MM DD
Remarks
Well Record Number

0506E (08/2006)

Well Owner's Copy

Cette formule est disponible en français



A049301
17 683452E
4946156N

A049302
17 683437E
4946147N

Abandonned
17 683412E
4946141N

	Scale 1 : 2000	Date NOVEMBER 2006
SOMERVILLE LANDFILL SITE		Figure 1

MW14

Ontario Ministry of the Environment

Well Tag Number **A 049302**

A049302

Well Record

Regulation 903 Ontario Water Resources Act

page 1 of 1

Instructions for Completing Form

- For use in the Province of Ontario only. This document is a permanent legal document. Please retain for future reference.
- All Sections must be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Help Desk (Toll Free) at 1-888-396-9355.
- All metre measurements shall be reported to 1/10th of a metre.
- Please print clearly in blue or black ink only.

Ministry Use Only

MUN ☐☐☐☐☐ CON ☐☐☐☐☐☐☐☐☐ LOT ☐☐☐

Well Owner's Information and Location of Well Information

First Name / Last Name: City of Kawartha Lakes
Mailing Address (Street Number/Name, RR,Lot,Concession): 50 Wolfe St.
County/District/Municipality:
Township/City/Town/Village: Lindsay
Province: Ontario
Postal Code: K9V 2J2
Telephone Number (include area code):
Address of Well Location (County/District/Municipality): Somerville Landfill
Township: Somerville
Lot: 13
Concession: 3
RR#/Street Number/Name: 381 Ledgehill Road
City/Town/Village: Kawartha Lakes
Site/Compartment/Block/Tract etc.:
GPS Reading: NAD 83 Zone 17 Easting 683437 Northing 4946169
Unit Make/Model: Magellan
Mode of Operation: ☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth Metres From	To
Brown	FILL	silt, sand, gravel	saturated	0	0.9
Brown, Grey	Sand	silt, gravel	very fine to fine sand, moist, dense	0.9	4.8
Brown	Sand	silt, gravel	fine sand, dense, moist	4.8	6.82
Grey	Clay		dense	6.82	6.87
Brown, Grey	sand, gravel	silt	moist, silty sand + gravel	6.87	8.2
Grey	Bedrock - Limestone		competent, fractured beyond 13.1	8.2	18.2

Hole Diameter

Depth Metres From	To	Diameter Centimetres
0	8.22	20
8.22	18.2	

Water Record

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

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

Chlorinated ☐ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth Metres From	To
Casing				
5.0	☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete ☐ Galvanized	.4	+0.8	15.0
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam		Slot No.		
6.1	☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete ☐ Galvanized	010	15.0	18.1
No Casing or Screen				
	☐ Open hole			

Test of Well Yield

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

Plugging and Sealing Record

☒ Annular space ☐ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	0.3	Cement	
0.3	14.4	Bentonite	
14.4	18.2	Sand	

Location of Well

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

See attached.

Method of Construction

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

Water Use

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

Final Status of Well

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

Audit No. **Z 73955**

Date Well Completed: 2006 12 06

Was the well owner's information package delivered? ☐ Yes ☒ No

Date Delivered YYYY MM DD

Well Contractor/Technician Information

Name of Well Contractor: All-Terrain Drilling Ltd.
Well Contractor's Licence No.: 1128
Business Address (street name, number, city etc.): 3-661 Colby Dr. Waterloo, ON N2V 1C2
Name of Well Technician (last name, first name): Grant, Don Pollice, Mike
Well Technician's Licence No.: 268
Signature of Technician/Contractor:
Date Submitted YYYY MM DD: 2007 01 12

Ministry Use Only

Data Source:
Contractor:
Date Received YYYY MM DD
Date of Inspection YYYY MM DD
Remarks:
Well Record Number:

0506E (08/2006)

Well Owner's Copy

Cette formule est disponible en français

A049302.

BOREHOLE LOG

PROJECT: [illegible]

BOREHOLE: MW 8

Hydrogeological Investigations MW14

[illegible] Somerville Landfill

FOR: County of Victoria

DATE: Dec 6/06

GEOLOGIST All Terrain

ELEVATION ----

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
		Fill - silty sand + gravel saturated, brown		1		SS	3		30			
0.9			0.9									
1.52		very fine sand, some silt, trace gravel brown, grey, moist		2		SS	11		90			
3.00		fine sand, trace silt, trace gravel moist, dense, grey		3		SS	51		55			
4.5				4		SS	69		80			
4.8		fine sand, brown, moist										
4.82		fine sand, trace silt, trace gravel moist, dense, grey										
5.1		fine sand, brown, moist										
5.12		fine sand, trace silt, trace gravel moist, dense, grey										
6.0				5		SS	94		80			
6.57		Fine sand, brown : grey										
6.82		clay, grey, dense										
6.87		silty sand + gravel brown, grey, moist,										
7.6				6		SS	60		40			

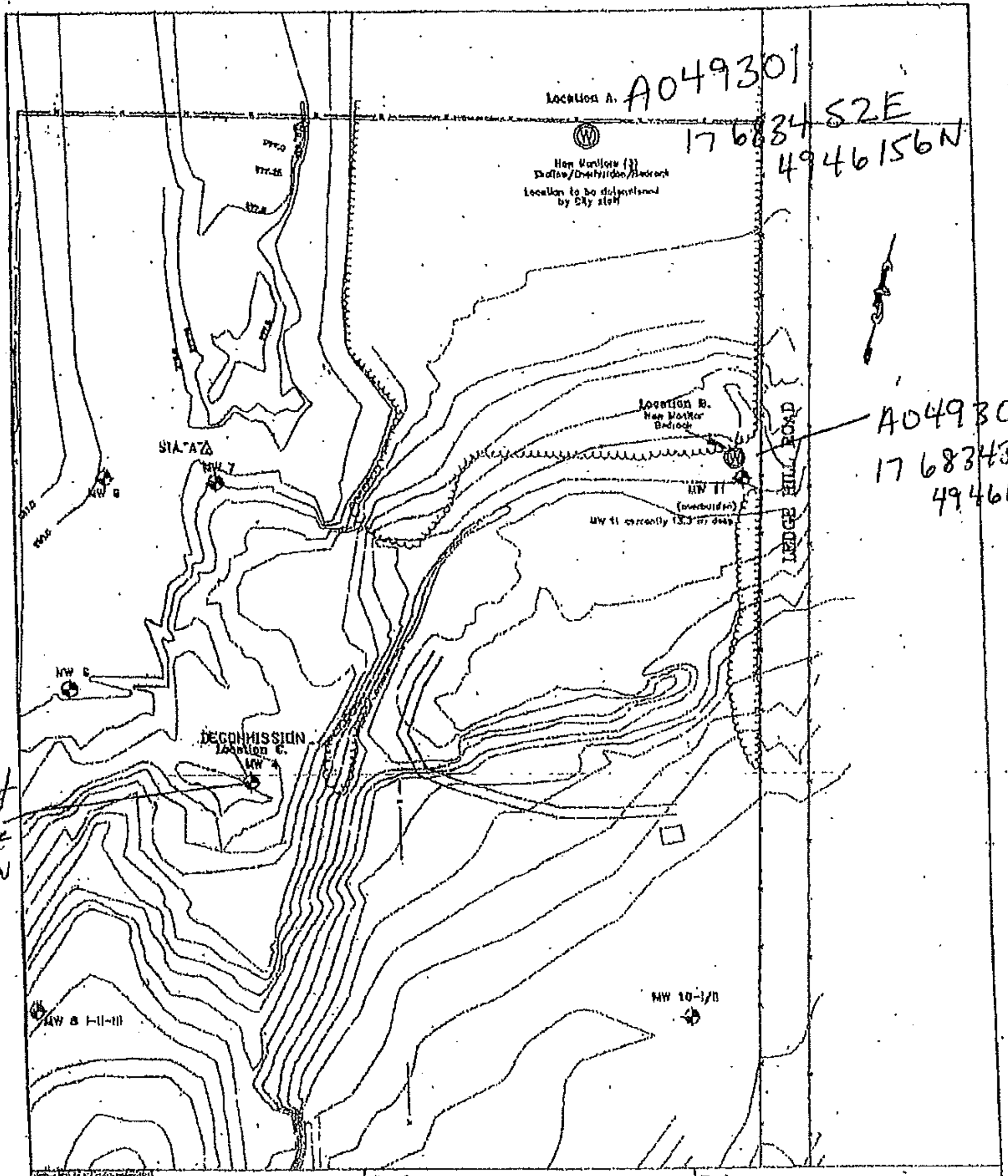
Printed: 14 Feb 00

BOREHOLE LOG	**PROJECT:** ~~Elden~~	**BOREHOLE:** MW 8
Hydrogeological Investigations ~~Elden Landfill Property~~ SOMERVILLE LANDFILL **FOR:** County of Victoria		**DATE:** DEC 6/06 **GEOLOGIST**- ALL TERRAIN **ELEVATION**

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
8.2		assumed bedrock 8.2 m, limestone, grey, competent				AR						
13.1		Becoming fractured beyond 13.1 m										
14.4		Increasing return of water										
15												
18.2		Borehole terminated at 18.2 m in shaley limestone										

6

Printed: 14 Feb 00



A049301
17 68452E
4946156N

A049302
17 683437E
4946147N

Abandonned
17 683412E
4946141N

SOMERVILLE LANDFILL SITE	Scale 1 : 2000	Date NOVEMBER 2000
		Figure 1

MW15

Ontario Ministry of the Environment

Well Tag Number **A 049301**
A049301

Well Record

Regulation 903 Ontario Water Resources Act

page 1 of 1

Instructions for Completing Form

- For use in the Province of Ontario only. This document is a permanent legal document. Please retain for future reference.
- All Sections must be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Help Desk (Toll Free) at 1-888-396-9355.
- All metre measurements shall be reported to 1/10th of a metre.
- Please print clearly in blue or black ink only.

Ministry Use Only

MUN ☐☐☐☐☐ CON ☐☐☐☐☐☐☐☐☐☐ LOT ☐☐☐

Well Owner's Information and Location of Well Information

First Name / Last Name: City of Kawartha Lakes

Mailing Address (Street Number/Name, RR,Lot,Concession): 50 Wolfe St.

County/District/Municipality:

Township/City/Town/Village: Lindsay

Province: Ontario

Postal Code: K9V 2J2

Telephone Number (include area code):

Address of Well Location (County/District/Municipality): Somerville Landfill

Township: Somerville

Lot: 13

Concession: 3

RR#/Street Number/Name: 381 Ledgehill Road

City/Town/Village: Kawartha Lakes

Site/Compartment/Block/Tract etc.:

GPS Reading: NAD 83 Zone 17 Easting 683452 Northing 4946156

Unit Make/Model: Magellan

Mode of Operation: ☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth Metres From	Depth Metres To
Black, Brown	Peat	organics	moist	0	0.07
Brown	~~[illegible]~~ Silt	limestone cobble, sand, gravel	moist, sandy silt	0.07	1.52
	Bedrock - Limestone		shaley limestone	1.52	8.88

Hole Diameter

Depth Metres From	Depth Metres To	Diameter Centimetres
0	8.88	20

Water Record

Water found at ___ Metres / Kind of Water

___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:

___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:

___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:

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

Chlorinated ☐ Yes ☒ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth Metres From	Depth Metres To
Casing				
5.0	☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete ☐ Galvanized	.4	+0.3	5.84
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam 6.1	☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete ☐ Galvanized	Slot No. 010	5.84	8.88
No Casing or Screen				
	☐ Open hole			

Test of Well Yield

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

Plugging and Sealing Record

☒ Annular space ☐ Abandonment

Depth set at - Metres From	Depth set at - Metres To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	0.3	Cement	
0.3	4.7	Bentonite	
4.7	8.88	Sand	

Location of Well

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

- See attached

Method of Construction

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

Water Use

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

Final Status of Well

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

Audit No. **Z 73954**

Date Well Completed (YYYY MM DD): 2006 12 06

Was the well owner's information package delivered? ☐ Yes ☒ No

Date Delivered YYYY MM DD

Well Contractor/Technician Information

Name of Well Contractor: All-Terrain Drilling Ltd.

Well Contractor's Licence No.: 1128

Business Address (street name, number, city etc.): 3-661 Colby Drive Waterloo, ON N2V 1C2

Name of Well Technician (last name, first name): Grant, Don Pollice, Mike

Well Technician's Licence No.: 268

Signature of Technician/Contractor: X

Date Submitted (YYYY MM DD): 2007 01 12

Ministry Use Only

Data Source

Contractor

Date Received YYYY MM DD

Date of Inspection YYYY MM DD

Remarks

Well Record Number

0506E (03/2006)

Well Owner's Copy

Cette formule est disponible en français

MW15

A049307

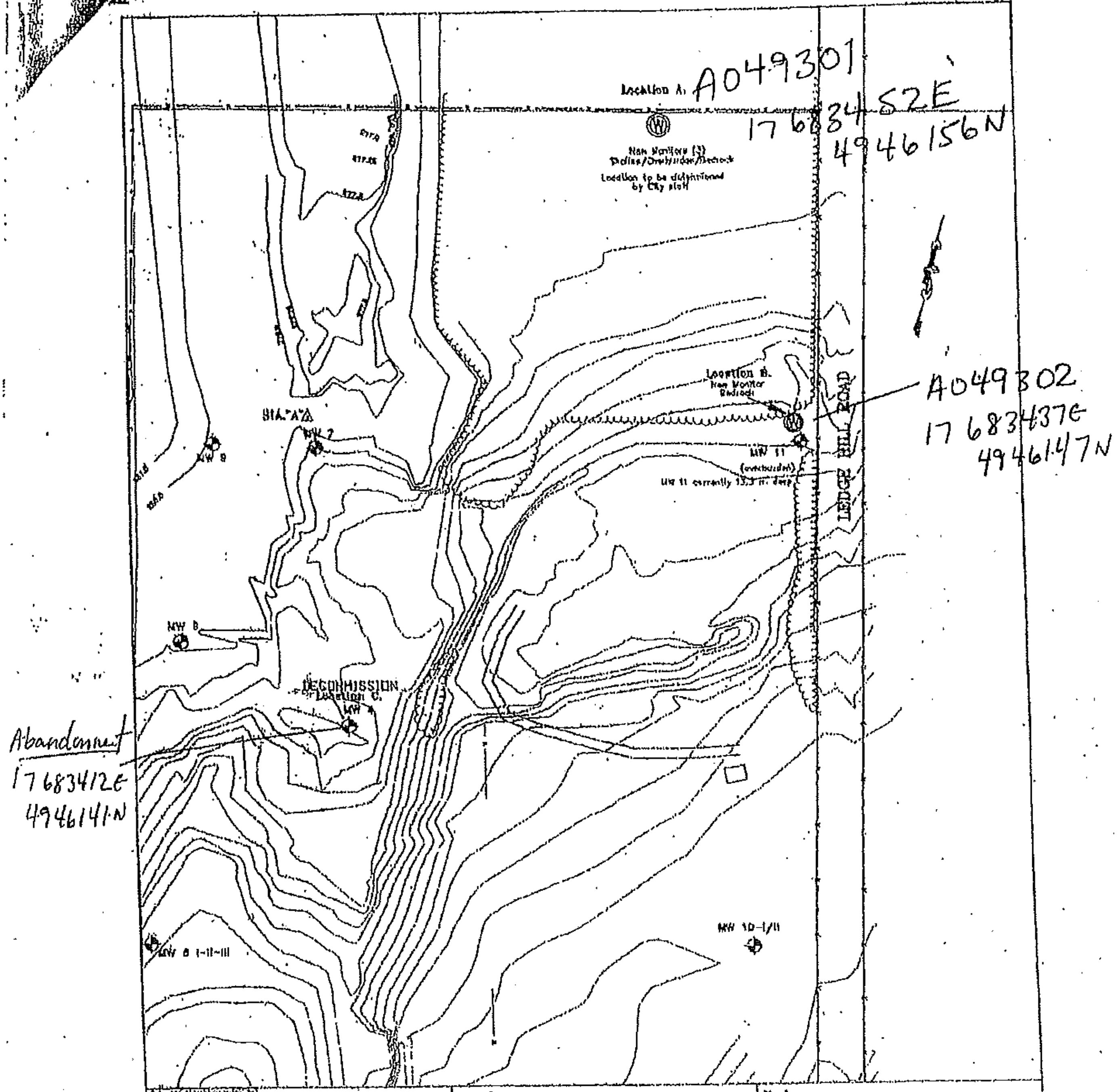
BOREHOLE LOG | **PROJECT:** [illegible] | **BOREHOLE:** A

Hydrogeological Investigations
~~[illegible] Landfill~~ / SOMERVILLE LANDFILL
FORT / County of Victoria

DATE: [illegible]
GEOLOGIST: ALL[illegible]
ELEVATION:

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITORING DETAILS & NUMBER	SAMPLE NUMBER	INTERVAL	TYPE	N VALUE	WATER	% REC	ROD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
0.07		PEAT ORGANICS, MOIST, BLACK, BROWN		1		SS	86		80			
		LIMESTONE COBBLES, Sandy silt, some gravel, BROWN Moist										
1.52				2		SS	dns		25			
		assumed bedrock at 1.5m Limestone				AR						
		[illegible] D at 8.5m [illegible] limestone										

[illegible] Feb 00



SOMERVILLE LANDFILL SITE

Scale: 1 : 2000

Date: NOVEMBER 2006

Figure 1

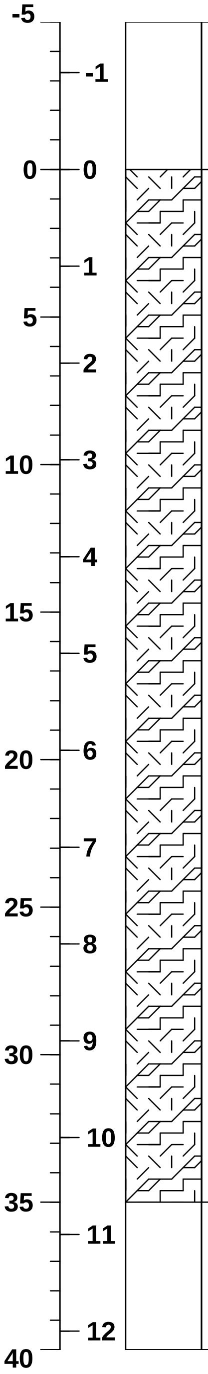
Peterborough
Barrie
Oshawa
T: 866-217-7900
www.cambium-inc.com

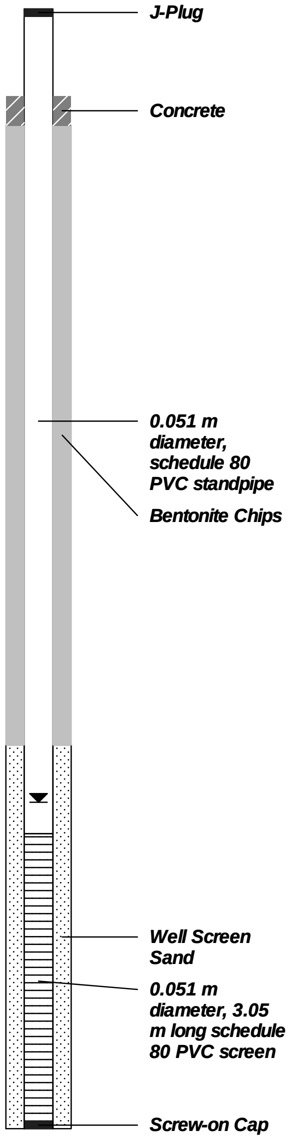
Log of Borehole: MW 17

Page 1 of 1

Client: City of Kawartha Lakes
Project Name: Installation of Monitoring Wells
Project No.: 5210-001
Contractor: Canadian Environmental Drilling
Method: 8' Hollow Stem
Date Completed: September 16, 201
Location: Somerville WDS
UTM: ____________
Top of Pipe Elevation: _________

SUBSURFACE PROFILE			SAMPLE				
(ft) Depth (m)	Lithology	Description	Number	Type	% Recovery	Well Installation	Remarks
0 / 0		Refuse: Waste					Well installed with lockable casing and sample tubing
							Water level = 7.30 mBGS (8.20 mTOP) on Oct 12, 2016
		Borehole terminated at 10.77 mBGS in waste					Well depth = 10.67 mBGS (11.62 mTOP)





Logged By: Cameron M.
Input By: Cameron M.

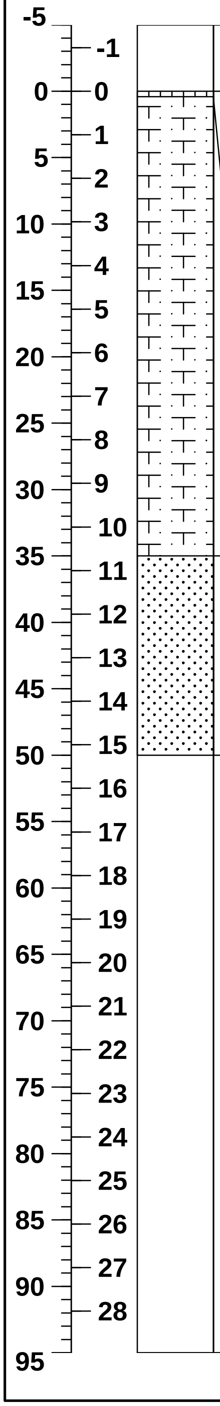
CAMBIUM
Peterborough
Barrie
Oshawa
T: 866-217-7900
www.cambium-inc.com

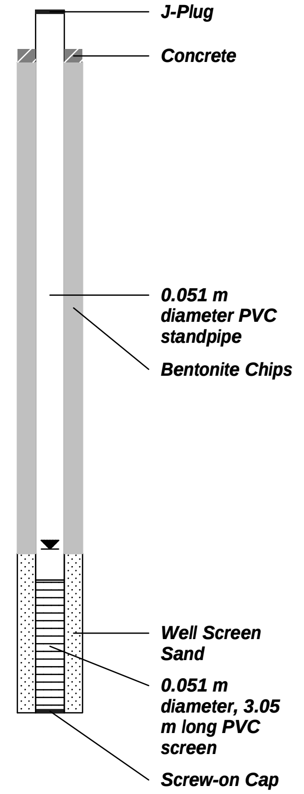
Log of Borehole: MW 16-III

Page 1 of 1

Client: City of Kawartha Lakes
Project Name: Installation of Monitoring Wells
Project No.: 5210-001
Contractor: Canadian Environmental Drilling
Method: 8' Hollow Stem and 4.5' Air Hammer
Date Completed: September 7, 2016
Location: Somerville WDS
UTM: ____________
Top of Pipe Elevation: _________

SUBSURFACE PROFILE	SAMPLE		
Description	Number	Type	% Recovery
Fill: Brown fine to medium sand, dry, loose (Fill)	1	SS	83
	2	SS	75
	3	SS	83
	4	SS	83
Silty Sand: Grey silty fine sand, dry, stiff to dense, sporadic broken cobbles Note: Tri-cone was used after 7.62 mBGS for borehole advancement until bedrock	5	SS	92
	6	SS	100
	7	SS	100
	8	SS	38
	9	SS	46
Fine Sand: Grey fine sand, some silt/clay, very dense, some moisture	10	SS	21
Borehole terminated at 15.24 mBGS in fine sand			





Remarks

Well installed with lockable casing and sample tubing

Water Level = 11.485 mBGS (12.385 mTOP) on Oct 12, 2016

Well depth = 15.24 mBGS (16.15 mTOP)

Logged By: Cameron M. ***Input By:*** Cameron M.

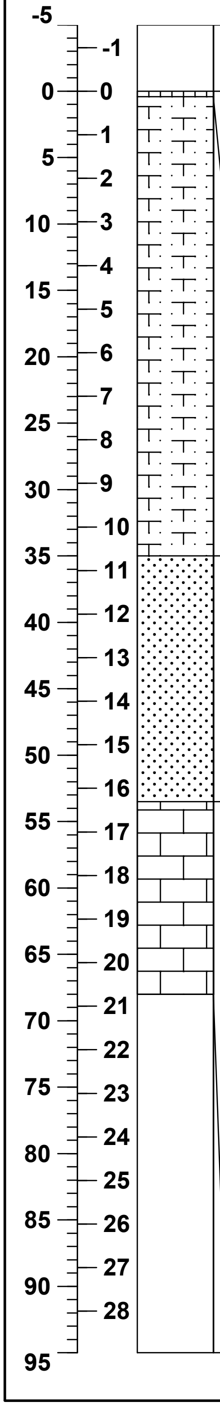
Peterborough
Barrie
Oshawa
T: 866-217-7900
www.cambium-inc.com

Log of Borehole: MW 16-II

Page 1 of 1

Client: City of Kawartha Lakes
Project Name: Installation of Monitoring Wells
Project No.: 5210-001
Contractor: Canadian Environmental Drilling
Method: 8' Hollow Stem and 4.5' Air Hammer
Date Completed: Sep 12, 2016
Location: Somerville WDS
UTM: ____________
Elevation: _________

SUBSURFACE PROFILE



Description

Fill: Brown fine to medium sand, loose, dry
(Fill)

Silty Sand: Grey silty fine sand, stiff to dense, sporadic broken cobbles, dry

Note: Tri-cone was used after 7.62 mBGS for borehole advancement until bedrock

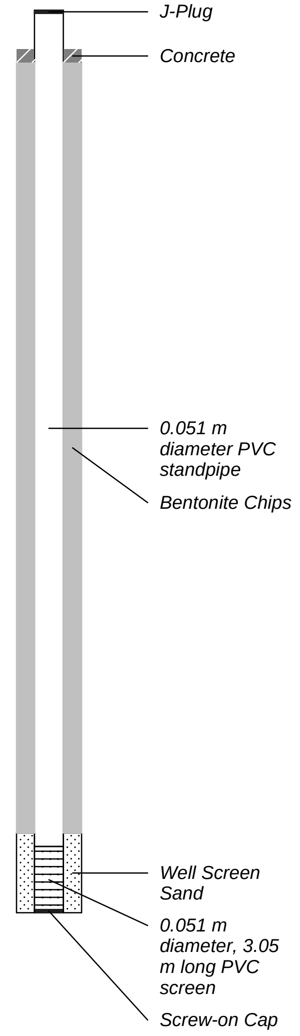
Fine Sand: Grey fine sand, some silt/clay, very dense, some moisture

Limestone: Limestone (Mudstone) Bedrock encountered at 16.1 at mBGS
Upper Kirkfield Fm (Upper Bobcaygeon Fm). Crystaline very fine mudstone, thin noddular bedded, clay seems every couple inches, calcite and iron scale on wethered surfaces, black specs on core suggesting period of lesser deposition. Borehole terminated at 24.54 mBGS

SAMPLE

Number	Type	% Recovery	SPT (n)/RQD
1	SS	83	10
2	SS	75	19
3	SS	83	24
4	SS	83	33
5	SS	92	35
6	SS	100	46
7	SS	100	64
8	SS	38	>100
9	SS	46	96
10	SS	21	>100
11	HQ	100	Very Poor
12	HQ	52	Very Poor
13	HQ	72	Fair
14	HQ	95	Poor

Well Installation



Remarks

Well installed with lockable casing and sample tubing

Well did not intercept a water bearing formation.

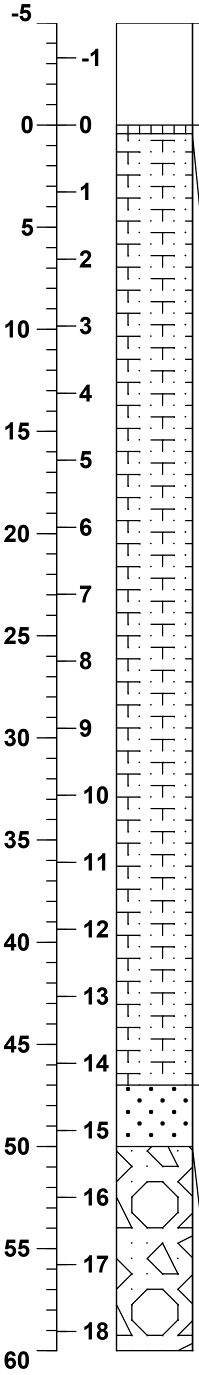
Logged By: Cameron M. ***Input By:*** Cameron M.

Peterborough
Barrie
Oshawa
T: 866-217-7900
www.cambium-inc.com

Log of Borehole: MW 16-I

Client: City of Kawartha Lakes
Contractor: Canadian Environmental Drilling
Location: Somerville WDS
Project Name: Installation of Monitoring Wells
Method: 8' Hollow Stem and 4.5' Air Hammer
UTM: ____________
Project No.: 5210-001
Date Completed: Sep 13, 2016
Elevation: _________

SUBSURFACE PROFILE

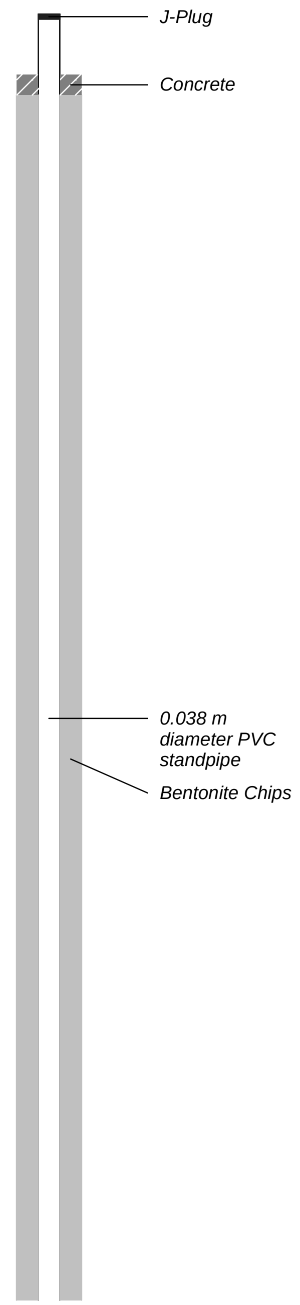


Description
Fill: Brown fine to medium sand, dry, loose (Fill)
Silty Sand: grey fine to very fine silty sand, trace coarse sand, fining down, very stiff, disturbed cross bedding evident of dewatered post deposition, rip-ups eveident which could increase vertical conductivity.
Sand: Soft grey / brown medium to fine sandwith trace rounded cobbles at depth.
Till: Till, dark grey, fine sand with trace coarse sand and angular gravel, very dense,

SAMPLE

Number	Type	% Recovery	SPT (n)/RQD
1	SS	83	10
2	SS	75	19
3	SS	83	24
4	SS	83	33
5	SS	92	35
6	SS	100	46
7	SS	100	64
8	SS	38	>100
9	SS	46	96
10	SS	21	>100
11	HQ	100	Very Poor
12	HQ	52	Very Poor

Well Installation



Remarks

Well installed with lockable casing and sample tubing

Logged By: Mike B.
Input By: Cameron M.

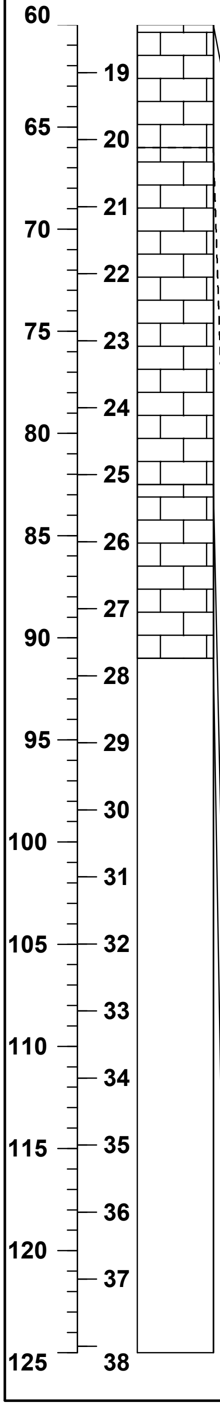
CAMBIUM

Peterborough
Barrie
Oshawa
T: 866-217-7900
www.cambium-inc.com

Log of Borehole: MW 16-I

Client: City of Kawartha Lakes
Project Name: Installation of Monitoring Wells
Project No.: 5210-001
Contractor: Canadian Environmental Drilling
Method: 8' Hollow Stem and 4.5' Air Hammer
Date Completed: Sep 13, 2016
Location: Somerville WDS
UTM: ____________
Elevation: _________

SUBSURFACE PROFILE



Description

moist.

Limestone: Limestone (Mudtsone) encountered at 18.29 mBGS. Upper Kirkfield Fm. (Upper Bobcaygeon Fm). Crystaline very fine mudstone, thin noddular bedded, clay seams every couple inches, calcite and iron scale on weathered surfaces, black specs on core suggesting period of lesser deposition.

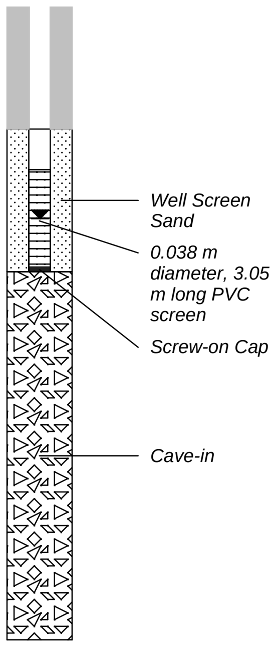
Limestone: (Argillaceous Limestone) Lower Kirkfield Fm. (Middle Bobcaygeon) [Gradational Contact]. Thin to medium bedded fine grainstone with coarser chrinoidal debris interbedded, voids and vugs from 20.73 to 23.84 m, drops from 0.02 to 0.10 m common. Increasingly competent with depth below 23.84 m with better core recovery, calcite vugs and bioturbation evident.

Limestone: Coboconk Fm (Lower Bobcaygeon). medium bedded, very fine grained bioclastic limestone, thin shaley partings, sutured styloseams, buff tan colour, calcite filled burrows, trace pyrite. no weathering evident.

SAMPLE

Number	Type	% Recovery	SPT (n)/RQD
13	HQ	72	Fair
14	HQ	95	Poor
15	HQ	92	Fair
16	HQ	47	Poor
17	HQ	55	Fair
18	HQ	81	Good
19	HQ	100	Excellent
20	HQ	98	Excellent

Well Installation



Remarks

Water level = 21.47 mBGS (22.38 mTOP) on Oct 12, 2016

Well depth = 22.26 mBGS (23.17 mTOP)

Logged By: Mike B.
Input By: Cameron M.

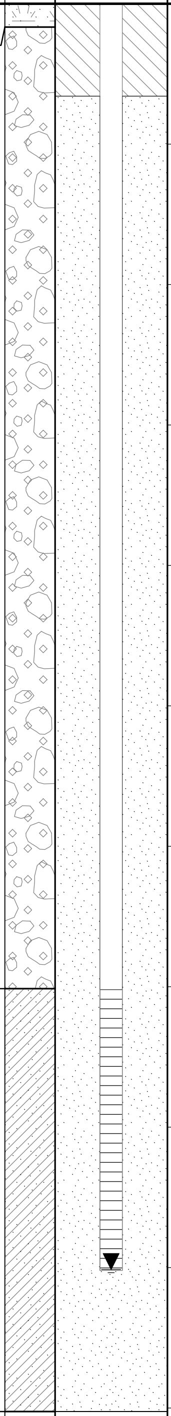
BOREHOLE NO. GP1

PAGE 1 of 1

PROJECT NAME: CITY OF KAWARTHA LAKES - SOMERVILLE LANDFILL
PROJECT NO.: 171-00763-00
CLIENT: CITY OF KAWARTHA LAKES
DATE COMPLETED: Jan 27, 2017
BOREHOLE TYPE: DIRECT PUSH/ 210 mm DIA. AIR ROTARY METHOD
SUPERVISOR: TB
GROUND ELEVATION: NOT SURVEYED
REVIEWER: JSA

CONE PENETRATION
"N" VALUE 10 20 30
SHEAR STRENGTH 50 100 150 200
Intact (MaX) Cu
Remoulded Cu
WATER CONTENT % 10 20 30
WP WL

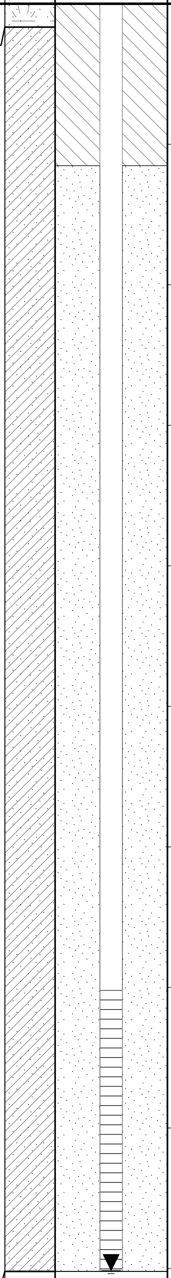
UTM CO-ORDINATES
UTM Zone: NAD:
Easting:
Northing:


STRATIGRAPHY
MONITOR DETAILS

DEPTH (m)	ELEV (mASL)	STRATIGRAPHIC DESCRIPTION	SAMPLE TYPE	N VALUE	% WATER	% RECOVERY	PID/TOV (ppm)	REMARKS
0.0		**TOPSOIL** Dark brown TOPSOIL.						Monitor completed as gas probe with PVC slip cap with 1/4" sampling port. Gas probe installed with 50 mm inner diameter, schedule 40 PVC risers, with a 3.05 m length No. 10 screen size well screen installed at the water table (13.7 m below ground surface).
0.3		**SAND AND GRAVEL** Brown to light brown SAND AND GRAVEL, some to trace silt, occasional cobbles noted, moist	DP1					
1.0								
2.0			DP2					
3.0								
4.0			DP3					
5.0			DP4					
6.0								
7.0			DP5					
8.0			DP6					
9.0								
10.0			DP7					
10.7		**SILTY SAND TILL** Light brown SILTY SAND TILL, some to trace gravel, with cobbles and boulders, moist						
11.0			DP8					
12.0								
13.0			DP9					
14.0		- wet to saturated	DP10					Groundwater encountered at 13.7 m below ground surface during drilling.
15.0								
15.2		Borehole terminated at 15.2 m below ground surface in SILTY SAND TILL.						
16.0								

BOREHOLE NO. GP2

PROJECT NAME: CITY OF KAWARTHA LAKES - SOMERVILLE LANDFILL
PROJECT NO.: 171-00763-00
CLIENT: CITY OF KAWARTHA LAKES
DATE COMPLETED: Jan 31, 2017
BOREHOLE TYPE: DIRECT PUSH/ 210 mm DIA. AIR ROTARY METHOD
SUPERVISOR: TB
GROUND ELEVATION: NOT SURVEYED
REVIEWER: JSA



DEPTH (m)	ELEV (mASL)	STRATIGRAPHIC DESCRIPTION	SAMPLE TYPE	N VALUE	% WATER	% RECOVERY	PID/TOV (ppm)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH 50 100 150 200 (Intact (MaX) Cu, Remoulded Cu)	WATER CONTENT % 10 20 30 (WP WL)	REMARKS
0.0										
0.3		**TOPSOIL** Dark brown TOPSOIL.								Monitor completed as gas probe with PVC slip cap with 1/4" sampling port. Gas probe installed with 50 mm inner diameter, schedule 40 PVC risers, with a 3.05 m length No. 10 screen size well screen installed at the water table (13.7 m below ground surface)
1.0		**SILTY SAND TILL** Brown to light brown SILTY SAND TILL, some to trace gravel, occasional cobbles and boulders noted, moist.	DP1							
2.0			DP2							
3.0										
4.0			DP3							
5.0			DP4							
6.0										
7.0			DP5							
8.0			DP6							
9.0										
10.0			DP7							
11.0			DP8							
12.0										
13.0			DP9							
13.7		- Moist to saturated.								Groundwater encountered at 13.7 m below ground surface during drilling.
14.0		Borehole terminated at 13.7 m below ground surface in SILTY SAND TILL.								
15.0										
16.0										

UTM CO-ORDINATES
UTM Zone: NAD:
Easting:
Northing:

Log of Borehole TH201

Project No. MRK-00256269-A0

Drawing No. 1

Project: City of Kawartha Landfill Sites

Sheet No. 1 of 2

Location: Various Landfill Sites, Kawartha Lakes

Somerville Landfill

Date Drilled: October 15-17, 2018

Drill Type: CME-75 Track Mount

Datum:

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value 20 40 60	Combustible Vapour Reading (ppm) 25 50 75	SAMPLES	% RECOV	SAMPLE ID	ANALYSIS
		Brown **SAND**, some silt, some rootlets from 0 to 0.31 mbgs, moist, no odour, no staining.	295.43	0						
		Brown turning grey at 3.1 mbgs silty **SAND**, trace gravel, trace cobbles below 3.7 mbgs, moist, no odour, no staining.	~293.9							
		Grey sand silt **TILL**, trace cobbles below 9.6 mbgs, moist, no odour, no staining.	~289.3							

Continued Next Page

exp Services Inc.
Markham, Ontario
Telephone: 905.695.3217

Time	Water Level (m)	Depth to Cave (m)

Log of Borehole TH201

Project No. MRK-00256269-A0

Drawing No. 1

Project: City of Kawartha Landfill Sites

Sheet No. 2 of 2

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value 20 40 60	Combustible Vapour Reading (ppm) 25 50 75	SAMPLES	% RECOV	SAMPLE ID	ANALYSIS
			283.43	12						
		Grey clayey silt **TILL**, trace cobbles, moist, no odour, no staining.	~283.2							
				13						
				14						
				15						
		LIMESTONE BEDROCK	~279.9							
				16						
			~279.2							
				17						
		End of Test hole at 16.2 mbgs.								
				18						
				19						
				20						
				21						
				22						
				23						
				24						
				25						
				26						

ENVIRONMENTAL-EXP TESTHOLE LOGS.GPJ 1/17/20

exp Services Inc.
Markham, Ontario
Telephone: 905.695.3217

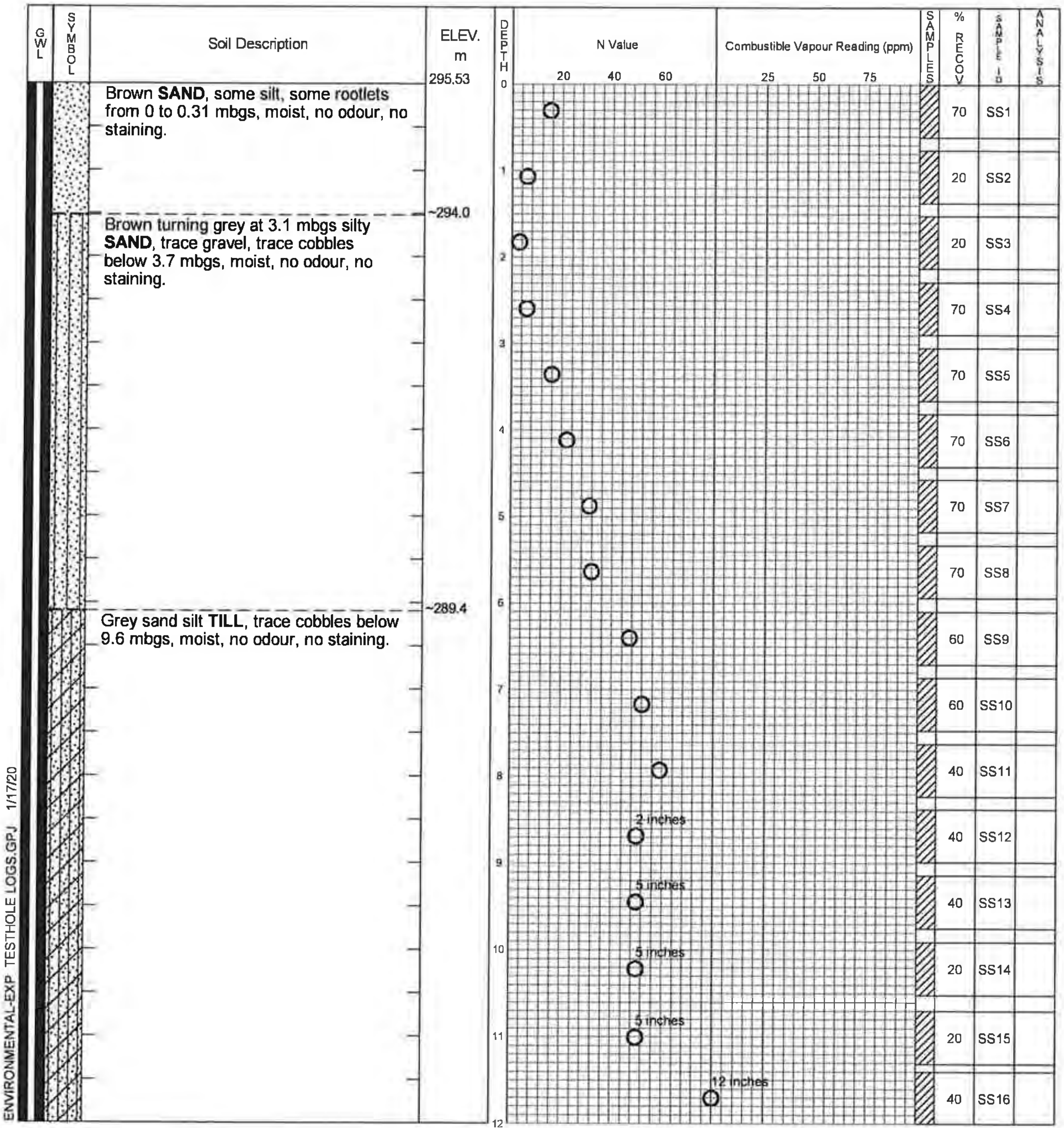
Time	Water Level (m)	Depth to Cave (m)

Log of Borehole TH201D

Project No. MRK-00256269-A0
Drawing No. 2
Project: City of Kawartha Landfill Sites
Sheet No. 1 of 3
Location: Various Landfill Sites, Kawartha Lakes
Somerville Landfill
Date Drilled: October 17-18 2019
Drill Type: CME-75 Track Mount
Datum:

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		



Soil Description	ELEV. m
	295.53
Brown **SAND**, some silt, some rootlets from 0 to 0.31 mbgs, moist, no odour, no staining.	
Brown turning grey at 3.1 mbgs silty **SAND**, trace gravel, trace cobbles below 3.7 mbgs, moist, no odour, no staining.	~294.0
Grey sand silt **TILL**, trace cobbles below 9.6 mbgs, moist, no odour, no staining.	~289.4

% RECOV	SAMPLE ID	ANALYSIS
70	SS1	
20	SS2	
20	SS3	
70	SS4	
70	SS5	
70	SS6	
70	SS7	
70	SS8	
60	SS9	
60	SS10	
40	SS11	
40	SS12	
40	SS13	
20	SS14	
20	SS15	
40	SS16	

Continued Next Page

exp Services Inc.
Markham, Ontario
Telephone: 905.695.3217

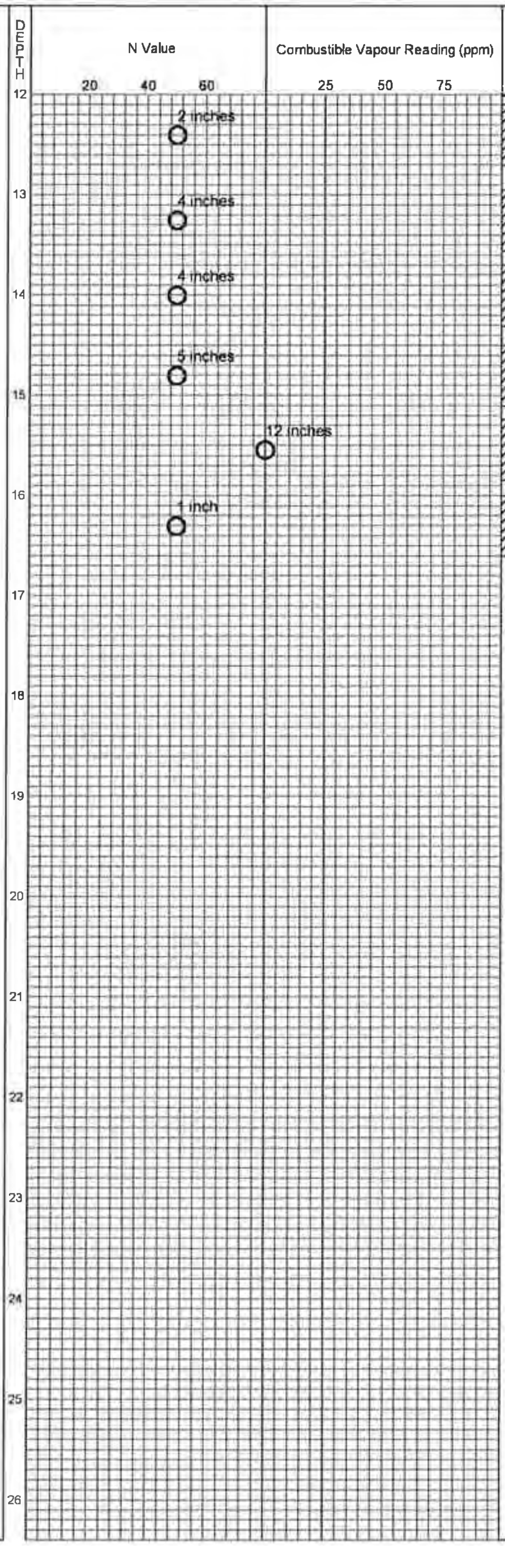
Time	Water Level (m)	Depth to Cave (m)

Log of Borehole TH201D

Project No. MRK-00256269-A0 | Drawing No. 2

Project: City of Kawartha Landfill Sites | Sheet No. 2 of 3

GWL	SYMBOL	Soil Description	ELEV. m
			283.53
		Grey clayey silt **TILL**, trace cobbles, moist, no odour, no staining.	~283.3
		LIMESTONE BEDROCK	~280.0
			~270.2



SAMPLES	% RECOV	SAMPLE ID	ANALYSIS
▨	10	SS17	
▨	20	SS18	
▨	30	SS19	
▨	20	SS20	
▨	30	SS21	
▨	10	SS22	

Continued Next Page

Time	Water Level (m)	Depth to Cave (m)

Log of Borehole TH201D

Project No. MRK-00256269-A0

Drawing No. 2

Project: City of Kawartha Landfill Sites

Sheet No. 3 of 3

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value 20 40 60	Combustible Vapour Reading (ppm) 25 50 75	SAMPLES	% RECOV	SAMPLE ID	ANALYSIS
			269.13							
		End of Test hole at 25.3 mbgs.		27						
				28						
				29						
				30						
				31						
				32						
				33						
				34						
				35						
				36						
				37						
				38						
				39						
				40						

exp Services Inc.
Markham, Ontario
Telephone: 905.695.3217

Time	Water Level (m)	Depth to Cave (m)

ROCK CORE LOG

BH TH 201-D

PROJECT City of Kawartha, RFQ	**ORIENTATION** Vertical	**ELEVATION (m)** 295.5	**DATUM** Geodetic	**PROJECT NUMBER** MRK00256269-A0
LOCATION Sommerville Landfill, Kawartha Lakes, Ontario	**DATE STARTED** 10/17/19	**COMPLETED** 10/18/19	**LOGGED BY** AM	**DRAWING NUMBER** 2A
CLIENT City of Karartha Lakes	**DRILLER** Pontil	**DRILL TYPE** CME 75 Track	**CORE BARREL** HQ	**SHEET** 1 of 2

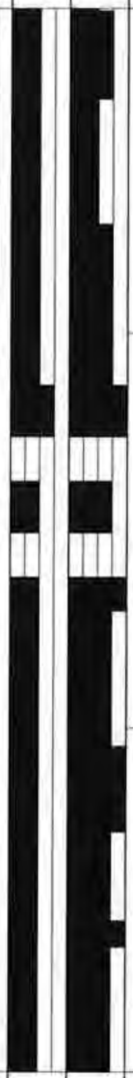
ELEVATION (m)	DEPTH (m)	SYMBOL	GENERAL DESCRIPTION	JOINT CHARACTERISTICS NO. OF SETS	JOINT TYPE	ORIENTATION	SPACING	ROUGHNESS	FILLING	APERTURE (mm)	WEATHERING	STRENGTH	FRACTURE FREQUENCY	RUN NUMBER	RECOVERY (%)	RQD	WATER RECOVERY (%)	WATER COLOUR
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
279.2 279.1			- RUBBLE ZONE	1	B	F	VC C	RU	T	0				1	73	0	N/A	Beige
			BOBCAYGEON FORMATION Fossiliferous Limestone Brown to grey-brown crinoidal limestone with calcarenites and nodular texture. Generally unweathered with the exception of RUN 1 and RUN 3, becomes increasingly laminated a 2-3 meters depth from bedrock surface, moderate strength. Discontinuities: Low recovery noted in RUN 1 possibly due to the rubble zone at the till-bedrock interface. Voids noted in RUN 8, while coring the drill string dropped abruptly between 22.96 and 23.50 m depth. Bedding joints are rough undulating, flat and at wide to close intervals; rough undulating vertical joints at 17.47, 19.31, 21.33, 22.77, 23.16, 23.36 and 24.08 m depth.	1	B	F	W	RU	T	0				2	100	100	N/A	Beige
	17			1 1	B C	F V	C	RU RU	T T	0 0				3	100	60	N/A	Beige
277.8																		
	18																	
	19			1 1	B C	F V	W	RU RU	T T	0 0				4	100	91	N/A	Beige
	20			1	B	F	W C	RU	T	0				5	100	71	N/A	Beige
	21			1	B	F	C W	RU	T	0				6	100	64	N/A	Beige

ROCK CORE LOG

BH TH 201-D

PROJECT City of Kawartha, RFQ	**ORIENTATION** Vertical	**ELEVATION (m)** 295.5	**DATUM** Geodetic	**PROJECT NUMBER** MRK00256269-A0
LOCATION Sommerville Landfill, Kawartha Lakes, Ontario	**DATE STARTED** 10/17/19	**COMPLETED** 10/18/19	**LOGGED BY** AM	**DRAWING NUMBER** 2A
CLIENT City of Karartha Lakes	**DRILLER** Pontil	**DRILL TYPE** CME 75 Track	**CORE BARREL** HQ	**SHEET** 2 of 2

ELEVATION (m) 1	DEPTH (m) 2	SYMBOL 3	GENERAL DESCRIPTION 4	JOINT CHARACTERISTICS NO. OF SETS 5	JOINT TYPE 6	ORIENTATION 7	SPACING 8	ROUGHNESS 9	FILLING 10	APERTURE (mm) 11	WEATHERING 12	STRENGTH 13	FRACTURE FREQUENCY 14	RUN NUMBER 15	RECOVERY (%) 16	RQD 17	WATER RECOVERY (%) 18	WATER COLOUR 19
														7	100	70	N/A	Beige
	22			1	C	V		RU	T	0								
273.0																		
272.8																		
272.6	23		- VOID															
272.4																		
272.2			- VOID	1 1	B C	F V	C	RU RU	T T	0 0				8	73	0	N/A	Beige
272.0																		
	24																	
271.4																		
				1 1	B C	F V	C	RU RU	T T	0 0				9	100	0	N/A	Beige
	25																	
270.1			End of Borehole at 25.4 m															
	26																	



EXP_ROCKCORE KAWARTHA LAKES ROCK CORE LOGS.GPJ CORE_LOG.GDT 1/16/20

exp.

Log of Borehole TH202

Project No. MRK-00256269-A0

Project: City of Kawartha Landfill Sites

Location: Various Landfill Sites, Kawartha Lakes

Somerville Landfill

Date Drilled: October 22-23, 2019

Drill Type: CME-75 Track Mount

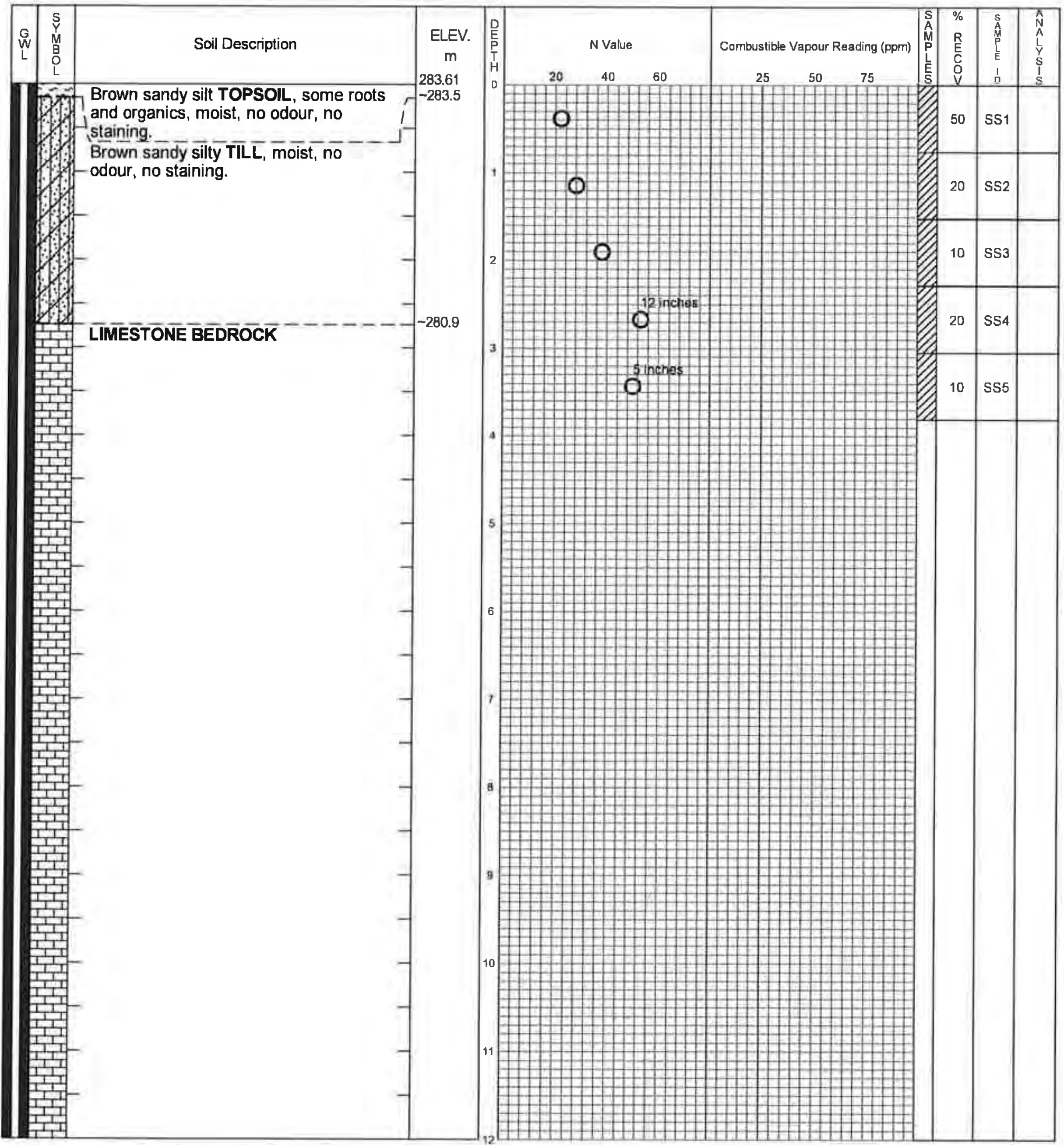
Datum:

Drawing No. 3

Sheet No. 1 of 2

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		



ELEV. m	Soil Description
283.61	
~283.5	Brown sandy silt **TOPSOIL**, some roots and organics, moist, no odour, no staining.
	Brown sandy silty **TILL**, moist, no odour, no staining.
~280.9	**LIMESTONE BEDROCK**

SAMPLES	% RECOV	SAMPLE ID	ANALYSIS
▨	50	SS1	
▨	20	SS2	
▨	10	SS3	
▨	20	SS4	
▨	10	SS5	

Continued Next Page

ENVIRONMENTAL-EXP TESTHOLE LOGS.GPJ 1/17/20

exp Services Inc.
Markham, Ontario
Telephone: 905.695.3217

Time	Water Level (m)	Depth to Cave (m)

Log of Borehole TH202

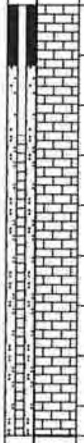
Project No. MRK-00256269-A0

Drawing No. 3

Project: City of Kawartha Landfill Sites

Sheet No. 2 of 2

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value 20 40 60	Combustible Vapour Reading (ppm) 25 50 75	SAMPLES	% RECOV	SAMPLE ID	ANALYSIS
			271.61	12						
				13						
				14						
				15						
				16						
			~267.3							
				17						
		End of Test hole at 16.3 mbgs.								
				18						
				19						
				20						
				21						
				22						
				23						
				24						
				25						
				26						



exp Services Inc.
Markham, Ontario
Telephone: 905.695.3217

Time	Water Level (m)	Depth to Cave (m)

ROCK CORE LOG

BH TH 202

PROJECT City of Kawartha, RFQ	**ORIENTATION** Vertical	**ELEVATION (m)** 283.6	**DATUM** Geodetic	**PROJECT NUMBER** MRK00256269-A0
LOCATION Sommerville Landfill, Kawartha Lakes, Ontario	**DATE STARTED** 10/22/19	**COMPLETED** 10/23/19	**LOGGED BY** AM	**DRAWING NUMBER** 3A
CLIENT City of Karartha Lakes	**DRILLER** Pontil	**DRILL TYPE** CME 75 Track	**CORE BARREL** HQ	**SHEET** 1 of 2

				JOINT CHARACTERISTICS														
ELEVATION (m) 1	DEPTH (m) 2	SYMBOL 3	GENERAL DESCRIPTION 4	NO. OF SETS 5	JOINT TYPE 6	ORIENTATION 7	SPACING 8	ROUGHNESS 9	FILLING 10	APERTURE (mm) 11	WEATHERING 12	STRENGTH 13	FRACTURE FREQUENCY 14	RUN NUMBER 15	RECOVERY (%) 16	RQD 17	WATER RECOVERY (%) 18	WATER COLOUR 19
276.5			**BOBCAYGEON FORMATION** Fossiliferous Limestone Brown to grey-brown crinoidal limestone with calcarenites and nodular texture. Generally unweathered with the exception of RUN 1, becomes increasingly laminated a 2-3 meters depth from bedrock surface, moderate strength. Discontinuities: Low recovery due to numerous voids noted between RUNS 2, 3 and 4. bedding joints are rough undulating, flat and at wide to very close intervals; rough undulating vertical joints at 7.83, 8.00, 8.54, 12.95, 15.85, 16.06 and 16.25m depth.	1 1	B C	F V	W C	RU RU	T T	0 0				1	100	69	N/A	Beige
	8																	
				1 1	B C	F V	C	RU RU	T T	 0				2	83	58	N/A	Beige
	9																	
	10																	
				1	B	F	W C	RU	T	0				3	90	75	N/A	Beige
	11																	
				1	B	F	C W	RU	T	0				4	82	73	N/A	Beige
	12																	

ROCK CORE LOG

BH TH 202

PROJECT City of Kawartha, RFQ	**ORIENTATION** Vertical	**ELEVATION (m)** 283.6	**DATUM** Geodetic	**PROJECT NUMBER** MRK00256269-A0
LOCATION Sommerville Landfill, Kawartha Lakes, Ontario	**DATE STARTED** 10/22/19	**COMPLETED** 10/23/19	**LOGGED BY** AM	**DRAWING NUMBER** 3A
CLIENT City of Karartha Lakes	**DRILLER** Pontil	**DRILL TYPE** CME 75 Track	**CORE BARREL** HQ	**SHEET** 2 of 2

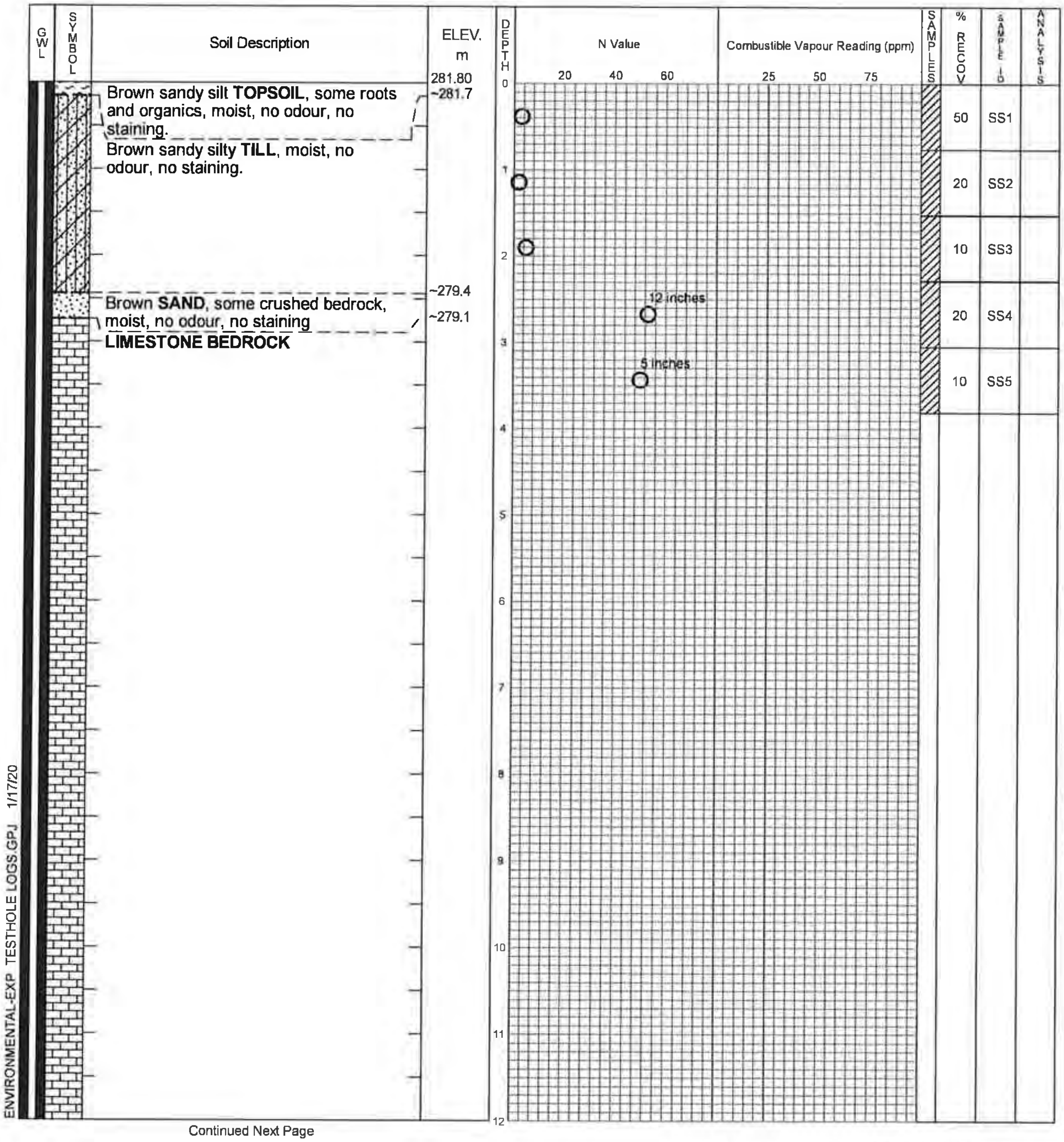
ELEVATION (m)	DEPTH (m)	SYMBOL	GENERAL DESCRIPTION	JOINT CHARACTERISTICS							WEATHERING	STRENGTH	FRACTURE FREQUENCY	RUN NUMBER	RECOVERY (%)	RQD	WATER RECOVERY (%)	WATER COLOUR
				NO. OF SETS	JOINT TYPE	ORIENTATION	SPACING	ROUGHNESS	FILLING	APERTURE (mm)								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	13			1 1	B C	F V	C W	RU RU	T T	0 0				5	100	98	N/A	Beige
	14			1	B	F	C W	RU	T	0				6	100	87	N/A	Beige
	15																	
	16			1 1	B C	F V	W C	RU RU	T T	0 0				7	100	60	N/A	Beige
266.8			End of Borehole at 16.8 m															
	17																	

Log of Borehole TH203

Project No.	MRK-00256269-A0	Drawing No.	4
Project:	City of Kawartha Landfill Sites	Sheet No.	1 of 2
Location:	Various Landfill Sites, Kawartha Lakes Somerville Landfill		
Date Drilled:	October 23-24, 2019		
Drill Type:	CME-75 Track Mount		
Datum:			

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		



Soil Description	ELEV. m
	281.80
Brown sandy silt **TOPSOIL**, some roots and organics, moist, no odour, no staining.	~281.7
Brown sandy silty **TILL**, moist, no odour, no staining.	~279.4
Brown **SAND**, some crushed bedrock, moist, no odour, no staining	~279.1
LIMESTONE BEDROCK	

% RECOV	SAMPLE ID	ANALYSIS
50	SS1	
20	SS2	
10	SS3	
20	SS4	
10	SS5	

Continued Next Page

Time	Water Level (m)	Depth to Cave (m)

exp Services Inc.
Markham, Ontario
Telephone: 905.695.3217

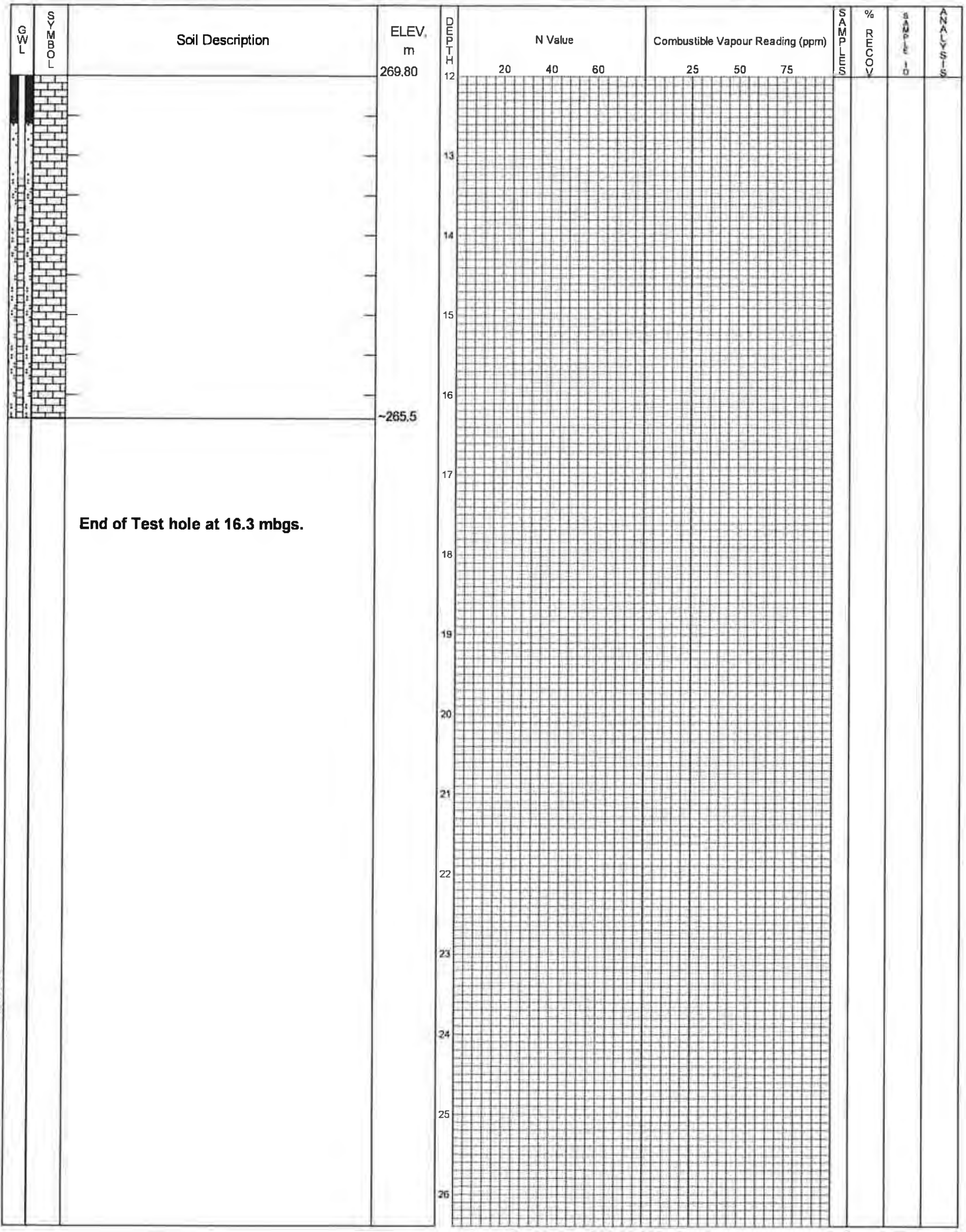
Log of Borehole TH203

Project No. MRK-00256269-A0

Drawing No. 4

Project: City of Kawartha Landfill Sites

Sheet No. 2 of 2



End of Test hole at 16.3 mbgs.

ENVIRONMENTAL-EXP TESTHOLE LOGS.GPJ 1/17/20

exp Services Inc.
Markham, Ontario
Telephone: 905.695.3217

Time	Water Level (m)	Depth to Cave (m)

ROCK CORE LOG

BH TH 203

PROJECT City of Kawartha, RFQ	**ORIENTATION** Vertical	**ELEVATION (m)** 281.8	**DATUM** Geodetic	**PROJECT NUMBER** MRK00256269-A0
LOCATION Sommerville Landfill, Kawartha Lakes, Ontario	**DATE STARTED** 10/23/19	**COMPLETED** 10/24/19	**LOGGED BY** AM	**DRAWING NUMBER** 4A
CLIENT City of Karartha Lakes	**DRILLER** Pontil	**DRILL TYPE** CME 75 Track	**CORE BARREL** HQ	**SHEET** 1 of 2

				JOINT CHARACTERISTICS														
ELEVATION (m)	DEPTH (m)	SYMBOL	GENERAL DESCRIPTION	NO. OF SETS	JOINT TYPE	ORIENTATION	SPACING	ROUGHNESS	FILLING	APERTURE (mm)	WEATHERING	STRENGTH	FRACTURE FREQUENCY	RUN NUMBER	RECOVERY (%)	RQD	WATER RECOVERY (%)	WATER COLOUR
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
274.6			**BOBCAYGEON FORMATION** Fossiliferous Limestone Brown to grey-brown crinoidal limestone with calcarenites and nodular texture. Generally unweathered, becomes increasingly laminated a 2-3 meters depth from bedrock surface, moderate strength. Discontinuities: Poor recovery in RUN 1 possibly due weak material being washed away at the bedrock-till interface. bedding joints are rough undulating, flat and at wide to very close intervals; rough undulating vertical joint at 10.34 m depth.	1	B	F	C C	RU	T	0				1	40	0	N/A	Beige
	8																	
				1	B	F	C W	RU	T	0				2	100	78	N/A	Beige
	9																	
	10			1	B	F	C	RU	T	0				3	100	58	N/A	Beige
				1	C	V		RU	T	0								
	11																	
				1	B	F	C W	RU	T	0				4	100	51	N/A	Beige
	12																	

ROCK CORE LOG

BH TH 203

PROJECT City of Kawartha, RFQ	**ORIENTATION** Vertical	**ELEVATION (m)** 281.8	**DATUM** Geodetic	**PROJECT NUMBER** MRK00256269-A0
LOCATION Sommerville Landfill, Kawartha Lakes, Ontario	**DATE STARTED** 10/23/19	**COMPLETED** 10/24/19	**LOGGED BY** AM	**DRAWING NUMBER** 4A
CLIENT City of Karartha Lakes	**DRILLER** Pontil	**DRILL TYPE** CME 75 Track	**CORE BARREL** HQ	**SHEET** 2 of 2

				JOINT CHARACTERISTICS														
ELEVATION (m)	DEPTH (m)	SYMBOL	GENERAL DESCRIPTION	NO. OF SETS	JOINT TYPE	ORIENTATION	SPACING	ROUGHNESS	FILLING	APERTURE (mm)	WEATHERING	STRENGTH	FRACTURE FREQUENCY	RUN NUMBER	RECOVERY (%)	RQD	WATER RECOVERY (%)	WATER COLOUR
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	13			1	B	F	C W	RU	T	0				5	100	91	N/A	Beige
	14			1	B	F	W	RU	T	0				6	100	84	N/A	Beige
	15			1	B	F	C	SP RU	T	0				7	100	80	N/A	Beige
265.9	16		End of Borehole at 15.9 m															
	17																	

exp.

Log of Borehole TH204

Project No. MRK-00256269-A0

Drawing No. 5

Project: City of Kawartha Landfill Sites

Sheet No. 1 of 2

Location: Various Landfill Sites, Kawartha Lakes

Somerville Landfill

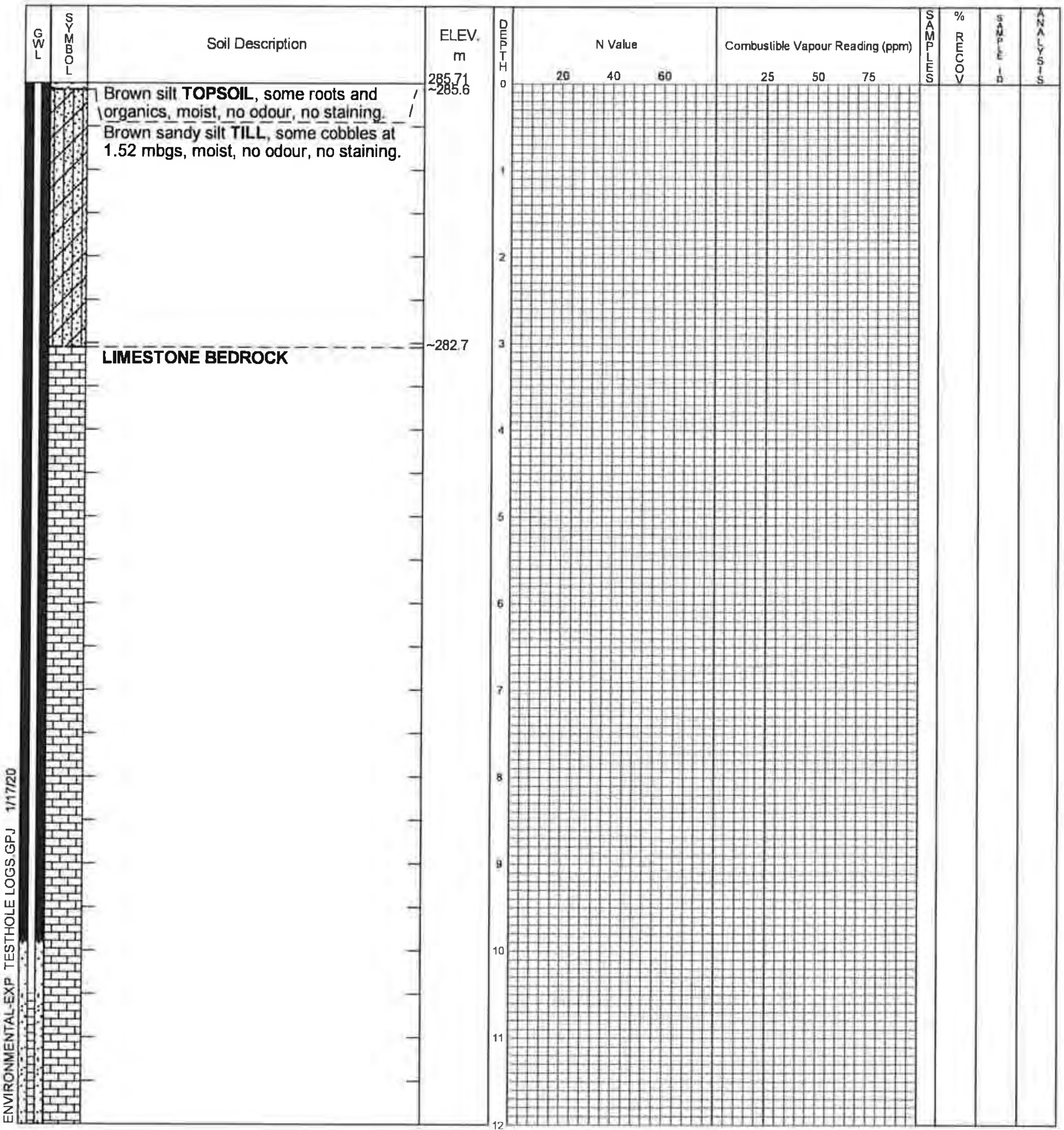
Date Drilled: October 18 and 21, 2019

Drill Type: CME-75 Track Mount

Datum:

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		



285.71

~285.6 Brown silt **TOPSOIL**, some roots and organics, moist, no odour, no staining.

Brown sandy silt **TILL**, some cobbles at 1.52 mbgs, moist, no odour, no staining.

~282.7 **LIMESTONE BEDROCK**

Continued Next Page

Time	Water Level (m)	Depth to Cave (m)

exp Services Inc.
Markham, Ontario
Telephone: 905.695.3217

Log of Borehole TH204

Project No. MRK-00256269-A0
Drawing No. 5
Project: City of Kawartha Landfill Sites
Sheet No. 2 of 2

GWL	SYMBOL	Soil Description	ELEV m	DEPTH	N Value 20 40 60	Combustible Vapour Reading (ppm) 25 50 75	SAMPLES	% RECOV	SAMPLE ID	ANALYSIS
			273.71	12						
				13						
			~272.1							
				14						
		End of Test hole at 13.6 mbgs.								
				15						
				16						
				17						
				18						
				19						
				20						
				21						
				22						
				23						
				24						
				25						
				26						

ENVIRONMENTAL-EXP TESTHOLE LOGS.GPJ 1/17/20

exp Services Inc.
Markham, Ontario
Telephone: 905.695.3217

Time	Water Level (m)	Depth to Cave (m)

ROCK CORE LOG

BH TH 204

PROJECT	ORIENTATION	ELEVATION (m)	DATUM	PROJECT NUMBER
City of Kawartha, RFQ	Vertical	285.7	Geodetic	MRK00256269-A0
LOCATION	**DATE STARTED**	**COMPLETED**	**LOGGED BY**	**DRAWING NUMBER**
Sommerville Landfill, Kawartha Lakes, Ontario	10/18/19	10/21/19	AM	5A
CLIENT	**DRILLER**	**DRILL TYPE**	**CORE BARREL**	**SHEET**
City of Karartha Lakes	Pontil	CME 75 Track	HQ	1 of 2

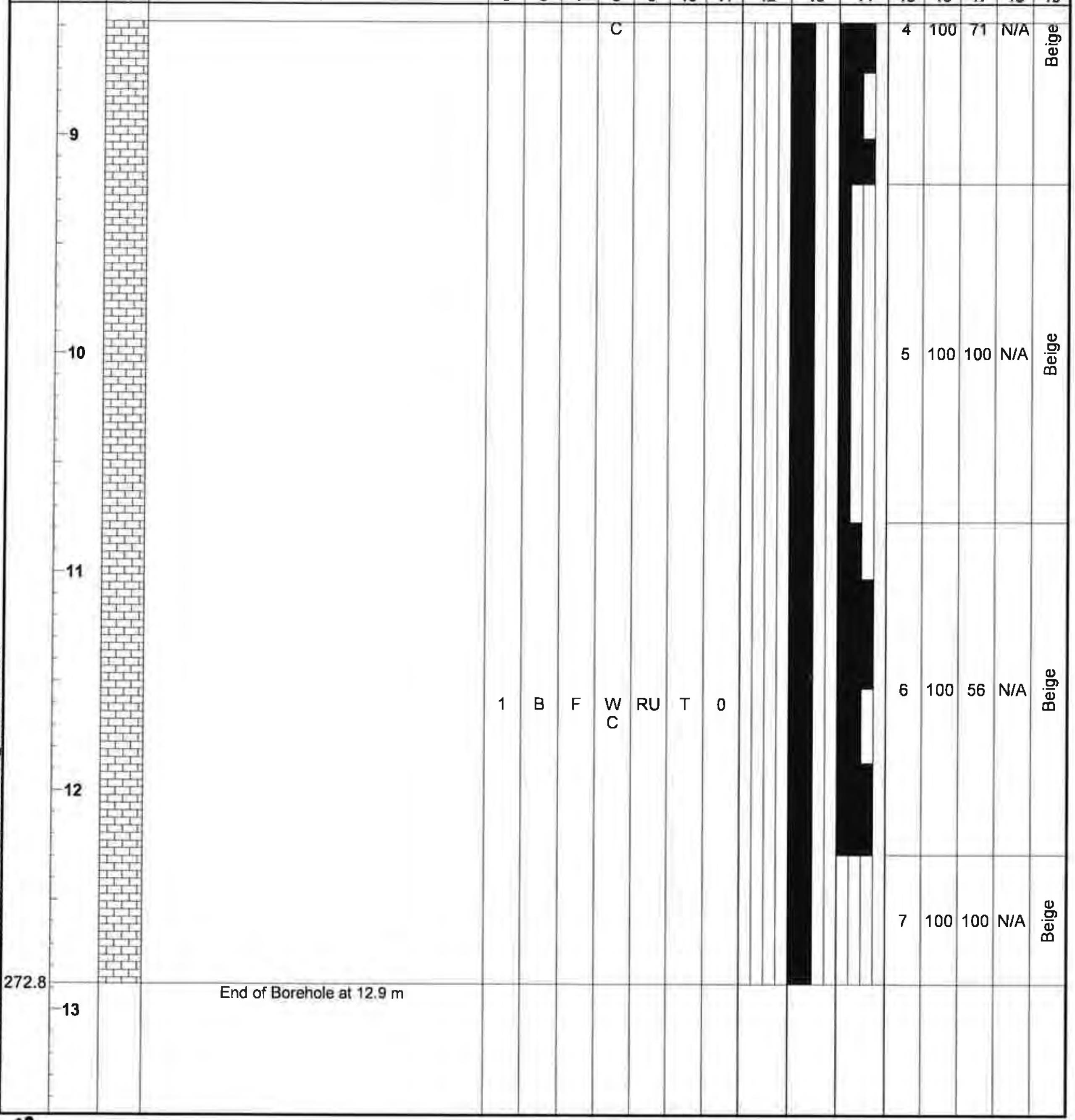
ELEVATION (m)	DEPTH (m)	SYMBOL	GENERAL DESCRIPTION	JOINT CHARACTERISTICS NO. OF SETS	JOINT TYPE	ORIENTATION	SPACING	ROUGHNESS	FILLING	APERTURE (mm)	WEATHERING	STRENGTH	FRACTURE FREQUENCY	RUN NUMBER	RECOVERY (%)	RQD	WATER RECOVERY (%)	WATER COLOUR
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
282.2	4		**BOBCAYGEON FORMATION** Fossiliferous Limestone Brown to grey-brown crinoidal limestone with calcarenites and nodular texture. Generally unweathered, becomes increasingly laminated a 2-3 meters depth from bedrock surface, moderate strength. Discontinuities: bedding joints are rough undulating, flat and at wide to very close intervals; rough undulating vertical joints at 4.47 m depth.	1 1	B C	F F	C	RU RU	T T	0 0				1	100	80	N/A	Beige
	5			1	B	F	C	RU	T	0				2	100	56	N/A	Beige
	6																	
	7			1	B	F	C	RU	T	0				3	100	50	N/A	Beige
	8			1	B	F	W	RU	T	0								

exp.

ROCK CORE LOG

BH TH 204

PROJECT City of Kawartha, RFQ	**ORIENTATION** Vertical	**ELEVATION (m)** 285.7	**DATUM** Geodetic	**PROJECT NUMBER** MRK00256269-A0
LOCATION Sommerville Landfill, Kawartha Lakes, Ontario	**DATE STARTED** 10/18/19	**COMPLETED** 10/21/19	**LOGGED BY** AM	**DRAWING NUMBER** 5A
CLIENT City of Karartha Lakes	**DRILLER** Pontil	**DRILL TYPE** CME 75 Track	**CORE BARREL** HQ	**SHEET** 2 of 2



ELEVATION (m)	DEPTH (m)	SYMBOL	GENERAL DESCRIPTION	JOINT CHARACTERISTICS NO. OF SETS	JOINT TYPE	ORIENTATION	SPACING	ROUGHNESS	FILLING	APERTURE (mm)	WEATHERING	STRENGTH	FRACTURE FREQUENCY	RUN NUMBER	RECOVERY (%)	RQD	WATER RECOVERY (%)	WATER COLOUR
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
							C							4	100	71	N/A	Beige
	9																	
	10													5	100	100	N/A	Beige
	11																	
				1	B	F	W C	RU	T	0				6	100	56	N/A	Beige
	12																	
														7	100	100	N/A	Beige
272.8	13		End of Borehole at 12.9 m															

APPENDIX G

Amended Environmental Compliance Approval

Ontario

Ministry of the Environment, Conservation and Parks
Ministère de l'Environnement, de la Protection de la nature et des Parcs

---

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER A321604
Issue Date: August 1, 2019

The Corporation of the City of Kawartha Lakes
12 Peel St
Post Office Box, No. 9000
Lindsay, Ontario
K9V 5R8

Site Location: Somerville Landfill Site
381 Ledgehill Road, Lot 13, Concession 3, former Somerville Township
Kawartha Lakes City

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:

a waste disposal site consisting of a 13 hectare fill area within a total site area of 61.6 hectares

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

"Act" means the Environmental Protection Act, R.S.O. 1990, C. E-19 as amended;

"Approval" means this Environmental Compliance Approval No. A321604;

"Owner" means The Corporation of the City of Kawartha Lakes;

"Coarse Leaf and Yard Waste" means leaf and yard waste that consists of tree trunks, stumps, limbs or other woody material in excess of 7 centimetres in diameter;

"Compost" means leaf and yard waste that has been composted and fully cured and tested to confirm it meets the criteria in Table 1 of O .Reg. 101. Compost is not considered a waste if testing for the compost quality criteria is completed and compliance with the criteria is demonstrated;

"Director" means the person(s) appointed for the purposes of Part II.1 of the Environmental Protection Act;

"District Manager" means the District Manager, Peterborough District Office, Ontario Ministry of Environment and Climate Change;

"Ministry" means the Ontario Ministry of Environment and Climate Change;

"Reg. 347" means Regulation 347 (General - Waste Management Regulation), R.R.O. 1990, under the EPA as amended;

"O. Reg. 903" means Ontario Regulation 903 (Wells), R.R.O. 1990, under the OWRA, as amended;

"O. Reg. 101" means Ontario Regulation 101 (Recycling and Composting of Municipal Waste), R.R.O. 1990, under the EPA, as amended;

"OWRA" mean the Ontario Water Resource Act, R.S.O 1990, Chapter O.40;

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

"Partially Composted Leaf and Yard Waste" is leaf and yard waste which has not been composted in strict accordance with Sections 31 to 33 of Regulation 101/94, Part V- Leaf and Yard Waste Composting Sites and can not be defined as Compost.

"PWQO" means the Provincial Water Quality Objectives;

"RUP" means the Ministry's Reasonable Use Policy (Policy 15-08); and

"Site" means the entire 61.6 hectare waste disposal site, consisting of an 13 hectare landfilling area and the 50 m x 90 m composting area, and includes buffer lands and contaminant attenuation zone, located at 381 Ledgehill Road, City of Kawartha Lakes, legally described as Lot 13, Concession 3, former Somerville Township, approved by 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

Compliance

(1) (a) The Owner 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.

(b) The Owner shall ensure that the RUP is applied and met at all points on the property line which are impacted by leachate generated at the Site.

(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 for in this Approval, the Site shall be designed, developed, built, operated and maintained in accordance with the original application for this Approval, the conditions herein this Approval and the supporting documentation listed in Schedule “A”.

Interpretation

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

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

(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 to furnish any further information related to compliance with this Approval;

Adverse Effect

(9) The Owner 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 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 Owner

(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;
(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. In the event of any change in Ownership of the works, other than change to a successor municipality, the Owner shall notify the successor of and provide the successor with a copy of this Approval, and the Owner shall provide a copy of the notification to the District Manager and the Director.

Inspections

(13) No person shall hinder or obstruct a Provincial Officer from carrying out any and all inspections authorized by the OWRA, the EPA, or the PA, of any place to which this 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 or the PA.

Information and Record Retention

(14) (a) Any information requested, by the Ministry, 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, in a timely manner.

(b) Records shall be retained for 5 years except for as otherwise authorized in writing by the Director.

(15) 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.

(16) The Owner shall install and maintain a sign at the main entrance/exit to the Site on which the following information is legibly displayed:

(a) name of the Site and Owner;
(b) this Approval number;
(c) normal hours of operation;
(d) allowable and prohibited waste types;
(e) telephone number to which complaints may be directed; and
(f) twenty-four hour emergency telephone number (if different from above).

(17) The Owner shall install and maintain signs at the Site to direct vehicles to the working face, the recycling bins and the other disposal or storage areas designated for wastes requiring special handling procedures.

(18) The Owner shall take all practical steps to prevent the escape of litter from the Site. Weekly pick-up of litter at the Site and along the access road in the vicinity of the Site shall be carried out. Appropriate fencing shall be erected around the working area of the landfill as required.

(19) During non-operating hours, the Owner shall ensure that the Site entrance and exit gate is locked and the Site is secured against access by unauthorized persons.

(20) No waste shall be received at the Site except during the operating hours (Monday - Saturday, 7:00 am to 7:00 pm) when the Site is under the supervision of either trained Site personnel or the Owner's Environmental Supervisor or trained personnel.

(21) The Owner shall ensure that all operators at the Site have been trained with respect to:

(a) the terms, conditions and operating requirements of this Approval;
(b) the operation and management of all transfer, process, storage and contingency measures equipment;
(c) any environmental concerns pertaining to the Site and wastes to be transferred/processed; and
(d) relevant waste management legislation and Regulations under the Act and OWRA.

(22) 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 each complaint on a formal complaint form entered in a sequentially numbered log book. The information recorded shall include the nature of the complaint, the name, address and the telephone number of the complainant and the time and date of the complaint;

(b) The Owner, upon notification of the complaint shall initiate appropriate steps to determine all possible causes of the complaint, proceed to take the necessary actions to eliminate the cause of the complaint and forward a formal reply to the complainant; and

(c) The Owner shall retain on-site a report written within one (1) week of the complaint date, listing the actions taken to resolve the complaint and any recommendations for remedial measures, and managerial or operational changes to reasonably avoid the re-occurrence of similar incidents.

(23) The Owner shall promptly take all necessary steps to contain and clean up any spills which result from the operation of the Site. All spills and upsets shall be immediately reported to the Ministry's Spills Action Centre at (416) 325-3000 or 1-800-268-6060 and shall be recorded in a written log or an electronic file format, referred to in Condition (45) of this Approval, as to the nature of the spill or upset, and the action taken for clean-up, correction and prevention of future occurrences.

(24) The Owner must conduct regular inspections of the equipment and facilities to ensure that all equipment and facilities at the Site are maintained in good working order at all times. Any deficiencies detected during these regular inspections must be promptly corrected. A written record must be maintained at the Site, which includes the following:

(a) name and signature of trained personnel conducting the inspection;
(b) date and time of the inspection;
(c) list of equipment inspected and all deficiencies observed;
(d) a detailed description of the maintenance activity;
(e) date and time of maintenance activity; and
(f) recommendations for remedial action and actions undertaken.

Types and Quantities of Waste

(25) The Site may receive only municipal waste as defined by O. Reg 347 that has been generated within the City of Kawartha Lakes. No liquid industrial wastes or hazardous wastes, as defined under O.Reg. 347 shall be accepted at the Site.

(26) The total waste disposal capacity of the Site, including waste, daily, intermediate and final cover is 637,100 cubic metres.

(27) (a) The maximum amount of domestic, commercial and industrial waste that the Site may receive for final disposal (landfilling) is eighty (80) tonnes per day;

(b) In addition to the quantity of waste specified in Condition 27(a), the Site may also receive for a limited period of time an additional 400 tonnes per day of other solid, non-hazardous waste, limited to construction and demolition waste for final disposal. The Owner is required to provide written notification to the District Manager that specifies the expected duration of the increased disposal rate beyond eighty tonnes per day.

(c) In addition to the waste received for final disposal, the Site may receive, for composting, not more than 150 tonnes of leaf and yard waste in any given day; and

(d) the total amount of leaf and yard waste accepted for composting annually shall be limited to 2,000 tonnes.

(28) The Owner shall ensure that no burning of waste occurs at the Site.

(29) The Owner shall ensure that no scavenging is taking place at the Site

Landfill Operations

(30) (a) At end of each operating day, the entire working face shall be compacted and covered with a minimum thickness of 150 mm of daily cover or alternate daily cover listed in Condition 30(b);

(b) The following materials are approved for use as alternative daily cover. The thickness of the material, with the exception of (v) must be at least 150 mm:

(i) Soil;
(ii) Wood chips;
(iii) Compost;
(iv) Partially composted leaf and yard waste from on-Site composting; or
(v) Steel plates

(c) In areas of the Site where landfilling has reached the final grade, a minimum thickness of 300 mm of intermediate cover shall be placed.

(31) Following completion of landfilling in Areas 2A ad 2B as shown in Drawing F-6, Item (11) of Schedule "A", the Owner may commence landfill operations in Area 2C. Approval of the Director is required before landfilling can occur in Areas 2D through 2J.

(32) No waste shall be placed above the final contours shown in the plans and specifications noted as part of Item (11) of Schedule "A".

(33) The Owner shall ensure that all loads of waste are properly inspected by trained Site personnel prior to acceptance at the Site to prevent the acceptance of liquid industrial waste and hazardous waste and to prevent the acceptance of waste from outside the permitted service area. Waste vehicles shall be directed to the appropriate areas for disposal or transfer of the waste. The Owner shall notify the District Manager of load rejections at the Site within one (1) day from their occurrence.

(34) The access road and on-site roads shall be provided and maintained so that vehicles hauling waste to and on the Site may travel readily and safely on any operating day. The Owner shall ensure that reasonable efforts are made to keep the access roads used by vehicles to leave the Site, free of waste.

(35) No waste shall be landfilled within one (1) metre of the seasonal high water table and no waste shall be landfilled in ponded water at any time. The limits on the depth of fill shall be clearly marked within the fill area to ensure the minimum one metre separation distance is maintained.

(36) Temporary berms and ditches shall be constructed around the active waste disposal area, as necessary, to prevent extraneous surface water from contacting the active working face.

Composting

(37) (a) Waste accepted for composting or grinding/chipping shall be limited to leaf and yard waste, tree trunks, stumps, branches, leaves and brush.

(b) Only leaf and yard waste that has been composted and cured in accordance with Sections 31 to 33 of Regulation 101/94, Part V - Leaf and Yard Waste Composting Sites, and can be defined as Compost, may leave the Site for use at other sites or by the general public.

(c) All activities associated with the composting operations shall take place on the designated pad with measures in place to control storm water run off and leachate.

(d) Leaf and yard waste segregated into fine material may not be stored for more than five days before it is placed in windrows.

(e) Coarse Leaf and Yard Waste that is segregated for grinding/chipping shall be processed once per year at a minimum, or at another frequency approved by the District Manager.

(f) Partially Composted Leaf and Yard Waste, wood chips and wood grindings may be used as alternative daily cover at the Site.

(g) The Owner is permitted to use a mixture of Partially Composted Leaf and Yard Waste as interim cover. The mixture shall consist of 3 parts soil, one part screened Partially Composted Leaf and Yard Waste.

(h) At a minimum, the Owner shall keep weekly records of all the operations related to composting (e.g. windrow turning, screening, sampling etc.), including quantities and source of leaf and yard waste received at the Site, and include this information in the Annual Report.

Environmental Monitoring

(38) Groundwater, surface water and landfill gas monitoring shall be undertaken in accordance with Schedule "B". No changes to the groundwater, surface water and landfill gas monitoring programs shall be implemented prior to receiving a written approval of the Director.

(39) By March 31, 2018, the Owner shall develop and implement a procedure to be used to detect unacceptable levels of landfill gas in the equipment shed.

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

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

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

(a) The Owner shall repair or replace any monitoring well which is destroyed or in any way made to be inoperable for sampling such that no more than one regular sampling event is missed.

(b) All monitoring wells which are no longer required as part of the groundwater monitoring program, and have been approved by the Director for abandonment, shall be decommissioned by the Owner, as required, in accordance with O. Reg. 903, that will prevent contamination through the abandoned well. A report on the decommissioning of the well shall be included in the annual monitoring report for the period during which the well was decommissioned.

Record Keeping and Reporting

(43) The Owner shall maintain, at the Site for a minimum of two (2) years, a log book or electronic file format which records daily the following information:

(a) date of record;
(b) types, quantities and source of waste received;
(c) quantity and type of waste transferred;
(d) quantities and destination of each type of waste shipped from the Site;
(e) the amount of finished compost and/or rejected compost shipped from the Site;
(f) a record of daily inspections including the following information as a minimum; time and date of inspection, name and title of inspector, potential impacts noted, remedial actions taken, measures to prevent the problem from recurring;
(g) windrow temperature readings;
(h) composting activities undertaken (e.g. windrow formation, turning, screening etc);
(i) meteorological information including ambient temperature, wind direction and wind speed; and
(j) with respect to the compost sampling required by Condition 37, the Owner shall maintain the following records as a minimum: sample collection locations and volume of the samples collected, day and time of collection, sample handling procedures, parameters tested for and the resulting concentrations, name of the laboratory facility doing the testing, and conclusions drawn with respect to the results of the monitoring and testing.

(44) By May 31st of each year, the Owner shall prepare and retain on-site an annual report covering the previous calendar year. Each report shall include, as a minimum, the following information:

(a) a detailed monthly summary of the type and quantity of all wastes received and transferred from the Site;
(b) a detailed monthly summary of finished compost transferred from the Site and the amount and destination of rejected compost;
(c) results and analysis of the required environmental monitoring which includes comparison of monitoring results to the approved trigger and RUG compliance limits for the Site and the PWQO;
(d) analytical results of samples taken from the finished compost;
(e) drawings showing the areas of fill, compost pad, buffer areas and current landfill contours;
(f) any environmental and operational problems, that could negatively impact the environment, encountered during the operation of the Site and during the facility inspections and any mitigative actions taken;
(g) a statement as to compliance with all conditions of this Approval and with the inspection and reporting requirements of the conditions herein; and
(h) any recommendations to minimize environmental impacts from the operation of the Site and to improve Site operations and monitoring programs.

Closure Plan

(45) The Company must submit, for approval by the Director, a written Closure Plan for the Site, two (2) years prior to closure of the Site. This plan must include, as a minimum, a description of the work that will be done to facilitate closure of the Site, a schedule for completion of that work as well as recommendations for post-closure monitoring and maintenance of the Site.

SCHEDULE "A"

This Schedule "A" forms part of Approval No. A321604.

(1) Document entitled "Somerville Landfill Design and Operations Report" dated March 1998 and updated May 1998, prepared by the County of Victoria.

(2) Document entitled "Report on Hydrological/Hydrogeological Conditions: Somerville Landfill, County of Victoria" dated December 1997, prepared by Golder Associates.

(3) Letter dated July 22, 1999 to Waste Management Engineer, County of Victoria, from J. Robert Bruce, Hydrogeologist, MOE. Re: Somerville Landfill Site, Ministry Review Comments on the D&O and Hydrogeological Reports.

(4) Letter dated March 30, 2000 to David Moy, County of Victoria, from Phil Moddle, Golder Associates Ltd. Re: Response to MOE Comments Hydrological/Hydrogeological Conditions.

(5) Letter dated April 4, 2000 to Robert Bruce, MOE, from David Moy, Waste Management Engineer, County of Victoria. Re: County of Victoria Somerville Landfill A321604.

(6) Letter dated January 3, 2003 to Chris Johnston, Senior Environmental Officer, MOE, from Stan Irwin, Manager of Environmental Services. Re: Compliance Inspection Report Somerville Landfill Site.

(7) E-mail dated January 21, 2005, from Roberta Perdue, Waste Management Technician, The Corporation of the City of Kawartha Lakes, Environmental Services to David Lee, MOE. Re: Administrative error present of Somerville WDS Certificate of Approval.

(8) Application for a Provisional Certificate of Approval for a Waste Disposal Site signed by Bill Pickard, Manager of Solid Waste Services, City of Kawartha Lakes, dated February 1, 2008.

(9) Composting Facility at Somerville Landfill, Design and Operations Report, prepared by Totten Sims Hubicki Associates, prepared for the City of Kawartha Lakes, dated December 2007.

(10) Letter from K. Dechert, Totten Sims Hubicki Associates, to Environmental Assessment and Approvals Branch, dated May 15, 2006, re: addendum to Section 6 of the Design and Operations report.

(11) Document entitled "Somerville Landfill Site, Design and Operations Report 2016 Update", dated November 2016 and prepared by Archibald Engineering, which includes the application to amend Environmental Compliance Approval A321604.

(12) Letter from Azimuth Environmental Consulting, Inc. to K. Snoddy, City of Kawartha Lakes, dated July 25, 2019 Re: Reasonable Use Policy (RUP) Study and Response to Conditions 40 and 41 of ECA for the Somerville Landfill Site (A321604) - REVISED.

SCHEDULE "B"

This Schedule "B" forms part of Approval No. A321604.

Monitoring Station	Frequency	Parameters
Ground Water MW 1-I , MW 1-II , MW2-II , MW5-I , MW7 , MW8-I, MW8-III, MW9, MW 10-II , MW 11, MW 12, MW13 , MW 14, MW15, MW 16-I , MW16-II , MW 16-III , MW17 New Well Nests** northeast southeast south west	Semi-Annual April/May & September/October	Biochemical Oxygen Demand (BOD), Volatile Organic Compounds (VOCs*), Dissolved Organic Carbon (DOC), alkalinity, ammonia, chloride, hardness, nitrate, sulfate, Total Kjeldahl Nitrogen (TKN), barium, boron, calcium, iron, magnesium, sodium, potassium , manganese, pH, conductivity, Total Dissolved Solids (TDS), Total Suspended Solids (TSS) (leachate only), Chemical Oxygen Demand (COD) *VOC's - annual during Fall event Water Level Measurements ** - 4 new well nests to be installed in time for sampling in September/October 2019.
Landfill Gas MW 1-I , MW 1-II , MW2-II , MW5-I , MW7 , MW8-I, MW8-III, MW9, MW 10-II , MW 11, MW 12, MW13 , MW 14, MW15, MW 16-I , MW16-II , MW 16-III , MW17 **MW-5-II, MW5-III, MW8-II and MW10-I* *Gas Probes GP1 and*	Semi-Annual April/May & September/October	Combustible Gas Measurements *Gas monitoring in MW-5-II, MW5-III, MW8-II and MW10-I may be discontinued after 2 years if gas is not detected.

GP2		
Surface Water SWA, SWB & SWD	Semi-Annual April/May & September/October	BOD, phenols, Free cyanide, Total Organic Carbon (TOC), Dissolved Organic Carbon (DOC), TKN nitrate, nitrite, ammonia (un-ionized), ammonia (total), alkalinity, hardness, chloride, phosphorous,sulphate, aluminum, arsenic, barium, boron, cadmium, calcium, chromium, copper, iron, lead, magnesium, mercury, nickel, potassium, selenium, silver, sodium, zinc, pH , conductivity, TSS, COD, colour, turbidity

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

1. *The reason for inclusion of the definitions is to define the specific meaning of terms and simplify the wording of conditions in this Approval.*

2. *The reason for Condition 1 is to ensure that the Site is designed, operated, monitored and maintained in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.*

3. *The reason for Conditions 2, 3, 4, 5, 6, 7, 8, 9, 10, 14 and 15 is to clarify the legal rights and responsibilities of the Owner under this Approval.*

4. *The reason for Condition 12 is 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.*

5. *The reasons for Conditions 11 is 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.*

6. *The reason for Condition 13 is to ensure that appropriate Ministry staff have ready access to the Site for inspection of facilities, equipment, practices and operations required by the conditions in this Approval. These conditions are supplementary to the powers of entry afforded a Provincial Officer pursuant to the EPA and OWRA.*

7. *The reason for Conditions 16 and 17 are to ensure that members of the public and users of the Site are aware of important information related to the proper operation of the site, such as operating hours and directions on how to access services offered at the Site.*

8. *The reasons for Condition 19 is to specify site access to/from the Site and to ensure the controlled access and integrity of the Site by preventing unauthorized access to the Site.*

9. *The reason for Conditions 25, 26, 27 and 32 is to ensure that the Site only receives the types and*

quantities of waste for which it is approved.

10. *The reason for Condition 31 is to ensure that the Director is satisfied that the Site is in compliance with all applicable regulatory requirements before landfilling proceeds to subsequent phases.*

11. *The reason for Conditions 18, 20, 21, 22, 23, 24, 28, 29, 30, 32, 33, 34, 35, 36, 37, 40, 41 and 42 are to ensure the site is maintained in a manner in which as adverse effect does not occur. This is to ensure the long-term protection of the environment and human health.*

12. *The reason for Condition 38 is to demonstrate that the landfill 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.*

13. *The reason for Condition 37 is to ensure that dangerous levels of landfill gas are detected prior to people entering the equipment shed. This is necessary to protect the health and safety of people.*

14. *The reason for Conditions 43 and 44 is 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.*

15. *The reason for Condition 45 is to ensure that the Site is closed in accordance with Ministry standards and to protect the health and safety of the public and the environment.*

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). A321604 issued on February 14, 2018

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, Conservation and Parks 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 1st day of August, 2019

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

IP/
c: District Manager, MECP Peterborough
Colin Ross, Azimuth Environmental Consulting

APPENDIX H

Sampling Protocols

FIELD SAMPLING PROTOCOL FOR CKL LANDFILL SITES

Last updated: November 19, 2018

Table of Contents

Review Sampling Requirements

- All of the sampling requirements are listed in the monthly sampling requirements spreadsheet S G:\Environmental\Env Ser - SWaste - Gen\W22 LANDFILL MONITORING PROGRAMS. The Waste Technician and Regulatory Compliance Officer will ensure that the sampling requirements spreadsheet is kept up to date.
- Ensure that the sampling requirements spreadsheets and site maps are in the back of each field book, and are current prior to each sampling event.

Prepare Equipment

- Ensure that you have all equipment on the field equipment list. See Appendix A - Field Sampling Equipment List.
- Equipment must be calibrated according to manufacturer's standards. See Appendix B - Equipment Calibration and Maintenance Protocols for a complete set of maintenance and calibration instructions.
- Sampling bottles should be ordered at least 2 weeks before scheduled field sampling. Sample bottles should be stored primarily at 12 Peel Street in the Waste Management Department, or the Lindsay Ops maintenance building if necessary.
- Check the charge on the phone, GPS, YSI (dissolved oxygen, pH, temperature and conductivity) and gas monitor.
- Inspect your vehicle to ensure you have enough fuel, washer fluid and oil. Also check tire pressure and make note of any other alarms present on the vehicle. It is important to fill out the daily log book located in the vehicle to document the checks being conducted. Do not drive the vehicle if it requires servicing – contact Fleet for assistance.
- Leave the Supervisor of Waste Management Operations with your daily schedule. The Administrative Assistant or Regulatory Compliance Officer should also be informed of your schedule. If you will be working alone, you must follow SOP WM-005 – Working Alone. You are required to contact TAS (1-877-885-7337) when you arrive on-site and when you leave the site.
- Contact the Supervisor of Waste Management Operations or Regulatory Compliance Officer as well as TAS in the case of after-hours sampling. Confirm with the Supervisor of Waste Management Operations or Regulatory Compliance Officer and TAS when you arrive back at the office.
- Ensure that you have your cell phone and that it is fully charged at all times when you are out of the vehicle.

On-site Arrival

- Observe your surroundings. Note if gates and offices (if applicable) are locked if site is not in operation. Contact Supervisor of Waste Management Operations immediately if suspicious activity is noted.
- Honk the vehicle horn if you note bear signs in the area.
- Generally always work from areas of less contamination to areas of higher potential contamination to reduce the possibility of sample cross contamination.
- Sampling should not be conducted during a thunderstorm or other severe weather conditions. If severe weather conditions arise while you are at a landfill follow the SOP WM004 – Extreme Weather.
- Appropriate precautions must be followed in extreme cold/heat conditions. See Appendix D - Health and Safety information.
- Ensure that appropriate PPE is worn for sampling including gloves, steel toed boots, long pants, sunscreen, safety glasses, etc.
- Do not proceed with work in isolated areas if you are uncomfortable with the work. Contact the Supervisor of Waste Management Operations to make alternate arrangements.

SAMPLING

Landfill Gas Monitoring

1. The GMI GT-44 Methane Monitor is a certified Class 1, Div 1 Groups C and D instrument. The GT-44 should be operated and maintained as per manufacture's instructions. See Appendix B for further information; a copy of the manual is available in the Equipment Manuals binder. The monitor uses 3 C batteries as a power source – ensure extra batteries are always available.

2. The GMI GT-44 Gas Monitor can be programmed to read %VOL, %LEL and ppm CH4. Readings should be recorded in %VOL. This can be achieved by placing the monitor in Purge Mode. Record the date, site, monitor number and both the %VOL and the %LEL in the methane field book.

3. You must complete a fresh air calibration before each sampling event. Switch the monitor on in an open environment away from any sources of contamination. The monitor will begin a 30 second warm-up and calibration sequence.

4. If gas monitoring is required, it should be done before water level measurements and shall be taken <u>without</u> the removal of the any dedicated sampling device. Place the tube of the gas meter into the monitoring well. Avoid lowering the tube into the well water; water will damage the meter's sensors. If a release valve is

not available hold your hand over the top of the well ensuring a seal. You must wear latex or protective gloves when putting your hand over the monitoring well. If taking measurements from a dedicated gas monitoring probe, insert the tip of the monitor into the well valve and then open the stopcock. The monitor should be attached before opening the stopcock to ensure there is no release of methane gas.

5. Place the monitor in purge mode and allow the automatic pump to run for at least 30 seconds, or until the gas reading reaches a maximum and then begins to decline. In the field book record the highest %VOL displayed on the meter and determine the %LEL. The maximum reading is stored in the monitor for your reference.

Groundwater

1. Field Book Setup

Monitoring Well Number	Water Level	Well Depth	Casing Volume (WD-WL xF)	Casing Volume x 3	Volume of Water Purged	Sample Collected (2B4B, VOC etc)	Date Sample Collected	Well Condition, Weather, etc.
MW	**WL**	**WD**	**V**	**Vx3**	**Purge**	**Sample**	**Date**	**Comments**
e.g. MW1	6.2	15.2	18.18	54.54	55	2B4B	25-Oct-10	overcast, 25°C, well cap replaced

Table 1: Sample field book format

Pipe Size (inch)	**Factor (F)**
1/2	0.127
3/4	0.285
1	0.506
1 1/4	0.791
1 1/2	1.140
1 3/4	1.551
2	**2.026**

Table 2: Common factors for determining well volume

2. Water Level Measurements

a. To ensure that water levels are not affected by purging adjacent wells, gas and water levels should be taken from all wells prior to sampling/purging any wells in the area. Sample tubing should not be moved until the gas and water level measurements have been taken.

b. Water level measurements shall be taken without the removal of any dedicated sampling device (tubing and foot-valve arrangements). Disturbing anything in the well including the tubing and foot-valve can alter the water level reading.
c. Rinse the water level meter with distilled water prior to lowering it into the well. Make sure the water meter is on and lower the meter into the well until the meter beeps. The meter can be affected by condensation on the walls of the pipe or conductivity levels, so slightly raise and lower the water meter to be sure of your measurement. Water levels shall be measured with an electric depth gauge to the nearest 0.01 meters.
d. Measurements shall be taken from the top of the monitored well. The measurement will be taken from the top of the PVC casing (well pipe) and not the top of the protective casing. Ensure that the TOP levels are up to date.
e. Water level measurements shall be recorded in the field book for each specific monitor.
f. Switch off the water level monitor and continue lowering the table until it reaches the bottom of the well – the tape should become slack. Raise the tape just until it becomes taught and read the depth from the top of the PVC casing (well pipe). The height of standing water in each well shall be calculated by subtracting the static water level from the total well depth.

3. Purging Procedure

a. Prior to sampling, each well shall be purged to remove stagnant water within the casing.
b. Three casing volumes shall be removed by the dedicated samplers or by use of a bailer from the wells with moderate inflow. The casing volume can be determined by multiplying the height of standing water by F. The casing volume is then multiplied by 3 to determine the purge volume. Record these values in the field book.
c. The volume of water required to be purged is calculated as follows:

$$\boxed{\textbf{Volume (m}^{\mathbf{3}}\textbf{)} = 3 \times (F(m^2) * (\text{Depth of Well-Water Level (m)})}$$

Where:

F is equal to the area (F=(3.14 *D^2)/4*1000
D is the diameter measured in meters

d. The purged water shall be measured into a calibrated container (i.e. bucket with known volume) and the volume of water purged shall be recorded in the field book for the specific monitor. Be sure to purge any sediment that may have accumulated at the bottom of the well.
e. Slow inflow monitors shall be purged entirely dry. The volume of purged water shall be recorded in the field book for the specific monitor. Staff should leave

the monitor to recharge and return periodically to the well to attempt to purge the full volume.

f. For slow recharge wells it may be necessary to return the following day to collect your sample.

4. Sampling Procedure

a. Suitable sample bottles (containing pre-measured preservatives, as required) shall be obtained from the analyzing laboratory in advance of the sampling program.

b. Each sample bottle shall be labeled to indicate the project name (landfill site), well designation, date, time of sample collection, and preservatives added.

c. Samples shall be collected by means of the dedicated samplers in all monitoring wells, if present. For slow inflow monitors, samples shall be collected the day following the purging exercise (to permit water-level recovery, if required).

d. Nitrile gloves should be worn when taking any sample. Change gloves for each sampling location.

e. When 3 borehole volumes have been purged sample the groundwater in the following order as necessary:

i. If required, pH, conductivity, and water temperature

ii. VOC glass amber bottles contain preservatives (usually HCl) but need to be filled with no headspace. Carefully fill the VOC bottles to the top without losing the preservative. To help ensure no air in the sample fill the top of the cap with the groundwater as well or ensure there is a convex surface on the mouth of the bottle. After filling the bottle and putting the lid on, invert the bottle and tap the sides to ensure that no air is present in the sample. Add more sample until no air bubbles remain. If a significant volume of water is lost during refilling, the sample must be collected in a new bottle to ensure sufficient preservatives.

iii. Poly Aromatic Hydrocarbons (PAHs) - 1 L amber bottles with Teflon lids.

iv. Pesticides – 1 or 2 unpreserved 1 L amber bottles may be required (depending on the amount of sediment, check with the lab). Fill bottle leaving a bit of headspace to allow for liquid to expand in temperature changes. Ensure that the lip of the bottle and the lid do not come into contact with anything except the sample.

v. Dissolved Organic Carbon (DOC) –bottle may contain preservative

vi. Phenols – glass bottle with preservative (H_2SO_4 or $CuSO_4$)

vii. Mercury – glass bottle contains preservative ($K_2Cr_2O_7$ or HNO_3)

viii. General chemistry is taken in PET bottles with no filtration and no preservative

ix. Inorganic compounds (metals) – PET bottle with acid preservative (often HNO_3). In Ontario metals are measured in the dissolved state so groundwater samples must be filtered. Use a 45 micron filter, ensure that it is placed on the waterra tubing in the correct direction, purge some water though the filter and then fill the bottle. There is a preservative in metals bottles. Fill the bottle almost entirely but not all the way to the top. If there is a lot of sediment you may require more than one filter. Alternatively you can request lab filtration of the sample but this must be indicated on the sample bottle and the chain of custody and the sample must be collected in an unpreserved bottle.

f. Sampling information shall be recorded in the field book. Information includes the well number, date of sample collection, static water level, well casing volume, purge volume, actual volume of water purged, and any repairs necessary on the well and weather conditions. Take any field notes on the condition of the well or the reason if a sample could not be obtained. A pencil is preferred as it won't smudge if wet.

g. If sampling during the winter ensure that all water is emptied from the waterra tubing before closing the well.

5. Laboratory Procedures

Laboratory sample submission protocols should be confirmed with the laboratory where samples will be shipped to. This information should be known ahead of time.

6. Troubleshooting in the Field

The following are a number of common issues that may be encountered in the field when groundwater sampling.

Issue	Solution
Water level meter won't beep	Check that the meter is on. If the meter is on and will not buzz, try changing the batteries. If the meter still will not buzz, the well may be dry. Attempt purging the well using the dedicated tubing. If no water is present note this in the field book.
Water level meter won't stop beeping	Try rinsing the water level meter with distilled water.
While purging, water stops coming out of Waterra	The foot valve may have become plugged with sediment or small stones or may have fallen off. Remove the waterra (making sure not to rest it on the ground) and inspect the foot valve. If there is no problem with the foot valve, the well may be dry. Confirm this with the water level meter and make note in the field book.
When you remove the well cap the Waterra has slid too far down the PVC casing to grab.	Always carry a coat hanger in your field bag. This can be used to hook and raise waterra that has fallen down the standpipe.
The waterra tubing has split and	If the leak is coming from the connection between

water is spraying out of the side	the large diameter and small diameter tubing, ensure they are connected properly and use electrical tape if necessary. If the leak is coming from other parts of the waterra, cut and replace that section. Depending on where the leak is, you may have to replace the entire length of tubing.
Well has been purged dry and exhibits slow recharge	Move on and complete the remaining wells, returning to the dry well at the end of the sampling day. If the well is still dry, you may have to return the following day to collect the sample. Note this in the field book.

Surface Water

1. Field Book Setup

Your field book should be set up in the following way, prior to heading out into the field:

Station	pH	DO (mg/L)	Cond (uS/cm)	H_2O Temp	Air Temp	Width (m)	Depth (m)	Flow (m/s)	Sample/Date/ Comments
SWA	7.03	2.36	456	14	17	2	1	0.3	2B4B/Aug 3/silty sample

2. Sampling Procedure

a. Sampling should usually be conducted under base flow conditions (to observe maximum quality impact). Thus, there shall be several days without precipitation before the sampling survey. However, sampling of ponding water during stagnant conditions shall be discouraged unless representative of the local conditions. If a sample is collected in a stagnant water body this should be noted in the field book.
b. Confirm the monitoring regime. There are some sites where surface water sampling is specified to occur after a rainfall event (e.g. Lindsay Ops and Verulam surface water sampling).
c. Samples should be collected from the furthest station downstream from the site first and then progress up stream towards the site. This ensures that downstream samples are not affected by disturbances caused from upstream sampling.
d. Ensure that equipment is properly cleaned and gloves are changed between sampling locations, especially prior to taking a background sample.
e. Prior to sampling conduct a visual inspection and take photographs of the site. Label the site and the SW location in the photos once they have been uploaded to the computer in the office. Field measurements shall be taken for temperature, conductivity, pH and DO at each sampling

station when samples are collected for chemical analysis. It is best to take these measurements from a location slightly downstream of your collection location before you take samples to avoid influencing results from disturbances during sample collection. You can also take these measurements after sample collection but in this case they should be taken slightly upstream of the sample collection location.

f. The YSI must be calibrated at the beginning of every day it is being used (see Appendix C). Turn the YSI on 5-15 minutes before use. Allow temperature readings to stabilize. The probe shall be placed perpendicular to flow direction in a flowing stream. In a non-flowing sample, the YSI probe should be stirred at least 6 inches per second (for 1.25 PE membranes). When the DO values plateau and stabilize you may record the measurement in the field book or log the data set. The probe should be completely submerged for accurate conductivity readings; the pH probe may need a bit of time to stabilize so take this reading last.
g. Nitrile or latex gloves should be worn when taking any sample. Change gloves for each sampling location.
h. Samples should not be filtered unless directly indicated in the protocol. The general chemistry bottle can be used to fill bottles with preservatives already in the bottle (bottles with preservative should not be filled directly in the surface water).
i. To take the sample, remove the lid and keep in your fingers of one hand (the lids and mouth of the bottle should only be in contact with the air and sample). Collect the sample from the middle of the stream where possible. Place the sample bottle into the water column facing downwards about half way down the water column. Turn the sample bottle facing upstream to collect the sample.
j. Weather conditions shall be recorded in the field book.
k. Flow measurements shall be recorded after samples have been collected.
    i. For typical stream flow in a distinguished channel, measure the average water depth, stream width, and water velocity using the method below. It is preferable to measure at a minimum of three (3) locations across the stream. The measurement should be taken in an area as straight as possible with similar substrate.
    ii. Flow can also be measured at culverts by taking the depth of the water in the culvert, and diameter of the culvert, and the velocity of the water entering or exiting the culvert.
    iii. Water velocity can be measured by the time it takes a floating object to travel a set distance (orange peel and stop-watch method). Make sure that you measure the distance and have a stop watch to measure the time.
l. Additional observations may include vegetation, substrate, water colour, odour, iron staining, algae etc. All measurements and observations should be recorded in the field book.

m. Any digitally-metered instrument used to obtain field measurements (other than temperature) shall be calibrated before the sampling survey to ensure reliable results.

Lindsay OPS Stormwater Sampling

Lindsay OPS Stormwater sampling at SW14, SW15 and SW18 must be completed following at least four storm events producing surface water runoff in the spring, summer and fall. At each station, one sample is collected to measure pH using a general chemistry bottle, one sample is collected to measure for ammonia using a nutrients bottle, and an additional sample is collected to conduct an on-site ammonia reading using a general chemistry bottle. One general chemistry bottle and one nutrients bottle will be sent to the lab for certified analysis of pH and ammonia.

When each station has been sampled, immediately bring the additional sample bottle collected to the Lindsay Ops Administration Building. There is a LaMotte Ammonia-Nitrogen kit kept on-site for analysis. Proper PPE, including safety glasses and nitrile gloves should be worn during this procedure. The test kits contain reagents that may be harmful if you come in contact with them.

The following is the procedure for the Ammonia-Nitrogen Kit:

a. Insert the Ammonia Nitrogen Octa-Slide 2 Bar into the Octa-Slide 2 Viewer.
b. Fill a test tube to the 5 mL line with the water sample.
c. Add 10 drops of Salicylate Ammonia #1. Cap the test tube and mix thoroughly.
d. Add 7 drops of Salicylate Ammonia #2. Cap the test tube and mix thoroughly.
e. Wait 1 minute. Add 7 drops of Salicylate Ammonia #3. Cap the test tube and mix thoroughly. Wait 20 minutes.
f. Insert the test tube into the Octa-Slide 2 Viewer. Match the sample colour to a standard colour. Record as ppm of ammonia nitrogen.

Follow the laboratory submission protocol. It is imperative to request that laboratory analysis is completed as quickly as possible.

Leachate Pumping Chambers

Field Book Setup

Your field book should be set up in the following way prior to heading into the field:

Station	pH	Cond (uS/cm)	H_2O Temp	Air Temp	Sample/Date/ Comments
LPC WPCP	7.03	456	14	17	2B4B/Aug 3/orange colouration

1. Lindsay Ops and Lindsay St. North Leachate Pumping Chambers

- Open chamber lid.
- Lower dedicated bailer attached inside the chamber to collect water sample. Lift and lower the bailer until it is full.
- Fill an extra PET bottle with a representative sample of leachate and use the YSI to record sample temperature, pH, DO and conductivity in the field book.
- Samples can be collected directly from the bailer into sample bottles.
- Metals must be collected in an unfiltered metals bottle which must be lab filtered and preserved. This should be indicated on the bottle and laboratory submission sheet.
- Ensure that after sample collection the bailer is emptied and securely tied to the top of the chamber to avoid fouling in the chamber.
- If a bailer is not available use a large bucket to collect a sample. Ensure that the rope on the bucket is secured to something before lowering the bucket into the chamber.

2. Emily Purge Wells

When the system is not turned off and the system is in use, sampling protocol for the purge wells are as follows:

- All pumps should be placed in the off position.
- Open TW1 slightly and turn on Pump 1. Allow TW1 to flush to the lagoons for at least five minutes. This will help dislodge any sediment that has become trapped in the pipes. Once complete turn off Pump1.
- The backflow valve should be closed to prevent water from the force main back flowing into your sample.
- Open the ball valve for TW1 slightly to avoid build up of pressure in the pipes when collecting the sample.
- Turn on TW1 and open the upper tap. Run the tap into a bucket until it runs clear. There is sometimes build up of iron in the pipes that comes loose when the taps are opened.
- After you have run the tap, collect your samples. When you are done collecting the sample turn off the tap and the pump.
- It should be indicated on the bottle and laboratory submission sheet that the sample could not be filtered.
- Follow the same procedure for TW2 and TW3 using the middle and bottom taps, respectively.
- For the composite sample, use the procedure outlined above to fill each sample bottle 1/3 with a sample from each TW. You can fill the combined bottles at the same time as you are filling the sample bottles for each TW.

- To restart the collection system, open the force main valve. Then start all the pumps and follow the procedures outlined in the Emily Operations Manual to set the optimal flow rates for each pump.

Residential

- If possible, notify resident of sampling prior to your arrival at their house. When you arrive at their home, knock on the door and identify yourself as a City employee conducting water sampling, and ask if it is a convenient time to take a sample. If resident is not home but received prior notification, proceed with sampling.

- Ensure sampling location is of raw water (water not treated by a water softener or other treatment device).

- Run the tap for 3-5 minutes prior to sampling. Generally it is good to direct the water away from the foundation of the house with a hose or bucket with running the tap. The home owner may have specific requests which will be noted in the sampling requirements per site sheet.

- Prior to collecting the sample, remove hose if taking sample from an outside tap.

- Take sample.

- Place sample in cooler with ice for transport back to office.

- If taking a sample for bacteria, please follow the directions for sampling and submission provided by the Health Unit with the sample bottle.

- See the residential section of Laboratory Procedures.

Compost

- Samples are to be taken and submitted for analysis once the compost has finished curing and it is ready to be moved. Take 10 grab samples from diverse points within the compost pile; dig in at least 1 meter into the pile.
- Each grab sample will contain a minimum of 20 liters (one pail, ensure pail/ tools are clean).
- Mix the 10 grab samples in a separate pile, and from that pile, take one sample for submission to the laboratory.
- Sample will be sent to Caduceon laboratory for compost analysis.

- Samples are to be contained in a clean PET bag, PET bottle, or glass jars and submitted for analysis for the parameters listed below.
- Currently Caduceon laboratory will provide 2 glass jars (one for metals and one for particle size) for the analysis.

Table 3: Ontario Compost Quality Standards, July 2012

Parameter	**Category AA**	**Category A**	**Category B**
	ppm = mg/kg = ug/g		
Arsenic	13	13	75
Cadmium	3	3	20
Chromium	210	210	1060
Cobalt	34	34	150
Copper	100	400	760
Lead	150	150	500
Mercury	0.8	0.8	5
Molybdenum	5	5	20
Nickel	62	62	180
Selenium	2	2	14
Zinc	500	700	1850
Foreign matter particles greater than 3mm	1%	1%	2%
Plastic foreign matter	0.5%	0.5%	0.5%
Sharp foreign matter	No material that can reasonably cause injury	No material that can reasonably cause injury	Max. 3 pieces/500 ml, Max. 12.5 mm in size
Pathogen Testing (SSO only) Fecal coliforms	<1000 MPN/g of total solids on dry weight basis	<1000 MPN/g of total solids on dry weight basis	<1000 MPN/g of total solids on dry weight basis
Pathogen Testing (SSO only) Salmonellae	<3 MPN/4g total solids calculated on dry weight basis	<3 MPN/4g total solids calculated on dry weight basis	<3 MPN/4g total solids calculated on dry weight basis

LABORATORY PROCEDURES

Laboratory procedures are subject to change with a new lab. Procedures should be confirmed with the lab if there are any changes in laboratories.

Groundwater and Surface Water

- QA/QC procedures (i.e. number and type of field and spiked blanks) shall be determined by prior consultation with the laboratory representative. Current practice is 1 duplicate sample taken for every 10 samples collected. Additionally, one travel blank should be included for every couple of sites.

- Place samples into a cooler with pre-frozen ice packs and if possible send the samples to the lab the same day or next morning. Surface water samples must be sent to the laboratory within 48 hours of sample collection because of BOD holding times. Groundwater samples may be kept up to a maximum of 72 hours before they are sent to the laboratory.

- Samples must maintain a temperature below 10^{o}C. Coolers (or samples) must be stored in fridge at Lindsay Ops if keeping overnight. If they cannot be stored in the fridge, make sure to add extra ice in the coolers for overnight keeping, and ensure more ice is added in the morning.

- A chain of custody form shall be completed and submitted together with the samples to the laboratory. A copy of the chain of custody shall be retained by the sample collector.

- Surface water samples should not be sampled on Friday as the sample will not get to the laboratory before holding time expires. Laboratory holding times for samples are currently as follows:

Table 4: Laboratory holding times

Parameter	Days
ICP Metals	60
Mercury	14
Nitrite	7
Nitrate	7
Fluoride	30
Turbidity	7
Alkalinity	14

Chloride	30
Sulphate	30
DOC	5
TDS	7
pH	ASAP
BOD	5
VOC	14

Residential Well Sample Submission

- Residential well samples must be submitted to the laboratory as soon as possible after sampling. Bacti samples are to be submitted to the health unit as soon as possible. Samples cannot sit over the weekend and cannot be shipped on a Friday.

- Complete the chain of custody ensuring all the required information is completed. There may be specific forms from the lab for submitting residential drinking water samples.

- Pack samples in a cooler with LOTS of ice and ship via courier. Residential samples must be 5°C upon receipt at the laboratory.

POST MONITORING PROCEDURES

Groundwater

- Ensure that all equipment is cleaned and stored in the equipment area at Lindsay Ops.
- Transfer water level information into the field notes folder in the G drive. Go to G:\Environmental\Env Ser - SWaste - Gen\W22 LANDFILL MONITORING PROGRAMS.
- If monitoring well repairs are required note these in the MW repair excel sheet in the G drive. Go to G:\Environmental\Env Ser - SWaste - Gen\W22 LANDFILL MONITORING PROGRAMS and select the excel sheet for the appropriate year entitled Monitoring Well Repairs.

Surface Water

- Ensure that all equipment is clean and stored in the equipment area at Lindsay Ops. The YSI and calibration solutions should be stored inside at 12 Peel Street with the Waste Management Department.

- Transfer surface water information into the field notes folder in the G drive. Go to G:\Environmental\Env Ser - SWaste - Gen\W22 LANDFILL MONITORING PROGRAMS.
- Copy pictures into the SW photo folder for the appropriate site in the G drive. Ensure that the date of the picture is included in the name.

Landfill Gas

- Transfer methane information into the field notes folder in the G drive. Go to G:\Environmental\Env Ser - SWaste - Gen\W22 LANDFILL MONITORING PROGRAMS.

Monitoring Well Repairs

- Monitoring wells should be repaired on a regular basis. Repairs include fixing the waterra tubing, fixing loose casings, cutting down well PVC pipe if the casing has sunk and won't close, extending the well if it is too short. etc.
- All repairs should be documented in the monitoring well repairs excel spreadsheet in the landfill general folder in the G drive.
- For some repairs, it may be necessary to contract a licensed well technician to complete the work. Refer to O Reg. 903 for more information.
- **Be sure to measure the length of PVC that is being extended or cut and adjust the well depth in the field book accordingly.
- **Any changes to the elevation of the pipe must be carried out by a certified well technician and must be indicated to the Regulatory Compliance Officer so a new TOP elevation can be surveyed at the end of the year

Appendix A – Field Sampling Equipment List

All sampling

- Site keys
- Location maps and field sheets
- GPS and locations for the site
- Mobile phone equipped with a camera, or digital camera
- Bear deterrents (bear spray, fog horn, whistle, etc.)
- Cell phone
- Small knife
- Tool box and socket set
- PPE (gloves, bug spray, sunscreen)
- Biodegradable detergent
- Distilled water
- Sharpies
- Hand wipes/hand sanitizer
- Pencils
- Electrical tape
- Measuring tape
- Watch or mobile phone displaying time
- Paper towel

Groundwater monitoring

- Water level indicator (extra C batteries)
- Sampling bottles
- Purging buckets – at least 2 marked with volumes (i.e. 4L, 8L, etc)
- Filters for GW samples
- Additional tubing and foot valves
- Calculator
- Field book
- Coat hanger or threaded rod
- Extra locks and well caps

Surface water monitoring

- Sampling bottles
- YSI meter (extra AA batteries)
- Calibration solutions and distilled water
- Swing sampler
- Mobile phone equipped with camera, or digital camera
- Hip waders
- Rubber boots
- Field book

Gas monitoring

- Methane monitoring device (GMI GT-44)
- Extra C batteries
- Methane field book

Monitoring well repairs

- Hand held electric saw
- Casing caps and collars
- Well caps
- Bucket
- Concrete
- Bentonite
- Waterra tubing (high and low density)
- Foot valves
- PVC pipe
- Ski pole
- Orange spray paint
- Locks

Appendix B – Equipment Calibration and Maintenance Protocols

YSI

For detailed information on YSI please consult the Professional Plus User Manual.

General Use

- The YSI should be calibrated at the beginning of every day that it will be used.
- Prior to departing for field work the protective sleeve can be removed and the field sleeve can be attached.
- Upon return from the field the probe should be rinsed with clean water.
- At the end of every day the probe should be stored with a damp sponge in the bottom of the storage sleeve, or a small amount of water is to be added to the storage sleeve if no sponge is present. The YSI and calibration solutions should be stored in a temperature regulated room. Check the acceptable range for storage on the calibration solution bottles.
- Calibration solutions should be transferred into smaller glass jars to avoid contaminating the entire bottle of solution. Jars should be labeled with the name and concentration of solution as well as the date of transfer and expiry date.

Calibration and Maintenance

- DO Meter

- Follow the “Calibrating DO % in Water Saturated Air: 1 Point Calibration” as described in the Professional Plus YSI user manual (pg 27) and below:
- The supplied sensor storage container (a screw on plastic cup) can be used for DO calibration purposes
- Moisten the sponge in the storage sleeve or plastic cup with small amount of clean water. The sponge should be clean since bacterial growth may consume oxygen and interfere with the calibration. If using the cup and you no longer have the sponge, place a small amount of clean water (1/8 inch) in the plastic storage cup instead.
- Make sure there are no water droplets on the DO membrane or temperature sensor. Then install the storage sleeve or cup over the sensors. The storage sleeve ensures venting to the atmosphere. If using the cup, screw it on the cable and then disengage one or two threads to ensure atmospheric venting. Make sure the DO and temperature sensors are not immersed in water. Turn the instrument on and wait approximately 5-15 minutes for the storage container to become completely saturated and to allow the sensors to stabilize.
- Pres Cal. Highlight probe ID (which must be enabled in the GLP menu to appear in calibration menu).
- Highlight DO % and press enter to confirm.
- Wait for the temperature and DO % values under “actual readings” to stabilize then highlight accept calibration and press enter to calibrate. Or press Esc to cancel calibration.
- The potassium chloride solution and membrane cap should be changed at least every 30 days during regular use.

- Conductivity

- Follow the “Calibrating in Specific (Sp.) Conductance or Conductivity” as described in the Professional Plus YSI manual (pg 36) and below:
- Press Cal. Highlight Probe ID
- Place the sensor into a fresh, traceable conductivity calibration solution. The solution must cover the holes of the conductivity sensor that are closest to the cable. Ensure the entire conductivity sensor is submerged in the solution or the instrument will read approximately half the expected value
- Choose the units in SPC-uS/cm
- Highlight Calibration Value and press enter to input the value of the calibration standard
- Once the temperature and conductivity readings stabilize highlight accept calibration and press enter or press esc to cancel

- The openings that allow sample access to the conductivity electrodes should be cleaned regularly (small cleaning brush included in the maintenance kit). Dip the brush into clean water and insert into each hole 10 to 12 times.

  - pH

- Follow the instructions “Calibration pH” as described in the Professional Plus SI user manual (pg40).
- Press Calc. Highlight probe ID
- Highlight ISE (pH) and press enter. The message line will show the instrument is “Ready for point 1” (The pH calibration allows up to six points)
- Rinse the sensor with distilled water and pat dry before placing in the buffer solution.
- Place the sensor in a traceable pH buffer solution. The value of the buffer should show up at the top of the calibration screen. If not, highlight calibration value and enter it manually.
- Once the temperature and pH readings stabilize press accept calibration.
- The probe should be rinsed with distilled water and patted dry in between buffer solutions.
- To continue with the second point, place the sensor in the second buffer solution. Again this buffer solution should be recognized or entered manually.
- Once the pH and temperature have stabilized press accept calibration and press enter.
- If you do not wish to perform a 3rd calibration point press cal to complete the calibration.

Barometer

- Do not calibrate the barometer unless you have specific reason to believe that the values are untrue. If calibrating the barometer carefully follow the instructions in the Professional Plus YSI user manual (pg 32).

GMI GT-44 (Methane Monitor)

For detailed information on the GT-44 please consult the GMI GT Series User Handbook – CSA.

General Use
- To turn the unit on hold the PUMP button down for 1 second. The instrument will ask you if all filters are installed and in good condition – check that they are and then select YES.
- The unit will then ask you if you would like to perform a flow fault test. Place your finger over the sensor. The monitor should read successful – select yes to continue.

- Fresh air calibration should be conducted at the beginning of every sampling day. The monitor will do this automatically, counting down from 30 in the top right hand corner.
- The following different modes will read methane concentration in these units:
  - Confined space - %LEL
  - Barhole – 0-100% LEL ; 0-100% VOL
  - Purge – 0-100% VOL
  - Sniffer - ppm CH4
  - Leak Test – ppm CH4
- For best results, the monitor should be operated in Purge mode as methane readings must be recorded in %VOL. However, if you would like to identify very small methane concentrations, the monitor can be placed in sniffer or leak test mode and ppm CH4 can be easily converted to %VOL using the following equation:

%VOL methane = ppm/10,000

- To switch between operation modes, press and hold both the INVERT and PUMP buttons at the same time.
- The max/live or min/max methane readings can be seen by pressing and holding the INVERT button (only available in confined space or leak test mode). To return to live readings press and hold the INVERT button again.
- The automatic pump can be turned on and off by pressing the PUMP button.
- To turn the monitor off, press and hold the INVERT and PUMP button simultaneously while the monitor counts down from 3.

Calibration

- To conduct a Fresh Air calibration, turn the monitor on – the monitor will automatically begin the fresh air calibration and warm up sequence.
- If the instrument reads error please refer to the Instruction manual or call a service technician.
- The unit is to be calibrated when Hetek Solutions Inc. is on site for gas detection calibration at the Lindsay Ops Landfill.

Compost Thermometer

Please refer to Recalibrating your Reotemp Dial Compost Thermometer information sheet for more information.

- To calibrate the thermometer prepare a Reference Bath**.** You will need a bath of water of a known temperature. You can use ice water for any range that includes 0^{o}C. The ice bath should be mostly ice, with just enough water to fill the spaces.
- You can use any other temperature bath (room temperature is most convenient, but your working temperature will be most effective), if you have another reference thermometer that you know is accurate.
- The reference bath should be at least 4 inches deep (6 or more inches is better.) If the reference bath is water at room temperature, use a big container, like a bucket.

- The bath should be agitated (stirred) just before or during calibration (boiling water will do its own agitation).
- If you are using a reference thermometer, place the Unit under test (UUT) right next to the reference unit (REF). You can even strap them together with a small rubber band. The UUT should be immersed at least 4 inches into the bath, as the sensitive portion of the thermometer is in the last 2-3 inches of the stem.
- Leave the UUT in the bath for at least a minute, to make sure temperatures have stabilized. Then rotate the small (1/4") hex screw head on the back of the dial case of the UUT until the pointer is indicating the proper temperature. You can use a flat screwdriver, or a small coin, or pliers to rotate the screw head. Once the UUT and REF thermometers agree, you are done!
- If your thermometer will not recalibrate, it may need factory repair. (If the stem is bent, it cannot be repaired, and must be replaced). Contact our factory at 858-784-0710, or fax us at 858-784-0720, or email (sales@reotemp.com) to discuss repair/replacement options.

Appendix C – Contact Information

City of Kawartha Lakes Contact List

Name	Position	Number (705) 324-9411 ext:	Cell
Heather Dzurko	Supervisor of Waste Management Operations	1133	705-328-4263
Kerri Snoddy	Regulatory Compliance Officer	2360	705-879-2666
Nikki Payne	Waste Technician	1144	705-928-3056
David Kerr	Manager Environmental Services	1118	705-340-3448

Repair and Maintenance Contact List

Company Name	Contact Name/Information	Number	Email	Equipment
Coe Fisher Cameron	Herman Wimmelbach or Geoff Lees	705-324-4152	geoff@coefishercameron.com	Surveys
Sitech	Spencer Wykes	905-669-4773(w) 416-436-3241(c)	spencer.wykes@sitechmidcanada.com	Trimble GPS unit
Hart & Sons Drilling	Clark Watson	887-3331		Monitoring well repairs
Kevin Keenan	Keenan Electric	878-2111		Electrician for Emily (set up spray irrigation times etc.)
Tom Taylor	Taylor Electric	705-878-6050		Emily electrical
Steve Walsh	Walsh's welding	705-328-0738		Welding repairs of Emily irrigation system
Christie Mechanical	Christie Mechanical (7415 Highway 9 Rr	519-943-0506		Emily Rotork Valves: for replcement only

	1, Palgrave L0N 1P0, ON			
Syntec Maintenance	Steve Stoll	905-951-8000	steve@syntecpe.com	Emily Rotork Valves: for information/support
Hetek Environmental Solutions	Karl Stoute, Account Manager - GTA	519-659-1144	karl.stoute@hetek.com	GMI GT-44 Methane Monitor Calibration and Support

Equipment Supplies Contact List

Company Name	Contact Name/ Information	Number	Email	Equipment
Hoskin Scientific	Natalia Lecki 4210 Morris Dr. Burlington	905-333-5510 x 232	nlecki@hoskin.ca	Calibration Solutions for YSI and other environmental monitoring equipment
Desco Plumbing and Heating Supply Inc.	39 Colborne St. East Lindsay	705-324-9421		Plumbing supplies
Solinst Canada Ltd.	35 Todd Rd Georgetown, ON	1-800-516-9081	john.buckley@solinst.com	environmental monitoring equipment
Pine Environmental Services	Aimee Fossett or Grahamn Johnstone, 6380 Tomken Rd. Mississauga	905-795-9700	gjohnstone@pine-environmental.com	renting water level meter, other equipment
Maxim Environmental & Safety	Paul Coulombe, 170 Ambassador ON	1-888-285-2324	paul@maximenvironmental.com	environmental monitoring equipment
Osprey Scientific	Claire Aucott, Mississauga	905-820-3122	caucott@ospreyscientific.com	environmental monitoring equipment

Appendix D – Health and Safety Information

Every field sample technician should be aware of the hazards of working in the outdoor environment. Please consult the following information included in the protocol and ask any questions if you feel additional information should be included.

Confined Space Entry

- Consult the City Policy number M-HR-003.

Bear Spray

- Consult the Bear Spray fact sheet included in this appendix. Detailed information about being bear safe can be found on the MNR website.
- http://www.mnr.gov.on.ca/en/Business/Bearwise/index.html

Heat and Cold

- Consult the Working in Hot and Cold Temperatures SOP WM025.

Plants to avoid

- Consult the plants to avoid information sheet included in G:\Environmental\Env Ser - SWaste - Gen\W22 LANDFILL MONITORING PROGRAMS.

APPENDIX I

Laboratory Certificates of Analysis

CADUCEON
ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B23-03372

Report To:

City of Kawartha Lakes
PO Box 9000, 12 Peel St
Lindsay ON K9V 5R8
Attention: Kayla Pantaleo

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 11-May-23
DATE REPORTED: 09-Jun-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Somerville Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		1-I	1-II	2-II	5-I
			Sample I.D.		B23-03372-1	B23-03372-2	B23-03372-3	B23-03372-4
			Date Collected		10-May-23	10-May-23	10-May-23	10-May-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	15-May-23/O	589	716	248	223
Conductivity @25°C	µmho/cm	1	SM 2510B	15-May-23/O	1070	1300	579	444
pH @25°C	pH Units		SM 4500H	15-May-23/O	7.56	7.23	7.80	7.60
Colour	TCU	2	SM 2120C	15-May-23/O	< 2	25	< 2	4
Turbidity	NTU	0.1	SM 2130	15-May-23/O	1690	154	176	18.7
TDS(ion sum calc.)	mg/L	1	Calc.	18-May-23/O	566	716	304	230
Total Suspended Solids	mg/L	3	SM2540D	19-May-23/K	1620	470	680	18
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	16-May-23/O	4.1	6.9	3.8	3.0
BOD(5 day)	mg/L	3	SM 5210B	18-May-23/K	< 3	19	< 3	< 3
COD	mg/L	5	SM5220C	26-May-23/K	54	290	11	10
Phenolics	mg/L	0.001	MOEE 3179	26-May-23/K	< 0.001	< 0.001	< 0.001	0.004
Cyanide (Free)	mg/L	0.005	SM 4500CN	23-May-23/K	< 0.005	< 0.005	< 0.005	< 0.005
Chloride	mg/L	0.5	SM4110C	16-May-23/O	0.7	3.1	20.5	5.9
Fluoride	mg/L	0.1	SM4110C	16-May-23/O	< 0.1	4.1	< 0.1	< 0.1
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	01-Jun-23/K	0.68	3.00	1.71	0.37
Ammonia (N)-unionized	mg/L	0.01	CALC	01-Jun-23/K	< 0.01	< 0.01	< 0.01	< 0.01
Sulphate	mg/L	1	SM4110C	16-May-23/O	4	< 1	34	9
Nitrite (N)	mg/L	0.05	SM4110C	16-May-23/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	16-May-23/O	0.10	0.10	1.21	0.08
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	01-Jun-23/K	0.7	6.1	2.0	0.6
Hardness (as CaCO3)	mg/L	1	SM 3120	16-May-23/O	517	635	258	201
Aluminum	mg/L	0.01	SM 3120	16-May-23/O	0.06	0.08	0.03	0.02
Antimony	mg/L	0.0001	EPA 200.8	26-May-23/O	0.0002	0.0002	< 0.0001	< 0.0001
Arsenic	mg/L	0.0001	EPA 200.8	26-May-23/O	0.0003	0.0013	0.0001	< 0.0001
Barium	mg/L	0.001	SM 3120	16-May-23/O	0.171	0.186	0.118	0.038
Beryllium	mg/L	0.002	SM 3120	16-May-23/O	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	0.005	SM 3120	16-May-23/O	0.010	0.024	0.107	0.040

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Steve Garrett
Director of Laboratory Services

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B23-03372

Report To:

City of Kawartha Lakes
PO Box 9000, 12 Peel St
Lindsay ON K9V 5R8
Attention: Kayla Pantaleo

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 11-May-23

DATE REPORTED: 09-Jun-23

SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Somerville Landfill

P.O. NUMBER:

WATERWORKS NO.

				Client I.D.	1-I	1-II	2-II	5-I
				Sample I.D.	B23-03372-1	B23-03372-2	B23-03372-3	B23-03372-4
				Date Collected	10-May-23	10-May-23	10-May-23	10-May-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Cadmium	mg/L	0.000010	EPA 200.8	26-May-23/O	< 0.000012	< 0.000012	< 0.000010	< 0.000010
Calcium	mg/L	0.02	SM 3120	16-May-23/O	188	233	80.7	75.2
Chromium	mg/L	0.001	SM 3120	16-May-23/O	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (VI)	mg/L	0.001	MOE E3056	29-May-23/O	< 0.001 [1]	< 0.001 [1]	< 0.001	< 0.001 [1]
Cobalt	mg/L	0.005	SM 3120	16-May-23/O	0.008	0.018	< 0.005	< 0.005
Copper	mg/L	0.0001	EPA 200.8	26-May-23/O	0.0008	0.0008	0.0011	0.0006
Iron	mg/L	0.005	SM 3120	16-May-23/O	2.76	24.0	< 0.005	0.009
Lead	mg/L	0.00002	EPA 200.8	26-May-23/O	< 0.00004	0.00004	< 0.00002	< 0.00002
Magnesium	mg/L	0.02	SM 3120	16-May-23/O	11.7	12.6	13.8	3.20
Manganese	mg/L	0.001	SM 3120	16-May-23/O	1.49	2.28	0.002	0.004
Mercury	mg/L	0.00002	SM 3112 B	30-May-23/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	0.0001	EPA 200.8	26-May-23/O	0.0007	0.0001	0.0005	0.0002
Nickel	mg/L	0.01	SM 3120	16-May-23/O	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	0.1	SM 3120	16-May-23/O	2.9	3.9	2.5	0.6
Phosphorus-Total	mg/L	0.01	E3516.2	01-Jun-23/K	0.78	0.17	0.29	0.04
Phosphorus	mg/L	0.1	SM 3120	16-May-23/O	< 0.1	< 0.1	< 0.1	< 0.1
Selenium	mg/L	0.001	EPA 200.8	26-May-23/O	< 0.001	0.001	< 0.001	< 0.001
Silver	mg/L	0.0001	EPA 200.8	26-May-23/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	0.2	SM 3120	16-May-23/O	2.0	2.6	4.3	2.9
Strontium	mg/L	0.001	SM 3120	16-May-23/O	0.461	0.592	0.219	0.157
Tin	mg/L	0.05	SM 3120	16-May-23/O	< 0.05	< 0.05	< 0.05	< 0.05
Thallium	mg/L	0.00005	EPA 200.8	26-May-23/O	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Titanium	mg/L	0.005	SM 3120	16-May-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Uranium	mg/L	0.00005	EPA 200.8	26-May-23/O	0.00029	0.00028	0.00138	0.00012
Vanadium	mg/L	0.0001	EPA 200.8	26-May-23/O	0.0002	0.0002	0.0015	< 0.0001
Zinc	mg/L	0.005	SM 3120	16-May-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Anion Sum	meq/L		Calc.	18-May-23/O	11.9	14.6	6.32	4.81

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Steve Garrett
Director of Laboratory Services

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B23-03372

Report To:

City of Kawartha Lakes
PO Box 9000, 12 Peel St
Lindsay ON K9V 5R8
Attention: Kayla Pantaleo

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 11-May-23

DATE REPORTED: 09-Jun-23

SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Somerville Landfill

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		1-I	1-II	2-II	5-I
			Sample I.D.		B23-03372-1	B23-03372-2	B23-03372-3	B23-03372-4
			Date Collected		10-May-23	10-May-23	10-May-23	10-May-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Cation Sum	meq/L		Calc.	18-May-23/O	10.7	14.3	5.41	4.16
% Difference	%		Calc.	18-May-23/O	5.20	1.13	7.73	7.29
Ion Ratio	AS/CS		Calc.	18-May-23/O	1.11	1.02	1.17	1.16
Conductivity (calc.)	µmho/cm		Calc.	18-May-23/O	952	1127	548	418
Sodium Adsorption Ratio	-		Calc.	18-May-23/O	0.0388	0.0452	0.117	0.0894
TDS(calc.)/EC(actual)	-		Calc.	18-May-23/O	0.531	0.552	0.525	0.519
Langelier Index(25°C)	S.I.		Calc.	18-May-23/O	1.13	0.970	0.659	0.392

1. Chromium (VI) result is based on total Chromium

2. Digested

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Steve Garrett
Director of Laboratory Services

CADUCEON
ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: --- **REPORT No. B23-03372**

Report To:

City of Kawartha Lakes
PO Box 9000, 12 Peel St
Lindsay ON K9V 5R8
Attention: Kayla Pantaleo

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 11-May-23
DATE REPORTED: 09-Jun-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Somerville Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		8-III	DUP-1	10-II	12
			Sample I.D.		B23-03372-5	B23-03372-6	B23-03372-7	B23-03372-8
			Date Collected		10-May-23	10-May-23	10-May-23	10-May-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	15-May-23/O	232	180	291	183
Conductivity @25°C	µmho/cm	1	SM 2510B	15-May-23/O	452	400	622	351
pH @25°C	pH Units		SM 4500H	15-May-23/O	7.70	7.77	7.93	7.71
Colour	TCU	2	SM 2120C	15-May-23/O	4	5	< 2	4
Turbidity	NTU	0.1	SM 2130	15-May-23/O	20.4	180	116	25.9
TDS(ion sum calc.)	mg/L	1	Calc.	18-May-23/O	228	197	314	178
Total Suspended Solids	mg/L	3	SM2540D	19-May-23/K	16	126	300	28
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	16-May-23/O	4.6	4.4	1.5	4.3
BOD(5 day)	mg/L	3	SM 5210B	18-May-23/K	< 3	< 3	< 3	< 3
COD	mg/L	5	SM5220C	26-May-23/K	12	15	9	29
Phenolics	mg/L	0.001	MOEE 3179	26-May-23/K	< 0.001	< 0.001	< 0.001	< 0.001
Cyanide (Free)	mg/L	0.005	SM 4500CN	23-May-23/K	< 0.005	< 0.005	< 0.005	< 0.005
Chloride	mg/L	0.5	SM4110C	16-May-23/O	1.7	17.6	12.0	1.4
Fluoride	mg/L	0.1	SM4110C	16-May-23/O	< 0.1	< 0.1	< 0.1	< 0.1
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	01-Jun-23/K	0.85	0.74	3.16	3.64
Ammonia (N)-unionized	mg/L	0.01	CALC	01-Jun-23/K	< 0.01	< 0.01	0.02	0.04
Sulphate	mg/L	1	SM4110C	16-May-23/O	4	2	20	3
Nitrite (N)	mg/L	0.05	SM4110C	16-May-23/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	16-May-23/O	< 0.05	0.07	3.21	< 0.05
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	01-Jun-23/K	1.1	1.1	8.0	3.8
Hardness (as CaCO3)	mg/L	1	SM 3120	16-May-23/O	206	169	260	161
Aluminum	mg/L	0.01	SM 3120	16-May-23/O	0.02	0.02	0.02	0.02
Antimony	mg/L	0.0001	EPA 200.8	26-May-23/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.0001	EPA 200.8	26-May-23/O	0.0005	0.0001	0.0002	< 0.0001
Barium	mg/L	0.001	SM 3120	16-May-23/O	0.036	0.027	0.111	0.016
Beryllium	mg/L	0.002	SM 3120	16-May-23/O	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	0.005	SM 3120	16-May-23/O	0.013	0.010	0.136	0.005

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Steve Garrett
Director of Laboratory Services

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B23-03372

Report To:

City of Kawartha Lakes
PO Box 9000, 12 Peel St
Lindsay ON K9V 5R8
Attention: Kayla Pantaleo

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 11-May-23

DATE REPORTED: 09-Jun-23

SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Somerville Landfill

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		8-III	DUP-1	10-II	12
			Sample I.D.		B23-03372-5	B23-03372-6	B23-03372-7	B23-03372-8
			Date Collected		10-May-23	10-May-23	10-May-23	10-May-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Cadmium	mg/L	.00001	EPA 200.8	26-May-23/O	< 0.000010	< 0.000010	< 0.000010	< 0.000010
Calcium	mg/L	0.02	SM 3120	16-May-23/O	76.8	64.5	71.7	61.9
Chromium	mg/L	0.001	SM 3120	16-May-23/O	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (VI)	mg/L	0.001	MOE E3056	29-May-23/O	< 0.001 [1]	< 0.001 [1]	< 0.001 [1]	< 0.001 [1]
Cobalt	mg/L	0.005	SM 3120	16-May-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Copper	mg/L	0.0001	EPA 200.8	26-May-23/O	0.0003	0.0004	0.0003	0.0012
Iron	mg/L	0.005	SM 3120	16-May-23/O	0.519	< 0.005	< 0.005	0.035
Lead	mg/L	0.00002	EPA 200.8	26-May-23/O	0.00009	< 0.00002	< 0.00002	0.00007
Magnesium	mg/L	0.02	SM 3120	16-May-23/O	3.40	1.93	19.7	1.62
Manganese	mg/L	0.001	SM 3120	16-May-23/O	0.126	< 0.001	< 0.001	0.001
Mercury	mg/L	0.00002	SM 3112 B	30-May-23/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	0.0001	EPA 200.8	26-May-23/O	0.0002	< 0.0001	0.0011	< 0.0001
Nickel	mg/L	0.01	SM 3120	16-May-23/O	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	0.1	SM 3120	16-May-23/O	0.8	0.4	4.1	0.3
Phosphorus-Total	mg/L	0.01	E3516.2	01-Jun-23/K	0.02	0.11	0.16	0.04
Phosphorus	mg/L	0.1	SM 3120	16-May-23/O	< 0.1	< 0.1	< 0.1	< 0.1
Selenium	mg/L	0.001	EPA 200.8	26-May-23/O	< 0.001	< 0.001	< 0.001	< 0.001
Silver	mg/L	0.0001	EPA 200.8	26-May-23/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	0.2	SM 3120	16-May-23/O	1.3	1.9	12.0	0.6
Strontium	mg/L	0.001	SM 3120	16-May-23/O	0.162	0.140	0.255	0.112
Tin	mg/L	0.05	SM 3120	16-May-23/O	< 0.05	< 0.05	< 0.05	< 0.05
Thallium	mg/L	0.00005	EPA 200.8	26-May-23/O	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Titanium	mg/L	0.005	SM 3120	16-May-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Uranium	mg/L	0.00005	EPA 200.8	26-May-23/O	0.00010	0.00005	0.00351	0.00007
Vanadium	mg/L	0.0001	EPA 200.8	26-May-23/O	0.0002	< 0.0001	0.0017	< 0.0001
Zinc	mg/L	0.005	SM 3120	16-May-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Anion Sum	meq/L		Calc.	18-May-23/O	4.77	4.15	6.81	3.74

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Steve Garrett
Director of Laboratory Services

CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: --- **REPORT No. B23-03372**

Report To:

City of Kawartha Lakes
PO Box 9000, 12 Peel St
Lindsay ON K9V 5R8
Attention: Kayla Pantaleo

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 11-May-23
DATE REPORTED: 09-Jun-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Somerville Landfill
P.O. NUMBER:
WATERWORKS NO.

				Client I.D.	8-III	DUP-1	10-II	12
				Sample I.D.	B23-03372-5	B23-03372-6	B23-03372-7	B23-03372-8
				Date Collected	10-May-23	10-May-23	10-May-23	10-May-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Cation Sum	meq/L		Calc.	18-May-23/O	4.22	3.47	5.82	3.26
% Difference	%		Calc.	18-May-23/O	6.11	8.94	7.77	6.87
Ion Ratio	AS/CS		Calc.	18-May-23/O	1.13	1.20	1.17	1.15
Conductivity (calc.)	µmho/cm		Calc.	18-May-23/O	413	367	563	328
Sodium Adsorption Ratio	-		Calc.	18-May-23/O	0.0399	0.0641	0.323	0.0221
TDS(calc.)/EC(actual)	-		Calc.	18-May-23/O	0.504	0.492	0.505	0.508
Langelier Index(25°C)	S.I.		Calc.	18-May-23/O	0.519	0.413	0.807	0.351

1 . Chromium (VI) result is based on total Chromium

2 . Digested

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Steve Garrett
Director of Laboratory Services

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B23-03372

Report To:

City of Kawartha Lakes
PO Box 9000, 12 Peel St
Lindsay ON K9V 5R8
Attention: Kayla Pantaleo

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 11-May-23

DATE REPORTED: 09-Jun-23

SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Somerville Landfill

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		13	14	15	16-I
			Sample I.D.		B23-03372-9	B23-03372-10	B23-03372-11	B23-03372-12
			Date Collected		10-May-23	10-May-23	10-May-23	10-May-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	15-May-23/O	183	530	249	185
Conductivity @25°C	µmho/cm	1	SM 2510B	15-May-23/O	395	992	481	360
pH @25°C	pH Units		SM 4500H	15-May-23/O	7.73	7.39	7.75	7.73
Colour	TCU	2	SM 2120C	15-May-23/O	6	6	< 2	6
Turbidity	NTU	0.1	SM 2130	15-May-23/O	106	654	16.3	6.5
TDS(ion sum calc.)	mg/L	1	Calc.	18-May-23/O	198	548	250	182
Total Suspended Solids	mg/L	3	SM2540D	19-May-23/K	108	150	10	24
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	16-May-23/O	2.9	9.1	2.1	5.2
BOD(5 day)	mg/L	3	SM 5210B	18-May-23/K	< 3	< 3	< 3	< 3
COD	mg/L	5	SM5220C	26-May-23/K	14	44	< 5	8
Phenolics	mg/L	0.001	MOEE 3179	26-May-23/K	< 0.001	< 0.001	< 0.001	< 0.001
Cyanide (Free)	mg/L	0.005	SM 4500CN	23-May-23/K	< 0.005	< 0.005	< 0.005	< 0.005
Chloride	mg/L	0.5	SM4110C	16-May-23/O	15.6	4.5	1.8	2.8
Fluoride	mg/L	0.1	SM4110C	16-May-23/O	< 0.1	< 0.1	< 0.1	< 0.1
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	01-Jun-23/K	1.68	2.54	0.47	1.03
Ammonia (N)-unionized	mg/L	0.01	CALC	01-Jun-23/K	< 0.01	< 0.01	< 0.01	< 0.01
Sulphate	mg/L	1	SM4110C	16-May-23/O	2	11	9	2
Nitrite (N)	mg/L	0.05	SM4110C	16-May-23/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	16-May-23/O	0.07	< 0.05	0.09	< 0.05
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	01-Jun-23/K	1.8	3.6	0.5	1.1
Hardness (as CaCO3)	mg/L	1	SM 3120	16-May-23/O	172	483	225	164
Aluminum	mg/L	0.01	SM 3120	16-May-23/O	0.02	0.06	0.02	0.02
Antimony	mg/L	0.0001	EPA 200.8	26-May-23/O	< 0.0001	< 0.0001	< 0.0001	0.0001
Arsenic	mg/L	0.0001	EPA 200.8	26-May-23/O	0.0001	0.0016	< 0.0001	0.0001
Barium	mg/L	0.001	SM 3120	16-May-23/O	0.027	0.252	0.041	0.024
Beryllium	mg/L	0.002	SM 3120	16-May-23/O	< 0.002	< 0.002	< 0.002	< 0.002

Steve Garrett
Director of Laboratory Services

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: --- **REPORT No. B23-03372**

Report To:

City of Kawartha Lakes
PO Box 9000, 12 Peel St
Lindsay ON K9V 5R8
Attention: Kayla Pantaleo

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 11-May-23
DATE REPORTED: 09-Jun-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Somerville Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		13	14	15	16-I
			Sample I.D.		B23-03372-9	B23-03372-10	B23-03372-11	B23-03372-12
			Date Collected		10-May-23	10-May-23	10-May-23	10-May-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Boron	mg/L	0.005	SM 3120	16-May-23/O	0.009	0.062	0.013	0.008
Cadmium	mg/L	.00001	EPA 200.8	26-May-23/O	< 0.000010	< 0.000010	< 0.000010	< 0.000010
Calcium	mg/L	0.02	SM 3120	16-May-23/O	65.5	177	86.7	62.3
Chromium	mg/L	0.001	SM 3120	16-May-23/O	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (VI)	mg/L	0.001	MOE E3056	29-May-23/O	< 0.001 [1]	< 0.001 [1]	< 0.001	< 0.001 [1]
Cobalt	mg/L	0.005	SM 3120	16-May-23/O	< 0.005	0.010	< 0.005	< 0.005
Copper	mg/L	0.0001	EPA 200.8	26-May-23/O	0.0002	0.0004	0.0003	0.0005
Iron	mg/L	0.005	SM 3120	16-May-23/O	0.008	15.6	0.006	0.007
Lead	mg/L	0.00002	EPA 200.8	26-May-23/O	< 0.00002	0.00019	< 0.00002	< 0.00002
Magnesium	mg/L	0.02	SM 3120	16-May-23/O	1.98	9.69	2.01	1.97
Manganese	mg/L	0.001	SM 3120	16-May-23/O	0.002	1.72	< 0.001	< 0.001
Mercury	mg/L	0.00002	SM 3112 B	30-May-23/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	0.0001	EPA 200.8	26-May-23/O	< 0.0001	0.0007	0.0003	0.0001
Nickel	mg/L	0.01	SM 3120	16-May-23/O	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	0.1	SM 3120	16-May-23/O	0.4	2.0	0.6	0.3
Phosphorus-Total	mg/L	0.01	E3516.2	01-Jun-23/K	0.11	0.28	0.12	0.05
Phosphorus	mg/L	0.1	SM 3120	16-May-23/O	< 0.1	< 0.1	< 0.1	< 0.1
Selenium	mg/L	0.001	EPA 200.8	26-May-23/O	< 0.001	< 0.001	< 0.001	< 0.001
Silver	mg/L	0.0001	EPA 200.8	26-May-23/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	0.2	SM 3120	16-May-23/O	2.0	7.7	1.0	1.1
Strontium	mg/L	0.001	SM 3120	16-May-23/O	0.141	0.367	0.213	0.126
Tin	mg/L	0.05	SM 3120	16-May-23/O	< 0.05	< 0.05	< 0.05	< 0.05
Thallium	mg/L	0.00005	EPA 200.8	26-May-23/O	< 0.00005	0.00006	< 0.00005	< 0.00005
Titanium	mg/L	0.005	SM 3120	16-May-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Uranium	mg/L	0.00005	EPA 200.8	26-May-23/O	0.00005	0.00027	0.00008	0.00007
Vanadium	mg/L	0.0001	EPA 200.8	26-May-23/O	< 0.0001	0.0009	< 0.0001	< 0.0001
Zinc	mg/L	0.005	SM 3120	16-May-23/O	< 0.005	< 0.005	< 0.005	< 0.005

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Steve Garrett
Director of Laboratory Services

C.O.C.: --- **REPORT No. B23-03372**

Report To:

City of Kawartha Lakes
PO Box 9000, 12 Peel St
Lindsay ON K9V 5R8
Attention: Kayla Pantaleo

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 11-May-23
DATE REPORTED: 09-Jun-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Somerville Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		13	14	15	16-I
			Sample I.D.		B23-03372-9	B23-03372-10	B23-03372-11	B23-03372-12
			Date Collected		10-May-23	10-May-23	10-May-23	10-May-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Anion Sum	meq/L		Calc.	18-May-23/O	4.15	11.0	5.21	3.82
Cation Sum	meq/L		Calc.	18-May-23/O	3.53	10.9	4.55	3.33
% Difference	%		Calc.	18-May-23/O	8.03	0.130	6.79	6.92
Ion Ratio	AS/CS		Calc.	18-May-23/O	1.17	1.00	1.15	1.15
Conductivity (calc.)	µmho/cm		Calc.	18-May-23/O	368	899	450	335
Sodium Adsorption Ratio	-		Calc.	18-May-23/O	0.0662	0.152	0.0276	0.0373
TDS(calc.)/EC(actual)	-		Calc.	18-May-23/O	0.500	0.552	0.520	0.505
Langelier Index(25°C)	S.I.		Calc.	18-May-23/O	0.386	0.890	0.651	0.380

1. Chromium (VI) result is based on total Chromium
2. Digested

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Steve Garrett
Director of Laboratory Services

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B23-03372

Report To:

City of Kawartha Lakes
PO Box 9000, 12 Peel St
Lindsay ON K9V 5R8
Attention: Kayla Pantaleo

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 11-May-23
DATE REPORTED: 09-Jun-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Somerville Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		16-II	16-III	17	201D
			Sample I.D.		B23-03372-13	B23-03372-14	B23-03372-15	B23-03372-16
			Date Collected		10-May-23	10-May-23	10-May-23	10-May-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	15-May-23/O	195	216	2460	219
Conductivity @25°C	µmho/cm	1	SM 2510B	15-May-23/O	388	440	5720	459
pH @25°C	pH Units		SM 4500H	15-May-23/O	7.75	7.94	7.27	7.85
Colour	TCU	2	SM 2120C	15-May-23/O	5	< 2	119	4
Turbidity	NTU	0.1	SM 2130	15-May-23/O	44.3	1230	980	515
TDS(ion sum calc.)	mg/L	1	Calc.	18-May-23/O	199	226	3118	242
Total Suspended Solids	mg/L	3	SM2540D	19-May-23/K	51	6270	2000	235
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	16-May-23/O	4.7	1.5	34.3	3.2
BOD(5 day)	mg/L	3	SM 5210B	18-May-23/K	< 3	< 3	33	< 3
COD	mg/L	5	SM5220C	26-May-23/K	6	37	802	31
Phenolics	mg/L	0.001	MOEE 3179	26-May-23/K	< 0.001	< 0.001	0.015	< 0.001
Cyanide (Free)	mg/L	0.005	SM 4500CN	23-May-23/K	< 0.005	< 0.005	< 0.005	< 0.005
Chloride	mg/L	0.5	SM4110C	16-May-23/O	5.6	9.0	450	7.5
Fluoride	mg/L	0.1	SM4110C	16-May-23/O	< 0.1	< 0.1	< 1	0.1
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	01-Jun-23/K	2.68	0.82	235	1.55
Ammonia (N)-unionized	mg/L	0.01	CALC	01-Jun-23/K	< 0.01	< 0.01	0.36	< 0.01
Sulphate	mg/L	1	SM4110C	16-May-23/O	3	9	22	17
Nitrite (N)	mg/L	0.05	SM4110C	16-May-23/O	< 0.05	< 0.05	< 0.5	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	16-May-23/O	< 0.05	0.33	< 0.5	< 0.05
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	01-Jun-23/K	2.6	0.9	260	1.7
Hardness (as CaCO3)	mg/L	1	SM 3120	16-May-23/O	178	198	948	201
Aluminum	mg/L	0.01	SM 3120	16-May-23/O	0.02	0.02	0.14	0.05
Antimony	mg/L	0.0001	EPA 200.8	26-May-23/O	< 0.0001	< 0.0001	0.0011	< 0.0001
Arsenic	mg/L	0.0001	EPA 200.8	26-May-23/O	0.0001	0.0001	0.0024 [2]	0.0004
Barium	mg/L	0.001	SM 3120	16-May-23/O	0.039	0.069	0.367	0.030
Beryllium	mg/L	0.002	SM 3120	16-May-23/O	< 0.002	< 0.002	< 0.002	< 0.002

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Steve Garrett
Director of Laboratory Services

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B23-03372

Report To:

City of Kawartha Lakes
PO Box 9000, 12 Peel St
Lindsay ON K9V 5R8
Attention: Kayla Pantaleo

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 11-May-23
DATE REPORTED: 09-Jun-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Somerville Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		16-II	16-III	17	201D
			Sample I.D.		B23-03372-13	B23-03372-14	B23-03372-15	B23-03372-16
			Date Collected		10-May-23	10-May-23	10-May-23	10-May-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Boron	mg/L	0.005	SM 3120	16-May-23/O	0.008	< 0.005	7.90	0.049
Cadmium	mg/L	).00001(	EPA 200.8	26-May-23/O	0.000212	< 0.000010	< 0.000059	< 0.000010
Calcium	mg/L	0.02	SM 3120	16-May-23/O	67.1	61.0	428	75.4
Chromium	mg/L	0.001	SM 3120	16-May-23/O	< 0.001	0.001	0.003	0.001
Chromium (VI)	mg/L	0.001	MOE E3056	29-May-23/O	< 0.001 [1]	< 0.001	< 0.001	< 0.001
Cobalt	mg/L	0.005	SM 3120	16-May-23/O	< 0.005	< 0.005	0.025	< 0.005
Copper	mg/L	0.0001	EPA 200.8	26-May-23/O	0.0007	0.0005	0.0004	0.0009
Iron	mg/L	0.005	SM 3120	16-May-23/O	< 0.005	< 0.005	0.470	0.047
Lead	mg/L	0.00002	EPA 200.8	26-May-23/O	< 0.00002	< 0.00002	0.00031	0.00012
Magnesium	mg/L	0.02	SM 3120	16-May-23/O	2.53	11.1	78.0	3.15
Manganese	mg/L	0.001	SM 3120	16-May-23/O	< 0.001	< 0.001	1.48	0.014
Mercury	mg/L	0.00002	SM 3112 B	30-May-23/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	0.0001	EPA 200.8	26-May-23/O	0.0003	0.0007	0.0007	0.0005
Nickel	mg/L	0.01	SM 3120	16-May-23/O	< 0.01	< 0.01	0.04	< 0.01
Potassium	mg/L	0.1	SM 3120	16-May-23/O	0.5	2.0	231	0.8
Phosphorus-Total	mg/L	0.01	E3516.2	01-Jun-23/K	0.07	2.15	1.06	0.20
Phosphorus	mg/L	0.1	SM 3120	16-May-23/O	< 0.1	< 0.1	< 0.1	< 0.1
Selenium	mg/L	0.001	EPA 200.8	26-May-23/O	< 0.001	< 0.001	< 0.002	< 0.001
Silver	mg/L	0.0001	EPA 200.8	26-May-23/O	< 0.0001	< 0.0001	0.0015	< 0.0001
Sodium	mg/L	0.2	SM 3120	16-May-23/O	2.8	4.2	432	6.4
Strontium	mg/L	0.001	SM 3120	16-May-23/O	0.137	0.165	2.32	0.467
Tin	mg/L	0.05	SM 3120	16-May-23/O	< 0.05	< 0.05	0.06	< 0.05
Thallium	mg/L	0.00005	EPA 200.8	26-May-23/O	< 0.00005	< 0.00005	0.00009	< 0.00005
Titanium	mg/L	0.005	SM 3120	16-May-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Uranium	mg/L	0.00005	EPA 200.8	26-May-23/O	0.00016	0.00062	0.00031	0.00012
Vanadium	mg/L	0.0001	EPA 200.8	26-May-23/O	< 0.0001	0.0023	0.0109	0.0002
Zinc	mg/L	0.005	SM 3120	16-May-23/O	< 0.005	< 0.005	0.005	< 0.005

Steve Garrett
Director of Laboratory Services

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CADUCEON
ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: --- **REPORT No. B23-03372**

Report To:

City of Kawartha Lakes
PO Box 9000, 12 Peel St
Lindsay ON K9V 5R8
Attention: Kayla Pantaleo

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 11-May-23
DATE REPORTED: 09-Jun-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Somerville Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		16-II	16-III	17	201D
			Sample I.D.		B23-03372-13	B23-03372-14	B23-03372-15	B23-03372-16
			Date Collected		10-May-23	10-May-23	10-May-23	10-May-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Anion Sum	meq/L		Calc.	18-May-23/O	4.12	4.79	62.2	4.95
Cation Sum	meq/L		Calc.	18-May-23/O	3.69	4.19	52.6	4.32
% Difference	%		Calc.	18-May-23/O	5.53	6.66	8.40	6.81
Ion Ratio	AS/CS		Calc.	18-May-23/O	1.12	1.14	1.18	1.15
Conductivity (calc.)	µmho/cm		Calc.	18-May-23/O	367	418	4234	435
Sodium Adsorption Ratio	-		Calc.	18-May-23/O	0.0907	0.131	5.04	0.195
TDS(calc.)/EC(actual)	-		Calc.	18-May-23/O	0.512	0.515	0.545	0.527
Langelier Index(25°C)	S.I.		Calc.	18-May-23/O	0.444	0.627	1.76	0.636

1 . Chromium (VI) result is based on total Chromium
2 . Digested

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Steve Garrett
Director of Laboratory Services

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B23-03372

Report To:

City of Kawartha Lakes
PO Box 9000, 12 Peel St
Lindsay ON K9V 5R8
Attention: Kayla Pantaleo

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 11-May-23
DATE REPORTED: 09-Jun-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Somerville Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		202	203	204	
			Sample I.D.		B23-03372-17	B23-03372-18	B23-03372-19	
			Date Collected		10-May-23	10-May-23	10-May-23	
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	15-May-23/O	207	144	179	
Conductivity @25°C	µmho/cm	1	SM 2510B	15-May-23/O	647	4270	1440	
pH @25°C	pH Units		SM 4500H	15-May-23/O	7.97	7.86	7.91	
Colour	TCU	2	SM 2120C	15-May-23/O	< 2	< 2	< 2	
Turbidity	NTU	0.1	SM 2130	15-May-23/O	92.4	42.5	25.6	
TDS(ion sum calc.)	mg/L	1	Calc.	18-May-23/O	364	2789	942	
Total Suspended Solids	mg/L	3	SM2540D	19-May-23/K	42	70	78	
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	16-May-23/O	2.0	< 0.2	0.8	
BOD(5 day)	mg/L	3	SM 5210B	18-May-23/K	< 3	3	< 3	
COD	mg/L	5	SM5220C	26-May-23/K	8	5	< 5	
Phenolics	mg/L	0.001	MOEE 3179	26-May-23/K	< 0.001	< 0.001	< 0.001	
Cyanide (Free)	mg/L	0.005	SM 4500CN	23-May-23/K	< 0.005	< 0.005	< 0.005	
Chloride	mg/L	0.5	SM4110C	16-May-23/O	33.9	724	93.6	
Fluoride	mg/L	0.1	SM4110C	16-May-23/O	0.9	1.5	1.8	
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	01-Jun-23/K	4.26	1.52	0.81	
Ammonia (N)-unionized	mg/L	0.01	CALC	01-Jun-23/K	< 0.01	< 0.01	< 0.01	
Sulphate	mg/L	1	SM4110C	16-May-23/O	102	1150	448	
Nitrite (N)	mg/L	0.05	SM4110C	16-May-23/O	< 0.05	< 0.05	< 0.5	
Nitrate (N)	mg/L	0.05	SM4110C	16-May-23/O	< 0.05	0.29	< 0.5	
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	01-Jun-23/K	4.4	1.6	1.2	
Hardness (as CaCO3)	mg/L	1	SM 3120	16-May-23/O	237	752	389	
Aluminum	mg/L	0.01	SM 3120	16-May-23/O	0.03	0.04	0.04	
Antimony	mg/L	0.0001	EPA 200.8	26-May-23/O	< 0.0001	0.0003	0.0002	
Arsenic	mg/L	0.0001	EPA 200.8	26-May-23/O	0.0001	0.0042	0.0007	
Barium	mg/L	0.001	SM 3120	16-May-23/O	0.012	0.020	0.016	
Beryllium	mg/L	0.002	SM 3120	16-May-23/O	< 0.002	< 0.002	< 0.002	

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Steve Garrett
Director of Laboratory Services

CADUCEON™
ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: --- **REPORT No. B23-03372**

Report To:

City of Kawartha Lakes
PO Box 9000, 12 Peel St
Lindsay ON K9V 5R8
Attention: Kayla Pantaleo

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 11-May-23
DATE REPORTED: 09-Jun-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Somerville Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		202	203	204	
			Sample I.D.		B23-03372-17	B23-03372-18	B23-03372-19	
			Date Collected		10-May-23	10-May-23	10-May-23	
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Boron	mg/L	0.005	SM 3120	16-May-23/O	0.478	3.92	1.89	
Cadmium	mg/L	).00001(	EPA 200.8	26-May-23/O	< 0.000010	< 0.000029	< 0.000012	
Calcium	mg/L	0.02	SM 3120	16-May-23/O	66.0	141	146	
Chromium	mg/L	0.001	SM 3120	16-May-23/O	< 0.001	< 0.001	< 0.001	
Chromium (VI)	mg/L	0.001	MOE E3056	29-May-23/O	< 0.001 [1]	< 0.001 [1]	< 0.001 [1]	
Cobalt	mg/L	0.005	SM 3120	16-May-23/O	< 0.005	< 0.005	< 0.005	
Copper	mg/L	0.0001	EPA 200.8	26-May-23/O	0.0003	< 0.0002	0.0005	
Iron	mg/L	0.005	SM 3120	16-May-23/O	0.023	0.258	< 0.005	
Lead	mg/L	0.00002	EPA 200.8	26-May-23/O	0.00004	< 0.00009	< 0.00004	
Magnesium	mg/L	0.02	SM 3120	16-May-23/O	17.5	97.2	42.1	
Manganese	mg/L	0.001	SM 3120	16-May-23/O	0.003	0.031	0.008	
Mercury	mg/L	0.00002	SM 3112 B	30-May-23/O	< 0.00002	< 0.00002	< 0.00002	
Molybdenum	mg/L	0.0001	EPA 200.8	26-May-23/O	0.0002	0.0046	0.0005	
Nickel	mg/L	0.01	SM 3120	16-May-23/O	< 0.01	< 0.01	< 0.01	
Potassium	mg/L	0.1	SM 3120	16-May-23/O	3.5	13.9	6.8	
Phosphorus-Total	mg/L	0.01	E3516.2	01-Jun-23/K	0.03	0.03	0.07	
Phosphorus	mg/L	0.1	SM 3120	16-May-23/O	< 0.1	< 0.1	< 0.1	
Selenium	mg/L	0.001	EPA 200.8	26-May-23/O	< 0.001	< 0.001	0.002	
Silver	mg/L	0.0001	EPA 200.8	26-May-23/O	< 0.0001	< 0.0001	< 0.0001	
Sodium	mg/L	0.2	SM 3120	16-May-23/O	16.2	575	97.3	
Strontium	mg/L	0.001	SM 3120	16-May-23/O	7.04	9.19	3.59	
Tin	mg/L	0.05	SM 3120	16-May-23/O	< 0.05	< 0.05	< 0.05	
Thallium	mg/L	0.00005	EPA 200.8	26-May-23/O	< 0.00005	< 0.00005	< 0.00005	
Titanium	mg/L	0.005	SM 3120	16-May-23/O	< 0.005	< 0.005	< 0.005	
Uranium	mg/L	0.00005	EPA 200.8	26-May-23/O	< 0.00005	0.00252	0.00026	
Vanadium	mg/L	0.0001	EPA 200.8	26-May-23/O	< 0.0001	< 0.0004	0.0006	
Zinc	mg/L	0.005	SM 3120	16-May-23/O	< 0.005	< 0.005	< 0.005	

Steve Garrett
Director of Laboratory Services

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B23-03372

Report To:

City of Kawartha Lakes
PO Box 9000, 12 Peel St
Lindsay ON K9V 5R8
Attention: Kayla Pantaleo

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 11-May-23
DATE REPORTED: 09-Jun-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Somerville Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		202	203	204	
			Sample I.D.		B23-03372-17	B23-03372-18	B23-03372-19	
			Date Collected		10-May-23	10-May-23	10-May-23	
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Anion Sum	meq/L		Calc.	18-May-23/O	7.27	47.3	15.6	
Cation Sum	meq/L		Calc.	18-May-23/O	5.53	40.4	15.1	
% Difference	%		Calc.	18-May-23/O	13.6	7.91	1.57	
Ion Ratio	AS/CS		Calc.	18-May-23/O	1.31	1.17	1.03	
Conductivity (calc.)	µmho/cm		Calc.	18-May-23/O	626	3716	1438	
Sodium Adsorption Ratio	-		Calc.	18-May-23/O	0.458	9.12	1.83	
TDS(calc.)/EC(actual)	-		Calc.	18-May-23/O	0.563	0.653	0.653	
Langelier Index(25°C)	S.I.		Calc.	18-May-23/O	0.653	0.646	0.823	

1. Chromium (VI) result is based on total Chromium
2. Digested

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Steve Garrett
Director of Laboratory Services

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: --- **REPORT No. B23-03371**

Report To:

City of Kawartha Lakes
PO Box 9000, 12 Peel St
Lindsay ON K9V 5R8
Attention: Kayla Pantaleo

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 11-May-23

DATE REPORTED: 07-Jun-23

SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Somerville Landfill

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		SWA	SWB	DUP	
			Sample I.D.		B23-03371-1	B23-03371-2	B23-03371-3	
			Date Collected		10-May-23	10-May-23	10-May-23	
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	15-May-23/O	167	172	170	
Conductivity @25°C	µmho/cm	1	SM 2510B	15-May-23/O	339	335	336	
pH @25°C	pH Units		SM 4500H	15-May-23/O	7.78	8.03	8.05	
Colour	TCU	2	SM 2120C	15-May-23/O	16	11	13	
Turbidity	NTU	0.1	SM 2130	15-May-23/O	0.9	0.4	1.1	
TDS(ion sum calc.)	mg/L	1	Calc.	18-May-23/O	173	174	174	
Total Suspended Solids	mg/L	3	SM2540D	19-May-23/K	< 3	< 3	< 3	
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	15-May-23/O	6.3	3.8	6.6	
BOD(5 day)	mg/L	3	SM 5210B	17-May-23/K	< 3	< 3	< 3	
COD	mg/L	5	SM5220C	19-May-23/K	5	15	12	
Total Organic Carbon	mg/L	0.2	EPA 415.2	15-May-23/O	6.5	5.6	7.0	
Phenolics	mg/L	0.001	MOEE 3179	26-May-23/K	< 0.001	< 0.001	< 0.001	
Cyanide (Free)	mg/L	0.005	SM 4500CN	23-May-23/K	< 0.005	< 0.005	< 0.005	
Chloride	mg/L	0.5	SM4110C	16-May-23/O	1.1	1.0	1.0	
Fluoride	mg/L	0.1	SM4110C	16-May-23/O	< 0.1	< 0.1	< 0.1	
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	02-Jun-23/K	1.81	2.48	2.26	
Ammonia (N)-unionized	mg/L	0.01	CALC	02-Jun-23/K	0.02	0.03	0.06	
Sulphate	mg/L	1	SM4110C	16-May-23/O	3	2	2	
Nitrite (N)	mg/L	0.05	SM4110C	16-May-23/O	< 0.05	< 0.05	< 0.05	
Nitrate (N)	mg/L	0.05	SM4110C	16-May-23/O	0.18	< 0.05	< 0.05	
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	01-Jun-23/K	2.6	2.4	2.6	
Hardness (as CaCO3)	mg/L	1	SM 3120	15-May-23/O	156	154	156	
Aluminum	mg/L	0.01	SM 3120	16-May-23/O	0.01	< 0.01	0.01	
Aluminum (total)	mg/L	0.01	SM 3120	15-May-23/O	0.03	0.02	0.03	
Antimony	mg/L	0.0001	EPA 200.8	24-May-23/O	0.0001	0.0003	0.0004	
Arsenic	mg/L	0.0001	EPA 200.8	24-May-23/O	0.0001	0.0001	0.0001	
Barium	mg/L	0.001	SM 3120	15-May-23/O	0.012	0.011	0.012	

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Steve Garrett
Director of Laboratory Services

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: --- **REPORT No. B23-03371**

Report To:

City of Kawartha Lakes
PO Box 9000, 12 Peel St
Lindsay ON K9V 5R8
Attention: Kayla Pantaleo

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 11-May-23
DATE REPORTED: 07-Jun-23
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Somerville Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		SWA	SWB	DUP	
			Sample I.D.		B23-03371-1	B23-03371-2	B23-03371-3	
			Date Collected		10-May-23	10-May-23	10-May-23	
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Beryllium	mg/L	0.002	SM 3120	15-May-23/O	< 0.002	< 0.002	< 0.002	
Boron	mg/L	0.005	SM 3120	15-May-23/O	0.006	0.006	0.007	
Cadmium	mg/L	0.000015	EPA 200.8	24-May-23/O	< 0.000015	< 0.000015	< 0.000015	
Calcium	mg/L	0.02	SM 3120	15-May-23/O	59.7	59.1	60.0	
Chromium	mg/L	0.001	SM 3120	15-May-23/O	< 0.001	< 0.001	< 0.001	
Chromium (VI)	mg/L	0.001	MOE E3056	29-May-23/O	0.003	< 0.001 [1]	< 0.001 [1]	
Cobalt	mg/L	0.0001	EPA 200.8	24-May-23/O	< 0.0001	< 0.0001	< 0.0001	
Copper	mg/L	0.0001	EPA 200.8	24-May-23/O	0.0005	0.0005	0.0007	
Iron	mg/L	0.005	SM 3120	15-May-23/O	0.028	0.010	0.021	
Lead	mg/L	0.00002	EPA 200.8	24-May-23/O	0.00005	0.00003	0.00004	
Magnesium	mg/L	0.02	SM 3120	15-May-23/O	1.59	1.57	1.57	
Manganese	mg/L	0.001	SM 3120	15-May-23/O	0.003	0.003	0.002	
Mercury	mg/L	0.00002	SM 3112 B	29-May-23/O	< 0.00002	< 0.00002	< 0.00002	
Molybdenum	mg/L	0.0001	EPA 200.8	24-May-23/O	< 0.0001	< 0.0001	< 0.0001	
Nickel	mg/L	0.01	SM 3120	15-May-23/O	< 0.01	< 0.01	< 0.01	
Potassium	mg/L	0.1	SM 3120	15-May-23/O	0.4	0.4	0.4	
Phosphorus-Total	mg/L	0.01	E3516.2	01-Jun-23/K	0.06	0.02	0.02	
Phosphorus	mg/L	0.1	SM 3120	15-May-23/O	< 0.1	< 0.1	< 0.1	
Selenium	mg/L	0.001	EPA 200.8	24-May-23/O	< 0.001	< 0.001	< 0.001	
Silver	mg/L	0.0001	EPA 200.8	24-May-23/O	< 0.0001	< 0.0001	< 0.0001	
Sodium	mg/L	0.2	SM 3120	15-May-23/O	1.1	1.0	1.1	
Strontium	mg/L	0.001	SM 3120	15-May-23/O	0.115	0.113	0.116	
Tin	mg/L	0.05	SM 3120	15-May-23/O	< 0.05	< 0.05	< 0.05	
Titanium	mg/L	0.005	SM 3120	15-May-23/O	< 0.005	< 0.005	< 0.005	
Thallium	mg/L	0.00005	EPA 200.8	24-May-23/O	< 0.00005	< 0.00005	< 0.00005	
Uranium	mg/L	0.00005	EPA 200.8	24-May-23/O	< 0.00005	< 0.00005	< 0.00005	
Vanadium	mg/L	0.0001	EPA 200.8	24-May-23/O	< 0.0001	< 0.0001	0.0001	

Steve Garrett
Director of Laboratory Services

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: --- **REPORT No. B23-03371**

Report To:

City of Kawartha Lakes
PO Box 9000, 12 Peel St
Lindsay ON K9V 5R8
Attention: Kayla Pantaleo

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 11-May-23
DATE REPORTED: 07-Jun-23
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Somerville Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		SWA	SWB	DUP	
			Sample I.D.		B23-03371-1	B23-03371-2	B23-03371-3	
			Date Collected		10-May-23	10-May-23	10-May-23	
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Zinc	mg/L	0.005	SM 3120	15-May-23/O	< 0.005	< 0.005	< 0.005	
Anion Sum	meq/L		Calc.	18-May-23/O	3.43	3.50	3.46	
Cation Sum	meq/L		Calc.	18-May-23/O	3.47	3.42	3.47	
% Difference	%		Calc.	18-May-23/O	0.532	1.14	0.0617	
Ion Ratio	AS/CS		Calc.	18-May-23/O	0.989	1.02	0.999	
Conductivity (calc.)	µmho/cm		Calc.	18-May-23/O	327	327	328	
Sodium Adsorption Ratio	-		Calc.	18-May-23/O	0.0221	0.0213	0.0209	
TDS(calc.)/EC(actual)	-		Calc.	18-May-23/O	0.510	0.519	0.516	
Langelier Index(25°C)	S.I.		Calc.	18-May-23/O	0.409	0.666	0.687	

1 . Chromium (VI) result is based on total Chromium

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Steve Garrett
Director of Laboratory Services

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: --- **REPORT No. B23-03600**

Report To:

City of Kawartha Lakes
PO Box 9000, 12 Peel St
Lindsay ON K9V 5R8
Attention: Deyonte Levene

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 26-May-23
DATE REPORTED: 20-Jun-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Somerville Landfill
P.O. NUMBER: 23-010
WATERWORKS NO.

			Client I.D.		MW11			
			Sample I.D.		B23-03600-1			
			Date Collected		25-May-23			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	29-May-23/O	381			
Conductivity @25°C	µmho/cm	1	SM 2510B	29-May-23/O	806			
pH @25°C	pH Units		SM 4500H	29-May-23/O	7.62			
Colour	TCU	2	SM 2120C	30-May-23/O	11			
Turbidity	NTU	0.1	SM 2130	30-May-23/O	64.2			
TDS(ion sum calc.)	mg/L	1	Calc.	30-May-23/O	435			
Total Suspended Solids	mg/L	3	SM2540D	02-Jun-23/K	32			
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	30-May-23/O	7.5			
BOD(5 day)	mg/L	3	SM 5210B	01-Jun-23/K	< 3			
COD	mg/L	5	SM5220C	13-Jun-23/K	15			
Phenolics	mg/L	0.001	MOEE 3179	15-Jun-23/K	< 0.001			
Cyanide (Free)	mg/L	0.005	SM 4500CN	30-May-23/K	< 0.005			
Chloride	mg/L	0.5	SM4110C	07-Jun-23/O	29.2			
Fluoride	mg/L	0.1	SM4110C	07-Jun-23/O	< 0.1			
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	06-Jun-23/K	< 0.01			
Ammonia (N)-unionized	mg/L	0.01	CALC	06-Jun-23/K	< 0.01			
Sulphate	mg/L	1	SM4110C	07-Jun-23/O	8			
Nitrite (N)	mg/L	0.05	SM4110C	07-Jun-23/O	< 0.05			
Nitrate (N)	mg/L	0.05	SM4110C	07-Jun-23/O	0.10			
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	15-Jun-23/K	0.6			
Hardness (as CaCO3)	mg/L	1	SM 3120	30-May-23/O	407			
Aluminum	mg/L	0.01	SM 3120	30-May-23/O	0.05			
Antimony	mg/L	0.0001	EPA 200.8	02-Jun-23/O	0.0001			
Arsenic	mg/L	0.0001	EPA 200.8	02-Jun-23/O	0.0002			
Barium	mg/L	0.001	SM 3120	30-May-23/O	0.228			
Beryllium	mg/L	0.002	SM 3120	30-May-23/O	< 0.002			
Boron	mg/L	0.005	SM 3120	30-May-23/O	0.044			

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Steve Garrett
Director of Laboratory Services

CADUCEON
ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B23-03600

Report To:

City of Kawartha Lakes
PO Box 9000, 12 Peel St
Lindsay ON K9V 5R8
Attention: Deyonte Levene

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 26-May-23
DATE REPORTED: 20-Jun-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Somerville Landfill
P.O. NUMBER: 23-010
WATERWORKS NO.

				Client I.D.	MW11			
				Sample I.D.	B23-03600-1			
				Date Collected	25-May-23			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Cadmium	mg/L	.000010	EPA 200.8	02-Jun-23/O	< 0.000010			
Calcium	mg/L	0.02	SM 3120	30-May-23/O	151			
Chromium	mg/L	0.001	SM 3120	30-May-23/O	< 0.001			
Chromium (VI)	mg/L	0.001	MOE E3056	05-Jun-23/O	< 0.001 [1]			
Cobalt	mg/L	0.005	SM 3120	30-May-23/O	0.006			
Copper	mg/L	0.0001	EPA 200.8	02-Jun-23/O	0.0071			
Iron	mg/L	0.005	SM 3120	30-May-23/O	0.104			
Lead	mg/L	0.00002	EPA 200.8	02-Jun-23/O	< 0.00002			
Magnesium	mg/L	0.02	SM 3120	30-May-23/O	6.98			
Manganese	mg/L	0.001	SM 3120	30-May-23/O	0.422			
Mercury	mg/L	0.00002	SM 3112 B	08-Jun-23/O	< 0.00002			
Molybdenum	mg/L	0.0001	EPA 200.8	02-Jun-23/O	0.0005			
Nickel	mg/L	0.01	SM 3120	30-May-23/O	< 0.01			
Potassium	mg/L	0.1	SM 3120	30-May-23/O	3.3			
Phosphorus-Total	mg/L	0.01	E3516.2	15-Jun-23/K	0.06			
Phosphorus	mg/L	0.1	SM 3120	30-May-23/O	< 0.1			
Selenium	mg/L	0.001	EPA 200.8	02-Jun-23/O	< 0.001			
Silver	mg/L	0.0001	EPA 200.8	02-Jun-23/O	< 0.0001			
Sodium	mg/L	0.2	SM 3120	30-May-23/O	6.9			
Strontium	mg/L	0.001	SM 3120	30-May-23/O	0.314			
Tin	mg/L	0.05	SM 3120	30-May-23/O	< 0.05			
Thallium	mg/L	0.00005	EPA 200.8	02-Jun-23/O	< 0.00005			
Titanium	mg/L	0.005	SM 3120	30-May-23/O	< 0.005			
Uranium	mg/L	0.00005	EPA 200.8	02-Jun-23/O	0.00034			
Vanadium	mg/L	0.0001	EPA 200.8	02-Jun-23/O	0.0002			
Zinc	mg/L	0.005	SM 3120	30-May-23/O	< 0.005			
Anion Sum	meq/L		Calc.	30-May-23/O	8.62			

Steve Garrett
Director of Laboratory Services

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: --- **REPORT No. B23-03600**

Report To:

City of Kawartha Lakes
PO Box 9000, 12 Peel St
Lindsay ON K9V 5R8
Attention: Deyonte Levene

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 26-May-23
DATE REPORTED: 20-Jun-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Somerville Landfill
P.O. NUMBER: 23-010
WATERWORKS NO.

				Client I.D.	MW11			
				Sample I.D.	B23-03600-1			
				Date Collected	25-May-23			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Cation Sum	meq/L		Calc.	30-May-23/O	8.53			
% Difference	%		Calc.	30-May-23/O	0.470			
Ion Ratio	AS/CS		Calc.	30-May-23/O	1.01			
Conductivity (calc.)	µmho/cm		Calc.	30-May-23/O	782			
Sodium Adsorption Ratio	-		Calc.	30-May-23/O	0.148			
TDS(calc.)/EC(actual)	-		Calc.	30-May-23/O	0.540			
Langelier Index(25°C)	S.I.		Calc.	30-May-23/O	0.918			

1 . Chromium (VI) result is based on total Chromium

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Steve Garrett
Director of Laboratory Services

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: -

REPORT No: 23-029344 - Rev. 0

Report To:
City of Kawartha Lakes
PO Box 9000
322 Kent Street West
Lindsay, ON K9V 4T7

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

Attention: Kayla Pantaleo

DATE RECEIVED: 2023-Oct-19
DATE REPORTED: 2023-Nov-17
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: Somerville Landfill
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	10	OTTAWA	LMACGREGOR	2023-Nov-07	A-IC-01	SM 4110B
BOD5 (Liquid)	10	KINGSTON	JWOLFE2	2023-Nov-02	BOD-001	SM 5210B
COD (Liquid)	10	KINGSTON	EHINCH	2023-Oct-26	COD-001	SM 5220D
Colour (Liquid)	10	OTTAWA	MDON	2023-Oct-25	A-COL-01	SM 2120C
Cond/pH/Alk Auto (Liquid)	10	OTTAWA	SBOUDREAU	2023-Oct-26	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
Cyanide WAD (Liquid)	10	KINGSTON	JMACINNES	2023-Oct-25	CN-001	SM 4500-CN-E
DOC/DIC (Liquid)	10	OTTAWA	VKASYAN	2023-Nov-01	C-OC-01	EPA 415.2
Ion Balance (Calc.)	10	OTTAWA	STAILLON		CP-028	MECP E3196
Chromium VI (Liquid)	10	OTTAWA	STAILLON	2023-Oct-26	D-CRVI-01	MECP E3056
ICP/MS (Liquid)	10	OTTAWA	TPRICE	2023-Oct-25	D-ICPMS-01	EPA 200.8
ICP/OES (Liquid)	10	OTTAWA	NHOGAN	2023-Oct-24	D-ICP-01	SM 3120B
Mercury (Liquid)	10	OTTAWA	TBENNETT	2023-Oct-25	D-HG-02	SM 3112B
Ammonia & o-Phosphate (Liquid)	10	KINGSTON	KDIBBITS	2023-Nov-06	NH3-001	SM 4500NH3
Phenols (Liquid)	10	KINGSTON	JMACINNES	2023-Nov-16	PHEN-01	MECP E3179
TP & TKN (Liquid)	10	KINGSTON	KDIBBITS	2023-Nov-10	TPTKN-001	MECP E3516.2
TSS (Liquid)	10	KINGSTON	TSUNNY	2023-Oct-26	TSS-001	SM 2540D
Turbidity (Liquid)	10	OTTAWA	MDON	2023-Oct-25	A-TURB-01	SM 2130B
VOC-Volatiles Full (Water)	10	RICHMOND_HILL	FLENA	2023-Oct-29	C-VOC-02	EPA 8260

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Michelle Dubien
Data Specialist

		Client I.D.	1-I	2-II	DUP	8-III	DUP-I
		Sample I.D.	23-029344-1	23-029344-2	23-029344-3	23-029344-4	23-029344-5
		Date Collected	2023-10-18	2023-10-18	2023-10-18	2023-10-18	2023-10-18
Parameter	**Units**	**R.L.**	-	-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5	621	286	206	581	239
TDS (Calc. from Cond.)	mg/L	3	586	350	390	567	375
Conductivity @25°C	uS/cm	1	1090	673	747	1060	721
pH @25°C	pH units	-	7.36	7.53	7.62	7.44	7.62
Colour	TCU	2	<2	<2	<2	3	5
Turbidity	NTU	0.1	395	263	13.4	39.3	194
Fluoride	mg/L	0.1	<0.1	<0.1	1.0	<0.1	<0.1
Chloride	mg/L	0.5	0.8	37.9	51.7	10.1	103
Nitrate (N)	mg/L	0.05	<0.05	0.89	0.08	0.05	0.45
Nitrite (N)	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	1	4	38	142	10	8
BOD5	mg/L	3	<3	<3	<3	<3	<3
Total Suspended Solids	mg/L	3	5030	1030	28	30	338
Phosphorus (Total)	mg/L	0.01	0.58	0.30	0.05	0.02	0.08
Total Kjeldahl Nitrogen	mg/L	0.1	1.2	0.8	0.9	0.3	0.5
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05	1.05	0.49	0.78	0.55	0.78
Ammonia (N)-unionized	mg/L	0.01	<0.01	<0.01	0.01	<0.01	<0.01
Dissolved Organic Carbon	mg/L	0.2	8.4	7.6	3.6	7.3	3.8
Cyanide (WAD)	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Phenolics	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
COD	mg/L	5	20	25	13	18	25

Michelle Dubien
Data Specialist

		Client I.D.	1-I	2-II	DUP	8-III	DUP-I
		Sample I.D.	23-029344-1	23-029344-2	23-029344-3	23-029344-4	23-029344-5
		Date Collected	2023-10-18	2023-10-18	2023-10-18	2023-10-18	2023-10-18
Parameter	**Units**	**R.L.**	-	-	-	-	-
Hardness (as CaCO3)	mg/L	0.02	599	352	295	542	317
Aluminum	mg/L	0.01	0.11	0.06	0.07	0.10	0.06
Barium	mg/L	0.001	0.193	0.169	0.012	0.140	0.096
Boron	mg/L	0.005	0.014	0.236	0.639	0.061	0.013
Calcium	mg/L	0.02	220	114	82.9	190	121
Iron	mg/L	0.005	6.26	0.007	0.044	1.55	<0.005
Magnesium	mg/L	0.02	11.9	16.4	21.4	16.3	3.49
Manganese	mg/L	0.001	2.05	0.020	0.002	0.759	0.001
Phosphorus	mg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Potassium	mg/L	0.1	2.9	2.7	4.0	2.3	0.5
Sodium	mg/L	0.2	2.0	6.3	35.8	9.0	10.2
Strontium	mg/L	0.001	0.469	0.269	9.86	0.426	0.267
Tin	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Titanium	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	mg/L	0.005	<0.005	<0.005	0.005	<0.005	<0.005
Antimony	mg/L	0.0001	<0.0001	0.0001	<0.0001	0.0002	<0.0001
Arsenic	mg/L	0.0001	0.0006	0.0001	0.0003	0.0003	0.0001
Beryllium	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium	mg/L	0.000015	<0.000015	<0.000015	<0.000015	0.000158	<0.000015
Chromium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	mg/L	0.0001	0.0086	0.0060	0.0002	0.0075	0.0003

Michelle Dubien
Data Specialist

		Client I.D.	1-I	2-II	DUP	8-III	DUP-I
		Sample I.D.	23-029344-1	23-029344-2	23-029344-3	23-029344-4	23-029344-5
		Date Collected	2023-10-18	2023-10-18	2023-10-18	2023-10-18	2023-10-18
Parameter	**Units**	**R.L.**	-	-	-	-	-
Copper	mg/L	0.0001	0.0004	0.0009	<0.0001	0.0007	0.0002
Lead	mg/L	0.00002	<0.00004	<0.00002	<0.00002	0.00004	<0.00002
Molybdenum	mg/L	0.0001	0.0004	0.0004	0.0002	0.0004	<0.0001
Nickel	mg/L	0.0002	0.0020	0.0021	0.0003	0.0041	0.0003
Selenium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	0.002
Silver	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Thallium	mg/L	0.00005	<0.00005	<0.00005	<0.00005	0.00014	<0.00005
Uranium	mg/L	0.00005	0.00027	0.00142	0.00006	0.00031	0.00006
Vanadium	mg/L	0.0001	0.0003	0.0015	<0.0001	0.0002	<0.0001
Chromium (VI)	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury	mg/L	0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Anion Sum	meq/L	-	12.5	7.63	8.58	12.1	7.86
Cation Sum	meq/L	-	12.6	7.42	7.24	11.4	6.84
% Difference	%	-	0.407	1.41	8.44	2.89	6.90
Ion Ratio	-	-	0.992	1.03	1.18	1.06	1.15
Sodium Adsorption Ratio	-	-	0.0361	0.145	0.956	0.168	0.249
TDS (Ion Sum Calc)	mg/L	1	624	391	452	590	392
TDS(calc.)/EC(actual)	-	-	0.571	0.581	0.604	0.557	0.543
Conductivity Calc	µmho/cm	-	1050	710	764	1000	742
Conductivity Calc / Conductivity	-	-	0.961	1.06	1.02	0.949	1.03
Langelier Index(25°C)	-	-	1.02	0.591	0.322	1.01	0.628

Michelle Dubien
Data Specialist

		Client I.D.	1-I	2-II	DUP	8-III	DUP-I
		Sample I.D.	23-029344-1	23-029344-2	23-029344-3	23-029344-4	23-029344-5
		Date Collected	2023-10-18	2023-10-18	2023-10-18	2023-10-18	2023-10-18
Parameter	**Units**	**R.L.**	-	-	-	-	-
Saturation pH (25°C)	-	-	6.34	6.94	7.30	6.43	6.99
pH (Client Data)	pH units	-	7.36	7.77	7.95	7.44	7.75
Temperature (Client Data)	°C	-	8.7	8.7	8.3	8.5	8.7

Michelle Dubien
Data Specialist

		Client I.D.	10-II (B)	13	14	15	9
		Sample I.D.	23-029344-6	23-029344-7	23-029344-8	23-029344-9	23-029344-10
		Date Collected	2023-10-18	2023-10-18	2023-10-18	2023-10-18	2023-10-18
Parameter	**Units**	**R.L.**	-	-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5	288	241	764	272	343
TDS (Calc. from Cond.)	mg/L	3	304	427	996	286	345
Conductivity @25°C	uS/cm	1	586	812	1810	551	665
pH @25°C	pH units	-	7.55	7.61	7.22	7.68	7.51
Colour	TCU	2	<2	4	3	<2	5
Turbidity	NTU	0.1	72.3	371	127	8.7	89.2
Fluoride	mg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chloride	mg/L	0.5	12.7	133	17.8	2.1	14.3
Nitrate (N)	mg/L	0.05	3.40	0.49	<0.05	0.22	0.30
Nitrite (N)	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	0.10
Sulphate	mg/L	1	20	10	3	36	5
BOD5	mg/L	3	<3	<3	<3	<3	<3
Total Suspended Solids	mg/L	3	123	414	40	11	464
Phosphorus (Total)	mg/L	0.01	0.10	0.11	0.06	0.02	0.20
Total Kjeldahl Nitrogen	mg/L	0.1	0.4	0.5	0.6	0.8	2.3
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05	0.18	0.37	0.40	0.85	1.81
Ammonia (N)-unionized	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	0.02
Dissolved Organic Carbon	mg/L	0.2	3.0	3.9	7.3	3.6	10.8
Cyanide (WAD)	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.008
Phenolics	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	0.004
COD	mg/L	5	12	22	19	17	48

Michelle Dubien
Data Specialist

		Client I.D.	10-II (B)	13	14	15	9
		Sample I.D.	23-029344-6	23-029344-7	23-029344-8	23-029344-9	23-029344-10
		Date Collected	2023-10-18	2023-10-18	2023-10-18	2023-10-18	2023-10-18
Parameter	**Units**	**R.L.**	-	-	-	-	-
Hardness (as CaCO3)	mg/L	0.02	289	314	896	280	327
Aluminum	mg/L	0.01	0.06	0.07	0.13	0.06	0.06
Barium	mg/L	0.001	0.129	0.094	0.453	0.031	0.034
Boron	mg/L	0.005	0.126	0.013	0.026	0.144	0.076
Calcium	mg/L	0.02	83.2	120	329	102	125
Iron	mg/L	0.005	<0.005	<0.005	9.87	0.006	0.078
Magnesium	mg/L	0.02	19.7	3.48	17.8	6.04	3.48
Manganese	mg/L	0.001	0.001	0.001	2.15	0.001	0.003
Phosphorus	mg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Potassium	mg/L	0.1	3.9	0.5	2.2	1.6	0.5
Sodium	mg/L	0.2	10.8	10.0	45.7	1.6	7.0
Strontium	mg/L	0.001	0.252	0.266	0.639	1.23	0.222
Tin	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Titanium	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Antimony	mg/L	0.0001	0.0001	0.0001	<0.0001	0.0002	0.0001
Arsenic	mg/L	0.0001	0.0001	0.0001	0.0013	0.0001	0.0001
Beryllium	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium	mg/L	0.000015	<0.000015	<0.000015	<0.000015	<0.000015	<0.000015
Chromium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	mg/L	0.0001	0.0002	0.0003	0.0165	0.0002	0.0003

Michelle Dubien
Data Specialist

		Client I.D.	10-II (B)	13	14	15	9
		Sample I.D.	23-029344-6	23-029344-7	23-029344-8	23-029344-9	23-029344-10
		Date Collected	2023-10-18	2023-10-18	2023-10-18	2023-10-18	2023-10-18
Parameter	**Units**	**R.L.**	-	-	-	-	-
Copper	mg/L	0.0001	0.0005	0.0006	0.0003	0.0005	0.0006
Lead	mg/L	0.00002	<0.00002	<0.00002	0.00004	<0.00002	0.00002
Molybdenum	mg/L	0.0001	0.0009	<0.0001	0.0004	0.0010	<0.0001
Nickel	mg/L	0.0002	0.0004	0.0003	0.0068	0.0008	0.0011
Selenium	mg/L	0.001	<0.001	0.002	0.004	<0.001	<0.001
Silver	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Thallium	mg/L	0.00005	<0.00005	<0.00005	0.00007	<0.00005	<0.00005
Uranium	mg/L	0.00005	0.00345	0.00010	0.00084	0.00045	0.00008
Vanadium	mg/L	0.0001	0.0018	<0.0001	0.0003	0.0001	0.0001
Chromium (VI)	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury	mg/L	0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Anion Sum	meq/L	-	6.76	8.81	15.8	6.26	7.40
Cation Sum	meq/L	-	6.36	6.75	20.6	5.78	6.98
% Difference	%	-	3.06	13.2	13.0	3.93	2.94
Ion Ratio	-	-	1.06	1.30	0.769	1.08	1.06
Sodium Adsorption Ratio	-	-	0.276	0.246	0.665	0.0416	0.167
TDS (Ion Sum Calc)	mg/L	1	338	424	886	315	366
TDS(calc.)/EC(actual)	-	-	0.577	0.523	0.489	0.571	0.550
Conductivity Calc	µmho/cm	-	605	798	1490	557	657
Conductivity Calc / Conductivity	-	-	1.03	0.982	0.822	1.01	0.987
Langelier Index(25°C)	-	-	0.477	0.609	1.13	0.680	0.690

Michelle Dubien
Data Specialist

		Client I.D.	10-II (B)	13	14	15	9
		Sample I.D.	23-029344-6	23-029344-7	23-029344-8	23-029344-9	23-029344-10
		Date Collected	2023-10-18	2023-10-18	2023-10-18	2023-10-18	2023-10-18
Parameter	**Units**	**R.L.**	-	-	-	-	-
Saturation pH (25°C)	-	-	7.07	7.00	6.09	7.00	6.82
pH (Client Data)	pH units	-	7.75	7.75	6.92	7.45	7.68
Temperature (Client Data)	°C	-	8.7	8.8	8.7	9.2	12.2

M. Dubien

Michelle Dubien
Data Specialist

		Client I.D.	1-I	2-II	DUP	8-III	DUP-I
		Sample I.D.	23-029344-1	23-029344-2	23-029344-3	23-029344-4	23-029344-5
		Date Collected	2023-10-18	2023-10-18	2023-10-18	2023-10-18	2023-10-18
Parameter	**Units**	**R.L.**	-	-	-	-	-
Acetone	µg/L	30	<30	<30	<30	<30	<30
Benzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L	2	<2	<2	<2	<2	<2
Bromoform	µg/L	5	<5	<5	<5	<5	<5
Bromomethane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroform	µg/L	1	<1	<1	<1	<1	<1
Chloromethane (Methyl Chloride)	µg/L	2	<2	<2	<2	<2	<2
Dibromochloromethane	µg/L	2	<2	<2	<2	<2	<2
Ethylene Dibromide	µg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Dichlorobenzene,1,2-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichlorobenzene,1,3-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichlorobenzene,1,4-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloroethane,1,1-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloroethane,1,2-	µg/L	0.5	<0.5	0.7	<0.5	<0.5	<0.5
Dichloroethylene,1,1-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloroethylene,1,2-cis-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloroethylene,1,2-trans-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloropropane,1,2-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloropropene,1,3-cis-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Michelle Dubien
Data Specialist

		Client I.D.	1-I	2-II	DUP	8-III	DUP-I
		Sample I.D.	23-029344-1	23-029344-2	23-029344-3	23-029344-4	23-029344-5
		Date Collected	2023-10-18	2023-10-18	2023-10-18	2023-10-18	2023-10-18
Parameter	**Units**	**R.L.**	-	-	-	-	-
Dichloropropene,1,3-trans-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane (Methylene Chloride)	µg/L	5	<5	<5	<5	<5	<5
Methyl Ethyl Ketone	µg/L	20	<20	<20	<20	<20	<20
Methyl Isobutyl Ketone	µg/L	20	<20	<20	<20	<20	<20
Methyl tert-Butyl Ether (MTBE)	µg/L	2	<2	<2	<2	<2	<2
Styrene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethane,1,1,1,2-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethane,1,1,2,2-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorobenzene,1,2,4-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethane,1,1,1-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethane,1,1,2-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane (Freon 11)	µg/L	5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylene, m,p-	µg/L	1	<1	<1	<1	<1	<1
Xylene, o-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Michelle Dubien
Data Specialist

Client I.D.			10-II (B)	13	14	15	9
Sample I.D.			23-029344-6	23-029344-7	23-029344-8	23-029344-9	23-029344-10
Date Collected			2023-10-18	2023-10-18	2023-10-18	2023-10-18	2023-10-18
Parameter	**Units**	**R.L.**	-	-	-	-	-
Acetone	µg/L	30	<30	<30	<30	<30	<30
Benzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L	2	<2	<2	<2	<2	<2
Bromoform	µg/L	5	<5	<5	<5	<5	<5
Bromomethane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroform	µg/L	1	<1	<1	<1	<1	<1
Chloromethane (Methyl Chloride)	µg/L	2	<2	<2	<2	<2	<2
Dibromochloromethane	µg/L	2	<2	<2	<2	<2	<2
Ethylene Dibromide	µg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Dichlorobenzene,1,2-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichlorobenzene,1,3-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichlorobenzene,1,4-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloroethane,1,1-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloroethane,1,2-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloroethylene,1,1-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloroethylene,1,2-cis-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloroethylene,1,2-trans-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloropropane,1,2-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloropropene,1,3-cis-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Michelle Dubien
Data Specialist

		Client I.D.	10-II (B)	13	14	15	9
		Sample I.D.	23-029344-6	23-029344-7	23-029344-8	23-029344-9	23-029344-10
		Date Collected	2023-10-18	2023-10-18	2023-10-18	2023-10-18	2023-10-18
Parameter	**Units**	**R.L.**	-	-	-	-	-
Dichloropropene,1,3-trans-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane (Methylene Chloride)	µg/L	5	<5	<5	<5	<5	<5
Methyl Ethyl Ketone	µg/L	20	<20	<20	<20	<20	<20
Methyl Isobutyl Ketone	µg/L	20	<20	<20	<20	<20	<20
Methyl tert-Butyl Ether (MTBE)	µg/L	2	<2	<2	<2	<2	<2
Styrene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethane,1,1,1,2-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethane,1,1,2,2-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	2.4
Trichlorobenzene,1,2,4-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethane,1,1,1-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethane,1,1,2-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane (Freon 11)	µg/L	5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylene, m,p-	µg/L	1	<1	<1	<1	<1	<1
Xylene, o-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Michelle Dubien
Data Specialist

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: - **REPORT No: 23-029532 - Rev. 0**

Report To:
City of Kawartha Lakes
PO Box 9000
322 Kent Street West
Lindsay, ON K9V 4T7

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

Attention: Kayla Pantaleo

DATE RECEIVED: 2023-Oct-19
DATE REPORTED: 2023-Nov-23
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: Somerville Landfill
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	6	OTTAWA	PCURIEL	2023-Nov-09	A-IC-01	SM 4110B
BOD5 (Liquid)	6	KINGSTON	JWOLFE2	2023-Nov-02	BOD-001	SM 5210B
COD (Liquid)	6	KINGSTON	EHINCH	2023-Oct-27	COD-001	SM 5220D
Colour (Liquid)	6	OTTAWA	MDON	2023-Oct-26	A-COL-01	SM 2120C
Cond/pH/Alk Auto (Liquid)	6	OTTAWA	SBOUDREAU	2023-Oct-30	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
Cyanide WAD (Liquid)	6	KINGSTON	JMACINNES	2023-Oct-26	CN-001	SM 4500-CN-E
DOC/DIC (Liquid)	6	OTTAWA	VKASYAN	2023-Nov-01	C-OC-01	EPA 415.2
Ion Balance (Calc.)	6	OTTAWA	STAILLON		CP-028	MECP E3196
Chromium VI (Liquid)	6	OTTAWA	STAILLON	2023-Oct-30	D-CRVI-01	MECP E3056
ICP/MS (Liquid)	6	OTTAWA	AOZKAYMAK	2023-Oct-27	D-ICPMS-01	EPA 200.8
ICP/OES (Liquid)	6	OTTAWA	APRUDYVUS	2023-Oct-26	D-ICP-01	SM 3120B
Mercury (Liquid)	6	OTTAWA	TBENNETT	2023-Oct-26	D-HG-02	SM 3112B
Ammonia & o-Phosphate (Liquid)	6	KINGSTON	KDIBBITS	2023-Oct-31	NH3-001	SM 4500NH3
Phenols (Liquid)	6	KINGSTON	JMACINNES	2023-Nov-16	PHEN-01	MECP E3179
TP & TKN (Liquid)	6	KINGSTON	KDIBBITS	2023-Oct-31	TPTKN-001	MECP E3516.2
TSS (Liquid)	6	KINGSTON	TSUNNY	2023-Oct-26	TSS-001	SM 2540D
Turbidity (Liquid)	6	OTTAWA	MDON	2023-Oct-26	A-TURB-01	SM 2130B
VOC-Volatiles Full (Water)	6	RICHMOND_HILL	FLENA	2023-Oct-29	C-VOC-02	EPA 8260

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Steve Garrett
Director of Laboratory Services

Client I.D.			16-III	17	201D	202	203
Sample I.D.			23-029532-1	23-029532-2	23-029532-3	23-029532-4	23-029532-5
Date Collected			2023-10-13	2023-10-13	2023-10-13	2023-10-13	2023-10-13
Parameter	**Units**	**R.L.**	-	-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5	232	2080	261	208	148
TDS (Calc. from Cond.)	mg/L	3	237	3000	288	366	2510
Conductivity @25°C	uS/cm	1	458	5300	556	704	4450
pH @25°C	pH units	-	8.12	7.45	7.90	8.11	7.96
Colour	TCU	2	<2	135	4	<2	<2
Turbidity	NTU	0.1	855	1010	168	21.9	34.2
Fluoride	mg/L	0.1	<0.1	<0.7	<0.1	1.0	<1.8
Chloride	mg/L	0.5	13.4	340	13.3	43.2	900
Nitrate (N)	mg/L	0.05	0.36	<0.40	0.08	0.06	<0.05
Nitrite (N)	mg/L	0.05	<0.05	<0.40	<0.05	<0.05	<0.05
Sulphate	mg/L	1	10	35	32	123	1340
BOD5	mg/L	3	<3	7	<3	<3	7
Total Suspended Solids	mg/L	3	5680	2720	252	84	68
Phosphorus (Total)	mg/L	0.01	1.30	1.57	0.13	0.03	0.03
Total Kjeldahl Nitrogen	mg/L	0.1	2.0	280	1.7	1.1	3.3
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05	2.23	260	1.24	1.25	3.42
Ammonia (N)-unionized	mg/L	0.01	0.02	0.71	0.01	0.02	0.03
Dissolved Organic Carbon	mg/L	0.2	2.2	104	6.9	3.8	0.7
Cyanide (WAD)	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Phenolics	mg/L	0.001	<0.001	0.014	<0.001	<0.001	<0.001
COD	mg/L	5	12	657	13	7	9

Steve Garrett
Director of Laboratory Services

		Client I.D.	16-III	17	201D	202	203
		Sample I.D.	23-029532-1	23-029532-2	23-029532-3	23-029532-4	23-029532-5
		Date Collected	2023-10-13	2023-10-13	2023-10-13	2023-10-13	2023-10-13
Parameter	**Units**	**R.L.**	-	-	-	-	-
Hardness (as CaCO3)	mg/L	0.02	232	1280	273	285	845
Aluminum	mg/L	0.01	0.01	0.13	0.03	0.35	0.05
Barium	mg/L	0.001	0.083	0.571	0.043	0.013	0.022
Boron	mg/L	0.005	0.006	7.68	0.063	0.534	4.17
Calcium	mg/L	0.02	71.7	397	102	80.6	167
Iron	mg/L	0.005	0.009	3.91	0.532	0.142	0.483
Magnesium	mg/L	0.02	12.8	70.4	4.37	20.3	104
Manganese	mg/L	0.001	<0.001	1.48	0.087	0.004	0.024
Phosphorus	mg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Potassium	mg/L	0.1	2.1	163	0.9	3.8	14.7
Sodium	mg/L	0.2	4.7	381	10.6	29.0	673
Strontium	mg/L	0.001	0.181	2.41	0.749	9.10	8.84
Tin	mg/L	0.05	<0.05	0.06	<0.05	<0.05	<0.05
Titanium	mg/L	0.005	<0.005	<0.005	<0.005	0.010	<0.005
Zinc	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Antimony	mg/L	0.0001	0.0001	0.0008	<0.0001	<0.0001	<0.0001
Arsenic	mg/L	0.0001	0.0001	0.0021	0.0019	0.0003	0.0048
Beryllium	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium	mg/L	0.000015	<0.000015	<0.000030	<0.000015	<0.000015	<0.000030
Chromium	mg/L	0.001	0.002	0.006	<0.001	<0.001	<0.001
Cobalt	mg/L	0.0001	0.0002	0.0077	0.0004	0.0002	0.0003

Steve Garrett
Director of Laboratory Services

		Client I.D.	16-III	17	201D	202	203
		Sample I.D.	23-029532-1	23-029532-2	23-029532-3	23-029532-4	23-029532-5
		Date Collected	2023-10-13	2023-10-13	2023-10-13	2023-10-13	2023-10-13
Parameter	**Units**	**R.L.**	-	-	-	-	-
Copper	mg/L	0.0001	0.0006	0.0039	0.0003	0.0003	0.0002
Lead	mg/L	0.00002	<0.00002	<0.00009	0.00004	<0.00002	<0.00009
Molybdenum	mg/L	0.0001	0.0004	0.0002	0.0009	0.0002	0.0012
Nickel	mg/L	0.0002	0.0007	0.0261	0.0028	0.0008	0.0016
Selenium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silver	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Thallium	mg/L	0.00005	<0.00005	0.00012	<0.00005	<0.00005	<0.00005
Uranium	mg/L	0.00005	0.00079	0.00012	0.00024	<0.00005	0.00092
Vanadium	mg/L	0.0001	0.0021	0.0130	0.0002	<0.0001	<0.0004
Chromium (VI)	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury	mg/L	0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Anion Sum	meq/L	-	5.24	55.0	6.28	8.01	56.3
Cation Sum	meq/L	-	5.05	64.8	6.05	7.35	46.9
% Difference	%	-	1.81	8.24	1.85	4.27	9.07
Ion Ratio	-	-	1.04	0.848	1.04	1.09	1.20
Sodium Adsorption Ratio	-	-	0.136	4.63	0.280	0.748	10.1
TDS (Ion Sum Calc)	mg/L	1	258	3080	322	428	3300
TDS(calc.)/EC(actual)	-	-	0.563	0.582	0.580	0.609	0.740
Conductivity Calc	µmho/cm	-	484	4870	576	737	4230
Conductivity Calc / Conductivity	-	-	1.06	0.918	1.04	1.05	0.952
Langelier Index(25°C)	-	-	0.908	1.83	0.881	0.873	0.819

Steve Garrett
Director of Laboratory Services

		Client I.D.	16-III	17	201D	202	203
		Sample I.D.	23-029532-1	23-029532-2	23-029532-3	23-029532-4	23-029532-5
		Date Collected	2023-10-13	2023-10-13	2023-10-13	2023-10-13	2023-10-13
Parameter	**Units**	**R.L.**	-	-	-	-	-
Saturation pH (25°C)	-	-	7.21	5.62	7.02	7.24	7.14
pH (Client Data)	pH units	-	7.7	7.12	7.78	7.95	7.75
Temperature (Client Data)	°C	-	9.1	11.5	7.8	8.3	9.1

Steve Garrett
Director of Laboratory Services

		Client I.D.	204
		Sample I.D.	23-029532-6
		Date Collected	2023-10-13
Parameter	**Units**	**R.L.**	-
Alkalinity(CaCO3) to pH4.5	mg/L	5	151
TDS (Calc. from Cond.)	mg/L	3	1400
Conductivity @25°C	uS/cm	1	2520
pH @25°C	pH units	-	7.95
Colour	TCU	2	<2
Turbidity	NTU	0.1	43.6
Fluoride	mg/L	0.1	1.3
Chloride	mg/L	0.5	248
Nitrate (N)	mg/L	0.05	<0.40
Nitrite (N)	mg/L	0.05	<0.40
Sulphate	mg/L	1	923
BOD5	mg/L	3	4
Total Suspended Solids	mg/L	3	134
Phosphorus (Total)	mg/L	0.01	0.06
Total Kjeldahl Nitrogen	mg/L	0.1	1.6
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05	1.51
Ammonia (N)-unionized	mg/L	0.01	<0.01
Dissolved Organic Carbon	mg/L	0.2	1.7
Cyanide (WAD)	mg/L	0.005	<0.005
Phenolics	mg/L	0.001	<0.001
COD	mg/L	5	<5

Steve Garrett
Director of Laboratory Services

Parameter	Units	R.L.	204
		Sample I.D.	23-029532-6
		Date Collected	2023-10-13
			-
Hardness (as CaCO3)	mg/L	0.02	814
Aluminum	mg/L	0.01	0.06
Barium	mg/L	0.001	0.031
Boron	mg/L	0.005	1.60
Calcium	mg/L	0.02	226
Iron	mg/L	0.005	0.104
Magnesium	mg/L	0.02	60.5
Manganese	mg/L	0.001	0.027
Phosphorus	mg/L	0.1	<0.1
Potassium	mg/L	0.1	7.4
Sodium	mg/L	0.2	116
Strontium	mg/L	0.001	5.36
Tin	mg/L	0.05	<0.05
Titanium	mg/L	0.005	<0.005
Zinc	mg/L	0.005	<0.005
Antimony	mg/L	0.0001	0.0001
Arsenic	mg/L	0.0001	0.0018
Beryllium	mg/L	0.0001	<0.0001
Cadmium	mg/L	0.000015	<0.000015
Chromium	mg/L	0.001	<0.001
Cobalt	mg/L	0.0001	0.0005

Steve Garrett
Director of Laboratory Services

		Client I.D.	204
		Sample I.D.	23-029532-6
		Date Collected	2023-10-13
Parameter	**Units**	**R.L.**	-
Copper	mg/L	0.0001	0.0013
Lead	mg/L	0.00002	<0.00004
Molybdenum	mg/L	0.0001	0.0004
Nickel	mg/L	0.0002	0.0004
Selenium	mg/L	0.001	<0.001
Silver	mg/L	0.0001	<0.0001
Thallium	mg/L	0.00005	<0.00005
Uranium	mg/L	0.00005	0.00021
Vanadium	mg/L	0.0001	0.0003
Chromium (VI)	mg/L	0.01	<0.01
Mercury	mg/L	0.00002	<0.00002
Anion Sum	meq/L	-	29.3
Cation Sum	meq/L	-	21.7
% Difference	%	-	14.9
Ion Ratio	-	-	1.35
Sodium Adsorption Ratio	-	-	1.77
TDS (Ion Sum Calc)	mg/L	1	1680
TDS(calc.)/EC(actual)	-	-	0.665
Conductivity Calc	µmho/cm	-	2270
Conductivity Calc / Conductivity	-	-	0.899
Langelier Index(25°C)	-	-	0.969

Steve Garrett
Director of Laboratory Services

		Client I.D.	204
		Sample I.D.	23-029532-6
		Date Collected	2023-10-13
Parameter	**Units**	**R.L.**	-
Saturation pH (25°C)	-	-	6.98
pH (Client Data)	pH units	-	7.48
Temperature (Client Data)	°C	-	7.6

Steve Garrett
Director of Laboratory Services

		Client I.D.	16-III	17	201D	202	203
		Sample I.D.	23-029532-1	23-029532-2	23-029532-3	23-029532-4	23-029532-5
		Date Collected	2023-10-13	2023-10-13	2023-10-13	2023-10-13	2023-10-13
Parameter	**Units**	**R.L.**	-	-	-	-	-
Acetone	µg/L	30	<30	70	<30	<30	<30
Benzene	µg/L	0.5	<0.5	9.1	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L	2	<2	<2	<2	<2	<2
Bromoform	µg/L	5	<5	<5	<5	<5	<5
Bromomethane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	0.5	<0.5	5.4	<0.5	<0.5	<0.5
Chloroform	µg/L	1	<1	<1	<1	<1	<1
Chloromethane (Methyl Chloride)	µg/L	2	<2	<2	<2	<2	5
Dibromochloromethane	µg/L	2	<2	<2	<2	<2	<2
Ethylene Dibromide	µg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Dichlorobenzene,1,2-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichlorobenzene,1,3-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichlorobenzene,1,4-	µg/L	0.5	<0.5	0.6	<0.5	<0.5	<0.5
Dichloroethane,1,1-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloroethane,1,2-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloroethylene,1,1-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloroethylene,1,2-cis-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloroethylene,1,2-trans-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloropropane,1,2-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloropropene,1,3-cis-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Steve Garrett
Director of Laboratory Services

		Client I.D.	16-III	17	201D	202	203
		Sample I.D.	23-029532-1	23-029532-2	23-029532-3	23-029532-4	23-029532-5
		Date Collected	2023-10-13	2023-10-13	2023-10-13	2023-10-13	2023-10-13
Parameter	**Units**	**R.L.**	-	-	-	-	-
Dichloropropene,1,3-trans-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	µg/L	0.5	<0.5	32.8	<0.5	<0.5	<0.5
Dichloromethane (Methylene Chloride)	µg/L	5	<5	<5	<5	<5	<5
Methyl Ethyl Ketone	µg/L	20	<20	<20	<20	<20	<20
Methyl Isobutyl Ketone	µg/L	20	<20	<20	<20	<20	<20
Methyl tert-Butyl Ether (MTBE)	µg/L	2	<2	<2	<2	<2	<2
Styrene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethane,1,1,1,2-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethane,1,1,2,2-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	<0.5	1.3	<0.5	<0.5	<0.5
Trichlorobenzene,1,2,4-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethane,1,1,1-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethane,1,1,2-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane (Freon 11)	µg/L	5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylene, m,p-	µg/L	1	<1	81	<1	<1	<1
Xylene, o-	µg/L	0.5	<0.5	4.7	<0.5	<0.5	<0.5

Steve Garrett
Director of Laboratory Services

		Client I.D.	204
		Sample I.D.	23-029532-6
		Date Collected	2023-10-13
Parameter	**Units**	**R.L.**	-
Acetone	µg/L	30	<30
Benzene	µg/L	0.5	<0.5
Bromodichloromethane	µg/L	2	<2
Bromoform	µg/L	5	<5
Bromomethane	µg/L	0.5	<0.5
Carbon Tetrachloride	µg/L	0.2	<0.2
Chlorobenzene	µg/L	0.5	<0.5
Chloroform	µg/L	1	<1
Chloromethane (Methyl Chloride)	µg/L	2	<2
Dibromochloromethane	µg/L	2	<2
Ethylene Dibromide	µg/L	0.2	<0.2
Dichlorobenzene,1,2-	µg/L	0.5	<0.5
Dichlorobenzene,1,3-	µg/L	0.5	<0.5
Dichlorobenzene,1,4-	µg/L	0.5	<0.5
Dichloroethane,1,1-	µg/L	0.5	<0.5
Dichloroethane,1,2-	µg/L	0.5	<0.5
Dichloroethylene,1,1-	µg/L	0.5	<0.5
Dichloroethylene,1,2-cis-	µg/L	0.5	<0.5
Dichloroethylene,1,2-trans-	µg/L	0.5	<0.5
Dichloropropane,1,2-	µg/L	0.5	<0.5
Dichloropropene,1,3-cis-	µg/L	0.5	<0.5

Steve Garrett
Director of Laboratory Services

		Client I.D.	204
		Sample I.D.	23-029532-6
		Date Collected	2023-10-13
Parameter	**Units**	**R.L.**	-
Dichloropropene,1,3-trans-	µg/L	0.5	<0.5
Ethylbenzene	µg/L	0.5	<0.5
Dichloromethane (Methylene Chloride)	µg/L	5	<5
Methyl Ethyl Ketone	µg/L	20	<20
Methyl Isobutyl Ketone	µg/L	20	<20
Methyl tert-Butyl Ether (MTBE)	µg/L	2	<2
Styrene	µg/L	0.5	<0.5
Tetrachloroethane,1,1,1,2-	µg/L	0.5	<0.5
Tetrachloroethane,1,1,2,2-	µg/L	0.5	<0.5
Tetrachloroethylene	µg/L	0.5	<0.5
Toluene	µg/L	0.5	<0.5
Trichlorobenzene,1,2,4-	µg/L	0.5	<0.5
Trichloroethane,1,1,1-	µg/L	0.5	<0.5
Trichloroethane,1,1,2-	µg/L	0.5	<0.5
Trichloroethylene	µg/L	0.5	<0.5
Trichlorofluoromethane (Freon 11)	µg/L	5	<5
Vinyl Chloride	µg/L	0.2	<0.2
Xylene, m,p-	µg/L	1	<1
Xylene, o-	µg/L	0.5	<0.5

Steve Garrett
Director of Laboratory Services

APPENDIX J

Site Inspection Forms

CITY OF KAWARTHA LAKES
OPERATING LANDFILL INSPECTION FORM

LANDFILL: Somerville

Inspected by: Drew W.

Date: May 10, 2023

Time: 11:15 am

Weather Conditions: Sunny 5°C

A. GENERAL OBSERVATIONS

A.1 Landfill Site: In good condition, not much change since Oct 2022.

A.2 Status of Landfill Development/Construction Activities: Active waste area larger than 2022, old waste area unchanged

A.3 Tipping Face: Good

A.4 Residential Container Station: N/A

A.5 Maintenance and Administration Building: N/A

A.6 Weigh Scale Inspection Building: Closed, outside in good condition

A.7 Reuse Centre: N/A

A.8 HHW Facility: N/A

A.9 Leaf & Yard Waste Composting Facility: Good, isolated from residential waste.

B. STAFFING:

B.1 Is staffing for the landfill operations and ancillary landfill operations (i.e., HHW Facility, Reuse Centre Leaf & Yard Waste Composting Facility) adequate?

Landfill closed during inspection

B.2 Are staff wearing adequate safety equipment? N/A

C. LANDFILL COVER:

C.1 Any evidence of leachate seeps or erosion of landfill cover on waste disposal fill area? No

C.2 Condition of North Slope? All slopes stable

C.3 Condition of vegetation? Good

D. STORM WATER MANAGEMENT SYSTEM:

D.1 Is the surface water management system in good operating order? (e.g. any erosion, litter, debris of the perimeter stormwater ditches or stormwater sedimentation ponds? Are culverts free from debris? Yes, water draining as designed

E. LEACHATE COLLECTION SYSTEM

E.1 Are manholes free of litter and debris? N/A

E.2 Condition of manholes/need repairs? N/A

F. MAIN ENTRANCE AND INTERNAL ROADS:

F.1 Is the main entrance or internal roads in need of repair or maintenance work?

No

G. DUST CONTROL:

G.1 Any dust problems because of the internal roads, working face or fill stockpiles?

No

G.2 Condition of Roads: Good

H. ODOURS:

H.1 Any odour problems? No

I. LITTER CONTROL:

I.1 Any evidence of litter on the landfill buffer area site fencing, along Wilson Road, on adjacent properties or around the residential container station?

Some litter present in adjacent forests

J. LANDSCAPING:

J.1 Does the landscaping (trees, shrubs, and ground cover) require maintenance work (e.g. grass cutting, replacement or vegetation)?

No

K. SITE PERIMETER FENCING AND SIGNING:

K.1 Is the site perimeter fencing in good condition? Yes

K.2 Are the traffic and information signs in good condition? Yes

L. LANDFILL OPERATIONS:

L.1 Is there sufficient material for daily and interim cover? Unknown

L.2 Is the landfill operations equipment in good working order? Unknown.

L.3 Is the waste being spread, compacted and covered in accordance with the Maintenance & Operations Report?

Unknown

M. SITE SECURITY AND SAFETY PROTOCOLS

M.1 Are waste loads being adequately inspected (weigh scale/inspection building, residential container station, tipping face)?

Landfill closed during inspection

M.2 Are there sufficient fire extinguishers (fully loaded and operable) at tipping face, weigh scale/ inspection building, maintenance and administration building, HHW Facility, Reuse Centre?

Unknown

M.3 Location and condition of medical emergency kits (eye wash stations and first aid kits).

Unknown

M.4 Staff knowledge of emergency procedures/numbers? No staff present

N. OTHER COMMENTS:

None

O. RECOMMENDATIONS:

None

CITY OF KAWARTHA LAKES
OPERATING LANDFILL INSPECTION FORM

LANDFILL: Somerville

Inspected by: Drew West

Date: Oct 18, 2023

Time: 11:30 am

Weather Conditions: Sunny - 12°C

A. GENERAL OBSERVATIONS

A.1 Landfill Site: Good, tidy and organized

A.2 Status of Landfill Development/Construction Activities: No new activities, new waste cell is larger and has expanded to the north

A.3 Tipping Face: Good

A.4 Residential Container Station: N/A

A.5 Maintenance and Administration Building: N/A

A.6 Weigh Scale Inspection Building: Good from outside, landfill closed during inspection

A.7 Reuse Centre: N/A

A.8 HHW Facility: N/A

A.9 Leaf & Yard Waste Composting Facility: Good.

B. STAFFING:

B.1 Is staffing for the landfill operations and ancillary landfill operations (i.e., HHW Facility, Reuse Centre Leaf & Yard Waste Composting Facility) adequate?

Landfill closed during inspection

B.2 Are staff wearing adequate safety equipment? N/A

C. LANDFILL COVER:

C.1 Any evidence of leachate seeps or erosion of landfill cover on waste disposal fill area? No

C.2 Condition of North Slope? All slopes stable.

C.3 Condition of vegetation? Good

D. STORM WATER MANAGEMENT SYSTEM:

D.1 Is the surface water management system in good operating order? (e.g. any erosion, litter, debris of the perimeter stormwater ditches or stormwater sedimentation ponds? Are culverts free from debris? Yes, good condition - pond full but no active drainage occurring

E. LEACHATE COLLECTION SYSTEM

E.1 Are manholes free of litter and debris? N/A

E.2 Condition of manholes/need repairs? N/A

F. MAIN ENTRANCE AND INTERNAL ROADS:

F.1 Is the main entrance or internal roads in need of repair or maintenance work?

No

G. DUST CONTROL:

G.1 Any dust problems because of the internal roads, working face or fill stockpiles?

No

G.2 Condition of Roads: Good

H. ODOURS:

H.1 Any odour problems? No

I. LITTER CONTROL:

I.1 Any evidence of litter on the landfill buffer area site fencing, along Wilson Road, on adjacent properties or around the residential container station?

Yes some litter in adjacent woods

J. LANDSCAPING:

J.1 Does the landscaping (trees, shrubs, and ground cover) require maintenance work (e.g. grass cutting, replacement or vegetation)?

No

K. SITE PERIMETER FENCING AND SIGNING:

K.1 Is the site perimeter fencing in good condition?

Yes

K.2 Are the traffic and information signs in good condition?

Yes

L. LANDFILL OPERATIONS:

L.1 Is there sufficient material for daily and interim cover?

Unknown

L.2 Is the landfill operations equipment in good working order?

Unknown

L.3 Is the waste being spread, compacted and covered in accordance with the Maintenance & Operations Report?

Unknown

M. SITE SECURITY AND SAFETY PROTOCOLS

M.1 Are waste loads being adequately inspected (weigh scale/inspection building, residential container station, tipping face)?

Landfill closed

M.2 Are there sufficient fire extinguishers (fully loaded and operable) at tipping face, weigh scale/ inspection building, maintenance and administration building, HHW Facility, Reuse Centre?

Unknown

M.3 Location and condition of medical emergency kits (eye wash stations and first aid kits).

Unknown

M.4 Staff knowledge of emergency procedures/numbers?

Unknown

N. OTHER COMMENTS:

MW9 was found damaged/vandalized - riser pipe was broken/bent and cannot connect to pipe in ground. Well is now exposed to surface water runoff/contamination - area is known to flood in the spring.

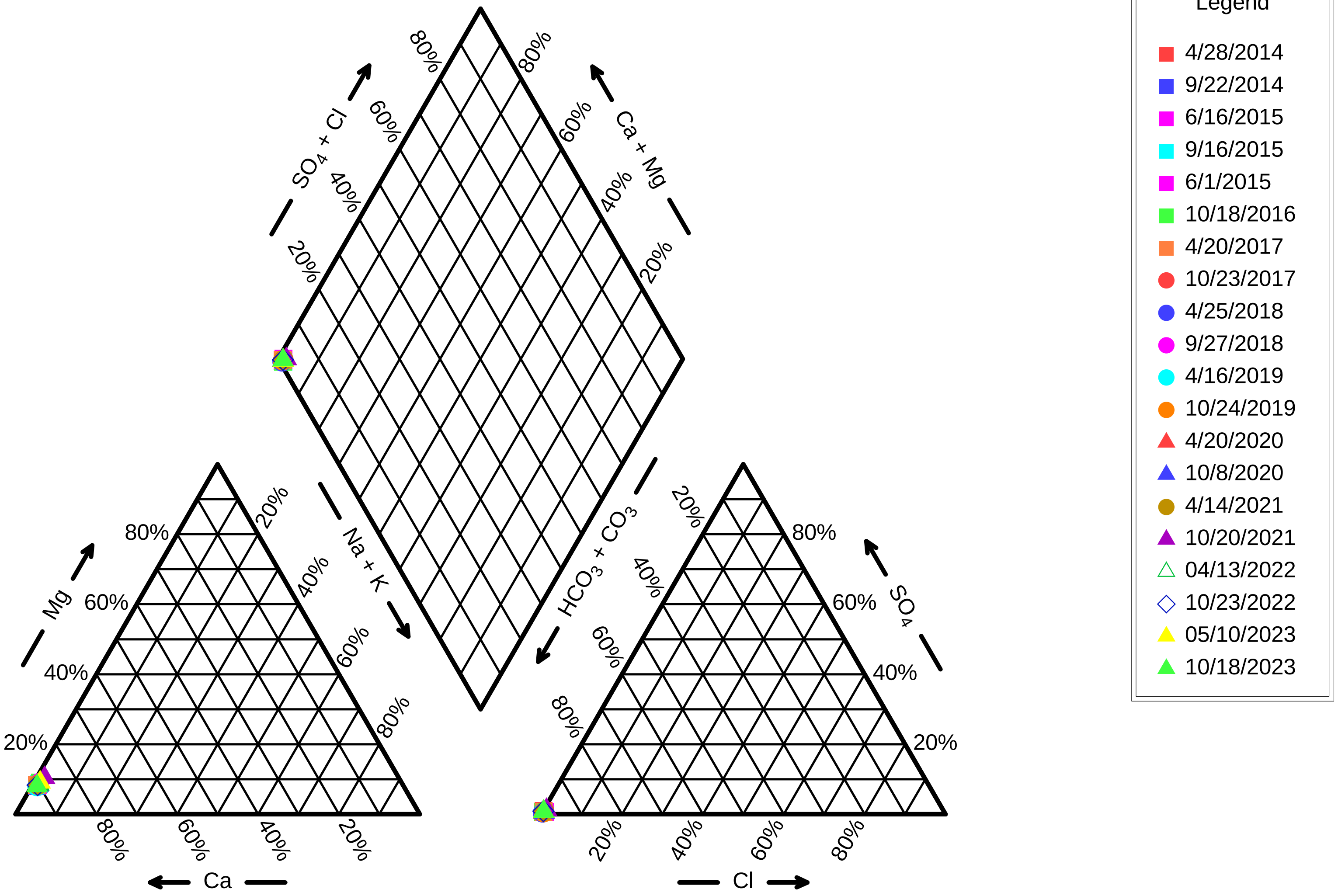
O. RECOMMENDATIONS:

Repair MW9 and make it conform to Reg. 903 standard for well construction.

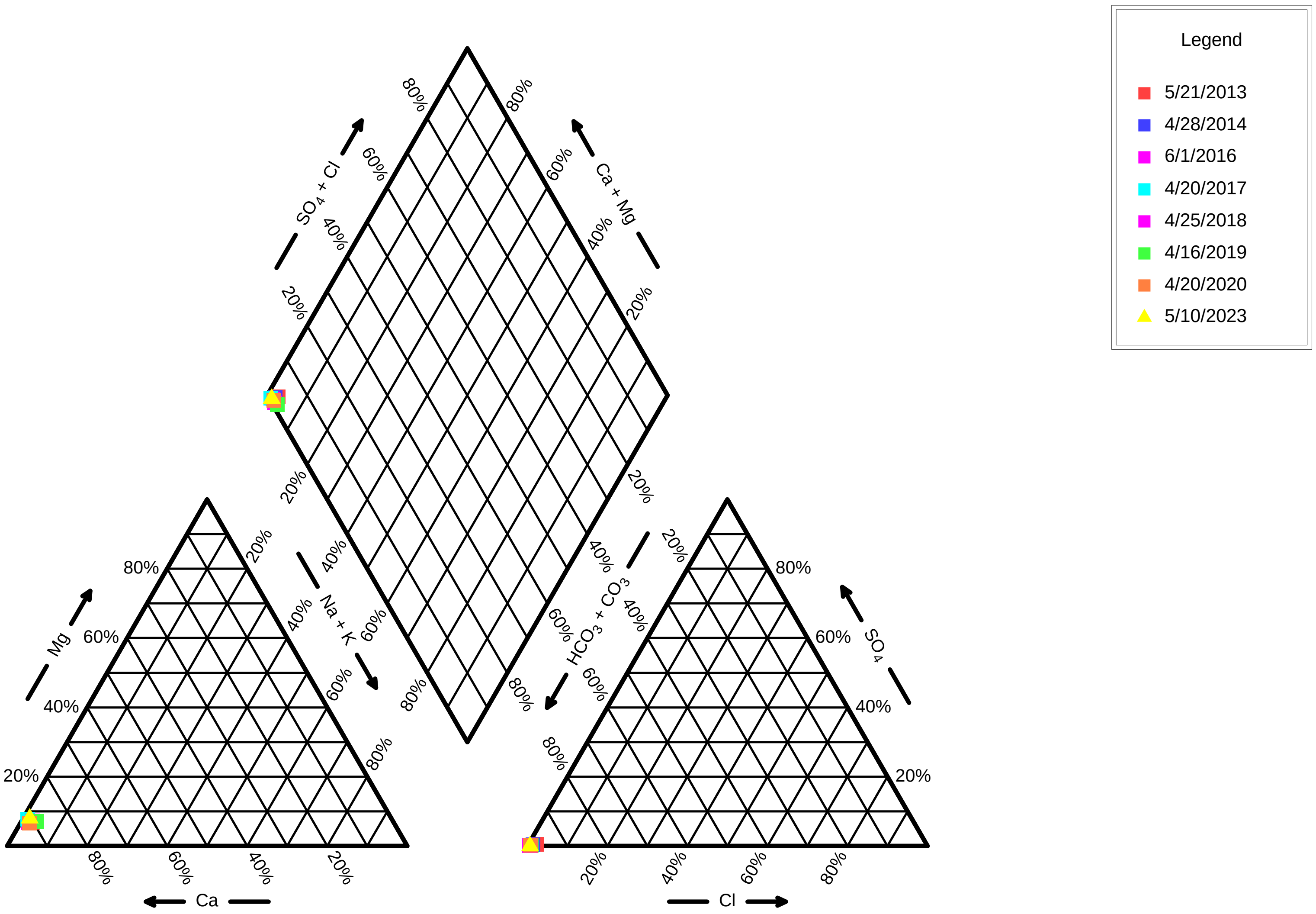
APPENDIX K

Piper Diagrams

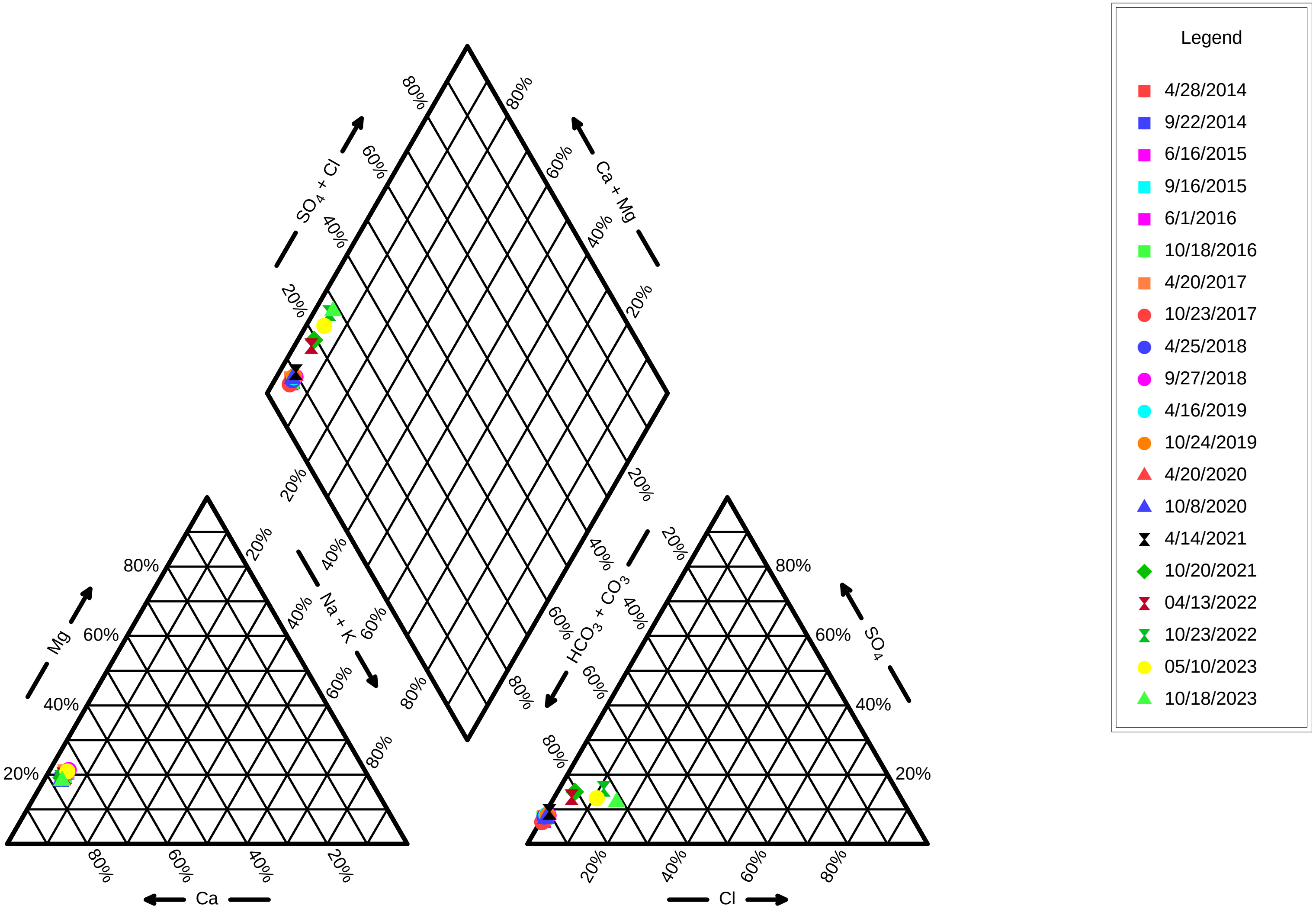
MW1-I Piper Diagram



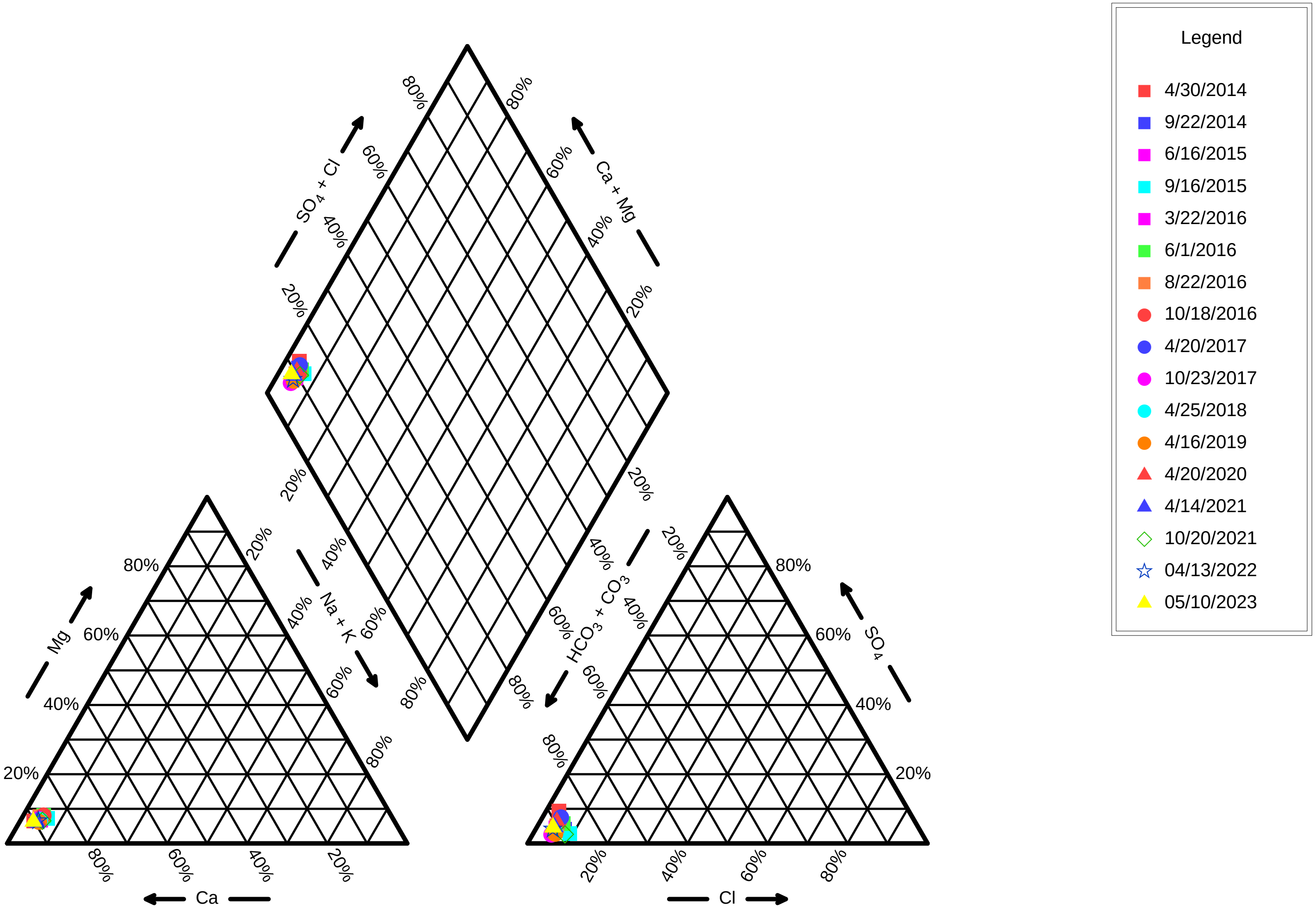
MW1-II Piper Diagram



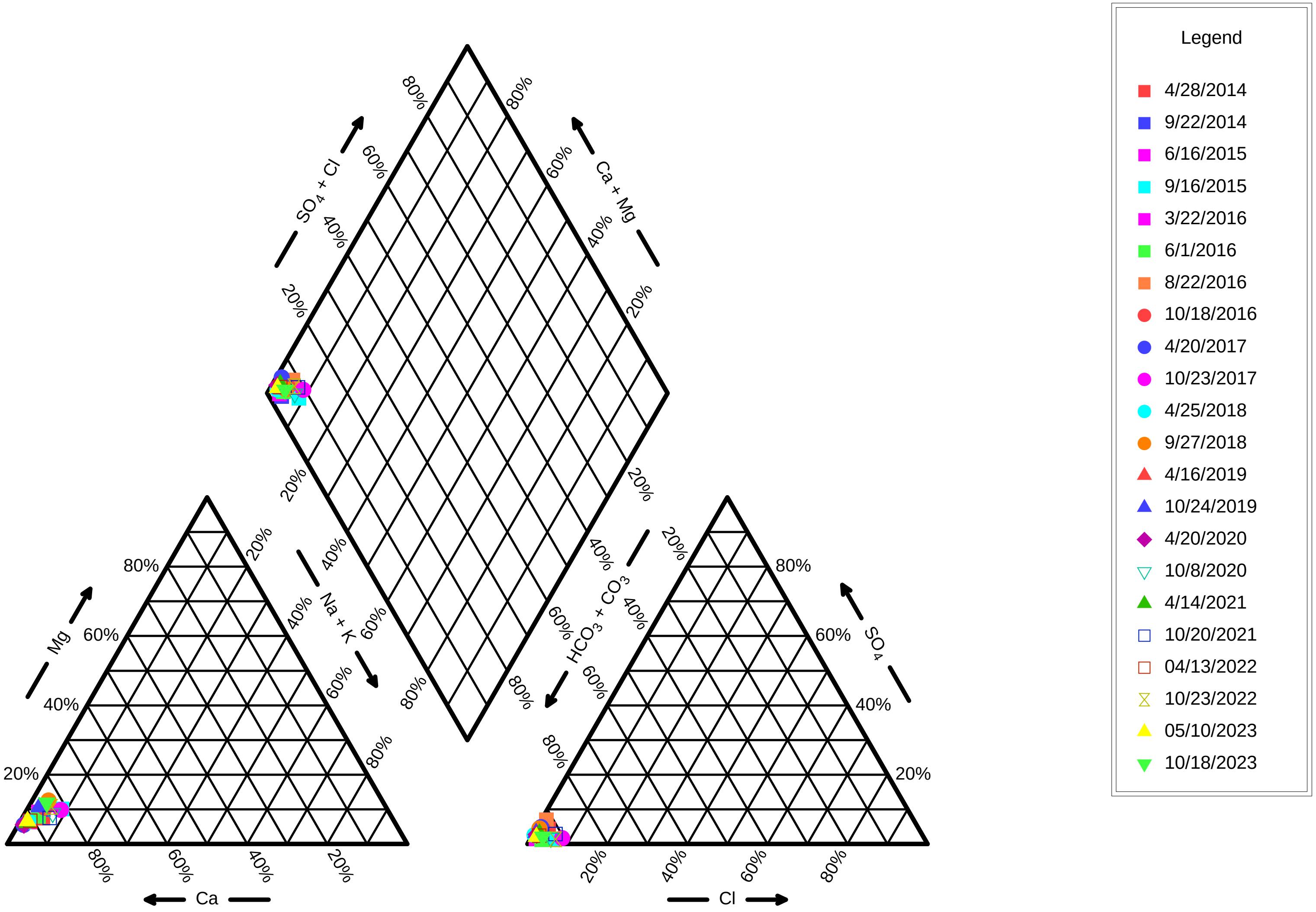
MW2-II Piper Diagram



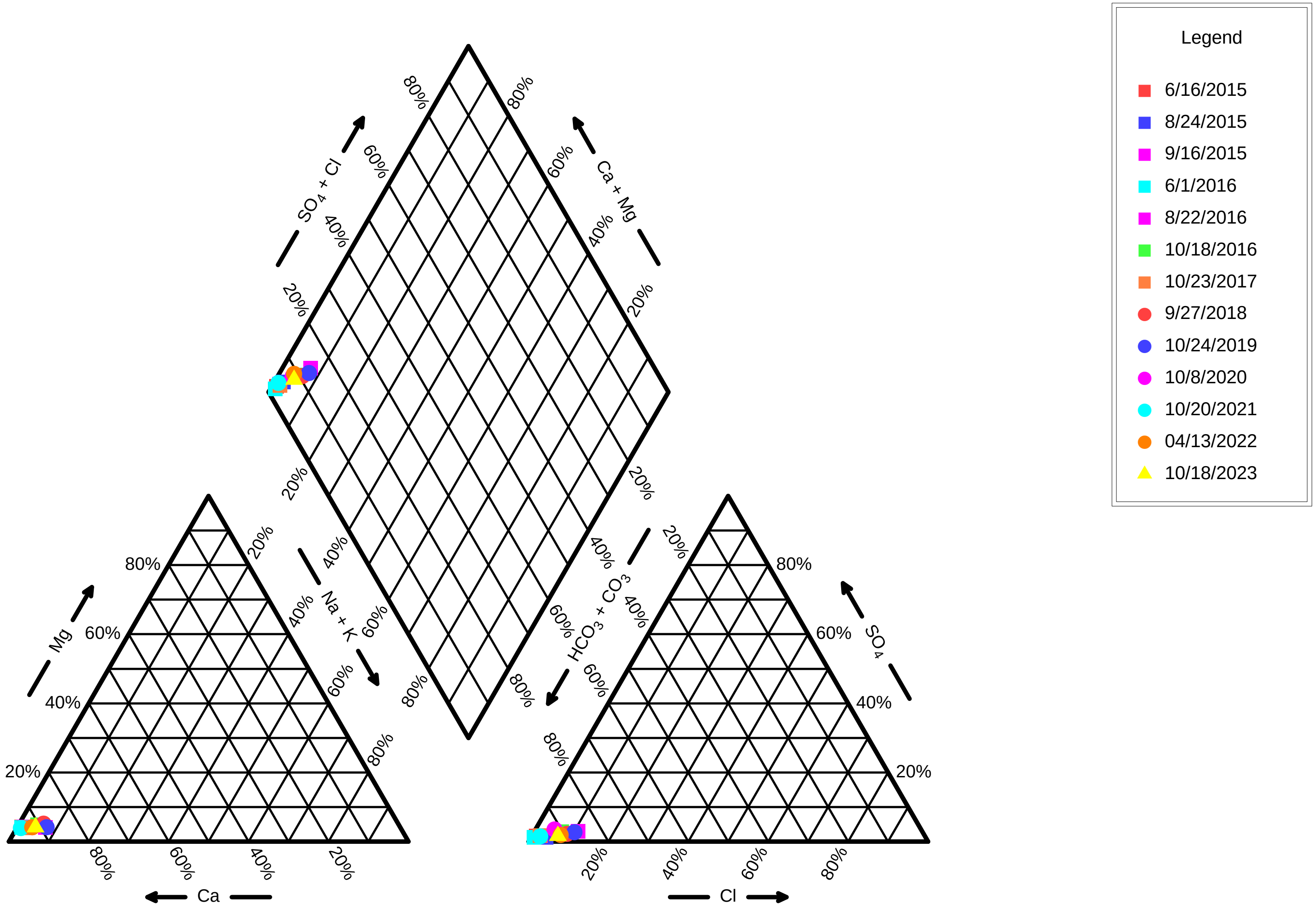
MW5-I Piper Diagram



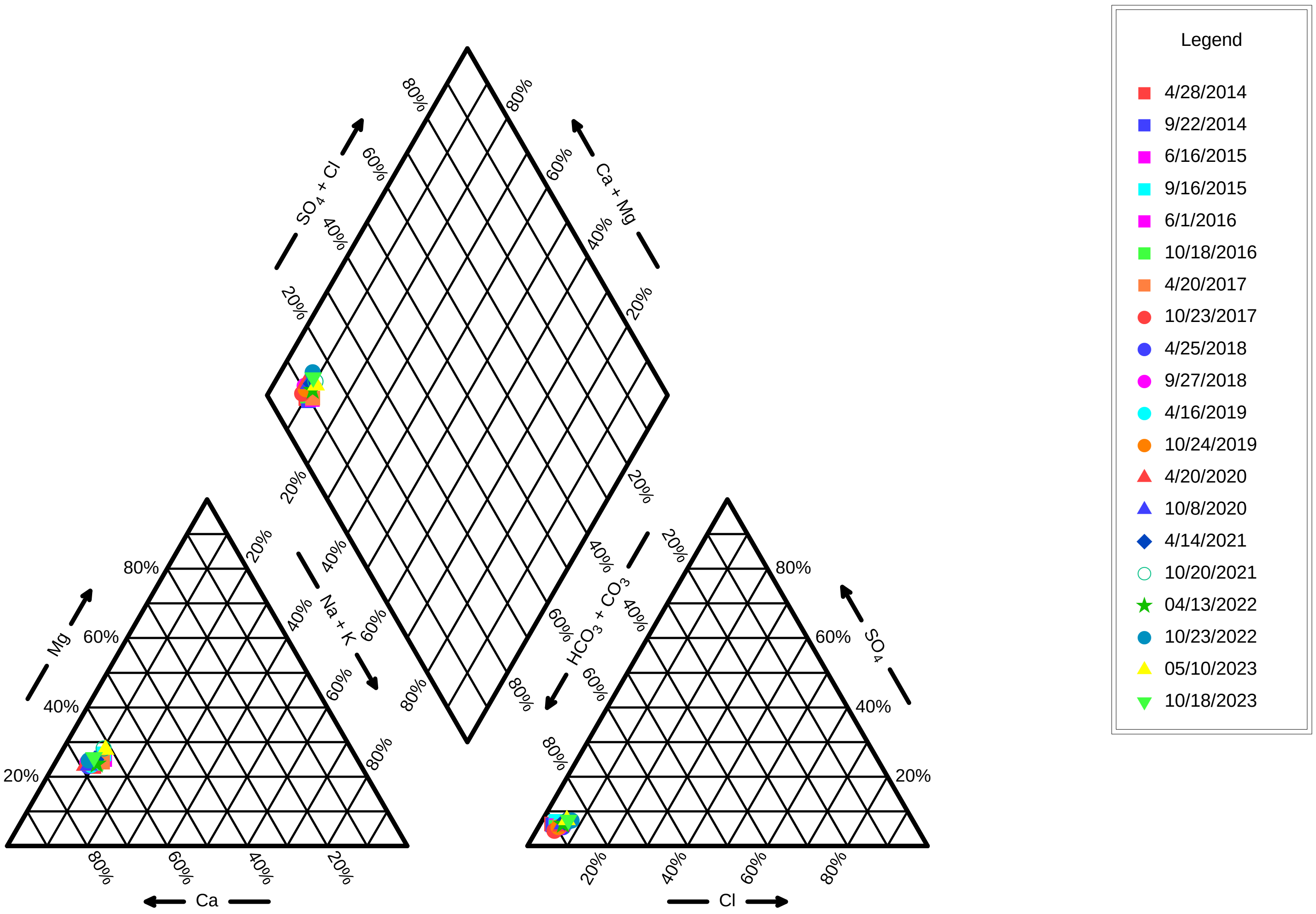
MW8-III Piper Diagram



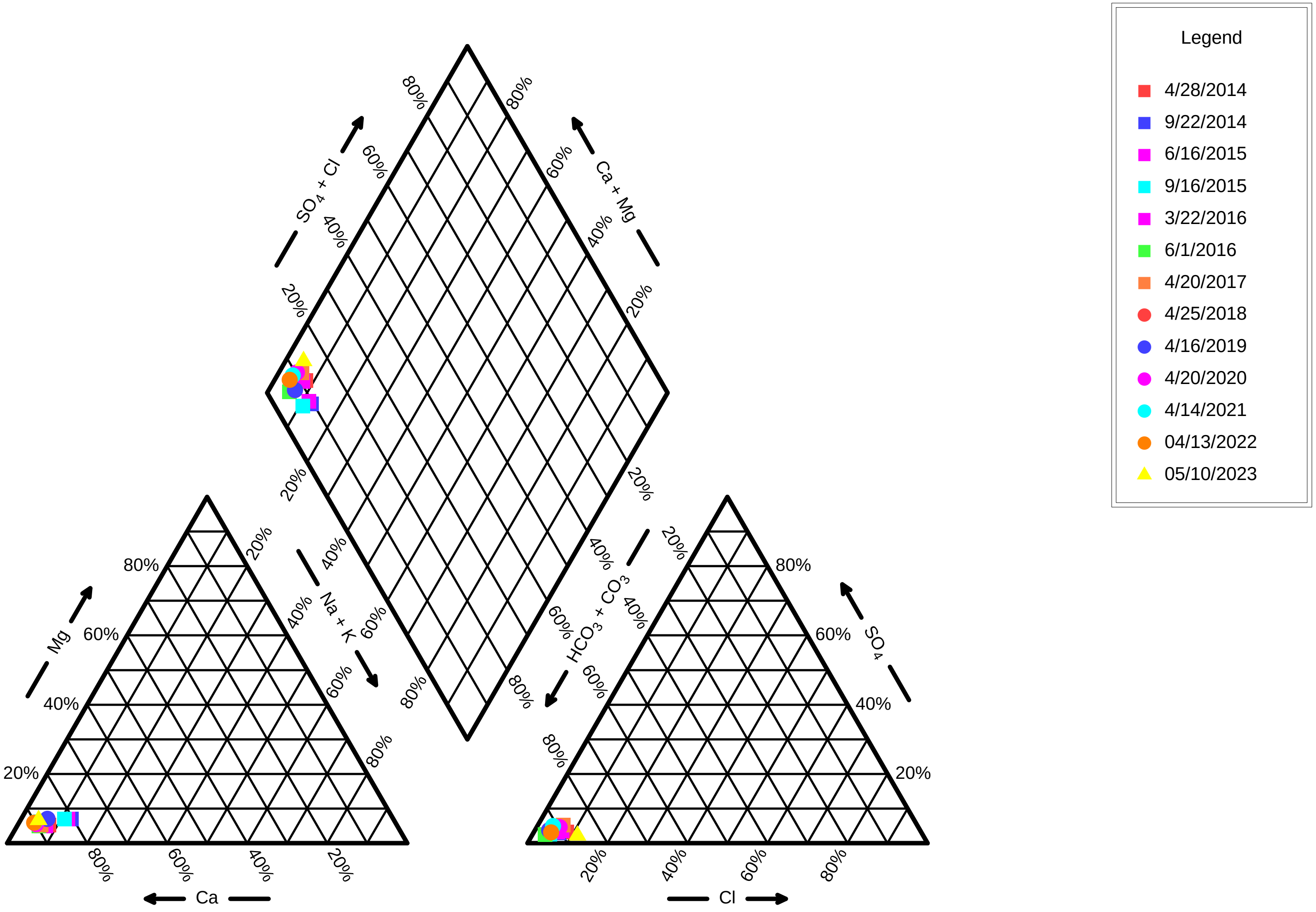
MW9 Piper Diagram



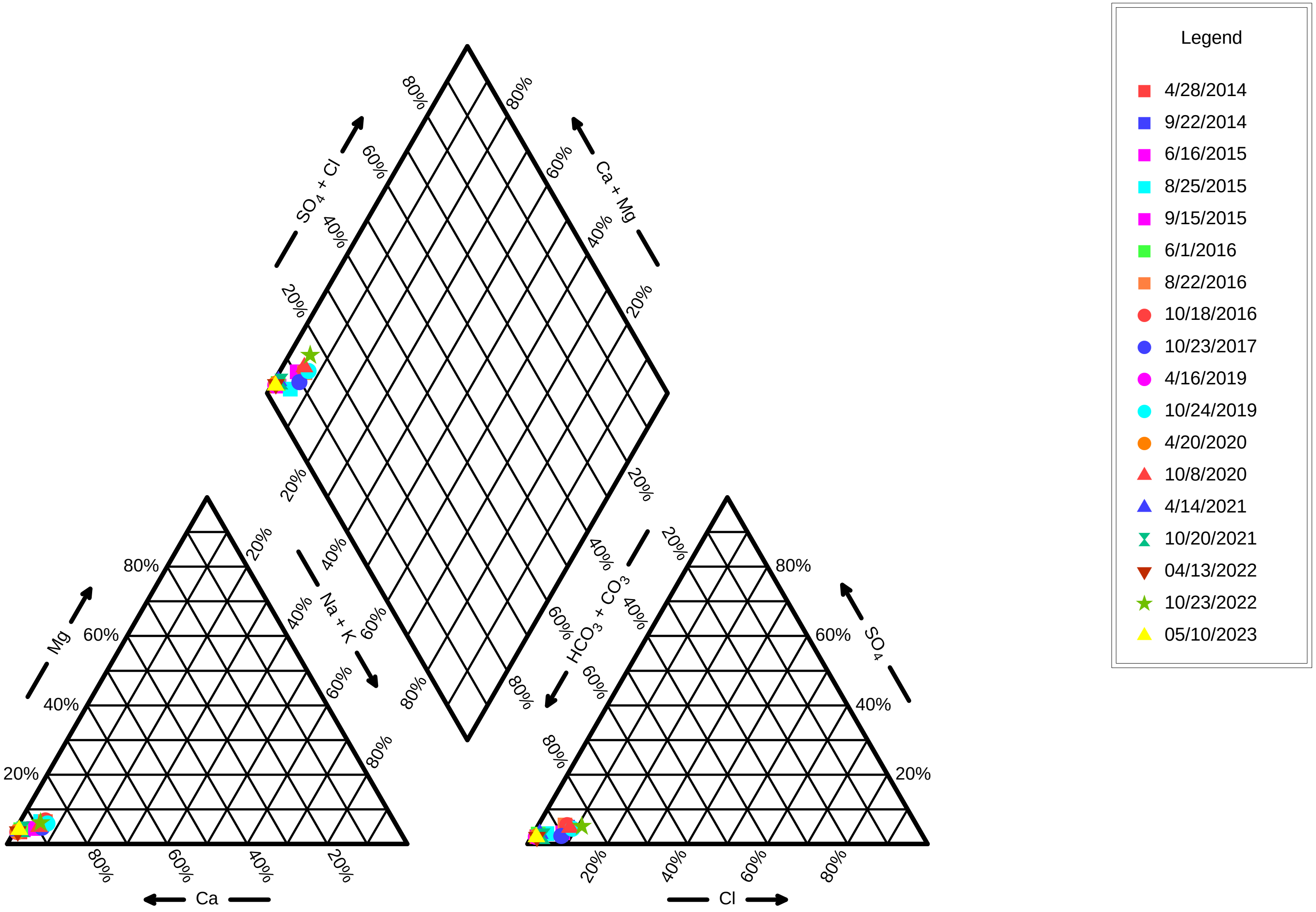
MW10-II Piper Diagram



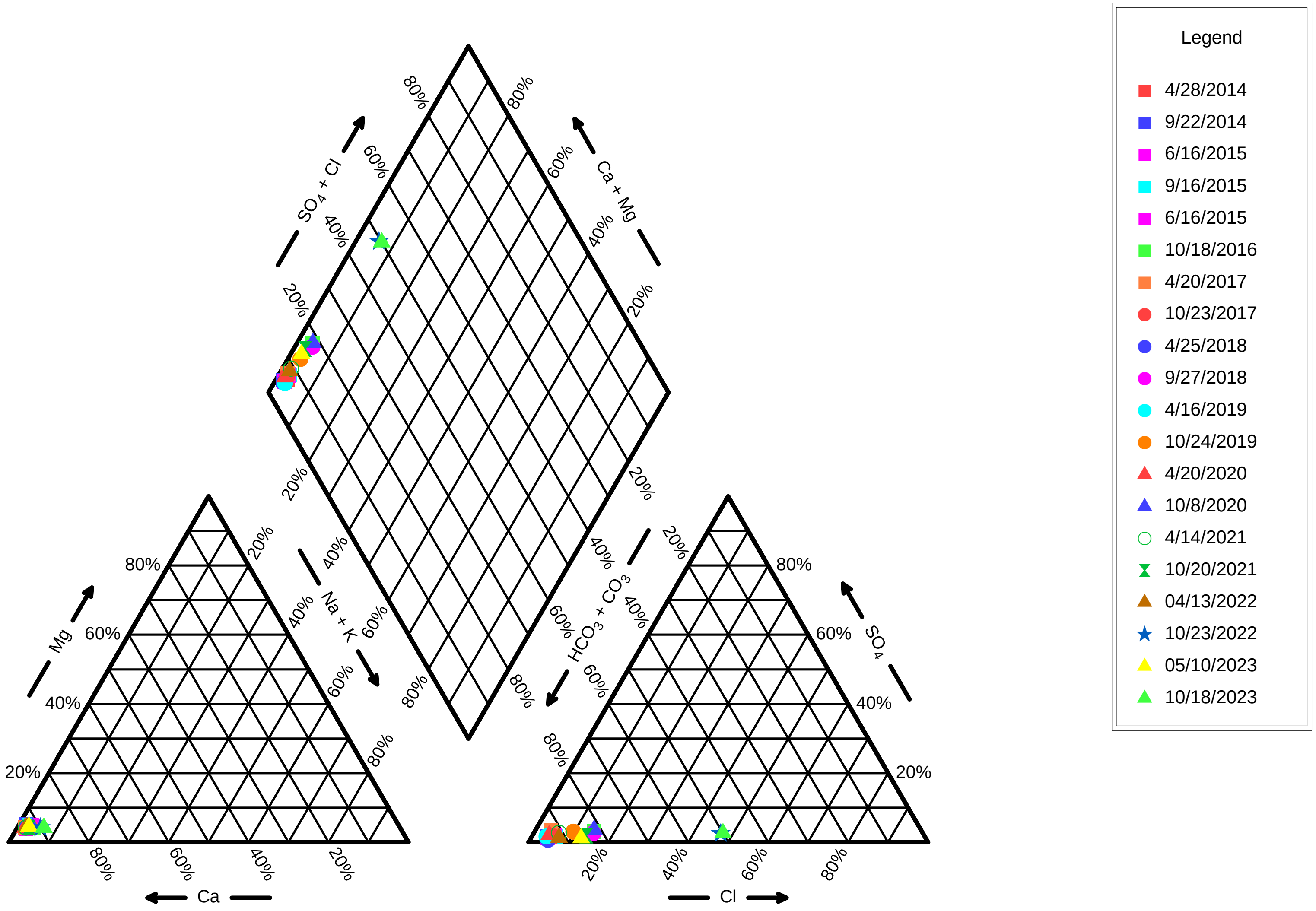
MW11 Piper Diagram



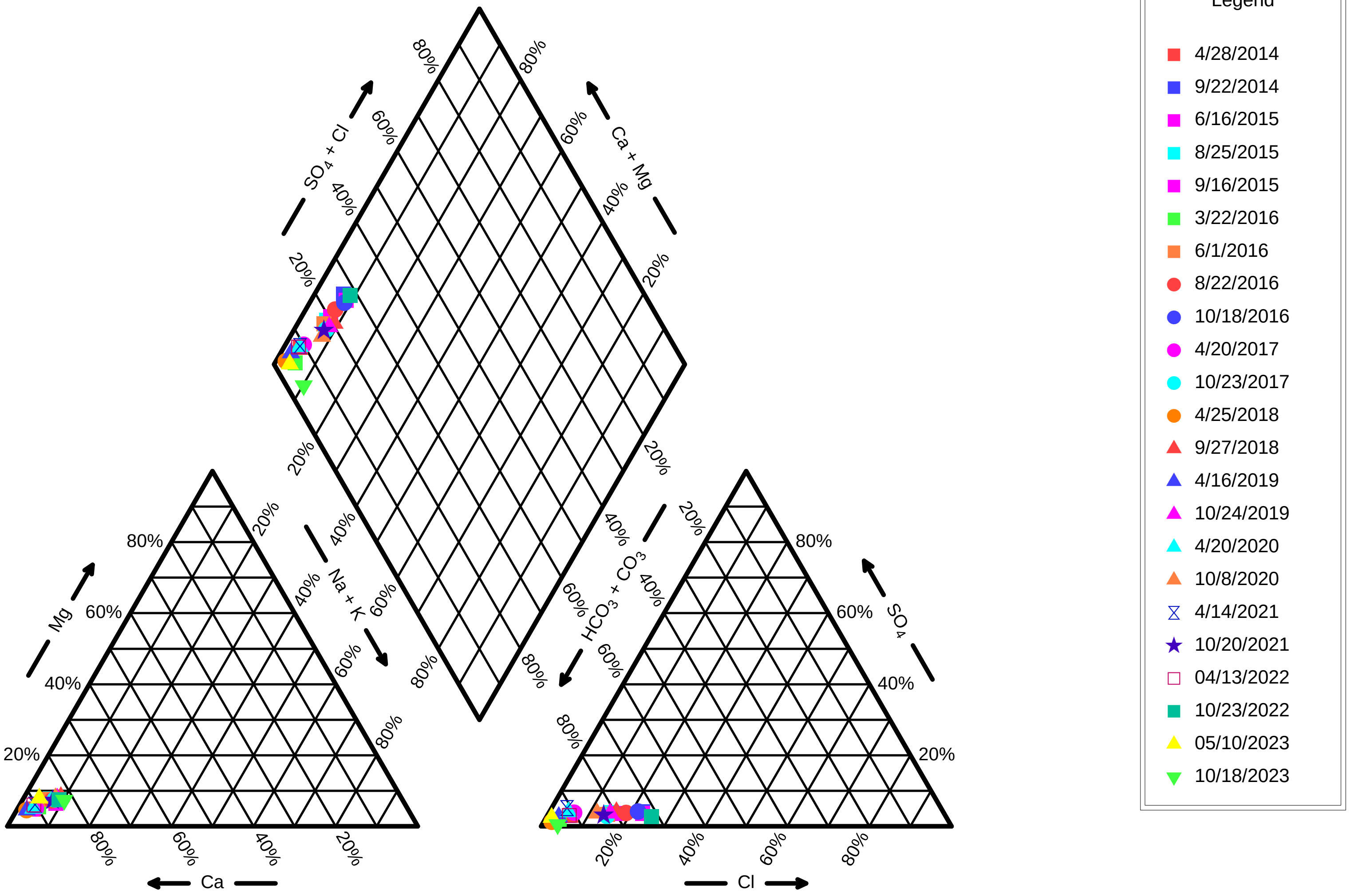
MW12 Piper Diagram



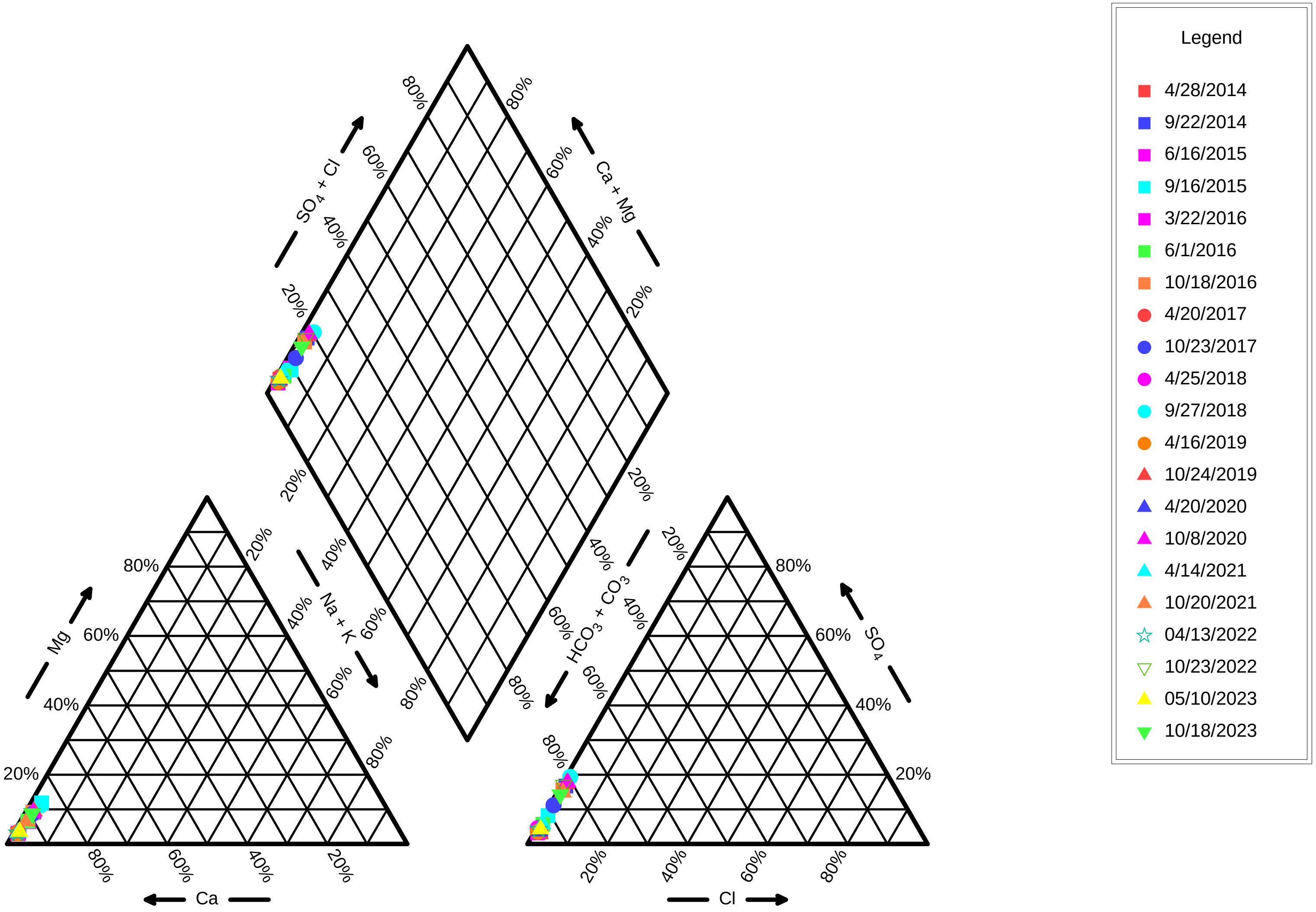
MW13 Piper Diagram



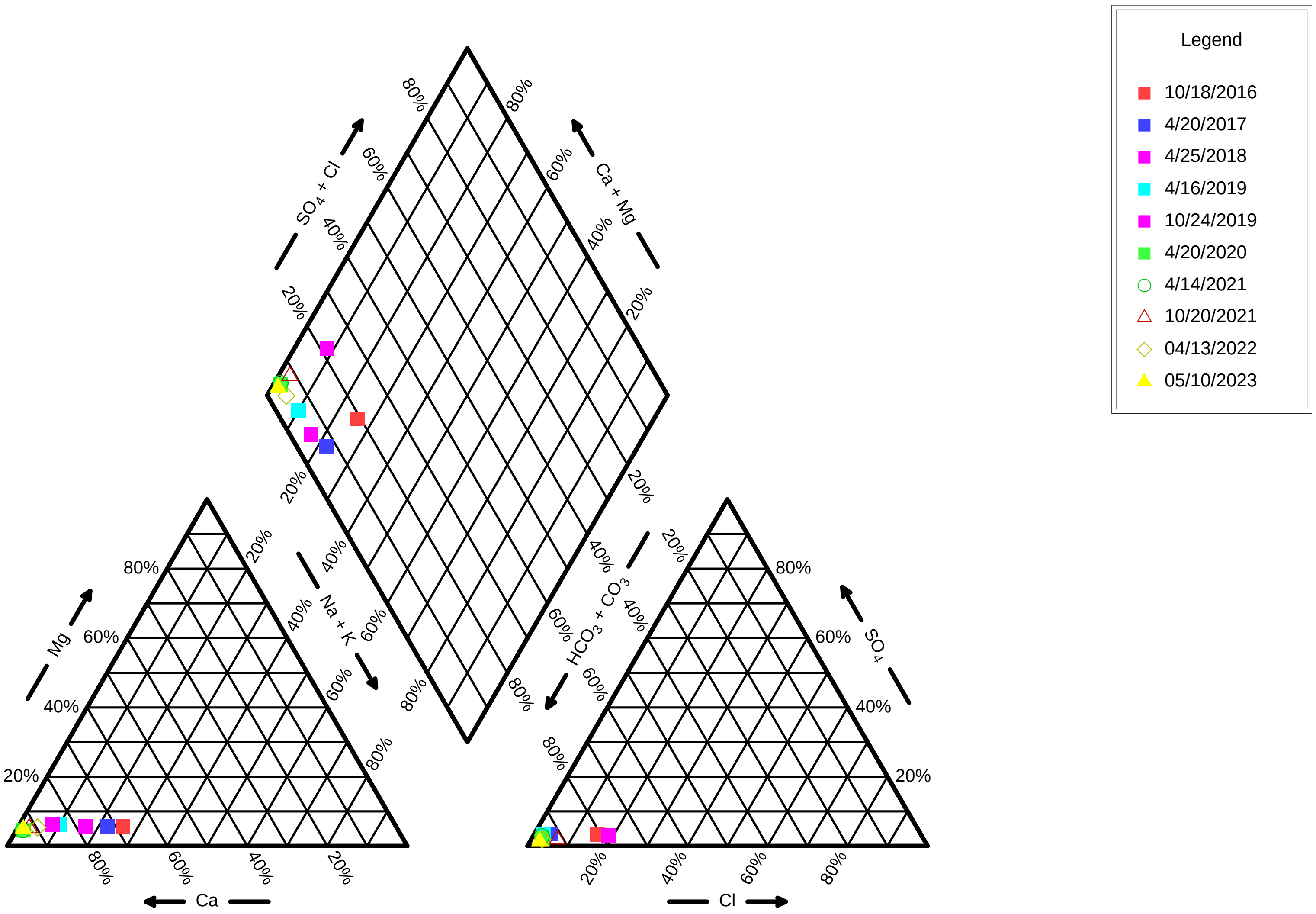
MW14 Piper Diagram



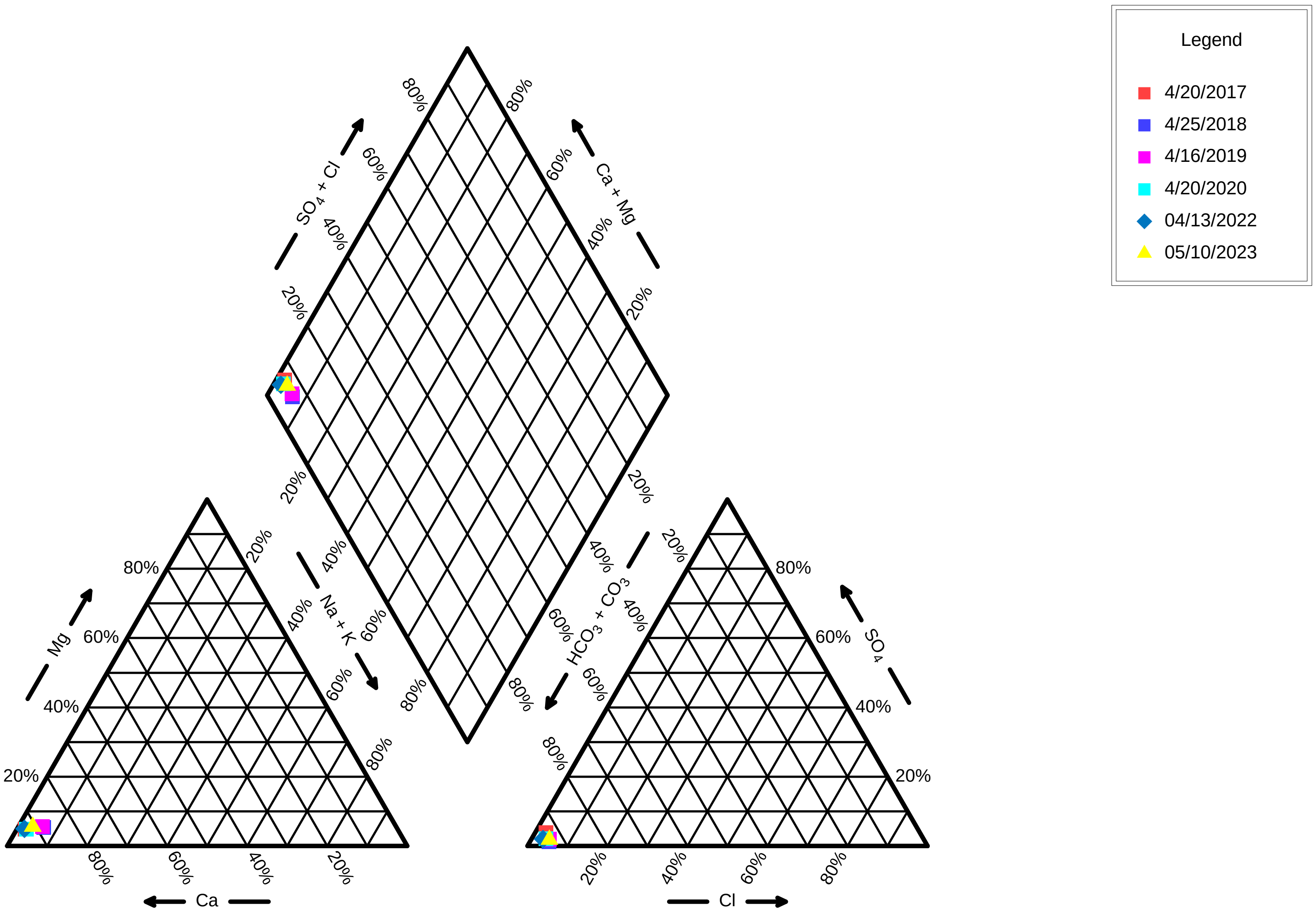
MW15 Piper Diagram



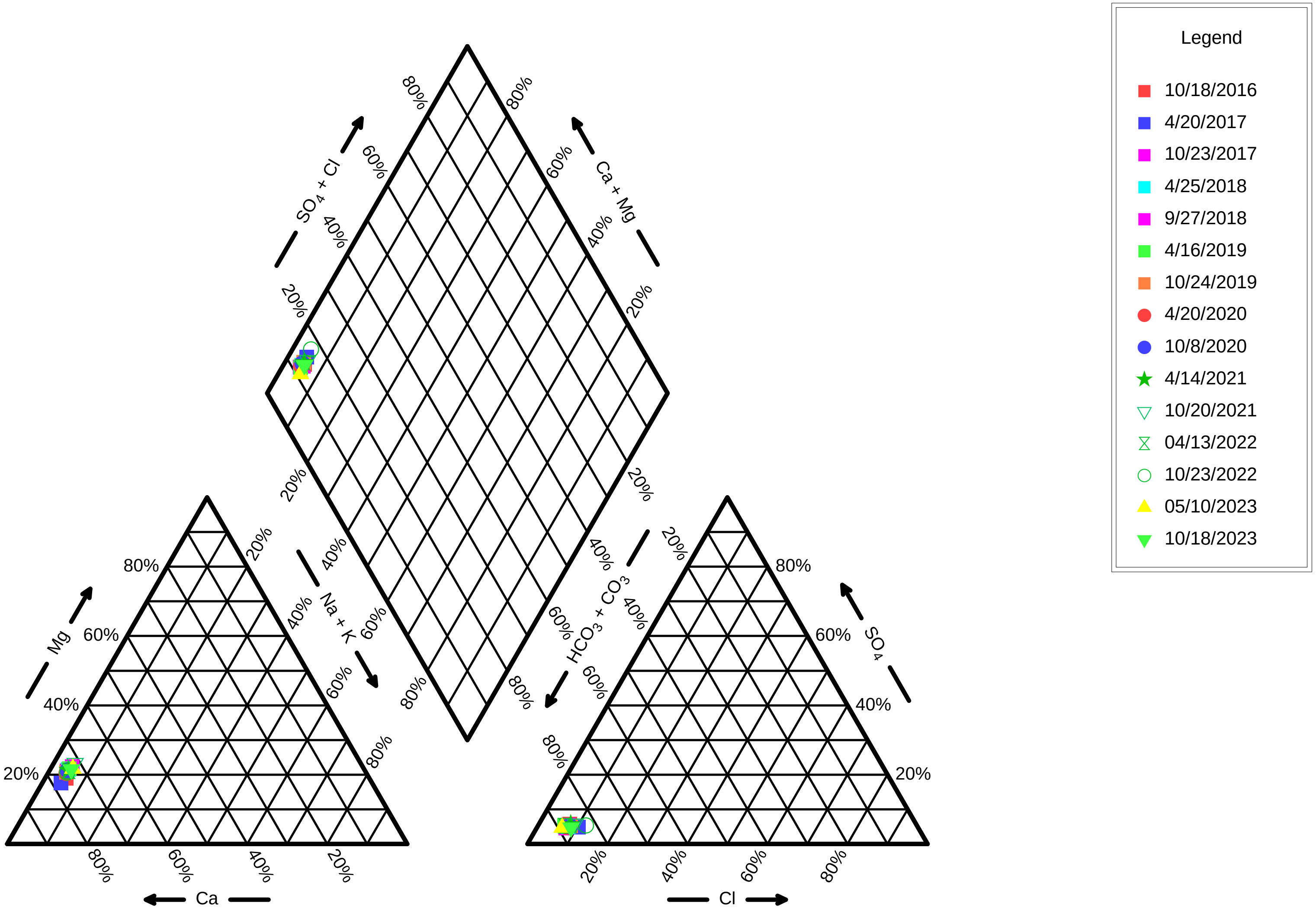
MW16-I Piper Diagram



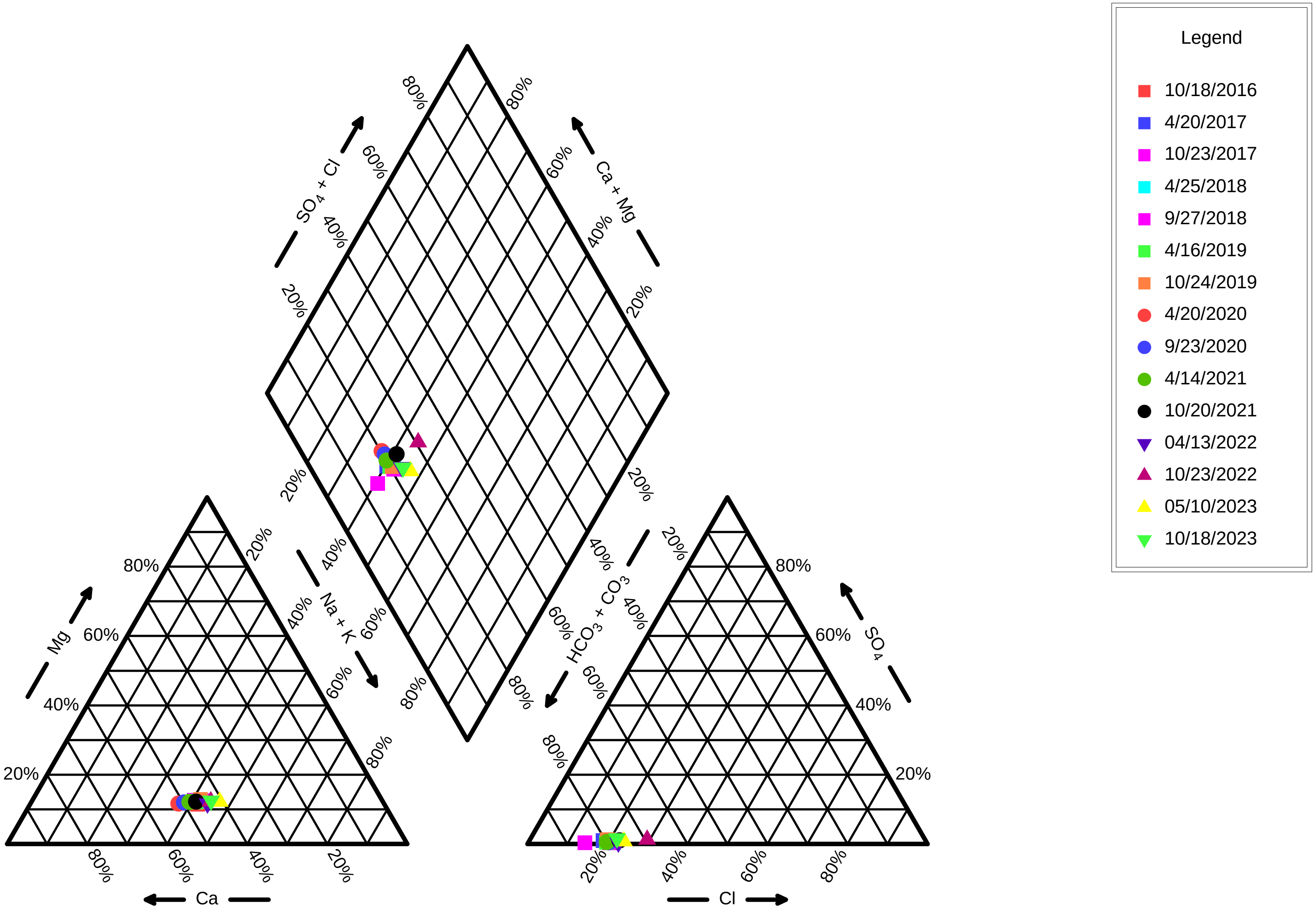
MW16-II Piper Diagram



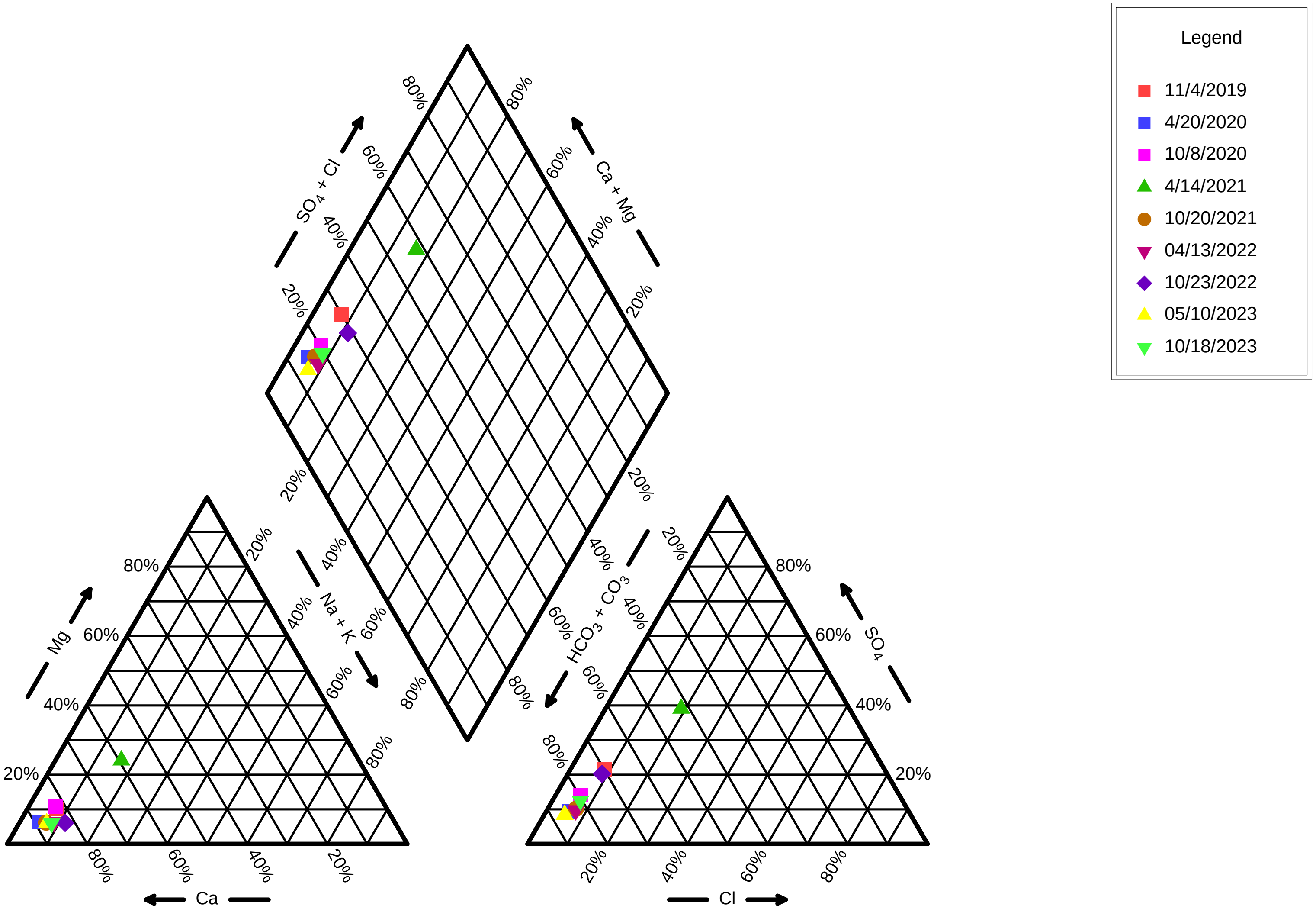
MW16-III Piper Diagram



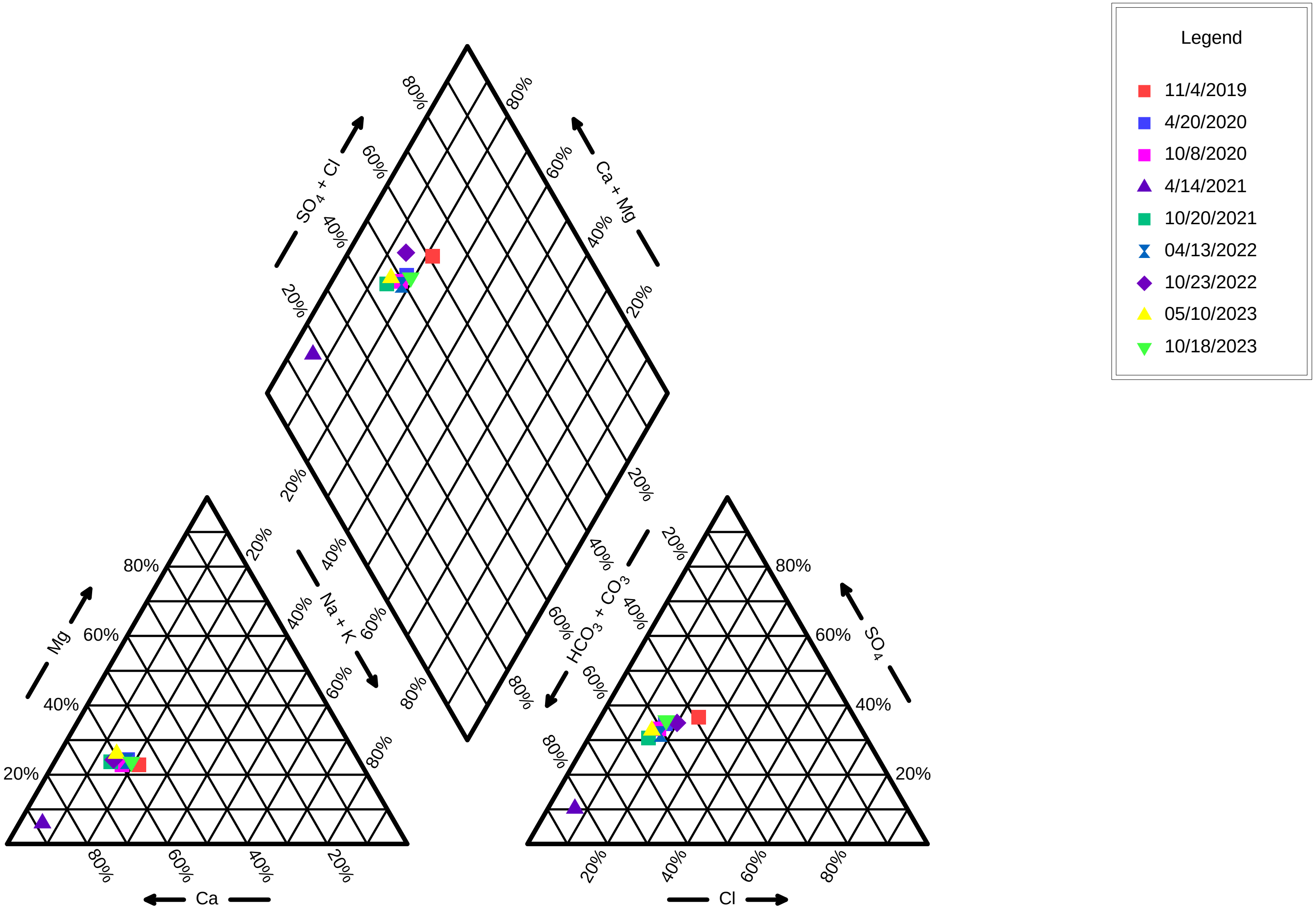
MW17 Piper Diagram



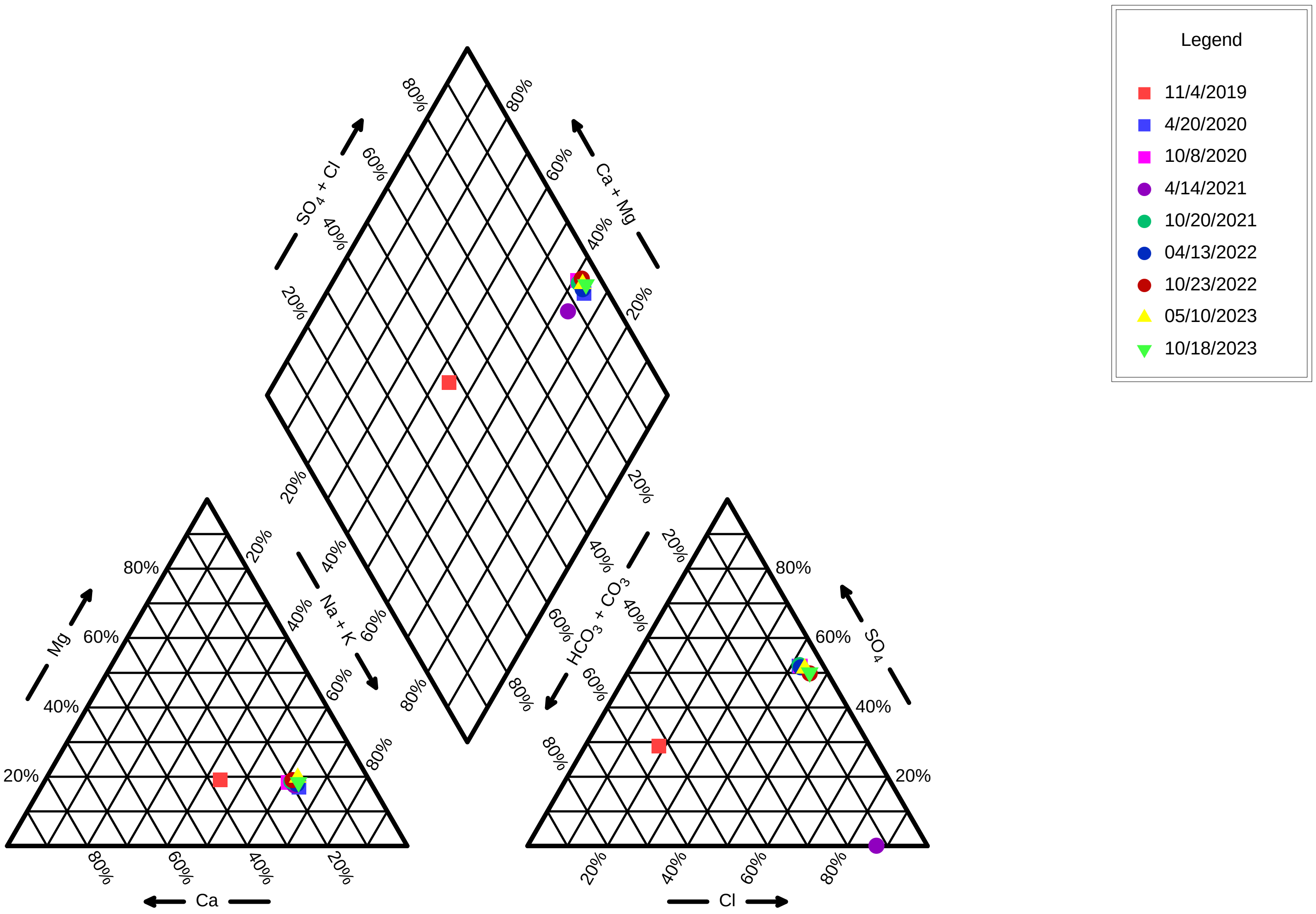
MW201D Piper Diagram



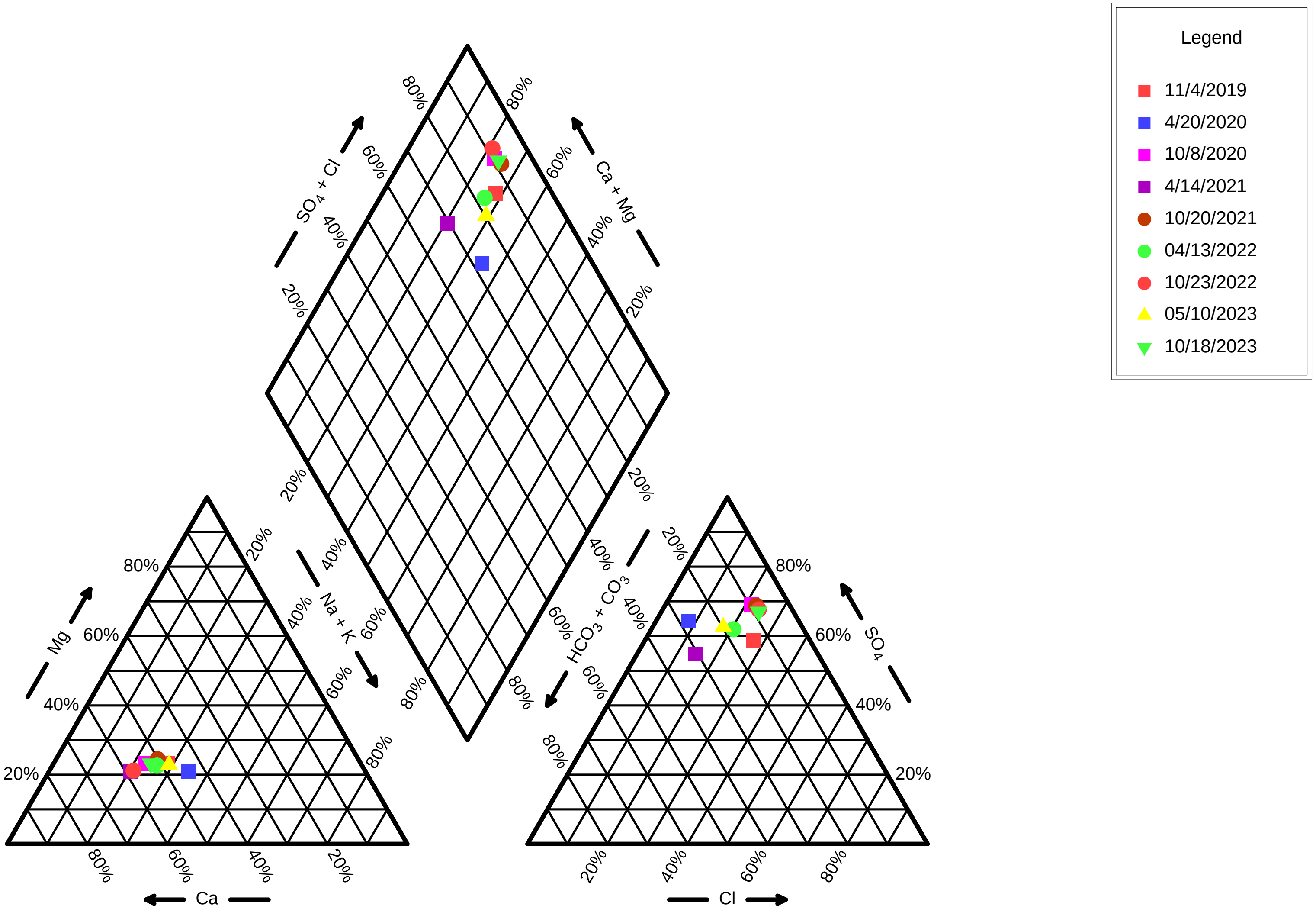
MW202 Piper Diagram



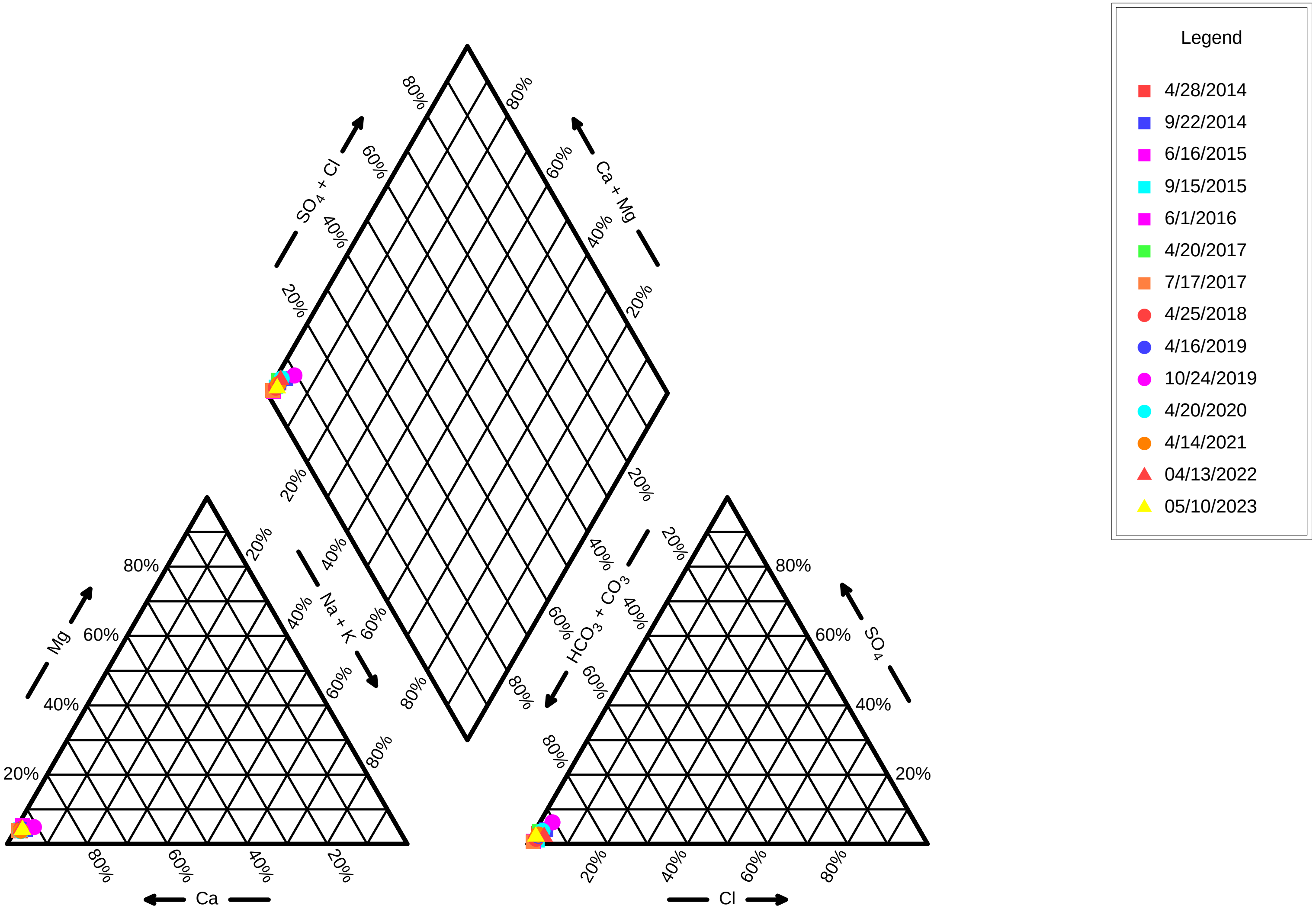
MW203 Piper Diagram



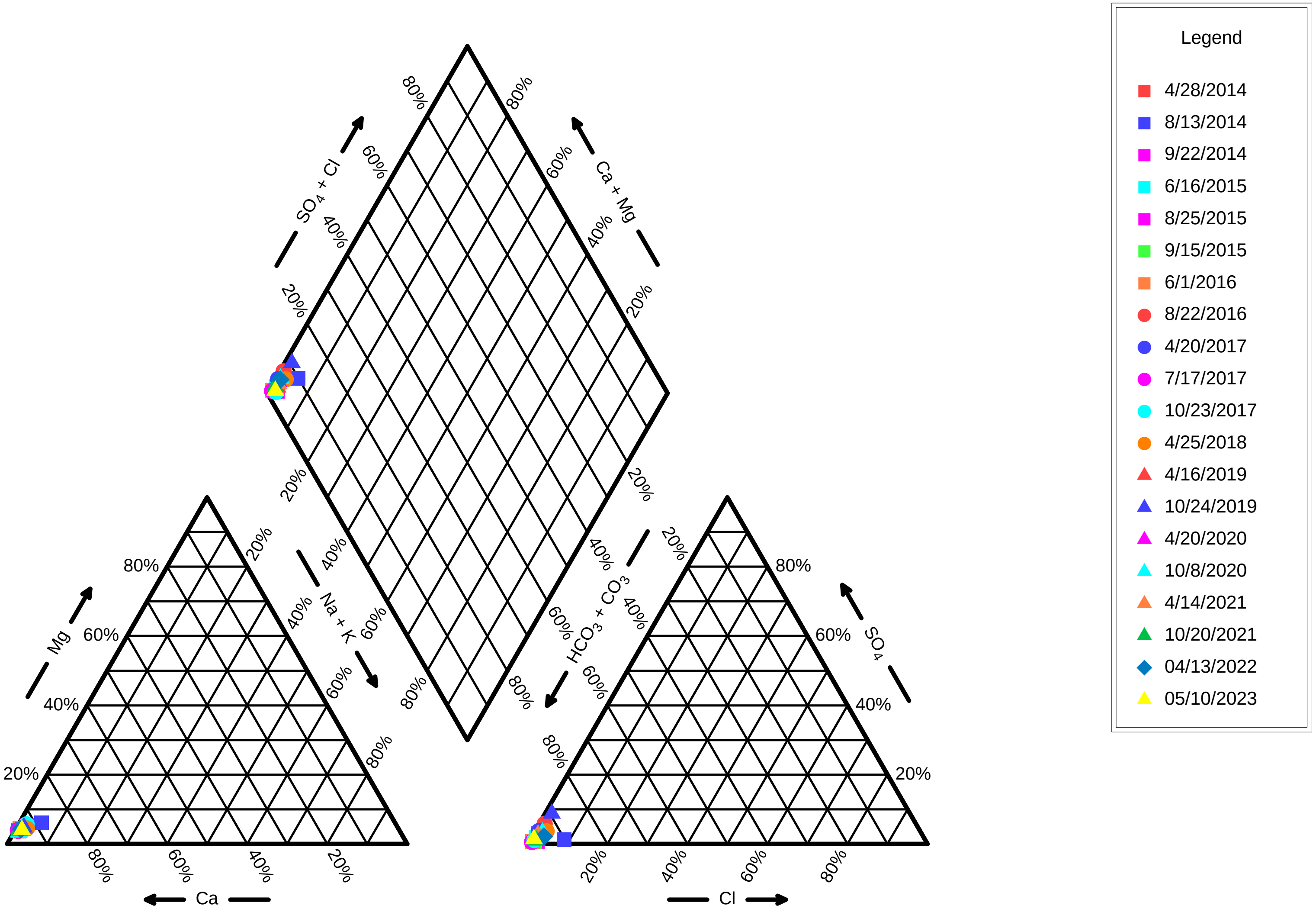
MW204 Piper Diagram



SWA Piper Diagram



SWB Piper Diagram



APPENDIX L

Surface Water Photos

SW-A: May 10, 2023

SW-A: October 18, 2023

SW-B: May 10, 2023

SW-B: October 18, 2023

SW-D: May 10, 2023

SW-D: October 18, 2023

STF-1: May 10, 2023

STF-1: October 18, 2023

STF-2: May 10, 2023

STF-2: October 18, 2023

STF-3: May 10, 2023

STF-3: October 18, 2023

APPENDIX M

Landfill Gas Monitoring Summary Table

Landfill Gas
Summary Table

	26-Feb-15		22-May-15		30-Nov-15		22-Feb-16		01-Jun-16		18-Oct-16		07-Feb-17		20-Apr-17	
Monitoring Location	**%VOL**	**%LEL**	**%VOL**	**%LEL**	**%VOL**	**%LEL**	**%VOL**	**%LEL**	**%VOL**	**%LEL**	**%VOL**	**%LEL**	**%VOL**	**%LEL**	**%VOL**	**%LEL**
MW1-I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MW1-II	0	0	0	0	18	>UEL	0	0	0	0	0	0	0	0	-	>100
MW2-I	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
MW2-II	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MW3			0	0	0	0	0	0	0	0	0	0	0	0	0	0
MW5-I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<0.1	0
MW5-II	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MW5-III	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MW7	1	20	0	0	1	20	0	0	0	0	0	0	0	0	0	0
MW8-I	0	0	0	0	11	>LEL	2	40	0	0	0	0	0	0	0	0
MW8-II	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MW8-III	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MW9	0	0	1	20	0	0	0	0	0	0	0	0	-	-	0	0
MW10-I	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
MW10-II	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
MW11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MW12	-	-	0	0	-	-	0	0	0	0	0	0	0	0	0	0
MW13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MW14	0	0	0	0	0	0	0	0	2	40	0	0	0	0	0	0
MW15	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MW16-I	-	-	-	-	-	-	-	-	-	-	<0.1	0	0	0	0	0
MW16-II	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0
MW16-III	-	-	-	-	-	-	-	-	-	-	0	0	0	0	<0.1	0
MW17	-	-	-	-	-	-	-	-	-	-	<0.1	0	34	>100	-	>100
GP-1	-	-	-	-	-	-	-	-	-	-	-	-	0	0	-	-
GP-2	-	-	-	-	-	-	-	-	-	-	-	-	0	0	-	-

Landfill Gas
Summary Table

	17-Jul-17		23-Oct-17		25-Apr-18		27-Sep-18		16-Apr-19		24-Oct-19		20-Apr-20		08-Oct-20	
Monitoring Location	**%VOL**	**%LEL**	**%VOL**	**%LEL**	**%VOL**	**%LEL**	**%VOL**	**%LEL**	**%VOL**	**%LEL**	**%VOL**	**%LEL**	**%VOL**	**%LEL**	**%VOL**	**%LEL**
MW1-I	0	0	0	0	0	0	0	0	<0.1	1.8	0	0	0	0	0	0
MW1-II	<0.1	0	0	0	0	0	0	0	<0.1	<1	0	0	<0.1	<1	0	0
MW2-I	0	0	0	0	0	0	0	0	<0.1	<1	0	0	0	0	0	0
MW2-II	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MW3	0	0	<0.1	0	0	0	0	0	0	0	0	0	0	0	0	0
MW5-I	0	0	0	0	0	0	0	0	<0.1	<1	0	0	0	0	0	0
MW5-II	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MW5-III	0	0	0	0	<0.1	<1	<0.1	0	0	0	0	0	0	0	0	0
MW7	0	0	0	0	0	0	<0.1	0	Submerged		0	0	0	0	0	0
MW8-I	0	0	0	0	0	0	0	0	<0.1	<1	0	0	<0.1	<1	0	0
MW8-II	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MW8-III	0	0	0	0	0	0	0	0	<0.1	0	<0.1	<1	<0.1	<1	<0.1	0.3
MW9	0	0	0	0	0	0	0	0	Submerged		0	0	Submerged		0	0
MW10-I	0	0	0	0	0	0	0	0	<0.1	<1	0	0	0	0	0	0
MW10-II	0	0	0	0	<0.1	0	0	0	0	0	0	0	0	0	0	0
MW11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MW12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MW13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MW14	0	0	0	0	<0.1	0	0.38	7	<0.1	1	0.34	6.8	<0.1	3	2	40
MW15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MW16-I	0	0	0	0	0	0	0	0	<0.1	0	0	0	0	0	0	0
MW16-II	0	0	0	0	0	0	0	0	0.27	5.4	0	0	0	0	0	0
MW16-III	0	0	0	0	0	0	0	0	<0.1	0	0	0	0	0	0	0
MW17	-	>100	<0.1	3	<0.1	6	max reading		max reading		1.7	34	2.7	54	max reading	
GP-1	<0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Landfill Gas
Summary Table

Monitoring Location	14-Apr-21		20-Oct-21		13-Apr-22		23-Oct-22		10-May-23		18-Oct-23	
	%VOL	%LEL	%VOL	%LEL	%VOL	%LEL	%VOL	%LEL	%VOL	%LEL	%VOL	%LEL
MW1-I	0	0	<0.1	0.01	0	0	<0.1	0	0	0	<0.1	0
MW1-II	0	0	max reading		max reading		<0.1	0	max reading		<0.1	0
MW2-I	-	-	-	-	-	-	-	-	-	-	-	-
MW2-II	0	0	<0.1	0.2	<0.1	0	<0.1	0	0	0	<0.1	0
MW3	-	-	-	-	-	-	-	-	-	-	-	-
MW5-I	0	0	0	0	0	0	0	0	0	0	0	0
MW5-II	-	-	-	-	-	-	-	-	-	-	-	-
MW5-III	-	-	-	-	-	-	-	-	-	-	-	-
MW7	Submerged		0	0	0	0	0	0	Submerged		0	0
MW8-I	0	0	0	0	0	0	0	0	<0.1	0	0	0
MW8-II	-	-	-	-	-	-	-	-	-	-	-	-
MW8-III	0	0	0	0	0	0	0	0	<0.1	0	0	0
MW9	Submerged		0	0	Submerged		0	0	Submerged		0	0
MW10-I	-	-	-	-	-	-	-	-	-	-	-	-
MW10-II	0	0	0	0	0	0	0	0	0	0	0	0
MW11	0	0	<0.1	0.2	0	0	0	0	<0.1	0	0	0
MW12	0	0	0	0	0	0	0	0	0	0	0	0
MW13	0	0	0	0	0	0	0	0	0	0	0	0
MW14	<0.1	1.5	0.1	2	<0.1	1	<0.1	1	<0.1	0	<0.1	1
MW15	0	0	0	0	0	0	0	0	0	0	0	0
MW16-I	0	0	0	0	0	0	0	0	0	0	0	0
MW16-II	0	0	<0.1	0.01	0	0	0	0	<0.1	0	0	0
MW16-III	0	0	<0.1	0.01	0	0	0	0	0	0	0	0
MW17	1.8	36	max reading		max reading		max reading		max reading		max reading	
GP-1	0	0	0	0	0	0	0	0	0	0	0	0
GP-2	0	0	0	0	0	0	0	0	0	0	0	0

APPENDIX N

2023 Leaf & Yard Waste Quantities

Leaf and Yard Waste Quanities

Somerville

Date	Material	Quantity (tonnes) from TS
2023-01-02	Leaf and Yard Waste (kg)	0.16
2023-01-06	Leaf and Yard Waste (kg)	0.15
2023-01-09	Leaf and Yard Waste (kg)	0.24
2023-01-13	Leaf and Yard Waste (kg)	0.21
2023-02-20	Leaf and Yard Waste (kg)	0.31
2023-02-25	Leaf and Yard Waste (n/c)	0.05
2023-03-03	Leaf and Yard Waste (kg)	0.08
2023-03-10	Leaf and Yard Waste (kg)	0.07
2023-03-20	Leaf and Yard Waste (kg)	0.16
2023-03-24	Leaf and Yard Waste (kg)	0.61
2023-03-31	Leaf and Yard Waste (kg)	0.2
2023-04-08	Leaf and Yard Waste (kg)	1.16
2023-04-10	Leaf and Yard Waste (kg)	0.21
2023-04-14	Leaf and Yard Waste (kg)	2.49
2023-04-14	Leaf and Yard Waste (n/c)	0.08
2023-04-15	Leaf and Yard Waste (kg)	3.58
2023-04-17	Leaf and Yard Waste (kg)	2.04
2023-04-21	Leaf and Yard Waste (kg)	3.38
2023-04-22	Leaf and Yard Waste (kg)	2.6
2023-04-22	Leaf and Yard Waste (n/c)	0.18
2023-04-24	Leaf and Yard Waste (kg)	2.23
2023-04-28	Leaf and Yard Waste (kg)	3.12
2023-04-29	Leaf and Yard Waste (kg)	3.72
2023-04-29	Leaf and Yard Waste (n/c)	0.57
2023-05-01	Leaf and Yard Waste (kg)	0.87
2023-05-05	Leaf and Yard Waste (kg)	2.05
2023-05-05	Leaf and Yard Waste (n/c)	0.16
2023-05-06	Leaf and Yard Waste (kg)	2.14
2023-05-06	Leaf and Yard Waste (n/c)	1.8
2023-05-08	Leaf and Yard Waste (kg)	1.87
2023-05-12	Leaf and Yard Waste (kg)	1.16
2023-05-13	Leaf and Yard Waste (kg)	1.91
2023-05-15	Leaf and Yard Waste (kg)	2.52
2023-05-19	Leaf and Yard Waste (kg)	5.98
2023-05-20	Leaf and Yard Waste (kg)	1.27
2023-05-22	Leaf and Yard Waste (kg)	1.76
2023-05-26	Leaf and Yard Waste (kg)	1.66
2023-05-27	Leaf and Yard Waste (kg)	2.19
2023-05-29	Leaf and Yard Waste (kg)	3.38
2023-06-02	Leaf and Yard Waste (kg)	1.04
2023-06-03	Leaf and Yard Waste (kg)	0.41
2023-06-05	Leaf and Yard Waste (kg)	2.48
2023-06-09	Leaf and Yard Waste (kg)	1.18
2023-06-10	Leaf and Yard Waste (kg)	1.66
2023-06-12	Leaf and Yard Waste (kg)	0.27
2023-06-16	Leaf and Yard Waste (kg)	1.18
2023-06-17	Leaf and Yard Waste (kg)	1.93
2023-06-19	Leaf and Yard Waste (kg)	2.74
2023-06-23	Leaf and Yard Waste (kg)	1.05
2023-06-23	Leaf and Yard Waste (n/c)	0.19
2023-06-24	Leaf and Yard Waste (kg)	2.12
2023-06-26	Leaf and Yard Waste (kg)	0.82
2023-06-27	Leaf and Yard Waste (kg)	0.28
2023-06-30	Leaf and Yard Waste (kg)	4.12
2023-07-03	Leaf and Yard Waste (kg)	2.27
2023-07-07	Leaf and Yard Waste (kg)	3.53

Total Yards:	0
Yards to Tonnes:	0.00
Tonnes Weighed:	253.03
Total Tonnes:	253.03

Leaf and Yard Waste Quanities

Somerville

Date	Material	Quantity (tonnes) from TS
2023-07-08	Leaf and Yard Waste (kg)	2.54
2023-07-10	Leaf and Yard Waste (kg)	2.06
2023-07-14	Leaf and Yard Waste (kg)	4.35
2023-07-15	Leaf and Yard Waste (kg)	1.29
2023-07-15	Leaf and Yard Waste (n/c)	0.08
2023-07-17	Leaf and Yard Waste (kg)	1.12
2023-07-21	Leaf and Yard Waste (kg)	1.42
2023-07-22	Leaf and Yard Waste (kg)	2.28
2023-07-24	Leaf and Yard Waste (kg)	2.27
2023-07-28	Leaf and Yard Waste (kg)	2.5
2023-07-29	Leaf and Yard Waste (kg)	2.2
2023-07-31	Leaf and Yard Waste (kg)	3.11
2023-08-04	Leaf and Yard Waste (kg)	0.68
2023-08-05	Leaf and Yard Waste (kg)	2.94
2023-08-07	Leaf and Yard Waste (kg)	2.33
2023-08-11	Leaf and Yard Waste (kg)	2.23
2023-08-12	Leaf and Yard Waste (kg)	1.58
2023-08-14	Leaf and Yard Waste (kg)	1.44
2023-08-18	Leaf and Yard Waste (kg)	0.97
2023-08-19	Leaf and Yard Waste (kg)	1.42
2023-08-21	Leaf and Yard Waste (kg)	2.14
2023-08-25	Leaf and Yard Waste (kg)	2.01
2023-08-25	Leaf and Yard Waste (n/c)	0.06
2023-08-26	Leaf and Yard Waste (kg)	1.23
2023-08-28	Leaf and Yard Waste (kg)	0.63
2023-09-01	Leaf and Yard Waste (kg)	0.67
2023-09-02	Leaf and Yard Waste (kg)	1.26
2023-09-04	Leaf and Yard Waste (kg)	1.49
2023-09-08	Leaf and Yard Waste (kg)	0.49
2023-09-09	Leaf and Yard Waste (kg)	0.67
2023-09-11	Leaf and Yard Waste (kg)	3.85
2023-09-15	Leaf and Yard Waste (kg)	1.63
2023-09-16	Leaf and Yard Waste (kg)	0.64
2023-09-18	Leaf and Yard Waste (kg)	1.56
2023-09-22	Leaf and Yard Waste (kg)	2.36
2023-09-23	Leaf and Yard Waste (kg)	1.5
2023-09-25	Leaf and Yard Waste (kg)	1.7
2023-09-29	Leaf and Yard Waste (kg)	4.46
2023-09-30	Leaf and Yard Waste (kg)	1.13
2023-10-02	Leaf and Yard Waste (kg)	2.54
2023-10-06	Leaf and Yard Waste (kg)	0.79
2023-10-07	Leaf and Yard Waste (kg)	1.35
2023-10-09	Leaf and Yard Waste (kg)	1.07
2023-10-13	Leaf and Yard Waste (kg)	3.44
2023-10-14	Leaf and Yard Waste (kg)	2.91
2023-10-16	Leaf and Yard Waste (kg)	2.99
2023-10-20	Leaf and Yard Waste (kg)	2.02
2023-10-21	Leaf and Yard Waste (kg)	2.85
2023-10-23	Leaf and Yard Waste (kg)	4.52
2023-10-23	Leaf and Yard Waste (n/c)	0.3
2023-10-27	Leaf and Yard Waste (kg)	2.64
2023-10-28	Leaf and Yard Waste (kg)	4.09
2023-10-30	Leaf and Yard Waste (kg)	3.1
2023-10-30	Leaf and Yard Waste (n/c)	0.11
2023-11-03	Leaf and Yard Waste (kg)	4.76
2023-11-03	Leaf and Yard Waste (n/c)	0.14
2023-11-04	Leaf and Yard Waste (kg)	3.38

Leaf and Yard Waste Quanities

Somerville

Date	Material	Quantity (tonnes) from TS
2023-11-06	Leaf and Yard Waste (kg)	8.23
2023-11-10	Leaf and Yard Waste (kg)	2.28
2023-11-11	Leaf and Yard Waste (kg)	3.41
2023-11-13	Leaf and Yard Waste (kg)	4.16
2023-11-17	Leaf and Yard Waste (kg)	20.76
2023-11-18	Leaf and Yard Waste (kg)	2.1
2023-11-20	Leaf and Yard Waste (kg)	1.11
2023-11-24	Leaf and Yard Waste (kg)	2.88
2023-11-25	Leaf and Yard Waste (kg)	0.35
2023-11-27	Leaf and Yard Waste (kg)	0.64
2023-12-01	Leaf and Yard Waste (kg)	0.64
2023-12-02	Leaf and Yard Waste (kg)	0.03
2023-12-04	Leaf and Yard Waste (kg)	0.32
2023-12-09	Leaf and Yard Waste (kg)	0.48
2023-12-11	Leaf and Yard Waste (kg)	5.3
2023-12-15	Leaf and Yard Waste (kg)	1.72
2023-12-16	Leaf and Yard Waste (kg)	0.66
2023-12-18	Leaf and Yard Waste (kg)	0.34
2023-12-22	Leaf and Yard Waste (kg)	0.35
2023-12-29	Leaf and Yard Waste (kg)	0.16
2023-12-30	Leaf and Yard Waste (kg)	0.23