Eldon Waste Disposal Site

2023 Annual Monitoring Report

Prepared for:
City of Kawartha Lakes

Prepared by:
Azimuth Environmental
Consulting, Inc.

March 2024

AEC 24-010

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Environmental Assessments & Approvals

March 27, 2024 AEC 24-010

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

Attention: Ms. Kayla Pantaleo
Regulatory Compliance Officer

Re: 2023 Annual Monitoring Report
Eldon Waste Disposal Site

Dear Kayla:

Azimuth Environmental Consulting, Inc. (Azimuth) is pleased to provide the 2023 Annual Monitoring Report (AMR) for the Eldon 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 Eldon Landfill Site is well understood based on over 25 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 near steady state condition. This is supported by the general consistency between the 2023 data with the historic data set for the majority of monitoring locations.

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

Yours truly,

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

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Attach:

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Executive Summary

The City of Kawartha Lakes (City) is responsible for the operation and maintenance of the Eldon Landfill Site (Site) in accordance with the Environmental Compliance Approval (ECA) (No. A321004) issued by the Ministry of the Environment, Conservation & Parks (MECP) on February 21, 1980 and last amended June 13, 2016.

The Eldon Landfill Site is located along an esker feature that extends along a northeast / southwest axis within an incised bedrock trough that extends along the same axis. This trough has been infilled with a substantial thickness of glaciofluvial sand and gravel deposits (~10 m). A discontinuous glacial till unit of limited extent and thickness (i.e., Peterborough Drumlin Till Plain) lies immediately over the underlying Ordovician limestone of the Verulam Formation away from the esker complex/ bedrock trough (Cambium, 2011). A wetland complex exists to the north and west of the Site which has a surficial peat unit reportedly 1 m in depth.

The soils underlying the Site vary from coarse sands and gravel along the centre line of the esker, while a more extensive sand unit and underlying till deposit are located beneath. Surficial peat deposits are present in the wetland areas that surround the landfill and make up the Butternut Creek Wetland Complex, which is present along the northern and western periphery of the waste mound and extends more than two kilometers to the west of the waste mound. A seasonal tributary follows this wetland alignment originating north of the Site flowing in a southwesterly direction.

At this Site, there is the potential for a certain level of hydrogeologic complexity given the multiple aquifer units present and the surrounding environmental setting. The Site geochemistry has been used to differentiate the individual flow regimes. The ability to distinguish different ground water signatures has allowed the physical flow regime to be better defined and suggests some degree of isolation between different flow zones. The result is that there are two distinctive ground water signatures present in the environs of the Site consisting of the granular overburden and underlying fractured bedrock (which indicates a naturally mineralized water quality). Some similarities exist between the leachate and bedrock water quality; however, the salinity associated with the bedrock water quality are defined by more elevated sodium and chloride concentrations than those observed in the leachate.

The ground water flow patterns at the Site generally follow the orientation of the esker / bedrock trough feature such that an overall western migration pathway exists. Given the Site hydrogeology and geochemistry, it has been determined that leachate impacted ground water flows within the granular overburden materials in a western direction which

ultimately discharges into the Butternut Creek Wetland Complex west of the Site following the downward dip in topography. Despite the westerly flow path and permeable overburden materials, there is a significant reduction in leachate indicator parameter concentrations with distance from the waste mound indicating that the attenuative capacity of the Site is sufficient.

In interpreting the Site data, it was important to distinguish the organic rich geochemical signature in the wetland complex from that in proximity to the landfill Site. This proves to be the most challenging aspect to the Site interpretation since several leachate impacted parameters are also associated with the naturally occurring geochemically reduced conditions present in the downgradient wetland.

The data trends over this monitoring period have yielded a relatively consistent geochemical signature, although some subtle long term trends are present at select locations owing to the fact that the Site is still active. More localized trending is present in closer proximity to the waste mound, although these are determined to represent changes in the operations within waste mound over time. Despite these trends, the relative consistency would indicate that conditions are at a near steady state condition. This finding is in keeping with the conductive granular environment present beneath the landfill Site. The underflow is considered considerable and dilutes / disperses the leachate percolating from the landfill. The permeability contrast between the emplaced waste and esker sediments allows for attenuation and dispersion to background levels within the downgradient wetland complex.

Results from monitoring wells to the west could be inferred to represent a dilute leachate influence; but other parameters including the organic nitrogen concentration suggest a natural signature associated with the wetland complex. Regardless, wetland monitoring results have much lower concentrations than those observed in closer proximity wells to the Site, which are attributed to the landfill. Attenuative processes at this Site are significant and have abated the influence of the contaminant plume from the landfill. It is also recognized that the contaminant flux from the landfill Site is rate-limited by the vertical waste permeability and the mass flux into the underlying aquifer system is limiting and appears to be effectively dispersed, such that a significant contaminant plume away from the landfill Site has not been measured.

Elevated concentrations relative to Reasonable Use Policy (RUP) B-7-1 continued in 2023, with a number of elevated concentrations to the north, south and west; however the majority of these were more related to the naturally occurring anoxic wetland conditions in which a number of the compliance monitoring wells are located within, which cause natural elevations in dissolved organic carbon (DOC), iron and manganese. Regardless

of these and other landfill related parameters, it is noted that a large Contaminant Attenuation Zone (CAZ) exists to the northwest, west and south such that any RUP exceedances in the current monitoring network would be more than adequately attenuated with the additional downgradient lands present. Despite this, a location for a more southwesterly RUP compliance monitor has been proposed to address recent MECP Site inspection comments.

As in previous years, downstream surface water quality results did not indicate any leachate influence suggesting that the Site is providing adequate attenuation of leachate within the property boundaries.

Revisions to the monitoring program have been proposed as part of the 2024 monitoring program, similar to that proposed for 2023 which include a reduction in the background monitoring wells due to redundancy, as well as some other proposed reductions for consideration following the formal closure of the Phase I/II area of the landfill.

The operations at the Site had completed filling of the Phase I/II area in 2019 and progressed into the Phase III filling area which is a lined waste cell with underlying leachate collection system. This is designed to collect all leachate generated within the Phase III area such that it can be hauled off-Site to the Lindsay Sewage Treatment Facility. Finalizing of the grading and capping of Phase I/II took place in 2021 which will help to reduce the leachate generation within this historically unlined, natural attenuation area of the Site. Continued monitoring will be utilized to assess the effectiveness of these activities.

1.0 Introduction

The City of Kawartha Lakes (City) is responsible for the operation and maintenance of the Eldon Landfill Site (Site) in accordance with the Environmental Compliance Approval (ECA) (No. A321004) originally issued by the Ministry of the Environment, Conservation & Parks (MECP) on February 21, 1980 and last amended June 13, 2016.

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 311 Rockview Road within the City of Kawartha Lakes (Figure 1). Waste deposition began at this 100.5 hectare (ha) Site sometime before 1980, prior to which the Site operated as a sand borrow pit.

The current Site boundaries reflect the original 19.2 ha Site area as well as the additional 81.3 ha which are Contaminant Attenuation Zone (CAZ) encompassing lands to the west, south and southwest. These lands have been acquired to ensure compliance with Reasonable Use Policy (RUP) as they represent the downgradient area for the landfill.

The Site currently operates under the Design and Operations Plan prepared as part of the June 2016 ECA amendment (Golder, 2016) for the expansion of the waste footprint into the Phase III area, which has incorporated a landfill liner and leachate collection system. During late 2019, the active landfill area shifted to the Phase III area as Phase I/II areas reached capacity and final grades. It is noted that the Phase I & II areas represent a total approved waste footprint area of 3.7 ha, while the Phase III area has an approved waste footprint area of 5 ha. The Site layout including current and future waste areas are illustrated on Figure 2. In 2021, the Phase I/II area underwent grading and capping activities to formally close this section of the Site. Vegetation across this area has become well established with no notable erosion evident in 2023.

In addition to the landfilling operations at the Site, the Site is also approved for composting of leaf, yard waste, tree trunks, stumps, branches, leaves and brush with limitations of 150 tonnes daily and 500 tonnes annually.

2.0 Site Conceptual Model

Physiographically, the Site is situated within a region known collectively as the Carden Plain (Chapman and Putnam, 1984). This region encompasses an area of approximately 583 km^2 (225 mi^2) and is characterized by a "…flat-to-undulating limestone plain from which a glacier stripped off most of the overburden". To the south and east of the Site, the Ontario Geological Survey (Barnett *et al.*, 1991) note the presence of several drumlins scattered throughout the local area, which represent a northward extension of the Peterborough Drumlin Field.

Being formerly situated beneath the shoreline of glacial Lake Algonquin discrete pockets of both nearshore and lacustrine deposits can be found throughout the Carden Plain. The dominant overburden material of this region; however, consists of an undifferentiated sand till that is typically high in clasts and total matrix carbonate content (Barnett *et al.*, 1991).

More specifically, the Eldon Landfill Site is located along an esker feature that extends along a northeast / southwest axis within a buried bedrock trough that extends along the same axis. These conditions have been documented in previous reports (Cambium, 2011) and are evident through the borehole logs which indicate bedrock contact elevations with distinct ridges noted to the south and north of the buried trough. It is also noted that some of the surrounding areas are made up of wetland features residing in areas of lower elevation that have been interpreted to be supported by ground water discharge from the upland areas.

The soils underlying the Site vary from coarse sands and gravel along the centre line of the esker at surface, while a more extensive sand unit and underlying till deposit are located beneath. Surficial peat deposits are present in the wetland areas that surround the landfill.

At this Site, there is the potential for a certain level of hydrogeologic complexity given the multiple aquifer units present. The Site geochemistry has been used to differentiate the individual flow regimes. The ability to distinguish different ground water signatures has allowed the physical flow regime to be better defined and suggests some degree of isolation between different flow zones. The result is that there are two distinctive ground water signatures present in the environs of the Site.

The first hydrogeologic zone is identified by the overburden water quality, which is represented in the background water quality data collected from several wells including MW9-I, MW11-II, MW12-I & MW33-II (Figure 2). At these locations, the water quality has shown to be consistent over time and geochemically similar between locations. As such, it would be suggested that the overburden aquifer in these areas is not influenced by the landfill.

The second identified hydrogeologic zone / geochemical signature is that from the bedrock unit. Although this unit has been represented by one aquifer unit, it should be noted that there is some variability within the bedrock water quality noted between monitoring locations that would indicate that natural brine waters are present in the area (*i.e.*, MW10-I & 27-I). However, the level of mineralization varies across the Site and becomes more prevalent in deeper conductive bedding plane fractures present in the vertical bedrock profile for the wells screened at these depths. Review of potable well records in the Eldon area indicates that saline, mineralized and sulfurous water are present within the general proximity of the Site.

In addition to the ground water signatures described above, the surface water quality was also evaluated in comparison to these ground water quality signatures. The surface water

from the channel that flows north of the Site and is part of the Butternut Creek Wetland Complex (SW1, SW2B and SW4), as well as the background stations within a wetland east of the waste mound along Rockview Road (SW5) and south of the entrance road (SW6) was noted to have a similar signature to that of the ground water aquifers. The expectation is that ground waters from the esker complex are flowing toward and discharging to this channel and associated wetland complex to the west. However, there does not appear to be any strong similarities to that of the leachate geochemical signature and there does not appear to be any significant difference in water quality between the upstream and downstream sampling locations. These data suggest that there is no significant leachate influence at the downstream sampling location. If ground water originating from the landfill is discharging to the adjacent wetland area (as expected), any potential leachate is sufficiently diluted and attenuated such that there is no significant leachate influence in the wetland area and adjacent creek.

In summary, this facility has been present at this location for over 40 years. The facility is founded on permeable sediments associated with an esker complex that is situated in a bedrock trough. The conceptualization is that the bedrock has been eroded through glaciofluvial processes. This would also account for the granular deposition within the trough. The trough orientation is expected to define the primary ground water flow direction that occurs in the conductive sands.

The conceptualization could also suggest that it would be reasonable to assume that the landfill leachate production has likely achieved a steady-state condition in Phase I/II. Given the granular nature of the underlying sediments; this situation would result in the development and maintenance of a steady-state dissolved-phase contaminant plume associated with the leachate release from the unlined portion of the landfill (i.e., Phase I/II). Long-term monitoring would be used to confirm this assumption and demonstrates the geochemical consistency of the Site's influence on the surrounding environment.

While ground water movement within the bedrock trough (overburden) is considered to be the primary contaminant transport pathway; it may also be possible to disperse and attenuate contaminants within the layered limestone bedrock formation. Thus, this potential is also evaluated through the monitoring data to assess whether there is any validity to this possible contaminant transport pathway. The layered structure of the limestone formations within the Carden Plain would suggest that lateral migration along exposed conductive bedding plane fractures is far more likely than any vertical percolation between conductive lateral bedding plane fractures.

3.0 Geology

As noted above, ground water flow and contaminant transport is controlled by the geological setting. A sound understanding of the geologic environment facilitates a more insightful interpretation of the Site hydrogeology. The Site Conceptual Model (SCM) is based on an understanding of the functional aspects of the regional and local geological setting.

The Eldon Landfill Site is located above a glaciofluvial bedrock trough that extends generally in a southwest direction and has been cut into the bedrock profile about eight metres. This trough has been infilled with a substantial thickness of glaciofluvial sand and gravel deposits (~10 m). A discontinuous glacial till unit of limited extent and thickness (i.e., Peterborough Drumlin Till Plain) lies immediately over the underlying Ordovician limestone of the Verulam Formation (Cambium, 2011). A wetland complex has developed to the north and west of the Site which has a surficial peat unit reportedly 1 m in depth.

Outside the immediate area of the Site, local MECP water well record data suggest that the overburden thickness is variable with thicknesses ranging from <1 m to approximately 28 m which would indicate that the bedrock surface might be scoured or plucked in the area through glacial processes.

A description of the monitoring wells and the associated screened intervals for each location is provided in following Tables.

Table 1: Shallow Overburden Ground Water Monitors

Monitoring Well	Well Depth (mbgs)	Screened Interval
7-I	7.08	Fine Sand
8-I	6.12	Fine Sand w Silt / Med. to Coarse Sand w Silt & Gravel
9-I	2.30	Sand to Sandy Silt / Shale Limestone
13-II	4.65	Silty Medium Sand/ Silt
14-III	12.98	Waste, Silt and Sand
16-II	7.62	Sand
17-II	7.32	Fine Sand
19-I	7.47	Fine to Coarse Sand with some Silt / Sandy Silt
26-III	5.41	Sand / Silt Till
27-II	4.00	Medium Sand
29-III	4.00	Silty Sand
30-I	3.72	Silty Sand
31-I	3.69	Silty Sand
32-I	2.55	Sandy Silt
33-II	4.88	Fine Sand and Silt
35	2.40	Clayey Sand with some Silt
36	2.60	Clayey Sand with some Silt
37	2.30	Clayey Sand with some Silt

Notes: mbgs - metres below ground surface

Table 2: Deep Overburden Ground Water Monitors

Monitoring Well	Well Depth (mbgs)	Screened Interval
11-II	6.83	Sand and Gravel
12-I	2.22	Sand and Gravel
14-II	17.77	Fine to Coarse Sand with some Silt and Gravel
15-II	12.93	Fine to Medium Sand with some Gravel
17-I	13.10	Fine to Coarse Sand with some Gravel
25-I	10.62	Fine Sand
25-II	5.57	Fine to Medium Sand
26-II	7.32	Fine Sand / Silt
29-II	7.42	Sand
201	3.26	Sand and Gravel

Table 3: Bedrock Ground Water Monitors

Monitoring Well	Well Depth (mbgs)	Screened Interval
10-I	8.90	Limestone
11-I	11.68	Limestone
13-I	14.53	Limestone
14-I	22.30	Limestone
16-I	12.23	Limestone
26-I	14.60	Limestone
27-I	16.30	Limestone
29-I	12.51	Limestone
33-I	15.42	Limestone
34-I	5.18	Limestone

For reference, all available borehole logs for the Site have been included in Appendix F.

4.0 Hydrogeologic Interpretation

The ground water flow system underlying the Eldon Landfill Site is controlled by the Site geology described above. Ground water flows principally through the underlying sand and gravel unit from the esker along the buried bedrock trough present beneath the Site towards the west and southwest. The preferred migration pathway would be within this sand unit (given the high permeability) instead of the low permeability underlying bedrock based on the hydraulic testing completed by Cambium as part of their 2010 annual monitoring report (Cambium, 2011). The results are summarized in Table 4 below.

Table 4: Ground Water Flow Velocities

Hydrogeologic Unit	Hydraulic Conductivity (m/s)*	Lateral Gradient (m/m)**	Porosity	Ground Water Velocity
Overburden	1.0×10^{-3}	0.002	0.25	250 m/yr
Bedrock	1.0×10^{-5} to 1.0×10^{-10}	0.004		5 m/yr to 0.05 mm/yr

* - Based on recovery test data presented in Cambium, 2010

** - Gradient calculated based on October 2022 GW elevations

As the Phase I and II portions of the Site have been historically operated as a natural attenuation facility, the wastes are deposited atop the native overburden materials. As such, there is an expectation of a hydraulic connection between the waste mound and underlying overburden aquifer system. At the very least, the underlying overburden

should be able to assimilate any volume of leachate flow generated in the overlying waste and discharged through the bottom of the landfill given a likely limited relative permeability in the waste owing to compaction. It is noted that the expanded footprint Phase III area is located atop a lined waste cell with associated leachate collection system; however, the previous historically filled areas (Phase I & II) of the landfill are proposed to remain in their original design and function as a natural attenuation waste areas.

Ground water elevation data since 2008 has been reviewed (Appendix C) and the data indicates that the ground water table shows minimal seasonal variation (i.e., <1 m) in both the overburden and bedrock monitors. The vertical gradients at the Site are relatively minimal for most locations; however some variability is observed over time. The horizontal gradient is more apparent. Finally, a small but measureable and consistent upward gradient (~0.3 m) is observed at MW29 between the bedrock and overburden aquifer units which would suggest that there is potential for discharge of deeper ground water into the shallow overburden and overlying wetland west of the Site.

Given the complex geologic deposition created by the bedrock trough and esker complex, delineation of ground water flow direction is somewhat complicated. As such, the ground water elevations, as well as the presence of the bedrock ridges were utilized to present an inferred ground water flow direction. As in previous reports, the overburden has been divided into two separate units; however, given the lack of significant confining unit within the overburden present horizontally or vertically, the overburden aquifer was treated as a single unit and the shallow intervals (where nested) were not included in the interpretation. The flow direction in the overburden unit (Figures 3 to 6) has been inferred to flow from the centre of the esker feature east and southeast towards the road and west towards the Butternut Creek wetland complex. These flow paths coincide with the orientation of both the esker and bedrock trough.

5.0 Summary of 2023 Monitoring Program

The 2023 monitoring program for the Site was undertaken by Azimuth Environmental Consulting (Azimuth) and City staff. Azimuth completed the spring and fall ground and surface water monitoring which occurred in April and October 2023, whereas the City completed the summer surface water monitoring in August 2023.

This program, which includes 37 ground water monitoring wells and five surface water locations, represents a similar program that has been completed for a number of years. The program has evolved over time with additional downgradient monitoring wells being incorporated and redundant leachate / perimeter wells being removed from the program over time. Most recently (2019), the program was revised with the decommissioning of

MW15-I, 15-II, 15-III, 18-I & 25-III and installation of a new well adjacent to the new Phase III waste area (MW201). These revisions were outlined in the 2016 ECA amendment. For reference, the locations are summarized in Section 3.0 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 inorganic analysis were also field-filtered for metals and dissolved organic carbon (DOC) 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. It is noted that surface water features at this Site are seasonal, with most locations being dry or very limited water depth during the summer and fall monitoring events.

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 for Environmental Analytical Laboratories. 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, nine QA/QC samples were collected out of 78 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 greater variance noted at MW10-I, where many parameters indicates a larger variance in concentration between parameters. However, all of the concentrations fell within the historical range, and this location is noted to have more variability than other locations such that it is likely a function of the monitoring well and variability in contribution from various bedrock fractures within the screened interval. Overall, the laboratory data collected in 2023 is considered representative.

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. The 2023 ground water elevations have been included in Appendix C and illustrated on Figures 3 to 6.

5.2.2 Background Ground Water Quality

The background ground water chemistry is currently and has historically been monitored at four upgradient overburden locations (MW9-I, MW11-II, MW12-I & MW33-II) and four bedrock locations (MW10-I, MW11-I, MW33-I & MW34). These monitoring wells are located east of the active waste area and provide a good representation of background conditions (Figure 2).

The overburden water quality can be characterized by a low to moderate level of mineralization, which results in only a few and sporadic exceedances to Ontario Drinking Water Quality Standards (ODWQS, 2006), including iron, aluminum, manganese and more consistently elevated hardness concentrations. Furthermore during the 2023 monitoring program the only exceedance of the ODWQS within the overburden background locations was manganese at MW9-I. The bedrock water quality indicates a much more mineralized signature likely due to a longer travel time through the host environment. In some instances, the geochemical signature is representative of natural brines with elevated sodium, chloride, strontium, barium, boron, selenium and TDS concentrations. The bedrock water quality also indicates significantly more variability than the overburden water quality owing to the different laterally conductive bedding plane fractures that are being monitored.

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, if available, 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 in the waste environment, specifically the oxidation state which tends to be depleted in a landfilled environment. Inherent difficulties arise when selecting leachate related parameters in a limestone bedrock environment. Typically, elements such as alkalinity and sulphate are elevated in natural limestone bedrock ground waters, thus reducing their effectiveness to be used as leachate indicator parameters.

For the Eldon Landfill Site, the leachate strength is moderate given it's an active Site. An elevated ammonia / total kjeldhal nitrogen (TKN) concentration is noted which attests to the chemically reduced conditions in the landfill. This reduced condition has also affected the valence of iron and manganese species in the landfill as denoted by the elevated concentration of these parameters causing them to be in a reduced dissolved form (see Tables 5 to 8 – Section 5.2.4). Other parameters are slightly elevated (ex., chloride); but to a much lesser extent.

Presently, the best available estimate of leachate quality at the Eldon Landfill Site is the analytical data obtained from MW14-III, although the first dedicated leachate sample was collected in 2021 from the leachate collection system beneath the current active lined waste cell. No sample was collected in 2022 or 2023. MW14-III is screened within the centre of the waste within Phase I/II such that it represents the historical leachate signature, while the leachate sample is derived from the current fill area Phase III (Figure 2). Overall, there is some variance in chemistry between the two locations resulting from the differential waste areas, but generally indicate similar leachate conditions. The time series chemistry graphs provided in Appendix D illustrate the concentration of selective leachate parameters at MW14-III for all samples collected between 2008 and 2022. No samples were collected during the spring or fall sampling programs of 2023 due to MW14-III having been damaged and in need of repair. It is understood that these repairs will be undertaken in 2024.

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]). An elevated concentration of both of these parameters 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 exhaustion of oxygen supplies 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 to NH_4] and [SO_4 to SO_2 / H_2S] dissolved in the leachate).

These geochemically reducing conditions will also allow for valence changes in many metal species which tends to increase dissolution potential of metal ions. This is evident at this Site with the significantly elevated dissolved iron and manganese concentrations.

A final characteristic of the leachate quality is the concentrations over time. The parameter concentrations appear to be relatively consistent, albeit a slight decreasing trend is noted for iron, manganese and sulphate. The reduced sulphate is likely correlated to a subtle increase in the anoxic state of the landfill, while the overall consistency in data would support the landfill being in a quasi steady state condition. The fact ammonia concentrations have remained relatively consistent support the overall limitations in the anoxic conditions. The overall stability in leachate quality is somewhat expected given the age of the facility, limited waste acceptance rate and permeable hydrogeological setting. Eventually, the carbon-rich source present in the landfill will be depleted and will result in geochemical changes that will shift water quality towards natural conditions. These trends are expected to begin to be noted following the shift of the active waste area into the lined waste cell and capping of the remainder of the historic waste mound.

Given these consistent leachate conditions, it also suggests that the level of influence the leachate condition at the Eldon Landfill Site has on its surrounding environment would be expected to remain relatively steady throughout the operational lifespan of the Site and will likely show a slow decline over time.

Based on the leachate quality derived at MW14-III and the newly collected Leachate sample, the leachate indicator parameters (LIPs) identified for this Site in 2023 are listed below and have been included in the chemistry graphs (Appendix D) and average concentration tables in subsequent sections of the report. It is noted that these are similar to last year:

-Alkalinity
-Boron
-Chloride
-Dissolved Organic Carbon (DOC)
-Iron
-Manganese
-Sodium
-Sulphate
-Total Dissolved Solids (TDS)
-Total Kjeldahl Nitrogen (TKN)
-Ammonia

5.2.4 Downgradient Ground Water Quality

In 2023, the ground water quality downgradient of the Eldon Landfill Site is monitored via 10 locations (MW7, 8, 17, 19, 27, 29, 30, 31, 32, 36 & 37). Additionally, six perimeter locations are present only a short distance from the waste area (MW13, 16, 18, 25, 26 & 35). Many of these locations have nested locations that target bedrock as well as the shallow and deep overburden.

A review of the geochemical database has indicated that in general the water quality of the shallow and deeper overburden unit does not show any significant variation from each other aside from some subtle shifts owing to leachate influence in some monitors. Some downgradient bedrock monitors indicate a much different water quality to that of both that of the overburden and leachate and has previously been attributed to naturally saline waters and brines known to be present in the area. As such, leachate influence has not been interpreted to be impacting the bedrock aquifer.

As discussed previously, the overburden materials from the esker complex (sands and gravels) have been established as the primary migration pathway for leachate impacted ground water.

A summary of the average concentrations for leachate indicator parameters in the perimeter wells at the Site is provided in Table 5. Averages from the past five years are used since in general the geochemical signature is relatively consistent over time. As can be observed, leachate influence is present to the north, west and south in the vicinity of the toe of the landfill. These results support the previously interpreted ground water flow directions to west and radially to the north, while the southern influence has been stated in previous reports to be residual leachate influence from a former waste ash pile that was located in close proximity to MW16 or some limited radial flow from the waste mound. Based on the values shown in Table 5, the southern influence is very limited relative to the north and west although the elevated ammonia concentration at MW17-II may be the result of the combination of the western and radial flow paths.

Despite the above interpretation that the water quality between the shallow and deep overburden locations are similar, Tables 6 & 7 provide summaries of average concentrations for each due to the number of locations. The concentrations provided clearly indicate that although elevated LIPs are noted in the downgradient monitors, it is apparent that attenuative processes are active downgradient of the landfill as concentrations are greatly reduced from those observed in both the leachate and perimeter monitors only a short distance downgradient of the landfill.

As shown, elevated concentrations of LIPs are noted at MW8, 17, 29, 30 & 31 while other locations appear to be similar to background conditions (i.e., MW19, 27 & 201). This distribution would indicate that a leachate plume does extend in the overburden from the Site to the west and northwest. The degree of leachate impacts to the north are marginal and are inconsequential to the south (i.e. MW7, 19 & 27). Despite the above noted monitors where impacts are observed, it is noted that the degree of impact varies. MW17 has a much stronger influence than MW29, likely owing to relative proximity, while MW31 is elevated above MW30, which is likely reflective of relative positions from the downgradient leachate plume. MW31 is situated immediately northwest of the waste mound such that it is interpreted to be situated closer to the centre line of the plume, while MW30 is located north of the waste, such that its influence likely represents the outer limits of radial flow from the mound versus a defined northern flow path.

Within the shallow monitors at the western extent of the monitoring network (MW29-III, MW36 & MW37), more significantly elevated DOC, iron and manganese concentrations are observed. Although it is interpreted that the remaining LIP parameter concentrations may indicate a dilute leachate influence, these parameters are elevated above those within the deeper and more proximal locations such that they are interpreted to be sourced to the surficial wetland conditions in which they are located. These anoxic conditions can contribute to elevated iron, manganese and DOC through natural sources.

Based on this interpretation, as well as the previously discussed westerly ground water flow direction, it is interpreted that the centre line of the leachate plume extends in a westerly direction.

The final downgradient aquifer of note is the bedrock unit. Similar to the previous tables, average concentrations for all bedrock monitors are provided in Table 8.

As discussed previously, the bedrock aquifer unit at this Site has a natural saline water quality which has resulted in numerous parameters being elevated, including several typical leachate indicator parameters (i.e. chloride, sulphate, potassium, etc). However, as some locations have concentrations above those observed in the leachate, including background locations MW33-I & MW34-I, it is evident that they are natural in source. These naturally elevated parameters, as well as the limited hydraulic conductivity of the bedrock unit at some locations / elevations support that leachate is not impacting this unit. The geochemical uniqueness of the bedrock unit is also illustrated further in Section 5.7.

Table 5: Average Leachate Indicator Parameter Concentrations – Perimeter Overburden Locations

Parameters	ODWQS	Background		Leachate	South			West		North
		12-I	11-II	14-III	8-I	16-II	17-II	25-II	26-III	13-II
Alkalinity	500	199	195	**1,574**	368	303	500	**793**	**577**	**1,359**
Boron	5	0.01	0.01	3	0.5	0.2	1	1	0.2	2
Chloride	250	5	5	**312**	26	18	38	108	87	**274**
Fluoride	1.5	0.1	0.1	1	0.1	0.1	0.1	0.3	0.2	1
Dissolved Organic Carbon	5	2	2	**33**	4	4	**12**	**14**	**10**	**27**
Iron	0.3	0.01	0.02	**13**	0.01	0.01	**8**	0.2	**2**	**12**
Manganese	0.05	0.003	0.004	**2**	0.02	**0.2**	**2**	**1**	**2**	**0.4**
Sodium	200	3	3	**318**	22	19	45	114	56	**288**
Strontium		0.1	0.1	2	0.3	0.2	0.5	1	1	1
Sulphate	500	10	9	74	79	46	26	30	30	212
Total Dissolved Solids	500	223	220	**2,321**	**518**	414	**622**	**1,023**	**763**	**2,184**
Ammonia		0.2	0.2	162	0.2	1	25	0.4	0.3	117
Total Kjeldhal Nitrogen		1	0.4	177	1	2	29	1	1	134

ODWQS - Ontario Drinking Water Quality Objectives

Bold and highlighted indicates exceedance

All data in mg/L

Average Concentrations from 2019-2023 (where available)

Table 6: Average Leachate Indicator Parameter Concentrations – Downgradient Shallow Overburden

Parameters	ODWQS	Background		Leachate	Downgradient										
					North				West						
		9-I	33-II	14-III	30-I	31-I	32-I	35	8-I	7-I	19-I	27-II	29-III	36	37
Alkalinity	500	249	228	**1,574**	235	**863**	254	412	368	272	212	222	302	272	356
Boron	5	0.04	0.01	3	0.1	0.5	0.02	0.1	0.5	0.1	0.1	0.1	0.04	0.1	0.02
Chloride	250	4	4	**312**	42	199	2	52	26	18	6	8	22	15	10
Fluoride	1.5	0.1	0.1	1	0.1	0.4	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Dissolved Organic Carbon	5	2	3	**33**	**13**	**14**	**9**	**6**	4	5	3	2	4	**14**	**38**
Iron	0.3	0.1	0.1	**13**	**1**	**6**	**1**	0.1	0.01	0.1	0.01	0.01	**1**	**1**	**5**
Manganese	0.05	0.01	0.04	**2**	**0.1**	**0.1**	**0.1**	**1**	0.02	0.01	0.003	0.001	**0.1**	**0.1**	**1**
Sodium	200	6	4	**318**	11	154	2	31	22	15	5	6	10	12	18
Strontium		0.3	0.2	2	1	3	0.2	1	0.3	0.1	0.2	0.2	0.3	0.2	0.3
Sulphate	500	16	12	74	9	47	4	33	79	21	16	15	32	36	52
Total Dissolved Solids	500	267	252	**2,321**	305	**1,251**	271	**536**	**518**	334	246	259	382	339	467
Ammonia		0.2	0.4	162	0.5	1	0.3	0.3	0.2	0.2	0.1	0.4	0.1	0.4	1
Total Kjeldhal Nitrogen		1	3	177	2	10	5	13	1	1	0	1	0.5	7	4

ODWQS - Ontario Drinking Water Quality Objectives

Bold and highlighted indicates exceedance

All data in mg/L

Average Concentrations from 2019-2023 (where available)

Table 7: Average Leachate Indicator Parameter Concentrations – Downgradient Deep Overburden

Parameters	ODWQS	Background		Leachate	Proximal			Downgradient	
		12-I	11-II	14-III	25-I	26-II	201	17-I	29-II
Alkalinity	500	199	195	**1,574**	482	381	206	**805**	412
Boron	5	0.01	0.01	3	0.3	0.3	0.03	2	0.2
Chloride	250	5	5	**312**	97	63	7	143	32
Fluoride	1.5	0.1	0.1	1	0.2	0.1	0.1	0.3	0.1
Dissolved Organic Carbon	5	2	2	**33**	5	**6**	2	**16**	4
Iron	0.3	0.01	0.02	**13**	**1**	0.01	0.01	**3**	**1**
Manganese	0.05	0.003	0.004	**2**	**0.1**	**1**	0.01	**2**	0.03
Sodium	200	3	3	**318**	59	37	5	128	23
Strontium		0.1	0.1	2	1	0.3	0.1	1	0.4
Sulphate	500	10	9	74	45	50	11	47	35
Total Dissolved Solids	500	223	220	**2,321**	**698**	**553**	231	**1,119**	**510**
Ammonia		0.2	0.2	162	0.2	0.2	0.4	1	0.1
Total Kjeldhal Nitrogen		1	0.4	177	1	0.5	2	3	1

ODWQS - Ontario Drinking Water Quality Objectives

Bold and highlighted indicates exceedance

All data in mg/L

Average Concentrations from 2019-2023 (where available)

Table 8: Average Leachate Indicator Parameter Concentrations – Downgradient Bedrock

Parameters	ODWQS	Background				Leachate	Perimeter				Downgradient	
		10-I	11-I	33-I	34-I	14-III	14-I	13-I	26-I	16-I	27-I	29-I
Alkalinity	500	258	213	303	275	**1,574**	473	212	231	347	190	234
Boron	5	0.3	0.1	2	1	3	1	0.03	1	1	1	2
Chloride	250	**732**	61	**391**	**658**	**312**	**817**	8	144	162	**1,190**	237
Fluoride	1.5	0.5	0.1	1	1	1	1	0.1	0.2	0.1	1	**2**
Dissolved Organic Carbon	5	1	2	1	1	**33**	5	2	2	4	1	1
Iron	0.3	0.02	0.01	0.1	**0.4**	**13**	**40**	0.01	0.02	0.02	0.1	0.03
Manganese	0.05	0.002	0.003	0.01	0.02	**2**	**1**	**0.1**	0.002	**0.3**	0.002	0.002
Sodium	200	**326**	59	**300**	**402**	**318**	**365**	6	98	77	**636**	**227**
Strontium		5	1	2	3	2	4	1	2	1	5	1
Sulphate	500	18	12	4	16	74	17	16	10	110	9	4
Total Dissolved Solids	500	**1,425**	330	**946**	**1,349**	**2,321**	**1,848**	244	470	**762**	**2,088**	**628**
Ammonia		1	0.3	2	2	162	15	0.2	2	1	3	1
Total Kjeldhal Nitrogen		2	1	2	3	177	23	0.4	2	2	3	2

ODWQS - Ontario Drinking Water Quality Objectives

Bold and highlighted indicates exceedance

All data in mg/L

Average Concentrations from 2019-2023 (where available)

As there appears to be a measurable leachate influence in the downgradient overburden wells, it was important to look at any potential trending over time with respect to leachate parameter concentrations such that it could be determined how the leachate plume originating from the Site has evolved and will continue to evolve over time. This trending is very important in being able to determine an effective monitoring program for the Site.

These trends are illustrated for several time-trend graphs for LIPs provided in Appendix D. It should be noted that these locations were selected as they provided adequate coverage to reflect all areas surrounding the Site. For reference purposes, the entire geochemical database has been appended in Appendix B.

As can be observed in these graphs, trends are evident relating to leachate influence at a number of locations, while there is limited to no seasonal variation noted throughout the monitoring well network.

The leachate trends that are noted are relatively subtle; but are evident for a number of LIPs supporting leachate as the source of the trends. The longer term trends are present at MW13-II and MW25-I with trends extending back as far as 10+ years, although some parameters have begun to show stability the past few years. MW26-II, MW26-III, MW29-II and MW31-I historically indicated similar trending but most parameters have become more stable in the last two to five years. More recent trends were also noted at MW7-I, MW8-I, MW16-II, MW17-I and MW17-II which began around 2014 - 2017, although have stabilized or begun to decline the last four years. In previous reports, subtle trends are also noted at MW35 and MW201, which are newer monitors such that the dataset is not as extensive as the remaining monitoring network. With additional data, concentrations appear to be more stable, although a very subtle boron increasing trend remains at MW201 and variable ammonia concentrations at both. However, given the limited boron concentrations (<0.07 mg/L) and lack of overall trends correlating boron, ammonia to other LIPs, these trends are unlikely leachate related. Concentrations at both of these locations will continue to be monitored and assessed.

In addition to the above assessment, all 2023 values were compared to ODWQS in the chemistry summary tables (Appendix B) and indicated relatively similar results to previous years. Numerous LIPs are elevated along the perimeter of the landfill, albeit reduced concentrations from those found at MW14. Further downgradient, LIP exceedances included alkalinity, sodium, hardness, iron, manganese, DOC, aluminum and TDS, with the most elevated concentrations and number of exceeded parameters found in the lower lying wetland areas (i.e. MW29, 30, 31, 32, 35, 36 & 37). In these areas, natural anoxic conditions associated with the wetland and decaying seasonal

vegetation will contribute to elevated LIPs such as iron, manganese, aluminum and DOC. Therefore the overall water quality should be considered when establishing which exceedances are attributable to the leachate and which are natural or agricultural related.

5.3 Ground Water / Surface Water Interaction

In addition to ODWQS as a comparative standard for the ground water quality results, a select number of shallow overburden monitoring wells has been targeted for comparison to PWQO. This comparison also has been requested by the MECP such that the locations targeted will follow those presented in previous reports including MW27-II, 29-III, 30-I, 31-I, 32-I, 35, 36 and 37. The following table summarizes the exceedances for associated PWQO values at these locations. MW32-I has been removed from Table 9 as no samples were obtained due to the well being destroyed and needing replacement.

Table 9: Ground Water PWQO Exceedances Summary Table

Location	Parameter	PWQO	Concentrations Exceeding PWQO	
			April, 2023	October, 2023
MW27-II	Total Phosphorus	0.03	<0.001	**0.04**
MW29-III	Iron	0.3	**0.959**	**1.02**
	Total Phosphorus	0.03	**1.04**	**1.34**
	Aluminum	0.075	**0.08**	0.03
MW30-I	Iron	0.3	**1.31**	**1.69**
	Total Phosphorus	0.03	**0.32**	**0.71**
MW31-I	Iron	0.3	**6.95**	**7.15**
	Aluminum	0.075	**0.14**	0.07
	Total Phosphorus	0.03	**11.9**	**4.46**
	Boron	0.2	**0.416**	**0.543**
	Cobalt	0.0009	<0.005	**0.0015**
MW35	Aluminum	0.075	**0.11**	0.04
	Cobalt	0.0009	**0.013**	**0.009**
	Total Phosphorus	0.03	**4.1**	**2.38**
MW36	Iron	0.3	**0.503**	**2.22**
	Total Phosphorus	0.03	**2.1**	**2.13**
MW37	Aluminum	0.075	**0.12**	0.07
	Iron	0.3	**2.54**	**2.99**
	Total Phosphorus	0.03	**1.55**	**0.59**
	Unionized Ammonia	0.02	<0.01	**0.03**

Notes: All values are in mg/L
* - Concentrations in bold exceed PWQO

In reviewing the PWQO exceedances identified above, all parameters with the exception of iron, cobalt, unionized ammonia and boron have been found at similar concentrations in the background locations historically. The boron exceedances at MW31-I likely related to localized leachate influence; however, caution should be exercised when evaluating boron compliance with PWQO as boron is also associated with natural brines and saline ground water which is known to occur in the area. Specifically this is observed on-Site in background monitoring wells MW33-I (~2 mg/L) and MW34-I (~1 mg/L). AS well, it is noted that the interim nature of the PWQO criteria for boron, MECP Standards Branch has been contacted regarding the supporting information with respect to this parameter. Given the limited toxicology dataset that was utilized during development of the criteria that the Canadian Water Quality Guidelines (CWQG) for the Protection of Aquatic Life (CCME, 2003) value was advised to be more appropriate to use as it utilized a more robust toxicological dataset and was developed by the MECP. As such, the CWQG value for boron for long term exposure is 1.5 mg/L, which is met with the measured concentrations at all monitoring locations including MW31-I.

The unionized ammonia exceedance at MW37 did not correlate with any other parameter concentrations which were beyond the historical range such that it may be anomolous. As it was only a singular exceecance, this will be re-evaluated in 2024.

The iron exceedances, which have been noted at most locations routinely with the exception of MW27-II and MW35, which are both located beyond the main wetland areas. These downgradient iron exceedances, as discussed previously in the report are interpreted to represent the anoxic wetland conditions rather than leachate impact, which would also be the same for other metals as well. This is most evident when reviewing the iron concentrations relative to distance from the landfill, which show the most elevated concentrations furthest from the waste at MW36 & MW37 between 2019 and 2023. The one location where there is a more clear correlation between the host water quality and leachate impacts is at MW31-I, which had elevated measurements for most other LIPs, including boron discussed above. On an individual parameter basis, it is difficult to quantify the contributions between the natural and landfill source. Our tendency is to look for multiple parameters like that seen at MW31-I. Where anoxic wetland conditions are present and increasing concentrations with distance downgradient from the waste mound are observed, then this would support more of a natural source opposed to the landfill. The same can be said for the singular exceedance of unionized ammonia at MW37, which can be associated with the anoxic wetland conditions that would support more of a natural source.

Finally, the cobalt exceedances are low level exceedances and are found to be generally consistent over time. The presence of these exceedances are similarly sourced to the

natural anoxic conditions within the wetland area in which these wells are situated (MW31& 35), (MW36 & 37 historically). A similar rationale as noted above for iron is applied for cobalt.

5.4 Surface Water

5.4.1 Surface Water Flow

The monitoring program is in place to assess potential leachate influence in the perceived downgradient area to the west of the waste mound within the Butternut Creek Wetland Complex. Locations are targeted along the tributary that intersects this wetland feature with locations upstream to the north (SW2B), adjacent to the waste mound (SW1) and downstream at SW4. Additionally, surface water location SW5 represents background water quality at the east end of the Site, while SW6 is located downstream of any surface flow originating at the new waste cell area. It is noted that these locations are illustrated on Figure 2. Surface flow is not typically observed at SW5 and SW6, while flow at the tributary locations is routinely only observed during the spring monitoring events. Flow within this tributary is also noted to be difficult to quantify in the Spring due to areas of the tributary becoming flooded causing braided flow through most of the area.

5.4.2 Surface Water Quality

Table 10 summarizes average concentrations of LIPs between up and downstream monitoring locations that surround the landfill.

Table 10: Average Leachate Indicator Parameter Concentrations – Surface Water

Parameters	PWQO	Upstream		Leachate	Downstream		
		SW-2B	SW-5	14-III	SW-6	SW-1	SW-4
Alkalinity		218	205	1,574	193	252	196
Boron	0.2	0.01	0.01	**3**	0.02	0.02	0.05
Chloride		10	13	312	23	12	14
Dissolved Organic Carbon		14	9	33	13	24	15
Iron	0.3	0.3	0.3	**13**	**1**	**1**	0.3
Manganese		0.1	0.1	2	0.2	0.4	0.04
Sodium		4	4	318	8	6	7
Strontium		0.2	0.2	2	0.2	0.2	0.2
Sulphate		5	5	74	6	3	12
Total Dissolved Solids		243	233	2,321	236	281	237
Ammonia		0.3	1	162	0.3	0.3	0.3
Total Kjeldhal Nitrogen		1	2	177	1	1	1

PWQO - Provincial Water Quality Objectives

Bold and highlighted indicates exceedance

All data in mg/L

Average Concentrations from 2019-2023 (w here available)

As can be observed in this summary table as well as the 2023 results (Appendix B), there is a small but measurable difference between the up- and downstream locations with elevated measurements noted for most LIPs.

The 2023 results were also compared to PWQO as is standard for surface water quality evaluations as summarized Table 11 below. Exceedances during 2023 were limited to aluminum at two locations (SW1 and SW4) and iron and total phosphorus at SW1, SW2 and SW6. Cyanide exceedance was limited to SW1 in August and an exceedance of un-ionized ammonia at SW5 in April. The 2023 exceedances, with the exception of cyanide are noted to be at concentrations typically observed at background locations such that they are interpreted to represent the more stagnant and shallow conditions and not specifically related to leachate impacts. The cyanide exceedance represents the first concentration above detection limits for any surface water location at the Site. As other leachate parameter concentrations were elevated, it is likely sourced to the landfill. No other detections were noted, but other locations were found to be dry during the August monitoring event. As such, this exceedance is interpreted to be localized. Further downstream impacts are not expected as dilution potential would increase with increased flows following the summer drought conditions.

Overall the water quality along the tributary (SW1, SW2B and SW4) indicated similar water quality with all parameter concentrations generally falling within a similar range for the April monitoring event where all were able to be sampled. This would indicate

that there is limited ability for the landfill to influence the downgradient wetland feature as flow conditions within the feature and baseflow contributions from the remainder of the watershed provide sufficient dilution for any leachate impacted ground water that is discharging into the feature downgradient of the waste mound.

Table 11: Surface Water PWQO Exceedances Summary Table

Location	Parameter	PWQO	Concentrations Exceeding PWQO			
			April, 2023	August, 2023	October, 2023	January, 2024
SW-1 (adjacent to waste mound)	Iron	0.3	0.069	**0.977**	**1.07**	**0.263**
	Total Phosphorus	0.03	**0.04**	**0.09**	**0.1**	<0.1
	Aluminum	0.075	0.03	**0.1**	**0.1**	0.03
	Cyanide	0.005	<0.005	**0.006**	<0.005	<0.005
SW-2B (upstream)	Iron	0.3	0.157	Dry	**0.879**	-
	Total Phosphorus	0.03	**0.11**	Dry	**0.2**	-
SW-4 (downstream)	Aluminum	0.075	0.02	Dry	**0.08**	-
SW-5 (upstream)	Un-ionized Ammonia	0.02	**0.03**	Dry	Dry	-
SW-6 (south of waste)	Iron	0.3	**0.155**	Dry	**0.5**	**0.162**
	Total Phosphorus	0.03	**0.05**	Dry	**0.2**	<0.1

* - Bold indicates PWQO exceedance

5.5 Surface Water Trigger Mechanism Program

Conditions 13.7 of the June 13, 2016 ECA Amendment required that a surface water trigger mechanism be developed following two years of monitoring at the new (Phase III) water monitoring stations SW5 and SW6, which was proposed by Golder as part of the 2018 AMR. Their program proposed separate surface water trigger mechanisms for the Phase I / II Butternut Creek Wetland Complex downstream stations SW1 and SW4 and the Phase III downstream station SW6 located in the low lying wetland area southeast of Phase III.

The proposed trigger parameters were noted to be key leachate indicator parameters: boron, DOC, iron, manganese and unionized ammonia. These parameters have leachate source concentrations well above background groundwater / surface water concentrations and / or surface water quality guidelines (i.e. PWQO).

Except for ammonia, the proposed trigger concentrations to be applied to the downstream surface water stations were set at 95th percentile of the concentrations obtained for the

background stations SW2B (Phase I / II Butternut Creek Wetland Complex) and SW5 (Phase III upstream station). The 95th percentile concentration for a given trigger parameter was noted to be calculated as the average of the concentration data plus two standard deviations. All of the background concentration data for the spring, summer and fall events (combined) was used for the calculations. The resulting trigger concentrations and 2023 concentrations are summarized in the tables below.

Table 12: 2023 Phase I/II Trigger Concentrations

Trigger Parameters	PWQO	Trigger Concentrations	2023 Concentrations						
			SW1				SW4		
			April	August	October	Jan 2024	April	August	October
Boron	0.2	0.04	0.017	0.026	0.031	0.006	0.033	Dry	**0.141**
DOC		27	17.5	**37.4**	**48.3**	13.7	10.5		24.2
Iron	0.3	2.0	0.069	**0.977**	**1.07**	0.263	0.124		0.294
Manganese		0.87	0.014	**0.923**	0.608	0.087	0.011		0.025
Ammonia (unionized)	0.02	0.02	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01

* - all concentrations in mg/L
** - bold indicates PWQO exceedance – bold & underlined indicates trigger exceedance

Table 13: 2023 Phase III Trigger Concentrations

Trigger Parameters	PWQO	Trigger Concentrations (mg/L)	2023 SW6 Concentrations			
			April	August	October	January 2024
Boron	0.2	0.09	0.035	Dry	0.032	0.011
DOC		12	9.1		**24.5**	9.1
Iron	0.3	0.11	**0.155**		**0.5**	**0.162**
Manganese		0.08	0.011		**0.352**	0.025
Ammonia (unionized)	0.02	0.02	<0.01		<0.01	<0.01

* - all concentrations in mg/L
** - bold indicates PWQO exceedance – bold & underlined indicates trigger exceedance

As per the trigger program outlined by Golder, for additional trigger sampling to be initiated, two consecutive parameter exceedances at a given location need to occur. An additional sample from the trigger exceedance location within one month is required following the second exceedance. If the exceedance is still present, then potential sources of the exceedance need to be assessed within a calendar year. If the exceedance(s) are determined to be landfill sourced, then MECP should be notified and an action plan developed. If determined not to be landfill related then the trigger criteria and / or monitoring locations need to be re-established.

As noted in the summary of trigger data in Tables 12 and 13, a single parameter exceedance was noted for manganese at SW1 in August; with two consecutive exceedances of DOC noted in August and October. Additional trigger sampling was conducted by the City at SW1 in January 2024 which noted a decrease in DOC concentration below the trigger concentration limit, thus complying with the trigger program for 2023.

SW4 had one exceedance of Boron in October and will be monitored in the April monitoring program for 2024. While SW6 had one exceedance of DOC and one exceedance of manganese both during the October monitoring event, the parameters declined below the trigger concentration limit during the additional trigger sampling program conducted in January 2024. SW6 also had two consecutive parameter exceedances for iron, which was also exceeded for a third time during the supplementary trigger sampling program in January 2024. However, despite the three parameter exceedances of iron it is deemed to not be landfill related. This is due to historic and current naturally elevated concentrations of iron above the trigger concentration in the upstream surface water locations of SW2B and SW5 as well as potential for sediment entrainment to influence iron concentrations when water levels are shallow. It is recommended to change the trigger concentration criteria to remove iron as a trigger, given its prevalence in the naturally occurring surface waters.

Overall, the parameters and concentrations included in the trigger evaluation can be sourced naturally by the anoxic wetland conditions or through the upward gradients between the bedrock and overburden at MW29 (*i.e.* boron). As such, the trigger program should be evaluated within this context and could potentially be revised in the future if continued exceedances are readily attributable to natural sources.

5.6 Organic Sampling Results

As part of the monitoring program in 2023, volatile organic compounds (VOC) sampling was to be completed from the leachate monitoring wells MW14-I/II/III. Sampling was only completed from MW14-II as MW14-I and MW14-III are damaged and cannot be sampled. No detections for any organic parameter occurred in 2023.

It is recommended that the organic sampling component of the monitoring program be discontinued.

5.7 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.

A comparison was done of the ratios of major ion constituents between locations in 2023. 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 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).

For reference, MW9, 10, 11, 12, 33 and 34 were utilized for background signatures in both the bedrock and overburden units. The overburden ground water signature is very well defined and consistent over time, while the bedrock water quality shows a bit more variability, which is likely owed to the varying target depths and natural salty waters observed at some of the locations from the review of the general water quality. The saline waters are most evident at MW10, 11-I, 14-I, 26-I, 27-I, 29-I, 33-I & MW34. However, as the primary pathway for leachate migration is within the overburden sediments, the plots allow for very clear definition between natural and leachate influenced waters surrounding the Site. For instance, many of the proximal locations are a bit more scattered and / or plot somewhat closer to those observed at the leachate locations (MW14), while some of the distant wells do not indicate any observable variance from the background locations (i.e. MW19 & 27). It should be noted that some subtle leachate influence was noted to the north at MW30 & 31, as well as to the west at MW29 and possibly MW36 & 37, although these signatures plot closer to background than those observed in the leachate. As such, the anoxic wetland conditions may be contributing to the signature at MW29, 36 & 37 as the overall water quality does not suggest leachate impacts. Given the interpreted ground water flow direction and previous evaluation of the general water quality, this interpretation would seem appropriate.

The surface water stations were also evaluated as the Butternut Creek Wetland Complex has been interpreted to be a likely discharge point for ground water originating from the landfill Site. The signatures plotted for both the upstream and downstream locations are noted to be very similar and are relatively consistent over time. It should also be noted that the signature is similar to that observed in the background overburden water monitoring locations, which would attest to the wetland being at least partially ground water sourced.

5.8 Reasonable Use Policy

Calculations with respect to MECP's Reasonable Use Policy (RUP) B–7 were performed using the 2023 monitoring program results at MW11-II as this location is the furthest removed upgradient from the landfill, such it is viewed as the most representative background location. As with the previous AMRs, RUP assessment will focus on the overburden water quality. Given the relatively poor natural ground water quality in the

shallow bedrock surrounding the Site (*i.e.,* elevated TDS, chloride, sodium, ammonia-N and boron at MW33-I & 34-I), drinking water is not considered a reasonable use of the bedrock ground water.

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 MECPto 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, MW32-I was used for the north, MW7-I & 19-I were used for the south and MW36 and 37 were utilized for the west. Specific exceedances for RUP are illustrated in the summary chemistry table below.

As with previous years, a number of parameters have exceeded RUP, including hardness, alkalinity, iron, aluminum, manganese, DOC, TDS and nitrate.

Table 15: Reasonable Use Exceedance Summary Table

Location	Parameter	ODWQS	RUP	Concentrations Exceeding RUP*	
				April, 2023	October, 2023
MW7-I	DOC	5	3.5	2.8	**7.2**
	Nitrate	10	4.0	<0.5	**7.52**
	Aluminum	0.1	0.07	**0.08**	0.03
MW19-I	No Exceedances				
MW32-I	Well Destroyed				
MW36	Alkalinity	500	349	218	**405**
	TDS	500	368	269	**428**
	DOC	5	3.5	**10.9**	**21.4**
	Hardness	500	361	249	**424**
	Iron	0.3	0.16	**0.503**	**2.22**
	Manganese	0.05	0.03	**0.04**	**0.084**
MW37	Alkalinity	500	349	321	**366**
	TDS	500	368	**444**	**405**
	DOC	5	3.5	**21.1**	**59.5**
	Hardness	500	361	**446**	**389**
	Aluminum	0.1	0.07	**0.12**	0.07
	Iron	0.3	0.16	**2.54**	**2.99**

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

Exceedances to the south were limited to aluminum, nitrate and DOC at MW7-I, while no detections were observed at MW19-I. Despite these exceedances, the purchase of additional lands to the south for a Contaminant Attenuation Zone (CAZ) (Figure 2) represent an attenuation distance of ~600 m to the CAZ boundary, such that it is expected that these lands would be fully capable of providing the required attenuation. This is supported by the fact that the concentrations at MW19-I, which is only 50 m downgradient of MW7-I have shown reductions in the concentrations for all leachate

indicator parameters and only exceed on occasion. It is also noted that the nitrate source may not be related to the landfill as elevated and variable concentrations have been noted across the monitoring network including the background location MW11-II and could as easily be decaying leaf litter given the surrounding natural setting. Elevated nitrate concentrations can be associated with agricultural fertilizers and/or vegetation decay. There are some nearby agricultural properties and on a more regional scale, there are many. As well, the local treed setting surrounding the landfill does contain considerable seasonal vegetation litter as well as peat all around the Site.

Although RUP compliance can be achieved given the concentrations and attenuation lands present to the south, a proposed location for a more southwesterly RUP compliance monitor has been included on Figure 2 to address recent MECP Site inspection comments.

MW32-I has been destroyed, likely from a fallen tree, and was not sampled during the 2023 sampling program. Historically, exceedances were observed to the north at MW32-I and include alkalinity, TDS, hardness, iron, manganese and DOC. However, the LIP concentrations at this location show a significant reduction from those in closer proximity to the waste mound (MW31-I), with the RUC exceedance parameters are more likely sourced to the anoxic wetland conditions (iron, manganese & DOC), such that they are not interpreted to be related to the landfill.

Finally, exceedances were also noted to the west at the recently constructed monitoring wells MW36 and MW37 which included alkalinity, aluminum, hardness, iron, manganese, DOC and TDS. However, similar to the northern compliance well, it is interpreted that natural sources are influencing these locations. The iron, manganese and DOC are surmised to be sourced to the anoxic conditions of the wetland, which is more extensive to the west of the landfill. This is supported by the fact that the further downgradient monitor MW37 shows more elevated concentrations than those closer to the landfill (MW36 and MW29). This distribution of concentrations would better support variance of the wetland conditions than influence from the landfill, which would more likely show a declining trend with distance. With respect to the alkalinity, hardness and by association TDS exceedances at MW37, these concentrations similarly do not correlate with those observed further upgradient at MW36 & MW29. Given the consistency between MW36 and MW29-III, the water quality at MW37, which is also screened at a similar shallow overburden depth (<4 m) is reflective of potential natural variability within the area. A few parameters which assist in this interpretation include the ammonia and TKN concentrations. Organic nitrogen is calculated as the difference between the ammonia and TKN values. For leachate impacted waters both the TKN and ammonia are elevated. For nutrient rich waters, the ammonia is negligible; but the TKN

is elevated. Another evaluated parameter was the phosphorus concentration. At MW14-III, the typical phosphorus result is minimal. In contrast, wetland monitoring wells show an elevated phosphorus attributed to the organic decay of vegetation and peat in the wetland setting. This decaying vegetation also elevates the DOC concentration in the same way that it shows an elevated organic nitrogen result. Furthermore, there is an additional 120 m of attenuation lands to the west, which would be more than capable of providing attenuative capacity for the Site.

Given these items, it is interpreted that the Site is in compliance with RUP at the northern, western and southern downgradient property boundaries and no further actions are proposed to address these measured exceedances.

5.9 Gas Monitoring

Landfill gas venting occurs naturally through the landfill cover soils and laterally through the unsaturated sands along the perimeter of the waste fill area. The potential lateral extent of subsurface landfill gas migration is typically taken as about 10 times the thickness of the unsaturated zone. Given that the unsaturated zone thickness is less than about 2 m along the perimeter of the Phase I/II waste fill area, the potential lateral migration distance out from the limit of waste is estimated at about 20 m. The nearest residence is 700 m from the waste fill area. Furthermore, the landfill exists within a bedrock trough which daylights to the north and south and falls away to the west into the Butternut Wetland Complex and similarly to the east at the Rockview Road. Based on the Site setting and landfill orientation within this setting it is our opinion that there will be no meaningful impacts.

On-Site buildings/structures (i.e., scale house and equipment shelter) are within the potential zone of landfill gas migration and therefore are constructed as ventilated above grade structures to minimize the accumulation of landfill gas. Landfill staff measure gas levels in the on-Site buildings each day during their shift for health and safety as requested previously by the MECP. To date, no detections in the buildings have occurred. Historically, no landfill gas monitoring has been undertaken at the Site, with the exception of a short term monitoring program requested by the MECP which included landfill gas measurements within the monitoring well network in 2014, 2015 and 2016. The results indicated negligible values at all wells beyond the waste area and the requirement was subsequently omitted from the June 2016 amended ECA as a monitoring requirement.

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 facility is approved to accept solid non-hazardous wastes from the City of Kawartha Lakes, although most of the waste originates from residents within the local area.

The hours of operation for the Site in 2023 were:

Winter – October 16 to April 30
Wednesdays: 9:00 AM to 5:00 PM
Saturdays: 11:00 AM to 5:00 PM

Summer – May 1 to October 15
Wednesdays: 9:00 AM to 5:00 PM
Saturdays & Sundays: 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 as part of the semi-annual monitoring events. It was noted in the spring that the entrance driveway was in need of grading as there was multiple pot holes and uneven ground. Minor amounts of debris were noted along the tree / fence line surrounding the waste mound; however, it is understood that the City undertakes routine litter collection at all active sites such that this is not seen as a concern or require any additional actions. Overall, the Site was noted to be neat and organized with proper waste and diversion material separation occurring.

The monitoring wells were all noted to be in good condition; however, the leachate wells MW14-I/II/III were noted to be difficult to purge due to pipes bent approximately 1-2 m below grade, with MW14-I and MW14-III not able to be purged / sampled in both spring and fall monitoring events. This also limited the ability to measure water levels of these monitoring wells in 2023 as the water level meters could not extend beneath these obstructions at MW14-I and MW14-III. Furthermore MW32-I has been destroyed, likely from a fallen tree, thus sampling during the spring and fall 2023 program was also not obtainable.

Overall, the reports did not identify any concerns requiring action or mitigation measures, although consideration to removal of MW14-I & 14-II given their compromised condition and potential conduit of leachate directed into the underlying aquifers. MW14-III could be repaired and maintained to track leachate quality within the waste mound, along with replacement of MW-32-I.

6.2 2023 Waste Volumes / Site Capacity

Typically an annual topographic survey is completed at the Site in December that is utilized for cut and fill calculations in AutoCAD to generate an annual volume estimate. However, as a result of staff turnover in 2023, this work was not scheduled for end of year. As such, the estimate for current and remaining capacity was done using an annual historical average of 5,000 m^3,which was based on a waste compaction of 0.5 tonnes/m^3 with an annual estimate of 2,500 tonnes (Golder, 2019). Given the total capacity of Stage 1 of the landfill being estimated at 107,600 m^3 and the total current waste volume in that area at 22,620 m^3, the remaining capacity is 85,340 m^3. With half of the Stage 1 cell currently constructed, only about a third of this capacity (about 36,000 m^3) may be workable before the remaining half of the Stage 1 cell has to be constructed. Based on a fill rate of approximately 5,000 m^3 per year, the Stage 1 area of Phase III has a remaining lifespan of approximately 17 years, while the remaining section of Stage 1 will need to be constructed in approximately 2-3 years.

6.3 Recyclable Materials Summary

The Site also 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 2023.

Table 16: Summary of Recyclable Materials Received in 2023

Item	Number of Units	Units
Recycling (containers)	10.14	Tonnes
Recycling (fibres)	15.69	Tonnes
Leaf and Yard Waste	284.43	Tonnes
Electronics	17.88	Tonnes
Scrap Metal	0	Tonnes
Textiles	1.95	Tonnes

Based on the diversion quantities listed above, and 1,335 tonnes of waste received in 2023, the total divertible material received at the Site in 2023 was approximately 330 tonnes. Of the material received at the Eldon WDS, approximately 25% of the material was diverted.

6.4 Compost Operations

Approximately 284 tonnes of leaf and yard waste was received at the Site in 2023. In accordance with Condition 11.2 of the March 1, 2016 ECA Amendment, only leaf and yard waste that has been fully composted and cured in accordance with Sections 31 to 33 of Regulation 101/94, Part V – Leaf and Yard Waste Composting Sites, may leave the Site for use at other sites or by the general public. In 2023, none of the leaf and yard

waste received was fully composted and diverted from the Site. All material was partially composted and reused for daily cover mixed with soil at a ratio of 3 parts soil to 1 part screened partially composted material in accordance with Condition 11.7 of the March 1, 2016 ECA Amendment.

6.5 Active Waste Area

During 2023, the active landfilling area was Stage 1 of Phase III, which was initiated at the end of 2019. As the new lined cell for Stage 1 of Phase III has a leachate collections system, the City will be pumping and hauling leachate collected to the Lindsay Sewage Treatment Facility. During 2023, no leachate was removed from the Site as the levels within the collection system did not increase to a level where removal was required.

6.5.1 Daily Cover

Daily cover was applied on Wednesdays and Saturdays. These days correspond to the two days of Site operation each week between October 16 and April 31. During the period of May 1 and October 15, the Site was open on Wednesday, Saturday, Sunday and Holiday Mondays and therefore there was one and possibly two operating days that daily cover was not applied to landfill waste on that day.

Condition 7(8) of the March 1, 2016 ECA permits alternative materials to soil for daily cover provided that an application with supporting information is provided to the MECP for review and approval. The alternative daily cover materials must be non-hazardous and perform at least as well as soil in relation to the following functions:

1) Control of blowing litter, odours, dust, landfill gas, gulls, vectors, vermin and fires;
2) Provision of an aesthetic condition of the landfill: and
3) Provision of a suitable surface for equipment access to the active tipping face.

In addition, the alternative daily cover must be compatible with the design of the Site for ground water protection, leachate management and landfill gas management. In the event that alternative daily cover materials are used, the ECA requires that a suitable stockpile of clean granular cover soil equivalent to 20% of the daily cover quantity required annually be maintained at the Site as a contingency measure.

Alternative daily cover used at the Site has historically consisted of a mix of sand with finished leaf and yard waste compost. The March 1, 2016 ECA now allows the use of partially composted leaf and yard waste, wood chips and wood grindings instead of

finished compost. Partially composted material mixed with sand at a ratio of 1 part compost to 3 parts sand was used as alternative daily cover throughout 2020.

6.5.2 Interim Cover

In areas where landfilling has been temporarily discontinued for six (6) months or more, a minimum thickness of 300 mm of soil cover or an approved thickness of alternative cover must be placed. The March 1, 2016 amendment of the ECA allows, on a two year trial basis, the use of a mixture of 1 part screened partially composted leaf and yard waste to 3 parts sand as interim cover. Partially composted leaf and yard waste is defined as material that has not been composted in strict accordance with Sections 31 to 33 of Regulation 101/94, Part V-Leaf and Yard Waste Composting Sites. The compost promotes the establishment of vegetation on the interim cover, which in turn helps to protect the cover from erosion. The City is currently using this combination of material for daily and interim cover and has indicated that the material is performing well.

6.5.3 Final Cover

In areas where landfilling has been completed to final contours, final cover consisting of a minimum 600 mm thick layer of soil of "medium permeability" overlain by 150 mm of topsoil (vegetative cover) is required by the ECA. The final cover is to be placed progressively as areas of the landfill reach final contours. To date, final cover has been placed entirely over the Phase I/II waste area, with the most recent additions taking place over the central, north and eastern sections of the waste mound in 2021. Vegetation was noted to continue to establish throughout 2023. It is expected that repairs will be completed as necessary following this work. It is expected that the application of final cover will also improve the groundwater quality around the Site as it will reduce leachate generation.

7.0 Conclusions

Based on the interpretation presented in the above sections, the environmental setting at the Eldon Landfill Site is well understood based on over 20 years of performance monitoring. The data trends over this monitoring period have generally yielded a relatively consistent geochemical signature at most monitoring locations, although some subtle long term trends are present at select locations owing to the fact that the Site is still active. More localized trending is present in closer proximity to the waste mound as anticipated, and is determined to represent changes in the operations within waste mound over time. Despite these trends, the relative consistency would indicate that underlying environmental setting has characteristics that facilitate a steady state condition. Results from monitoring wells to the west appear to illustrate a leachate influence, although at much lower concentrations than those observed in closer proximity wells. However, a

careful interpretation of the Site data would suggest that the data more accurately reflects the wetland setting present in the Butternut Creek Wetland Complex.

Attenuative processes at this Site are pronounced and have abated the influence of the contaminant plume that is detected downgradient of the landfill. It is also recognized that the contaminant flux from the landfill Site is rate-limited by the waste permeability and this mass flux into the underlying aquifer system is limiting and appears to be effectively dispersed such that a significant contaminant plume away from the landfill Site has not been measured.

It is our opinion that transverse dispersion of the leachate within the bedrock trough in the vicinity of the landfill accounts for the detections noted in the overburden to the north of the waste fill area. However, this transverse migration pathway is limited by the extent of the bedrock trough within the waste fill area. Therefore, there is no meaningful concern with contaminant migration to the north or south of the Site based on the existing geologic setting.

The primary pathway for leachate influenced ground water to migrate from the Site is within the overburden aquifer unit with a dynamic flow direction that is controlled by the bedrock trough with ridges to the north and south as well as the presence of the esker complex that is situated within this trough. As such, ground water originating at the Site would be directed to the west and to the northwest within the incised bedrock channel that is cut through this Site. The edge of the bedrock trough to the south also prevents over burden ground water migration in this direction which is evidenced by the very limited leachate influence at MW7 and MW8 despite their proximal locations to the waste mound.

Despite the dominant westerly flow path and permeable overburden materials, there is a significant reduction in leachate indicator parameter concentrations with distance from the waste mound indicating that the attenuative capacity of the Site is sufficient.

Surface water quality from the Butternut Creek Wetland Complex has also shown to be relatively consistent over time and only indicates a subtle shift for a couple of parameters between upstream and downstream locations indicating that the surface water quality may be influenced very subtly by leachate or some degree of natural variability in the ground water downgradient of the Site. The surface water system at the Site conveys excess waters during the Spring and therefore is considered to be a "losing" stream once it drops into the bedrock trough. The stream displays an ephemeral nature and the corridor is often dry in the summer months since the granular soils in the trough readily drain the water course where modern alluvium is thin or absent. The leachate influence

in surface waters is most evident during dry periods when the surface flow is minimal creating limited flow within the surface water regime. This coupled with ground water elevations sufficient to contribute to the stream corridor facilitate this flux reversal occasionally detected. Overall, the limited concentrations observed at both downstream locations, the wetland complex provides adequate attenuation to potential leachate influenced ground water discharge.

The downgradient ground water quality at this Site reflects a wetland environment. Elevated earth elements like iron and manganese concentrations are the result of the geochemically reduced conditions created by the fully saturated environment. The wetland complex is also organically rich and significantly forested. Evidence of this is measured by both the Organic Nitrogen / Organic Carbon results at ground water monitoring locations within the wetlands.

Immediately surrounding the landfill (*i.e.* perimeter), leachate influence will increase the dissolution potential of naturally occurring metal ions. As such, the dissolved phase ground water plume attributable to the landfill Site is likely depleted with respect to dissolved oxygen accounting for the geochemically reduced conditions, similar to the natural condition noted above owing to the wetland environment. It is expected that the ground waters discharge to the wetland complex from the landfill and this would result in a valence change and hence precipitation of the excess iron and manganese at or near the interface point. The downstream water quality in the wetland would suggest this interaction has no detrimental effect on the surface water quality based on the monitoring to date. The net result is that the landfill Site is incapable of influencing the surrounding natural environment to any measureable extent owing to the geologic setting that exists at this location. The large Contaminant Attenuation Zone present to the west would also allow for further attenuation of leachate influence downgradient of the existing monitoring wells, prior to the western compliance point such that there would be no expectation of trigger or RUP exceedances at the western property. The natural anoxic conditions of the Site and nutrient rich peat soils represent the source of the elevated parameters noted at MW36 and MW37. Similarly, although there are perceived non-compliance issues to the north of the Site at MW30 & 31 more related to the landfill, the presence of the bedrock ridge and additional distance to the northern compliance boundary would limit any non-compliance issues to the north.

8.0 Recommendations

The monitoring program recommended for 2024 is identified in Table 17 and is based on the current data set and Site understanding and previous AMRs. Given the recent reductions to the monitoring program with several perimeter monitoring well decommissions, the proposed program will match closely to what was completed in 2023,

although it is proposed that a reduction to the number of background locations be targeted and consideration be given to abandoning the deeper leachate monitoring wells MW14-I & 14-II as they have become compromised and represent conduits for enhanced leachate migration into the underlying aquifers. MW14-III could be repaired and maintained as a leachate monitoring wells to track leachate quality and leachate mound conditions following formal closure of the Phase I/II area. MW32-I will be in need of replacement.

As for the background locations, there are currently four bedrock and four overburden locations included in the monitoring program, with several of these having been sampled for the entire period of record. Given the size of the background data set for both overburden and bedrock and relatively stability in water quality over time, it is proposed that water quality samples from the background locations could be limited to a single sample from both a bedrock and overburden well on an annual basis (*i.e.* MW11-I & 11-II). The remaining background locations could be maintained for ground water level measurements (*i.e.*, MW9-I, 10-1, 12-I, 33-I, 33-II).

It is noted that other monitoring wells should be considered for removal from the monitoring program in the near future if leachate conditions stabilize as a result of the closing and capping of the Phase I/II area. These potential locations include the bedrock monitoring wells (MW13-I, 16-I, 26-I, 27-I, 28-I & 29-I) as they do not represent the primary leachate migration pathway and are known to have natural mineralization as well as some redundant downgradient monitors where there are intervals at these nested locations that better represent leachate migration (MW17-II, 26-II & 29-II), while MW35 also represents a redundant shallow overburden location given its close proximity to MW26-III.

Finally, the sporadic and limited priority pollutant organic detections within the leachate over the period of record would indicate there is likely a limited organic source with the landfill. As such, it is proposed that this program could be eliminated or at least curtailed such that only an annual sample collected from MW14-III be collected which would assist to track the potential changes in conditions over time.

The proposed monitoring surface water monitoring program is proposed to remain similar to what was completed in 2023, although Azimuth supports Golder's previous recommendation that surface water samples only be collected when flowing conditions are present as artificially elevated concentrations can develop under stagnant conditions such that they are not representative water quality and represent conditions that are not able to be mobilized downstream of the landfill.

Table 17: Proposed 2024 Monitoring Program

Monitoring Station	Frequency	Parameters
Ground Water MW7-I, MW8-I, **MW9-I**, **MW10**, **MW12**, MW13-I, MW13-II, **MW14-I**, **MW14-II**, MW14-III*, MW16-I, MW16-II, MW17-I, **MW17-II**, MW18-II, MW19-I, MW25-I, MW25-II, MW26-I, **MW26-II**, MW26-III MW27-I, MW27-II, MW27-III, MW29-I, **MW29-II**, MW29-III, MW30-I, MW31-I, MW32-I, **MW33-I, MW33-II**, **MW35**, MW36, MW37, MW201 & New Southwest RUP compliance MW	Semi-Annual (April / May & September / October)	Total Kjeldahl Nitrogen (TKN), Nitrate, Nitrite, Ammonia, Alkalinity, Hardness, Chloride, Calcium, Magnesium, Total Phosphorus, Sulfate, Phenols, Dissolved Organic Carbon (DOC), Aluminum, Arsenic, Barium, Boron, Cadmium, Chromium, Cobalt, Copper, Fluoride, Iron, Lead, Manganese, Mercury, Nickel, Potassium, Sodium, Zinc, pH, Conductivity, Total Dissolved Solids (TDS), Chemical Oxygen Demand (COD). * VOCs – annual during Fall event Water Level Measurements
MW11-I & MW11-II	Annual (September / October)	
Surface Water SW1, SW2B, SW4, SW5 & SW6	Seasonal (April / May, July & September / October) Samples only to be collected when flowing conditions observed	Total Kjeldahl Nitrogen (TKN), Nitrate, Nitrite, Ammonia, Alkalinity, Hardness, Chloride, Calcium, Magnesium, Total Phosphorus, Sulfate, Phenols, Dissolved Organic Carbon (DOC), Aluminum, Arsenic, Barium, Boron, Cadmium, Chromium, Cobalt, Copper, Fluoride, Iron, Lead, Manganese, Mercury, Nickel, Potassium, Sodium, Zinc, pH, Conductivity, Total Dissolved Solids (TDS), Chemical Oxygen Demand (COD), Biochemical Oxygen Demand (BOD), Free Cyanide, Colour, Turbidity, Total Suspended Solids (TSS)

Notes: **Bold** and underlined monitoring locations could be considered for removal from the program

9.0 References

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APPENDICES

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Appendix D: **Chemistry Over Time Graphs**
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Appendix F: **Borehole Logs**
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Appendix I: **Laboratory Certificate of Analysis**
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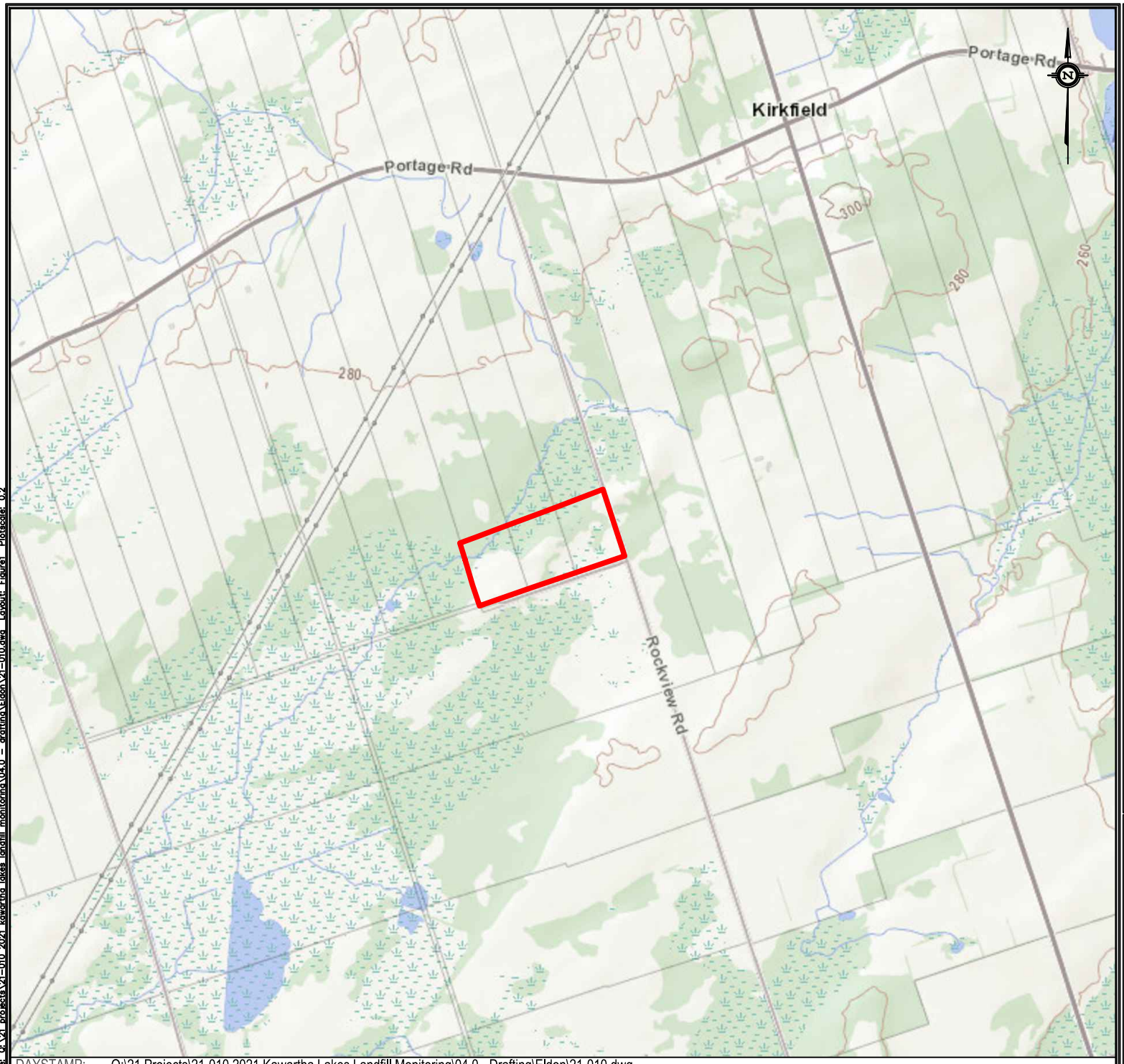
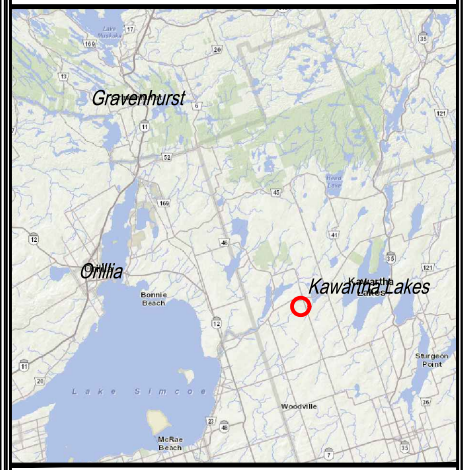
APPENDIX A

Figures



LEGEND:

Approx. Property Boundary



REG MAP

250m 0 750m

HORIZONTAL SCALE 1:25,000

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Study Area Location

Eldon Waste Disposal Site
Eldon, Kawartha Lakes, ON

DATE ISSUED: *February 2024*	Figure No.
CREATED BY: *JLM*	
PROJECT NO.: *24-010*	1
REFERENCE: *MNRF*	

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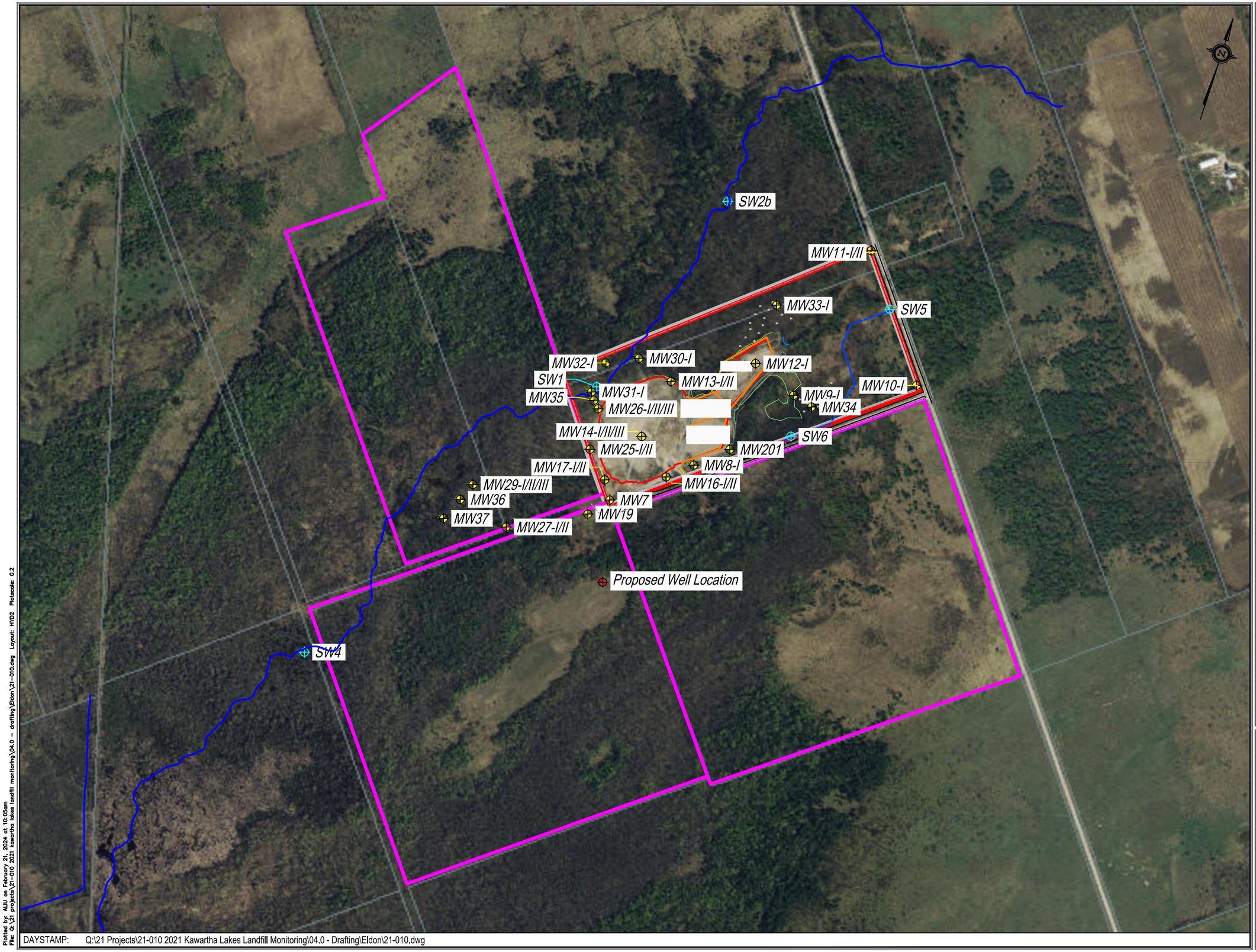

LEGEND:

- Watercourse
- Primary Topographic Contour Line
- Secondary Topographic Contour Line
- Contaminant Attenuation Zone (CAZ)
- Property Boundary
- Approved Waste Footprint
- Fence
- Low Wet Area
- Monitoring Well Location
- Proposed Monitoring Well
- Surface Water Sampling Location

100m 0 200m

HORIZONTAL SCALE 1:7,500

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Monitoring Locations

Eldon Landfill,
Eldon, Kawartha Lakes, ON

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

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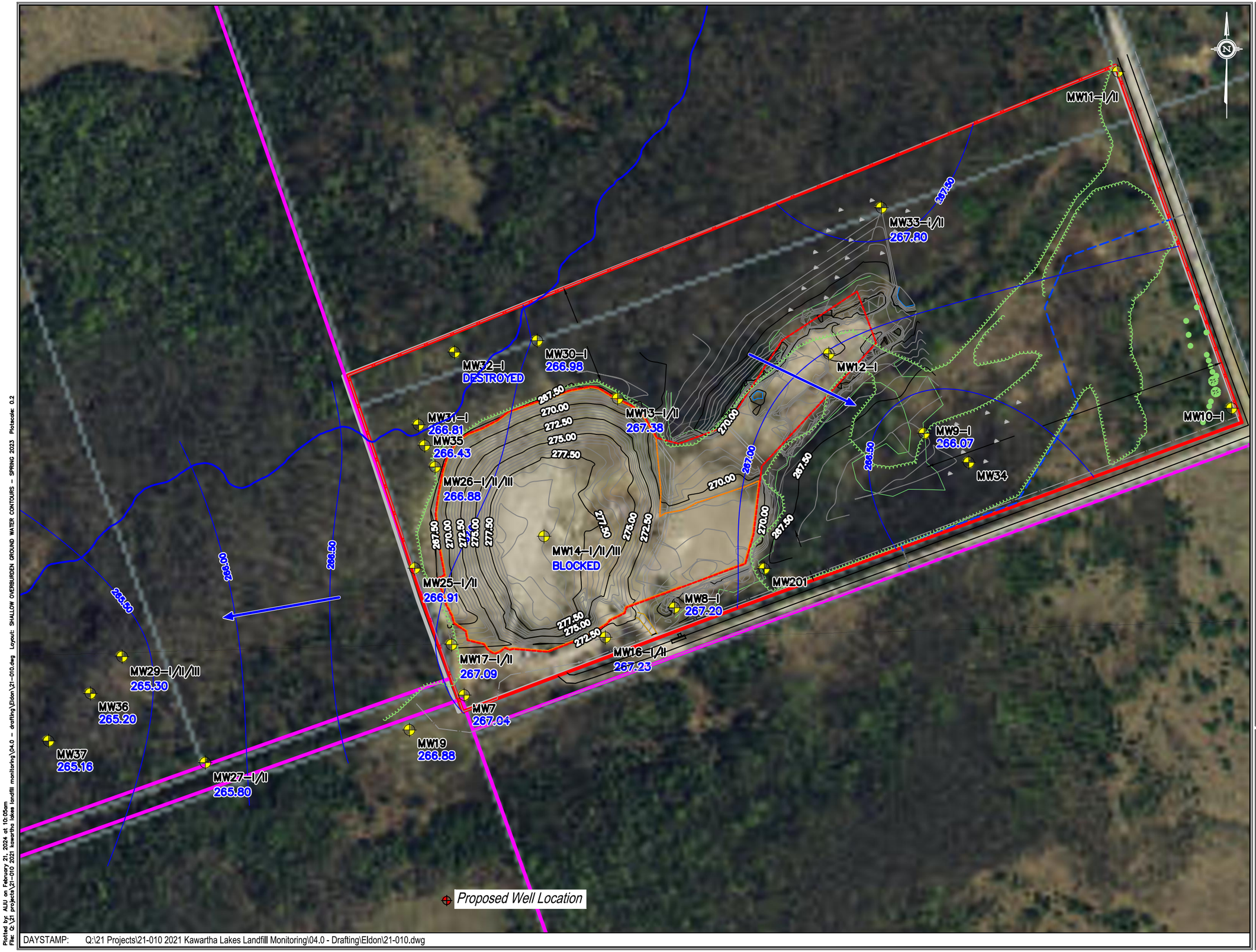

LEGEND:

- Primary Topographic Contour Line
- Secondary Topographic Contour Line
- Contaminant Attenuation Zone (CAZ)
- Property Boundary
- Existing Limit of Waste
- Approved Waste Footprint
- Fence
- Approximate Tree Line
- Low Wet Area
- Monitoring Well Location
- Proposed Monitoring Well
- Ground Water Elevation (masl)
- Ground Water Contour (masl)
- Inferred Ground Water Flow Direction

50m 0 100m

HORIZONTAL SCALE 1: 3,000

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Shallow Overburden Ground Water Contours Spring 2023

Eldon Landfill,
Eldon, Kawartha Lakes, ON

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

DAYSTAMP: Q:\21 Projects\21-010 2021 Kawartha Lakes Landfill Monitoring\04.0 - Drafting\Eldon\21-010.dwg

Plotted by: ALU on February 21, 2024 at 10:05am
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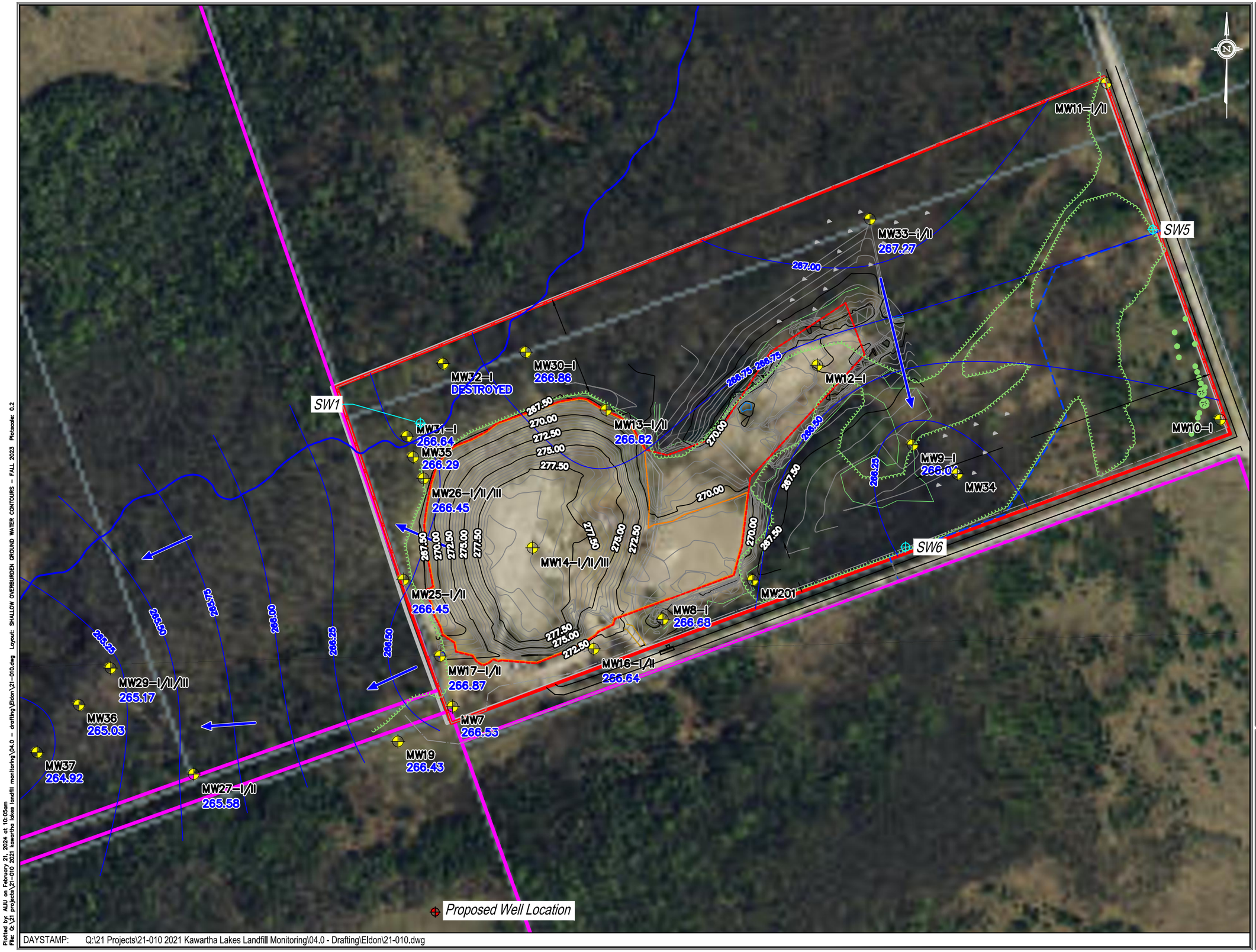

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LEGEND:

- Primary Topographic Contour Line
- Secondary Topographic Contour Line
- Contaminant Attenuation Zone (CAZ)
- Property Boundary
- Existing Limit of Waste
- Approved Waste Footprint
- Fence
- Approximate Tree Line
- Low Wet Area
- Monitoring Well Location
- Proposed Monitoring Well
- Ground Water Elevation (masl)
- Ground Water Contour (masl)
- Inferred Ground Water Flow Direction

50m 0 100m

HORIZONTAL SCALE 1: 3,000

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Shallow Overburden Ground Water Contours Fall 2023

Eldon Landfill,
Eldon, Kawartha Lakes, ON

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

LEGEND:

- *Primary Topographic Contour Line*
- *Secondary Topographic Contour Line*
- *Contaminant Attenuation Zone (CAZ)*
- *Property Boundary*
- *Existing Limit of Waste*
- *Approved Waste Footprint*
- *Fence*
- *Approximate Tree Line*
- *Low Wet Area*
- *Monitoring Well Location*
- *Proposed Monitoring Well*
- *Ground Water Elevation (masl)*
- *Ground Water Contour (masl)*
- *Inferred Ground Water Flow Direction*

50m 0 100m

HORIZONTAL SCALE 1: 3,000

Bedrock Ground Water Contours Spring 2023

Eldon Landfill,
Eldon, Kawartha Lakes, ON

DATE ISSUED:	*February 2024*	Figure No. 5
CREATED BY:	*JLM*	
PROJECT NO.:	*24-010*	
REFERENCE:	*MNRF*	

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

DAYSTAMP: Q:\21 Projects\21-010 2021 Kawartha Lakes Landfill Monitoring\04.0 - Drafting\Eldon\21-010.dwg

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LEGEND:

- Primary Topographic Contour Line
- Secondary Topographic Contour Line
- Contaminant Attenuation Zone (CAZ)
- Property Boundary
- Existing Limit of Waste
- Approved Waste Footprint
- Fence
- Approximate Tree Line
- Low Wet Area
- Monitoring Well Location
- Proposed Monitoring Well
- Ground Water Elevation (masl)
- Ground Water Contour (masl)
- Inferred Ground Water Flow Direction

50m 0 100m

HORIZONTAL SCALE 1:3,000

MW11–I/II 267.47
MW33–I/II 263.99
SW5
MW32–I
MW30–I
MW12–I
SW1
MW31–I
MW13–I/II 266.77
MW35
MW26–I/II/III 266.10
MW9–I
MW34 266.94
MW10–I 269.68
SW6
MW14–I/II/III BLOCKED
MW25–I/II
MW201
MW8–I
MW16–I/II 266.63
MW17–I/II
MW29–I/II/III 265.59
MW36
MW7
MW19
MW37
MW27–I/II 264.94
Proposed Well Location

DAYSTAMP: Q:\21 Projects\21-010 2021 Kawartha Lakes Landfill Monitoring\04.0 - Drafting\Eldon\21-010.dwg

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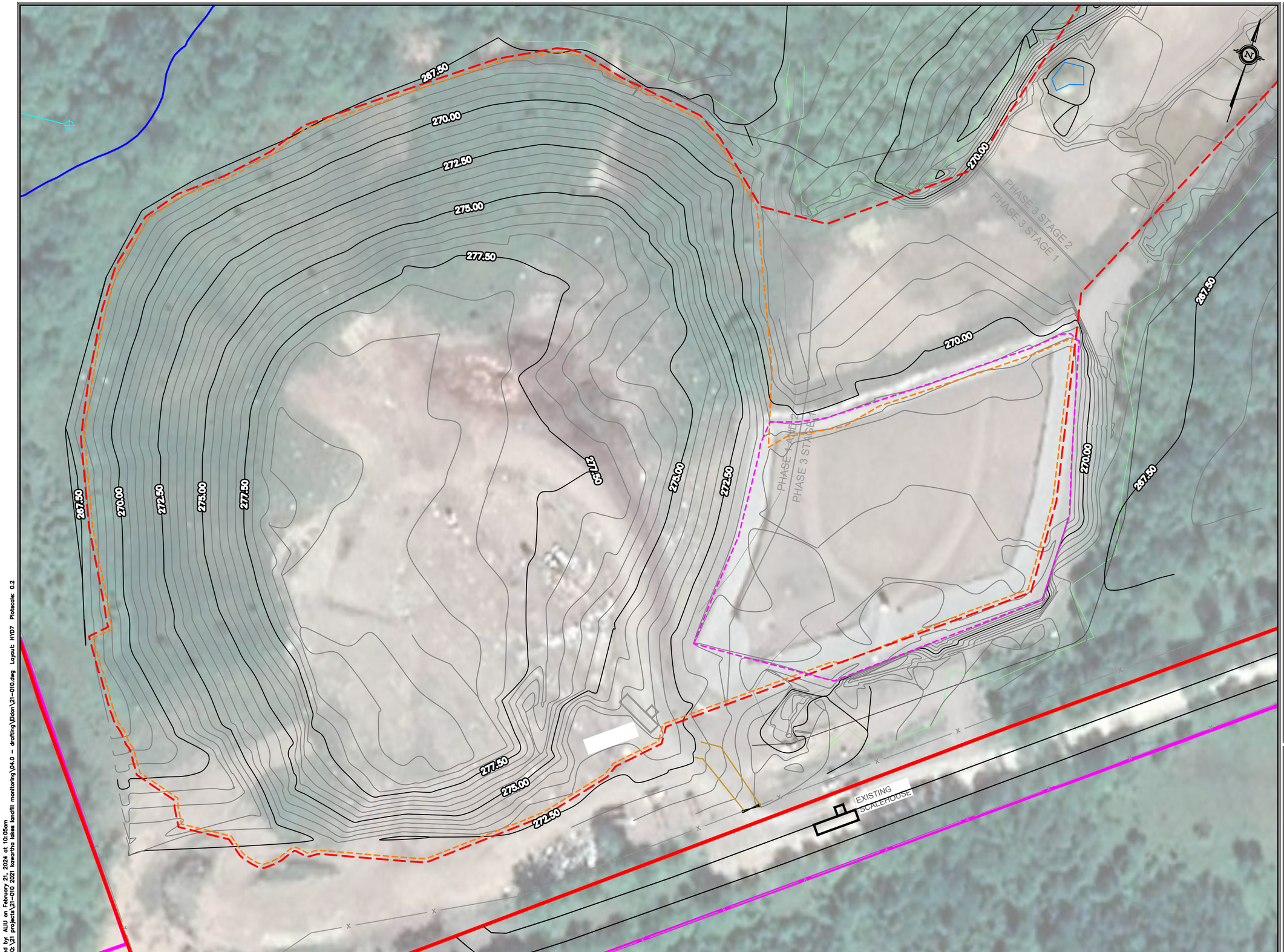
AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Bedrock Ground Water Contours Fall 2023

Eldon Landfill, Eldon, Kawartha Lakes, ON

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



LEGEND:

- *Watercourse*
- *Primary Topographic Contour Line*
- *Secondary Topographic Contour Line*
- *Contaminant Attenuation Zone (CAZ)*
- *Property Boundary*
- *Existing Limit of Waste*
- *Active Waste Area*
- *Approved Waste Footprint*
- *Fence*

100m 0 200m

HORIZONTAL SCALE 1:7,500

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Site Layout

Eldon Landfill, Eldon, Kawartha Lakes, ON

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

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APPENDIX B

Chemistry Summary Tables

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	7-I 13-May-08	7-I 15-Aug-08	7-I 5-Jun-09	7-I 4-Aug-09	7-I 6-Oct-09	7-I 10-Jun-10	7-I 6-Oct-10	7-I 12-May-11	7-I 8-Nov-11	7-I 19-Apr-12	7-I 29-Oct-12	7-I 3-Jun-13
Alkalinity	mg/L	500	OG	349	NV	251	273	274	280	281	299	309	275	285	300	310	305
Conductivity	µS/cm	-		-	NV	470	515	521	540	542	529	533	553	576	590	620	598
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.25	7.47	7.77	7.64	7.68	7.74	7.78	7.75	7.91	7.9	7.68	7.75
TDS	mg/L	500	AO	368	NV	306	335	339	351	352	344	346	313	335	338	361	347
DOC	mg/L	5		3.5	NV	<1	1.2	< 2	1	1	<1	< 1	0.9	-	0.9	1	3.2
COD	mg/L	-		-	NV	3	3	<1	< 2	9	6	< 2	10	16	<4.0	13	24
Phenols	mg/L	-		-	0.001	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	0.003	<0.0010	<0.0010	< 0.001
Chloride	mg/L	250	AO	131	NV	10	8	7	8	10	6	6	5	8	8	10	6
Ammonia, total	mg/L	-		-	NV	<0.1	<0.1	< 0.01	< 0.01	< 0.01	0.03	< 0.01	0.02	1.5	<0.01	0.04	< 0.01
Unionized Ammonia	mg/L	-		-	0.02												
Fluoride	mg/L	2.4	MAC	0.7	NV	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	<0.1	<0.10	<0.10	< 0.1
Sulphate	mg/L	500	AO	255	NV	8	9	9	10	14	11	9	9	9	10	12	9
Nitrite (N)	mg/L	1	MAC	0.3	NV	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.01	<0.01	<0.010	<0.010	< 0.1
Nitrate (N)	mg/L	10	MAC	4.0	NV	1.4	1.2	1.1	1.2	1.5	1.8	1.8	1.5	1.5	1.4	1.5	1.4
Bromide	mg/L	-		-	NV	-	-	-	-	-	< 0.1	-	<1	<1	<1.0	<1.0	< 0.4
TKN	mg/L	-		-	NV	<0.1	0.2	0.1	< 0.1	< 0.1	0.1	0.1	0.2	2	0.41	0.51	0.14
Hardness	mg/L	500	OG	361	NV	255	281	281	288	294	297	320	280	300	300	320	340
Aluminum	mg/L	0.1	OG	0.07	0.075	0.02	<0.01	0.02	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	<0.005	<0.0050	<0.0050	0.04
Antimony	mg/L	0.006	IMAC	0.002	0.02	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	<0.0005	<0.00050	<0.00050	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.006	0.005	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.005	<0.001	<0.001	<0.0010	<0.0010	< 0.0001
Barium	mg/L	1	MAC	0.3	NV	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	0.09	0.11	0.1	0.12	0.12
Beryllium	mg/L	-		-	1.1	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.005	<0.0005	<0.00050	<0.00050	< 0.002
Boron	mg/L	5	IMAC	1.3	0.2	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.03	0.04	0.031	0.061	0.037
Cadmium	mg/L	0.005	MAC	0.001	0.0005	<0.0001	<0.0001	< 0.0001	< 0.0001	0.0004	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002
Calcium	mg/L	-		-	NV	86	93	96	96	98	100	108	97	100	100	110	115
Chromium	mg/L	0.05	MAC	0.013	0.001	0.0005	0.0005	0.0004	0.0003	0.0003	0.0003	0.0005	<0.005	<0.005	<0.0050	-	0.0004
Chromium (VI)	mg/L			-													
Cobalt	mg/L	-		-	0.0009	<0.0003	<0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	<0.0005	<0.0005	<0.00050	<0.00050	0.0001
Copper	mg/L	1	AO	0.5	0.005	0.0012	0.0005	0.001	0.0002	0.0012	0.0006	0.0021	0.002	0.001	0.0015	0.0017	0.001
Iron	mg/L	0.3	AO	0.16	0.3	0.15	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	<0.1	<0.10	<0.10	< 0.005
Lead	mg/L	0.01	MAC	0.003	0.005	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.0005	<0.0005	<0.00050	<0.00050	< 0.00002
Magnesium	mg/L	-		-	NV	10	12	10	12	12	11	13	10	12	12	14	12.4
Manganese	mg/L	0.05	AO	0.03	NV	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.002	<0.002	<0.0020	<0.0020	< 0.001
Mercury	mg/L	0.001	MAC	0.0003	0.0002	0.00002	<0.00005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00001	<0.00001	<0.00001	<0.00001	< 0.00002
Molybdenum	mg/L	-		-	0.04	<0.002	<0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.001	<0.0005	<0.00050	<0.00050	< 0.0001
Nickel	mg/L	-		-	0.025	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.001	<0.001	<0.0010	<0.0010	< 0.01
Potassium	mg/L	-		-	NV	1.3	2	1.4	1.8	2	1.5	1.8	1.3	1.8	1.5	2.1	1.5
Phosphorus-Total	mg/L	-		-	0.03	<0.01	0.33	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	0.14	0.75	<0.10	0.23	0.22
Selenium	mg/L	0.01	MAC	0.003	0.1	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.002	<0.002	<0.0020	<0.0020	< 0.001
Silver	mg/L	-		-	0.0001	<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002
Sodium	mg/L	200	AO	105	NV	9	11	8	11	11	10	11	8	11	9.5	14	13.7
Strontium	mg/L	-		-	NV	0.112	0.118	0.111	0.106	0.102	0.114	0.146	0.14	0.14	0.15	0.15	-
Thallium	mg/L	-		-	0.0003	<0.0003	<0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	<0.00005	<0.00005	<0.000050	<0.000050	< 0.00005
Vanadium	mg/L	-		-	0.006	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.0005	<0.00050	<0.00050	0.0037
Zinc	mg/L	5	AO	2.5	0.02	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.006	<0.005	<0.0050	<0.0050	< 0.005
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	-	-	-	-	-	-	-	-	-	10.6	7.8	9
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	-	-	-	-	-	-	-	-	-	7.11	7.73	8.04
Field Conductivity	µS/cm	-		-	NV	-	-	-	-	-	-	-	-	-	589	670	622

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	7-I 29-Oct-13	7-I 1-May-14	7-I 24-Sep-14	7-I 27-Apr-15	7-I 5-Oct-15	7-I 25-Apr-16	7-I 19-Oct-16	7-I 12-Apr-17	7-I 5-Oct-17	7-I 10-Apr-18	7-I 1-Oct-18	7-I 22-Apr-19
Alkalinity	mg/L	500	OG	349	NV	321	287	295	271	301	248	264	281	223	270	223	291
Conductivity	µS/cm	-		-	NV	662	575	629	548	654	625	629	636	822	680	724	715
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.77	7.86	7.87	7.85	7.73	7.75	7.72	7.85	7.85	7.94	7.89	7.8
TDS	mg/L	500	AO	368	NV	***371***	318	341	311	***371***	320	311	337	365	338	340	***379***
DOC	mg/L	5		3.5	NV	-	2.2	***3.6***	2.6	2	2.4	***3.5***	3.3	**6.5**	***4.5***	**8.5**	5
COD	mg/L	-		-	NV	7	< 5	< 5	< 5	< 5	5	10	< 5	21	< 5	27	10
Phenols	mg/L	-		-	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.009	< 0.001	0.004	< 0.001	< 0.002	< 0.002
Chloride	mg/L	250	AO	131	NV	7	6	9	7	15	35	21	21	62	25.2	55.7	29.5
Ammonia, total	mg/L	-		-	NV	< 0.005	< 0.01	0.04	0.08	0.06	0.05	0.1	0.04	0.05	0.09	0.06	0.08
Unionized Ammonia	mg/L	-		-	0.02												< 0.01
Fluoride	mg/L	2.4	MAC	0.7	NV	0.1	< 0.1	< 0.1	0.1	0.2	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sulphate	mg/L	500	AO	255	NV	12	10	13	11	13	11	10	16	21	18	21	22
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2	0.2	< 0.05	0.07	0.07	0.07
Nitrate (N)	mg/L	10	MAC	4.0	NV	1.9	1.7	2	2	2.9	2.7	2.1	2.7	**16.9**	***5.48***	**14**	***4.18***
Bromide	mg/L	-		-	NV	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	-					
TKN	mg/L	-		-	NV	< 0.1	0.3	0.2	0.4	0.4	0.4	0.4	0.3	0.9	0.5	2.2	0.7
Hardness	mg/L	500	OG	361	NV	357	291	322	288	350	273	265	284	***362***	314	308	348
Aluminum	mg/L	0.1	OG	0.07	0.075	0.04	0.02	0.03	0.03	0.03	0.03	0.03	0.07	***0.09***	0.05	***0.08***	0.07
Antimony	mg/L	0.006	IMAC	0.002	0.02	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	0.0003	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.006	0.005	< 0.0001	< 0.0001	0.0016	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0002	< 0.0001	0.0001	< 0.0001
Barium	mg/L	1	MAC	0.3	NV	0.14	0.08	0.12	0.11	0.14	0.08	0.1	0.14	0.15	0.121	0.12	0.135
Beryllium	mg/L	-		-	1.1	< 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	mg/L	5	IMAC	1.3	0.2	0.057	0.025	0.046	0.044	0.045	< 0.005	0.034	0.046	0.033	0.044	0.034	0.059
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015
Calcium	mg/L	-		-	NV	122	99.9	110	99	120	93	90	96	123	107	105	119
Chromium	mg/L	0.05	MAC	0.013	0.001	0.007	< 0.0002	0.0012	0.0026	0.0028	< 0.0002	0.001	***0.0171***	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (VI)	mg/L			-													
Cobalt	mg/L	-		-	0.0009	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.01	0.01
Copper	mg/L	1	AO	0.5	0.005	0.0011	0.0015	0.0012	0.0008	0.0026	0.001	0.0012	0.001	0.0018	0.0015	0.0045	0.0026
Iron	mg/L	0.3	AO	0.16	0.3	0.11	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.01	< 0.005	0.01	0.071	< 0.005
Lead	mg/L	0.01	MAC	0.003	0.005	< 0.00002	0.00003	< 0.00002	0.00008	0.00006	< 0.00002	0.00008	< 0.00002	< 0.00002	< 0.00002	0.00013	< 0.00002
Magnesium	mg/L	-		-	NV	12.9	10.1	11.5	10.2	12.3	9.6	9.9	11	13.3	11.3	11	12.2
Manganese	mg/L	0.05	AO	0.03	NV	< 0.001	< 0.001	< 0.001	***0.03***	0.001	< 0.001	0.004	0.001	< 0.001	< 0.001	0.008	< 0.001
Mercury	mg/L	0.001	MAC	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		-	0.04	< 0.0001	0.0001	< 0.0001	0.0002	0.0001	0.0002	0.0002	0.0002	0.0001	< 0.0001	0.0002	0.0001
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		-	NV	1.8	1.3	1.9	1.5	2.3	1.4	2.5	1.5	2	1.5	2	1.7
Phosphorus-Total	mg/L	-		-	0.03	0.31	0.15	0.08	0.14	0.11	0.24	0.19	0.18	0.22	0.13	0.25	0.09
Selenium	mg/L	0.01	MAC	0.003	0.1	< 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	mg/L	-		-	0.0001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	105	NV	14.4	10.5	9.7	11.3	14.5	8.8	9	10	10.3	12.9	11.4	20
Strontium	mg/L	-		-	NV	-	-	0.16	0.16	0.19	0.14	0.14	0.13	0.18	0.141	0.148	0.169
Thallium	mg/L	-		-	0.0003	< 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	mg/L	-		-	0.006	0.0018	0.0035	0.0062	0.0026	0.0011	0.0008	0.001	0.0008	0.0011	0.0002	0.0003	0.0002
Zinc	mg/L	5	AO	2.5	0.02	< 0.005	< 0.005	< 0.005	< 0.005	0.007	0.007	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	10.6	7.8	13.2	8.9	11.5	4.8	13	7.3	12.2			7.9
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	7.35	8	7.74	7.76	7.41	8.05	7.7	8.21	7.52	7.94	7.89	7.61
Field Conductivity	µS/cm	-		-	NV	650	670	670	620	490	375	435	453	705	622	635	780

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	7-I 8-Oct-19	7-I 13-Apr-20	7-I 14-Oct-20	7-I 21-Apr-21	7-I 18-Oct-21	7-I 20-Apr-22	7-I 12-Oct-22	7-I 19-Apr-23	7-I 12-Oct-23	8-I 13-May-08	8-I 16-Aug-08	8-I 25-May-09
Alkalinity	mg/L	500	OG	349	NV	257	253	241	282	282	277	294	265	282	182	170	164
Conductivity	µS/cm	-		-	NV	659	663	587	648	590	643	668	596	649	352	348	321
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.78	7.81	7.88	7.96	7.66	7.6	7.82	7.82	7.68	7.24	7.59	7.9
TDS	mg/L	500	AO	368	NV	324	327	309	332	337	329	358	303	337	229	226	209
DOC	mg/L	5		3.5	NV	**8.1**	***4.2***	**6.3**	**6.2**	**5.9**	***3.5***	***4***	***2.8***	**7.2**	<1	1.2	1
COD	mg/L	-		-	NV	14	8	13	17	11	12	8	12	11	2	3	7
Phenols	mg/L	-		-	0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001	0.002	<0.001	< 0.001
Chloride	mg/L	250	AO	131	NV	26.4	25.8	17	15.4	17.3	13	14.4	10.3	13.1	7	6	5
Ammonia, total	mg/L	-		-	NV	0.12	< 0.01	0.08	0.04	0.18	0.55	0.05	0.16	0.28	<0.1	<0.1	0.03
Unionized Ammonia	mg/L	-		-	0.02	< 0.01	< 0.01	< 0.01		< 0.01	0.01	< 0.01	< 0.01	<0.01			
Fluoride	mg/L	2.4	MAC	0.7	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
Sulphate	mg/L	500	AO	255	NV	19	23	20	18	25	22	19	19	19	12	10	7
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.05	< 0.05	< 0.05	< 0.05	0.1	< 0.05	< 0.05	< 0.5	0.13	<0.1	<0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	4.0	NV	***6.71***	***4.45***	***4.36***	***4.38***	3.61	3.22	***5.82***	< 0.5	***7.52***	0.6	0.4	< 0.1
Bromide	mg/L	-		-	NV										-	-	< 0.1
TKN	mg/L	-		-	NV	0.7	0.5	0.7	0.5	0.6	0.7	0.5	0.4	0.7	0.1	<0.1	< 0.1
Hardness	mg/L	500	OG	361	NV	281	292	288	297	288	290	340	267	311	198	184	177
Aluminum	mg/L	0.1	OG	0.07	0.075	**0.17**	0.06	0.04	0.06	0.06	0.03	0.04	***0.08***	0.03	0.02	<0.01	< 0.01
Antimony	mg/L	0.006	IMAC	0.002	0.02	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.01	<0.01	< 0.01
Arsenic	mg/L	0.025	IMAC	0.006	0.005	0.0002	< 0.0001	0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.01	<0.01	< 0.01
Barium	mg/L	1	MAC	0.3	NV	0.111	0.11	0.124	0.118	0.131	0.127	0.158	0.107	0.161	<0.1	<0.1	< 0.1
Beryllium	mg/L	-		-	1.1	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	<0.1	<0.1	< 0.1
Boron	mg/L	5	IMAC	1.3	0.2	0.052	0.063	0.079	0.067	0.076	0.09	0.098	0.066	0.099	<0.1	<0.1	< 0.1
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000010	< 0.000010	<0.000015	<0.0001	<0.0001	< 0.0001
Calcium	mg/L	-		-	NV	96.5	98.6	98.3	101	97.9	97.7	115	90.2	104	67	62	60
Chromium	mg/L	0.05	MAC	0.013	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	0.0005	0.0011	0.0004
Chromium (VI)	mg/L			-							< 0.001	< 0.001	< 0.001	<0.01			
Cobalt	mg/L	-		-	0.0009	< 0.005	0.0001	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.0003	<0.0003	<0.0003	< 0.0003
Copper	mg/L	1	AO	0.5	0.005	0.0067	0.0025	0.0067	0.0044	0.0036	0.0029	0.0033	0.002	0.0039	0.0009	0.001	0.0009
Iron	mg/L	0.3	AO	0.16	0.3	**0.629**	< 0.005	0.012	0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	0.1	<0.1	< 0.1
Lead	mg/L	0.01	MAC	0.003	0.005	0.00132	0.00004	0.0001	0.00007	< 0.00002	0.00004	0.00003	< 0.00002	0.00003	<0.001	<0.001	< 0.001
Magnesium	mg/L	-		-	NV	9.7	11	10.3	10.8	10.5	11.1	12.7	10.1	12.3	7	7	7
Manganese	mg/L	0.05	AO	0.03	NV	***0.043***	< 0.001	0.002	< 0.001	< 0.001	< 0.001	0.001	< 0.001	0.001	<0.01	<0.01	< 0.01
Mercury	mg/L	0.001	MAC	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002	0.00003	<0.00005	0.00003
Molybdenum	mg/L	-		-	0.04	0.0002	0.0003	0.0003	0.0002	0.0003	0.0003	0.0002	0.0003	0.0003	<0.002	<0.002	< 0.002
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.0007	<0.01	<0.01	< 0.01
Potassium	mg/L	-		-	NV	1.9	1.4	2.3	1.7	2.4	2.3	2.7	1.6	4.1	0.7	1.1	0.7
Phosphorus-Total	mg/L	-		-	0.03	0.08	0.06	0.04	0.09	0.05	0.04	0.08	< 0.01	0.05	<0.01	0.05	0.02
Selenium	mg/L	0.01	MAC	0.003	0.1	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.01	<0.01	< 0.01
Silver	mg/L	-		-	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.0001	< 0.0001
Sodium	mg/L	200	AO	105	NV	15.4	15.7	16.7	15.3	14.2	16.5	17.4	11	10.2	4	5	4
Strontium	mg/L	-		-	NV	0.143	0.144	0.132	0.144	0.142	0.142	0.166	0.126	0.164	0.098	0.085	0.083
Thallium	mg/L	-		-	0.0003	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.005	< 0.00005	<0.00005	0.0004	<0.0003	< 0.0003
Vanadium	mg/L	-		-	0.006	0.0011	0.0003	0.0004	0.0002	0.0002	0.0003	0.0003	< 0.0004	0.0003	<0.001	<0.001	< 0.001
Zinc	mg/L	5	AO	2.5	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.006	<0.01	<0.01	< 0.01
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	11.9	7.6	12	5	11.2	8	13.1	6.7	11.9	-	-	-
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	7.66	7.14	7.63	7.88	7.75	8.1	7.6	7.9	7.74	-	-	-
Field Conductivity	µS/cm	-		-	NV	491	595	500	630	600	650	800	556	721	-	-	-

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	8-I 4-Aug-09	8-I 6-Oct-09	8-I 10-Jun-10	8-I 15-Oct-10	8-I 12-May-11	8-I 8-Nov-11	8-I 19-Apr-12	8-I 29-Oct-12	8-I 3-Jun-13	8-I 29-Oct-13	8-I 1-May-14	8-I 24-Sep-14
Alkalinity	mg/L	500	OG	349	NV	160	165	192	186	244	221	220	230	210	206	198	196
Conductivity	µS/cm	-		-	NV	354	330	362	326	487	438	420	450	431	440	405	422
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.62	7.78	7.87	7.95	7.91	8.04	7.97	7.75	7.86	7.96	7.9	8.06
TDS	mg/L	500	AO	368	NV	230	215	235	212	275	253	247	265	243	238	219	224
DOC	mg/L	5		3.5	NV	1	1	1	< 1	1.1	-	0.7	0.7	2.4	-	1.8	2.4
COD	mg/L	-		-	NV	< 2	7	7	< 2	<4	8	10	43	32	8	< 5	< 5
Phenols	mg/L	-		-	0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	<0.0010	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001
Chloride	mg/L	250	AO	131	NV	5	6	5	4	4	4	3	4	4	4	4	5
Ammonia, total	mg/L	-		-	NV	< 0.01	< 0.01	0.07	< 0.05	<0.05	0.5	0.01	0.04	< 0.01	< 0.005	0.04	0.04
Unionized Ammonia	mg/L	-		-	0.02												
Fluoride	mg/L	2.4	MAC	0.7	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
Sulphate	mg/L	500	AO	255	NV	8	11	17	8	8	8	9	10	11	9	7	9
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.1	< 0.1	< 0.1	< 0.1	<0.01	<0.01	<0.010	<0.010	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	4.0	NV	4	0.3	0.4	0.2	0.4	0.5	0.53	1.2	1.1	1	0.9	1
Bromide	mg/L	-		-	NV	-	-	< 0.1	-	<1	<1	<1.0	<1.0	< 0.4	< 0.4	< 0.4	< 0.4
TKN	mg/L	-		-	NV	0.2	< 0.1	< 0.1	0.1	<2	3	0.5	0.22	0.15	< 0.1	0.3	0.2
Hardness	mg/L	500	OG	361	NV	181	176	202	223	270	240	240	250	248	241	215	221
Aluminum	mg/L	0.1	OG	0.07	0.075	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	<0.005	<0.0050	<0.0050	0.03	0.03	0.02	0.02
Antimony	mg/L	0.006	IMAC	0.002	0.02	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	<0.0005	<0.00050	<0.00050	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.006	0.005	< 0.01	< 0.01	< 0.005	< 0.005	<0.001	<0.001	<0.0010	<0.0010	0.0002	< 0.0001	0.0001	0.0016
Barium	mg/L	1	MAC	0.3	NV	< 0.1	< 0.1	< 0.1	< 0.1	0.054	0.056	0.048	0.058	0.06	0.06	0.04	0.05
Beryllium	mg/L	-		-	1.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.005	<0.0005	<0.00050	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	5	IMAC	1.3	0.2	< 0.1	< 0.1	< 0.1	< 0.1	0.017	0.02	0.021	0.017	0.018	0.021	< 0.005	0.015
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002	0.00005	< 0.00002
Calcium	mg/L	-		-	NV	61	59	68	76	91	80	78	81	82.9	80.8	73.3	74.2
Chromium	mg/L	0.05	MAC	0.013	0.001	0.0003	0.0002	0.0005	< 0.0001	<0.005	<0.005	<0.0050	-	< 0.0002	0.004	< 0.0002	0.001
Chromium (VI)	mg/L			-													
Cobalt	mg/L	-		-	0.0009	< 0.0003	< 0.0003	< 0.0003	< 0.0003	<0.0005	<0.0005	<0.00050	<0.00050	< 0.0001	< 0.005	< 0.005	< 0.005
Copper	mg/L	1	AO	0.5	0.005	0.0015	0.001	< 0.0001	0.0033	0.001	<0.001	<0.0010	<0.0010	0.0006	0.0004	0.0011	0.0006
Iron	mg/L	0.3	AO	0.16	0.3	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	<0.1	<0.10	<0.10	< 0.005	< 0.005	< 0.005	< 0.005
Lead	mg/L	0.01	MAC	0.003	0.005	< 0.001	< 0.001	< 0.001	< 0.001	<0.0005	<0.0005	<0.00050	<0.00050	< 0.00002	< 0.00002	0.00002	< 0.00002
Magnesium	mg/L	-		-	NV	7	7	8	8	9.9	9.8	10	10	10	9.4	7.7	8.7
Manganese	mg/L	0.05	AO	0.03	NV	< 0.01	< 0.01	< 0.01	< 0.01	<0.002	<0.002	<0.0020	<0.0020	< 0.001	< 0.001	< 0.001	< 0.001
Mercury	mg/L	0.001	MAC	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00001	0.00001	<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		-	0.04	< 0.002	< 0.002	< 0.002	< 0.002	<0.001	<0.0005	<0.00050	<0.00050	0.0002	0.0002	0.0002	0.0003
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01	< 0.01	< 0.01	<0.001	<0.001	<0.0010	<0.0010	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		-	NV	1.1	1.2	0.8	1.2	0.79	1.2	0.93	1.4	1	1.4	0.7	1.4
Phosphorus-Total	mg/L	-		-	0.03	< 0.01	< 0.01	< 0.01	0.006	2.1	1.7	<0.10	0.37	0.68	0.9	2.52	1.01
Selenium	mg/L	0.01	MAC	0.003	0.1	< 0.01	< 0.01	< 0.01	< 0.01	<0.002	<0.002	<0.0020	<0.0020	< 0.001	< 0.001	< 0.001	< 0.001
Silver	mg/L	-		-	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Sodium	mg/L	200	AO	105	NV	5	4	3	3	3	3	3	4	3.6	4.3	2.6	3.3
Strontium	mg/L	-		-	NV	0.096	0.08	0.092	0.096	0.15	0.13	0.12	0.14	-	-	-	0.14
Thallium	mg/L	-		-	0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	<0.00005	<0.00005	<0.000050	<0.000050	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		-	0.006	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.0005	0.00068	0.00052	0.0028	0.0012	0.0025	0.0046
Zinc	mg/L	5	AO	2.5	0.02	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	<0.005	0.012	<0.0050	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	-	-	-	-	-	-	8.6	11.1	7.7	9.8	6.2	12.8
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	-	-	-	-	-	-	7.55	8.13	8.46	7.73	8.21	7.74
Field Conductivity	µS/cm	-		-	NV	-	-	-	-	-	-	443	490	455	455	460	450

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	8-I 27-Apr-15	8-I 5-Oct-15	8-I 25-Apr-16	8-I 19-Oct-16	8-I 12-Apr-17	8-I 5-Oct-17	8-I 10-Apr-18	8-I 1-Oct-18	8-I 22-Apr-19	8-I 8-Oct-19	8-I 13-Apr-20	8-I 14-Oct-20
Alkalinity	mg/L	500	OG	349	NV	194	202	198	203	204	196	194	224	209	226	400	365
Conductivity	µS/cm	-		-	NV	409	450	424	430	437	412	452	791	429	493	1090	916
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.94	7.9	7.96	8.18	8.17	8.08	8.06	7.74	7.71	7.71	7.69	7.55
TDS	mg/L	500	AO	368	NV	225	249	230	226	244	212	242	407	234	263	**686**	**551**
DOC	mg/L	5		3.5	NV	1.8	0.8	0.8	0.9	1.2	1.5	1.5	2.1	1.3	2.4	3.1	3
COD	mg/L	-		-	NV	< 5	< 5	< 5	40	41	21	< 5	7	1.5	< 5	5	46
Phenols	mg/L	-		-	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.004	< 0.001	< 0.002	<0.002	< 0.002	< 0.002	< 0.002
Chloride	mg/L	250	AO	131	NV	10	12	8	6	6	4	20.5	89.7	5.5	3.9	6.8	21.8
Ammonia, total	mg/L	-		-	NV	0.08	0.01	0.03	0.04	0.03	< 0.01	0.14	0.03	0.8	0.09	0.03	0.03
Unionized Ammonia	mg/L	-		-	0.02									<0.01	< 0.01	< 0.01	< 0.01
Fluoride	mg/L	2.4	MAC	0.7	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
Sulphate	mg/L	500	AO	255	NV	9	9	10	11	12	7	9	35	16	19	192	95
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.1	< 0.1	< 0.1	0.2	< 0.1	< 0.05	< 0.05	< 0.05	<0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	10	MAC	4.0	NV	1	0.9	1.3	1.5	1.7	1.2	1.73	1.15	1.03	1.48	1.95	1.48
Bromide	mg/L	-		-	NV	< 0.4	< 0.4	< 0.4	-								
TKN	mg/L	-		-	NV	0.3	0.2	0.2	0.4	0.4	0.2	0.2	0.4	1.3	0.3	0.4	0.6
Hardness	mg/L	500	OG	361	NV	216	246	217	195	241	208	243	332	226	247	**601**	**503**
Aluminum	mg/L	0.1	OG	0.07	0.075	0.02	0.02	0.02	0.05	0.04	0.06	0.06	0.07	0.04	0.06	0.1	0.07
Antimony	mg/L	0.006	IMAC	0.002	0.02	< 0.0001	0.0002	< 0.0001	0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	< 0.0001	< 0.0001	0.0005
Arsenic	mg/L	0.025	IMAC	0.006	0.005	< 0.0001	< 0.0001	< 0.0001	0.0001	0.0005	< 0.0001	< 0.0001	< 0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001
Barium	mg/L	1	MAC	0.3	NV	0.05	0.06	0.04	0.05	0.07	0.06	0.053	0.101	0.042	0.063	0.137	0.153
Beryllium	mg/L	-		-	1.1	< 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	mg/L	5	IMAC	1.3	0.2	0.011	0.015	< 0.005	0.014	0.02	0.033	0.018	0.173	0.024	0.03	0.353	0.559
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	<0.000015	< 0.000015	< 0.000015	< 0.000015
Calcium	mg/L	-		-	NV	73.1	82.8	73.6	62.9	81.8	68.9	81.7	113	70.1	83.7	208	174
Chromium	mg/L	0.05	MAC	0.013	0.001	0.002	0.002	< 0.0002	0	0.001	< 0.001	< 0.001	< 0.001	<0.001	< 0.001	< 0.001	0.002
Chromium (VI)	mg/L			-													
Cobalt	mg/L	-		-	0.0009	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.005	< 0.005	< 0.0001	0.0004	< 0.005	< 0.005	0.0008
Copper	mg/L	1	AO	0.5	0.005	0.0012	0.0008	0.0005	0.0007	0.001	0.0007	0.0003	0.0012	0.0005	0.0006	0.002	0.0026
Iron	mg/L	0.3	AO	0.16	0.3	< 0.005	< 0.005	< 0.005	< 0.005	0.01	0.01	< 0.005	0.01	0.021	< 0.005	0.007	0.045
Lead	mg/L	0.01	MAC	0.003	0.005	0.00006	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00002	< 0.00002	< 0.00002	0.00003	< 0.00002	0.00006	0.00007
Magnesium	mg/L	-		-	NV	8	9.5	8.2	9.2	8.9	8.6	9.34	12.1	12.3	9.27	19.7	16.6
Manganese	mg/L	0.05	AO	0.03	NV	< 0.001	< 0.001	< 0.001	0	< 0.001	0	< 0.001	0.0045	0.002	0.001	< 0.001	0.011
Mercury	mg/L	0.001	MAC	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	mg/L	-		-	0.04	0.0004	0.0003	0.0002	0.0003	0.0003	0.0003	0.0001	0.0003	0.0002	0.0003	0.0001	0.0002
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		-	NV	0.8	1.5	0.9	1.1	0.9	1.4	1	1.6	1.6	1.3	1.3	1.6
Phosphorus-Total	mg/L	-		-	0.03	0.99	1.84	3.02	1.2	3.45	1.32	1.14	0.9	8.82	1.61	2.05	1.74
Selenium	mg/L	0.01	MAC	0.003	0.1	< 0.001	< 0.001	< 0.001	< 0.001	0	< 0.001	< 0.001	< 0.001	<0.001	< 0.001	< 0.001	< 0.001
Silver	mg/L	-		-	0.0001	< 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	mg/L	200	AO	105	NV	2.9	7.9	5.7	6.8	3.9	4.1	3.5	21.6	3.4	9.9	17.9	25
Strontium	mg/L	-		-	NV	0.13	0.16	0.13	0.11	0.13	0.13	0.14	0.221	0.241	0.153	0.349	0.28
Thallium	mg/L	-		-	0.0003	< 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	mg/L	-		-	0.006	0.0017	0.0009	0.0009	0.0009	0.0002	0.0011	0.0003	0.0003	<0.0001	0.0003	0.0003	0.0002
Zinc	mg/L	5	AO	2.5	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	< 0.005	< 0.005	0.016
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	6.7	12.5	6	12	6.4	13.4			8.5	11.8	8.8	11.9
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	8	7.76	8.12	7.82	7.91	7.91	8.06	7.74	7.47	7.48	6.14	7.37
Field Conductivity	µS/cm	-		-	NV	460	345	330	400	343	365	465	763	540	485	1037	820

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	8-I 21-Apr-21	8-I 18-Oct-21	8-I 20-Apr-22	8-I 12-Oct-22	8-I 19-Apr-23	8-I 12-Oct-23	8-I DUP 12-Oct-23	9-I 13-May-08	9-I 16-Aug-08	9-I 5-Jun-09	9-I 4-Aug-09	9-I 6-Oct-09
Alkalinity	mg/L	500	OG	349	NV	421	377	438	345	436	465	475	268	257	239	243	267
Conductivity	µS/cm	-		-	NV	936	948	1030	917	959	1120	1120	501	498	473	472	504
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.78	7.73	7.7	7.76	7.48	7.26	7.53	7.11	7.56	7.8	7.68	7.58
TDS	mg/L	500	AO	368	NV	**562**	**610**	**605**	**526**	**542**	**602**	**602**	326	324	307	307	328
DOC	mg/L	5		3.5	NV	**5.2**	5	**5.3**	1.3	2.3	**7.2**	**7.1**	1	1.6	3	1	1
COD	mg/L	-		-	NV	14	< 3	16	5	20	10	20	3	4	1	< 2	7
Phenols	mg/L	-		-	0.001	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	0.002	< 0.001	0.001
Chloride	mg/L	250	AO	131	NV	17.1	42.7	43.6	49.3	21.3	50.6	45.3	7	7	6	7	7
Ammonia, total	mg/L	-		-	NV	0.02	0.14	0.57	0.05	0.34	0.12	0.14	<0.1	<0.1	< 0.01	0.11	< 0.01
Unionized Ammonia	mg/L	-		-	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.01	<0.01					
Fluoride	mg/L	2.4	MAC	0.7	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
Sulphate	mg/L	500	AO	255	NV	74	108	83	78	43	79	71	18	17	16	17	18
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.05	<0.05	<0.1	<0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	4.0	NV	1.55	1.16	1.53	1.06	1.57	1.97	2.07	0.2	0.8	0.4	< 0.1	< 0.1
Bromide	mg/L	-		-	NV								-	-	-	-	-
TKN	mg/L	-		-	NV	0.5	1.1	0.7	0.6	0.7	0.6	0.7	<0.1	0.1	0.3	0.2	< 0.1
Hardness	mg/L	500	OG	361	NV	**514**	**508**	485	423	**538**	**559**	**586**	271	286	255	266	288
Aluminum	mg/L	0.1	OG	0.07	0.075	0.1	0.1	0.04	0.04	0.1	0.06	0.07	0.03	0.01	0.03	< 0.01	< 0.01
Antimony	mg/L	0.006	IMAC	0.002	0.02	< 0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	<0.0001	<0.01	<0.01	< 0.01	< 0.01	< 0.01
Arsenic	mg/L	0.025	IMAC	0.006	0.005	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.01	<0.01	< 0.01	< 0.01	< 0.01
Barium	mg/L	1	MAC	0.3	NV	0.137	0.178	0.152	0.148	0.128	0.191	0.201	<0.1	<0.1	< 0.1	< 0.1	< 0.1
Beryllium	mg/L	-		-	1.1	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	<0.0001	<0.1	<0.1	< 0.1	< 0.1	< 0.1
Boron	mg/L	5	IMAC	1.3	0.2	0.577	0.919	0.707	0.533	0.357	0.493	0.545	<0.1	<0.1	< 0.1	< 0.1	< 0.1
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.000015	< 0.000015	< 0.000015	< 0.000010	< 0.000010	<0.000015	<0.000015	<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001
Calcium	mg/L	-		-	NV	178	171	161	142	182	188	195	82	86	79	75	89
Chromium	mg/L	0.05	MAC	0.013	0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	0.0006	0.0007	0.0001	0.0001	0.0002
Chromium (VI)	mg/L			-				< 0.001	< 0.001	**0.002**	<0.01	<0.01					
Cobalt	mg/L	-		-	0.0009	< 0.005	< 0.005	< 0.005	0.005	< 0.005	0.0016	0.0016	0.0003	<0.0003	< 0.0003	< 0.0003	< 0.0003
Copper	mg/L	1	AO	0.5	0.005	0.0033	0.0045	0.0037	0.0042	0.0019	0.0057	0.0057	0.0018	0.0003	0.0002	< 0.0001	< 0.0001
Iron	mg/L	0.3	AO	0.16	0.3	0.034	< 0.005	< 0.005	< 0.005	< 0.005	0.017	0.008	0.2	<0.1	< 0.1	< 0.1	< 0.1
Lead	mg/L	0.01	MAC	0.003	0.005	0.00008	< 0.00002	< 0.00002	0.00003	< 0.00002	0.00004	0.00003	<0.001	<0.001	< 0.001	< 0.001	< 0.001
Magnesium	mg/L	-		-	NV	16.7	19.5	20.4	16.5	20.1	21.6	23.9	16	17	14	19	16
Manganese	mg/L	0.05	AO	0.03	NV	0.003	0.05	0.009	0.039	< 0.001	0.044	**0.061**	<0.01	0.03	0.01	0.03	0.01
Mercury	mg/L	0.001	MAC	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002	<0.00002	0.00002	<0.00005	0.00003	< 0.00002	< 0.00002
Molybdenum	mg/L	-		-	0.04	< 0.0001	0.0002	0.0002	0.0003	0.0001	0.0002	0.0002	<0.002	<0.002	< 0.002	< 0.002	< 0.002
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.003	0.0031	<0.01	<0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		-	NV	1.4	2.6	1.8	2.4	1.1	2.3	2.6	2	2.7	1.8	2.9	2
Phosphorus-Total	mg/L	-		-	0.03	1.04	1.27	1.27	0.03	0.73	0.71	0.83	<0.01	0.04	< 0.01	< 0.01	< 0.01
Selenium	mg/L	0.01	MAC	0.003	0.1	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	<0.01	<0.01	< 0.01	< 0.01	< 0.01
Silver	mg/L	-		-	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	105	NV	22.6	40.3	32.6	29.8	12.7	29.6	33.7	5	6	4	6	5
Strontium	mg/L	-		-	NV	0.311	0.373	0.319	0.297	0.305	0.365	0.41	0.307	0.349	0.262	0.486	0.202
Thallium	mg/L	-		-	0.0003	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	<0.00005	<0.00005	<0.0003	<0.0003	< 0.0003	< 0.0003	< 0.0003
Vanadium	mg/L	-		-	0.006	0.0003	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	<0.001	<0.001	< 0.001	< 0.001	< 0.001
Zinc	mg/L	5	AO	2.5	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.006	<0.005	<0.01	<0.01	< 0.01	< 0.01	< 0.01
TSS	mg/L	-	-	-	NV	2180	5600	5000	3180	3880	11300						
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005						
BOD(5 day)	mg/L	-	-	-	NV	< 6	5.9	< 3	< 3	< 3	<3						
Field Temperature	°C	-	AO	-	NV	5.7	11.1	7.7	13.1	8.1	13.2	13.2	-	-	-	-	-
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	7.56	7.34	7.13	6.98	7.36	7.18	7.18	-	-	-	-	-
Field Conductivity	µS/cm	-		-	NV	910	1000	1009	959	832	974	974	-	-	-	-	-

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	9-I 10-Jun-10	9-I 12-Oct-10	9-I 12-May-11	9-I 8-Nov-11	9-I 19-Apr-12	9-I 29-Oct-12	9-I 3-Jun-13	9-I 29-Oct-13	9-I 1-May-14	9-I 24-Sep-14	9-I 27-Apr-15	9-I 5-Oct-15
Alkalinity	mg/L	500	OG	349	NV	222	257	253	268	280	280	235	229	217	300	268	245
Conductivity	µS/cm	-		-	NV	421	419	509	531	520	520	474	481	456	604	513	495
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.91	7.73	7.89	7.99	7.9	7.85	7.77	7.93	7.89	7.91	7.81	7.89
TDS	mg/L	500	AO	368	NV	274	272	276	293	282	307	242	259	242	321	277	272
DOC	mg/L	5		3.5	NV	< 1	< 1	1.3	1.4	1.2	1.4	3.3	-	1.9	4.7	3.2	1
COD	mg/L	-		-	NV	8	4	79	12	<4.0	71	156	12	120	121	< 5	< 5
Phenols	mg/L	-		-	0.001	< 0.001	< 0.001	<0.001	<0.001	<0.0010	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Chloride	mg/L	250	AO	131	NV	8	6	5	6	5	4	5	4	5	4	4	4
Ammonia, total	mg/L	-		-	NV	0.16	< 0.05	0.06	<0.1	0.04	0.13	< 0.01	0.01	0.05	0.07	0.25	0.06
Unionized Ammonia	mg/L	-		-	0.02												
Fluoride	mg/L	2.4	MAC	0.7	NV	0.2	0.1	0.1	0.1	<0.10	0.11	0.3	0.2	0.2	0.2	0.2	0.2
Sulphate	mg/L	500	AO	255	NV	21	14	12	12	10	15	16	17	18	13	12	15
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.1	< 0.1	<0.01	0.03	<0.010	<0.010	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	4.0	NV	< 0.1	< 0.1	<0.1	<0.1	<0.10	<0.10	0.3	0.2	0.4	0.2	0.2	0.3
Bromide	mg/L	-		-	NV	< 0.1	-	<1	<1	<1.0	<1.0	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
TKN	mg/L	-		-	NV	0.3	0.2	<2	1.7	0.49	<0.50 (2)	0.52	0.1	0.9	0.8	0.6	0.4
Hardness	mg/L	500	OG	361	NV	233	306	250	270	240	290	207	257	226	322	260	270
Aluminum	mg/L	0.1	OG	0.07	0.075	< 0.01	0.01	0.005	<0.005	<0.0050	0.0061	**0.13**	0.03	0.02	0.03	0.02	0.02
Antimony	mg/L	0.006	IMAC	0.002	0.02	< 0.01	< 0.01	<0.005	<0.0005	<0.00050	<0.00050	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001
Arsenic	mg/L	0.025	IMAC	0.006	0.005	< 0.005	< 0.005	<0.001	<0.001	<0.0010	<0.0010	0.0003	< 0.0001	< 0.0001	0.0016	0.0001	< 0.0001
Barium	mg/L	1	MAC	0.3	NV	< 0.1	< 0.1	0.05	0.059	0.036	0.054	0.03	0.06	0.04	0.07	0.05	0.06
Beryllium	mg/L	-		-	1.1	< 0.1	< 0.1	<0.005	<0.0005	<0.00050	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	5	IMAC	1.3	0.2	< 0.1	< 0.1	0.031	0.03	0.031	0.032	0.011	0.044	0.019	0.036	0.028	0.045
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.0001	**0.0196**	<0.0001	<0.0001	<0.00010	<0.00010	0.00004	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Calcium	mg/L	-		-	NV	62	93	74	80	65	85	61.3	77.8	67.6	97.5	75.8	81.2
Chromium	mg/L	0.05	MAC	0.013	0.001	0.0001	0.0002	<0.005	<0.005	<0.0050	-	0.0004	0.0054	< 0.0002	0.0015	0.0015	0.0024
Chromium (VI)	mg/L			-													
Cobalt	mg/L	-		-	0.0009	0.0004	< 0.0003	<0.0005	<0.0005	<0.00050	<0.00050	0.0007	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Copper	mg/L	1	AO	0.5	0.005	< 0.0001	0.0021	<0.001	<0.001	<0.0010	<0.0010	0.0023	0.0004	0.0011	0.0006	0.0009	0.0009
Iron	mg/L	0.3	AO	0.16	0.3	< 0.1	< 0.1	<0.100	<0.1	0.17	<0.10	0.09	< 0.005	< 0.005	< 0.005	0.01	< 0.005
Lead	mg/L	0.01	MAC	0.003	0.005	< 0.001	< 0.001	<0.0005	<0.0005	<0.00050	<0.00050	0.00047	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Magnesium	mg/L	-		-	NV	19	18	17	16	20	18	13	15.1	13.9	18.9	17.1	16.2
Manganese	mg/L	0.05	AO	0.03	NV	0.04	0.02	0.02	0.026	0.033	0.013	0	0	0.01	0.03	**0.06**	**0.07**
Mercury	mg/L	0.001	MAC	0.0003	0.0002	< 0.00002	< 0.00002	0.00003	0.00003	<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		-	0.04	< 0.002	< 0.002	<0.001	<0.0005	<0.00050	<0.00050	0.0001	0.0002	0.0002	0.0002	0.0005	0.0002
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01	<0.001	0.001	<0.0010	<0.0010	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		-	NV	2.6	2	1.7	2.1	2.6	2.2	1.6	2.2	1.9	2.4	1.8	2.6
Phosphorus-Total	mg/L	-		-	0.03	< 0.01	< 0.02	6.3	1.9	<0.10	4.1	8.97	2.02	4.73	7.01	4.35	4.23
Selenium	mg/L	0.01	MAC	0.003	0.1	< 0.01	< 0.01	<0.002	<0.002	<0.0020	<0.0020	< 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	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Sodium	mg/L	200	AO	105	NV	4	4	3.9	3.9	3.8	4	3.4	4.2	3.5	4	3.4	4.4
Strontium	mg/L	-		-	NV	0.542	0.289	0.37	0.36	0.54	0.37	-	-	-	0.41	0.42	0.39
Thallium	mg/L	-		-	0.0003	< 0.0003	< 0.0003	<0.00005	<0.00005	<0.000050	<0.000050	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		-	0.006	< 0.001	< 0.001	<0.001	<0.0005	<0.00050	<0.00050	0.0037	0.0016	0.0018	0.0072	0.0017	0.001
Zinc	mg/L	5	AO	2.5	0.02	< 0.01	< 0.01	<0.005	<0.005	<0.0050	<0.0050	< 0.005	< 0.005	< 0.005	0.01	0.01	< 0.005
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	-	-	-	6.1	-	8.9	8.7	6.4	7.2	13.5	6	12.8
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	-	-	-	7.34	-	7.9	8.23	7.56	8.12	7.68	7.9	7.63
Field Conductivity	µS/cm	-		-	NV	-	-	-	468	-	530	449	500	490	610	560	360

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	9-I 25-Apr-16	9-I 19-Oct-16	9-I 12-Apr-17	9-I 5-Oct-17	9-I 10-Apr-18	9-I 1-Oct-18	9-I 22-Apr-19	9-I 8-Oct-19	9-I 13-Apr-20	9-I 14-Oct-20	9-I 21-Apr-21	9-I 18-Oct-21
Alkalinity	mg/L	500	OG	349	NV	249	255	236	261	246	226	256	220	212	218	234	265
Conductivity	µS/cm	-		-	NV	489	522	468	527	471	459	494	461	450	466	476	497
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.87	8.01	8.1	8.06	7.97	7.92	7.68	7.83	7.83	7.87	7.95	7.89
TDS	mg/L	500	AO	368	NV	266	273	261	275	259	249	288	246	236	248	257	288
DOC	mg/L	5		3.5	NV	1.4	1.6	2.3	3.1	2.3	1.9	1.6	2.3	1.8	1.5	3.1	2.2
COD	mg/L	-		-	NV	< 5	< 5	83	44	11	80	1.6	30	102	105	136	< 3
Phenols	mg/L	-		-	0.001	< 0.001	< 0.001	< 0.001	0.004	< 0.001	0.008	<0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Chloride	mg/L	250	AO	131	NV	3	4	3	4	3.8	6.4	5.3	2.8	5	5.4	4.4	5
Ammonia, total	mg/L	-		-	NV	0.09	0.22	0.11	0.05	0.22	0.05	0.1	0.16	0.04	0.04	0.05	0.17
Unionized Ammonia	mg/L	-		-	0.02							<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoride	mg/L	2.4	MAC	0.7	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
Sulphate	mg/L	500	AO	255	NV	13	17	13	12	9	16	21	15	14	17	12	14
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.1	0.2	< 0.1	< 0.05	< 0.05	< 0.05	<0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	10	MAC	4.0	NV	0.3	0.4	0.1	0.3	0.16	1.02	1.51	0.69	0.7	0.54	0.26	0.35
Bromide	mg/L	-		-	NV	< 0.4	-										
TKN	mg/L	-		-	NV	0.5	0.6	0.6	0.5	0.6	0.8	0.4	1.1	1	0.8	0.2	0.3
Hardness	mg/L	500	OG	361	NV	258	253	268	269	259	231	224	244	230	251	262	286
Aluminum	mg/L	0.1	OG	0.07	0.075	0.02	0.05	0.05	0.06	0.06	0.05	0.05	0.06	0.05	0.03	0.06	0.08
Antimony	mg/L	0.006	IMAC	0.002	0.02	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	< 0.0001	< 0.0001	0.0002	0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.006	0.005	< 0.0001	0.0001	0.0004	< 0.0001	< 0.0001	< 0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Barium	mg/L	1	MAC	0.3	NV	0.05	0.05	0.07	0.06	0.051	0.057	0.058	0.056	0.048	0.056	0.055	0.065
Beryllium	mg/L	-		-	1.1	< 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	mg/L	5	IMAC	1.3	0.2	< 0.005	0.026	0.021	0.044	0.028	0.018	0.103	0.017	0.014	0.056	0.02	0.037
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.00002	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	<0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015
Calcium	mg/L	-		-	NV	79.6	75.2	84.4	80.2	77.6	73.7	75.6	77.6	72.8	75.3	81.5	87.7
Chromium	mg/L	0.05	MAC	0.013	0.001	< 0.0002	< 0.0002	0.0004	< 0.001	< 0.001	< 0.001	<0.001	< 0.001	< 0.001	0.001	0.001	< 0.001
Chromium (VI)	mg/L			-													
Cobalt	mg/L	-		-	0.0009	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0001	0.0002	< 0.005	< 0.005	< 0.0001	< 0.005	< 0.005
Copper	mg/L	1	AO	0.5	0.005	0.0004	0.0004	0.0014	0.0008	0.0004	0.0008	0.0009	0.0003	0.0018	0.0008	0.0016	0.0011
Iron	mg/L	0.3	AO	0.16	0.3	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	<0.005	< 0.005	0.006	0.05	0.013	0.076
Lead	mg/L	0.01	MAC	0.003	0.005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002	< 0.00002	0.00005	0.00003	0.00005	0.00006
Magnesium	mg/L	-		-	NV	14.5	15.8	13.9	16.7	15.8	11.4	8.5	12.2	11.8	15.2	14.1	16.2
Manganese	mg/L	0.05	AO	0.03	NV	0.01	0.01	0	0.04	0.033	0.0006	<0.001	0.001	< 0.001	0.005	0.009	0.009
Mercury	mg/L	0.001	MAC	0.0003	0.0002	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	mg/L	-		-	0.04	0.0002	0.0001	0.0002	0.0002	< 0.0001	0.0002	0.0003	0.0002	0.0001	0.0002	0.0002	0.0001
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		-	NV	1.5	1.5	1.1	2.2	1.4	2	1.1	2.2	1.5	2.4	1.3	2.2
Phosphorus-Total	mg/L	-		-	0.03	0.99	6.81	5.78	1.7	4.81	14.7	0.66	12.5	6.77	6.69	1.03	1.94
Selenium	mg/L	0.01	MAC	0.003	0.1	< 0.001	< 0.001	0	< 0.001	< 0.001	< 0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Silver	mg/L	-		-	0.0001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	105	NV	3.3	4	2.9	3.9	3.3	3.6	23.4	4	3.1	4.2	3.2	3.9
Strontium	mg/L	-		-	NV	0.28	0.23	0.24	0.35	0.324	0.193	0.146	0.217	0.201	0.345	0.248	0.309
Thallium	mg/L	-		-	0.0003	< 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	mg/L	-		-	0.006	0.001	0.0009	0.0002	0.0014	0.0001	0.0001	0.0002	0.0001	0.0001	0.0003	0.0002	0.0004
Zinc	mg/L	5	AO	2.5	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	< 0.005	< 0.005	0.008	< 0.005	< 0.005
TSS	mg/L	-	-	-	NV											11900	15400
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005											< 0.005	< 0.005
BOD(5 day)	mg/L	-	-	-	NV											< 3	2.6
Field Temperature	°C	-	AO	-	NV	4.4	12	4.9	12.3			1.1	10.2	5.4	12.5	7.6	13.1
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	8.14	7.74	7.83	7.75	7.97	7.92	8	7.7	7.41	7.83	7.5	7.65
Field Conductivity	µS/cm	-		-	NV	365	480	360	445	486	459	510	375	516	430	540	535

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	9-I 20-Apr-22	9-I 12-Oct-22	9-I 19-Apr-23	9-I 12-Oct-23	9-I 12-Oct-23 DUP	11-II 13-May-08	11-II 16-Aug-08	11-II 5-Jun-09	11-II 4-Aug-09	11-II 6-Oct-09	11-II 10-Jun-10	11-II 12-Oct-10
Alkalinity	mg/L	500	OG	349	NV	278	250	254	298	271	210	201	198	195	190	200	200
Conductivity	µS/cm	-		-	NV	503	505	509	521	528	412	410	385	387	382	367	344
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.87	7.87	7.75	7.42	7.42	7.34	7.64	7.75	7.81	7.75	7.88	7.85
TDS	mg/L	500	AO	368	NV	279	285	275	270	273	268	267	250	252	248	239	224
DOC	mg/L	5		3.5	NV	2.7	< 0.2	2.5	3.5	3.3	<1	1.3	< 2	1	1	< 1	< 1
COD	mg/L	-		-	NV	176	64	133	49	40	4	3	1	< 2	6	6	6
Phenols	mg/L	-		-	0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Chloride	mg/L	250	AO	131	NV	3.2	5.3	3.5	5	<0.5	7	5	4	4	4	4	4
Ammonia, total	mg/L	-		-	NV	1.41	< 0.01	0.05	0.32	0.4	<0.1	<0.1	< 0.01	0.01	< 0.01	0.03	< 0.05
Unionized Ammonia	mg/L	-		-	0.02	< 0.01	< 0.01	< 0.01	<0.01	<0.01							
Fluoride	mg/L	2.4	MAC	0.7	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
Sulphate	mg/L	500	AO	255	NV	8	19	10	33	<1	13	12	12	12	15	15	11
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.05	< 0.05	< 0.05	<0.05	0.43	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	4.0	NV	0.13	0.32	0.2	0.09	<0.05	1	0.9	0.8	0.9	1.3	1.2	1.1
Bromide	mg/L	-		-	NV						-	-	-	-	-	< 0.1	-
TKN	mg/L	-		-	NV	2.6	0.6	0.2	2.8	2	<0.1	0.2	0.2	0.1	< 0.1	< 0.1	0.2
Hardness	mg/L	500	OG	361	NV	268	286	291	258	255	218	222	215	213	210	209	245
Aluminum	mg/L	0.1	OG	0.07	0.075	0.03	**0.36**	0.07	0.02	0.02	0.01	<0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Antimony	mg/L	0.006	IMAC	0.002	0.02	0.0001	< 0.0001	< 0.0001	0.0001	<0.0001	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Arsenic	mg/L	0.025	IMAC	0.006	0.005	< 0.0001	0.0001	< 0.0001	<0.0001	<0.0001	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.005
Barium	mg/L	1	MAC	0.3	NV	0.057	0.06	0.068	0.057	0.061	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Beryllium	mg/L	-		-	1.1	< 0.002	< 0.002	< 0.002	<0.0001	<0.0001	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron	mg/L	5	IMAC	1.3	0.2	0.011	0.043	0.014	0.052	0.06	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.000015	< 0.000010	0.000015	0.000039	<0.000015	<0.0001	<0.0001	< 0.0001	< 0.0001	0.0004	< 0.0001	< 0.0001
Calcium	mg/L	-		-	NV	80.8	86.6	88	76.1	73.1	74	75	73	72	71	71	84
Chromium	mg/L	0.05	MAC	0.013	0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	0.0005	0.0006	0.0003	0.0002	0.0007	0.0004	0.0003
Chromium (VI)	mg/L			-		< 0.001	< 0.001	< 0.001	<0.01	<0.01							
Cobalt	mg/L	-		-	0.0009	< 0.005	< 0.005	< 0.005	0.0002	0.0005	<0.0003	<0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003
Copper	mg/L	1	AO	0.5	0.005	0.0016	0.0012	0.0009	0.0008	0.0003	0.001	0.0001	0.0004	0.0005	0.0003	< 0.0001	0.0002
Iron	mg/L	0.3	AO	0.16	0.3	< 0.005	**0.5**	< 0.005	0.008	0.015	0.2	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Lead	mg/L	0.01	MAC	0.003	0.005	0.00003	0.00042	0.00002	<0.00002	<0.00002	<0.001	<0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001
Magnesium	mg/L	-		-	NV	16	16.9	17.3	16.6	17.6	8	8	8	8	8	8	9
Manganese	mg/L	0.05	AO	0.03	NV	0.026	0.037	0.002	0.02	**0.056**	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Mercury	mg/L	0.001	MAC	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002	<0.00002	<0.00002	0.00002	<0.00005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		-	0.04	0.0002	< 0.0001	0.0002	0.0113	0.0002	<0.002	<0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01	< 0.01	0.0011	0.0014	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		-	NV	1.3	2.5	1.1	2.5	2.9	0.8	0.8	0.8	0.8	0.8	0.7	0.8
Phosphorus-Total	mg/L	-		-	0.03	21.7	3.62	1.18	7.44	6.28	<0.01	0.17	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02
Selenium	mg/L	0.01	MAC	0.003	0.1	< 0.001	< 0.001	< 0.001	<0.001	<0.001	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver	mg/L	-		-	0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	105	NV	2.9	3.9	2.8	3.9	4.2	5	5	4	4	4	3	3
Strontium	mg/L	-		-	NV	0.23	0.376	0.247	0.376	0.437	0.123	0.108	0.103	0.103	0.092	0.112	0.113
Thallium	mg/L	-		-	0.0003	< 0.00005	< 0.00005	< 0.00005	<0.00005	<0.00005	<0.0003	<0.0003	< 0.0003	< 0.0003	< 0.0003	0.0004	< 0.0003
Vanadium	mg/L	-		-	0.006	0.0003	0.0015	0.0003	0.0004	0.0005	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Zinc	mg/L	5	AO	2.5	0.02	< 0.005	< 0.005	< 0.005	<0.005	<0.005	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
TSS	mg/L	-	-	-	NV	81500	5870	19700									
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005	< 0.005	< 0.005	< 0.005	<0.005								
BOD(5 day)	mg/L	-	-	-	NV	< 3	< 3	< 3	<3								
Field Temperature	°C	-	AO	-	NV	4.9	13.1	6.2	13.3	13.3	-	-	-	-	-	-	-
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	7.65	7.37	7.91	7.62	7.62	-	-	-	-	-	-	-
Field Conductivity	µS/cm	-		-	NV	562	620	437	482	482	-	-	-	-	-	-	-

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	11-II 12-May-11	11-II 8-Nov-11	11-II 19-Apr-12	11-II 29-Oct-12	11-II 3-Jun-13	11-II 29-Oct-13	11-II 1-May-14	11-II 24-Sep-14	11-II 27-Apr-15	11-II 5-Oct-15	11-II 25-Apr-16	11-II 19-Oct-16
Alkalinity	mg/L	500	OG	349	NV	199	194	200	200	200	192	215	205	202	201	208	191
Conductivity	µS/cm	-		-	NV	419	408	420	410	421	435	515	432	421	432	434	425
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.99	8.08	7.91	7.72	7.9	7.98	8.05	7.95	7.93	8.01	7.99	7.98
TDS	mg/L	500	AO	368	NV	236	223	241	242	239	236	281	234	231	244	240	238
DOC	mg/L	5		3.5	NV	1.1	1	0.9	0.7	2.2	-	2.2	2.1	2	0.7	0.7	1.1
COD	mg/L	-		-	NV	7	11	<4.0	7.8	< 5	< 5	< 5	< 5	< 5	< 5	< 5	38
Phenols	mg/L	-		-	0.001	<0.001	<0.001	<0.0010	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.008
Chloride	mg/L	250	AO	131	NV	4	4	3	3	5	7	16	5	4	4	4	7
Ammonia, total	mg/L	-		-	NV	<0.01	1.2	<0.01	0.07	< 0.01	< 0.005	0.11	< 0.01	0.02	< 0.01	0.03	0.03
Unionized Ammonia	mg/L	-		-	0.02												
Fluoride	mg/L	2.4	MAC	0.7	NV	<0.1	<0.1	<0.10	<0.10	< 0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1
Sulphate	mg/L	500	AO	255	NV	11	10	11	10	11	11	17	11	11	11	10	10
Nitrite (N)	mg/L	1	MAC	0.3	NV	<0.01	<0.01	<0.010	<0.010	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	4.0	NV	1.2	1.2	1.3	1.6	1.5	1.7	0.9	1.5	1.6	2.1	1.8	2.3
Bromide	mg/L	-		-	NV	<1	<1	<1.0	<1.0	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	-
TKN	mg/L	-		-	NV	0.2	0.2	0.26	<0.10	0.09	< 0.1	0.5	0.2	0.3	0.2	0.4	< 0.1
Hardness	mg/L	500	OG	361	NV	210	190	220	220	244	240	175	224	222	248	234	244
Aluminum	mg/L	0.1	OG	0.07	0.075	<0.005	<0.005	<0.0050	<0.0050	0.03	0.03	0.01	0.02	0.02	0.02	0.02	0.02
Antimony	mg/L	0.006	IMAC	0.002	0.02	<0.005	<0.0005	<0.00050	<0.00050	< 0.0001	< 0.0001	0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0004
Arsenic	mg/L	0.025	IMAC	0.006	0.005	<0.001	<0.001	<0.0010	<0.0010	0.0001	< 0.0001	0.0019	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Barium	mg/L	1	MAC	0.3	NV	0.041	0.041	0.04	0.041	0.05	0.05	0.04	0.04	0.04	0.05	0.04	0.05
Beryllium	mg/L	-		-	1.1	<0.005	<0.0005	<0.00050	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	5	IMAC	1.3	0.2	0.01	<0.01	<0.010	0.012	0.011	0.01	0.103	< 0.005	0.007	0.009	< 0.005	0.01
Cadmium	mg/L	0.005	MAC	0.001	0.0005	<0.0001	<0.0001	<0.00010	<0.00010	0.00003	< 0.00002	< 0.00002	< 0.00002	0.00004	< 0.00002	< 0.00002	< 0.00002
Calcium	mg/L	-		-	NV	73	66	75	75	82.7	82.4	42	76.2	75.8	84.9	79.7	83
Chromium	mg/L	0.05	MAC	0.013	0.001	<0.005	<0.005	<0.0050	-	0.0002	0.0066	0.0009	0.0002	0.0014	0.0016	< 0.0002	0.0007
Chromium (VI)	mg/L			-													
Cobalt	mg/L	-		-	0.0009	<0.0005	<0.0005	<0.00050	<0.00050	< 0.0001	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Copper	mg/L	1	AO	0.5	0.005	0.001	<0.001	<0.0010	<0.0010	0.0006	0.0004	0.0008	0.0011	0.001	0.0008	0.0005	0.0006
Iron	mg/L	0.3	AO	0.16	0.3	<0.1	<0.1	<0.10	<0.10	0.1	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Lead	mg/L	0.01	MAC	0.003	0.005	<0.0005	<0.0005	<0.00050	<0.00050	< 0.00002	< 0.00002	0.00003	0.00004	0.00006	< 0.00002	< 0.00002	< 0.00002
Magnesium	mg/L	-		-	NV	7.7	7.1	8.1	8.3	9	8.4	17	8.1	8	8.7	8.5	8.9
Manganese	mg/L	0.05	AO	0.03	NV	<0.002	<0.002	<0.0020	<0.0020	0.02	< 0.001	0	< 0.001	< 0.001	< 0.001	< 0.001	0
Mercury	mg/L	0.001	MAC	0.0003	0.0002	0.00002	0.00002	<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		-	0.04	<0.001	<0.0005	<0.00050	<0.00050	0.0001	< 0.0001	0.001	0.0001	0.0003	< 0.0001	< 0.0001	0.0001
Nickel	mg/L	-		-	0.025	<0.001	<0.001	<0.0010	<0.0010	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		-	NV	0.8	0.7	0.79	0.78	0.9	0.7	5	0.7	0.6	0.8	0.7	0.7
Phosphorus-Total	mg/L	-		-	0.03	0.033	0.03	<0.10	<0.002	0.06	< 0.01	0.07	0.03	0.02	0.03	0.11	0.03
Selenium	mg/L	0.01	MAC	0.003	0.1	<0.002	<0.002	<0.0020	<0.0020	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Silver	mg/L	-		-	0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Sodium	mg/L	200	AO	105	NV	2.8	2.7	2.9	3	3.5	3.3	51.2	3.3	3.7	4.1	3.5	4.3
Strontium	mg/L	-		-	NV	0.12	0.12	0.12	0.12	-	-	-	-	0.14	0.16	0.15	0.15
Thallium	mg/L	-		-	0.0003	<0.00005	<0.00005	<0.000050	<0.000050	< 0.00005	< 0.00005	0.0001	0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		-	0.006	<0.001	<0.0005	0.00059	<0.00050	0.0025	0.002	0.0022	0.0028	0.0016	0.0008	0.001	0.0008
Zinc	mg/L	5	AO	2.5	0.02	0.016	0.005	0.0083	<0.0050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	-	-	9.1	8.8	8.5	8.1	10.8	10.5	8.3	9.1	7.1	10
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	-	-	7.43	6.94	7.78	7.19	8.17	8.05	8.68	7.8	7.77	8.06
Field Conductivity	µS/cm	-		-	NV	-	-	430	450	443	460	590	430	480	330	460	405

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	11-II 12-Apr-17	11-II 5-Oct-17	11-II 10-Apr-18	11-II 1-Oct-18	11-II 22-Apr-19	11-II 8-Oct-19	11-II 13-Apr-20	11-II 14-Oct-20	11-II 21-Apr-21	11-II 18-Oct-21	11-II 20-Apr-22	11-II 12-Oct-22
Alkalinity	mg/L	500	OG	349	NV	202	194	189	192	188	186	186	188	199	203	194	196
Conductivity	µS/cm	-		-	NV	431	426	410	407	415	406	425	413	423	398	440	422
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.95	7.97	8.09	7.92	8.02	7.93	7.94	7.9	8.05	7.81	7.52	7.86
TDS	mg/L	500	AO	368	NV	235	215	215	210	219	203	211	219	221	228	222	224
DOC	mg/L	5		3.5	NV	1.7	1.5	2	1.4	1.4	2.3	0.9	2.1	3	2.6	1.6	2.5
COD	mg/L	-		-	NV	< 5	< 5	< 5	< 5	< 5	6	< 5	5	11	6	< 5	< 5
Phenols	mg/L	-		-	0.001	< 0.001	0.004	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001
Chloride	mg/L	250	AO	131	NV	6	5	4.3	4.7	5.4	1.1	4.2	4.4	4.4	5.1	4.9	5.7
Ammonia, total	mg/L	-		-	NV	< 0.01	< 0.01	0.02	0.02	0.01	0.06	< 0.01	0.01	0.02	0.07	1.22	< 0.01
Unionized Ammonia	mg/L	-		-	0.02					< 0.01	< 0.01	< 0.01	< 0.01		< 0.01	0.01	< 0.01
Fluoride	mg/L	2.4	MAC	0.7	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
Sulphate	mg/L	500	AO	255	NV	10	8	9	10	10	6	10	9	10	11	10	8
Nitrite (N)	mg/L	1	MAC	0.3	NV	0.2	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	10	MAC	4.0	NV	1.7	2.6	2.39	2.19	2.02	2.44	1.92	2	2.06	2.48	2.15	2.35
Bromide	mg/L	-		-	NV												
TKN	mg/L	-		-	NV	0.2	0.2	0.2	0.2	0.2	0.5	0.3	0.3	0.2	0.2	1.4	0.2
Hardness	mg/L	500	OG	361	NV	225	213	223	202	228	212	216	234	220	230	227	234
Aluminum	mg/L	0.1	OG	0.07	0.075	0.05	0.07	0.08	0.1	**0.14**	0.06	0.05	0.04	0.05	0.06	0.02	0.04
Antimony	mg/L	0.006	IMAC	0.002	0.02	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.006	0.005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Barium	mg/L	1	MAC	0.3	NV	0.07	0.05	0.042	0.04	0.04	0.04	0.041	0.045	0.041	0.046	0.048	0.045
Beryllium	mg/L	-		-	1.1	< 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	mg/L	5	IMAC	1.3	0.2	0.012	0.011	0.01	0.007	0.009	0.005	0.008	0.011	0.008	0.01	0.005	0.008
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000010
Calcium	mg/L	-		-	NV	75.5	71.8	75.6	68.1	77.5	71.9	73.2	79.6	74.5	78.7	76.6	79.8
Chromium	mg/L	0.05	MAC	0.013	0.001	0.0015	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001
Chromium (VI)	mg/L			-												< 0.001	< 0.001
Cobalt	mg/L	-		-	0.0009	< 0.005	< 0.005	< 0.005	0.007	< 0.005	< 0.005	< 0.0001	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Copper	mg/L	1	AO	0.5	0.005	0.0002	0.0002	0.0005	0.0016	0.0012	0.0005	0.0012	0.0009	0.0016	0.0009	0.0007	0.0013
Iron	mg/L	0.3	AO	0.16	0.3	< 0.005	< 0.005	0.008	0.169	0.105	< 0.005	< 0.005	0.023	< 0.005	0.02	< 0.005	0.019
Lead	mg/L	0.01	MAC	0.003	0.005	< 0.00002	< 0.00002	< 0.00002	0.00026	0.00018	< 0.00002	0.00002	0.00005	0.00006	0.00003	< 0.00002	0.00006
Magnesium	mg/L	-		-	NV	8.8	8.2	8.21	7.63	8.24	7.87	8.07	8.53	8.25	8.12	8.54	8.32
Manganese	mg/L	0.05	AO	0.03	NV	< 0.001	< 0.001	< 0.001	0.027	0.022	< 0.001	< 0.001	0.005	< 0.001	0.003	< 0.001	0.005
Mercury	mg/L	0.001	MAC	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	mg/L	-		-	0.04	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001	0.0001	0.0001	< 0.0001	0.0001	0.0002
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		-	NV	0.7	0.7	0.6	0.7	0.7	0.7	0.7	0.8	0.7	0.8	0.8	0.7
Phosphorus-Total	mg/L	-		-	0.03	0.09	0.06	0.05	0.12	0.04	0.36	0.02	0.06	0.08	0.07	0.03	0.12
Selenium	mg/L	0.01	MAC	0.003	0.1	< 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	mg/L	-		-	0.0001	< 0.00002	< 0.00002	0.00003	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	105	NV	4.4	4.1	4.2	3.8	3.6	3.5	3.2	3.3	3.3	3.3	3.1	3.2
Strontium	mg/L	-		-	NV	0.13	0.13	0.128	0.117	0.131	0.129	0.13	0.128	0.133	0.134	0.137	0.133
Thallium	mg/L	-		-	0.0003	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.005
Vanadium	mg/L	-		-	0.006	0.0011	0.0011	0.0003	0.0006	0.0005	0.0003	0.0003	0.0004	0.0003	0.0003	0.0003	0.0004
Zinc	mg/L	5	AO	2.5	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	6.2	9.4			7.7	9.5	7.1	9.1	6.9	9.4	7.3	11.1
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	7.85	7.89	8.09	7.92	7.82	7.86	7.73	8.13	7.19	7.94	7.77	7.93
Field Conductivity	µS/cm	-		-	NV	330	375	411	394	690	340	680	390	560	476	423	455

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	11-II 19-Apr-23	11-II 12-Oct-23
Alkalinity	mg/L	500	OG	349	NV	202	210
Conductivity	µS/cm	-		-	NV	428	442
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.9	7.3
TDS	mg/L	500	AO	368	NV	229	228
DOC	mg/L	5		3.5	NV	1.3	4.3
COD	mg/L	-		-	NV	< 5	5
Phenols	mg/L	-		-	0.001	< 0.001	<0.001
Chloride	mg/L	250	AO	131	NV	5.7	7.8
Ammonia, total	mg/L	-		-	NV	0.52	<0.05
Unionized Ammonia	mg/L	-		-	0.02	< 0.01	<0.01
Fluoride	mg/L	2.4	MAC	0.7	NV	< 0.1	<0.1
Sulphate	mg/L	500	AO	255	NV	9	9
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.05	<0.05
Nitrate (N)	mg/L	10	MAC	4.0	NV	1.71	2.09
Bromide	mg/L	-		-	NV		
TKN	mg/L	-		-	NV	0.8	<0.1
Hardness	mg/L	500	OG	361	NV	236	222
Aluminum	mg/L	0.1	OG	0.07	0.075	0.05	0.02
Antimony	mg/L	0.006	IMAC	0.002	0.02	< 0.0001	<0.0001
Arsenic	mg/L	0.025	IMAC	0.006	0.005	< 0.0001	<0.0001
Barium	mg/L	1	MAC	0.3	NV	0.047	0.044
Beryllium	mg/L	-		-	1.1	< 0.002	<0.0001
Boron	mg/L	5	IMAC	1.3	0.2	< 0.005	0.011
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.000010	<0.000015
Calcium	mg/L	-		-	NV	79.4	75.3
Chromium	mg/L	0.05	MAC	0.013	0.001	< 0.001	<0.001
Chromium (VI)	mg/L			-		< 0.001	<0.01
Cobalt	mg/L	-		-	0.0009	< 0.005	0.0002
Copper	mg/L	1	AO	0.5	0.005	0.0012	0.0008
Iron	mg/L	0.3	AO	0.16	0.3	< 0.005	<0.005
Lead	mg/L	0.01	MAC	0.003	0.005	< 0.00002	0.00002
Magnesium	mg/L	-		-	NV	9.02	8.2
Manganese	mg/L	0.05	AO	0.03	NV	< 0.001	<0.001
Mercury	mg/L	0.001	MAC	0.0003	0.0002	< 0.00002	<0.00002
Molybdenum	mg/L	-		-	0.04	0.0001	<0.0001
Nickel	mg/L	-		-	0.025	< 0.01	<0.0002
Potassium	mg/L	-		-	NV	0.6	0.8
Phosphorus-Total	mg/L	-		-	0.03	< 0.01	0.03
Selenium	mg/L	0.01	MAC	0.003	0.1	< 0.001	<0.001
Silver	mg/L	-		-	0.0001	< 0.0001	<0.0001
Sodium	mg/L	200	AO	105	NV	3	3.4
Strontium	mg/L	-		-	NV	0.134	0.137
Thallium	mg/L	-		-	0.0003	< 0.00005	<0.00005
Vanadium	mg/L	-		-	0.006	0.0003	0.0004
Zinc	mg/L	5	AO	2.5	0.02	< 0.005	<0.005
TSS	mg/L	-	-	-	NV		
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005		
BOD(5 day)	mg/L	-	-	-	NV		
Field Temperature	°C	-	AO	-	NV	7.7	9.8
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	7.16	7.6
Field Conductivity	µS/cm	-		-	NV	389	392

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ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	12-I 13-May-08	12-I 16-Aug-08	12-I 5-Jun-09	12-I 4-Aug-09	12-I 6-Oct-09	12-I 10-Jun-10	12-I 12-Oct-10	12-I 12-May-11	12-I 8-Nov-11	12-I 19-Apr-12	12-I 29-Oct-12	12-I 3-Jun-13
Alkalinity	mg/L	500	OG	NV	216	218	204	209	205	210	215	206	213	220	210	213
Conductivity	µS/cm	-		NV	415	422	396	409	410	377	373	424	436	420	440	437
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.24	7.6	7.72	7.75	7.77	7.86	7.8	7.97	8.03	7.95	7.75	7.86
TDS	mg/L	500	AO	NV	270	274	257	266	267	245	242	241	241	246	251	245
DOC	mg/L	5		NV	1	1.5	< 2	1	1	1	< 1	1.1	1	1	0.8	2.8
COD	mg/L	-		NV	3	4	1	< 2	7	7	2	8	12	10	9.5	16
Phenols	mg/L	-		0.001	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	<0.0010	<0.0010	< 0.001
Chloride	mg/L	250	AO	NV	7	5	4	5	5	5	4	5	4	4	3	5
Ammonia, total	mg/L	-		NV	<0.1	<0.1	< 0.01	0.01	< 0.01	0.03	< 0.05	<0.01	1.2	0.05	0.05	< 0.01
Unionized Ammonia	mg/L	-		0.02												
Fluoride	mg/L	2.4	MAC	NV	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	<0.1	<0.10	<0.10	< 0.1
Sulphate	mg/L	500	AO	NV	15	10	10	10	15	12	11	11	11	10	12	10
Nitrite (N)	mg/L	1	MAC	NV	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.01	<0.01	<0.010	<0.010	< 0.1
Nitrate (N)	mg/L	10	MAC	NV	0.4	0.6	0.4	0.7	1	0.8	1	0.8	1.2	0.9	1.6	0.8
Bromide	mg/L	-		NV	-	-	-	-	-	< 0.1	-	<1	<1	<1.0	<1.0	< 0.4
TKN	mg/L	-		NV	<0.1	0.1	0.2	0.2	< 0.1	0.1	0.1	0.2	0.2	0.55	<0.20	0.17
Hardness	mg/L	500	OG	NV	225	234	220	224	223	214	262	220	210	220	230	251
Aluminum	mg/L	0.1	OG	0.075	**0.236**	<0.01	< 0.01	< 0.01	0.01	< 0.01	0.02	<0.005	<0.005	<0.0050	<0.0050	0.03
Antimony	mg/L	0.006	IMAC	0.02	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	<0.0005	<0.00050	<0.00050	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.005	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.005	<0.001	<0.001	<0.0010	<0.0010	0.0001
Barium	mg/L	1	MAC	NV	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.039	0.045	0.041	0.044	0.05
Beryllium	mg/L	-		1.1	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.005	<0.0005	<0.00050	<0.00050	< 0.002
Boron	mg/L	5	IMAC	0.2	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.01	<0.01	<0.010	<0.010	0.009
Cadmium	mg/L	0.005	MAC	0.0005	<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	0.00013
Calcium	mg/L	-		NV	76	79	75	75	76	73	90	75	70	74	77	85.1
Chromium	mg/L	0.05	MAC	0.001	0.0011	0.0003	0.0002	0.0003	0.0008	0.0003	0.0004	<0.005	<0.005	<0.0050	-	< 0.0002
Chromium (VI)	mg/L	-														
Cobalt	mg/L	-		0.0009	<0.0003	<0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	<0.0005	<0.0005	<0.00050	<0.00050	< 0.0001
Copper	mg/L	1	AO	0.005	0.0033	0.0012	0.0004	0.0002	0.0005	0.0004	0.0023	0.001	<0.001	0.0012	<0.0010	0.0011
Iron	mg/L	0.3	AO	0.3	0.1	<0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	<0.1	<0.1	<0.10	<0.10	< 0.005
Lead	mg/L	0.01	MAC	0.005	0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.0005	<0.0005	<0.00050	<0.00050	0.00402
Magnesium	mg/L	-		NV	9	9	8	9	8	8	9	8.1	7.8	8.6	9	9.3
Manganese	mg/L	0.05	AO	NV	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.002	<0.002	<0.0020	<0.0020	< 0.001
Mercury	mg/L	0.001	MAC	0.0002	<0.00002	<0.00005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00002	0.00002	<0.00001	<0.00001	< 0.00002
Molybdenum	mg/L	-		0.04	<0.002	<0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.001	<0.0005	<0.00050	<0.00050	0.0002
Nickel	mg/L	-		0.025	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.001	<0.001	<0.0010	<0.0010	< 0.01
Potassium	mg/L	-		NV	0.9	1.1	0.9	1.1	1	0.8	0.9	0.75	0.9	0.83	0.92	0.8
Phosphorus-Total	mg/L	-		0.03	<0.01	0.2	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	0.087	0.21	<0.10	0.87	0.14
Selenium	mg/L	0.01	MAC	0.1	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.002	<0.002	<0.0020	<0.0020	< 0.001
Silver	mg/L	-		0.0001	<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002
Sodium	mg/L	200	AO	NV	5	5	4	4	4	3	3	2.9	2.7	2.9	3	3.4
Strontium	mg/L	-		NV	0.1222	0.111	0.108	0.113	0.097	0.119	0.112	0.12	0.12	0.13	0.13	-
Thallium	mg/L	-		0.0003	<0.0003	<0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	<0.00005	<0.00005	<0.000050	<0.000050	< 0.00005
Vanadium	mg/L	-		0.006	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.0005	<0.00050	<0.00050	0.0025
Zinc	mg/L	5	AO	0.02	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.006	0.015	0.04	<0.0050	< 0.005
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	-	-	-	-	-	-	-	-	-	7.5	9.6	10.2
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	-	-	-	-	-	-	-	-	-	7.3	7.87	7.97
Field Conductivity	µS/cm	-		NV	-	-	-	-	-	-	-	-	-	444	470	456

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Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	12-I 29-Oct-13	12-I 1-May-14	12-I 24-Sep-14	12-I 27-Apr-15	12-I 5-Oct-15	12-I 25-Apr-16	12-I 19-Oct-16	12-I 12-Apr-17	12-I 5-Oct-17	12-I 10-Apr-18	12-I 2-Oct-18	12-I 22-Apr-19
Alkalinity	mg/L	500	OG	NV	209	206	208	207	216	208	204	204	206	203	175	162
Conductivity	µS/cm	-		NV	454	436	451	427	450	440	442	432	449	417	409	391
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.92	7.96	8.03	7.94	7.95	7.98	7.97	7.96	7.91	8.05	8.04	8
TDS	mg/L	500	AO	NV	248	237	240	233	252	239	252	236	226	227	212	194
DOC	mg/L	5		NV	-	2.2	2.7	2.2	0.8	0.8	1.2	1.7	1.7	2	1.9	1.4
COD	mg/L	-		NV	33	< 5	< 5	< 5	< 5	< 5	< 5	29	< 5	24	159	57
Phenols	mg/L	-		0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.007	0.002	< 0.001	0.014	< 0.002
Chloride	mg/L	250	AO	NV	6	6	4	4	4	5	6	7	5	4.6	4.5	3.8
Ammonia, total	mg/L	-		NV	0.01	< 0.01	0.05	0.04	0.04	0.04	0.23	0.02	< 0.01	0.14	0.13	0.05
Unionized Ammonia	mg/L	-		0.02												< 0.01
Fluoride	mg/L	2.4	MAC	NV	0.1	0.1	0.2	0.1	0.1	0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sulphate	mg/L	500	AO	NV	11	13	10	10	10	11	10	10	9	9	15	9
Nitrite (N)	mg/L	1	MAC	NV	0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2	0.2	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	10	MAC	NV	1.1	1.1	1.5	1.2	1.5	1.3	2.1	1.3	2.1	1.95	2.47	1.76
Bromide	mg/L	-		NV	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	-					
TKN	mg/L	-		NV	0.5	0.2	0.1	0.3	0.4	0.2	0.3	0.4	0.2	0.3	1.7	0.8
Hardness	mg/L	500	OG	NV	255	228	237	227	256	236	261	227	224	231	208	209
Aluminum	mg/L	0.1	OG	0.075	0.04	0.02	0.02	0.02	0.02	0.02	0.03	0.05	0.06	0.06	0.04	0.05
Antimony	mg/L	0.006	IMAC	0.02	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	0.0003	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.005	< 0.0001	< 0.0001	0.0021	0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Barium	mg/L	1	MAC	NV	0.05	0.04	0.05	0.04	0.05	0.04	0.05	0.07	0.05	0.04	0.045	0.035
Beryllium	mg/L	-		1.1	< 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	mg/L	5	IMAC	0.2	0.01	< 0.005	0.01	0.008	0.009	< 0.005	0.01	0.011	0.011	0.007	0.008	0.009
Cadmium	mg/L	0.005	MAC	0.0005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015
Calcium	mg/L	-		NV	87	77	80.7	77.2	87.5	79.9	88.7	75.9	75.2	78.4	69.9	71.2
Chromium	mg/L	0.05	MAC	0.001	0.0042	< 0.0002	0.001	0.0012	0.0021	< 0.0002	0.001	0.0014	< 0.001	< 0.001	0.001	< 0.001
Chromium (VI)	mg/L	-														
Cobalt	mg/L	-		0.0009	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.005	< 0.005	< 0.005
Copper	mg/L	1	AO	0.005	0.0005	0.0016	0.0007	0.0014	0.001	0.0039	0.0006	0.0005	0.0005	0.0005	0.0009	0.0013
Iron	mg/L	0.3	AO	0.3	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.02	< 0.005	< 0.005	0.007	< 0.005	< 0.005
Lead	mg/L	0.01	MAC	0.005	< 0.00002	0.00004	< 0.00002	0.00004	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Magnesium	mg/L	-		NV	9.1	8.6	8.6	8.3	9.1	8.8	9.5	9.1	8.8	8.48	8	7.61
Manganese	mg/L	0.05	AO	NV	0	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.01	< 0.001	< 0.001	< 0.001	0.001	< 0.001
Mercury	mg/L	0.001	MAC	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	mg/L	-		0.04	< 0.0001	0.0002	0.0001	0.0003	0.0001	< 0.0001	0.0001	0.0001	0.0001	< 0.0001	0.0015	0.0003
Nickel	mg/L	-		0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		NV	1.2	0.8	0.9	0.6	0.9	0.7	0.9	0.6	0.9	0.5	1	0.7
Phosphorus-Total	mg/L	-		0.03	0.11	0.04	0.01	0.06	0.99	0.44	0.14	0.59	0.14	0.62	7.8	3.7
Selenium	mg/L	0.01	MAC	0.1	< 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	mg/L	-		0.0001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	NV	3.1	3.3	3.4	3.5	3.9	3.6	3.9	3.8	3.9	3.9	7.4	3.7
Strontium	mg/L	-		NV	-	-	0.15	0.14	0.16	0.14	0.16	0.13	0.14	0.123	0.122	0.117
Thallium	mg/L	-		0.0003	< 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	mg/L	-		0.006	0.0014	0.0025	0.005	0.0016	0.001	0.0009	0.001	0.001	0.0014	0.0002	0.0003	0.0002
Zinc	mg/L	5	AO	0.02	< 0.005	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	0.18	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	10	7.4	15.3	7.4	11.9	4.9	12.8	6.2	11.7			7.6
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	7.91	8.25	8	8.12	8.03	8.19	7.9	7.85	7.8	8.05	8.04	7.84
Field Conductivity	µS/cm	-		NV	490	510	480	480	420	350	405	330	390	430	401	460

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	12-I 8-Oct-19	12-I 13-Apr-20	12-I 14-Oct-20	12-I 21-Apr-21	12-I 18-Oct-21	12-I 20-Apr-22	12-I 12-Oct-22	12-I 19-Apr-23	DUP 12-I 19-Apr-23	12-I 12-Oct-23	DUP 12-I 12-Oct-23	13-II 6-May-08
Alkalinity	mg/L	500	OG	NV	192	182	199	208	216	202	206	201	199	223	220	394
Conductivity	µS/cm	-		NV	412	412	427	435	419	440	441	430	435	447	441	844
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.93	7.94	7.86	7.94	7.8	7.47	7.87	7.84	8	7.3	7.45	6.83
TDS	mg/L	500	AO	NV	209	205	228	230	240	229	238	228	226	231	228	**549**
DOC	mg/L	5		NV	2.4	1.3	1.9	3.3	2.5	2	1	0.4	1.7	3.2	3.3	**11**
COD	mg/L	-		NV	8	9	34	9	10	17	48	6	< 5	5	6	19
Phenols	mg/L	-		0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	0.001
Chloride	mg/L	250	AO	NV	0.9	4.3	4.4	4.7	5.4	4.9	6.5	5.7	5.5	6.9	6.9	49
Ammonia, total	mg/L	-		NV	0.08	< 0.01	0.02	0.03	0.06	1.74	< 0.01	0.26	0.04	<0.05	0.06	0.9
Unionized Ammonia	mg/L	-		0.02	< 0.01	< 0.01	< 0.01		< 0.01	0.03	< 0.01	< 0.01	< 0.01	<0.01	<0.01	
Fluoride	mg/L	2.4	MAC	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
Sulphate	mg/L	500	AO	NV	7	9	9	10	11	10	11	16	11	9	9	35
Nitrite (N)	mg/L	1	MAC	NV	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.05	<0.05	<0.1
Nitrate (N)	mg/L	10	MAC	NV	2.3	1.62	1.75	1.37	2.12	2.01	2.17	0.93	1.5	1.68	1.7	<0.1
Bromide	mg/L	-		NV												-
TKN	mg/L	-		NV	0.7	0.2	0.4	0.2	0.7	2	0.4	0.3	0.2	0.1	0.2	1.6
Hardness	mg/L	500	OG	NV	217	209	241	230	238	231	247	238	237	233	237	430
Aluminum	mg/L	0.1	OG	0.075	0.06	0.05	0.03	0.05	0.05	0.02	0.02	0.04	0.04	0.02	0.02	<0.01
Antimony	mg/L	0.006	IMAC	0.02	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.01
Arsenic	mg/L	0.025	IMAC	0.005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.01
Barium	mg/L	1	MAC	NV	0.04	0.036	0.046	0.042	0.048	0.043	0.051	0.044	0.044	0.046	0.047	0.2
Beryllium	mg/L	-		1.1	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	<0.0001	<0.1
Boron	mg/L	5	IMAC	0.2	0.005	0.007	0.009	0.008	0.009	< 0.005	0.005	0.005	0.008	0.011	0.011	0.1
Cadmium	mg/L	0.005	MAC	0.0005	< 0.000015	< 0.000015	< 0.000015	< 0.000059	< 0.000015	< 0.000015	< 0.000010	< 0.000010	< 0.000010	<0.000015	<0.000015	<0.0001
Calcium	mg/L	-		NV	73	70.5	81.8	77.9	81	77.7	84.1	80.1	79.9	78.8	79.8	126
Chromium	mg/L	0.05	MAC	0.001	< 0.001	< 0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	0.0002
Chromium (VI)	mg/L	-								< 0.001	< 0.001	< 0.001	< 0.001	<0.01	<0.01	
Cobalt	mg/L	-		0.0009	< 0.005	< 0.0001	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.0002	0.0002	<0.0003
Copper	mg/L	1	AO	0.005	0.0005	0.0015	0.0009	0.0018	0.0009	0.0011	0.0008	0.0007	0.0005	0.0009	0.0006	0.0003
Iron	mg/L	0.3	AO	0.3	< 0.005	< 0.005	< 0.005	0.015	0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	<0.005	**1.4**
Lead	mg/L	0.01	MAC	0.005	< 0.00002	0.00003	< 0.00002	0.00026	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00003	<0.00002	<0.001
Magnesium	mg/L	-		NV	8.32	8.03	8.91	8.62	8.59	8.86	9	9.21	9.08	8.85	9.05	28
Manganese	mg/L	0.05	AO	NV	< 0.001	< 0.001	< 0.001	0.003	0.016	< 0.001	< 0.001	< 0.001	< 0.001	0.001	0.001	**0.06**
Mercury	mg/L	0.001	MAC	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002	<0.00002	0.00003
Molybdenum	mg/L	-		0.04	0.0001	< 0.0001	0.0001	< 0.0004	0.0001	0.0001	0.0001	0.0001	< 0.0001	0.0001	0.0001	<0.002
Nickel	mg/L	-		0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.0002	<0.0002	<0.01
Potassium	mg/L	-		NV	0.8	0.7	1	0.8	1	0.9	0.9	0.7	0.7	0.9	1	4.4
Phosphorus-Total	mg/L	-		0.03	2.29	0.32	0.53	0.25	0.41	0.32	0.54	0.04	0.03	0.12	0.13	0.04
Selenium	mg/L	0.01	MAC	0.1	< 0.001	< 0.001	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	<0.01
Silver	mg/L	-		0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.0001
Sodium	mg/L	200	AO	NV	3.4	3.2	3	3.3	3.2	3	3.1	2.9	3	3.2	3.3	23
Strontium	mg/L	-		NV	0.13	0.121	0.129	0.135	0.135	0.134	0.139	0.132	0.131	0.141	0.147	0.312
Thallium	mg/L	-		0.0003	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.005	< 0.00005	< 0.00005	<0.00005	<0.00005	<0.0003
Vanadium	mg/L	-		0.006	0.0004	0.0002	0.0004	< 0.0007	0.0003	0.0003	0.0003	0.0003	0.0003	0.0004	0.0004	<0.001
Zinc	mg/L	5	AO	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	<0.005	<0.01
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	12.1	5.7	12.3	5.6	11	5.6	13.4	7.4	7.4	12.7	12.7	-
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	7.71	7.53	7.9	7.98	8.23	8.05	7.86	7.97	7.97	7.92	7.92	-
Field Conductivity	µS/cm	-		NV	350	452	400	402	462	412	546	523	523	509	509	-

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	13-II 18-Aug-08	13-II 25-May-09	13-II 4-Aug-09	13-II 10-Jun-10	13-II 12-Oct-10	13-II 12-May-11	13-II 8-Nov-11	13-II 19-Apr-12	13-II 29-Oct-12	13-II 3-Jun-13	13-II 29-Oct-13	13-II 1-May-14
Alkalinity	mg/L	500	OG	NV	379	245	321	435	**545**	473	**774**	**790**	**970**	**997**	**1020**	**1060**
Conductivity	µS/cm	-		NV	826	511	692	967	1130	1140	2130	2100	2800	2860	3130	3110
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.37	7.62	7.53	7.59	7.25	7.63	7.43	7.44	7.26	6.86	6.82	6.87
TDS	mg/L	500	AO	NV	**537**	332	450	**629**	**735**	**662**	**1210**	**1240**	**1670**	**1770**	**1920**	**1950**
DOC	mg/L	5		NV	**10.5**	4	**7**	**10**	**17**	**13.3**	**35**	**31**	**48**	**53.9**	-	**64.2**
COD	mg/L	-		NV	26	11	18	38	50	64	150	140	130	276	234	287
Phenols	mg/L	-		0.001	0.001	< 0.001	< 0.001	0.001	< 0.001	<0.001	0.004	<0.0010	<0.0010	< 0.001	< 0.001	< 0.001
Chloride	mg/L	250	AO	NV	44	14	35	83	111	96	210	200	**280**	**290**	**359**	**345**
Ammonia, total	mg/L	-		NV	1.8	0.8	1.4	3.78	4	2.7	<0.1	9.8	5.8	12.7	6.25	19.3
Unionized Ammonia	mg/L	-		0.02												
Fluoride	mg/L	2.4	MAC	NV	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	<0.1	<0.10	<0.10	0.4	0.2	< 0.1
Sulphate	mg/L	500	AO	NV	31	29	30	30	22	28	70	82	150	176	208	217
Nitrite (N)	mg/L	1	MAC	NV	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.04	0.02	<0.010	<0.010	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	NV	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	<0.1	<0.10	<0.10	< 0.1	< 0.1	< 0.1
Bromide	mg/L	-		NV	-	< 0.1	-	0.2	-	<1	<1	1.1	1.1	1.9	1.8	1.6
TKN	mg/L	-		NV	2.2	1.3	1.8	4.5	5	5	12	13	6.7	20.2	12.2	28.4
Hardness	mg/L	500	OG	NV	403	278	347	**521**	**712**	**520**	**880**	**910**	**1200**	**1300**	**1370**	**1290**
Aluminum	mg/L	0.1	OG	0.075	0.02	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	0.006	0.0055	0.014	0.1	0.08	0.06
Antimony	mg/L	0.006	IMAC	0.02	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	<0.0005	<0.00050	0.00056	0.0003	0.0003	0.0003
Arsenic	mg/L	0.025	IMAC	0.005	<0.01	< 0.01	< 0.01	< 0.005	< 0.005	<0.001	0.001	<0.0010	<0.0010	0.0029	0.0031	0.0026
Barium	mg/L	1	MAC	NV	0.2	0.1	0.2	0.3	0.4	0.35	0.77	0.75	0.82	0.83	0.62	0.43
Beryllium	mg/L	-		1.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.005	<0.0005	<0.00050	<0.00050	< 0.002	< 0.002	< 0.002
Boron	mg/L	5	IMAC	0.2	<0.1	< 0.1	< 0.1	0.1	< 0.1	0.08	0.17	0.13	0.26	0.264	0.401	0.303
Cadmium	mg/L	0.005	MAC	0.0005	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002
Calcium	mg/L	-		NV	118	80	101	141	213	160	270	270	360	397	415	393
Chromium	mg/L	0.05	MAC	0.001	0.0002	0.0005	0.0002	< 0.0001	0.0005	<0.005	<0.03	<0.0050	-	0.0061	0.0429	0.0022
Chromium (VI)	mg/L	-														
Cobalt	mg/L	-		0.0009	<0.0003	< 0.0003	< 0.0003	< 0.0003	0.0004	<0.0005	0.0005	0.00073	0.0013	0.0009	< 0.005	< 0.005
Copper	mg/L	1	AO	0.005	0.0016	< 0.0001	< 0.0001	< 0.0001	0.0015	<0.001	<0.001	<0.0010	<0.0010	0.0011	0.0013	0.002
Iron	mg/L	0.3	AO	0.3	**1.56**	**0.8**	**1.6**	0.2	**3**	**3.1**	**6.5**	**7.2**	**13**	**14.7**	**19.8**	**16.5**
Lead	mg/L	0.01	MAC	0.005	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.0005	<0.0005	<0.00050	<0.00050	0.00002	< 0.00002	0.00003
Magnesium	mg/L	-		NV	26	19	23	41	44	32	52	57	76	75.5	82	74.7
Manganese	mg/L	0.05	AO	NV	**0.07**	0.04	**0.07**	**0.07**	**0.12**	**0.11**	**0.25**	**0.24**	**0.24**	**0.32**	**0.25**	**0.35**
Mercury	mg/L	0.001	MAC	0.0002	<0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00001	-	<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		0.04	<0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.001	<0.0005	<0.00050	<0.00050	< 0.0001	< 0.0001	< 0.0001
Nickel	mg/L	-		0.025	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.002	0.005	0.0046	0.0072	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		NV	4.3	2.5	3.9	6.4	7.2	5.1	13	12	11	18.5	10.8	22
Phosphorus-Total	mg/L	-		0.03	0.02	0.04	0.06	0.05	0.05	22	24	<0.10	2.1	14.4	2.63	3.78
Selenium	mg/L	0.01	MAC	0.1	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.002	<0.002	<0.0020	<0.0020	< 0.001	0	< 0.001
Silver	mg/L	-		0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002
Sodium	mg/L	200	AO	NV	21	11	18	30	43	34	91	95	160	187	**220**	**220**
Strontium	mg/L	-		NV	0.294	0.179	0.267	0.359	0.388	0.39	0.74	0.75	0.94	-	-	-
Thallium	mg/L	-		0.0003	<0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	<0.00005	<0.00005	<0.000050	<0.000050	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		0.006	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	0.0014	0.00078	0.0021	0.0143	0.0127	0.0144
Zinc	mg/L	5	AO	0.02	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.011	<0.005	0.0052	<0.0050	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	-	-	-	-	-	-	-	8.9	7.3	8.5	7.6	8.8
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	-	-	-	-	-	-	-	6.49	7.76	6.63	6.39	7.21
Field Conductivity	µS/cm	-		NV	-	-	-	-	-	-	-	2250	2300	3020	3100	3300

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	13-II 24-Sep-14	13-II 27-Apr-15	13-II 6-Oct-15	13-II 25-Apr-16	13-II 20-Oct-16	13-II 12-Apr-17	13-II 5-Oct-17	13-II 11-Apr-18	13-II 2-Oct-18	13-II 23-Apr-19	13-II 9-Oct-19	13-II 13-Apr-20
Alkalinity	mg/L	500	OG	NV	**1130**	**1100**	**1190**	**1290**	**1280**	**1390**	**1380**	**1330**	**1260**	**1180**	**1350**	**1250**
Conductivity	µS/cm	-		NV	3480	3230	3570	3520	3540	3690	3680	3550	3660	3550	3710	3830
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	6.92	6.82	7.02	7.06	6.83	7.05	6.81	7.26	7.15	7.27	7.14	7.28
TDS	mg/L	500	AO	NV	**2130**	**2070**	**2360**	**2270**	**2360**	**2310**	**2282**	**2241**	**2277**	**2288**	**2446**	**2203**
DOC	mg/L	5		NV	**24.5**	**18.2**	**20.1**	**23.5**	**21.6**	**61.3**	**69.3**	**70.4**	**24**	**28**	**80.3**	**26.1**
COD	mg/L	-		NV	258	281	251	241	246	300	376	275	276	308	260	260
Phenols	mg/L	-		0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.022	0.023	0.019	< 0.001	0.012	< 0.002	< 0.002	< 0.002
Chloride	mg/L	250	AO	NV	**349**	**346**	**362**	**339**	**317**	**340**	**296**	**284**	**336**	**391**	**428**	**302**
Ammonia, total	mg/L	-		NV	12.5	16.8	15.7	27.7	3.5	42.4	56.7	59.2	60	56.4	92.5	106
Unionized Ammonia	mg/L	-		0.02										0.02	0.11	0.09
Fluoride	mg/L	2.4	MAC	NV	< 0.1	0.1	< 0.5	**5.1**	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1
Sulphate	mg/L	500	AO	NV	288	278	385	300	338	297	233	232	293	340	271	238
Nitrite (N)	mg/L	1	MAC	NV	< 0.1	< 0.1	< 0.5	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nitrate (N)	mg/L	10	MAC	NV	< 0.1	< 0.1	< 0.5	1	< 0.5	1.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromide	mg/L	-		NV	2	1.8	< 2	< 4	-							
TKN	mg/L	-		NV	12.5	20.5	26.2	386	46.4	53.9	70.9	70.7	72.1	62	106	131
Hardness	mg/L	500	OG	NV	**1330**	**1300**	**1410**	**1300**	**1420**	**1260**	**1220**	**1260**	**1170**	**1170**	**1110**	**1050**
Aluminum	mg/L	0.1	OG	0.075	0.07	0.07	0.08	0.07	**0.11**	**0.26**	**0.16**	**0.15**	0.1	**0.14**	**0.14**	**0.12**
Antimony	mg/L	0.006	IMAC	0.02	0.0006	0.0004	0.0005	0.0004	0.0006	0.0004	0.0005	0.0003	0.0005	0.0004	< 0.0002	0.0003
Arsenic	mg/L	0.025	IMAC	0.005	0.0028	0.0019	0.0032	0.0017	0.0014	0.0034	0.0028	0.0014	0.0023	0.0019	0.0009	0.0008
Barium	mg/L	1	MAC	NV	0.36	0.25	0.22	0.2	0.22	0.44	0.31	0.265	0.278	0.269	0.281	0.299
Beryllium	mg/L	-		1.1	< 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	mg/L	5	IMAC	0.2	0.434	0.445	0.632	0.568	0.966	0.884	1.24	1.03	1.17	1.1	1.39	1.24
Cadmium	mg/L	0.005	MAC	0.0005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00012	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000059	< 0.000059
Calcium	mg/L	-		NV	402	395	428	392	430	386	370	381	354	353	335	319
Chromium	mg/L	0.05	MAC	0.001	0.0035	0.003	0.0254	< 0.0002	0.0031	0.0148	< 0.001	0.002	0.003	0.002	0.002	0.002
Chromium (VI)	mg/L	-														
Cobalt	mg/L	-		0.0009	< 0.005	< 0.005	< 0.005	< 0.005	0.006	0.008	0.009	< 0.005	0.006	< 0.005	< 0.005	0.0044
Copper	mg/L	1	AO	0.005	0.0027	0.0026	0.0027	0.002	0.003	0.0102	0.0017	0.0023	0.0004	0.0031	0.0021	0.0027
Iron	mg/L	0.3	AO	0.3	**21.5**	**19.1**	**23.8**	**21.4**	**23.6**	**2.9**	**18.1**	**17.5**	**16.1**	**16.5**	**15.7**	**12.9**
Lead	mg/L	0.01	MAC	0.005	< 0.00002	0.00016	0.00004	< 0.00002	0.00005	< 0.00002	0.00005	< 0.00002	0.00011	0.00007	< 0.0002	< 0.0002
Magnesium	mg/L	-		NV	79	77.2	81.5	78.5	84.8	72.2	70.7	75.9	70.1	69.6	65.3	61.6
Manganese	mg/L	0.05	AO	NV	**0.27**	**0.34**	**0.28**	**0.3**	**0.3**	**1.43**	**0.34**	**0.323**	**0.238**	**0.313**	**0.329**	**0.418**
Mercury	mg/L	0.001	MAC	0.0002	< 0.00002	< 0.00002	< 0.00002	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		0.04	0.0002	0.0006	0.0002	0.0001	0.0002	0.0005	0.0002	< 0.0001	0.0003	0.0002	0.0005	< 0.0004
Nickel	mg/L	-		0.025	< 0.01	< 0.01	0.01	0.01	0.02	0.02	0.01	0.02	0.01	0.01	0.01	< 0.01
Potassium	mg/L	-		NV	15.5	21.7	20.1	24.9	31.3	31.3	52.1	40.9	50.6	46.2	67.1	74.9
Phosphorus-Total	mg/L	-		0.03	9.15	11.8	11	50	7.94	11.4	9.41	6.9	4.17	16	4.29	3.7
Selenium	mg/L	0.01	MAC	0.1	0	0	0.01	< 0.001	0.01	< 0.001	0	0.004	0.003	0.003	0.004	0.003
Silver	mg/L	-		0.0001	< 0.00002	< 0.00002	0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.0001	< 0.0001	< 0.0002	< 0.0002
Sodium	mg/L	200	AO	NV	**282**	**254**	**321**	**292**	**363**	**284**	**342**	**338**	**325**	**293**	**337**	**309**
Strontium	mg/L	-		NV	1.04	1	0.94	1.03	1.18	1.57	1.22	1.11	1.16	1.12	1.24	1.24
Thallium	mg/L	-		0.0003	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		0.006	0.0358	0.0146	0.0111	0.0076	0.008	0.0123	0.0103	0.0031	0.00474	0.0038	0.0032	0.0032
Zinc	mg/L	5	AO	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	12.4	9.3	11.7	6.3	11.2	8.6	11.7			7.5	13.2	7.3
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	6.71	7.62	6.64	7.07	6.76	7.26	6.8	7.26	7.15	6.42	6.24	6.77
Field Conductivity	µS/cm	-		NV	3740	580	2720	2470	3025	2505	3025	3260	3280	3080	2650	3321

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	13-II 15-Oct-20	13-II 21-Apr-21	13-II 18-Oct-21	13-II 20-Apr-22	13-II 12-Oct-22	13-II 19-Apr-23	13-II 12-Oct-23
Alkalinity	mg/L	500	OG	NV	**1380**	**1420**	**1460**	**1390**	**1480**	**1370**	**1310**
Conductivity	µS/cm	-		NV	3670	3680	3490	3610	3560	3440	3410
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.34	7.45	7.1	7.33	7.47	7.28	7.22
TDS	mg/L	500	AO	NV	**2328**	**2318**	**2326**	**2135**	**2026**	**1863**	**1910**
DOC	mg/L	5		NV	**19.4**	**24.6**	**21**	**19.6**	**11.8**	**14.6**	**25.2**
COD	mg/L	-		NV	279	352	273	271	297	359	351
Phenols	mg/L	-		0.001	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001
Chloride	mg/L	250	AO	NV	**304**	**277**	**279**	217	161	199	181
Ammonia, total	mg/L	-		NV	108	121	124	125	163	129	141
Unionized Ammonia	mg/L	-		0.02	0.08		0.17	0.01	0.3	0.25	<0.01
Fluoride	mg/L	2.4	MAC	NV	< 1	< 0.1	< 1	< 1	**4.6**	< 1	<0.1
Sulphate	mg/L	500	AO	NV	253	245	248	188	158	35	143
Nitrite (N)	mg/L	1	MAC	NV	< 0.5	< 0.05	< 0.5	< 0.5	< 0.5	< 0.5	<0.05
Nitrate (N)	mg/L	10	MAC	NV	0.52	0.23	< 0.5	< 0.5	< 0.5	< 0.5	0.05
Bromide	mg/L	-		NV							
TKN	mg/L	-		NV	124	128	145	159	171	150	164
Hardness	mg/L	500	OG	NV	**1090**	**1050**	**972**	**1000**	**1080**	**943**	**832**
Aluminum	mg/L	0.1	OG	0.075	**0.14**	**0.13**	**0.13**	0.1	**0.12**	**0.14**	0.09
Antimony	mg/L	0.006	IMAC	0.02	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004
Arsenic	mg/L	0.025	IMAC	0.005	0.001	0.0009	0.0008	0.0009	0.0008	0.0007	0.001
Barium	mg/L	1	MAC	NV	0.333	0.307	0.299	0.331	0.451	0.311	0.312
Beryllium	mg/L	-		1.1	< 0.004	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001
Boron	mg/L	5	IMAC	0.2	1.7	1.55	1.8	1.59	2.17	1.85	2.1
Cadmium	mg/L	0.005	MAC	0.0005	< 0.000029	< 0.000029	< 0.000029	< 0.000029	< 0.000029	< 0.000029	<0.000015
Calcium	mg/L	-		NV	335	320	297	309	350	282	254
Chromium	mg/L	0.05	MAC	0.001	< 0.002	0.003	0.002	0.002	0.002	0.002	0.002
Chromium (VI)	mg/L	-						< 0.001	< 0.001	< 0.001	<0.01
Cobalt	mg/L	-		0.0009	0.013	< 0.005	< 0.005	0.009	0.01	0.006	0.0059
Copper	mg/L	1	AO	0.005	0.0007	0.0008	0.0017	0.0008	< 0.0002	0.0002	0.0005
Iron	mg/L	0.3	AO	0.3	**12.8**	**11.6**	**12.6**	**11.5**	**5.84**	**11.7**	**8.55**
Lead	mg/L	0.01	MAC	0.005	< 0.00009	0.00009	< 0.00009	0.00004	< 0.00009	< 0.00009	0.00006
Magnesium	mg/L	-		NV	61.1	60.2	55.8	56	49.2	57.8	47.9
Manganese	mg/L	0.05	AO	NV	**0.441**	**0.414**	**0.369**	**0.564**	**0.807**	**0.317**	**0.283**
Mercury	mg/L	0.001	MAC	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002
Molybdenum	mg/L	-		0.04	< 0.0002	0.0002	0.0002	0.0002	< 0.0002	< 0.0002	0.0002
Nickel	mg/L	-		0.025	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.0074
Potassium	mg/L	-		NV	85.3	80.8	88.2	91.5	134	93.4	117
Phosphorus-Total	mg/L	-		0.03	6.68	18.6	16.3	6.54	6.22	9.28	7.42
Selenium	mg/L	0.01	MAC	0.1	0.002	0.002	0.004	0.005	0.004	0.002	<0.001
Silver	mg/L	-		0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001
Sodium	mg/L	200	AO	NV	**308**	**316**	**308**	**268**	**252**	**243**	**245**
Strontium	mg/L	-		NV	1.25	1.29	1.26	1.33	1.63	1.24	1.31
Thallium	mg/L	-		0.0003	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.005	< 0.00005	<0.00005
Vanadium	mg/L	-		0.006	0.0038	0.0033	0.0032	0.003	0.0032	0.0008	0.0045
Zinc	mg/L	5	AO	0.02	< 0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005
TSS	mg/L	-	-	NV							
Cyanide (Total)	mg/L	0.2	MAC	0.005							
BOD(5 day)	mg/L	-	-	NV							
Field Temperature	°C	-	AO	NV	10.6	7	10.4	7.5	11.3	6.3	9.8
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	6.52	6.93	6.88	6.85	6.88	7.14	7.01
Field Conductivity	µS/cm	-		NV	2800	2800	2648	1909	3790	4210	3820

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	14-II 25-May-09	14-II 4-Aug-09	14-II 8-Jun-10	14-II 15-Oct-10	14-II 12-May-11	14-II 8-Nov-11	14-II 19-Apr-12	14-II 29-Oct-12	14-II 3-Jun-13	14-II 29-Oct-13	14-II 1-May-14	14-II 24-Sep-14
Alkalinity	mg/L	500	OG	NV	413	444	486	494	**522**	**527**	**570**	**590**	**660**	**624**	**661**	**684**
Conductivity	µS/cm	-		NV	1180	1240	1110	1080	1270	1240	1300	1400	1520	1450	1480	1580
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.41	7.37	7.58	7.51	7.61	7.71	7.6	7.6	7.25	7.33	7.43	7.22
TDS	mg/L	500	AO	NV	**764**	**806**	**723**	**701**	**736**	**705**	**791**	**790**	**925**	**838**	**774**	**904**
DOC	mg/L	5		NV	**9**	**10**	**9**	**8**	**7.9**	-	**8**	**8.5**	**15.2**	-	**15.2**	**12.5**
COD	mg/L	-		NV	24	25	26	21	25	38	38	37	173	49	111	29
Phenols	mg/L	-		0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	0.012	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001
Chloride	mg/L	250	AO	NV	93	108	109	98	89	83	80	80	103	76	< 0.5	102
Ammonia, total	mg/L	-		NV	0	< 0.01	0.1	< 0.05	<0.01	<0.1	0.02	0.08	< 0.01	0.04	0.05	0.13
Unionized Ammonia	mg/L	-		0.02												
Fluoride	mg/L	2.4	MAC	NV	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	<0.1	<0.10	<0.10	0.6	0.2	< 0.1	< 0.1
Sulphate	mg/L	500	AO	NV	132	124	77	62	37	32	38	<50 (3)	49	38	39	43
Nitrite (N)	mg/L	1	MAC	NV	< 0.1	< 0.1	< 0.1	< 0.1	<0.01	<0.01	<0.010	<0.010	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	NV	3.4	2	0.3	0.2	<0.1	<0.1	<0.10	<0.10	< 0.1	< 0.1	< 0.1	< 0.1
Bromide	mg/L	-		NV	0.3	-	0.4	-	<1	<1	<1.0	<1.0	0.8	< 0.4	92.6	< 0.4
TKN	mg/L	-		NV	0.7	0.8	0.6	0.5	0.9	3	1.4	1	1.01	0.4	1.2	0.9
Hardness	mg/L	500	OG	NV	**658**	**634**	**618**	**650**	**580**	-	**610**	**670**	**752**	**702**	**653**	**688**
Aluminum	mg/L	0.1	OG	0.075	< 0.01	< 0.01	0.02	< 0.01	<0.005	<0.005	<0.0050	0.016	0.07	0.06	0.04	0.05
Antimony	mg/L	0.006	IMAC	0.02	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	<0.0005	<0.00050	<0.00050	0.0001	< 0.0001	0.0001	0.0002
Arsenic	mg/L	0.025	IMAC	0.005	< 0.01	< 0.01	< 0.005	< 0.005	<0.001	<0.001	<0.0010	<0.0010	0.001	0.0008	0.0012	0.0012
Barium	mg/L	1	MAC	NV	0.1	0.1	0.1	0.1	0.16	0.16	0.17	0.17	0.23	0.19	0.18	0.2
Beryllium	mg/L	-		1.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.005	<0.0005	<0.00050	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	5	IMAC	0.2	0.8	0.8	0.4	< 0.1	0.33	0.3	0.32	0.33	0.47	0.44	0.441	0.499
Cadmium	mg/L	0.005	MAC	0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Calcium	mg/L	-		NV	229	221	215	228	200	180	210	230	257	241	216	233
Chromium	mg/L	0.05	MAC	0.001	0.0002	0.0002	0.0005	< 0.0001	<0.005	<0.005	<0.0050	-	0.0026	0.0101	0.0007	< 0.0002
Chromium (VI)	mg/L															
Cobalt	mg/L	-		0.0009	0.0022	0.0026	0.0054	0.0049	0.011	0.011	0.014	0.015	0.0261	0.032	0.031	0.033
Copper	mg/L	1	AO	0.005	0.0013	0.0019	0.0041	0.0031	0.005	0.004	0.0053	0.0039	0.005	0.0034	0.0069	0.0069
Iron	mg/L	0.3	AO	0.3	<0.1	< 0.1	0.3	< 0.1	<0.100	0.2	0.14	0.12	**0.46**	**0.85**	**0.43**	**0.49**
Lead	mg/L	0.01	MAC	0.005	< 0.001	< 0.001	< 0.001	< 0.001	<0.0005	<0.0005	<0.00050	0.00054	0.00006	< 0.00002	0.00005	0.00006
Magnesium	mg/L	-		NV	21	20	20	20	19	18	23	24	26.6	24.5	27.5	25.5
Manganese	mg/L	0.05	AO	NV	0.02	0.03	0.04	0.05	**0.13**	**0.34**	**0.79**	**0.95**	**3.4**	**3.07**	**2.66**	**2.35**
Mercury	mg/L	0.001	MAC	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00001	<0.00001	<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		0.04	< 0.002	< 0.002	< 0.002	0.004	<0.001	<0.0005	<0.00050	<0.00050	0.0001	< 0.0001	0.0002	0.0002
Nickel	mg/L	-		0.025	< 0.01	< 0.01	< 0.01	< 0.01	0.009	0.008	0.011	0.0091	0.02	0.02	0.02	0.02
Potassium	mg/L	-		NV	1.4	1.6	1.5	1.5	1.4	1.2	1.4	1.5	1.5	1.4	1.6	1.4
Phosphorus-Total	mg/L	-		0.03	0.01	< 0.01	< 0.01	0.015	0.43	2.1	<0.10	1	0.77	0.67	0.63	0.63
Selenium	mg/L	0.01	MAC	0.1	< 0.01	< 0.01	< 0.01	< 0.01	<0.002	<0.002	<0.0020	<0.0020	< 0.001	< 0.001	< 0.001	< 0.001
Silver	mg/L	-		0.0001	< 0.0001	< 0.0001	< 0.0001	0.0002	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Sodium	mg/L	200	AO	NV	39	45	54	51	55	58	73	72	87.8	79.5	90.7	85.2
Strontium	mg/L	-		NV	0.392	0.4	0.388	0.261	0.38	0.34	0.38	0.4	-	-	-	0.49
Thallium	mg/L	-		0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	<0.00005	<0.00005	<0.000050	<0.000050	< 0.00005	< 0.00005	0.0001	< 0.00005
Vanadium	mg/L	-		0.006	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.0005	0.00079	0.00061	0.008	0.0029	0.007	0.0181
Zinc	mg/L	5	AO	0.02	< 0.01	< 0.01	< 0.01	< 0.01	0.01	<0.005	0.0062	0.011	0.006	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	-	-	-	-	-	-	15.6	9.5	13.1	10	12.5	14.2
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	-	-	-	-	-	-	6.87	6.69	7.24	6.72	7.78	7.15
Field Conductivity	µS/cm	-		NV	-	-	-	-	-	-	1336	4800	1594	1440	1318	1650

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	14-II 28-Apr-15	14-II 5-Oct-15	14-II 26-Apr-16	14-II 19-Oct-16	14-II 12-Apr-17	14-II 5-Oct-17	14-II 10-Apr-18	14-II 2-Oct-18	14-II 22-Apr-19	14-II 9-Oct-19	14-II 13-Apr-20	14-II 14-Oct-20
Alkalinity	mg/L	500	OG	NV	**712**	**694**	**733**	**687**	**672**	**648**	**653**	**603**	**639**	**636**	**623**	**663**
Conductivity	µS/cm	-		NV	1600	1550	1620	1560	1470	1440	1450	1480	1490	1570	1580	1640
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.38	7.42	7.18	7.22	7.29	7.42	7.65	7.44	7.47	7.45	7.47	7.48
TDS	mg/L	500	AO	NV	**940**	**917**	**960**	**952**	**875**	**818**	**821**	**832**	**859**	**954**	**876**	**949**
DOC	mg/L	5		NV	**13.4**	**8.1**	**11.1**	**10.8**	**10**	**13**	**15**	**13.9**	**13.2**	**15.6**	**11**	**9.5**
COD	mg/L	-		NV	95	28	37	39	58	39	38	48	53	51	48	48
Phenols	mg/L	-		0.001	< 0.001	< 0.001	< 0.001	0.014	< 0.001	0.004	< 0.001	0.002	< 0.002	0.005	0.054	< 0.002
Chloride	mg/L	250	AO	NV	95	91	100	88	80	70	68.6	94.4	105	155	122	124
Ammonia, total	mg/L	-		NV	0.07	0.04	0.05	0.11	0.09	0.06	0.08	0.06	0.09	0.17	0.42	1.19
Unionized Ammonia	mg/L	-		0.02									< 0.01	< 0.01	< 0.01	< 0.01
Fluoride	mg/L	2.4	MAC	NV	0.1	0.2	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sulphate	mg/L	500	AO	NV	38	39	51	53	41	31	28	35	32	33	31	32
Nitrite (N)	mg/L	1	MAC	NV	< 0.1	< 0.1	< 0.1	< 0.1	0.6	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	10	MAC	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bromide	mg/L	-		NV	0.4	0.6	0.5	-								
TKN	mg/L	-		NV	1	0.9	1.1	1.3	1.2	1	1.1	1.1	4.5	1.3	1.6	2.3
Hardness	mg/L	500	OG	NV	**736**	**714**	**712**	**762**	**677**	**635**	**654**	**669**	**680**	**713**	**657**	**731**
Aluminum	mg/L	0.1	OG	0.075	0.04	0.06	0.05	0.1	**0.11**	**0.12**	0.1	0.08	0.1	0.1	0.09	0.09
Antimony	mg/L	0.006	IMAC	0.02	0.0001	0.0001	0.0001	0.0003	< 0.0001	0	< 0.0001	0.0001	< 0.0001	< 0.0001	0.0001	0.0001
Arsenic	mg/L	0.025	IMAC	0.005	0.0012	0.0008	0.0009	0.0008	0.0006	0.0007	0.0004	0.0003	0.0003	< 0.0003	0.0002	0.0003
Barium	mg/L	1	MAC	NV	0.21	0.21	0.21	0.24	0.308	0.224	0.205	0.208	0.206	0.239	0.234	0.28
Beryllium	mg/L	-		1.1	< 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	mg/L	5	IMAC	0.2	0.593	0.582	0.715	0.857	0.78	0.659	0.596	0.613	0.608	0.918	0.847	1.16
Cadmium	mg/L	0.005	MAC	0.0005	< 0.00002	< 0.00002	0.00003	0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000029	< 0.000015	< 0.000015
Calcium	mg/L	-		NV	248	239	236	251	220	206	214	217	224	230	215	240
Chromium	mg/L	0.05	MAC	0.001	0.005	0.01	< 0.0002	0.003	0.0055	< 0.001	0.001	0.001	< 0.001	0.001	< 0.001	< 0.001
Chromium (VI)	mg/L															
Cobalt	mg/L	-		0.0009	0.031	0.025	0.026	0.029	0.025	0.026	0.01	0.03	0.019	0.022	0.0194	0.027
Copper	mg/L	1	AO	0.005	0.0074	0.0051	0.0067	0.0067	0.0053	0.0036	0.0052	0.0058	0.0045	0.0057	0.0079	0.0058
Iron	mg/L	0.3	AO	0.3	**0.48**	**0.64**	**0.41**	**0.68**	**0.478**	**0.678**	**0.516**	**0.581**	**0.437**	**0.73**	**0.511**	**0.709**
Lead	mg/L	0.01	MAC	0.005	0.00008	0.00006	0.00007	0.00024	< 0.00002	0.00006	0.00006	0.00006	0.00007	< 0.00009	0.00009	0.00006
Magnesium	mg/L	-		NV	28.2	28	29.5	32.6	31	29.3	28.9	30.9	29.2	33.5	29	31.8
Manganese	mg/L	0.05	AO	NV	**2.21**	**1.93**	**1.71**	**1.79**	**1.47**	**1.36**	**1.3**	**1.52**	**1.53**	**1.93**	**1.76**	**2.1**
Mercury	mg/L	0.001	MAC	0.0002	0.00003	< 0.00002	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		0.04	0.0002	0.0002	0.0002	0.0001	0.0001	0.0002	< 0.0001	0.0001	0.0001	< 0.0002	< 0.0001	0.0001
Nickel	mg/L	-		0.025	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.02
Potassium	mg/L	-		NV	1.6	1.7	1.6	1.7	1.7	1.9	1.6	1.9	1.6	2.3	3.2	3.9
Phosphorus-Total	mg/L	-		0.03	0.52	0.34	0.34	1.18	1.1	0.35	0.44	0.49	1.34	0.38	0.23	0.51
Selenium	mg/L	0.01	MAC	0.1	0	0	< 0.001	0	< 0.001	< 0.001	0.001	0.001	< 0.001	0.002	0.001	0.001
Silver	mg/L	-		0.0001	< 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	mg/L	200	AO	NV	99	98.5	99.9	111	94.2	89.5	86.4	89.4	81.5	115	99.4	115
Strontium	mg/L	-		NV	0.5	0.5	0.48	0.53	0.434	0.433	0.419	0.457	0.45	0.562	0.525	0.548
Thallium	mg/L	-		0.0003	< 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	mg/L	-		0.006	0.0057	0.0035	0.0031	0.0028	0.0035	0.0038	0.0004	0.00034	0.0005	0.0007	0.0005	0.0008
Zinc	mg/L	5	AO	0.02	0.01	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	11.7	13.6	6.5	15.1	10.2	14.2			14.1	12.9	12.8	13.3
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	7.01	6.92	6.86	6.86	7.31	7.05	7.65	7.44	7.4	7.03	6.83	6.85
Field Conductivity	µS/cm	-		NV	1710	1180	1180	1410	1145	1210	1390	1430	1660	1234	1700	1300

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	14-II 21-Apr-21	14-II 18-Oct-21	14-II 20-Apr-22	14-II 12-Oct-22	14-II 19-Apr-23	14-II 12-Oct-23	14-III 6-May-08	14-III 15-Aug-08	14-III 25-May-09	14-III 4-Aug-09	14-III 6-Oct-09	14-III 8-Jun-10
Alkalinity	mg/L	500	OG	NV	**690**	**751**	**655**	**694**	**727**	**763**	**1280**	**1360**	**1410**	**1450**	**1270**	**1380**
Conductivity	µS/cm	-		NV	1660	1650	1550	1540	1660	1680	3480	3540	3490	3670	3520	3380
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.67	7.37	7.47	7.56	7.48	7.36	6.5	6.75	6.88	6.96	6.91	6.98
TDS	mg/L	500	AO	NV	**958**	**1013**	**858**	**906**	**927**	**918**	**2260**	**2300**	**2270**	**2390**	**2290**	**2200**
DOC	mg/L	5		NV	**13.8**	**15.8**	**11.4**	**6.2**	**7.7**	**14.7**	**52**	**52.4**	**63**	**62**	**115**	**52**
COD	mg/L	-		NV	58	105	55	53	65	64	22	34	32	151	175	18
Phenols	mg/L	-		0.001	0.006	0.005	0.003	0.002	< 0.001	<0.001	0.007	0.009	0.006	0.009	0.002	0.011
Chloride	mg/L	250	AO	NV	123	145	88.4	89.1	87.9	86.4	**374**	**322**	**306**	**352**	**346**	**358**
Ammonia, total	mg/L	-		NV	2.53	0.5	6.98	10.2	14.8	17.9	44	64.4	80.1	86.7	48.2	47.9
Unionized Ammonia	mg/L	-		0.02		< 0.01	0.02	0.03	0.05	<0.01						
Fluoride	mg/L	2.4	MAC	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 1	<0.1	<0.1	<0.1	< 0.1	< 0.1	0.1	< 0.1
Sulphate	mg/L	500	AO	NV	30	25	29	26	57	30	319	328	245	272	271	279
Nitrite (N)	mg/L	1	MAC	NV	0.06	0.05	< 0.05	< 0.05	< 0.05	<0.05	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	NV	< 0.05	< 0.05	< 0.05	< 0.05	2.37	0.24	<0.1	<0.1	< 0.1	< 0.1	<0.1	< 0.1
Bromide	mg/L	-		NV							-	-	1	-	-	1.3
TKN	mg/L	-		NV	3.7	2.4	9.8	12.1	19.1	22.5	53.2	69.3	81.4	100	66.6	78.6
Hardness	mg/L	500	OG	NV	**695**	**731**	**600**	**646**	**665**	**630**	**1340**	**1210**	**1210**	**1110**	**1240**	**1170**
Aluminum	mg/L	0.1	OG	0.075	**0.11**	**0.11**	0.06	0.07	**0.12**	0.07	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01
Antimony	mg/L	0.006	IMAC	0.02	0.0001	0.0004	0.0001	0.0003	0.0001	0.0001	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01
Arsenic	mg/L	0.025	IMAC	0.005	0.0003	0.001	0.0003	0.0003	0.0003	0.0003	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.005
Barium	mg/L	1	MAC	NV	0.29	0.253	0.369	0.431	0.556	0.558	0.2	0.3	0.3	0.3	0.2	0.8
Beryllium	mg/L	-		1.1	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron	mg/L	5	IMAC	0.2	1.38	1.23	1.27	1.41	1.83	1.77	2	1.8	2.5	2.1	2.1	1.9
Cadmium	mg/L	0.005	MAC	0.0005	< 0.000015	< 0.000015	< 0.000015	0.000017	< 0.000012	0.000015	0.0005	0.0005	0.0006	0.0005	0.0004	0.0005
Calcium	mg/L	-		NV	229	241	198	215	215	206	427	374	374	347	381	350
Chromium	mg/L	0.05	MAC	0.001	0.001	0.001	< 0.001	< 0.001	< 0.001	<0.001	0.0011	0.0015	0.0017	0.0013	0.001	0.0016
Chromium (VI)	mg/L						< 0.001	< 0.001	< 0.001	<0.01						
Cobalt	mg/L	-		0.0009	0.02	0.007	0.024	0.027	0.022	0.0274	0.0074	0.0075	0.0062	0.0054	0.0051	0.0049
Copper	mg/L	1	AO	0.005	0.0077	0.0005	0.0051	0.0048	0.0054	0.0058	<0.0001	<0.0001	< 0.0001	< 0.0001	0.0003	< 0.0001
Iron	mg/L	0.3	AO	0.3	**0.644**	**1.77**	**0.698**	**0.805**	**0.617**	**0.603**	**33.1**	**30.5**	**22.4**	**22**	**32.3**	**30.2**
Lead	mg/L	0.01	MAC	0.005	0.00011	< 0.00004	0.00005	0.00007	0.00005	0.00006	0.007	0.007	0.009	0.007	0.007	0.003
Magnesium	mg/L	-		NV	29.7	31.2	25.7	26.3	31.1	28.1	68	68	68	60	69	72
Manganese	mg/L	0.05	AO	NV	**2.13**	**1.66**	**2.5**	**2.61**	**3.05**	**2.92**	**6.08**	**3.03**	**4.27**	**3.53**	**4.55**	**3.72**
Mercury	mg/L	0.001	MAC	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
Molybdenum	mg/L	-		0.04	0.0002	0.0002	0.0002	0.0002	0.0002	0.0001	<0.002	<0.002	< 0.002	< 0.002	< 0.002	< 0.002
Nickel	mg/L	-		0.025	0.02	0.02	0.02	0.02	0.02	0.024	0.01	0.02	0.02	0.01	0.01	0.02
Potassium	mg/L	-		NV	5.8	2.7	12.9	16	21.7	23.8	91	107	115	123	95	109
Phosphorus-Total	mg/L	-		0.03	0.23	0.19	0.22	0.09	0.27	0.08	0.15	0.03	0.03	0.04	0.03	0.03
Selenium	mg/L	0.01	MAC	0.1	< 0.001	0.002	0.002	0.002	0.001	0.001	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver	mg/L	-		0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	0.0003	0.0003	0.0005	0.0002	0.0002	0.0002
Sodium	mg/L	200	AO	NV	120	114	99.5	101	96.5	106	**253**	**270**	**272**	**265**	**259**	**298**
Strontium	mg/L	-		NV	0.615	0.521	0.641	0.673	0.758	0.733	2.61	2.64	2.6	2.7	2.91	2.38
Thallium	mg/L	-		0.0003	< 0.00005	0.00008	< 0.00005	< 0.005	< 0.00005	<0.00005	0.002	0.0014	0.0008	0.0009	0.0009	0.0015
Vanadium	mg/L	-		0.006	0.0007	0.0013	0.0007	0.0008	0.0002	0.0011	0.004	0.003	0.004	0.004	0.004	0.005
Zinc	mg/L	5	AO	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	8.4	13.4	11.6	13.3	11.8	12	-	-	-	-	-	-
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	7.42	7.11	7.18	7.13	7.15	6.8	-	-	-	-	-	-
Field Conductivity	µS/cm	-		NV	1400	2626	1470	1613	1460	1405	-	-	-	-	-	-

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	14-III 15-Oct-10	14-III 12-May-11	14-III 8-Nov-11	14-III 19-Apr-12	14-III 29-Oct-12	14-III 3-Jun-13	14-III 29-Oct-13	14-III 1-May-14	14-III 24-Sep-14	14-III 28-Apr-15	14-III 5-Oct-15	14-III 26-Apr-16
Alkalinity	mg/L	500	OG	NV	**1440**	**1380**	**1580**	**1500**	**1600**	**1550**	**1630**	**1630**	**1720**	**1680**	**1690**	**1780**
Conductivity	µS/cm	-		NV	3510	4090	4360	4200	4400	4130	4370	4130	4330	4130	4300	4160
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7	7.34	7.24	7.43	7.41	6.97	7.07	7.04	7.04	7.29	7.18	7.14
TDS	mg/L	500	AO	NV	**2280**	**2560**	**2610**	**2700**	**2650**	**2650**	**2530**	**2540**	**2690**	**2570**	**2630**	**2460**
DOC	mg/L	5		NV	**66**	**65.8**	-	**70**	**88**	**65.8**	-	**84.4**	**72.6**	< 0.2	**23.1**	**29.5**
COD	mg/L	-		NV	33	200	280	210	280	201	251	223	216	220	231	300
Phenols	mg/L	-		0.001	0.009	<0.001	0.018	0.0037	0.0013	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.005
Chloride	mg/L	250	AO	NV	**413**	**390**	**430**	**370**	**410**	**383**	**404**	**370**	**402**	**351**	**370**	**295**
Ammonia, total	mg/L	-		NV	82	81	<0.1	78	110	122	114	139	122	102	122	154
Unionized Ammonia	mg/L	-		0.02												
Fluoride	mg/L	2.4	MAC	NV	< 0.1	<0.1	<0.1	<0.10	<0.10	0.3	0.2	0.2	< 0.1	0.2	0.1	< 1
Sulphate	mg/L	500	AO	NV	327	350	160	310	170	246	210	188	242	201	176	104
Nitrite (N)	mg/L	1	MAC	NV	< 0.1	<0.01	<0.01	<0.010	0.01	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1
Nitrate (N)	mg/L	10	MAC	NV	< 0.1	<0.1	<0.1	<0.10	<0.10	0.2	< 0.1	0.1	< 0.1	< 0.1	0.1	< 1
Bromide	mg/L	-		NV	-	3	<5	2.9	<5.0	4.4	3.5	3.8	3.3	3	3	< 4
TKN	mg/L	-		NV	83	69	110	94	110 (1)	135	174	142	122	112	152	187
Hardness	mg/L	500	OG	NV	**1340**	**1300**	-	**1400**	**1100**	**1190**	**1180**	**1090**	**1020**	**1110**	**1040**	**859**
Aluminum	mg/L	0.1	OG	0.075	< 0.01	<0.005	0.009	0.0071	0.0077	0.09	0.08	0.05	0.06	0.06	0.07	0.06
Antimony	mg/L	0.006	IMAC	0.02	< 0.01	<0.005	0.0005	<0.00050	0.00051	0.0005	0.0003	0.0003	0.0006	0.0003	0.0004	0.0004
Arsenic	mg/L	0.025	IMAC	0.005	< 0.005	0.002	0.004	0.0021	0.003	0.0047	0.0063	0.0062	0.0075	0.003	0.0041	0.0047
Barium	mg/L	1	MAC	NV	0.3	0.35	0.77	0.45	0.91	0.73	0.69	0.46	0.78	0.5	0.8	0.61
Beryllium	mg/L	-		1.1	< 0.1	<0.005	<0.0005	<0.00050	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	5	IMAC	0.2	1.5	2.3	2.4	2.6	2.9	2.9	3.2	2.7	3	3	3.6	3
Cadmium	mg/L	0.005	MAC	0.0005	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00004	< 0.00002
Calcium	mg/L	-		NV	405	370	300	380	310	338	336	307	288	313	289	237
Chromium	mg/L	0.05	MAC	0.001	0.0003	<0.005	0.006	<0.0050	-	0.0072	0.0412	0.0023	0.0041	0.0028	0.0328	< 0.0002
Chromium (VI)	mg/L															
Cobalt	mg/L	-		0.0009	0.0027	0.0068	0.004	0.0063	0.0059	0.004	0.007	0.006	0.011	0.007	0.01	0.013
Copper	mg/L	1	AO	0.005	< 0.0001	0.001	<0.001	<0.0020	0.0014	0.0014	0.0026	0.0033	0.0037	0.0031	0.0025	0.0022
Iron	mg/L	0.3	AO	0.3	**19.5**	**11**	**33**	**22**	**25**	**20.9**	**25.2**	**19.8**	**23.8**	**17.9**	**22.5**	**17.3**
Lead	mg/L	0.01	MAC	0.005	0.003	<0.0005	<0.0005	<0.00050	<0.00050	0.00002	< 0.00002	0.00003	< 0.00002	0.0001	0.00005	0.00004
Magnesium	mg/L	-		NV	80	82	66	100	73	83.4	81.9	78.5	72.7	80.8	76.6	64.9
Manganese	mg/L	0.05	AO	NV	**2.19**	**3.8**	**2.7**	**4**	**2.7**	**2.99**	**3.06**	**2.42**	**2.58**	**2.54**	**2.29**	**1.59**
Mercury	mg/L	0.001	MAC	0.0002	< 0.00002	<0.00001	-	<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00003
Molybdenum	mg/L	-		0.04	0.011	<0.001	0.0006	<0.00050	0.00057	0.0007	0.0005	0.0003	0.0005	0.0003	0.0004	0.0005
Nickel	mg/L	-		0.025	0.01	0.033	0.025	0.035	0.031	0.03	0.03	0.03	0.03	0.04	0.03	0.03
Potassium	mg/L	-		NV	105	92	120	100	120	115	109	93.2	117	105	131	129
Phosphorus-Total	mg/L	-		0.03	< 0.1*	0.1	0.17	<0.10	0.2	0.08	0.07	0.06	0.06	0.06	0.06	0.12
Selenium	mg/L	0.01	MAC	0.1	< 0.01	<0.002	<0.002	<0.0020	<0.0020	< 0.01	< 0.01	0.001	0.006	0.007	0.009	0.002
Silver	mg/L	-		0.0001	0.0009	<0.0001	<0.0001	<0.00010	<0.00010	0.00003	0.00003	0.00003	0.00003	0.00003	0.00004	0.00004
Sodium	mg/L	200	AO	NV	**313**	**300**	**380**	**370**	**400**	**371**	**388**	**323**	**354**	**354**	**392**	**343**
Strontium	mg/L	-		NV	2.35	2.3	2.7	2.4	2.5	-	-	-	2.4	2.12	2.41	2.17
Thallium	mg/L	-		0.0003	< 0.0003	<0.00005	<0.00005	<0.000050	<0.000050	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		0.006	0.003	0.003	0.0096	0.0073	0.0096	0.0194	0.016	0.0171	0.0571	0.0176	0.0172	0.011
Zinc	mg/L	5	AO	0.02	< 0.01	0.011	<0.005	<0.0050	<0.0050	0.01	< 0.005	< 0.005	< 0.005	0.02	0.01	< 0.005
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	-	-	-	14.6	6.7	14	12	11.5	14.1	11.2	13.9	6.7
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	-	-	-	6.65	7.4	6.61	6.72	7.01	6.96	6.72	6.78	7.28
Field Conductivity	µS/cm	-		NV	-	-	-	4260	1100	4350	4100	3287	4670	4230	3335	2860

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	14-III 19-Oct-16	14-III 12-Apr-17	14-III 5-Oct-17	14-III 5-Oct-17	14-III 10-Apr-18	14-III 22-Apr-19	14-III 9-Oct-19	14-III 13-Apr-20	14-III 14-Oct-20	14-III 21-Apr-21	14-III 18-Oct-21	14-III 20-Apr-22
Alkalinity	mg/L	500	OG	NV	**2000**	**1900**	**1750**	**1750**	**1640**	**1610**	**1590**	**1610**	**1560**	**1710**	**1440**	**1260**
Conductivity	µS/cm	-		NV	4610	4310	4270	4270	3780	3930	4090	4060	4060	4040	3970	3590
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.39	7.32	7.26	7.26	7.53	7.47	7.47	7.48	7.2	7.63	7.3	7.4
TDS	mg/L	500	AO	NV	**2790**	**2560**	**2511**	**2511**	**2298**	**2241**	**2493**	**2239**	**2323**	**2429**	**2488**	**1865**
DOC	mg/L	5		NV	**25**	**75.6**	**24.6**	**24.6**	**63.9**	**29.2**	**73.6**	**29.1**	**17.4**	**24.4**	**21.4**	**17.4**
COD	mg/L	-		NV	266	60	238	238	217	224	274	229	214	353	410	295
Phenols	mg/L	-		0.001	0.015	0.043	0.029	0.029	< 0.001	< 0.002	0.002	< 0.002	< 0.002	0.041	< 0.002	< 0.001
Chloride	mg/L	250	AO	NV	**349**	**294**	**272**	**272**	250	**284**	**395**	**300**	**323**	**300**	**431**	249
Ammonia, total	mg/L	-		NV	175	174	158	158	148	155	239	119	157	185	156	139
Unionized Ammonia	mg/L	-		0.02						< 0.01	0.87	0.28	0.33		0.04	0.38
Fluoride	mg/L	2.4	MAC	NV	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.1	< 1	< 1
Sulphate	mg/L	500	AO	NV	60	72	144	144	100	68	23	56	82	69	96	30
Nitrite (N)	mg/L	1	MAC	NV	< 0.5	**2.1**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.05	< 0.5	< 0.5
Nitrate (N)	mg/L	10	MAC	NV	< 0.5	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.68	0.33	< 0.5	< 0.5
Bromide	mg/L	-		NV	-											
TKN	mg/L	-		NV	186	211	183	183	150	174	186	149	162	206	188	191
Hardness	mg/L	500	OG	NV	**940**	**862**	**904**	**904**	**892**	**870**	**868**	**873**	**902**	**870**	**906**	**700**
Aluminum	mg/L	0.1	OG	0.075	0.06	**0.28**	**0.13**	**0.13**	**0.11**	**0.11**	**0.12**	0.1	**0.11**	**0.11**	**0.12**	0.06
Antimony	mg/L	0.006	IMAC	0.02	0.0008	0.0004	0.0003	0.0003	0.0002	0.0002	< 0.0002	< 0.0002	0.0004	0.0003	0.0009	0.0003
Arsenic	mg/L	0.025	IMAC	0.005	0.0038	0.0061	0.0036	0.0036	0.002	0.0015	0.0012	0.0011	0.0015	0.0019	0.0013	0.0011
Barium	mg/L	1	MAC	NV	**1.09**	0.99	**1.12**	**1.12**	0.64	0.442	0.687	0.465	0.628	0.661	0.908	0.55
Beryllium	mg/L	-		1.1	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.004	< 0.002	< 0.002	< 0.002
Boron	mg/L	5	IMAC	0.2	3.9	3.3	3.4	3.4	3.01	2.97	3.64	3.03	3.08	3.35	3.49	2.53
Cadmium	mg/L	0.005	MAC	0.0005	0.00005	0.00003	< 0.000014	< 0.000014	< 0.000014	< 0.000015	< 0.000059	< 0.000059	< 0.000059	< 0.000059	< 0.000059	< 0.000029
Calcium	mg/L	-		NV	256	232	243	243	243	240	236	232	245	235	248	190
Chromium	mg/L	0.05	MAC	0.001	0.0052	0.0115	< 0.001	< 0.001	0.002	0.002	0.001	0.002	< 0.002	0.002	0.002	0.001
Chromium (VI)	mg/L															< 0.001
Cobalt	mg/L	-		0.0009	0.01	0.009	0.007	0.007	< 0.005	< 0.005	0.005	0.0056	0.01	0.006	0.008	0.007
Copper	mg/L	1	AO	0.005	0.0034	0.0047	0.002	0.002	0.0031	0.0027	0.0027	0.003	0.0009	0.0011	0.0009	0.0005
Iron	mg/L	0.3	AO	0.3	**14**	**15.4**	**16.3**	**16.3**	**14.8**	**12.8**	0.193	**12.8**	**16.3**	**10.4**	**16.2**	**20.5**
Lead	mg/L	0.01	MAC	0.005	0.00003	0.00057	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.0002	< 0.0002	< 0.0002	0.00026	0.00039	0.00008
Magnesium	mg/L	-		NV	72.7	68.6	72.1	72.1	69.1	65.6	67.7	71.4	70.6	68.8	69.6	54.5
Manganese	mg/L	0.05	AO	NV	**1.39**	**1.47**	**1.58**	**1.58**	**1.74**	**1.74**	**1.31**	**1.97**	**1.46**	**1.32**	**1.42**	**1.13**
Mercury	mg/L	0.001	MAC	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	mg/L	-		0.04	0.0054	0.0006	0.0003	0.0003	0.0001	0.0003	0.0006	< 0.0004	< 0.0004	0.0006	0.0006	0.0003
Nickel	mg/L	-		0.025	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	< 0.02	0.03	0.03	< 0.01
Potassium	mg/L	-		NV	168	164	161	161	129	121	157	127	134	146	162	135
Phosphorus-Total	mg/L	-		0.03	0.28	0.23	0.14	0.14	0.05	0.09	0.15	0.05	0.06	0.42	1.22	0.58
Selenium	mg/L	0.01	MAC	0.1	0.01	< 0.001	0.003	0.003	0.003	0.004	0.006	0.004	0.004	0.002	<0.02	0.005
Silver	mg/L	-		0.0001	0.00005	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001
Sodium	mg/L	200	AO	NV	**442**	**339**	**346**	**346**	**314**	**282**	**349**	**320**	**314**	**334**	**352**	**250**
Strontium	mg/L	-		NV	2.49	2.44	2.53	2.53	2.21	2.21	2.3	2.23	2.21	2.4	2.29	1.94
Thallium	mg/L	-		0.0003	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.00025	< 0.00005
Vanadium	mg/L	-		0.006	0.0114	0.013	0.012	0.012	0.0053	0.0047	0.0019	0.0051	0.0057	0.0055	0.0067	0.0045
Zinc	mg/L	5	AO	0.02	0.01	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.01	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	NV										200	4980	2050
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	16.5	10.2	15	15		12.3	14.3	10.1	14.4	9.2	12.9	11
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	6.96	7.28	7.01	7.01	7.53	6.75	7.15	7.1	6.91	7.01	6.98	7.13
Field Conductivity	µS/cm	-		NV	3720	2905	3399	3399	3580	3550	2680	3500	2900	2900	>4000	3220

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	14-III 12-Oct-22	14-III 19-Apr-23	14-III 12-Oct-23	16-II 13-May-08	16-II 14-Aug-08	16-II 25-May-09	16-II 4-Aug-09	16-II 6-Oct-09	16-II 8-Jun-10	16-II 15-Oct-10	16-II 12-May-11	16-II 9-Nov-11
Alkalinity	mg/L	500	OG	NV				481	476	441	457	439	410	380	313	313
Conductivity	µS/cm	-		NV				1000	1100	888	966	881	726	688	645	645
pH	pH Units	6.5-8.5	OG	6.5 - 8.5				6.91	7.1	7.35	7.3	7.31	7.55	7.61	7.75	-
TDS	mg/L	500	AO	NV				**650**	**717**	**577**	**628**	**573**	472	447	366	366
DOC	mg/L	5		NV				2	3.9	3	3	2	1	1	1.1	-
COD	mg/L	-		NV				4	10	8	5	11	2	< 2	8	8
Phenols	mg/L	-		0.001				<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001
Chloride	mg/L	250	AO	NV				57	63	26	23	26	15	14	8	8
Ammonia, total	mg/L	-		NV				<0.1	<0.1	0.04	0.2	0.4	0.02	< 0.05	<0.01	0.8
Unionized Ammonia	mg/L	-		0.02												
Fluoride	mg/L	2.4	MAC	NV				<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	<0.1
Sulphate	mg/L	500	AO	NV				29	66	40	59	32	25	22	18	18
Nitrite (N)	mg/L	1	MAC	NV				<0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.01	<0.01
Nitrate (N)	mg/L	10	MAC	NV				1	1.6	0.7	0.5	0.5	0.9	0.9	0.8	0.8
Bromide	mg/L	-		NV				-	-	< 0.1	-	-	0.5	-	<1	<1
TKN	mg/L	-		NV				0.2	0.5	0.3	0.5	0.6	0.2	0.2	0.4	0.4
Hardness	mg/L	500	OG	NV				470	**527**	425	425	391	381	422	310	310
Aluminum	mg/L	0.1	OG	0.075				0.04	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	<0.005
Antimony	mg/L	0.006	IMAC	0.02				<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	<0.0005
Arsenic	mg/L	0.025	IMAC	0.005				<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.005	<0.001	<0.001
Barium	mg/L	1	MAC	NV				0.2	0.2	0.3	0.4	0.2	0.2	0.2	0.16	0.14
Beryllium	mg/L	-		1.1				<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.005	<0.0005
Boron	mg/L	5	IMAC	0.2				0.123	0.1	0.4	0.4	0.2	< 0.1	< 0.1	0.085	0.05
Cadmium	mg/L	0.005	MAC	0.0005				<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001
Calcium	mg/L	-		NV				152	179	134	134	122	125	141	100	110
Chromium	mg/L	0.05	MAC	0.001	Damaged	Damaged	Damaged	0.0009	0.0002	0.0002	0.0002	0.0001	0.0007	< 0.0001	<0.005	<0.005
Chromium (VI)	mg/L															
Cobalt	mg/L	-		0.0009				0.0003	<0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	<0.0005	<0.0005
Copper	mg/L	1	AO	0.005				0.0017	0.0024	0.006	0.0023	0.0007	0.0005	0.0025	0.001	0.001
Iron	mg/L	0.3	AO	0.3				0.1	<0.1	<0.1	< 0.1	< 0.1	0.1	< 0.1	<0.1	<0.1
Lead	mg/L	0.01	MAC	0.005				<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.0005	<0.0005
Magnesium	mg/L	-		NV				22	20	22	22	21	17	17	14	12
Manganese	mg/L	0.05	AO	NV				<0.01	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.002	0.003
Mercury	mg/L	0.001	MAC	0.0002				<0.00002	<0.00005	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00001	<0.00001
Molybdenum	mg/L	-		0.04				<0.002	<0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.003	0.001	0.0014
Nickel	mg/L	-		0.025				<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.001	<0.001
Potassium	mg/L	-		NV				25.3	26.6	32	65.4	56	21.6	21.8	14	9
Phosphorus-Total	mg/L	-		0.03				<0.01	0.2	0.01	< 0.01	< 0.01	< 0.01	0.009	0.21	0.04
Selenium	mg/L	0.01	MAC	0.1				<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.002	<0.002
Silver	mg/L	-		0.0001				<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	<0.0001	<0.0001
Sodium	mg/L	200	AO	NV				36	47	29	24	16	23	10	6	9.7
Strontium	mg/L	-		NV				0.315	0.184	0.28	0.297	0.144	0.161	0.165	0.14	0.14
Thallium	mg/L	-		0.0003				0.0003	<0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	<0.00005	<0.00005
Vanadium	mg/L	-		0.006				<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.0005
Zinc	mg/L	5	AO	0.02				<0.01	<0.01	< 0.01	< 0.01	< 0.01	<0.01	< 0.01	0.006	<0.005
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV				-	-	-	-	-	-	-	-	-
Field pH	pH Units	6.5-8.5	OG	6.5-8.5				-	-	-	-	-	-	-	-	-
Field Conductivity	µS/cm	-		NV				-	-	-	-	-	-	-	-	-

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	16-II 19-Apr-12	16-II 29-Oct-12	16-II 3-Jun-13	16-II 29-Oct-13	16-II 1-May-14	16-II 24-Sep-14	16-II 27-Apr-15	16-II 5-Oct-15	16-II 25-Apr-16	16-II 19-Oct-16	16-II 12-Apr-17	16-II 5-Oct-17
Alkalinity	mg/L	500	OG	NV	410	320	322	290	308	273	274	255	347	294	317	471
Conductivity	µS/cm	-		NV	800	650	688	626	713	694	595	627	900	892	878	1660
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.57	7.68	7.68	7.77	7.74	7.72	7.79	7.87	7.76	7.7	7.78	7.76
TDS	mg/L	500	AO	NV	463	482	400	360	428	379	340	339	**501**	**514**	**517**	**941**
DOC	mg/L	5		NV	1	1.2	4.2	-	2.9	3.3	2.4	1.7	0.8	1	2.2	**10.2**
COD	mg/L	-		NV	6.4	10	17	< 5	< 5	< 5	< 5	< 5	47	15	6	28
Phenols	mg/L	-		0.001	<0.0010	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.01
Chloride	mg/L	250	AO	NV	14	7	13	11	46	41	16	28	66	80	73	127
Ammonia, total	mg/L	-		NV	<0.01	0.05	< 0.01	0.02	< 0.01	0.12	0.06	0.05	0.05	0.03	< 0.01	0.08
Unionized Ammonia	mg/L	-		0.02												
Fluoride	mg/L	2.4	MAC	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
Sulphate	mg/L	500	AO	NV	15	120	20	14	19	19	19	16	20	37	24	178
Nitrite (N)	mg/L	1	MAC	NV	<0.010	<0.010	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.3	< 0.05
Nitrate (N)	mg/L	10	MAC	NV	0.65	1.6	1.3	1.5	2.2	2.8	2.2	2	2.9	2.5	2.3	0.7
Bromide	mg/L	-		NV	<1.0	<1.0	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	-		
TKN	mg/L	-		NV	0.67	0.38	0.21	< 0.1	0.5	0.3	0.4	0.4	0.4	0.2	0.5	1.6
Hardness	mg/L	500	OG	NV	400	330	395	359	389	325	298	306	401	442	371	**590**
Aluminum	mg/L	0.1	OG	0.075	<0.0050	<0.0050	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.04	0.07	**0.11**
Antimony	mg/L	0.006	IMAC	0.02	<0.00050	<0.00050	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0002	< 0.0001	0.0003	< 0.0001	0.0002
Arsenic	mg/L	0.025	IMAC	0.005	<0.0010	<0.0010	0.0001	< 0.0001	0.0001	0.0013	< 0.0001	< 0.0001	0.0001	< 0.0001	0.0002	0.0006
Barium	mg/L	1	MAC	NV	0.18	0.12	0.15	0.12	0.14	0.14	0.12	0.1	0.19	0.19	0.33	0.41
Beryllium	mg/L	-		1.1	<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	mg/L	5	IMAC	0.2	0.06	0.036	0.087	0.061	0.041	0.042	0.046	0.033	0.051	0.08	0.165	2.53
Cadmium	mg/L	0.005	MAC	0.0005	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.000014
Calcium	mg/L	-		NV	140	110	135	124	133	111	101	102	133	148	123	193
Chromium	mg/L	0.05	MAC	0.001	<0.0050	-	0.0014	**0.0825**	0.0004	0.0004	0.002	0.0046	< 0.0002	0.0012	0.0025	< 0.001
Chromium (VI)	mg/L															
Cobalt	mg/L	-		0.0009	<0.00050	<0.00050	< 0.0001	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.012
Copper	mg/L	1	AO	0.005	0.0014	0.0012	0.0009	0.0007	0.0012	0.001	0.0017	0.0014	0.001	0.0011	0.0028	0.0074
Iron	mg/L	0.3	AO	0.3	<0.10	<0.10	< 0.005	0.01	< 0.005	< 0.005	< 0.005	0.12	< 0.005	< 0.005	0.02	0.03
Lead	mg/L	0.01	MAC	0.005	<0.00050	<0.00050	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Magnesium	mg/L	-		NV	15	12	14	12	13.5	11.6	11.3	12.1	16.5	17.7	15.5	26.2
Manganese	mg/L	0.05	AO	NV	<0.0020	<0.0020	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0	< 0.001	0	0	0.01
Mercury	mg/L	0.001	MAC	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
Molybdenum	mg/L	-		0.04	0.00082	0.0012	0.0008	0.0006	0.0008	0.0008	0.0008	0.0012	0.0005	0.0004	0.0005	0.0004
Nickel	mg/L	-		0.025	<0.0010	<0.0010	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		NV	11	7.5	8.4	5.2	9.1	10.4	8.3	6.2	20.5	13.9	30.8	44.1
Phosphorus-Total	mg/L	-		0.03	<0.10	0.044	0.14	0.06	0.1	0.08	0.14	0.14	0.52	0.05	0.13	0.12
Selenium	mg/L	0.01	MAC	0.1	<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	mg/L	-		0.0001	<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	mg/L	200	AO	NV	10	9.3	10.5	13.7	12.2	10.2	10.5	12.5	24.4	31.2	49.4	90.3
Strontium	mg/L	-		NV	0.17	0.14	-	-	-	0.19	0.18	0.18	0.25	0.28	0.25	0.4
Thallium	mg/L	-		0.0003	<0.000050	<0.000050	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		0.006	<0.00050	<0.00050	0.0043	0.0007	0.003	0.0063	0.0023	0.0011	0.0013	0.0011	0.0015	0.0024
Zinc	mg/L	5	AO	0.02	<0.0050	<0.0050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	9.8	7.4	10.6	9.3	8.6	10.7	8.1	10.3	6.2	11	6.8	10.8
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	6.74	7.61	8.12	7.11	8.08	7.6	7.71	7.47	8.26	6.84	7.48	7.59
Field Conductivity	µS/cm	-		NV	801	720	700	680	750	700	720	471	880	795	801	1308

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	16-II 10-Apr-18	16-II 1-Oct-18	16-II 22-Apr-19	16-II 8-Oct-19	16-II 13-Apr-20	16-II 14-Oct-20	16-II 21-Apr-21	16-II 18-Oct-21	16-II 20-Apr-22	16-II 12-Oct-22	16-II 19-Apr-23	16-II 12-Oct-23
Alkalinity	mg/L	500	OG	NV	336	392	316	353	281	249	292	272	257	374	286	351
Conductivity	µS/cm	-		NV	932	1180	982	892	723	586	666	587	609	809	676	788
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.95	7.58	7.73	7.61	7.8	7.79	7.93	7.55	7.65	7.58	7.81	7.38
TDS	mg/L	500	AO	NV	492	**657**	**545**	**545**	395	327	379	351	323	471	388	413
DOC	mg/L	5		NV	**8.7**	**5.4**	**5.2**	**5.5**	**4**	**2.8**	**5.2**	**3.8**	**2.9**	**2.6**	**2.2**	**5.3**
COD	mg/L	-		NV	24	14	19	269	50	5	19	6	8	27	23	7
Phenols	mg/L	-		0.001	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001
Chloride	mg/L	250	AO	NV	45.5	96.9	55.4	37.7	12.8	8.5	12.1	13.4	8.9	9.7	10.5	11.2
Ammonia, total	mg/L	-		NV	2.64	1.45	1.88	1.05	0.78	0.31	0.13	0.58	1.11	0.08	0.74	0.11
Unionized Ammonia	mg/L	-		0.02			0.02	< 0.01	< 0.01	0.03		< 0.01	< 0.01	< 0.01	< 0.01	<0.01
Fluoride	mg/L	2.4	MAC	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
Sulphate	mg/L	500	AO	NV	36	68	83	58	55	35	36	33	28	36	44	51
Nitrite (N)	mg/L	1	MAC	NV	< 0.05	0.07	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	<0.05
Nitrate (N)	mg/L	10	MAC	NV	0.69	0.64	4.13	4.32	3.31	2.35	2.3	2.55	2.39	2.03	< 0.5	1.91
Bromide	mg/L	-		NV												
TKN	mg/L	-		NV	3.7	1.9	2.5	12.7	1.7	0.7	0.6	1.1	1.2	0.5	1.1	0.4
Hardness	mg/L	500	OG	NV	325	437	371	473	320	295	317	292	264	413	304	381
Aluminum	mg/L	0.1	OG	0.075	0.06	0.08	0.08	0.1	0.06	0.04	0.07	0.06	0.03	0.06	0.08	0.04
Antimony	mg/L	0.006	IMAC	0.02	0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	0.0001	0.0001	< 0.0001	0.0001
Arsenic	mg/L	0.025	IMAC	0.005	0.0001	0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001
Barium	mg/L	1	MAC	NV	0.231	0.229	0.171	0.209	0.146	0.104	0.134	0.144	0.106	0.176	0.166	0.11
Beryllium	mg/L	-		1.1	< 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	mg/L	5	IMAC	0.2	0.954	0.619	0.461	0.264	0.242	0.178	0.171	0.105	0.14	0.216	0.159	0.228
Cadmium	mg/L	0.005	MAC	0.0005	< 0.000014	0.000018	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000010	0.000028	<0.000015
Calcium	mg/L	-		NV	107	146	128	164	109	99.8	106	97.2	87.2	137	103	126
Chromium	mg/L	0.05	MAC	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)	mg/L												< 0.001	< 0.001	< 0.001	<0.01
Cobalt	mg/L	-		0.0009	< 0.005	0.006	0.009	< 0.005	0.0004	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.0003
Copper	mg/L	1	AO	0.005	0.0055	0.0039	0.004	0.0029	0.0032	0.0017	0.0029	0.0022	0.0023	0.0019	0.0017	0.0019
Iron	mg/L	0.3	AO	0.3	0.263	**0.538**	< 0.005	0.006	0.014	0.005	0.022	0.009	< 0.005	0.045	0.005	<0.005
Lead	mg/L	0.01	MAC	0.005	< 0.00002	0.00003	< 0.00002	< 0.00002	0.00004	0.00003	0.00006	0.00002	0.00002	0.00011	0.00003	<0.00002
Magnesium	mg/L	-		NV	14.1	17.5	12.5	15.3	11.6	11.1	12.6	11.9	11.3	17	11.4	16.1
Manganese	mg/L	0.05	AO	NV	0.026	0.039	0.037	0.043	**0.066**	**0.139**	**0.499**	**0.664**	**0.539**	**0.143**	**0.112**	0.007
Mercury	mg/L	0.001	MAC	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	mg/L	-		0.04	0.0007	0.0007	0.0012	0.0012	0.0016	0.0017	0.0013	0.0009	0.0008	0.0004	0.0004	0.0004
Nickel	mg/L	-		0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.0007
Potassium	mg/L	-		NV	46.6	26.5	15.9	19.9	15.9	9.3	19.6	22	21.2	36.3	49	20.9
Phosphorus-Total	mg/L	-		0.03	0.06	0.04	0.04	7.74	0.8	0.28	0.25	0.35	0.18	0.22	0.09	0.14
Selenium	mg/L	0.01	MAC	0.1	< 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	mg/L	-		0.0001	< 0.00002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001
Sodium	mg/L	200	AO	NV	38	63.7	57.9	36.5	20.8	9.8	16.4	9.5	9.7	10.3	7.9	8
Strontium	mg/L	-		NV	0.211	0.265	0.258	0.313	0.268	0.191	0.202	0.169	0.144	0.201	0.199	0.236
Thallium	mg/L	-		0.0003	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.005	0.00005	<0.00005
Vanadium	mg/L	-		0.006	0.0002	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0001	0.0002	0.0003	0.0009	0.0002
Zinc	mg/L	5	AO	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	<0.005
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV			11	9	9.6	10.6	7.1	10.2	7.4	13	8.7	12.2
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	7.95	7.58	7.65	7.01	6.78	7.67	7.53	7.65	7.59	7.2	7.54	7.23
Field Conductivity	µS/cm	-		NV	869	1130	1020	774	680	540	640	780	840	835	616	683

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	17-I 13-May-08	17-I 14-Aug-08	17-I 25-May-09	17-I 5-Aug-09	17-I 10-Jun-10	17-I 6-Oct-10	17-I 12-May-11	17-I 9-Nov-11	17-I 19-Apr-12	17-I 29-Oct-12	17-I 3-Jun-13	17-I 29-Oct-13
Alkalinity	mg/L	500	OG	NV	492	479	**533**	**627**	**575**	**587**	**570**	**604**	**590**	**570**	**560**	**533**
Conductivity	µS/cm	-		NV	1250	1260	1320	1460	1310	1240	1320	1340	1300	1300	1260	1270
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7	7.15	7.26	7.28	7.34	7.39	7.54	7.73	7.66	7.64	7.48	7.57
TDS	mg/L	500	AO	NV	**811**	**816**	**857**	**948**	**852**	**803**	**765**	**783**	**777**	**773**	**742**	**735**
DOC	mg/L	5		NV	**10**	**8.6**	**17**	**9**	5	**8**	**6.9**	-	**6.6**	**6.7**	**11.6**	-
COD	mg/L	-		NV	26	21	6	21	21	19	27	42	30	22	15	12
Phenols	mg/L	-		0.001	0.002	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	0.003	<0.0010	<0.0010	< 0.001	< 0.001
Chloride	mg/L	250	AO	NV	84	100	104	120	113	102	90	82	74	75	67	77
Ammonia, total	mg/L	-		NV	0.2	0.2	0.2	0.19	0.32	0.21	0.46	<0.1	0.44	0.86	0.4	0.43
Unionized Ammonia	mg/L	-		0.02												
Fluoride	mg/L	2.4	MAC	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
Sulphate	mg/L	500	AO	NV	159	109	81	55	56	36	28	27	39	29	31	40
Nitrite (N)	mg/L	1	MAC	NV	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.01	<0.01	<0.010	<0.010	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	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
Bromide	mg/L	-		NV	-	-	-	-	< 0.1	-	<1	-	<1.0	<1.0	< 0.4	< 0.4
TKN	mg/L	-		NV	1	0.8	0.7	0.8	0.7	0.9	1	2	1.3	1.2	1.02	0.6
Hardness	mg/L	500	OG	NV	**635**	**625**	**648**	**663**	**627**	**646**	**580**	**600**	**590**	**620**	**642**	**632**
Aluminum	mg/L	0.1	OG	0.075	0.02	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	0.006	<0.0050	<0.0050	0.06	0.05
Antimony	mg/L	0.006	IMAC	0.02	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	<0.0005	<0.00050	<0.00050	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.005	<0.01	<0.01	< 0.01	< 0.01	< 0.005	< 0.005	<0.001	<0.001	<0.0010	<0.0010	0.0012	0.0011
Barium	mg/L	1	MAC	NV	0.2	0.1	0.2	0.2	0.2	0.2	0.24	0.27	0.26	0.25	0.28	0.26
Beryllium	mg/L	-		1.1	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.005	<0.0005	<0.00050	<0.00050	< 0.002	< 0.002
Boron	mg/L	5	IMAC	0.2	1.01	0.7	0.4	0.8	0.4	<0.1	0.44	0.47	0.5	0.45	0.433	0.439
Cadmium	mg/L	0.005	MAC	0.0005	<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002
Calcium	mg/L	-		NV	204	200	210	211	203	208	190	190	190	200	208	207
Chromium	mg/L	0.05	MAC	0.001	0.0011	0.0002	0.0002	0.0003	0.0004	0.0003	<0.005	<0.005	<0.0050	-	0.0021	0.0309
Chromium (VI)	mg/L															
Cobalt	mg/L	-		0.0009	0.0221	0.0135	0.0208	0.0267	0.0215	0.029	0.036	0.036	0.031	0.029	0.0189	0.026
Copper	mg/L	1	AO	0.005	0.0035	0.0019	0.0017	0.0056	0.0017	0.0037	0.005	0.014	0.0045	0.0031	0.003	0.0031
Iron	mg/L	0.3	AO	0.3	**1.3**	**0.67**	**1.2**	**1.2**	**1.3**	**2.1**	**2.1**	**2.5**	**2.2**	**2.2**	**1.9**	**2.15**
Lead	mg/L	0.01	MAC	0.005	<0.001	<0.001	< 0.001	0.002	< 0.001	< 0.001	<0.0005	<0.0005	<0.00050	<0.00050	0.00004	< 0.00002
Magnesium	mg/L	-		NV	30	31	30	33	29	31	27	28	27	29	29.5	27.8
Manganese	mg/L	0.05	AO	NV	**1.35**	**0.7**	**1.58**	**1.55**	**1.58**	**1.45**	**1.9**	**1.9**	**1.7**	**1.7**	**1.69**	**1.68**
Mercury	mg/L	0.001	MAC	0.0002	<0.00002	<0.00005	< 0.00002	< 0.00002	< 0.00002	0.00004	<0.00001	-	<0.00001	<0.00001	< 0.00002	< 0.00002
Molybdenum	mg/L	-		0.04	<0.002	<0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.001	0.0006	0.00059	<0.00050	0.0006	0.0004
Nickel	mg/L	-		0.025	0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.013	0.014	0.013	0.021	< 0.01	0.01
Potassium	mg/L	-		NV	2.8	2.8	2.3	3	2.4	2.3	2.4	2.4	2.5	3	3.4	3.1
Phosphorus-Total	mg/L	-		0.03	<0.01	0.06	< 0.01	< 0.01	< 0.01	< 0.02	0.036	-	<0.10	<0.002	0.04	< 0.01
Selenium	mg/L	0.01	MAC	0.1	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.002	<0.002	<0.0020	<0.0020	< 0.001	< 0.001
Silver	mg/L	-		0.0001	<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002
Sodium	mg/L	200	AO	NV	59	57	54	80	69	60	62	61	62	63	63.1	57.2
Strontium	mg/L	-		NV	0.431	0.426	0.471	0.519	0.506	0.457	0.48	0.54	0.54	0.52	-	-
Thallium	mg/L	-		0.0003	0.0007	<0.0003	0.0008	0.0008	0.0015	0.0011	<0.00005	<0.00005	<0.000050	<0.000050	< 0.00005	< 0.00005
Vanadium	mg/L	-		0.006	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.002	<0.0005	<0.00050	<0.00050	0.0067	0.0035
Zinc	mg/L	5	AO	0.02	<0.01	<0.01	<0.01	< 0.01	< 0.01	< 0.01	0.008	0.008	<0.0050	<0.0050	< 0.005	< 0.005
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	-	-	-	-	-	-	-	-	12.2	8.3	11.2	11.3
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	-	-	-	-	-	-	-	-	6.91	7.44	7.31	6.91
Field Conductivity	µS/cm	-		NV	-	-	-	-	-	-	-	-	1313	1340	1267	1240

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	17-I 1-May-14	17-I 24-Sep-14	17-I 27-Apr-15	17-I 5-Oct-15	17-I 25-Apr-16	17-I 19-Oct-16	17-I 12-Apr-17	17-I 5-Oct-17	17-I 1-Oct-18	17-I 22-Apr-19	17-I 8-Oct-19	17-I 13-Apr-20
Alkalinity	mg/L	500	OG	NV	**665**	**668**	**706**	**689**	**735**	**682**	**777**	**751**	**831**	**770**	**794**	**811**
Conductivity	µS/cm	-		NV	1490	1480	1520	1470	1530	1470	1640	1640	1880	1880	1970	2040
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.42	7.34	7.39	7.48	7.39	7.37	7.37	7.4	7.44	7.4	7.38	7.47
TDS	mg/L	500	AO	NV	**864**	**841**	**883**	**853**	**880**	**896**	**965**	**923**	**1088**	**1077**	**1128**	**1174**
DOC	mg/L	5		NV	**14.9**	**14.3**	**8.6**	**8.9**	**10.6**	**10.7**	**14.2**	**14.5**	**18.3**	**16.4**	**22.2**	**18.8**
COD	mg/L	-		NV	29	29	25	26	44	33	37	35	73	66	87	95
Phenols	mg/L	-		0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.008	0.011	< 0.002	< 0.002	< 0.002
Chloride	mg/L	250	AO	NV	86	78	87	67	69	73	84	75	139	144	187	161
Ammonia, total	mg/L	-		NV	0.38	0.43	0.52	0.59	0.31	0.49	0.28	0.5	0.63	0.7	1.23	1.11
Unionized Ammonia	mg/L	-		0.02										< 0.01	< 0.01	< 0.01
Fluoride	mg/L	2.4	MAC	NV	0.1	< 0.1	0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1	< 0.1
Sulphate	mg/L	500	AO	NV	50	40	44	33	33	36	39	33	44	48	< 10	56
Nitrite (N)	mg/L	1	MAC	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.5	< 0.05
Nitrate (N)	mg/L	10	MAC	NV	0.2	< 0.1	0.1	0.3	0.2	0.2	< 0.1	< 0.05	0.22	< 0.05	< 0.5	< 0.05
Bromide	mg/L	-		NV	< 0.4	< 0.4	< 0.4	< 0.4	0.4	-						
TKN	mg/L	-		NV	1.3	1.1	1.3	1.3	1	1.2	1.2	1.3	2.2	2.1	3.2	3.4
Hardness	mg/L	500	OG	NV	**691**	**666**	**673**	**692**	**701**	**792**	**784**	**749**	**787**	**840**	**838**	**851**
Aluminum	mg/L	0.1	OG	0.075	0.04	0.04	0.05	0.05	0.05	0.06	**0.12**	**0.12**	**0.13**	**0.11**	**0.13**	**0.11**
Antimony	mg/L	0.006	IMAC	0.02	< 0.0001	0.0001	0.0001	0.0001	< 0.0001	0.0003	< 0.0001	< 0.0001	0.0001	0.0001	< 0.0001	0.0002
Arsenic	mg/L	0.025	IMAC	0.005	0.0011	0.0024	0.0015	0.0012	0.0012	0.0009	0.001	0.001	0.0009	0.0008	0.0006	0.0006
Barium	mg/L	1	MAC	NV	0.27	0.29	0.29	0.3	0.29	0.34	0.48	0.37	0.378	0.425	0.431	0.473
Beryllium	mg/L	-		1.1	< 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	mg/L	5	IMAC	0.2	0.694	0.644	0.684	0.649	0.613	0.697	0.866	0.813	1.04	1.13	1.71	1.74
Cadmium	mg/L	0.005	MAC	0.0005	< 0.00002	< 0.00002	< 0.00002	0.00003	< 0.00002	0.00002	< 0.00002	< 0.000014	0.000029	< 0.000015	< 0.000029	< 0.000029
Calcium	mg/L	-		NV	224	215	215	221	226	256	250	240	253	273	270	276
Chromium	mg/L	0.05	MAC	0.001	0.0005	< 0.0002	0.004	0.008	< 0.0002	0.003	0.007	< 0.001	0.001	0.001	0.005	0.001
Chromium (VI)	mg/L															
Cobalt	mg/L	-		0.0009	0.029	0.031	0.03	0.031	0.034	0.037	0.039	0.037	0.039	0.037	0.041	0.0403
Copper	mg/L	1	AO	0.005	0.0046	0.0052	0.0058	0.0051	0.0051	0.0049	0.0059	0.0046	0.0114	0.0073	0.0112	0.012
Iron	mg/L	0.3	AO	0.3	**1.69**	**2.14**	**1.57**	**2.16**	**1.82**	**1.96**	**2.39**	**2.24**	**2.67**	**2.07**	**2.52**	**2.63**
Lead	mg/L	0.01	MAC	0.005	0.00005	0.00007	0.00008	0.00009	0.00004	0.00006	< 0.00002	0.00009	0.00071	0.00009	0.00015	0.00014
Magnesium	mg/L	-		NV	32	31.6	33.2	33.8	32.8	37.1	38.7	36.3	37.6	38.3	39.6	39.1
Manganese	mg/L	0.05	AO	NV	**1.73**	**1.66**	**1.66**	**1.66**	**1.72**	**1.91**	**2**	**1.99**	**2.07**	**2.31**	**2.25**	**2.31**
Mercury	mg/L	0.001	MAC	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		0.04	0.0006	0.0006	0.0007	0.0006	0.0006	0.0005	0.0005	0.0005	0.0005	0.0005	0.0007	0.001
Nickel	mg/L	-		0.025	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.02	0.02	0.02	0.02	0.02
Potassium	mg/L	-		NV	3.1	3.6	3.2	3.5	3.2	3.6	3.4	3.5	4	4	5	5.4
Phosphorus-Total	mg/L	-		0.03	0.02	0.19	0.22	0.17	0.08	0.06	0.05	0.12	0.05	0.03	0.07	0.04
Selenium	mg/L	0.01	MAC	0.1	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	0.001	0.003	0.001
Silver	mg/L	-		0.0001	< 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	mg/L	200	AO	NV	64.7	68.2	72.3	75.7	70.2	76.2	79.5	80.4	106	102	144	143
Strontium	mg/L	-		NV	-	0.68	0.67	0.69	0.69	0.78	0.73	0.71	0.759	0.774	0.792	0.765
Thallium	mg/L	-		0.0003	< 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	mg/L	-		0.006	0.0066	0.0165	0.0061	0.0027	0.0028	0.0027	0.0036	0.0038	0.0008	0.0006	0.0008	0.0008
Zinc	mg/L	5	AO	0.02	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.005	< 0.005
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	11.2	13.1	11.1	11.7	7.1	11.9	9.2	12.3		11.3	12.8	11.3
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	7.48	7.14	7.39	6.9	7.45	7.16	7.03	7.69	7.44	6.81	6.41	6.69
Field Conductivity	µS/cm	-		NV	1550	1470	1620	1080	1080	1270	1259	1310	1770	1800	1388	1832

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	17-I 14-Oct-20	17-I 21-Apr-21	17-I 18-Oct-21	17-I 20-Apr-22	17-I 12-Oct-22	17-I 19-Apr-23	17-I 12-Oct-23	17-II 13-May-08	17-II 14-Aug-08	17-II 28-May-09	17-II 5-Aug-09	17-II 10-Jun-10
Alkalinity	mg/L	500	OG	NV	**819**	**832**	**850**	**802**	**782**	**814**	**780**	**622**	**650**	**618**	**622**	**567**
Conductivity	µS/cm	-		NV	1910	1980	1840	1970	1790	1910	1720	1380	1430	1370	1360	1140
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.54	7.64	7.45	7.35	7.61	7.42	7.45	6.87	7.04	7.21	7.27	7.31
TDS	mg/L	500	AO	NV	**1156**	**1183**	**1198**	**1127**	**1101**	**1095**	**946**	**898**	**926**	**891**	**884**	**744**
DOC	mg/L	5		NV	**13.5**	**19.2**	**16.5**	**15.1**	**7.1**	**16.7**	**15.5**	**16**	**17.1**	**17**	**16**	**11**
COD	mg/L	-		NV	77	89	78	89	77	106	70	40	40	39	39	39
Phenols	mg/L	-		0.001	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001	0.001	0.001	< 0.001	0.002	0.001
Chloride	mg/L	250	AO	NV	144	151	156	141	129	120	98.8	94	91	77	95	65
Ammonia, total	mg/L	-		NV	1.24	0.93	1.02	2.25	1.32	1.6	1.63	11.8	19.2	20.4	22	16.3
Unionized Ammonia	mg/L	-		0.02	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	<0.01					
Fluoride	mg/L	2.4	MAC	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1	<0.1	< 0.1	<0.1	< 0.1	< 0.1	< 0.1
Sulphate	mg/L	500	AO	NV	56	57	62	51	57	26	51	82	38	48	42	36
Nitrite (N)	mg/L	1	MAC	NV	< 0.05	0.06	0.06	< 0.05	< 0.05	< 0.05	<0.05	<0.1	<0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	NV	0.17	< 0.05	0.08	< 0.05	0.12	0.47	0.08	<0.1	<0.1	< 0.1	< 0.1	< 0.1
Bromide	mg/L	-		NV								-	-	-	-	< 0.1
TKN	mg/L	-		NV	3.2	3	2.9	3.6	2.9	3.5	2.7	23	20.7	49.8	22.9	16.4
Hardness	mg/L	500	OG	NV	**845**	**882**	**855**	**833**	**835**	**843**	**779**	**589**	**561**	**518**	**527**	**566**
Aluminum	mg/L	0.1	OG	0.075	0.1	**0.13**	**0.12**	0.07	0.09	**0.13**	0.08	0.02	<0.01	< 0.01	< 0.01	< 0.01
Antimony	mg/L	0.006	IMAC	0.02	0.0003	0.0006	0.0002	0.0002	0.0002	0.0003	0.0002	<0.01	<0.01	< 0.01	< 0.01	< 0.01
Arsenic	mg/L	0.025	IMAC	0.005	0.0007	0.0007	0.0006	0.0007	0.0006	0.0006	0.0006	<0.01	<0.01	< 0.01	< 0.01	< 0.005
Barium	mg/L	1	MAC	NV	0.483	0.488	0.49	0.486	0.477	0.518	0.459	0.5	0.5	0.5	0.5	0.4
Beryllium	mg/L	-		1.1	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	<0.1	<0.1	< 0.1	< 0.1	< 0.1
Boron	mg/L	5	IMAC	0.2	1.63	1.89	2.1	2.15	2.16	2.47	2.18	0.988	0.9	1	1.1	0.7
Cadmium	mg/L	0.005	MAC	0.0005	0.000021	< 0.000029	< 0.000029	0.000021	< 0.000012	< 0.000012	<0.000015	0.0001	<0.0001	< 0.0001	0.0001	0.0001
Calcium	mg/L	-		NV	273	288	282	273	275	271	251	191	180	168	168	187
Chromium	mg/L	0.05	MAC	0.001	< 0.001	0.001	0.001	< 0.001	< 0.001	< 0.001	<0.001	0.001	0.0012	0.0008	0.0007	0.0006
Chromium (VI)	mg/L							< 0.001	< 0.001	< 0.001	<0.01					
Cobalt	mg/L	-		0.0009	0.038	0.037	0.035	0.039	0.033	0.027	0.0289	0.0128	0.0112	0.0103	0.0109	0.009
Copper	mg/L	1	AO	0.005	0.0087	0.0099	0.0073	0.0076	0.0055	0.0063	0.0048	0.0134	0.0101	0.0042	0.0045	0.001
Iron	mg/L	0.3	AO	0.3	**2.68**	**2.93**	**3.17**	**3.29**	**3.08**	**3.1**	**2.95**	**0.5**	**0.93**	**2.2**	**2.6**	**2.9**
Lead	mg/L	0.01	MAC	0.005	0.00009	0.00015	0.00009	0.00008	0.00006	0.00007	0.00005	0.002	<0.001	< 0.001	0.002	< 0.001
Magnesium	mg/L	-		NV	39.8	39.3	36.4	37	35.8	40.2	36.9	27	27	24	26	24
Manganese	mg/L	0.05	AO	NV	**2.18**	**2.5**	**2.4**	**2.39**	**2.24**	**2.24**	**2.08**	**6.12**	**3.08**	**4.37**	**3.76**	**3.38**
Mercury	mg/L	0.001	MAC	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002	<0.00002	<0.00005	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		0.04	0.0008	0.0012	0.001	0.0007	0.0007	0.0007	0.0006	0.001	<0.002	< 0.002	< 0.002	< 0.002
Nickel	mg/L	-		0.025	0.02	0.03	0.02	0.02	0.02	0.02	0.0188	0.02	0.02	0.01	0.02	0.01
Potassium	mg/L	-		NV	6.5	5.8	6.2	6.3	6.6	7.5	7.9	19.2	22.9	23.7	25.9	22.8
Phosphorus-Total	mg/L	-		0.03	0.04	0.08	0.04	0.06	0.03	0.03	0.04	<0.01	0.11	0.01	< 0.01	< 0.01
Selenium	mg/L	0.01	MAC	0.1	0.001	0.001	0.003	0.002	0.002	0.002	0.002	<0.01	<0.01	< 0.01	< 0.01	< 0.01
Silver	mg/L	-		0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	0.0003	0.0002	0.0002	0.0001	< 0.0001
Sodium	mg/L	200	AO	NV	139	136	138	129	121	118	110	75	82	68	72	60
Strontium	mg/L	-		NV	0.798	0.824	0.844	0.872	0.789	0.77	0.699	0.539	0.528	0.563	0.59	0.512
Thallium	mg/L	-		0.0003	< 0.00005	0.00007	< 0.00005	< 0.00005	< 0.005	0.00005	<0.00005	0.0022	0.0026	0.0016	0.0016	0.0021
Vanadium	mg/L	-		0.006	0.0008	0.0008	0.0008	0.0009	0.0008	0.0002	0.0009	<0.001	<0.001	< 0.001	< 0.001	< 0.001
Zinc	mg/L	5	AO	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	<0.01	<0.01	< 0.01	< 0.01	< 0.01
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	12.3	10.5	11.1	10.7	15.4	10.2	11.2	-	-	-	-	-
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	6.82	6.95	7.05	6.98	6.96	6.98	6.83	-	-	-	-	-
Field Conductivity	µS/cm	-		NV	1522	1730	1944	1832	1859	1598	1455	-	-	-	-	-

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	17-II 6-Oct-10	17-II 12-May-11	17-II 9-Nov-11	17-II 19-Apr-12	17-II 29-Oct-12	17-II 3-Jun-13	17-II 29-Oct-13	17-II 1-May-14	17-II 24-Sep-14	17-II 5-Oct-15	17-II 25-Apr-16	17-II 19-Oct-16
Alkalinity	mg/L	500	OG	NV	**648**	**526**	**545**	**550**	500	486	**505**	489	478	418	457	**512**
Conductivity	µS/cm	-		NV	1380	1200	1260	1200	1100	1110	1180	1140	1100	945	1060	1220
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.43	7.61	7.75	7.63	7.66	7.41	7.53	7.51	7.44	7.74	7.59	7.45
TDS	mg/L	500	AO	NV	**894**	**681**	**729**	**695**	**657**	**645**	**641**	**657**	**610**	**529**	**590**	**711**
DOC	mg/L	5		NV	**17**	**9.8**	-	**12**	**9.9**	**15.7**	-	**15.4**	**14.9**	**10.2**	**9.2**	**11.7**
COD	mg/L	-		NV	40	44	52	45	35	38	39	61	65	21	32	37
Phenols	mg/L	-		0.001	< 0.001	<0.001	0.006	<0.0010	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Chloride	mg/L	250	AO	NV	94	49	64	48	38	41	43	43	42	29	41	52
Ammonia, total	mg/L	-		NV	22.9	22	<0.1	21	16	12.8	17.8	22	16	13.3	16.2	21.2
Unionized Ammonia	mg/L	-		0.02												
Fluoride	mg/L	2.4	MAC	NV	< 0.1	<0.1	<0.1	<0.10	<0.10	< 0.1	0.1	0.1	< 0.1	0.1	0.1	< 0.1
Sulphate	mg/L	500	AO	NV	31	25	44	26	33	34	39	59	35	27	39	47
Nitrite (N)	mg/L	1	MAC	NV	< 0.1	<0.01	0.01	<0.010	0.17	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	NV	< 0.1	<0.1	<0.1	<0.10	<0.10	< 0.1	< 0.1	0.1	< 0.1	< 0.1	0.1	0.1
Bromide	mg/L	-		NV	-	<1	-	<1.0	<1.0	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	-
TKN	mg/L	-		NV	27.2	23	17	25	15	18	28	22	17.3	16.1	18.9	26.8
Hardness	mg/L	500	OG	NV	**517**	420	460	420	460	486	461	427	417	386	397	488
Aluminum	mg/L	0.1	OG	0.075	< 0.01	<0.005	<0.005	0.0077	<0.0050	0.05	0.05	0.03	0.03	0.04	0.03	0.05
Antimony	mg/L	0.006	IMAC	0.02	< 0.01	<0.005	<0.0005	<0.00050	<0.00050	< 0.0001	< 0.0001	< 0.0001	0.0001	0.0001	< 0.0001	0.0004
Arsenic	mg/L	0.025	IMAC	0.005	< 0.005	<0.001	<0.001	0.0011	<0.0010	0.0014	0.0009	0.0019	0.0036	0.0015	0.0015	0.002
Barium	mg/L	1	MAC	NV	0.5	0.41	0.42	0.42	0.36	0.41	0.41	0.35	0.36	0.32	0.32	0.47
Beryllium	mg/L	-		1.1	< 0.1	<0.005	<0.0005	<0.00050	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	5	IMAC	0.2	0.8	0.66	0.66	0.61	0.6	0.62	0.711	0.541	0.557	0.491	0.525	0.828
Cadmium	mg/L	0.005	MAC	0.0005	0.0001	<0.0001	<0.0001	<0.00010	<0.00010	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Calcium	mg/L	-		NV	165	140	150	140	150	159	152	139	137	127	130	158
Chromium	mg/L	0.05	MAC	0.001	0.0014	<0.005	<0.01	<0.0050	-	0.0017	0.0118	0.0006	< 0.0002	0.004	< 0.0002	0.002
Chromium (VI)	mg/L															
Cobalt	mg/L	-		0.0009	0.0127	0.011	0.011	0.0098	0.009	0.0068	0.011	0.008	0.011	0.008	0.008	0.015
Copper	mg/L	1	AO	0.005	0.0392	0.007	0.006	0.0026	0.022	0.0058	0.0075	0.0024	0.0022	0.0026	0.0013	0.0011
Iron	mg/L	0.3	AO	0.3	**7**	**5.7**	**4.8**	**7.9**	**1.3**	**6.51**	**7.34**	**8**	**8**	**5.72**	**6.15**	**9.18**
Lead	mg/L	0.01	MAC	0.005	0.002	<0.0005	<0.0005	<0.00050	<0.00050	0.00006	< 0.00002	0.0001	0.00005	0.00007	0.0001	0.00007
Magnesium	mg/L	-		NV	26	21	22	20	21	21.9	19.7	19.4	17.9	16.7	17.6	22.4
Manganese	mg/L	0.05	AO	NV	**3.06**	**2.6**	**2.5**	**2.3**	**2.4**	**2.56**	**2.67**	**2.14**	**2.19**	**1.83**	**1.72**	**2.35**
Mercury	mg/L	0.001	MAC	0.0002	< 0.00002	0.00005	0.00001	<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		0.04	< 0.002	<0.001	0.0006	0.00066	<0.00050	0.0005	0.0004	0.0006	0.0006	0.0006	0.0005	0.0005
Nickel	mg/L	-		0.025	0.02	0.014	0.016	0.013	0.018	< 0.01	0.01	0.01	< 0.01	< 0.01	< 0.01	0.02
Potassium	mg/L	-		NV	26.8	23	21	26	22	23.2	24.1	22.9	20.5	19.1	20.3	28
Phosphorus-Total	mg/L	-		0.03	< 0.02	1.5	4.4	<0.10	0.51	0.31	0.41	0.46	0.14	0.07	0.15	0.81
Selenium	mg/L	0.01	MAC	0.1	< 0.01	<0.002	<0.002	<0.0020	<0.0020	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0
Silver	mg/L	-		0.0001	0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Sodium	mg/L	200	AO	NV	77	54	55	54	46	49.4	50.1	42	40.1	34.5	39	57.3
Strontium	mg/L	-		NV	0.544	0.47	0.5	0.48	0.46	-	-	-	0.48	0.44	0.45	0.6
Thallium	mg/L	-		0.0003	0.002	0.00007	0.0001	0.00005	0.00009	0.0001	< 0.00005	0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		0.006	< 0.001	<0.001	0.0005	<0.00050	<0.00050	0.0056	0.0034	0.0052	0.0116	0.0014	0.0017	0.0018
Zinc	mg/L	5	AO	0.02	0.02	0.044	<0.005	0.012	<0.0050	< 0.005	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	-	-	-	12.3	7.7	11.2	12	9.5	13.8	13.8	4.8	14
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	-	-	-	7.01	7.56	7.86	6.9	7.59	7.34	7.18	7.65	7.19
Field Conductivity	µS/cm	-		NV	-	-	-	1245	1200	1151	1140	1250	1180	725	810	1065

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	17-II 12-Apr-17	17-II 5-Oct-17	17-II 10-Apr-18	17-II 1-Oct-18	17-II 22-Apr-19	17-II 8-Oct-19	17-II 13-Apr-20	17-II 14-Oct-20	17-II 21-Apr-21	17-II 18-Oct-21	17-II 20-Apr-22	17-II 12-Oct-22
Alkalinity	mg/L	500	OG	NV	**533**	**628**	**551**	**571**	**532**	**560**	**549**	**558**	**522**	**550**	417	454
Conductivity	µS/cm	-		NV	1250	1490	1300	1320	1300	1310	1300	1270	1160	1110	950	938
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.59	7.56	7.61	7.59	7.68	7.64	7.73	7.73	7.79	7.6	7.68	7.71
TDS	mg/L	500	AO	NV	**719**	**823**	**738**	**776**	**688**	**739**	**710**	**731**	**665**	**666**	**508**	**536**
DOC	mg/L	5		NV	**13.2**	**16.5**	**16.6**	**15.4**	**14.9**	**18.5**	**12.7**	**13.1**	**14.1**	**13.9**	**10.2**	**6.2**
COD	mg/L	-		NV	38	56	45	62	45	44	65	36	26	53	39	44
Phenols	mg/L	-		0.001	< 0.001	0.007	< 0.001	0.009	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001
Chloride	mg/L	250	AO	NV	57	64	52.3	56.1	53.4	67.7	49.2	46.4	38.2	39.8	24.4	21.1
Ammonia, total	mg/L	-		NV	17.2	29.3	23.1	27.7	29.1	37.4	36.4	26.4	28.7	27	19	16.3
Unionized Ammonia	mg/L	-		0.02					0.03	0.14	0.09	0.08		0.19	0.08	0.08
Fluoride	mg/L	2.4	MAC	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
Sulphate	mg/L	500	AO	NV	52	40	46	43	30	24	39	41	31	23	17	15
Nitrite (N)	mg/L	1	MAC	NV	0.5	< 0.05	< 0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	10	MAC	NV	0.2	< 0.05	< 0.05	0.06	< 0.05	< 0.05	0.08	0.07	< 0.05	< 0.05	< 0.05	< 0.05
Bromide	mg/L	-		NV												
TKN	mg/L	-		NV	19.2	44.1	25.8	28.4	31.3	37.5	44.8	31.6	36.7	31.8	22.8	16.8
Hardness	mg/L	500	OG	NV	485	495	485	**536**	431	419	391	471	425	416	354	392
Aluminum	mg/L	0.1	OG	0.075	0.09	0.1	0.09	**0.68**	0.08	0.09	0.07	0.06	0.08	0.08	0.03	0.04
Antimony	mg/L	0.006	IMAC	0.02	< 0.0001	< 0.0001	0.0001	< 0.0001	0.0001	< 0.0001	0.0001	0.0002	0.0001	0.0001	0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.005	0.0008	0.0022	0.0014	0.0026	0.0005	0.0012	0.0011	0.0017	0.0017	0.0013	0.0014	0.0014
Barium	mg/L	1	MAC	NV	0.56	0.6	0.495	0.476	0.471	0.488	0.464	0.51	0.447	0.443	0.335	0.351
Beryllium	mg/L	-		1.1	< 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	mg/L	5	IMAC	0.2	0.871	1.25	1.31	1.13	1.28	1.33	1.3	1.36	1.13	1.05	0.727	0.75
Cadmium	mg/L	0.005	MAC	0.0005	< 0.00002	< 0.000014	< 0.000014	0.00014	0.000038	< 0.000029	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000010
Calcium	mg/L	-		NV	156	157	158	170	140	133	123	148	135	132	113	127
Chromium	mg/L	0.05	MAC	0.001	0.004	< 0.001	0.001	0.002	0.001	0.001	< 0.001	< 0.001	0.001	0.001	< 0.001	< 0.001
Chromium (VI)	mg/L														< 0.001	< 0.001
Cobalt	mg/L	-		0.0009	0.01	0.013	< 0.005	0.018	0.009	0.007	0.0064	0.011	0.006	< 0.005	0.012	0.005
Copper	mg/L	1	AO	0.005	0.003	0.0012	0.0018	0.049	0.0025	0.0011	0.002	0.0016	0.0012	0.0007	0.0006	0.0007
Iron	mg/L	0.3	AO	0.3	**5.19**	**13**	**9.33**	**12.4**	**0.965**	**6.66**	**9.39**	**10**	**11.7**	**5.96**	**8.47**	**7.69**
Lead	mg/L	0.01	MAC	0.005	0.00004	0.00005	0.00004	0.00412	0.00011	< 0.00009	0.00005	0.00005	0.00007	0.00005	0.00003	0.00003
Magnesium	mg/L	-		NV	23.1	25	22	27	19.8	21.1	20.4	24.8	21.4	20.9	17.5	18.2
Manganese	mg/L	0.05	AO	NV	**2.14**	**2.15**	**1.88**	**1.92**	**1.93**	**1.48**	**1.33**	**1.57**	**1.54**	**1.42**	**1.42**	**1.45**
Mercury	mg/L	0.001	MAC	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	mg/L	-		0.04	0.0004	0.0006	0.0003	0.0003	0.0004	0.0006	0.0006	0.0006	0.0005	0.0005	0.0005	0.0004
Nickel	mg/L	-		0.025	0.01	0.02	0.02	0.01	0.02	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		NV	24.6	32.5	25	29.2	29.6	36.6	35.2	31.8	29	29.9	22	21.6
Phosphorus-Total	mg/L	-		0.03	0.11	0.21	0.04	0.23	0.14	0.14	0.09	0.06	0.1	0.08	0.05	0.08
Selenium	mg/L	0.01	MAC	0.1	< 0.001	< 0.001	0.001	< 0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001
Silver	mg/L	-		0.0001	< 0.00002	< 0.00002	< 0.00002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	NV	55.1	74.8	62.6	58	55.5	64.8	56.6	58.7	47.9	48	29.4	31.1
Strontium	mg/L	-		NV	0.53	0.58	0.512	0.508	0.479	0.523	0.488	0.604	0.508	0.5	0.416	0.439
Thallium	mg/L	-		0.0003	< 0.00005	< 0.00005	< 0.00005	0.00008	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.005
Vanadium	mg/L	-		0.006	0.0024	0.0032	0.0003	0.0026	0.0005	0.0005	0.0005	0.0004	0.0005	0.0002	0.0003	0.0003
Zinc	mg/L	5	AO	0.02	< 0.005	< 0.005	< 0.005	0.01	< 0.005	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	8.2	12.4			9	13.8	10.7	13.8	8.9	12.7	9.7	15.9
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	7.25	7.51	7.61	7.59	6.8	7.18	7.11	7.09	7.28	7.48	7.34	7.24
Field Conductivity	µS/cm	-		NV	1003	1241	1260	1340	1300	1100	1061	1130	1070	1050	909	1015

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	17-II 19-Apr-23	17-II 12-Oct-23
Alkalinity	mg/L	500	OG	NV	397	460
Conductivity	µS/cm	-		NV	879	947
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.66	7.44
TDS	mg/L	500	AO	NV	474	**504**
DOC	mg/L	5		NV	**5.8**	**11.8**
COD	mg/L	-		NV	28	32
Phenols	mg/L	-		0.001	< 0.001	<0.001
Chloride	mg/L	250	AO	NV	19.3	20.6
Ammonia, total	mg/L	-		NV	12.4	13
Unionized Ammonia	mg/L	-		0.02	0.05	<0.01
Fluoride	mg/L	2.4	MAC	NV	< 0.1	<0.1
Sulphate	mg/L	500	AO	NV	17	18
Nitrite (N)	mg/L	1	MAC	NV	< 0.05	<0.05
Nitrate (N)	mg/L	10	MAC	NV	1.98	<0.05
Bromide	mg/L	-		NV		
TKN	mg/L	-		NV	16.7	15.8
Hardness	mg/L	500	OG	NV	379	395
Aluminum	mg/L	0.1	OG	0.075	0.07	0.04
Antimony	mg/L	0.006	IMAC	0.02	< 0.0001	0.0001
Arsenic	mg/L	0.025	IMAC	0.005	0.001	0.0013
Barium	mg/L	1	MAC	NV	0.319	0.35
Beryllium	mg/L	-		1.1	< 0.002	<0.0001
Boron	mg/L	5	IMAC	0.2	0.729	0.766
Cadmium	mg/L	0.005	MAC	0.0005	< 0.000010	<0.000015
Calcium	mg/L	-		NV	122	128
Chromium	mg/L	0.05	MAC	0.001	< 0.001	<0.001
Chromium (VI)	mg/L				< 0.001	<0.01
Cobalt	mg/L	-		0.0009	0.005	0.0057
Copper	mg/L	1	AO	0.005	0.0004	0.0013
Iron	mg/L	0.3	AO	0.3	**6.73**	**7.58**
Lead	mg/L	0.01	MAC	0.005	0.00002	0.00004
Magnesium	mg/L	-		NV	18	18.3
Manganese	mg/L	0.05	AO	NV	**1.44**	**1.43**
Mercury	mg/L	0.001	MAC	0.0002	< 0.00002	<0.00002
Molybdenum	mg/L	-		0.04	0.0004	0.0003
Nickel	mg/L	-		0.025	< 0.01	0.0071
Potassium	mg/L	-		NV	17.8	19.2
Phosphorus-Total	mg/L	-		0.03	0.02	0.08
Selenium	mg/L	0.01	MAC	0.1	< 0.001	<0.001
Silver	mg/L	-		0.0001	< 0.0001	<0.0001
Sodium	mg/L	200	AO	NV	24.6	29.4
Strontium	mg/L	-		NV	0.413	0.461
Thallium	mg/L	-		0.0003	< 0.00005	<0.00005
Vanadium	mg/L	-		0.006	0.0002	0.0003
Zinc	mg/L	5	AO	0.02	< 0.005	<0.005
TSS	mg/L	-	-	NV		
Cyanide (Total)	mg/L	0.2	MAC	0.005		
BOD(5 day)	mg/L	-	-	NV		
Field Temperature	°C	-	AO	NV	9.4	13.5
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	7.36	7.33
Field Conductivity	µS/cm	-		NV	788	843

Shading indicates detection

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ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	19-I 13-May-08	19-I 15-Aug-08	19-I 5-Jun-09	19-I 4-Aug-09	19-I 10-Jun-10	19-I 6-Oct-10	19-I 12-May-11	19-I 8-Nov-11	19-I 19-Apr-12	19-I 29-Oct-12	19-I 3-Jun-13	19-I 29-Oct-13
Alkalinity	mg/L	500	OG	349	NV	227	224	220	220	217	224	232	217	230	220	219	213
Conductivity	µS/cm	-		-	NV	452	439	434	434	397	417	446	451	460	450	467	459
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.28	7.6	7.82	7.71	7.82	7.89	7.85	7.95	7.83	7.66	7.93	8.03
TDS	mg/L	500	AO	368	NV	294	285	282	282	258	271	266	247	269	261	264	254
DOC	mg/L	5		3.5	NV	1	1.8	< 2	1	1	1	1	1.1	0.9	0.9	3.3	-
COD	mg/L	-		-	NV	4	4	1	< 2	10	2	30	27	17	9.4	63	11
Phenols	mg/L	-		-	0.001	0.002	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	<0.0010	<0.0010	< 0.001	< 0.001
Chloride	mg/L	250	AO	131	NV	9	7	6	6	6	6	5	5	5	4	6	6
Ammonia, total	mg/L	-		-	NV	<0.1	<0.1	< 0.01	0.04	0.03	0.04	0.15	1.2	0.03	0.1	< 0.01	0.11
Unionized Ammonia	mg/L	-		-	0.02												
Fluoride	mg/L	2.4	MAC	0.7	NV	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	<0.1	<0.10	<0.10	< 0.1	0.2
Sulphate	mg/L	500	AO	255	NV	15	11	11	12	14	12	12	11	11	11	11	12
Nitrite (N)	mg/L	1	MAC	0.3	NV	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.01	<0.01	<0.010	<0.010	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	4.0	NV	1	0.7	0.6	0.8	1.1	1	1.1	1.2	1.2	1.6	1.3	1.6
Bromide	mg/L	-		-	NV	-	-	-	-	< 0.1	-	<1	<1	<1.0	<1.0	< 0.4	< 0.4
TKN	mg/L	-		-	NV	<0.1	0.2	0.2	0.2	0.1	0.2	3	2.3	1.1	1.4	0.91	0.2
Hardness	mg/L	500	OG	361	NV	238	244	225	229	226	273	240	210	250	240	276	257
Aluminum	mg/L	0.1	OG	0.07	0.075	0.05	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	<0.005	<0.0050	<0.0050	0.03	0.03
Antimony	mg/L	0.006	IMAC	0.002	0.02	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	<0.005	<0.00050	<0.00050	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.006	0.005	<0.01	<0.01	< 0.01	< 0.01	< 0.005	< 0.005	<0.001	<0.001	<0.0010	<0.0010	0.0001	< 0.0001
Barium	mg/L	1	MAC	0.3	NV	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.055	0.059	0.055	0.053	0.07	0.06
Beryllium	mg/L	-		-	1.1	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.005	<0.005	<0.00050	<0.00050	< 0.002	< 0.002
Boron	mg/L	5	IMAC	1.3	0.2	0.2	<0.1	< 0.1	0.2	< 0.1	< 0.1	0.025	0.02	0.028	0.018	0.024	0.016
Cadmium	mg/L	0.005	MAC	0.001	0.0005	<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002
Calcium	mg/L	-		-	NV	80	82	77	77	77	93	80	72	82	82	93.2	87.4
Chromium	mg/L	0.05	MAC	0.013	0.001	0.0009	0.0003	0.0003	0.0002	0.0002	0.0003	<0.005	<0.005	<0.0050	-	0.0003	0.004
Chromium (VI)	mg/L			-													
Cobalt	mg/L	-		-	0.0009	<0.0003	<0.0003	< 0.0003	< 0.0003	< 0.0003	0.0004	<0.0005	<0.0005	<0.00050	<0.00050	< 0.0001	< 0.005
Copper	mg/L	1	AO	0.5	0.005	0.0016	0.0004	0.0018	0.0055	< 0.0001	0.0003	0.002	<0.001	<0.0010	<0.0010	0.0011	0.0006
Iron	mg/L	0.3	AO	0.16	0.3	***0.2***	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	<0.1	<0.10	<0.10	< 0.005	0.11
Lead	mg/L	0.01	MAC	0.003	0.005	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	<0.0005	<0.00050	***0.0078***	0.00039	0.00079
Magnesium	mg/L	-		-	NV	9	10	8	9	9	10	8.9	8.1	10	8.9	10.4	9.3
Manganese	mg/L	0.05	AO	0.03	NV	<0.01	<0.01	< 0.01	< 0.01	< 0.01	0.01	<0.002	0.008	0.0027	0.012	0.0	***0.03***
Mercury	mg/L	0.001	MAC	0.0003	0.0002	0.00003	<0.00005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00003	0.00001	<0.00001	<0.00001	< 0.00002	< 0.00002
Molybdenum	mg/L	-		-	0.04	<0.002	<0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.001	<0.0005	<0.00050	<0.00050	0.0001	0.0001
Nickel	mg/L	-		-	0.025	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.001	<0.001	<0.0010	<0.0010	< 0.01	< 0.01
Potassium	mg/L	-		-	NV	1.2	1.4	1.2	1.4	1.1	1.3	1.2	1.2	1.3	1.3	1.3	1.2
Phosphorus-Total	mg/L	-		-	0.03	<0.01	0.58	< 0.01	< 0.01	< 0.01	< 0.02	7.1	2.8	<0.10	1.4	1.45	0.42
Selenium	mg/L	0.01	MAC	0.003	0.1	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.002	<0.002	<0.0020	<0.0020	< 0.001	< 0.001
Silver	mg/L	-		-	0.0001	<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002
Sodium	mg/L	200	AO	105	NV	6	6	5	5	3	4	3.7	3.2	3.9	3.4	4.8	3.5
Strontium	mg/L	-		-	NV	0.131	0.121	0.116	0.112	0.115	0.137	0.14	0.13	0.13	0.14	-	-
Thallium	mg/L	-		-	0.0003	<0.0003	<0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	<0.00005	<0.00005	<0.000050	<0.000050	< 0.00005	< 0.00005
Vanadium	mg/L	-		-	0.006	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	0.00062	0.00055	0.003	0.0014
Zinc	mg/L	5	AO	2.5	0.02	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.013	< 0.01	-	<0.0050	< 0.005	< 0.005
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	-	-	-	-	-	-	-	-	8.7	7.2	8.6	10.2
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	-	-	-	-	-	-	-	-	7.46	8.32	8.48	7.6
Field Conductivity	µS/cm	-		-	NV	-	-	-	-	-	-	-	-	456	490	457	540

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	19-I 1-May-14	19-I 24-Sep-14	19-I 27-Apr-15	19-I 5-Oct-15	19-I 26-Apr-16	19-I 19-Oct-16	19-I 12-Apr-17	19-I 5-Oct-17	19-I 10-Apr-18	19-I 1-Oct-18	19-I 22-Apr-19	19-I 8-Oct-19
Alkalinity	mg/L	500	OG	349	NV	214	216	212	218	215	220	211	219	205	220	189	204
Conductivity	µS/cm	-		-	NV	462	470	447	461	469	484	469	481	451	470	434	452
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.95	7.9	7.99	8.01	7.89	7.91	8.05	7.97	7.99	7.73	7.95	7.88
TDS	mg/L	500	AO	368	NV	248	250	243	258	256	254	255	244	236	240	222	232
DOC	mg/L	5		3.5	NV	2.8	***4.1***	3	1.8	1	1.3	1.8	***3.5***	2.3	2.4	1.6	**6.6**
COD	mg/L	-		-	NV	125	59	77	26	< 5	17	46	48	16	6	9	11
Phenols	mg/L	-		-	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.005	< 0.001	< 0.002	< 0.002	< 0.002
Chloride	mg/L	250	AO	131	NV	7	5	5	5	7	7	8	7	6.7	7.3	5.3	2.8
Ammonia, total	mg/L	-		-	NV	0.03	0.2	0.17	0.02	0.04	0.05	0.01	0.07	0.03	0.07	0.02	0.05
Unionized Ammonia	mg/L	-		-	0.02											< 0.01	< 0.01
Fluoride	mg/L	2.4	MAC	0.7	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
Sulphate	mg/L	500	AO	255	NV	12	11	11	11	15	13	14	11	11	13	13	10
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	10	MAC	4.0	NV	1.6	1.6	1.7	1.6	1.8	2.2	1.8	2.4	2.3	2.1	1.9	2.34
Bromide	mg/L	-		-	NV	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	-						
TKN	mg/L	-		-	NV	2.6	1.2	1.5	0.5	0.5	0.8	0.8	1.1	0.7	0.3	0.2	0.2
Hardness	mg/L	500	OG	361	NV	232	242	232	261	243	230	242	236	235	215	221	241
Aluminum	mg/L	0.1	OG	0.07	0.075	0.04	0.02	0.02	0.02	0.03	0.03	0.05	0.07	0.05	0.05	0.05	0.06
Antimony	mg/L	0.006	IMAC	0.002	0.02	< 0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	0.0004	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.006	0.005	< 0.0001	0.0007	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Barium	mg/L	1	MAC	0.3	NV	0.05	0.06	0.05	0.06	0.05	0.05	0.07	0.06	0.051	0.052	0.046	0.057
Beryllium	mg/L	-		-	1.1	< 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	mg/L	5	IMAC	1.3	0.2	0.01	0.019	0.015	0.017	< 0.005	0.019	0.056	0.046	0.041	0.033	0.044	0.034
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000015
Calcium	mg/L	-		-	NV	78.5	82.1	78.5	88.8	82.3	77	80.6	78.8	79.2	72	75.2	81.4
Chromium	mg/L	0.05	MAC	0.013	0.001	< 0.0002	0.0013	0.0014	0.0017	< 0.0002	0.0009	0.0015	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (VI)	mg/L			-													
Cobalt	mg/L	-		-	0.0009	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Copper	mg/L	1	AO	0.5	0.005	0.0009	0.0007	0.0013	0.0011	0.001	0.0018	0.0013	0.0006	0.0008	0.0011	0.0011	0.0006
Iron	mg/L	0.3	AO	0.16	0.3	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	0.01	0.02	0.017	0.009	0.012	0.027
Lead	mg/L	0.01	MAC	0.003	0.005	0.00003	< 0.00002	0.00029	0.00009	0.00004	0.00068	< 0.00002	0.00007	< 0.00002	0.00065	0.00003	0.0001
Magnesium	mg/L	-		-	NV	8.8	9	8.7	9.5	9	9.1	9.8	9.6	9.01	8.63	8.14	9.16
Manganese	mg/L	0.05	AO	0.03	NV	< 0.001	0	0	0	< 0.001	< 0.001	0	0	0.001	< 0.001	< 0.001	0.01
Mercury	mg/L	0.001	MAC	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00005	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		-	0.04	0.0001	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	< 0.0001	0.0001	0.0001	0.0003
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		-	NV	1.2	1.5	1	1.4	1.1	1.2	1.1	1.5	0.9	1.3	1	1.4
Phosphorus-Total	mg/L	-		-	0.03	4.57	1.52	2.99	0.56	0.91	0.97	1.51	1.64	1.05	0.26	0.09	0.22
Selenium	mg/L	0.01	MAC	0.003	0.1	< 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	mg/L	-		-	0.0001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00003	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	105	NV	4.9	4.3	4.2	4.8	5.3	4.9	5.5	5.4	5.2	5.3	5.6	5.2
Strontium	mg/L	-		-	NV	-	0.15	0.14	0.16	0.15	0.14	0.14	0.15	0.132	0.131	0.126	0.145
Thallium	mg/L	-		-	0.0003	< 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	mg/L	-		-	0.006	0.0018	0.0052	0.0018	0.0007	0.0009	0.0011	0.001	0.0011	0.0003	0.0003	0.0002	0.0003
Zinc	mg/L	5	AO	2.5	0.02	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	7.3	13.5	7.5	11.7	7.5	12.5	6.5	12.1			7.2	11.5
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	8.19	8.02	7.9	7.63	8.22	7.7	7.43	7.47	7.99	7.73	7.81	7.7
Field Conductivity	µS/cm	-		-	NV	590	490	500	350	390	435	375	428	445	440	460	392

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	19-I 13-Apr-20	19-I 14-Oct-20	19-I 21-Apr-21	19-I 18-Oct-21	19-I 20-Apr-22	19-I 12-Oct-22	19-I 19-Apr-23	19-I 12-Oct-23	25-I 6-May-08	25-I 15-Aug-08	25-I 25-May-09	25-I 4-Aug-09
Alkalinity	mg/L	500	OG	349	NV	193	215	214	229	215	207	219	233	240	238	233	232
Conductivity	µS/cm	-		-	NV	455	471	467	466	481	427	483	487	709	719	692	711
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.9	7.82	7.9	7.8	7.65	8.1	7.79	7.37	7.21	7.56	7.73	7.68
TDS	mg/L	500	AO	368	NV	234	252	251	263	253	245	259	252	461	467	450	462
DOC	mg/L	5		3.5	NV	2.3	2.8	***3.8***	2.4	2.7	2	1	4	2	2.3	2	2
COD	mg/L	-		-	NV	10	20	24	12	< 5	< 5	8	6	<2	5	3	< 2
Phenols	mg/L	-		-	0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001	<0.001	<0.001	< 0.001	0.001
Chloride	mg/L	250	AO	131	NV	7	6.9	6.3	7.6	6.7	6.8	7.2	8.1	49	43	41	48
Ammonia, total	mg/L	-		-	NV	0.02	0.12	0.16	0.13	0.52	< 0.01	0.23	0.09	<0.1	<0.1	0.03	0.04
Unionized Ammonia	mg/L	-		-	0.02	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	<0.01				
Fluoride	mg/L	2.4	MAC	0.7	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.3	< 0.1	<0.1	0.1	<0.1	< 0.1	< 0.1
Sulphate	mg/L	500	AO	255	NV	17	15	16	15	17	11	38	12	97	103	99	110
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	<0.05	<0.1	<0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	4.0	NV	1.87	1.96	1.9	2.13	2.01	2.29	< 0.5	1.79	<0.1	<0.1	< 0.1	< 0.1
Bromide	mg/L	-		-	NV									-	-	0.3	-
TKN	mg/L	-		-	NV	0.3	0.6	0.5	0.6	0.7	0.3	0.4	0.2	<0.1	0.2	< 0.1	0.2
Hardness	mg/L	500	OG	361	NV	231	248	248	254	248	256	262	256	335	376	329	345
Aluminum	mg/L	0.1	OG	0.07	0.075	0.04	0.03	0.05	0.06	0.02	0.02	0.07	0.02	<0.01	<0.01	< 0.01	< 0.01
Antimony	mg/L	0.006	IMAC	0.002	0.02	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.01	<0.01	< 0.01	< 0.01
Arsenic	mg/L	0.025	IMAC	0.006	0.005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.01	<0.01	< 0.01	< 0.01
Barium	mg/L	1	MAC	0.3	NV	0.053	0.064	0.056	0.063	0.061	0.061	0.06	0.064	<0.1	<0.1	< 0.1	< 0.1
Beryllium	mg/L	-		-	1.1	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	<0.1	<0.1	< 0.1	< 0.1
Boron	mg/L	5	IMAC	1.3	0.2	0.087	0.087	0.067	0.06	0.07	0.038	0.075	0.066	<0.1	<0.1	< 0.1	0.2
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000010	< 0.000010	<0.000015	<0.0001	<0.0001	< 0.0001	< 0.0001
Calcium	mg/L	-		-	NV	77.5	82.8	83.3	85.7	83	86.8	87.6	85.8	99	111	97	102
Chromium	mg/L	0.05	MAC	0.013	0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	0.0002	0.0003	0.001	0.0001
Chromium (VI)	mg/L			-						< 0.001	< 0.001	< 0.001	<0.01				
Cobalt	mg/L	-		-	0.0009	0.0002	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.0002	<0.0003	0.0003	0.0005	< 0.0003
Copper	mg/L	1	AO	0.5	0.005	0.002	0.0012	0.0008	0.0011	0.0013	0.0008	0.0009	0.0015	<0.0001	0.001	0.0003	0.0005
Iron	mg/L	0.3	AO	0.16	0.3	0.01	< 0.005	0.005	0.005	< 0.005	< 0.005	< 0.005	0.005	0.1	0.15	0.2	0.1
Lead	mg/L	0.01	MAC	0.003	0.005	0.00005	0.00006	0.00006	0.00003	0.00003	0.00006	< 0.00002	0.00003	<0.001	<0.001	< 0.001	< 0.001
Magnesium	mg/L	-		-	NV	9.1	9.95	9.63	9.57	9.86	9.53	10.4	10.1	21	24	21	22
Manganese	mg/L	0.05	AO	0.03	NV	< 0.001	< 0.001	< 0.001	0.008	0.004	0.003	< 0.001	<0.001	0.04	0.05	0.05	0.05
Mercury	mg/L	0.001	MAC	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002	<0.00002	<0.00005	0.00008	< 0.00002
Molybdenum	mg/L	-		-	0.04	< 0.0001	0.0002	0.0001	0.0002	0.0001	0.0001	0.0001	0.0002	<0.002	<0.002	< 0.002	< 0.002
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.0003	<0.01	<0.01	< 0.01	< 0.01
Potassium	mg/L	-		-	NV	1.2	1.7	1.2	1.6	1.3	1.6	1.1	1.8	2.1	2.3	2.2	2.3
Phosphorus-Total	mg/L	-		-	0.03	0.04	0.19	0.18	0.12	0.08	0.14	0.07	0.1	<0.01	0.22	0.01	< 0.01
Selenium	mg/L	0.01	MAC	0.003	0.1	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.01	<0.01	< 0.01	< 0.01
Silver	mg/L	-		-	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.0001	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	105	NV	6.4	6.6	5.2	5.5	4.9	4	4.5	5.1	25	24	23	24
Strontium	mg/L	-		-	NV	0.139	0.162	0.149	0.156	0.152	0.153	0.153	0.17	0.563	0.611	0.546	0.604
Thallium	mg/L	-		-	0.0003	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.005	< 0.00005	<0.00005	<0.0003	<0.0003	< 0.0003	< 0.0003
Vanadium	mg/L	-		-	0.006	0.0002	0.0003	0.0003	0.0002	0.0002	0.0003	0.0003	0.0003	<0.001	<0.001	< 0.001	< 0.001
Zinc	mg/L	5	AO	2.5	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	<0.01	<0.01	< 0.01	< 0.01
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	6.8	11.4	6.6	11.2	6.8	12.3	6.5	11.8	-	-	-	-
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	7.34	7.7	7.95	7.78	8.03	8.04	7.87	7.79	-	-	-	-
Field Conductivity	µS/cm	-		-	NV	451	450	480	505	466	491	579	563	-	-	-	-

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	25-I 10-Jun-10	25-I 12-Oct-10	25-I 12-May-11	25-I 9-Nov-11	25-I 19-Apr-12	25-I 29-Oct-12	25-I 3-Jun-13	25-I 29-Oct-13	25-I 1-May-14	25-I 24-Sep-14	25-I 28-Apr-15	25-I 6-Oct-15
Alkalinity	mg/L	500	OG	349	NV	240	250	251	273	290	290	284	294	314	326	336	350
Conductivity	µS/cm	-		-	NV	686	664	807	827	830	860	861	893	915	941	949	968
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.72	7.68	7.85	7.77	7.83	7.74	7.82	7.85	7.88	7.66	7.81	7.75
TDS	mg/L	500	AO	368	NV	446	432	463	491	481	494	**513**	**508**	**513**	**528**	**543**	**540**
DOC	mg/L	5		3.5	NV	2	2	2.1	-	2.1	2.3	4.7	-	**5.2**	**5.8**	4.5	2.5
COD	mg/L	-		-	NV	11	6	27	29	13	13	49	< 5	47	30	< 5	34
Phenols	mg/L	-		-	0.001	< 0.001	< 0.001	<0.001	<0.001	<0.0010	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Chloride	mg/L	250	AO	131	NV	54	51	48	62	56	58	68	69	72	74	75	71
Ammonia, total	mg/L	-		-	NV	0.07	< 0.05	0.18	<0.1	0.1	0.09	< 0.01	0.02	< 0.01	0.2	0.1	0.17
Unionized Ammonia	mg/L	-		-	0.02												
Fluoride	mg/L	2.4	MAC	0.7	NV	< 0.1	< 0.1	<0.1	<0.1	<0.10	<0.10	< 0.1	0.2	0.1	< 0.1	0.1	0.1
Sulphate	mg/L	500	AO	255	NV	113	106	92	82	75	70	75	74	71	66	64	58
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.1	< 0.1	<0.01	<0.01	<0.010	<0.010	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	4.0	NV	< 0.1	< 0.1	<0.1	<0.1	<0.10	<0.10	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bromide	mg/L	-		-	NV	< 0.1	-	<1	-	<1.0	<1.0	0.5	0.4	0.5	0.6	0.5	0.4
TKN	mg/L	-		-	NV	0.2	0.2	<1	2	0.48	0.35	0.24	< 0.1	0.4	0.2	0.4	0.4
Hardness	mg/L	500	OG	361	NV	350	412	370	390	380	410	455	428	411	436	452	452
Aluminum	mg/L	0.1	OG	0.07	0.075	< 0.01	0.01	<0.005	<0.005	<0.0050	<0.0050	0.04	0.04	0.03	0.03	0.03	0.04
Antimony	mg/L	0.006	IMAC	0.002	0.02	< 0.01	< 0.01	<0.005	<0.0005	<0.00050	<0.00050	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.006	0.005	< 0.005	< 0.005	<0.001	<0.001	<0.0010	<0.0010	0.0005	0.0006	0.0006	0.0011	0.0007	0.0004
Barium	mg/L	1	MAC	0.3	NV	< 0.1	< 0.1	0.11	0.11	0.12	0.12	0.14	0.14	0.12	0.13	0.13	0.14
Beryllium	mg/L	-		-	1.1	< 0.1	< 0.1	<0.005	<0.0005	<0.00050	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	5	IMAC	1.3	0.2	< 0.1	< 0.1	0.092	0.09	0.1	0.11	0.131	0.134	0.122	0.14	0.157	0.153
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Calcium	mg/L	-		-	NV	105	122	110	120	110	120	136	128	123	130	135	134
Chromium	mg/L	0.05	MAC	0.013	0.001	0.0001	0.0001	<0.005	<0.005	<0.0050	-	0.0009	0.0111	0.0006	0.0006	0.0018	0.0036
Chromium (VI)	mg/L			-													
Cobalt	mg/L	-		-	0.0009	0.0003	0.0004	<0.0005	<0.0005	<0.00050	<0.00050	0.0001	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Copper	mg/L	1	AO	0.5	0.005	< 0.0001	0.0003	<0.001	0.001	<0.0010	<0.0010	0.0005	0.0003	0.0009	0.0005	0.0009	0.0009
Iron	mg/L	0.3	AO	0.16	0.3	**0.4**	0.3	0.24	0.2	0.24	0.22	**0.36**	**0.33**	**0.32**	**0.34**	**0.39**	**0.44**
Lead	mg/L	0.01	MAC	0.003	0.005	< 0.001	< 0.001	<0.0005	<0.0005	<0.00050	<0.00050	< 0.00002	< 0.00002	0.00005	< 0.00002	0.00003	0.00003
Magnesium	mg/L	-		-	NV	22	26	23	26	24	26	28.2	26.1	25.3	26.9	27.8	28.1
Manganese	mg/L	0.05	AO	0.03	NV	0.05	**0.06**	**0.059**	**0.058**	**0.073**	**0.074**	**0.09**	**0.09**	**0.08**	**0.09**	**0.09**	**0.1**
Mercury	mg/L	0.001	MAC	0.0003	0.0002	< 0.00002	< 0.00002	<0.00001	<0.0000	<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		-	0.04	< 0.002	< 0.002	<0.001	<0.0005	<0.00050	<0.00050	0.0003	0.0002	0.0004	0.0003	0.0003	0.0002
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01	0.001	0.001	0.0011	0.0014	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		-	NV	2	2	2	2.1	2.1	2.2	2.4	2.2	2.3	2.4	2.4	2.2
Phosphorus-Total	mg/L	-		-	0.03	< 0.01	< 0.02	6.4	3.6	<0.10	0.63	0.99	0.23	0.64	1.02	1.03	1.09
Selenium	mg/L	0.01	MAC	0.003	0.1	< 0.01	< 0.01	<0.002	<0.002	<0.0020	<0.0020	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0
Silver	mg/L	-		-	0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Sodium	mg/L	200	AO	105	NV	21	21	23	26	26	28	32.6	31.4	30.8	32.5	35.4	36.3
Strontium	mg/L	-		-	NV	0.592	0.521	0.62	0.59	0.62	0.62	-	-	-	0.72	0.74	0.67
Thallium	mg/L	-		-	0.0003	< 0.0003	< 0.0003	<0.00005	<0.00005	<0.000050	<0.000050	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		-	0.006	< 0.001	< 0.001	<0.001	<0.0005	<0.00050	<0.00050	0.0033	0.0014	0.0028	0.0069	0.0021	0.0012
Zinc	mg/L	5	AO	2.5	0.02	< 0.01	< 0.01	0.007	<0.005	<0.0050	<0.0050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	-	-	-	-	12.3	9	9.9	9.2	10.7	10.7	10.7	11.5
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	-	-	-	-	7.07	7.59	7.25	7.04	7.77	7.7	7.41	7.3
Field Conductivity	µS/cm	-		-	NV	-	-	-	-	841	930	881	920	1030	1010	1030	735

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	25-I 26-Apr-16	25-I 20-Oct-16	25-I 12-Apr-17	25-I 5-Oct-17	25-I 11-Apr-18	25-I 1-Oct-18	25-I 22-Apr-19	25-I 9-Oct-19	25-I 13-Apr-20	25-I 15-Oct-20	25-I 21-Apr-21	25-I 18-Oct-21
Alkalinity	mg/L	500	OG	349	NV	352	374	380	404	397	449	430	454	447	481	489	**522**
Conductivity	µS/cm	-		-	NV	969	1040	1040	1100	1070	1170	1150	1190	1200	1250	1230	1240
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.6	7.81	7.77	7.72	7.78	7.71	7.65	7.71	7.7	7.7	7.78	7.61
TDS	mg/L	500	AO	368	NV	**536**	**604**	**580**	**584**	**584**	**632**	**631**	**699**	**658**	**712**	**701**	**752**
DOC	mg/L	5		3.5	NV	2.9	3.6	4.2	5	5	4.8	**5.1**	**8.2**	**5.2**	3.8	**5.3**	**6.3**
COD	mg/L	-		-	NV	8	15	6	13	14	13	14	8	15	14	24	23
Phenols	mg/L	-		-	0.001	< 0.001	0.024	< 0.001	0.004	< 0.001	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Chloride	mg/L	250	AO	131	NV	75	80	82	74	71.9	86.2	86	111	90.7	95.3	92.7	107
Ammonia, total	mg/L	-		-	NV	0.06	0.05	0.03	0.02	0.04	0.06	0.03	0.05	0.03	0.08	0.05	0.08
Unionized Ammonia	mg/L	-		-	0.02							< 0.01	< 0.01	< 0.01	< 0.01		< 0.01
Fluoride	mg/L	2.4	MAC	0.7	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
Sulphate	mg/L	500	AO	255	NV	55	58	56	46	46	56	50	54	48	50	47	51
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.06
Nitrate (N)	mg/L	10	MAC	4.0	NV	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	< 0.05	< 0.05	< 0.05
Bromide	mg/L	-		-	NV	0.5	-										
TKN	mg/L	-		-	NV	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.4	0.4
Hardness	mg/L	500	OG	361	NV	432	**534**	476	487	**502**	481	**523**	**565**	**542**	**587**	**570**	**590**
Aluminum	mg/L	0.1	OG	0.07	0.075	0.03	0.09	0.08	0.1	0.08	0.07	0.08	0.09	0.07	0.07	0.09	0.09
Antimony	mg/L	0.006	IMAC	0.002	0.02	< 0.0001	0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.006	0.005	0.0005	0.0005	0.0001	0.0004	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Barium	mg/L	1	MAC	0.3	NV	0.13	0.17	0.24	0.19	0.175	0.165	0.18	0.199	0.193	0.222	0.211	0.223
Beryllium	mg/L	-		-	1.1	< 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	mg/L	5	IMAC	1.3	0.2	0.134	0.198	0.202	0.209	0.216	0.207	0.226	0.262	0.259	0.317	0.3	0.323
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.00002	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015
Calcium	mg/L	-		-	NV	129	158	138	141	148	139	157	167	159	170	168	175
Chromium	mg/L	0.05	MAC	0.013	0.001	< 0.0002	0.0009	0.0021	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001
Chromium (VI)	mg/L			-													
Cobalt	mg/L	-		-	0.0009	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.012	< 0.005	< 0.005	0.0003	0.006	< 0.005	< 0.005
Copper	mg/L	1	AO	0.5	0.005	0.0004	0.0006	< 0.0001	0.0004	0.0008	0.0002	0.0006	0.0007	0.0005	0.0004	0.0009	0.0004
Iron	mg/L	0.3	AO	0.16	0.3	**0.4**	**0.61**	**0.56**	**0.59**	**0.431**	**0.673**	**0.647**	**0.907**	**0.882**	**1**	**1.04**	**1.21**
Lead	mg/L	0.01	MAC	0.003	0.005	0.00002	0.00005	< 0.00002	0.00004	0.00124	< 0.00002	< 0.00002	< 0.00002	< 0.00004	< 0.00004	0.00005	< 0.00004
Magnesium	mg/L	-		-	NV	27	33.8	31.8	32.7	32.1	32.4	31.8	35.9	35.1	39.3	36.4	37.2
Manganese	mg/L	0.05	AO	0.03	NV	**0.09**	**0.12**	**0.1**	**0.12**	**0.113**	**0.111**	**0.126**	**0.134**	**0.13**	**0.135**	**0.136**	**0.154**
Mercury	mg/L	0.001	MAC	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	mg/L	-		-	0.04	0.0002	0.0002	0.0002	0.0002	< 0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0002
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	0.01	0.01
Potassium	mg/L	-		-	NV	2.3	2.7	2.6	2.7	2.4	2.7	2.7	2.9	2.9	3.3	3	3.3
Phosphorus-Total	mg/L	-		-	0.03	1.08	1.53	0.19	0.52	0.64	0.22	0.3	0.32	0.06	0.19	0.22	0.11
Selenium	mg/L	0.01	MAC	0.003	0.1	< 0.001	0	< 0.001	< 0.001	0.001	< 0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.001	0.002
Silver	mg/L	-		-	0.0001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	105	NV	36.9	45.8	40.8	43.9	44.7	45.7	45.3	54.6	52.9	63.7	59.9	64.1
Strontium	mg/L	-		-	NV	0.69	0.89	0.79	0.82	0.768	0.769	0.807	0.883	0.853	0.976	0.88	0.888
Thallium	mg/L	-		-	0.0003	< 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	mg/L	-		-	0.006	0.0012	0.0012	0.0015	0.0019	< 0.0001	0.0002	0.0002	0.0003	0.0002	0.0003	0.0003	0.0002
Zinc	mg/L	5	AO	2.5	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	8.6	11.6	8.4	10.8			10.4	9.2	9.6	10	9	9.7
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	7.96	7.62	7.71	8.1	7.78	7.71	7.68	6.29	7.03	7.21	7.22	7.43
Field Conductivity	µS/cm	-		-	NV	760	910	827	911	1040	1100	1140	875	1314	1030	1090	1290

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	25-I 20-Apr-22	25-I 12-Oct-22	25-I 19-Apr-23	DUP 19-Apr-23	25-I 12-Oct-23	25-II 6-May-08	25-II 15-Aug-08	25-II 25-May-09	25-II 4-Aug-09	25-II 10-Jun-10	25-II 12-Oct-10	25-II 12-May-11
Alkalinity	mg/L	500	OG	349	NV	467	**511**	490	**501**	**531**	**849**	**826**	**813**	**810**	**824**	**818**	**817**
Conductivity	µS/cm	-		-	NV	1260	1270	1270	1270	1320	1900	1920	1870	1900	1840	1700	1990
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.6	7.68	7.57	7.7	7.45	6.57	6.79	6.93	6.92	7.04	6.99	7.3
TDS	mg/L	500	AO	368	NV	**677**	**727**	**711**	**711**	**716**	**1230**	**1250**	**1210**	**1240**	**1190**	**1110**	**1220**
DOC	mg/L	5		3.5	NV	3.8	2	2.2	2.5	7	**18**	**19.5**	**18**	**18**	**18**	**17**	**18.3**
COD	mg/L	-		-	NV	13	26	19	19	21	30	48	70	34	46	49	56
Phenols	mg/L	-		-	0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	0.012	< 0.001	0.002	0.002	0.002	<0.001
Chloride	mg/L	250	AO	131	NV	95	97.1	99.5	98.3	99.7	142	114	145	145	134	140	140
Ammonia, total	mg/L	-		-	NV	0.23	0.13	0.94	0.08	0.09	<0.1	<0.1	0.07	0.04	0.04	0.06	0.21
Unionized Ammonia	mg/L	-		-	0.02	< 0.01	< 0.01	< 0.01	< 0.01	<0.01							
Fluoride	mg/L	2.4	MAC	0.7	NV	< 0.1	< 0.1	< 1	< 1	<0.1	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1
Sulphate	mg/L	500	AO	255	NV	43	39	29	39	38	154	122	148	156	164	137	130
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.05	< 0.05	< 0.5	< 0.5	<0.05	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.01
Nitrate (N)	mg/L	10	MAC	4.0	NV	< 0.05	< 0.05	< 0.5	< 0.5	<0.05	<0.1	<0.1	< 0.1	< 0.1	0.1	< 0.1	<0.1
Bromide	mg/L	-		-	NV						-	-	0.6	-	< 0.1	-	<1
TKN	mg/L	-		-	NV	0.8	0.5	1.5	0.4	0.5	1	1.3	1.3	1.2	1	1.2	2
Hardness	mg/L	500	OG	361	NV	**549**	**599**	**597**	**587**	**587**	**953**	**945**	**966**	**897**	**923**	**975**	**880**
Aluminum	mg/L	0.1	OG	0.07	0.075	0.05	0.05	**0.11**	0.1	0.06	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.005
Antimony	mg/L	0.006	IMAC	0.002	0.02	< 0.0001	< 0.0001	0.0001	< 0.0001	<0.0001	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.005
Arsenic	mg/L	0.025	IMAC	0.006	0.005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.01	<0.01	< 0.01	< 0.01	< 0.005	< 0.005	<0.001
Barium	mg/L	1	MAC	0.3	NV	0.208	0.226	0.218	0.216	0.225	0.2	0.4	0.4	0.3	0.4	0.3	0.32
Beryllium	mg/L	-		-	1.1	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.005
Boron	mg/L	5	IMAC	1.3	0.2	0.311	0.354	0.394	0.385	0.415	0.6	0.8	0.7	0.8	0.8	< 0.1	0.81
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.000015	< 0.000012	< 0.000012	< 0.000012	<0.000015	<0.0001	<0.0001	0.0001	0.0002	< 0.0001	0.0002	<0.0001
Calcium	mg/L	-		-	NV	160	178	173	170	172	314	308	316	295	302	317	290
Chromium	mg/L	0.05	MAC	0.013	0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	0.0003	0.0004	0.0005	0.0002	0.0003	0.0004	<0.005
Chromium (VI)	mg/L			-		< 0.001	< 0.001	< 0.001	< 0.001	<0.01							
Cobalt	mg/L	-		-	0.0009	< 0.005	< 0.005	< 0.005	< 0.005	0.0008	0.0042	0.0059	0.0061	0.0052	0.0061	0.0071	0.008.5
Copper	mg/L	1	AO	0.5	0.005	0.0002	0.0003	0.0002	< 0.0001	0.0003	0.0055	0.0055	0.0064	0.0047	0.0056	0.0069	0.009
Iron	mg/L	0.3	AO	0.16	0.3	**1.16**	**1.3**	**1.32**	**1.23**	**1.35**	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.100
Lead	mg/L	0.01	MAC	0.003	0.005	< 0.00004	< 0.00004	< 0.00004	< 0.00004	0.00002	<0.001	<0.001	0.001	0.002	< 0.001	< 0.001	< 0.001
Magnesium	mg/L	-		-	NV	36.1	37.3	40	39.3	38.3	41	43	43	39	41	45	40
Manganese	mg/L	0.05	AO	0.03	NV	**0.141**	**0.154**	**0.159**	**0.149**	**0.156**	**0.71**	**1.24**	**1.22**	**1.19**	**0.85**	**1.03**	**1.1**
Mercury	mg/L	0.001	MAC	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002	0.00016	<0.00005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00003
Molybdenum	mg/L	-		-	0.04	0.0002	0.0002	0.0002	0.0002	0.0002	<0.002	<0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.001
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01	0.01	0.01	0.0153	<0.01	0.01	0.01	< 0.01	0.01	0.01	0.018
Potassium	mg/L	-		-	NV	3	3.1	3	2.9	3.2	2.5	3	2.7	2.9	2.4	2.4	2
Phosphorus-Total	mg/L	-		-	0.03	0.32	0.07	0.14	0.11	0.14	<0.01	0.15	0.02	< 0.01	< 0.01	< 0.02	18
Selenium	mg/L	0.01	MAC	0.003	0.1	0.002	0.002	0.001	0.001	0.001	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.002
Silver	mg/L	-		-	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001
Sodium	mg/L	200	AO	105	NV	58.9	64.2	61.3	59.8	69.8	106	118	117	113	111	110	110
Strontium	mg/L	-		-	NV	0.85	0.865	0.868	0.85	0.9	0.635	0.647	0.664	0.655	0.659	0.608	0.62
Thallium	mg/L	-		-	0.0003	< 0.00005	< 0.005	< 0.00005	< 0.00005	<0.00005	0.0004	0.0006	< 0.0003	0.0005	0.0004	0.0017	0.00007
Vanadium	mg/L	-		-	0.006	0.0003	0.0003	0.0006	0.0003	0.0003	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001
Zinc	mg/L	5	AO	2.5	0.02	< 0.005	< 0.005	0.005	< 0.005	<0.005	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.019
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	5.5	13.7	7	7	11.5	-	-	-	-	-	-	-
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	7.14	7.17	7.27	7.27	7.27	-	-	-	-	-	-	-
Field Conductivity	µS/cm	-		-	NV	1218	1321	1511	1511	1114	-	-	-	-	-	-	-

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	25-II 9-Nov-11	25-II 19-Apr-12	25-II 29-Oct-12	25-II 3-Jun-13	25-II 29-Oct-13	25-II 1-May-14	25-II 24-Sep-14	25-II 28-Apr-15	25-II 6-Oct-15	25-II 26-Apr-16	25-II 20-Oct-16	25-II 12-Apr-17
Alkalinity	mg/L	500	OG	349	NV	**818**	**840**	**840**	**818**	**834**	**835**	**820**	**836**	**836**	**839**	**847**	**833**
Conductivity	µS/cm	-		-	NV	2000	2000	2000	1970	2010	1980	1970	1970	1940	1960	1990	1900
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.28	7.45	7.26	7.12	7.2	7.4	7.02	7.29	7.24	7.06	7.34	7.24
TDS	mg/L	500	AO	368	NV	**1240**	**1250**	**1220**	**1260**	**1260**	**1180**	**1170**	**1210**	**1050**	**1150**	**1230**	**1120**
DOC	mg/L	5		3.5	NV	-	**18**	**19**	**21.7**	-	**22.3**	**18.1**	**22.5**	**10.1**	**12.9**	**12.3**	**14.5**
COD	mg/L	-		-	NV	49	67	69	187	170	120	45	47	42	53	52	47
Phenols	mg/L	-		-	0.001	0.005	<0.0010	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.023	0.005
Chloride	mg/L	250	AO	131	NV	140	130	130	141	141	135	132	145	12	135	138	119
Ammonia, total	mg/L	-		-	NV	<0.1	0.16	0.23	0.01	0.1	0.12	0.3	0.14	0.35	0.1	0.13	0.07
Unionized Ammonia	mg/L	-		-	0.02												
Fluoride	mg/L	2.4	MAC	0.7	NV	<0.1	<0.10	<0.10	< 0.1	0.1	< 0.1	< 0.1	0.1	0.1	< 0.1	< 0.1	< 0.1
Sulphate	mg/L	500	AO	255	NV	130	120	100	119	109	108	93	96	84	79	80	67
Nitrite (N)	mg/L	1	MAC	0.3	NV	<0.01	<0.010	<0.010	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	4.0	NV	<0.1	<0.10	<0.10	< 0.1	0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1	0.1
Bromide	mg/L	-		-	NV	-	<1.0	<1.0	0.8	0.9	0.6	0.5	0.9	0.8	0.8	-	
TKN	mg/L	-		-	NV	4	2.6	<0.50	1.3	0.2	1.3	2.2	1.4	1.2	1.3	1.6	1.2
Hardness	mg/L	500	OG	361	NV	**890**	**930**	**900**	**1010**	**987**	**872**	**859**	**912**	**887**	**841**	**962**	**857**
Aluminum	mg/L	0.1	OG	0.07	0.075	<0.005	<0.0050	0.011	0.09	0.1	0.05	0.06	0.05	0.06	0.06	0.09	**0.13**
Antimony	mg/L	0.006	IMAC	0.002	0.02	<0.0005	<0.00050	<0.00050	0.0001	< 0.0001	0.0001	0.0003	0.0001	0.0002	0.0001	0.0003	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.006	0.005	<0.001	<0.0010	<0.0010	0.0012	0.0012	0.0011	0.0004	0.0015	0.0009	0.001	0.0009	0.0007
Barium	mg/L	1	MAC	0.3	NV	0.34	0.33	0.33	0.38	0.36	0.29	0.33	0.33	0.32	0.3	0.36	0.45
Beryllium	mg/L	-		-	1.1	<0.0005	<0.00050	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	5	IMAC	1.3	0.2	0.85	0.83	0.98	0.924	1.06	0.808	0.946	0.887	0.91	0.883	1.08	0.987
Cadmium	mg/L	0.005	MAC	0.001	0.0005	<0.0001	<0.00010	<0.00010	0.00015	0.00005	0.00003	0.00006	0.00002	0.00003	0.00004	0.00003	< 0.00002
Calcium	mg/L	-		-	NV	290	290	290	330	324	284	277	297	288	271	308	270
Chromium	mg/L	0.05	MAC	0.013	0.001	<0.03	<0.0050	-	0.0031	0.0152	0.001	< 0.0002	0.007	0.015	< 0.0002	0.002	0.005
Chromium (VI)	mg/L			-													
Cobalt	mg/L	-		-	0.0009	0.0087	0.01	0.012	0.0075	0.01	0.01	0.009	0.011	0.011	0.01	0.013	0.015
Copper	mg/L	1	AO	0.5	0.005	0.015	0.01	0.014	0.0124	0.0105	0.014	0.0133	0.0135	0.0103	0.0125	0.018	0.0116
Iron	mg/L	0.3	AO	0.16	0.3	<0.1	<0.10	<0.10	0.06	0.22	0.05	0.18	0.07	0.13	0.08	0.16	0.1
Lead	mg/L	0.01	MAC	0.003	0.005	< 0.001	<0.00050	<0.00050	0.00005	0.00005	0.00004	0.00003	0.00007	0.00007	0.00006	0.00007	< 0.00002
Magnesium	mg/L	-		-	NV	39	47	43	45.8	43.3	39.7	40.9	41.3	40.9	39.9	47	44.4
Manganese	mg/L	0.05	AO	0.03	NV	**1.2**	**1.5**	**1.8**	**1.55**	**1.3**	**1.42**	**0.87**	**1.41**	**1.47**	**1.4**	**1.71**	**1.46**
Mercury	mg/L	0.001	MAC	0.0003	0.0002	-	<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00003	0.00003	< 0.00002
Molybdenum	mg/L	-		-	0.04	< 0.001	<0.00050	<0.00050	0.0002	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0001	0.0001
Nickel	mg/L	-		-	0.025	0.02	0.02	0.019	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Potassium	mg/L	-		-	NV	2.3	2.3	2.6	2.5	2.3	2.4	2.2	2.4	2.6	2.5	3.1	2.8
Phosphorus-Total	mg/L	-		-	0.03	19	<0.10	22	9.25	2.04	2.25	23.5	2.1	0.89	3.47	13.3	1.5
Selenium	mg/L	0.01	MAC	0.003	0.1	<0.002	<0.0020	<0.0020	< 0.001	0	< 0.001	0	0	0	< 0.001	0	< 0.001
Silver	mg/L	-		-	0.0001	<0.0001	<0.00010	<0.00010	0.00003	0.00002	0.00003	< 0.00002	0.00003	0.00003	0.00002	< 0.00002	< 0.00002
Sodium	mg/L	200	AO	105	NV	120	120	130	128	136	113	128	121	120	118	142	119
Strontium	mg/L	-		-	NV	0.68	0.66	0.68	-	-	-	0.7	0.71	0.63	0.67	0.8	0.68
Thallium	mg/L	-		-	0.0003	0.00007	0.000064	0.000076	0.0001	0.0001	0.0001	0.0001	< 0.00005	0.0001	0.0001	< 0.00005	0.0001
Vanadium	mg/L	-		-	0.006	0.001	0.0013	0.0009	0.0101	0.0046	0.0098	0.0244	0.0091	0.0058	0.0038	0.0031	0.0035
Zinc	mg/L	5	AO	2.5	0.02	<0.005	<0.0050	0.0085	< 0.005	< 0.005	< 0.005	0.014	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	-	10.3	10.1	9.6	10.1	10.5	13.6	12.4	12.2	7.1	11.8	7.1
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	-	6.52	6.94	6.95	6.56	7.38	7.05	6.73	6.83	7.17	6.9	6.87
Field Conductivity	µS/cm	-		-	NV	-	2010	2200	2020	1910	1970	1950	2030	1400	1400	1525	1488

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

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OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	25-II 5-Oct-17	25-II 11-Apr-18	25-II 1-Oct-18	25-II 22-Apr-19	25-II 9-Oct-19	25-II 13-Apr-20	25-II 21-Apr-21	25-II 18-Oct-21	25-II 20-Apr-22	25-II 12-Oct-22	25-II 19-Apr-23	25-II 12-Oct-23
Alkalinity	mg/L	500	OG	349	NV	**817**	**817**	**858**	**770**	**786**	**758**	**791**	**824**	**767**	**809**	**805**	**828**
Conductivity	µS/cm	-		-	NV	1880	1790	1840	1780	1790	1740	1710	1690	1750	1740	1780	1800
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.31	7.4	7.4	7.36	7.33	7.47	7.55	7.35	7.41	7.5	7.26	7.32
TDS	mg/L	500	AO	368	NV	**1069**	**1073**	**1087**	**1043**	**1030**	**998**	**1022**	**1059**	**995**	**1026**	**1047**	**991**
DOC	mg/L	5		3.5	NV	**14.9**	**19.1**	**17.1**	**15.9**	**18.6**	**17.1**	**15.4**	**14.1**	**12.5**	**4.9**	**11.9**	**13.4**
COD	mg/L	-		-	NV	50	52	53	64	38	53	53	52	56	60	56	58
Phenols	mg/L	-		-	0.001	0.009	< 0.001	0.011	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001
Chloride	mg/L	250	AO	131	NV	103	96.6	114	109	124	104	98.1	111	101	102	112	110
Ammonia, total	mg/L	-		-	NV	0.07	0.11	0.11	0.11	0.14	0.15	0.24	0.32	0.53	0.45	0.87	0.7
Unionized Ammonia	mg/L	-		-	0.02				< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	<0.01
Fluoride	mg/L	2.4	MAC	0.7	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1	<0.1
Sulphate	mg/L	500	AO	255	NV	55	53	56	52	< 10	43	38	37	33	25	6	30
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.05
Nitrate (N)	mg/L	10	MAC	4.0	NV	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.05
Bromide	mg/L	-		-	NV												
TKN	mg/L	-		-	NV	1.2	1.1	1.2	1.2	1.4	1.2	1.2	1.3	1.7	1.5	2.1	1.8
Hardness	mg/L	500	OG	361	NV	**813**	**862**	**759**	**841**	**824**	**785**	**817**	**814**	**788**	**792**	**830**	**707**
Aluminum	mg/L	0.1	OG	0.07	0.075	0.1	**0.12**	**0.11**	**0.12**	**0.13**	0.1	**0.12**	**0.12**	0.07	0.08	**0.14**	0.06
Antimony	mg/L	0.006	IMAC	0.002	0.02	0.0001	0.0001	0.0001	0.0001	< 0.0001	0.0001	0.0001	< 0.0001	0.0002	0.0001	0.0002	0.0002
Arsenic	mg/L	0.025	IMAC	0.006	0.005	0.0007	0.0004	0.0003	0.0003	0.0003	0.0002	0.0003	0.0003	0.0003	0.0003	0.0002	0.0003
Barium	mg/L	1	MAC	0.3	NV	0.36	0.334	0.302	0.324	0.323	0.307	0.318	0.328	0.316	0.324	0.332	0.297
Beryllium	mg/L	-		-	1.1	< 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	mg/L	5	IMAC	1.3	0.2	0.952	0.897	0.895	0.892	1.03	0.875	0.901	0.976	0.917	1.02	1.08	1.03
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.000014	0.000019	0.000031	0.000035	< 0.000029	0.000028	0.000015	< 0.000015	< 0.000015	< 0.000012	< 0.000012	<0.000015
Calcium	mg/L	-		-	NV	256	276	237	269	258	246	257	253	244	244	254	208
Chromium	mg/L	0.05	MAC	0.013	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)	mg/L			-										< 0.001	< 0.001	< 0.001	<0.01
Cobalt	mg/L	-		-	0.0009	0.013	0.011	0.014	0.019	0.009	0.011	0.012	0.011	0.021	0.015	0.016	0.0162
Copper	mg/L	1	AO	0.5	0.005	0.0071	0.0088	0.0086	0.0133	0.0066	0.0127	0.0113	0.0091	0.0088	0.0052	0.0081	0.0114
Iron	mg/L	0.3	AO	0.16	0.3	0.11	0.068	0.122	0.064	0.245	0.077	0.092	0.182	0.139	**0.472**	0.169	**0.469**
Lead	mg/L	0.01	MAC	0.003	0.005	0.00006	0.00006	0.00007	0.00007	< 0.00009	0.00008	0.00009	< 0.00004	0.00004	< 0.00004	0.00004	<0.00002
Magnesium	mg/L	-		-	NV	42.2	41.9	40.5	41	43.6	41.3	42.4	44.1	43.5	44.3	47.4	45.4
Manganese	mg/L	0.05	AO	0.03	NV	**1.52**	**1.52**	**1.2**	**1.38**	**1.31**	**1.5**	**1.61**	**1.57**	**1.56**	**1.29**	**1.35**	**1.08**
Mercury	mg/L	0.001	MAC	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	mg/L	-		-	0.04	0.0001	< 0.0001	0.0002	0.0002	0.0005	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Nickel	mg/L	-		-	0.025	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.023
Potassium	mg/L	-		-	NV	3.3	2.8	2.9	2.8	3.1	3.5	3.8	4.3	3.4	3.3	2.3	3.9
Phosphorus-Total	mg/L	-		-	0.03	0.86	1.15	0.78	1.64	0.97	0.29	0.39	0.32	0.41	0.2	0.36	0.16
Selenium	mg/L	0.01	MAC	0.003	0.1	< 0.001	0.002	0.001	0.001	0.003	0.001	< 0.001	0.002	0.002	0.002	0.002	0.002
Silver	mg/L	-		-	0.0001	< 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	mg/L	200	AO	105	NV	118	111	120	106	128	104	107	113	107	119	118	122
Strontium	mg/L	-		-	NV	0.68	0.647	0.62	0.645	0.67	0.653	0.661	0.664	0.655	0.649	0.652	0.666
Thallium	mg/L	-		-	0.0003	0.0001	0.00005	0.00009	0.00008	< 0.00005	0.00007	< 0.00005	< 0.00005	< 0.00005	< 0.005	< 0.00005	<0.00005
Vanadium	mg/L	-		-	0.006	0.0045	0.0005	0.0007	0.0006	0.0011	0.0005	0.0005	0.0007	0.0006	0.0015	< 0.0001	0.0014
Zinc	mg/L	5	AO	2.5	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	11.5			9.5	10.6	8.6	8.1	10.9	8.1	13.9	6.4	11.3
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	7.66	7.4	7.4	6.82	6.97	6.8	7.14	7.42	6.97	6.88	7.1	7.07
Field Conductivity	µS/cm	-		-	NV	1474	1760	1750	1720	1270	1407	1542	1400	1700	1814	2210	1864

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	26-II 6-May-08	26-II 18-Aug-08	26-II 25-May-09	26-II 4-Aug-09	26-II 10-Jun-10	26-II 6-Oct-10	26-II 12-May-11	26-II 8-Nov-11	26-II 19-Apr-12	26-II 29-Oct-12	26-II 3-Jun-13	26-II 29-Oct-13
Alkalinity	mg/L	500	OG	NV	295	292	302	307	262	292	306	312	260	370	250	342
Conductivity	µS/cm	-		NV	709	702	779	790	564	690	782	801	620	940	606	868
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.1	7.49	7.59	7.55	7.6	7.7	7.7	7.73	7.87	7.6	7.87	7.79
TDS	mg/L	500	AO	NV	461	456	**506**	**514**	367	449	468	449	368	**541**	351	**502**
DOC	mg/L	5		NV	3	3	3	3	2	3	2.7	3.5	1.5	4.7	4.2	-
COD	mg/L	-		NV	<2	6	9	5	10	8	16	16	5.5	17	< 5	8
Phenols	mg/L	-		0.001	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	<0.0010	<0.0010	< 0.001	< 0.001
Chloride	mg/L	250	AO	NV	30	26	28	33	22	31	28	33	21	38	20	37
Ammonia, total	mg/L	-		NV	<0.1	<0.1	0.06	< 0.01	0.05	0.02	<0.01	0.7	<0.01	0.04	< 0.01	< 0.005
Unionized Ammonia	mg/L	-		0.02												
Fluoride	mg/L	2.4	MAC	NV	0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	<0.1	<0.10	<0.10	0.2	0.2
Sulphate	mg/L	500	AO	NV	82	63	101	105	50	85	76	54	42	61	35	62
Nitrite (N)	mg/L	1	MAC	NV	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.01	<0.01	<0.010	<0.010	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	NV	1.2	0.8	1.3	1.5	1.2	1.2	1.1	0.7	0.88	0.43	0.7	0.5
Bromide	mg/L	-		NV	-	-	< 0.1	-	< 0.1	-	<1	<1	<1.0	<1.0	< 0.4	< 0.4
TKN	mg/L	-		NV	0.2	0.2	0.3	0.3	0.1	0.3	0.5	0.4	0.44	0.11	0.07	0.2
Hardness	mg/L	500	OG	NV	388	352	403	422	329	435	380	380	320	460	339	457
Aluminum	mg/L	0.1	OG	0.075	<0.01	0.01	0.02	< 0.01	< 0.01	0.03	<0.005	<0.005	<0.0050	<0.0050	0.04	0.04
Antimony	mg/L	0.006	IMAC	0.02	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	<0.0005	<0.00050	<0.00050	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.005	<0.01	<0.01	< 0.01	< 0.01	< 0.005	< 0.005	<0.001	<0.001	<0.0010	<0.0010	0.0002	0.0002
Barium	mg/L	1	MAC	NV	<0.1	<0.1	0.1	0.1	< 0.1	0.1	0.13	0.14	0.1	0.17	0.12	0.16
Beryllium	mg/L	-		1.1	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.005	<0.0005	<0.00050	<0.00050	< 0.002	< 0.002
Boron	mg/L	5	IMAC	0.2	0.2	<0.1	0.1	0.3	0.1	<0.1	0.22	0.12	0.11	0.21	0.123	0.216
Cadmium	mg/L	0.005	MAC	0.0005	<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	0.00002	< 0.00002
Calcium	mg/L	-		NV	120	109	125	131	93	136	120	120	99	140	104	143
Chromium	mg/L	0.05	MAC	0.001	0.0002	0.0003	0.0003	0.0002	0.0003	0.0003	<0.005	<0.005	<0.0050	-	0.0004	0.0051
Chromium (VI)	mg/L															
Cobalt	mg/L	-		0.0009	0.0004	0.0006	0.0005	0.0006	< 0.0003	0.0004	<0.0005	<0.0005	<0.00050	<0.00050	0.0002	< 0.005
Copper	mg/L	1	AO	0.005	0.0006	0.001	0.0012	0.0011	0.0027	0.0012	0.003	0.003	0.0014	0.0041	0.0017	0.0028
Iron	mg/L	0.3	AO	0.3	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.100	<0.1	<0.10	<0.10	< 0.005	< 0.005
Lead	mg/L	0.01	MAC	0.005	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.0005	<0.0005	<0.00050	<0.00050	< 0.00002	< 0.00002
Magnesium	mg/L	-		NV	21	19	22	23	23	23	21	21	18	26	19.1	24.6
Manganese	mg/L	0.05	AO	NV	<0.01	0.02	0.01	0.02	< 0.01	0.01	0.009	0.01	0.0083	0.038	0.03	**0.07**
Mercury	mg/L	0.001	MAC	0.0002	0.00053	<0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00001	-	<0.00001	<0.00001	< 0.00002	< 0.00002
Molybdenum	mg/L	-		0.04	<0.002	<0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.001	<0.0005	<0.00050	<0.00050	0.0002	0.0001
Nickel	mg/L	-		0.025	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.001	<0.001	<0.0010	0.0022	< 0.01	< 0.01
Potassium	mg/L	-		NV	1.6	1.5	1.7	1.8	1.4	1.5	1.4	1.4	1.4	1.7	1.3	1.5
Phosphorus-Total	mg/L	-		0.03	<0.01	0.02	0.01	< 0.01	< 0.01	< 0.02	0.59	0.92	<0.10	0.44	0.18	0.08
Selenium	mg/L	0.01	MAC	0.1	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.002	<0.002	<0.0020	<0.0020	< 0.001	< 0.001
Silver	mg/L	-		0.0001	<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002
Sodium	mg/L	200	AO	NV	15	15	20	21	15	13	21	18	14	28	17.7	27.2
Strontium	mg/L	-		NV	0.21	0.252	0.388	0.445	0.329	0.373	0.34	0.32	0.23	0.35	-	-
Thallium	mg/L	-		0.0003	<0.0003	<0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	<0.00005	<0.00005	<0.000050	<0.000050	< 0.00005	< 0.00005
Vanadium	mg/L	-		0.006	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	0.0005	<0.00050	0.0013	0.0029	0.0016
Zinc	mg/L	5	AO	0.02	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.006	0.006	0.0061	<0.0050	< 0.005	< 0.005
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	-	-	-	-	-	-	-	-	13	9.6	11.4	11.1
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	-	-	-	-	-	-	-	-	7.03	7.53	7.68	7.2
Field Conductivity	µS/cm	-		NV	-	-	-	-	-	-	-	-	634	1000	620	900

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	26-II 1-May-14	26-II 24-Sep-14	26-II 28-Apr-15	26-II 6-Oct-15	26-II 26-Apr-16	26-II 20-Oct-16	26-II 12-Apr-17	26-II 5-Oct-17	26-II 11-Apr-18	26-II 2-Oct-18	26-II 23-Apr-19	26-II 9-Oct-19
Alkalinity	mg/L	500	OG	NV	338	331	303	313	319	368	352	358	326	335	388	386
Conductivity	µS/cm	-		NV	866	896	757	778	817	977	876	951	858	910	1100	7.76
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.78	7.76	7.85	7.78	7.78	7.79	7.78	7.73	7.8	7.71	7.81	1040
TDS	mg/L	500	AO	NV	492	**503**	428	435	453	**568**	496	**501**	460	497	**602**	**614**
DOC	mg/L	5		NV	**7.1**	**7.1**	1.7	3.1	3	4.6	4.7	4.8	**5.5**	**5.1**	**6.9**	**8**
COD	mg/L	-		NV	9	13	< 5	< 5	5	13	5	12	8	10	5	11
Phenols	mg/L	-		0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.01	< 0.001	0.002	< 0.001	< 0.002	< 0.002	< 0.002
Chloride	mg/L	250	AO	NV	42	50	37	36	41	59	47	50	40.3	55.7	73.8	91.2
Ammonia, total	mg/L	-		NV	0.01	0.05	0.04	< 0.01	0.01	0.04	< 0.01	< 0.01	0.01	0.03	0.03	0.03
Unionized Ammonia	mg/L	-		0.02											< 0.01	< 0.01
Fluoride	mg/L	2.4	MAC	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
Sulphate	mg/L	500	AO	NV	66	68	47	47	52	65	50	47	43	50	69	62
Nitrite (N)	mg/L	1	MAC	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.4	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	10	MAC	NV	0.8	0.5	0.6	0.6	0.6	0.5	0.5	0.5	0.66	0.52	0.14	0.11
Bromide	mg/L	-		NV	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	-						
TKN	mg/L	-		NV	0.4	0.3	0.4	0.2	0.2	0.4	0.3	0.3	0.2	0.3	0.5	0.3
Hardness	mg/L	500	OG	NV	386	436	367	381	383	**508**	438	438	415	440	**510**	**520**
Aluminum	mg/L	0.1	OG	0.075	0.03	0.05	0.02	0.04	0.03	0.05	0.07	0.09	0.08	0.06	0.08	0.09
Antimony	mg/L	0.006	IMAC	0.02	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	0.0003	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.005	0.0002	0.0018	0.0003	0.0002	0.0003	0.0003	0.0001	0.0003	< 0.0001	< 0.0001	0.0001	< 0.0003
Barium	mg/L	1	MAC	NV	0.14	0.15	0.13	0.13	0.13	0.18	0.21	0.17	0.147	0.152	0.193	0.186
Beryllium	mg/L	-		1.1	< 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	mg/L	5	IMAC	0.2	0.236	0.181	0.161	0.151	0.166	0.267	0.215	0.217	0.207	0.189	0.307	0.314
Cadmium	mg/L	0.005	MAC	0.0005	0.00008	< 0.00002	< 0.00002	< 0.00002	0.00003	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	0.000026	< 0.000029
Calcium	mg/L	-		NV	119	134	113	117	118	156	132	131	126	132	157	159
Chromium	mg/L	0.05	MAC	0.001	< 0.0002	0.0008	0.0015	0.0023	< 0.0002	0.0008	0.0018	< 0.001	< 0.001	0.001	< 0.001	< 0.001
Chromium (VI)	mg/L															
Cobalt	mg/L	-		0.0009	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Copper	mg/L	1	AO	0.005	0.0049	0.0043	0.0027	0.0029	0.0028	0.0044	0.0032	0.0027	0.0043	0.0032	0.0056	0.0045
Iron	mg/L	0.3	AO	0.3	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.01	0.005	0.008	< 0.005	< 0.005
Lead	mg/L	0.01	MAC	0.005	0.00002	< 0.00002	< 0.00002	< 0.00002	0.00004	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00009
Magnesium	mg/L	-		NV	21.4	24.3	20.8	21.3	21.4	28.9	26.3	27	24.4	26.7	28.7	29.8
Manganese	mg/L	0.05	AO	NV	**0.13**	**0.13**	**0.12**	**0.25**	**0.21**	**0.41**	**0.25**	**0.38**	**0.215**	**0.387**	**0.361**	**0.486**
Mercury	mg/L	0.001	MAC	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00003	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		0.04	0.0002	0.0002	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0005
Nickel	mg/L	-		0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		NV	1.5	1.5	1.4	1.4	1.4	1.6	1.5	1.5	1.2	1.4	1.6	1.6
Phosphorus-Total	mg/L	-		0.03	0.08	0.44	0.24	0.18	0.13	0.17	0.53	0.31	0.17	0.03	0.06	0.04
Selenium	mg/L	0.01	MAC	0.1	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001
Silver	mg/L	-		0.0001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	NV	35.9	23.7	24.7	22.2	24.1	35.3	25.3	29.4	28.4	28.7	39.2	38.5
Strontium	mg/L	-		NV	-	0.38	0.32	0.27	0.32	0.45	0.34	0.34	0.292	0.296	0.342	0.339
Thallium	mg/L	-		0.0003	< 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	mg/L	-		0.006	0.0028	0.0078	0.0021	0.001	0.0014	0.0011	0.0015	0.0017	0.0002	0.00031	0.0003	< 0.0004
Zinc	mg/L	5	AO	0.02	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	10.7	14.4	11.8	11.9	-	11.2	8.5	11.4			9.2	10.4
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	8.07	7.43	7.47	7.24	-	7.5	7.61	7.15	7.8	7.71	7.16	7.22
Field Conductivity	µS/cm	-		NV	930	890	830	590	806	835	702	784	833	896	1010	844

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	26-II 13-Apr-20	26-II 15-Oct-20	26-II 21-Apr-21	26-II 18-Oct-21	26-II 20-Apr-22	26-II 12-Oct-22	26-II 19-Apr-23	26-II 12-Oct-23	26-III 6-May-08	26-III 18-Aug-08	26-III 25-May-09	26-III 4-Aug-09
Alkalinity	mg/L	500	OG	NV	376	374	462	352	316	374	375	404	425	436	416	389
Conductivity	µS/cm	-		NV	1040	942	1200	812	807	907	978	989	990	1060	1000	963
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.68	7.72	7.75	7.67	7.62	7.76	7.69	7.49	6.87	7.29	7.41	7.36
TDS	mg/L	500	AO	NV	**577**	**536**	**703**	484	429	**516**	**543**	**527**	**644**	**686**	**650**	**626**
DOC	mg/L	5		NV	**5.8**	4.9	9	**5.2**	4.2	2.4	2.4	**6.7**	**6**	**7.1**	**6**	5
COD	mg/L	-		NV	16	11	13	8	5	24	19	15	<2	19	15	12
Phenols	mg/L	-		0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001	0.001	<0.001	< 0.001	< 0.001
Chloride	mg/L	250	AO	NV	69.9	55.6	82	50.8	40.6	45.8	60.8	57.9	68	71	58	63
Ammonia, total	mg/L	-		NV	< 0.01	0.04	0.02	0.06	0.22	< 0.01	0.71	0.59	<0.1	<0.1	0.03	< 0.01
Unionized Ammonia	mg/L	-		0.02	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	<0.01				
Fluoride	mg/L	2.4	MAC	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
Sulphate	mg/L	500	AO	NV	67	48	71	43	33	46	15	45	65	79	78	100
Nitrite (N)	mg/L	1	MAC	NV	< 0.05	< 0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.5	<0.05	<0.1	<0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	NV	0.24	0.66	< 0.05	0.51	0.78	0.53	< 0.5	0.43	0.3	<0.1	0.5	0.4
Bromide	mg/L	-		NV									-	-	0.2	-
TKN	mg/L	-		NV	0.3	0.4	0.5	0.3	0.5	0.3	0.9	0.7	0.4	0.4	0.3	0.3
Hardness	mg/L	500	OG	NV	483	440	**595**	422	380	442	473	474	**501**	**533**	496	498
Aluminum	mg/L	0.1	OG	0.075	0.07	0.05	0.1	0.07	0.03	0.04	0.09	0.04	<0.01	0.01	< 0.01	< 0.01
Antimony	mg/L	0.006	IMAC	0.02	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.01	<0.01	< 0.01	< 0.01
Arsenic	mg/L	0.025	IMAC	0.005	< 0.0001	0.0001	0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.01	<0.01	< 0.01	< 0.01
Barium	mg/L	1	MAC	NV	0.178	0.175	0.227	0.141	0.136	0.17	0.177	0.174	0.1	0.2	0.2	0.2
Beryllium	mg/L	-		1.1	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	<0.1	<0.1	< 0.1	< 0.1
Boron	mg/L	5	IMAC	0.2	0.291	0.323	0.325	0.154	0.174	0.247	0.254	0.251	0.1	0.1	0.1	0.3
Cadmium	mg/L	0.005	MAC	0.0005	< 0.000015	0.000018	0.000018	0.000017	< 0.000015	0.000017	0.00002	<0.000015	<0.0001	<0.0001	< 0.0001	0.0002
Calcium	mg/L	-		NV	145	132	181	127	114	136	143	144	149	157	146	150
Chromium	mg/L	0.05	MAC	0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	0.0002	0.0002	0.0003	0.0001
Chromium (VI)	mg/L								< 0.001	< 0.001	< 0.001	<0.01				
Cobalt	mg/L	-		0.0009	0.0048	0.011	< 0.005	0.006	0.006	0.011	< 0.005	0.0087	0.0022	0.0024	0.0032	0.0027
Copper	mg/L	1	AO	0.005	0.0059	0.0079	0.0087	0.0044	0.0042	0.0049	0.0053	0.0064	0.0024	0.0044	0.0034	0.0027
Iron	mg/L	0.3	AO	0.3	< 0.005	< 0.005	< 0.005	0.005	< 0.005	< 0.005	< 0.005	<0.005	<0.1	<0.1	< 0.1	< 0.1
Lead	mg/L	0.01	MAC	0.005	0.00002	< 0.00002	0.00004	< 0.00002	0.00002	< 0.00002	< 0.00002	<0.00002	<0.001	<0.001	< 0.001	< 0.001
Magnesium	mg/L	-		NV	29.4	26.7	34.7	25.5	22.8	24.9	28	27.8	31	34	32	30
Manganese	mg/L	0.05	AO	NV	**0.471**	**0.478**	**0.597**	**0.489**	**0.304**	**0.576**	**0.507**	**0.76**	**0.41**	**0.5**	**0.56**	**0.52**
Mercury	mg/L	0.001	MAC	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002	0.00016	<0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		0.04	0.0003	0.0003	0.0003	0.0004	0.0003	0.0004	0.0003	0.0003	<0.002	<0.002	< 0.002	< 0.002
Nickel	mg/L	-		0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.0064	<0.01	<0.01	< 0.01	< 0.01
Potassium	mg/L	-		NV	1.7	1.7	1.9	1.5	1.5	1.5	1.4	1.7	2	2.2	2	2.2
Phosphorus-Total	mg/L	-		0.03	0.04	0.03	< 0.1	< 0.1	0.07	0.05	0.03	0.03	<0.01	0.02	0.02	< 0.01
Selenium	mg/L	0.01	MAC	0.1	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	<0.01	<0.01	< 0.01	< 0.01
Silver	mg/L	-		0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.0001	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	NV	38	47.5	54.2	24.2	27	36.8	33.2	35	30	31	37	36
Strontium	mg/L	-		NV	0.331	0.327	0.408	0.265	0.248	0.272	0.316	0.343	0.36	0.379	0.366	0.38
Thallium	mg/L	-		0.0003	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.005	< 0.00005	<0.00005	0.0003	<0.0003	< 0.0003	0.0004
Vanadium	mg/L	-		0.006	0.0003	0.0003	0.0003	0.0002	0.0003	0.0003	0.0005	0.0003	<0.001	<0.001	< 0.001	< 0.001
Zinc	mg/L	5	AO	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	<0.01	<0.01	< 0.01	< 0.01
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	10	11	8.5	10.6	9.1	12.2	8.9	10.8	-	-	-	-
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	7.5	7.16	7.54	7.85	7.49	7.5	7.31	6.99	-	-	-	-
Field Conductivity	µS/cm	-		NV	971	810	1101	726	920	929	839	858	-	-	-	-

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	26-III 10-Jun-10	26-III 6-Oct-10	26-III 12-May-11	26-III 8-Nov-11	26-III 19-Apr-12	26-III 29-Oct-12	26-III 3-Jun-13	26-III 29-Oct-13	26-III 1-May-14	26-III 24-Sep-14	26-III 28-Apr-15	26-III 6-Oct-15
Alkalinity	mg/L	500	OG	NV	428	483	382	399	420	390	373	369	399	401	456	435
Conductivity	µS/cm	-		NV	974	1080	995	1030	1100	990	949	950	1010	1030	1130	1090
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.36	7.4	7.67	7.72	7.65	7.68	7.64	7.72	7.73	7.63	7.68	7.62
TDS	mg/L	500	AO	NV	**633**	**701**	**580**	**593**	**622**	**566**	**564**	**541**	**567**	**570**	**651**	**614**
DOC	mg/L	5		NV	5	**8**	**5.7**	-	**6.5**	4.8	**8.8**	-	**8.9**	**9.1**	**5.6**	4.7
COD	mg/L	-		NV	24	19	25	30	22	47	14	12	28	19	11	11
Phenols	mg/L	-		0.001	< 0.001	< 0.001	<0.001	<0.001	<0.0010	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Chloride	mg/L	250	AO	NV	75	80	55	57	63	60	57	56	65	67	84	70
Ammonia, total	mg/L	-		NV	0.04	< 0.01	<0.05	0.1	<0.01	0.08	< 0.01	0.01	0.03	0.06	0.05	0.04
Unionized Ammonia	mg/L	-		0.02												
Fluoride	mg/L	2.4	MAC	NV	< 0.1	< 0.1	<0.1	<0.1	<0.10	<0.10	< 0.1	0.1	0.1	< 0.1	0.1	0.1
Sulphate	mg/L	500	AO	NV	92	97	73	67	60	47	57	56	57	52	51	52
Nitrite (N)	mg/L	1	MAC	NV	< 0.1	< 0.1	0.03	<0.01	<0.010	<0.010	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	NV	0.4	< 0.1	0.2	0.1	<0.10	<0.10	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bromide	mg/L	-		NV	0.2	-	<1	<1	<1.0	<1.0	0.5	< 0.4	< 0.4	0.4	0.5	0.5
TKN	mg/L	-		NV	0.4	0.4	<1	3	0.62	0.86	0.26	0.3	0.4	0.4	0.7	0.4
Hardness	mg/L	500	OG	NV	**524**	**655**	480	-	**540**	490	**537**	494	490	**506**	**586**	**547**
Aluminum	mg/L	0.1	OG	0.075	< 0.01	0.03	<0.005	<0.005	<0.0050	<0.0050	0.05	0.04	0.03	0.04	0.03	0.04
Antimony	mg/L	0.006	IMAC	0.02	< 0.01	< 0.01	<0.005	<0.0005	<0.00050	<0.00050	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	0.0001
Arsenic	mg/L	0.025	IMAC	0.005	< 0.005	< 0.005	<0.001	<0.001	<0.0010	<0.0010	0.0005	0.0005	0.0007	0.0019	0.0008	0.0005
Barium	mg/L	1	MAC	NV	0.1	0.2	0.18	0.19	0.19	0.18	0.2	0.18	0.16	0.18	0.21	0.2
Beryllium	mg/L	-		1.1	< 0.1	< 0.1	<0.005	<0.0005	<0.00050	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	5	IMAC	0.2	0.2	<0.1	0.16	0.14	0.13	0.14	0.117	0.126	0.097	0.118	0.11	0.12
Cadmium	mg/L	0.005	MAC	0.0005	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	0.00003	< 0.00002	< 0.00002	0.00002	< 0.00002	0.00002
Calcium	mg/L	-		NV	158	197	140	150	160	150	161	148	146	150	174	162
Chromium	mg/L	0.05	MAC	0.001	0.0001	0.0002	<0.005	<0.005	<0.0050	-	0.0011	0.0055	0.0008	0.0005	0.002	0.0033
Chromium (VI)	mg/L															
Cobalt	mg/L	-		0.0009	0.0027	0.0039	0.0031	0.0036	0.0033	0.0035	0.0025	< 0.005	< 0.005	0.006	0.007	0.009
Copper	mg/L	1	AO	0.005	0.0028	0.0053	0.005	0.004	0.0049	0.004	0.0042	0.0029	0.0046	0.0035	0.0045	0.0037
Iron	mg/L	0.3	AO	0.3	< 0.1	< 0.1	<0.1	<0.1	<0.10	0.15	0.01	0.01	< 0.005	< 0.005	0.01	0.05
Lead	mg/L	0.01	MAC	0.005	< 0.001	< 0.001	<0.0005	<0.0005	<0.00050	<0.00050	< 0.00002	< 0.00002	0.00003	< 0.00002	< 0.00002	< 0.00002
Magnesium	mg/L	-		NV	32	39	30	32	35	30	32.8	29.9	30.5	32.2	36.9	34.6
Manganese	mg/L	0.05	AO	NV	**0.67**	**0.91**	**0.71**	**0.98**	**0.9**	**1**	**1.08**	**1.05**	**1.07**	**1.23**	**1.31**	**1.41**
Mercury	mg/L	0.001	MAC	0.0002	< 0.00002	< 0.00002	< 0.00002	<0.00002	<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		0.04	< 0.002	< 0.002	<0.001	<0.0005	<0.00050	<0.00050	0.0003	0.0003	0.0004	0.0003	0.0003	0.0003
Nickel	mg/L	-		0.025	< 0.01	< 0.01	0.003	0.002	0.0026	0.0026	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		NV	1.9	2	1.6	1.7	1.8	1.7	1.6	1.5	1.5	1.6	1.7	1.6
Phosphorus-Total	mg/L	-		0.03	< 0.01	< 0.02	1.9	14	<0.10	6.6	0.06	0.3	0.39	1.78	0.14	0.17
Selenium	mg/L	0.01	MAC	0.1	< 0.01	< 0.01	<0.002	<0.002	<0.0020	<0.0020	< 0.001	< 0.001	< 0.001	< 0.001	0	0
Silver	mg/L	-		0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Sodium	mg/L	200	AO	NV	35	36	30	30	32	27	29.1	26.9	25.7	26.1	29.4	30.4
Strontium	mg/L	-		NV	0.38	0.37	0.36	0.36	0.34	0.32	-	-	-	0.37	0.42	0.35
Thallium	mg/L	-		0.0003	0.0005	0.0005	0.00005	<0.00005	<0.000050	<0.000050	< 0.00005	< 0.00005	0.0001	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		0.006	< 0.001	< 0.001	<0.001	0.0009	0.00073	0.0012	0.0054	0.0017	0.0043	0.0097	0.0029	0.0013
Zinc	mg/L	5	AO	0.02	< 0.01	< 0.01	0.017	0.006	<0.0050	<0.0050	< 0.005	< 0.005	< 0.005	0.013	0.005	0.006
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	-	-	-	-	11	10.5	10.4	11.8	11.4	12.5	10.7	12.1
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	-	-	-	-	6.74	7.28	7.36	7.19	7.8	7.45	7.11	7.05
Field Conductivity	µS/cm	-		NV	-	-	-	-	1062	1020	976	960	1040	1080	1250	815

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	26-III 26-Apr-16	26-III 20-Oct-16	26-III 12-Apr-17	26-III 5-Oct-17	26-III 11-Apr-18	26-III 2-Oct-18	26-III 23-Apr-19	26-III 9-Oct-19	26-III 13-Apr-20	26-III 15-Oct-20	26-III 21-Apr-21	26-III 18-Oct-21
Alkalinity	mg/L	500	OG	NV	**515**	**545**	**613**	**653**	**552**	**590**	**521**	**541**	**533**	**525**	**541**	**598**
Conductivity	µS/cm	-		NV	1250	1300	1410	1480	1300	1380	1260	1250	1280	1220	1240	1270
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.41	7.55	7.59	7.4	7.49	7.36	7.64	7.58	7.52	7.61	7.7	7.43
TDS	mg/L	500	AO	NV	**697**	**759**	**801**	**805**	**715**	**765**	**688**	**743**	**702**	**701**	**715**	**785**
DOC	mg/L	5		NV	**6.7**	**6.6**	**9.2**	**10.5**	**11.8**	**12.4**	**9.5**	**13.5**	**10.3**	**7.2**	**10**	**12.1**
COD	mg/L	-		NV	23	29	26	33	31	35	35	27	42	47	20	33
Phenols	mg/L	-		0.001	< 0.001	0.008	< 0.001	0.004	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Chloride	mg/L	250	AO	NV	89	87	95	79	67	81.9	74.9	90	78.5	75.9	74.7	89.7
Ammonia, total	mg/L	-		NV	0.04	0.08	0.02	< 0.01	0.02	0.03	0.04	0.05	0.02	0.06	0.03	0.08
Unionized Ammonia	mg/L	-		0.02							< 0.01	< 0.01	< 0.01	< 0.01		< 0.01
Fluoride	mg/L	2.4	MAC	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
Sulphate	mg/L	500	AO	NV	42	37	33	24	27	29	36	30	31	34	36	37
Nitrite (N)	mg/L	1	MAC	NV	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	10	MAC	NV	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.06	< 0.05	< 0.05	< 0.05
Bromide	mg/L	-		NV	0.5	-										
TKN	mg/L	-		NV	0.5	0.7	0.7	0.6	0.5	0.7	0.6	0.8	0.7	0.8	0.6	0.8
Hardness	mg/L	500	OG	NV	**612**	**729**	**719**	**711**	**658**	**670**	**597**	**654**	**605**	**614**	**627**	**670**
Aluminum	mg/L	0.1	OG	0.075	0.04	0.06	0.1	**0.11**	0.09	0.07	0.09	**0.11**	0.08	0.08	0.1	0.09
Antimony	mg/L	0.006	IMAC	0.02	< 0.0001	0.0003	< 0.0001	0.0002	< 0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.005	0.0007	0.0007	0.0005	0.0007	0.0004	0.0005	0.0004	0.0005	0.0004	0.0005	0.0004	0.0005
Barium	mg/L	1	MAC	NV	0.22	0.28	0.4	0.33	0.278	0.289	0.258	0.285	0.26	0.28	0.27	0.29
Beryllium	mg/L	-		1.1	< 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	mg/L	5	IMAC	0.2	0.076	0.119	0.115	0.118	0.128	0.126	0.143	0.158	0.169	0.196	0.187	0.212
Cadmium	mg/L	0.005	MAC	0.0005	0.00004	0.00003	< 0.00002	0.00001	< 0.000014	0.000021	0.000017	< 0.000029	< 0.000015	< 0.000015	< 0.000015	< 0.000015
Calcium	mg/L	-		NV	181	213	206	201	191	190	175	186	173	173	180	191
Chromium	mg/L	0.05	MAC	0.001	< 0.0002	0.0013	0.0034	< 0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001
Chromium (VI)	mg/L															
Cobalt	mg/L	-		0.0009	0.01	0.018	0.021	0.028	0.017	0.03	0.021	0.03	0.0256	0.032	0.025	0.02
Copper	mg/L	1	AO	0.005	0.0043	0.0031	0.0035	0.0027	0.0025	0.0015	0.0019	0.0009	0.002	0.0012	0.0024	0.0012
Iron	mg/L	0.3	AO	0.3	0.05	0.17	0.27	**0.61**	**0.575**	**1.26**	**0.878**	**2.05**	**1.11**	**1.62**	**1.23**	**2.18**
Lead	mg/L	0.01	MAC	0.005	0.00003	0.00002	< 0.00002	< 0.00002	< 0.00002	0.00003	0.00004	< 0.00009	< 0.00004	0.00006	0.00008	< 0.00004
Magnesium	mg/L	-		NV	39	48.1	49.6	50.8	43.8	47.5	38.8	46.1	42	44.3	43.1	46.8
Manganese	mg/L	0.05	AO	NV	**1.61**	**2.22**	**2.38**	**2.47**	**2.38**	**2.58**	**2.33**	**2.72**	**2.43**	**2.38**	**2.5**	**2.35**
Mercury	mg/L	0.001	MAC	0.0002	0.00003	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		0.04	0.0002	0.0002	0.0002	0.0002	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0003	0.0003
Nickel	mg/L	-		0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		NV	1.7	2	2	2.1	1.7	2	1.8	2.1	2	2.3	2	2.4
Phosphorus-Total	mg/L	-		0.03	0.08	1.26	1.71	0.05	0.17	0.5	0.63	1.41	2.89	0.64	< 0.1	< 0.1
Selenium	mg/L	0.01	MAC	0.1	< 0.001	0	< 0.001	< 0.001	0.002	< 0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.001	0.002
Silver	mg/L	-		0.0001	< 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	mg/L	200	AO	NV	34	42.1	45.8	53.1	50.2	57.3	45.9	59.7	51.9	52.8	50.4	55.3
Strontium	mg/L	-		NV	0.44	0.57	0.51	0.55	0.452	0.494	0.433	0.5	0.446	0.473	0.45	0.47
Thallium	mg/L	-		0.0003	< 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	mg/L	-		0.006	0.002	0.0015	0.0025	0.0033	0.0002	0.00034	0.0003	0.0005	0.0003	0.0005	0.0004	0.0003
Zinc	mg/L	5	AO	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	8.5	11.8	8.2	11.9			8.3	10.6	9.1	10.8	7.8	10.7
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	7.59	6.99	7.03	7.71	7.49	7.36	7.05	6.9	7.26	6.85	6.98	7.61
Field Conductivity	µS/cm	-		NV	950	1235	1118	1205	1260	1330	1250	1028	1250	1070	1151	1124

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	26-III 20-Apr-22	26-III 12-Oct-22	26-III 19-Apr-23	26-III 12-Oct-23	27-II 13-May-08	27-II 14-Aug-08	27-II 5-Jun-09	27-II 4-Aug-09	27-II 10-Jun-10	27-II 6-Oct-10	27-II 12-May-11	27-II 8-Nov-11
Alkalinity	mg/L	500	OG	NV	**652**	**538**	**702**	**622**	239	233	224	224	222	228	216	219
Conductivity	µS/cm	-		NV	1530	1250	1620	1410	464	462	437	442	412	429	452	460
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.47	7.6	7.42	7.4	7.26	7.58	7.66	7.61	7.85	7.9	7.9	7.95
TDS	mg/L	500	AO	NV	**867**	**745**	**915**	**765**	302	300	284	287	268	279	255	249
DOC	mg/L	5		NV	**11.6**	3.5	**7.1**	**11.2**	1	1.4	6	1	1	1	0.9	-
COD	mg/L	-		NV	57	53	62	64	3	3	1	< 2	8	< 2	30	7
Phenols	mg/L	-		0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001
Chloride	mg/L	250	AO	NV	99.8	89	110	92.3	10	8	7	6	6	6	5	5
Ammonia, total	mg/L	-		NV	1.71	0.02	0.36	0.2	<0.1	<0.1	0.03	0.04	0.06	< 0.01	0.07	1.2
Unionized Ammonia	mg/L	-		0.02	< 0.01	< 0.01	< 0.01	<0.01								
Fluoride	mg/L	2.4	MAC	NV	< 0.1	< 0.1	< 1	<0.1	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	<0.1
Sulphate	mg/L	500	AO	NV	21	34	< 10	27	14	12	12	12	13	12	12	12
Nitrite (N)	mg/L	1	MAC	NV	< 0.05	< 0.05	< 0.5	<0.05	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.01	<0.01
Nitrate (N)	mg/L	10	MAC	NV	< 0.05	< 0.05	< 0.5	<0.05	1	0.7	0.5	0.7	1	0.9	1.1	1.2
Bromide	mg/L	-		NV					-	-	-	< 0.1	< 0.1	-	<1	<1
TKN	mg/L	-		NV	2.1	0.7	1.3	0.9	2	0.2	0.3	0.1	0.2	0.1	3	0.7
Hardness	mg/L	500	OG	NV	**784**	**677**	**851**	**701**	248	254	244	265	272	267	230	-
Aluminum	mg/L	0.1	OG	0.075	0.06	0.06	**0.14**	0.06	0.04	0.02	0.01	< 0.01	< 0.01	< 0.01	<0.005	<0.005
Antimony	mg/L	0.006	IMAC	0.02	0.0001	0.0002	< 0.0001	0.0001	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	<0.0005
Arsenic	mg/L	0.025	IMAC	0.005	0.0005	0.0007	0.0005	0.0008	<0.01	<0.01	< 0.01	< 0.01	< 0.005	< 0.005	<0.001	<0.001
Barium	mg/L	1	MAC	NV	0.352	0.311	0.38	0.321	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.053	0.058
Beryllium	mg/L	-		1.1	< 0.002	< 0.002	< 0.002	<0.0001	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.005	<0.0005
Boron	mg/L	5	IMAC	0.2	0.235	0.19	0.25	0.247	0.2	0.1	< 0.1	< 0.1	0.1	<0.1	0.04	0.02
Cadmium	mg/L	0.005	MAC	0.0005	< 0.000015	< 0.000012	< 0.000012	<0.000015	<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001
Calcium	mg/L	-		NV	217	191	235	189	84	85	83	89	94	90	78	72
Chromium	mg/L	0.05	MAC	0.001	< 0.001	< 0.001	< 0.001	<0.001	0.0009	0.0003	0.0003	0.0003	0.0002	0.0003	<0.005	<0.005
Chromium (VI)	mg/L				< 0.001	< 0.001	< 0.001	<0.01								
Cobalt	mg/L	-		0.0009	0.038	0.029	0.03	0.0298	<0.0003	<0.0003	< 0.0003	0.0003	< 0.0003	< 0.0003	<0.0005	<0.0005
Copper	mg/L	1	AO	0.005	0.0012	0.0012	0.0014	0.0007	0.001	0.0012	0.0007	0.0003	0.0001	0.0026	0.001	0.001
Iron	mg/L	0.3	AO	0.3	**2.99**	**3.23**	**3.06**	**5.69**	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.100	<0.1
Lead	mg/L	0.01	MAC	0.005	0.00004	0.00004	< 0.00004	0.00004	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.0005	<0.0005
Magnesium	mg/L	-		NV	58.8	48.7	64.2	55.5	10	10	9	10	9	10	9.2	8.3
Manganese	mg/L	0.05	AO	NV	**2.85**	**2.37**	**2.63**	**2.02**	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.002	<0.002
Mercury	mg/L	0.001	MAC	0.0002	< 0.00002	< 0.00002	< 0.00002	<0.00002	0	<0.00005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00001	0.00001
Molybdenum	mg/L	-		0.04	0.0003	0.0004	0.0003	0.0003	<0.002	<0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.001	<0.0005
Nickel	mg/L	-		0.025	< 0.01	< 0.01	< 0.01	0.0079	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.001	<0.001
Potassium	mg/L	-		NV	2.5	2.2	2.3	2.5	1.3	1.6	1.4	1.6	1.3	1.4	1.2	1.2
Phosphorus-Total	mg/L	-		0.03	1.13	1.12	0.95	0.77	<0.01	**0.26**	< 0.01	< 0.01	< 0.01	< 0.02	**3.6**	<0.02
Selenium	mg/L	0.01	MAC	0.1	0.002	0.002	0.001	0.002	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.002	<0.002
Silver	mg/L	-		0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001
Sodium	mg/L	200	AO	NV	68.6	51.8	62.1	63.5	7	7	6	6	4	4	3.9	3.5
Strontium	mg/L	-		NV	0.596	0.488	0.603	0.568	0.127	0.124	0.112	0.133	0.105	0.139	0.13	0.13
Thallium	mg/L	-		0.0003	< 0.00005	< 0.005	< 0.00005	<0.00005	<0.0003	<0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	<0.00005	<0.00005
Vanadium	mg/L	-		0.006	0.0005	0.0006	< 0.0004	0.001	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	<0.0005
Zinc	mg/L	5	AO	0.02	< 0.005	< 0.005	< 0.005	<0.005	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.018	<0.005
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	8.1	12.3	8.2	10.6	-	-	-	-	-	-	-	-
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	6.85	6.88	7.02	6.79	-	-	-	-	-	-	-	-
Field Conductivity	µS/cm	-		NV	1440	1297	1430	1182	-	-	-	-	-	-	-	-

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	27-II 19-Apr-12	27-II 29-Oct-12	27-II 3-Jun-13	27-II 29-Oct-13	27-II 1-May-14	27-II 24-Sep-14	27-II 27-Apr-15	27-II 5-Oct-15	27-II 25-Apr-16	27-II 20-Oct-16	27-II 12-Apr-17	27-II 5-Oct-17
Alkalinity	mg/L	500	OG	NV	220	230	222	217	217	221	214	222	217	226	216	226
Conductivity	µS/cm	-		NV	460	480	472	470	473	478	449	471	478	498	477	495
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.95	7.64	7.95	8.06	7.99	8.01	7.92	7.96	7.95	8	8.05	8.02
TDS	mg/L	500	AO	NV	270	275	272	260	255	255	245	263	262	282	262	253
DOC	mg/L	5		NV	0.9	0.9	2.6		2.4	2.8	1.1	1.7	1.1	1.2	1.9	1.8
COD	mg/L	-		NV	<4.0	<4.0	21	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Phenols	mg/L	-		0.001	<0.0010	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.004**
Chloride	mg/L	250	AO	NV	5	5	7	6	8	6	5	5	7	7	8	7
Ammonia, total	mg/L	-		NV	<0.01	0.05	< 0.01	< 0.005	0.01	0.04	0.05	< 0.01	0.01	0.03	< 0.01	< 0.01
Unionized Ammonia	mg/L	-		0.02												
Fluoride	mg/L	2.4	MAC	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
Sulphate	mg/L	500	AO	NV	11	11	11	12	12	11	11	11	16	14	16	11
Nitrite (N)	mg/L	1	MAC	NV	<0.010	<0.010	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.05
Nitrate (N)	mg/L	10	MAC	NV	1.2	1.6	1.3	1.5	1.6	1.6	1.7	1.9	1.8	2.1	1.8	2.2
Bromide	mg/L	-		NV	<1.0	<1.0	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	-		
TKN	mg/L	-		NV	0.62	0.24	0.12	< 0.1	0.4	0.2	0.3	0.2	0.1	0.2	0.2	0.2
Hardness	mg/L	500	OG	NV	250	250	287	266	241	246	233	262	252	290	248	247
Aluminum	mg/L	0.1	OG	0.075	<0.0050	<0.0050	0.03	0.04	0.02	0.02	0.02	0.02	0.02	0.04	0.05	0.04
Antimony	mg/L	0.006	IMAC	0.02	<0.00050	<0.00050	< 0.0001	< 0.0001	< 0.0001	0.0002	< 0.0001	< 0.0001	< 0.0001	0.0003	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.005	<0.0010	<0.0010	0.0001	< 0.0001	0.0002	0.0019	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0002
Barium	mg/L	1	MAC	NV	0.056	0.062	0.07	0.06	0.05	0.06	0.05	0.06	0.05	0.07	0.08	0.07
Beryllium	mg/L	-		1.1	<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	mg/L	5	IMAC	0.2	0.028	0.033	0.027	0.024	0.013	0.024	0.016	0.02	< 0.005	0.039	0.07	0.06
Cadmium	mg/L	0.005	MAC	0.0005	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.000014
Calcium	mg/L	-		NV	84	84	97	90	82	83	79	89	85	98	83	82
Chromium	mg/L	0.05	MAC	0.001	<0.0050	-	**0.0013**	**0.0036**	**0.0026**	**0.0017**	**0.0019**	**0.0016**	< 0.0002	0.0008	**0.0011**	< 0.001
Chromium (VI)	mg/L															
Cobalt	mg/L	-		0.0009	<0.00050	<0.00050	< 0.0001	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Copper	mg/L	1	AO	0.005	0.0013	<0.0010	0.001	0.0006	0.0013	0.0007	0.0009	0.0011	0.001	0.001	0.0011	0.0006
Iron	mg/L	0.3	AO	0.3	<0.10	<0.10	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Lead	mg/L	0.01	MAC	0.005	<0.00050	<0.00050	0.00003	0.00009	0.00007	< 0.00002	0.00005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Magnesium	mg/L	-		NV	11	9.6	10.9	9.7	9.1	9.3	8.8	9.8	9.5	11.1	10.1	10
Manganese	mg/L	0.05	AO	NV	<0.0020	<0.0020	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0	< 0.001	< 0.001
Mercury	mg/L	0.001	MAC	0.0002	<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00003	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		0.04	<0.00050	<0.00050	0.0001	0.0001	0.0002	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001
Nickel	mg/L	-		0.025	<0.0010	<0.0010	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		NV	1.3	1.5	1.5	1.4	1.3	1.4	1.1	1.4	1.3	1.5	1.3	1.5
Phosphorus-Total	mg/L	-		0.03	<0.10	**0.27**	**0.43**	< 0.01	**0.19**	**0.36**	**0.13**	**0.09**	0.03	**0.22**	**0.12**	**0.28**
Selenium	mg/L	0.01	MAC	0.1	<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	mg/L	-		0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00003	< 0.00002
Sodium	mg/L	200	AO	NV	4.5	4.2	5.2	4.2	5.6	4.6	4.2	5	5.6	6.1	5.8	6.1
Strontium	mg/L	-		NV	0.14	0.14	-	-	-	0.16	0.14	0.17	0.16	0.18	0.14	0.15
Thallium	mg/L	-		0.0003	<0.000050	<0.000050	< 0.00005	< 0.00005	0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		0.006	0.00057	0.0016	0.0025	0.0012	0.0024	0.0049	0.0018	0.0006	0.0009	0.0008	0.0009	0.0009
Zinc	mg/L	5	AO	0.02	<0.0050	<0.0050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	8	8.8	8.7	9.3	8.2	11.9	8.6	11.5	6.1	11.3	6.6	12.6
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	7.13	7.98	8.13	7.54	8.08	7.9	7.81	7.64	8.06	7.99	7.97	7.95
Field Conductivity	µS/cm	-		NV	472	530	481	490	530	510	600	390	435	465	393	458

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	27-II 10-Apr-18	27-II 1-Oct-18	27-II 22-Apr-19	27-II 8-Oct-19	27-II 13-Apr-20	27-II 14-Oct-20	27-II 21-Apr-21	27-II 18-Oct-21	27-II 20-Apr-22	27-II 12-Oct-22	27-II 19-Apr-23	27-II 12-Oct-23
Alkalinity	mg/L	500	OG	NV	201	221	202	216	209	225	221	235	219	228	220	243
Conductivity	µS/cm	-		NV	465	488	466	484	479	533	476	472	493	473	491	504
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.99	7.87	8.02	7.91	7.93	7.86	7.92	7.92	7.64	7.82	7.91	7.47
TDS	mg/L	500	AO	NV	240	246	241	252	254	265	260	272	258	267	262	261
DOC	mg/L	5		NV	2.2	1.9	1.6	2.5	1.9	2.2	3.7	0.6	2.4	1.1	1.5	3.7
COD	mg/L	-		NV	< 5	< 5	6	< 5	6	< 5	10	< 5	< 5	32	18	7
Phenols	mg/L	-		0.001	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001
Chloride	mg/L	250	AO	NV	7	8.3	7.4	5.2	12	7.9	7.1	7.7	6.8	7.3	7.3	8.1
Ammonia, total	mg/L	-		NV	0.02	0.02	0.05	0.02	< 0.01	0.04	0.03	0.04	1.01	< 0.01	0.48	2.57
Unionized Ammonia	mg/L	-		0.02			< 0.01	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	<0.01
Fluoride	mg/L	2.4	MAC	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.4	< 0.1	<0.1
Sulphate	mg/L	500	AO	NV	13	14	16	13	19	17	16	16	18	14	< 10	13
Nitrite (N)	mg/L	1	MAC	NV	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	<0.05
Nitrate (N)	mg/L	10	MAC	NV	2.28	2.19	1.98	2.48	1.95	1.93	1.99	2.18	2.13	2.92	< 0.5	1.76
Bromide	mg/L	-		NV												
TKN	mg/L	-		NV	0.1	0.2	0.2	0.1	0.1	0.3	0.2	0.2	1.1	0.3	0.7	2.8
Hardness	mg/L	500	OG	NV	247	224	237	255	237	258	258	266	250	271	268	265
Aluminum	mg/L	0.1	OG	0.075	0.05	0.05	0.04	0.06	0.05	0.03	0.05	0.03	0.02	0.02	0.05	0.03
Antimony	mg/L	0.006	IMAC	0.02	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001
Arsenic	mg/L	0.025	IMAC	0.005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001
Barium	mg/L	1	MAC	NV	0.057	0.057	0.052	0.064	0.057	0.07	0.062	0.072	0.064	0.076	0.067	0.07
Beryllium	mg/L	-		1.1	< 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	mg/L	5	IMAC	0.2	0.052	0.044	0.066	0.074	0.118	0.108	0.081	0.074	0.075	0.059	0.08	0.081
Cadmium	mg/L	0.005	MAC	0.0005	< 0.000014	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000010	< 0.000010	<0.000015
Calcium	mg/L	-		NV	83.3	74.8	79.8	85.5	79.1	85.8	86.7	90	83.4	91.7	89.6	89
Chromium	mg/L	0.05	MAC	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)	mg/L												< 0.001	< 0.001	< 0.001	<0.01
Cobalt	mg/L	-		0.0009	< 0.005	**0.005**	**0.01**	< 0.005	0.0002	< 0.005	< 0.005	< 0.005	< 0.005	**0.007**	< 0.005	0.0002
Copper	mg/L	1	AO	0.005	0.0011	0.0014	0.0016	0.0007	0.0011	0.0036	0.0017	0.0014	0.0013	0.0011	0.001	0.0013
Iron	mg/L	0.3	AO	0.3	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.012	< 0.005	< 0.005	< 0.005	< 0.005	<0.005
Lead	mg/L	0.01	MAC	0.005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00002	0.00004	< 0.00002	< 0.00002	0.00004	< 0.00002	0.00005
Magnesium	mg/L	-		NV	9.38	9.09	9.02	10	9.57	10.5	10.1	10	10.1	10.2	10.8	10.4
Manganese	mg/L	0.05	AO	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
Mercury	mg/L	0.001	MAC	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	mg/L	-		0.04	< 0.0001	0.0001	0.0001	0.0001	< 0.0001	0.0002	0.0002	0.0001	0.0001	0.0002	0.0001	0.0001
Nickel	mg/L	-		0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.0003
Potassium	mg/L	-		NV	1.1	1.4	1.2	1.6	1.3	1.8	1.4	1.8	1.5	1.8	1.3	1.8
Phosphorus-Total	mg/L	-		0.03	**0.13**	**0.15**	**0.08**	**0.09**	< 0.01	**0.06**	< 0.1	< 0.1	**0.04**	0.02	< 0.01	**0.04**
Selenium	mg/L	0.01	MAC	0.1	< 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	mg/L	-		0.0001	0.00003	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	<0.0001
Sodium	mg/L	200	AO	NV	5.7	5.9	6.4	6.9	7.2	7.4	5.7	6.1	5.1	4.9	4.8	5.5
Strontium	mg/L	-		NV	0.136	0.138	0.135	0.157	0.144	0.167	0.152	0.16	0.154	0.161	0.156	0.17
Thallium	mg/L	-		0.0003	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.005	< 0.00005	<0.00005
Vanadium	mg/L	-		0.006	0.0002	0.0003	0.0003	0.0003	0.0002	0.0004	0.0003	0.0002	0.0003	0.0003	< 0.0001	0.0004
Zinc	mg/L	5	AO	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV			7.6	11.2	7.1	9.6	5	11	6.4	13.1	7.3	10.3
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	7.99	7.87	7.85	7.68	7.05	7.7	7.95	7.8	7.71	7.73	7.74	7.91
Field Conductivity	µS/cm	-		NV	457	454	660	500	469	1070	440	511	475	515	435	875

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	29-II 13-May-08	29-II 14-Aug-08	29-II 5-Jun-09	29-II 4-Aug-09	29-II 6-Oct-09	29-II 10-Jun-10	29-II 6-Oct-10	29-II 12-May-11	29-II 8-Nov-11	29-II 19-Apr-12	29-II 29-Oct-12	29-II 3-Jun-13
Alkalinity	mg/L	500	OG	NV	306	303	313	314	321	333	337	345	340	350	350	348
Conductivity	µS/cm	-		NV	619	650	653	661	677	654	683	728	739	740	750	779
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.27	7.61	7.62	7.52	7.57	7.78	7.82	7.87	7.87	7.87	7.71	7.7
TDS	mg/L	500	AO	NV	402	423	424	430	440	425	444	427	425	447	444	429
DOC	mg/L	5		NV	1	1.9	4	2	2	2	2	1.9	-	1.8	1.7	**6.3**
COD	mg/L	-		NV	4	4	2	< 2	10	12	4	21	70	64	53	241
Phenols	mg/L	-		0.001	<0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	<0.0010	<0.0010	< 0.001
Chloride	mg/L	250	AO	NV	22	22	21	22	28	21	23	21	21	21	21	22
Ammonia, total	mg/L	-		NV	<0.1	<0.1	0.02	0.04	< 0.01	0.05	< 0.01	0.08	<0.1	0.13	0.16	< 0.01
Unionized Ammonia	mg/L	-		0.02												
Fluoride	mg/L	2.4	MAC	NV	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	<0.1	<0.10	<0.10	< 0.1
Sulphate	mg/L	500	AO	NV	40	37	36	38	42	32	37	34	32	38	32	42
Nitrite (N)	mg/L	1	MAC	NV	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.01	<0.01	<0.010	<0.010	< 0.1
Nitrate (N)	mg/L	10	MAC	NV	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	<0.1	<0.10	<0.10	0.1
Bromide	mg/L	-		NV	-	-	-	< 0.1	-	< 0.1	-	<1	<1	<1.0	<1.0	< 0.4
TKN	mg/L	-		NV	0.4	0.2	0.3	0.2	0.1	0.2	0.2	<2	3	1.7	3.8	0.99
Hardness	mg/L	500	OG	NV	359	368	359	396	378	374	402	380	380	410	410	382
Aluminum	mg/L	0.1	OG	0.075	<0.01	<0.01	0	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	<0.005	<0.0050	<0.0050	**0.28**
Antimony	mg/L	0.006	IMAC	0.02	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	<0.0005	<0.00050	<0.00050	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.005	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.005	<0.001	<0.001	<0.0010	<0.0010	0.0003
Barium	mg/L	1	MAC	NV	0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	0.11	0.12	0.12	0.12	0.14
Beryllium	mg/L	-		1.1	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.005	<0.0005	<0.00050	<0.00050	< 0.002
Boron	mg/L	5	IMAC	0.2	<0.1	<0.1	< 0.1	0.1	< 0.1	0.1	<0.1	0.099	0.09	0.092	0.087	0.086
Cadmium	mg/L	0.005	MAC	0.0005	<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	0.00012
Calcium	mg/L	-		NV	111	115	114	124	120	118	124	120	120	130	130	118
Chromium	mg/L	0.05	MAC	0.001	0.0004	0.0002	0.0002	0.0002	0.0016	0.0001	0.0002	<0.005	<0.005	<0.0050	-	0.0023
Chromium (VI)	mg/L															
Cobalt	mg/L	-		0.0009	<0.0003	<0.0003	< 0.0003	0.0004	< 0.0003	< 0.0003	< 0.0003	<0.0005	<0.0005	<0.00050	<0.00050	< 0.0001
Copper	mg/L	1	AO	0.005	<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0006	0.001	0.001	<0.0010	<0.0010	0.0008
Iron	mg/L	0.3	AO	0.3	**0.4**	0.26	0.3	0.3	**0.4**	0.3	**0.6**	**0.43**	**0.4**	**0.48**	**0.7**	0.18
Lead	mg/L	0.01	MAC	0.005	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.0005	<0.0005	<0.00050	<0.00050	0.00002
Magnesium	mg/L	-		NV	20	20	18	21	19	20	23	21	23	25	21	21.3
Manganese	mg/L	0.05	AO	NV	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.026	0.03	0.031	0.027	0.01
Mercury	mg/L	0.001	MAC	0.0002	<0.00002	0.00005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00001	<0.00001	<0.00001	<0.00001	< 0.00002
Molybdenum	mg/L	-		0.04	<0.002	<0.003	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.001	<0.0005	<0.00050	<0.00050	0.0003
Nickel	mg/L	-		0.025	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.002	0.001	0.002	<0.0010	< 0.01
Potassium	mg/L	-		NV	2	2	1.7	2.1	1.9	2.5	1.9	1.8	1.9	2.1	2	2.6
Phosphorus-Total	mg/L	-		0.03	<0.01	0.23	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	8.1	0.028	<0.10	19	5.95
Selenium	mg/L	0.01	MAC	0.1	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.002	<0.002	<0.0020	<0.0020	< 0.001
Silver	mg/L	-		0.0001	<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002
Sodium	mg/L	200	AO	NV	11	10	9	11	10	9	10	11	13	14	14	14.2
Strontium	mg/L	-		NV	0.272	0.161	0.218	0.299	0.199	0.286	0.251	0.29	0.32	0.34	0.27	-
Thallium	mg/L	-		0.0003	<0.0003	<0.0003	< 0.0003	0.0004	< 0.0003	< 0.0003	< 0.0003	<0.00005	<0.00005	<0.000050	<0.000050	< 0.00005
Vanadium	mg/L	-		0.006	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	<0.0005	<0.00050	<0.00050	0.0036
Zinc	mg/L	5	AO	0.02	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.015	0.009	<0.0050	<0.0050	< 0.005
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	-	-	-	-	-	-	-	-	-	8.8	8.1	8.9
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	-	-	-	-	-	-	-	-	-	7.06	7.64	7.9
Field Conductivity	µS/cm	-		NV	-	-	-	-	-	-	-	-	-	768	830	795

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	29-II 29-Oct-13	29-II 1-May-14	29-II 24-Sep-14	29-II 28-Apr-15	29-II 5-Oct-15	29-II 25-Apr-16	29-II 20-Oct-16	29-II 12-Apr-17	29-II 5-Oct-17	29-II 10-Apr-18	29-II 1-Oct-18	29-II 22-Apr-19
Alkalinity	mg/L	500	OG	NV	351	364	371	380	391	393	398	410	403	395	413	407
Conductivity	µS/cm	-		NV	800	817	857	859	881	876	894	918	901	886	892	899
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.91	8.01	7.79	7.85	7.82	7.75	7.87	7.83	7.8	7.8	7.72	7.84
TDS	mg/L	500	AO	NV	456	466	474	496	**519**	492	**520**	**518**	487	491	484	495
DOC	mg/L	5		NV	-	4.4	**5.6**	2.1	4.6	2.6	3	3.8	**9.2**	**5.6**	4.3	3.6
COD	mg/L	-		NV	111	260	124	137	233	119	6	98	177	33	74	94
Phenols	mg/L	-		0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.005	< 0.001	0.004	< 0.001	0.015	< 0.002
Chloride	mg/L	250	AO	NV	22	26	26	28	28	31	30	32	27	26.8	29.2	29.4
Ammonia, total	mg/L	-		NV	0.05	0.06	0.1	0.08	0.03	0.07	0.07	0.04	0.06	0.06	0.1	0.08
Unionized Ammonia	mg/L	-		0.02												< 0.01
Fluoride	mg/L	2.4	MAC	NV	0.1	0.1	< 0.1	0.1	**11**	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sulphate	mg/L	500	AO	NV	45	50	51	52	48	44	42	40	31	31	34	33
Nitrite (N)	mg/L	1	MAC	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.4	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	10	MAC	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05
Bromide	mg/L	-		NV	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	-					
TKN	mg/L	-		NV	0.3	0.8	0.7	0.6	0.8	0.7	0.6	0.8	0.7	0.9	1.2	0.7
Hardness	mg/L	500	OG	NV	438	420	427	463	482	444	**510**	486	452	476	417	456
Aluminum	mg/L	0.1	OG	0.075	0.04	0.03	0.03	0.03	0.04	0.03	**0.14**	0.09	0.1	0.09	0.06	0.08
Antimony	mg/L	0.006	IMAC	0.02	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0002	< 0.0001	< 0.0001	< 0.0001	0.0002	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.005	0.0002	0.0003	0.0019	0.0003	0.0002	0.0003	0.0003	0.0002	0.0004	0.0002	0.0004	0.0002
Barium	mg/L	1	MAC	NV	0.14	0.12	0.14	0.14	0.15	0.13	0.17	0.23	0.17	0.159	0.158	0.159
Beryllium	mg/L	-		1.1	< 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	mg/L	5	IMAC	0.2	0.106	0.087	0.1	0.112	0.124	0.099	0.148	0.179	0.173	0.173	0.161	0.176
Cadmium	mg/L	0.005	MAC	0.0005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015
Calcium	mg/L	-		NV	138	131	134	145	151	139	159	150	139	149	128	144
Chromium	mg/L	0.05	MAC	0.001	0.0411	0.0023	0.0012	0.0016	0.003	< 0.0002	0.0009	0.0016	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (VI)	mg/L															
Cobalt	mg/L	-		0.0009	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.008	0.007
Copper	mg/L	1	AO	0.005	0.0002	0.0002	0.0003	0.0007	0.0007	0.0004	0.0004	0.0001	0.0003	0.0019	0.0014	0.0012
Iron	mg/L	0.3	AO	0.3	**0.86**	**0.57**	**0.87**	**0.57**	**0.95**	**0.91**	**1.12**	**0.97**	**1.16**	**0.888**	**0.938**	**0.977**
Lead	mg/L	0.01	MAC	0.005	0.00008	< 0.00002	< 0.00002	0.00002	0.00003	0.00004	0.00009	< 0.00002	0.00006	0.00031	0.00002	0.00004
Magnesium	mg/L	-		NV	22.5	22.4	22.3	24.2	25.3	23.8	27.5	27	25.5	25.2	23.7	23.3
Manganese	mg/L	0.05	AO	NV	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.03	0.034	0.028	0.029
Mercury	mg/L	0.001	MAC	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		0.04	0.0002	0.0004	0.0003	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0002
Nickel	mg/L	-		0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		NV	1.9	1.9	2	2	2.1	1.9	2.2	2.2	2.1	1.9	2.1	2
Phosphorus-Total	mg/L	-		0.03	7.71	4.81	13.9	9.18	16.8	15.4	12.1	21.1	13.3	2.31	14.8	11.5
Selenium	mg/L	0.01	MAC	0.1	< 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	mg/L	-		0.0001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	NV	15.3	14.5	15	16.2	18.1	16.3	19.4	18.2	18.3	18.4	18.5	18
Strontium	mg/L	-		NV	-	-	0.32	0.37	0.38	0.36	0.38	0.38	0.34	0.334	0.318	0.33
Thallium	mg/L	-		0.0003	< 0.00005	0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		0.006	0.0014	0.0033	0.0074	0.0019	0.0009	0.0013	0.0012	0.0012	0.0014	< 0.0001	0.0001	< 0.0001
Zinc	mg/L	5	AO	0.02	< 0.005	< 0.005	0.01	< 0.005	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	8.6	8.1	11.9	10	9.5	5.2	9.9	7	10			8.1
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	7.19	8	7.58	7.4	7.31	7.79	7.61	7.46	7.4	7.8	7.72	7.52
Field Conductivity	µS/cm	-		NV	790	820	850	930	650	670	765	670	765	882	849	880

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	29-II 8-Oct-19	29-II 13-Apr-20	29-II 14-Oct-20	29-II 21-Apr-21	29-II 18-Oct-21	29-II 20-Apr-22	29-II 12-Oct-22	29-II 19-Apr-23	29-II 12-Oct-23	29-III 13-May-08	29-III 14-Aug-08	29-III 5-Jun-09
Alkalinity	mg/L	500	OG	NV	385	388	408	413	429	405	417	417	451	267	267	239
Conductivity	µS/cm	-		NV	870	890	912	896	877	911	880	926	965	617	634	473
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.77	7.72	7.78	7.82	7.71	7.69	7.79	7.78	7.46	7.39	7.67	7.8
TDS	mg/L	500	AO	NV	**501**	487	**519**	**507**	**531**	497	**530**	**520**	**514**	401	412	307
DOC	mg/L	5		NV	**5.3**	2.3	3.7	6	2	4.3	2.2	3.9	**6.6**	3	3.4	3
COD	mg/L	-		NV	24	94	84	185	25	195	219	186	39	13	13	1
Phenols	mg/L	-		0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001	**0.002**	0.001	**0.002**
Chloride	mg/L	250	AO	NV	40.9	32.5	32.9	29.7	32.3	28.7	32.6	31	29.9	17	15	6
Ammonia, total	mg/L	-		NV	0.06	0.05	0.09	0.05	0.16	0.05	0.02	0.28	0.37	<0.1	0.1	< 0.01
Unionized Ammonia	mg/L	-		0.02	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	<0.01			
Fluoride	mg/L	2.4	MAC	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
Sulphate	mg/L	500	AO	NV	33	33	37	37	38	33	36	35	36	67	68	16
Nitrite (N)	mg/L	1	MAC	NV	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.05	<0.1	<0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	NV	< 0.05	0.06	< 0.05	< 0.05	0.06	< 0.05	< 0.05	0.12	<0.05	<0.1	<0.1	0.4
Bromide	mg/L	-		NV										-	-	-
TKN	mg/L	-		NV	0.4	0.7	0.6	1.4	1.3	1.9	0.7	0.6	0.8	3.1	0.4	0.3
Hardness	mg/L	500	OG	NV	469	451	482	454	477	454	495	486	475	289	290	255
Aluminum	mg/L	0.1	OG	0.075	0.1	0.07	0.06	0.08	0.08	0.04	**0.11**	0.1	0.04	0.02	0.01	0.03
Antimony	mg/L	0.006	IMAC	0.02	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.01	<0.01	< 0.01
Arsenic	mg/L	0.025	IMAC	0.005	0.0002	0.0002	0.0002	0.0002	0.0002	0.0005	0.0003	0.0004	0.0002	<0.01	<0.01	< 0.01
Barium	mg/L	1	MAC	NV	0.157	0.156	0.18	0.156	0.177	0.172	0.189	0.184	0.177	<0.1	0.1	< 0.1
Beryllium	mg/L	-		1.1	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	<0.1	<0.1	< 0.1
Boron	mg/L	5	IMAC	0.2	0.192	0.189	0.219	0.196	0.216	0.197	0.218	0.225	0.233	<0.1	<0.1	< 0.1
Cadmium	mg/L	0.005	MAC	0.0005	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000010	< 0.000010	<0.000015	<0.0001	0.0001	< 0.0001
Calcium	mg/L	-		NV	146	140	149	142	149	142	157	151	149	90	90	79
Chromium	mg/L	0.05	MAC	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	0.0002	0.0002	0.0001
Chromium (VI)	mg/L									< 0.001	< 0.001	< 0.001	<0.01			
Cobalt	mg/L	-		0.0009	< 0.005	< 0.0001	0.005	< 0.005	< 0.005	0.008	< 0.005	< 0.005	0.0004	<0.0003	<0.0003	< 0.0003
Copper	mg/L	1	AO	0.005	0.0003	0.0011	0.0004	0.0012	0.0005	0.0004	0.0005	0.0003	0.0007	0.0009	0.0025	0.0002
Iron	mg/L	0.3	AO	0.3	**1.17**	**1.15**	**1.15**	**1.08**	**1.4**	**1.24**	**1.5**	**1.3**	**1.5**	**0.8**	**1.48**	< 0.1
Lead	mg/L	0.01	MAC	0.005	0.00008	0.00008	0.00003	0.00007	0.00002	0.00004	0.00011	< 0.00002	0.00003	0.001	<0.001	< 0.001
Magnesium	mg/L	-		NV	25.2	24.6	27	24.2	25.5	24.2	24.7	26.4	25	16	16	14
Manganese	mg/L	0.05	AO	NV	0.034	0.03	0.032	0.034	0.033	0.032	0.041	0.033	0.033	**0.07**	0.05	0.01
Mercury	mg/L	0.001	MAC	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002	<0.00002	0.00007	0.00003
Molybdenum	mg/L	-		0.04	0.0003	0.0002	0.0002	0.0002	0.0002	0.0003	0.0002	0.0002	0.0002	0.008	0.004	< 0.002
Nickel	mg/L	-		0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.005	<0.01	<0.01	< 0.01
Potassium	mg/L	-		NV	2.2	2.1	2.4	2.1	2.4	2.2	2.3	2	2.3	2.5	2.7	1.8
Phosphorus-Total	mg/L	-		0.03	6.59	10.5	10.2	< 0.1	< 0.1	38.2	7.03	9.69	7.83	<0.01	**0.36**	< 0.01
Selenium	mg/L	0.01	MAC	0.1	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.01	<0.01	< 0.01
Silver	mg/L	-		0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.0001	< 0.0001
Sodium	mg/L	200	AO	NV	21.3	21	24.9	23.2	24.7	23	24.6	22.8	25.8	19	22	4
Strontium	mg/L	-		NV	0.359	0.342	0.39	0.344	0.338	0.342	0.348	0.353	0.367	0.171	0.173	0.262
Thallium	mg/L	-		0.0003	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.006	< 0.00005	<0.00005	<0.0003	<0.0003	< 0.0003
Vanadium	mg/L	-		0.006	0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	0.0003	0.0001	<0.0001	<0.001	<0.001	< 0.001
Zinc	mg/L	5	AO	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	<0.01	<0.01	< 0.01
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	10.6	8.4	9.7	6.1	9.6	7.3	13.2	5.7	10.8	-	-	-
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	7.39	8.5	7.35	7.57	7.85	7.49	7.26	7.56	7.47	-	-	-
Field Conductivity	µS/cm	-		NV	720	850	820	880	790	864	933	1105	1046	-	-	-

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	29-III 4-Aug-09	29-III 6-Oct-09	29-III 10-Jun-10	29-III 6-Oct-10	29-III 12-May-11	29-III 8-Nov-11	29-III 19-Apr-12	29-III 29-Oct-12	29-III 3-Jun-13	29-III 29-Oct-13	29-III 1-May-14	29-III 24-Sep-14
Alkalinity	mg/L	500	OG	NV	238	250	246	250	241	255	260	290	256	268	277	270
Conductivity	µS/cm	-		NV	528	562	517	495	560	584	570	640	585	625	621	618
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.7	7.65	7.88	7.8	7.92	8	7.99	7.72	7.92	8.07	8.05	8.02
TDS	mg/L	500	AO	NV	343	365	336	322	322	322	380	377	312	342	344	346
DOC	mg/L	5		NV	2	2	2	2	1.9	-	1.7	4.3	4.7	-	3.8	**5.2**
COD	mg/L	-		NV	3	11	10	5	41	31	45	25	69	46	104	63
Phenols	mg/L	-		0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	<0.0010	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001
Chloride	mg/L	250	AO	NV	12	16	15	15	16	18	16	15	15	15	16	15
Ammonia, total	mg/L	-		NV	0.1	0	0.05	< 0.01	0.15	<0.1	0.12	0.13	< 0.01	0.03	0.04	0.1
Unionized Ammonia	mg/L	-		0.02												
Fluoride	mg/L	2.4	MAC	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
Sulphate	mg/L	500	AO	NV	44	59	39	36	30	29	32	33	31	31	31	32
Nitrite (N)	mg/L	1	MAC	NV	< 0.1	< 0.1	< 0.1	< 0.1	<0.01	<0.01	<0.010	<0.010	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	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
Bromide	mg/L	-		NV	< 0.1	-	< 0.1	-	<1	<1	<1.0	<1.0	< 0.4	< 0.4	< 0.4	< 0.4
TKN	mg/L	-		NV	0.2	0.1	0.2	0.2	1	2	2	<0.50 (2)	0.64	0.5	0.8	0.5
Hardness	mg/L	500	OG	NV	303	299	282	308	290	260	390	310	276	326	316	318
Aluminum	mg/L	0.1	OG	0.075	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	0.009	**0.99**	<0.0050	**0.08**	0.04	0.02	0.03
Antimony	mg/L	0.006	IMAC	0.02	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	<0.0005	0.00075	<0.00050	< 0.0001	< 0.0001	< 0.0001	0.0001
Arsenic	mg/L	0.025	IMAC	0.005	< 0.01	< 0.01	< 0.005	< 0.005	<0.001	<0.001	<0.0010	<0.0010	0.0005	0.0003	0.0003	0.0021
Barium	mg/L	1	MAC	NV	< 0.1	0.1	0.1	0.2	0.13	0.18	0.17	0.14	0.1	0.14	0.12	0.14
Beryllium	mg/L	-		1.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.005	<0.0005	<0.00050	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	5	IMAC	0.2	< 0.1	< 0.1	< 0.1	<0.1	0.02	0.02	0.019	0.037	0.016	0.026	0.013	0.027
Cadmium	mg/L	0.005	MAC	0.0005	< 0.0001	0.0003	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Calcium	mg/L	-		NV	95	95	89	98	90	80	130	97	85.8	104	101	101
Chromium	mg/L	0.05	MAC	0.001	0.0001	0.0002	0.0001	**0.0011**	<0.005	<0.005	<0.0050	-	**0.0015**	**0.0463**	0.0009	0.0006
Chromium (VI)	mg/L															
Cobalt	mg/L	-		0.0009	< 0.0003	0.0004	0.0004	0.0004	<0.0005	<0.0005	**0.0013**	0.00057	0.0002	< 0.005	< 0.005	< 0.005
Copper	mg/L	1	AO	0.005	0.0003	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0043	<0.0010	0.0004	0.0002	0.0011	0.0009
Iron	mg/L	0.3	AO	0.3	0.3	**0.4**	**0.4**	0.3	**0.33**	<0.10	2	0.17	0.05	**0.38**	0.22	0.12
Lead	mg/L	0.01	MAC	0.005	< 0.001	< 0.001	< 0.001	< 0.001	<0.0005	<0.0005	0.0014	<0.00050	0.00003	0.00004	0.00003	< 0.00002
Magnesium	mg/L	-		NV	16	15	14	16	15	14	18	16	15	16.3	15.6	15.8
Manganese	mg/L	0.05	AO	NV	0.02	0.04	0.04	0.04	0.047	0.035	**0.15**	**0.072**	0.02	**0.06**	**0.08**	**0.09**
Mercury	mg/L	0.001	MAC	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00001	<0.00001	<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		0.04	< 0.002	0.002	< 0.002	< 0.002	<0.001	0.0009	0.00061	0.0012	0.0004	0.0005	0.0007	0.001
Nickel	mg/L	-		0.025	< 0.01	< 0.01	< 0.01	< 0.01	0.002	0.001	0.0021	0.001	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		NV	2.3	2.3	1.7	1.9	1.6	1.8	2.1	2.2	1.7	1.8	1.7	2.3
Phosphorus-Total	mg/L	-		0.03	< 0.01	< 0.01	< 0.01	< 0.02	**17**	**8.7**	**0.34**	**3.8**	**2.85**	**1.03**	**5.31**	**4.64**
Selenium	mg/L	0.01	MAC	0.1	< 0.01	< 0.01	< 0.01	< 0.01	<0.002	<0.002	<0.0020	<0.0020	< 0.001	< 0.001	< 0.001	< 0.001
Silver	mg/L	-		0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Sodium	mg/L	200	AO	NV	16	16	9	12	8.1	9.7	9.4	24	9.2	12.3	12.5	17.7
Strontium	mg/L	-		NV	0.092	0.13	0.166	0.194	0.2	0.19	0.26	0.21	-	-	-	0.24
Thallium	mg/L	-		0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	<0.00005	<0.00005	0.00005	<0.000050	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		0.006	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	0.0006	0.0035	<0.00050	0.003	0.0017	0.0024	0.0055
Zinc	mg/L	5	AO	0.02	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.016	0.012	<0.0050	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	-	-	-	-	-	-	8.2	9.5	8.5	10.2	6.1	12
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	-	-	-	-	-	-	7.21	7.76	8.15	7.36	8.02	7.8
Field Conductivity	µS/cm	-		NV	-	-	-	-	-	-	593	690	622	650	740	690

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	29-III 28-Apr-15	29-III 5-Oct-15	29-III 25-Apr-16	29-III 20-Oct-16	29-III 12-Apr-17	29-III 5-Oct-17	29-III 10-Apr-18	29-III 1-Oct-18	29-III 22-Apr-19	29-III 8-Oct-19	29-III 13-Apr-20	29-III 14-Oct-20
Alkalinity	mg/L	500	OG	NV	281	285	286	295	298	292	276	297	283	283	289	297
Conductivity	µS/cm	-		NV	624	630	626	655	655	652	641	663	660	651	688	677
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	8	7.96	7.99	8.02	7.99	8.02	7.93	7.8	7.99	7.87	7.86	7.9
TDS	mg/L	500	AO	NV	351	359	346	370	367	350	345	356	356	367	369	382
DOC	mg/L	5		NV	**5.7**	3.4	2.1	2.7	3	**5.5**	3.2	3.6	3.5	4.7	3	3.8
COD	mg/L	-		NV	67	24	43	8	48	92	7	16	37	22	9	70
Phenols	mg/L	-		0.001	<0.001	< 0.001	< 0.001	**0.006**	< 0.001	**0.004**	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Chloride	mg/L	250	AO	NV	17	15	16	16	17	15	15.9	18.5	18.9	24.9	21.8	21.5
Ammonia, total	mg/L	-		NV	0.06	0.01	0.04	0.11	0.03	0.09	0.06	0.07	0.04	0.05	0.02	0.04
Unionized Ammonia	mg/L	-		0.02									< 0.01	< 0.01	< 0.01	< 0.01
Fluoride	mg/L	2.4	MAC	NV	0.1	0.1	< 0.1	0.1	0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sulphate	mg/L	500	AO	NV	31	31	29	30	31	25	26	31	31	32	33	34
Nitrite (N)	mg/L	1	MAC	NV	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	10	MAC	NV	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.06	< 0.05
Bromide	mg/L	-		NV	<0.4	< 0.4	< 0.4	-								
TKN	mg/L	-		NV	0.5	0.5	0.5	0.6	0.7	0.8	0.5	0.4	0.4	0.5	0.2	0.3
Hardness	mg/L	500	OG	NV	338	346	322	361	350	333	347	314	342	351	350	367
Aluminum	mg/L	0.1	OG	0.075	0.02	0.03	0.03	0.05	0.07	**0.1**	0.06	0.06	0.07	**0.08**	0.06	0.05
Antimony	mg/L	0.006	IMAC	0.02	< 0.0001	< 0.0001	< 0.0001	0.0003	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.005	0.0003	0.0005	0.0003	0.0004	< 0.0001	0.0003	0.0001	0.0002	< 0.0001	0.0003	0.0001	0.0004
Barium	mg/L	1	MAC	NV	0.13	0.15	0.11	0.15	0.19	0.16	0.14	0.146	0.131	0.142	0.139	0.161
Beryllium	mg/L	-		1.1	<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	mg/L	5	IMAC	0.2	0.024	0.026	< 0.005	0.029	0.034	0.033	0.026	0.027	0.029	0.026	0.036	0.043
Cadmium	mg/L	0.005	MAC	0.0005	0.00005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015
Calcium	mg/L	-		NV	108	110	102	114	110	104	110	98	110	110	111	115
Chromium	mg/L	0.05	MAC	0.001	**0.0012**	**0.0021**	< 0.0002	0.0005	**0.0012**	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (VI)	mg/L															
Cobalt	mg/L	-		0.0009	<0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	**0.007**	< 0.005	0.0006	< 0.005
Copper	mg/L	1	AO	0.005	0.001	0.0008	0.0003	0.0004	0.0003	0.0006	0.0007	0.0006	0.0009	0.0002	0.0004	0.0004
Iron	mg/L	0.3	AO	0.3	**0.34**	**0.85**	**0.39**	**0.54**	0.03	**0.33**	0.134	0.128	0.101	**0.792**	**0.465**	**1.09**
Lead	mg/L	0.01	MAC	0.005	< 0.00002	< 0.00002	< 0.00002	0.00004	< 0.00002	0.00005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Magnesium	mg/L	-		NV	16.5	17.4	16.4	18.8	18.3	17.8	17.4	16.9	16.3	18.4	17.7	19.2
Manganese	mg/L	0.05	AO	NV	**0.06**	**0.06**	**0.07**	**0.07**	0.05	**0.07**	**0.065**	**0.071**	**0.093**	**0.051**	**0.073**	0.045
Mercury	mg/L	0.001	MAC	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
Molybdenum	mg/L	-		0.04	0.0003	0.0005	0.0003	0.0004	0.0004	0.0005	< 0.0001	0.0006	0.0003	0.0003	0.0002	0.0003
Nickel	mg/L	-		0.025	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		NV	1.6	2	1.5	2	1.9	2.1	1.4	2.2	1.6	2	1.8	2.1
Phosphorus-Total	mg/L	-		0.03	**2.73**	**0.94**	**1.19**	**3.05**	**1.15**	**6.35**	**3.89**	**1.28**	**1.55**	**2.61**	**0.35**	**1.02**
Selenium	mg/L	0.01	MAC	0.1	<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	mg/L	-		0.0001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00003	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	NV	8.2	11.5	9.2	11.6	10.5	10.7	8	10.4	8.1	9.5	10.2	11
Strontium	mg/L	-		NV	0.26	0.27	0.24	0.27	0.24	0.25	0.24	0.232	0.239	0.257	0.264	0.29
Thallium	mg/L	-		0.0003	< 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	mg/L	-		0.006	0.0017	0.0007	0.0009	0.0007	0.001	0.001	0.0001	0.0002	0.0002	0.0001	0.0001	0.0001
Zinc	mg/L	5	AO	0.02	<0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.005												
BOD(5 day)	mg/L	-	-	NV												
Field Temperature	°C	-	AO	NV	10	11.9	5.1	11.1	5.5	11.6			7	11.5	8.6	10.7
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	7.7	7.54	8.04	7.61	8.03	7.58	7.93	7.8	7.48	7.6	7.2	7.45
Field Conductivity	µS/cm	-		NV	700	500	500	570	527	560	640	641	660	545	651	640

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		PWQO	29-III 21-Apr-21	29-III 18-Oct-21	29-III 20-Apr-22	29-III 12-Oct-22	29-III 19-Apr-23	29-III 12-Oct-23
Alkalinity	mg/L	500	OG	NV	299	310	302	313	318	330
Conductivity	µS/cm	-		NV	682	656	712	681	735	713
pH	pH Units	6.5-8.5	OG	6.5 - 8.5	7.92	7.85	7.86	7.83	7.88	7.55
TDS	mg/L	500	AO	NV	382	399	379	401	410	370
DOC	mg/L	5		NV	**5.2**	3.8	3.9	3.3	2	**5.7**
COD	mg/L	-		NV	18	6	10	44	43	16
Phenols	mg/L	-		0.001	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001
Chloride	mg/L	250	AO	NV	22	22.8	22.4	22	24.1	20.8
Ammonia, total	mg/L	-		NV	0.04	0.06	0.64	0.05	0.35	0.09
Unionized Ammonia	mg/L	-		0.02		< 0.01	< 0.01	< 0.01	< 0.01	<0.01
Fluoride	mg/L	2.4	MAC	NV	< 0.1	< 0.1	< 0.1	0.3	< 0.1	<0.1
Sulphate	mg/L	500	AO	NV	34	37	33	37	13	33
Nitrite (N)	mg/L	1	MAC	NV	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.05
Nitrate (N)	mg/L	10	MAC	NV	< 0.05	< 0.05	< 0.05	< 0.05	0.17	<0.05
Bromide	mg/L	-		NV						
TKN	mg/L	-		NV	0.4	0.3	1.2	0.3	0.7	0.4
Hardness	mg/L	500	OG	NV	369	374	354	382	403	369
Aluminum	mg/L	0.1	OG	0.075	0.07	**0.08**	0.03	0.04	**0.08**	0.03
Antimony	mg/L	0.006	IMAC	0.02	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001
Arsenic	mg/L	0.025	IMAC	0.005	0.0002	0.0002	< 0.0001	0.0003	0.0001	0.0003
Barium	mg/L	1	MAC	NV	0.143	0.162	0.141	0.172	0.163	0.163
Beryllium	mg/L	-		1.1	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001
Boron	mg/L	5	IMAC	0.2	0.034	0.04	0.041	0.047	0.045	0.05
Cadmium	mg/L	0.005	MAC	0.0005	< 0.000015	< 0.000015	< 0.000015	< 0.000010	< 0.000010	<0.000015
Calcium	mg/L	-		NV	117	118	112	121	127	116
Chromium	mg/L	0.05	MAC	0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001
Chromium (VI)	mg/L						< 0.001	< 0.001	< 0.001	<0.01
Cobalt	mg/L	-		0.0009	< 0.005	< 0.005	< 0.005	**0.006**	< 0.005	0.0006
Copper	mg/L	1	AO	0.005	0.0012	0.0009	0.0009	0.0006	0.0003	0.0006
Iron	mg/L	0.3	AO	0.3	**0.925**	**0.624**	**0.38**	**0.472**	**0.959**	**1.02**
Lead	mg/L	0.01	MAC	0.005	0.00004	< 0.00002	0.00003	0.00003	< 0.00002	<0.00002
Magnesium	mg/L	-		NV	18.6	19.3	17.8	19.3	20.9	19.3
Manganese	mg/L	0.05	AO	NV	**0.052**	**0.069**	**0.083**	**0.069**	**0.062**	**0.052**
Mercury	mg/L	0.001	MAC	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002
Molybdenum	mg/L	-		0.04	0.0002	0.0003	0.0001	0.0003	0.0002	0.0002
Nickel	mg/L	-		0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.0018
Potassium	mg/L	-		NV	1.6	2.2	1.7	2.2	1.6	2
Phosphorus-Total	mg/L	-		0.03	< 0.1	< 0.1	**0.18**	**0.5**	**1.04**	**1.34**
Selenium	mg/L	0.01	MAC	0.1	< 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	<0.0001
Sodium	mg/L	200	AO	NV	9.1	12.5	8.9	10.6	9.3	10.8
Strontium	mg/L	-		NV	0.272	0.258	0.273	0.271	0.288	0.276
Thallium	mg/L	-		0.0003	< 0.00005	< 0.00005	< 0.00005	< 0.005	< 0.00005	<0.00005
Vanadium	mg/L	-		0.006	< 0.0001	< 0.0001	0.0001	0.0002	0.0001	0.0001
Zinc	mg/L	5	AO	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005
TSS	mg/L	-	-	NV						
Cyanide (Total)	mg/L	0.2	MAC	0.005						
BOD(5 day)	mg/L	-	-	NV						
Field Temperature	°C	-	AO	NV	5.7	10.1	6.8	13.3	5.2	11.4
Field pH	pH Units	6.5-8.5	OG	6.5-8.5	6.35	7.61	7.7	7.49	7.64	7.67
Field Conductivity	µS/cm	-		NV	320	540	688	736	889	795

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	30-I 13-May-08	30-I 18-Aug-08	30-I 27-May-09	30-I 4-Aug-09	30-I 10-Jun-10	30-I 12-Oct-10	30-I 12-May-11	30-I 8-Nov-11	30-I 19-Apr-12	30-I 29-Oct-12	30-I 3-Jun-13	30-I 29-Oct-13
Alkalinity	mg/L	500	OG	349	NV	265	298	236	276	243	286	227	259	240	220	223	225
Conductivity	µS/cm	-		-	NV	548	598	521	557	488	509	565	567	560	640	561	588
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.2	7.42	7.72	7.49	7.58	7.38	7.89	7.79	7.88	7.49	7.87	7.83
TDS	mg/L	500	AO	368	NV	356	389	339	362	317	331	302	310	308	367	306	316
DOC	mg/L	5		3.5	NV	**6**	**25.1**	**18**	**18**	**16**	**28**	**5.9**	-	**5.7**	**20**	**9.2**	-
COD	mg/L	-		-	NV	15	75	7	46	34	69	350	220	280	91	207	258
Phenols	mg/L	-		-	0.001	0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	<0.0010	<0.0010	< 0.001	< 0.001
Chloride	mg/L	250	AO	131	NV	33	20	40	26	26	22	43	28	41	36	43	31
Ammonia, total	mg/L	-		-	NV	0.3	0.4	0.3	0.3	0.42	0.3	0.5	<0.1	0.37	0.44	0.27	0.29
Unionized Ammonia	mg/L	-		-	0.02												
Fluoride	mg/L	2.4	MAC	0.7	NV	0.2	<0.1	0.1	< 0.1	< 0.1	0.1	0.2	0.1	0.16	0.13	0.2	0.2
Sulphate	mg/L	500	AO	255	NV	6	7	< 1	< 1	4	< 1	<1	<1	<1	59	4	22
Nitrite (N)	mg/L	1	MAC	0.3	NV	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.01	0.03	<0.010	0.05	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	4.0	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
Bromide	mg/L	-		-	NV	-	-	0.4	-	0.2	-	<1	<1	<1.0	<1.0	0.6	< 0.4
TKN	mg/L	-		-	NV	49	2	0.8	1.5	2.4	1.8	9	6	6.8	2.4	2.62	0.5
Hardness	mg/L	500	OG	361	NV	273	311	290	293	294	361	270	270	280	300	312	310
Aluminum	mg/L	0.1	OG	0.07	0.075	**10.7**	0.04	0.01	0.03	0.04	0.03	0.006	0.019	<0.0050	0.012	0.03	0.05
Antimony	mg/L	0.006	IMAC	0.002	0.02	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	<0.0005	<0.00050	<0.00050	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.006	0.005	<0.01	<0.01	< 0.01	< 0.01	< 0.005	< 0.005	<0.001	<0.001	<0.0010	<0.0010	0.001	0.0007
Barium	mg/L	1	MAC	0.3	NV	0.8	0.1	0.1	0.1	< 0.1	< 0.1	0.12	0.093	0.12	0.13	0.16	0.1
Beryllium	mg/L	-		-	1.1	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.0005	<0.0005	<0.00050	<0.00050	< 0.002	< 0.002
Boron	mg/L	5	IMAC	1.3	0.2	**0.216**	<0.1	< 0.1	0.2	< 0.1	< 0.1	0.098	0.05	0.09	0.077	0.095	0.067
Cadmium	mg/L	0.005	MAC	0.001	0.0005	0.0005	<0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002
Calcium	mg/L	-		-	NV	75	98	80	91	82	120	74	89	73	96	85.4	100
Chromium	mg/L	0.05	MAC	0.013	0.001	**0.0108**	0.0003	0.0002	0.0002	0.0005	0.0002	<0.005	<0.005	<0.0050	-	**0.0013**	**0.0047**
Chromium (VI)	mg/L			-													
Cobalt	mg/L	-		-	0.0009	**0.0053**	<0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	<0.0005	<0.0005	<0.00050	<0.00050	< 0.0001	< 0.005
Copper	mg/L	1	AO	0.5	0.005	**0.0177**	<0.0001	< 0.0001	< 0.0001	0.004	0.0015	<0.001	<0.001	<0.0010	0.0012	0.0003	0.0002
Iron	mg/L	0.3	AO	0.16	0.3	**14**	**2**	**0.9**	**1.8**	<0.1	**1.9**	**1.5**	**1.7**	**1.6**	**1.5**	**1.78**	**1.87**
Lead	mg/L	0.01	MAC	0.003	0.005	**0.006**	0.003	< 0.001	< 0.001	< 0.001	< 0.001	<0.0005	<0.0005	<0.00050	<0.00050	0.00005	0.00006
Magnesium	mg/L	-		-	NV	21	16	22	16	22	15	21	13	23	16	24	14.5
Manganese	mg/L	0.05	AO	0.03	NV	**2.56**	**0.08**	0.04	**0.09**	<0.01	**0.13**	0.049	**0.14**	**0.051**	**0.1**	**0.06**	**0.16**
Mercury	mg/L	0.001	MAC	0.0003	0.0002	<0.00002	<0.00002	< 0.00002	< 0.00002	<0.00002	< 0.00002	<0.00001	-	<0.00001	<0.00001	< 0.00002	< 0.00002
Molybdenum	mg/L	-		-	0.04	0.005	<0.002	< 0.002	< 0.002	0.003	< 0.002	<0.001	<0.0005	<0.00050	0.0012	0.0002	0.0002
Nickel	mg/L	-		-	0.025	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.001	<0.001	<0.0010	0.0012	< 0.01	< 0.01
Potassium	mg/L	-		-	NV	3.4	2.2	2.7	2	3.1	1.4	2	1.1	2.1	1.8	2.3	1.2
Phosphorus-Total	mg/L	-		-	0.03	**0.24**	0.03	0.02	**0.04**	<0.01	**0.08**	**6.2**	**2.6**	<0.10	**0.91**	**0.94**	**0.65**
Selenium	mg/L	0.01	MAC	0.003	0.1	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.002	<0.002	<0.0020	<0.0020	< 0.001	< 0.001
Silver	mg/L	-		-	0.0001	**0.0004**	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002
Sodium	mg/L	200	AO	105	NV	9	16	11	14	10	9	8.6	9.5	10	14	10.8	10.4
Strontium	mg/L	-		-	NV	5.42	0.609	0.821	0.629	0.412	0.432	0.71	0.43	0.76	0.57	-	-
Thallium	mg/L	-		-	0.0003	**0.0004**	<0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	<0.00005	<0.00005	<0.000050	<0.000050	< 0.00005	< 0.00005
Vanadium	mg/L	-		-	0.006	**0.022**	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	0.0008	0.00056	0.0013	0.0026	0.0018
Zinc	mg/L	5	AO	2.5	0.02	**0.04**	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	<0.005	<0.0050	0.0066	< 0.005	< 0.005
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	-	-	-	-	-	-	-	-	7.6	10.3	8.3	9
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	-	-	-	-	-	-	-	-	7.17	7.93	7.31	7.12
Field Conductivity	µS/cm	-		-	NV	-	-	-	-	-	-	-	-	581	710	582	590

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	30-I 1-May-14	30-I 24-Sep-14	30-I 27-Apr-15	30-I 6-Oct-15	30-I 25-Apr-16	30-I 20-Oct-16	30-I 12-Apr-17	30-I 6-Oct-17	30-I 11-Apr-18	30-I 2-Oct-18	30-I 23-Apr-19	30-I 9-Oct-19
Alkalinity	mg/L	500	OG	349	NV	222	224	227	248	223	214	214	224	217	210	237	209
Conductivity	µS/cm	-		-	NV	577	595	567	580	567	592	584	586	571	596	567	575
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.95	7.98	7.83	7.77	7.97	7.98	8.01	7.68	7.94	7.87	7.97	7.91
TDS	mg/L	500	AO	368	NV	298	305	296	311	295	318	304	298	291	304	306	318
DOC	mg/L	5		3.5	NV	**10**	**9.1**	3.3	**24.3**	**8.4**	**8.2**	**5.8**	**9.3**	**7.7**	**8.2**	**7.5**	**8.1**
COD	mg/L	-		-	NV	80	47	34	249	72	25	71	52	53	86	61	50
Phenols	mg/L	-		-	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.006**	< 0.001	**0.004**	< 0.001	< 0.002	< 0.002	< 0.002
Chloride	mg/L	250	AO	131	NV	50	53	47	27	44	56	54	44	44.7	57.3	48.8	75.7
Ammonia, total	mg/L	-		-	NV	0.32	0.37	0.34	1.73	0.32	0.3	0.29	0.4	0.31	0.34	0.29	0.35
Unionized Ammonia	mg/L	-		-	0.02											< 0.01	< 0.01
Fluoride	mg/L	2.4	MAC	0.7	NV	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.1	< 0.1	< 0.1	0.1	< 0.1
Sulphate	mg/L	500	AO	255	NV	5	2	4	9	6	5	7	2	6	7	9	< 1
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	10	MAC	4.0	NV	0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1	0.1	< 0.05	< 0.05	< 0.05	< 0.05
Bromide	mg/L	-		-	NV	0.6	0.6	0.5	< 0.4	0.5	-						
TKN	mg/L	-		-	NV	2	0.9	0.9	5.4	1.3	1.1	1.3	1	1.4	1.7	1.1	1.3
Hardness	mg/L	500	OG	361	NV	276	287	272	301	277	319	288	288	276	285	266	286
Aluminum	mg/L	0.1	OG	0.07	0.075	0.02	0.02	0.02	0.05	0.02	0.06	0.06	0.07	0.05	0.04	0.05	0.06
Antimony	mg/L	0.006	IMAC	0.002	0.02	< 0.0001	0.0001	< 0.0001	0.0001	< 0.0001	0.0003	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.006	0.005	0.0014	0.0021	0.001	0.0007	0.0006	0.0009	0.0002	0.0005	0.0001	0.0001	0.0002	0.0003
Barium	mg/L	1	MAC	0.3	NV	0.12	0.14	0.12	0.1	0.11	0.15	0.18	0.16	0.128	0.146	0.126	0.152
Beryllium	mg/L	-		-	1.1	< 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	mg/L	5	IMAC	1.3	0.2	0.075	0.117	0.083	0.054	0.057	0.133	0.115	0.138	0.094	0.118	0.086	0.124
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000015
Calcium	mg/L	-		-	NV	75.5	79	75	98	77	88.1	75.7	77.6	74.3	76.7	73.3	77.1
Chromium	mg/L	0.05	MAC	0.013	0.001	**0.0014**	**0.0015**	**0.0015**	**0.0025**	< 0.0002	0.0004	0.0007	< 0.001	< 0.001	0.001	< 0.001	< 0.001
Chromium (VI)	mg/L			-													
Cobalt	mg/L	-		-	0.0009	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Copper	mg/L	1	AO	0.5	0.005	0.0009	0.0003	0.0012	0.0009	0.0002	0.0001	0.0016	0.0005	0.0006	0.0003	0.0004	0.0002
Iron	mg/L	0.3	AO	0.16	0.3	**1.47**	**1.63**	**1.36**	**1.62**	**1.53**	**1.4**	**1.52**	**1.77**	**1.17**	**1.28**	**1.11**	**1.61**
Lead	mg/L	0.01	MAC	0.003	0.005	0.00007	< 0.00002	0.00004	0.00002	< 0.00002	0.00003	< 0.00002	0.00004	< 0.00002	0.00003	0.00005	0.00004
Magnesium	mg/L	-		-	NV	21.1	21.8	20.6	13.7	20.5	24	24.1	22.8	22	22.8	20.2	22.7
Manganese	mg/L	0.05	AO	0.03	NV	0.05	0.05	0.05	**0.16**	0.05	**0.07**	0.05	**0.06**	0.046	0.048	0.04	0.045
Mercury	mg/L	0.001	MAC	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	mg/L	-		-	0.04	0.0001	0.0002	0.0002	0.0001	< 0.0001	0.0001	0.0002	< 0.0001	< 0.0001	< 0.0001	0.0002	0.0005
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		-	NV	2	2.4	1.8	1.4	1.9	2.5	2.2	2.4	1.8	2.4	2	2.6
Phosphorus-Total	mg/L	-		-	0.03	**1.26**	**0.3**	**0.24**	**4.54**	**7.58**	**0.37**	**0.72**	**0.41**	**0.98**	**0.82**	**0.67**	**1.31**
Selenium	mg/L	0.01	MAC	0.003	0.1	< 0.001	< 0.001	0	< 0.001	< 0.001	0	< 0.001	< 0.001	0.002	0.002	0.001	0.002
Silver	mg/L	-		-	0.0001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	105	NV	9.4	10.1	9.2	8.8	9.3	12.1	10.3	11	10.6	10.9	9.7	12.4
Strontium	mg/L	-		-	NV	-	0.86	0.79	0.47	0.79	0.9	0.86	0.8	0.795	0.84	0.793	0.875
Thallium	mg/L	-		-	0.0003	< 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	mg/L	-		-	0.006	0.0018	0.0043	0.0016	0.0015	0.0008	0.0007	0.0005	0.001	0.0001	0.00016	0.0001	0.0003
Zinc	mg/L	5	AO	2.5	0.02	0.01	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	7.8	12.1	6.8	12.6	5.2	12.9	6.7	12.3			7.1	11.9
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	8.11	7.74	7.65	7.23	8.05	7.59	7.5	7.57	7.94	7.87	7.8	7.75
Field Conductivity	µS/cm	-		-	NV	630	640	640	425	460	525	448	520	567	597	430	495

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	30-I 13-Apr-20	30-I 15-Oct-20	30-I 21-Apr-21	30-I 18-Oct-21	30-I 20-Apr-22	30-I 12-Oct-22	30-I 19-Apr-23	30-I 12-Oct-23	31-I 13-May-08	31-I 22-Aug-08	31-I 27-May-09	31-I 4-Aug-09
Alkalinity	mg/L	500	OG	349	NV	191	285	204	290	219	216	202	296	273	413	395	388
Conductivity	µS/cm	-		-	NV	561	606	550	564	550	545	561	614	684	943	857	905
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.87	7.74	7.88	7.6	7.65	7.78	7.92	7.16	7.66	7.63	7.59	7.81
TDS	mg/L	500	AO	368	NV	283	337	285	328	287	290	294	319	445	**613**	**557**	**588**
DOC	mg/L	5		3.5	NV	**5.2**	**45.8**	**5.8**	**25.3**	**8.6**	4.1	8	9	**11**	**12.8**	**18**	**6**
COD	mg/L	-		-	NV	54	170	51	120	50	114	50	160	3	30	8	17
Phenols	mg/L	-		-	0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001	0.001	<0.001	< 0.001	< 0.001
Chloride	mg/L	250	AO	131	NV	54.9	23.2	49.4	21.5	42.4	39.3	48	21.2	55	74	61	78
Ammonia, total	mg/L	-		-	NV	0.28	0.33	0.3	0.37	1.52	0.39	0.34	0.64	0.7	0.5	0.4	0.3
Unionized Ammonia	mg/L	-		-	0.02	< 0.01	< 0.01		< 0.01	0.02	< 0.01	< 0.01	<0.01				
Fluoride	mg/L	2.4	MAC	0.7	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.3	< 0.1	<0.1	0.3	0.1	0.1	0.1
Sulphate	mg/L	500	AO	255	NV	8	4	5	2	4	6	43	10	31	19	19	22
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	0.06	<0.1	<0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	4.0	NV	0.07	< 0.05	< 0.05	0.06	< 0.05	< 0.05	< 0.5	<0.05	<0.1	<0.1	< 0.1	0.4
Bromide	mg/L	-		-	NV									-	-	0.5	-
TKN	mg/L	-		-	NV	1.4	2.7	1.3	2.2	2.2	1.9	1.2	2.6	2	1.2	0.9	0.9
Hardness	mg/L	500	OG	361	NV	261	334	265	321	263	272	279	329	291	441	421	400
Aluminum	mg/L	0.1	OG	0.07	0.075	0.05	0.07	0.07	**0.08**	0.02	0.02	0.05	0.05	4	0.01	< 0.01	0.05
Antimony	mg/L	0.006	IMAC	0.002	0.02	< 0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	<0.01	<0.01	< 0.01	< 0.01
Arsenic	mg/L	0.025	IMAC	0.006	0.005	< 0.0001	0.001	0.0001	0.0005	0.0002	0.0002	0.0002	0.0005	<0.01	<0.01	< 0.01	**0.02**
Barium	mg/L	1	MAC	0.3	NV	0.135	0.133	0.124	0.12	0.125	0.143	0.142	0.14	0.1	0.1	0.1	**1.3**
Beryllium	mg/L	-		-	1.1	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	<0.1	<0.1	< 0.1	< 0.1
Boron	mg/L	5	IMAC	1.3	0.2	0.087	0.059	0.087	0.053	0.078	0.116	0.091	0.067	**0.32**	0.2	0.2	**0.4**
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000010	< 0.000010	<0.000015	0.0003	<0.0001	< 0.0001	**0.0174**
Calcium	mg/L	-		-	NV	69.7	108	72	106	73.1	74.3	75.7	105	84	115	114	104
Chromium	mg/L	0.05	MAC	0.013	0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	**0.0083**	0.0004	0.0002	**0.0016**
Chromium (VI)	mg/L			-						< 0.001	< 0.001	< 0.001	<0.01				
Cobalt	mg/L	-		-	0.0009	< 0.0001	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.0004	**0.0035**	<0.0003	0.0003	**0.003**
Copper	mg/L	1	AO	0.5	0.005	0.0012	0.0005	0.0011	0.0004	0.0003	0.0004	0.0001	0.0006	**0.0131**	0.0048	< 0.0001	0.0005
Iron	mg/L	0.3	AO	0.16	0.3	**1.19**	**1.73**	**1.45**	**1.72**	**1.37**	**1.15**	**1.31**	**1.69**	**6.9**	**0.64**	**0.9**	**3.7**
Lead	mg/L	0.01	MAC	0.003	0.005	0.00005	0.00013	0.00007	0.00003	0.00005	0.00003	0.00003	0.00005	**0.007**	<0.001	< 0.001	**0.01**
Magnesium	mg/L	-		-	NV	21.2	15.6	20.6	13.7	19.6	20.9	21.8	16.3	20	37	33	34
Manganese	mg/L	0.05	AO	0.03	NV	0.035	**0.201**	**0.053**	**0.22**	**0.067**	**0.054**	**0.051**	**0.194**	**0.29**	0.05	0.05	**0.33**
Mercury	mg/L	0.001	MAC	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	mg/L	-		-	0.04	< 0.0001	0.0003	< 0.0001	0.0001	< 0.0001	0.0001	< 0.0001	0.0001	0.003	<0.002	< 0.002	0.019
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.0007	<0.01	<0.01	< 0.01	0.02
Potassium	mg/L	-		-	NV	2.1	2	2.1	1.3	2	2.6	1.9	1.6	15.8	12	5.9	6.7
Phosphorus-Total	mg/L	-		-	0.03	**1.05**	**0.79**	**0.75**	**0.35**	**0.85**	**0.93**	**0.32**	**0.71**	<0.01	**0.08**	0.01	< 0.01
Selenium	mg/L	0.01	MAC	0.003	0.1	0.001	< 0.001	< 0.001	< 0.001	0.001	0.001	0.001	0.001	<0.01	<0.01	< 0.01	**0.02**
Silver	mg/L	-		-	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.0001	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	105	NV	10.6	10.9	11.7	7.8	10.7	14.1	10.8	9.1	40	50	40	45
Strontium	mg/L	-		-	NV	0.81	0.586	0.771	0.483	0.732	0.805	0.77	0.62	1.45	1.11	1.13	1.24
Thallium	mg/L	-		-	0.0003	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.005	< 0.00005	<0.00005	<0.0003	<0.0003	< 0.0003	**0.0036**
Vanadium	mg/L	-		-	0.006	0.0002	0.0012	0.0002	0.0008	0.0002	0.0003	0.0019	0.0008	**0.0088**	<0.001	< 0.001	**0.01**
Zinc	mg/L	5	AO	2.5	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.005	**0.037**	<0.01	< 0.01	0.02
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	7.9	11.7	6.7	11.6	5.3	14.9	6.9	12.2	-	-	-	-
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	7.44	7.05	8.05	7.26	7.95	7.87	7.95	7.39	-	-	-	-
Field Conductivity	µS/cm	-		-	NV	621	540	550	611	545	593	659	553	-	-	-	-

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	31-I 10-Jun-10	31-I 12-Oct-10	31-I 12-May-11	31-I 8-Nov-11	31-I 19-Apr-12	31-I 29-Oct-12	31-I 3-Jun-13	31-I 29-Oct-13	31-I 1-May-14	31-I 24-Sep-14	31-I 27-Apr-15	31-I 6-Oct-15
Alkalinity	mg/L	500	OG	349	NV	378	418	388	373	380	460	**616**	**657**	**681**	**658**	**579**	**569**
Conductivity	µS/cm	-		-	NV	809	824	922	898	910	1100	1440	1570	1550	1590	1480	1360
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.66	7.55	7.84	7.88	7.83	7.64	7.39	7.62	7.54	7.59	7.51	7.68
TDS	mg/L	500	AO	368	NV	**526**	**536**	**524**	**511**	**545**	**597**	**853**	**898**	**868**	**848**	**849**	**744**
DOC	mg/L	5		3.5	NV	5	**6**	5	-	4.1	**6.8**	**18.5**	-	**20.1**	**14.6**	**9.3**	**10.2**
COD	mg/L	-		-	NV	13	16	77	230	380	140	685	532	190	201	587	122
Phenols	mg/L	-		-	0.001	< 0.001	< 0.001	<0.001	<0.001	<0.0010	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Chloride	mg/L	250	AO	131	NV	62	66	64	62	62	66	106	116	122	133	151	109
Ammonia, total	mg/L	-		-	NV	0.42	0.48	0.43	0.1	0.7	0.77	0.44	0.6	0.62	0.63	0.6	2.27
Unionized Ammonia	mg/L	-		-	0.02												
Fluoride	mg/L	2.4	MAC	0.7	NV	< 0.1	0.1	0.1	0.2	0.16	0.17	< 0.1	0.2	0.1	0.2	0.2	0.2
Sulphate	mg/L	500	AO	255	NV	23	25	23	23	20	18	26	21	14	9	20	12
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.1	< 0.1	<0.01	0.08	<0.010	0.13	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	4.0	NV	< 0.1	< 0.1	<0.1	<0.1	<0.10	0.19	< 0.1	< 0.1	< 0.1	0.1	0.1	< 0.1
Bromide	mg/L	-		-	NV	0.4	-	<1	<1	<1.0	<1.0	0.7	0.7	0.8	1	1	0.7
TKN	mg/L	-		-	NV	3.4	0.8	4	14	9.3	4	8.56	1.6	3	5.7	12.3	2.4
Hardness	mg/L	500	OG	361	NV	399	491	430	410	480	480	**788**	**807**	**703**	**649**	**711**	**617**
Aluminum	mg/L	0.1	OG	0.07	0.075	0.01	0.02	<0.005	0.016	<0.0050	0.0061	0.06	0.06	0.04	0.04	0.04	0.05
Antimony	mg/L	0.006	IMAC	0.002	0.02	< 0.01	< 0.01	<0.005	<0.0005	<0.00050	<0.00050	< 0.0001	< 0.0001	< 0.0001	0.0002	0.0001	0.0002
Arsenic	mg/L	0.025	IMAC	0.006	0.005	< 0.005	< 0.005	<0.001	0.001	<0.0010	<0.0010	0.0017	0.0015	0.001	0.0023	0.002	0.0008
Barium	mg/L	1	MAC	0.3	NV	< 0.1	0.2	0.17	0.16	0.17	0.19	0.33	0.33	0.24	0.26	0.27	0.23
Beryllium	mg/L	-		-	1.1	< 0.1	< 0.1	<0.005	<0.0005	<0.00050	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	5	IMAC	1.3	0.2	0.2	< 0.1	0.17	**0.22**	**0.23**	**0.31**	**0.292**	**0.341**	**0.223**	**0.321**	**0.244**	**0.287**
Cadmium	mg/L	0.005	MAC	0.001	0.0005	0.0003	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Calcium	mg/L	-		-	NV	108	133	120	110	130	130	212	219	189	171	191	168
Chromium	mg/L	0.05	MAC	0.013	0.001	0.0001	0.0003	<0.005	<0.005	<0.0050	-	**0.0031**	**0.0143**	**0.0019**	**0.0017**	**0.0039**	**0.0054**
Chromium (VI)	mg/L			-													
Cobalt	mg/L	-		-	0.0009	< 0.0003	< 0.0003	<0.0005	<0.0005	<0.00050	<0.00050	0.0002	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Copper	mg/L	1	AO	0.5	0.005	0.0011	0.001	0.001	0.001	0.001	<0.0010	0.0004	0.0007	0.0008	0.0009	0.0014	0.0011
Iron	mg/L	0.3	AO	0.16	0.3	<0.1	**1.3**	**1.3**	**0.4**	**1.4**	**1.4**	**2.67**	**3.41**	**2.58**	**2.06**	**3.77**	**2.82**
Lead	mg/L	0.01	MAC	0.003	0.005	< 0.001	< 0.001	<0.0005	<0.0005	<0.00050	<0.00050	0.00004	0.00005	< 0.00002	< 0.00002	0.00007	0.00005
Magnesium	mg/L	-		-	NV	31	39	33	33	40	39	62.4	63.2	56.2	53.8	56.8	48.2
Manganese	mg/L	0.05	AO	0.03	NV	< 0.01	0.03	0.03	0.04	0.04	0.04	**0.06**	**0.07**	0.05	0.04	0.05	**0.09**
Mercury	mg/L	0.001	MAC	0.0003	0.0002	<0.00002	< 0.00002	<0.00001	-	<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		-	0.04	0.014	< 0.002	<0.001	0.0008	<0.00050	<0.00050	0.0001	< 0.0001	< 0.0001	0.0001	0.0002	< 0.0001
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01	0.002	0.001	0.0023	0.0017	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		-	NV	5.8	4.3	3.6	4.4	4.3	4.8	5.4	5.6	4.5	5.4	4.5	4.3
Phosphorus-Total	mg/L	-		-	0.03	**0.04**	0.03	**1.1**	**9.6**	<0.10	2	**3.55**	**3.36**	**1.55**	**3.11**	**7.67**	**1.23**
Selenium	mg/L	0.01	MAC	0.003	0.1	< 0.01	< 0.01	<0.002	<0.002	<0.0020	<0.0020	< 0.001	0.001	< 0.001	0.001	0	0
Silver	mg/L	-		-	0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Sodium	mg/L	200	AO	105	NV	35	34	35	38	47	45	68.4	74.7	70.7	77.8	72.8	55.4
Strontium	mg/L	-		-	NV	1.5	1.24	1.2	1.2	1.5	1.5	-	-	-	2.15	2.15	1.64
Thallium	mg/L	-		-	0.0003	< 0.0003	< 0.0003	<0.00005	<0.00005	<0.000050	<0.000050	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		-	0.006	< 0.001	< 0.001	0.001	0.0018	0.00079	0.001	**0.008**	0.0042	**0.0062**	**0.0142**	0.0047	0.0022
Zinc	mg/L	5	AO	2.5	0.02	< 0.01	< 0.01	0.019	0.009	<0.0050	<0.0050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.01
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	-	-	-	-	8	9.6	8.6	9.8	6.6	13.5	6.7	13
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	-	-	-	-	7.11	7.56	6.99	6.85	7.61	7.48	7.41	7.27
Field Conductivity	µS/cm	-		-	NV	-	-	-	-	945	1200	1450	1500	1620	1570	1640	975

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	31-I 25-Apr-16	31-I 20-Oct-16	31-I 12-Apr-17	31-I 6-Oct-17	31-I 11-Apr-18	31-I 2-Oct-18	31-I 23-Apr-19	31-I 9-Oct-19	31-I 13-Apr-20	31-I 15-Oct-20	31-I 21-Apr-21	31-I 18-Oct-21
Alkalinity	mg/L	500	OG	349	NV	**708**	**837**	**843**	**861**	**902**	**904**	**808**	**893**	**819**	**851**	**820**	**946**
Conductivity	µS/cm	-		-	NV	1790	2100	2130	2190	2080	2320	2150	2280	2200	2090	2040	2070
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.51	7.48	7.46	7.17	7.84	7.32	7.48	7.4	7.4	7.44	7.49	7.43
TDS	mg/L	500	AO	368	NV	**1020**	**1240**	**1220**	**1262**	**1240**	**1360**	**1225**	**1355**	**1256**	**1283**	**1180**	**1373**
DOC	mg/L	5		3.5	NV	**10.8**	**11.2**	**13.3**	**16.5**	**18.3**	**21.3**	**15.9**	**20.8**	**11.1**	**11.6**	**13.9**	**15.6**
COD	mg/L	-		-	NV	215	67	341	164	188	351	468	839	272	235	418	571
Phenols	mg/L	-		-	0.001	< 0.001	**0.009**	**0.017**	**0.008**	< 0.001	**0.013**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Chloride	mg/L	250	AO	131	NV	175	192	198	179	180	214	209	**262**	214	198	189	205
Ammonia, total	mg/L	-		-	NV	0.65	0.76	0.67	0.9	0.71	1.06	0.81	0.96	0.81	1.03	0.79	1.36
Unionized Ammonia	mg/L	-		-	0.02							< 0.01	< 0.01	< 0.01	< 0.01		< 0.01
Fluoride	mg/L	2.4	MAC	0.7	NV	0.2	0.1	< 0.5	< 0.1	< 0.1	< 0.1	< 0.1	< 1	< 0.1	< 0.1	< 0.1	< 0.1
Sulphate	mg/L	500	AO	255	NV	31	40	51	52	56	77	66	28	64	61	57	47
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.1	< 0.1	**1.1**	< 0.05	< 0.05	0.07	< 0.05	< 0.5	< 0.05	< 0.05	0.08	< 0.05
Nitrate (N)	mg/L	10	MAC	4.0	NV	< 0.1	< 0.1	1.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.05	< 0.05	0.08	< 0.05
Bromide	mg/L	-		-	NV	1	-										
TKN	mg/L	-		-	NV	4.8	4.3	9.6	3.7	6	10.1	9.5	17.5	6.8	5.9	9.3	12.8
Hardness	mg/L	500	OG	361	NV	**852**	**1080**	**988**	**1050**	**936**	**1050**	**953**	**990**	**928**	**946**	**829**	**1050**
Aluminum	mg/L	0.1	OG	0.07	0.075	0.05	**0.09**	**0.12**	**0.14**	**0.14**	**0.08**	**0.11**	**0.13**	**0.1**	**0.13**	**0.13**	**0.33**
Antimony	mg/L	0.006	IMAC	0.002	0.02	< 0.0001	0.0004	< 0.0001	< 0.0001	0.0001	0.0002	< 0.0001	< 0.0002	0.0001	0.0002	0.0002	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.006	0.005	0.0012	0.0005	0.0011	0.0012	0.0006	0.001	0.0002	0.0009	0.0003	0.0007	0.0007	0.0011
Barium	mg/L	1	MAC	0.3	NV	0.31	0.43	0.54	0.56	0.347	0.565	0.449	0.557	0.524	0.566	0.503	0.64
Beryllium	mg/L	-		-	1.1	< 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	mg/L	5	IMAC	1.3	0.2	**0.246**	**0.485**	**0.425**	**0.479**	**0.448**	**0.459**	**0.394**	**0.529**	**0.371**	**0.612**	**0.371**	**0.529**
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.00002	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000059	< 0.000029	< 0.000029	< 0.000029	< 0.000029
Calcium	mg/L	-		-	NV	227	287	256	280	241	276	254	261	244	244	219	289
Chromium	mg/L	0.05	MAC	0.013	0.001	< 0.0002	**0.0025**	**0.0042**	< 0.001	< 0.001	**0.002**	< 0.001	0.001	< 0.001	< 0.001	0.001	**0.002**
Chromium (VI)	mg/L			-													
Cobalt	mg/L	-		-	0.0009	< 0.005	< 0.005	**0.007**	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.0006	**0.006**	< 0.005	< 0.005
Copper	mg/L	1	AO	0.5	0.005	0.0006	0.001	0.0006	0.0012	0.0017	0.0003	0.0011	0.0012	0.0022	0.0009	0.0013	0.0024
Iron	mg/L	0.3	AO	0.16	0.3	**3.79**	**4.2**	**4.14**	**5.24**	0.051	**4.46**	**4.21**	**6.05**	**6.12**	**5.29**	**4.89**	**6.01**
Lead	mg/L	0.01	MAC	0.003	0.005	< 0.00002	0.00003	< 0.00002	0.00003	0.00003	0.00005	0.00004	< 0.0002	< 0.00009	0.0001	0.00014	0.00109
Magnesium	mg/L	-		-	NV	69.4	88.9	84.6	86.3	81.2	87	77.4	82.2	77.4	81.5	68.6	79
Manganese	mg/L	0.05	AO	0.03	NV	**0.06**	**0.08**	**0.08**	**0.09**	0.039	**0.096**	**0.082**	**0.091**	**0.089**	**0.09**	**0.085**	**0.141**
Mercury	mg/L	0.001	MAC	0.0003	0.0002	< 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	mg/L	-		-	0.04	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0004	< 0.0001	0.0007	< 0.0002	0.0002	0.0004	0.0003
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01	< 0.01	0.01	0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		-	NV	4.5	7.1	6.1	7.8	6.6	8.8	6	9.1	6.8	9	6.7	10.5
Phosphorus-Total	mg/L	-		-	0.03	**3.64**	**1.46**	**7.12**	**1.33**	**2.38**	**4.7**	**5.84**	**10.8**	**3.05**	**2.8**	**5.51**	**7.16**
Selenium	mg/L	0.01	MAC	0.003	0.1	< 0.001	0	< 0.001	< 0.001	0.004	0.002	0.002	0.004	0.002	0.002	0.001	0.003
Silver	mg/L	-		-	0.0001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	105	NV	81.3	123	108	134	133	148	123	169	152	171	141	167
Strontium	mg/L	-		-	NV	2.35	3.25	2.99	2.73	2.89	2.83	2.87	2.87	2.55	2.85	2.31	2.76
Thallium	mg/L	-		-	0.0003	< 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	mg/L	-		-	0.006	0.0025	0.0033	0.0035	0.0058	0.0013	0.00323	0.0012	0.0019	0.0017	0.0023	0.0026	0.0049
Zinc	mg/L	5	AO	2.5	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	3.9	12	5.2	12.7			7.2	13.5	7.8	11.7	5.8	12.4
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	7.58	7.14	7.28	7.06	7.84	7.32	6.9	6.85	7.54	6.72	7.07	6.8
Field Conductivity	µS/cm	-		-	NV	1210	1730	1619	1770	2030	2200	2040	1560	1946	1600	1620	2200

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	31-I 20-Apr-22	31-I 12-Oct-22	31-I 19-Apr-23	31-I 12-Oct-23	32-I 8-Nov-11	32-I 19-Apr-12	32-I 29-Oct-12	32-I 3-Jun-13	32-I 29-Oct-13	32-I 1-May-14	32-I 24-Sep-14	32-I 27-Apr-15
Alkalinity	mg/L	500	OG	349	NV	**847**	**904**	**853**	**891**	325	240	220	210	285	184	347	192
Conductivity	µS/cm	-		-	NV	2130	2140	2110	2090	746	480	510	423	582	366	695	385
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.34	7.38	7.35	7.22	7.74	7.85	7.48	7.78	7.88	7.84	7.54	7.75
TDS	mg/L	500	AO	368	NV	**1221**	**1281**	**1181**	**1150**	***463***	291	307	218	327	201	***396***	200
DOC	mg/L	5		3.5	NV	**13.2**	**6**	**14.4**	**19**	-	5	**6.7**	**8.6**	-	**6.2**	**10.3**	**7.7**
COD	mg/L	-		-	NV	385	582	4340	478	190	180	81	100	186	76	230	251
Phenols	mg/L	-		-	0.001	< 0.001	< 0.001	< 0.001	<0.001	**0.008**	<0.0010	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Chloride	mg/L	250	AO	131	NV	185	171	178	178	10	3	2	1	2	1	2	2
Ammonia, total	mg/L	-		-	NV	1.66	1.71	1.78	2.21	-	0.2	0.1	0.02	0.05	0.03	0.34	0.16
Unionized Ammonia	mg/L	-		-	0.02	< 0.01	< 0.01	< 0.01	<0.01								
Fluoride	mg/L	2.4	MAC	0.7	NV	< 0.5	< 0.5	< 1	<0.1	0.1	<0.10	<0.10	< 0.1	0.1	0.1	0.2	0.1
Sulphate	mg/L	500	AO	255	NV	46	51	< 10	39	58	17	43	8	14	7	22	10
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.3	< 0.3	< 0.5	<0.05	<0.01	<0.010	<0.010	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	4.0	NV	< 0.3	< 0.3	< 0.5	<0.05	<0.1	<0.10	0.86	0.2	0.1	0.1	0.2	0.2
Bromide	mg/L	-		-	NV					<1	<1.0	<1.0	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
TKN	mg/L	-		-	NV	8.8	11.6	9.8	12.8	5	5.9	1.1	1.53	0.7	1.3	11.6	6.4
Hardness	mg/L	500	OG	361	NV	**915**	**937**	**875**	**927**	280	260	270	195	333	200	***382***	176
Aluminum	mg/L	0.1	OG	0.07	0.075	0.07	**0.08**	**0.14**	0.07	0.019	0.0098	0.0069	**0.21**	0.05	0.02	0.04	**0.18**
Antimony	mg/L	0.006	IMAC	0.002	0.02	0.0002	< 0.0001	0.0002	0.0002	<0.0005	<0.00050	<0.00050	< 0.0001	< 0.0001	< 0.0001	0.0002	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.006	0.005	0.0004	< 0.0003	0.0011	0.0009	**0.007**	0.0025	<0.0010	0.0011	0.0005	0.0003	0.005	0.0004
Barium	mg/L	1	MAC	0.3	NV	0.542	0.506	0.604	0.686	0.016	0.015	0.013	0.01	0.02	0.01	0.02	0.01
Beryllium	mg/L	-		-	1.1	< 0.002	< 0.002	< 0.002	<0.0001	<0.0005	<0.00050	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	5	IMAC	1.3	0.2	**0.402**	**0.714**	**0.416**	**0.543**	0.04	0.012	0.031	0.016	0.021	< 0.005	0.028	0.015
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.000029	< 0.000029	< 0.000029	<0.000015	<0.0001	<0.00010	<0.00010	0.00006	< 0.00002	0.00002	< 0.00002	< 0.00002
Calcium	mg/L	-		-	NV	235	244	227	243	110	98	100	74.7	128	76.8	147	67.1
Chromium	mg/L	0.05	MAC	0.013	0.001	< 0.001	< 0.001	< 0.001	0.001	<0.01	<0.0050	-	0.001	**0.005**	0	**0.002**	**0.002**
Chromium (VI)	mg/L			-		< 0.001	< 0.001	< 0.001	<0.01								
Cobalt	mg/L	-		-	0.0009	**0.009**	**0.007**	< 0.005	**0.0015**	**0.0017**	0.00086	<0.00050	**0.001**	< 0.005	< 0.005	< 0.005	< 0.005
Copper	mg/L	1	AO	0.5	0.005	0.0006	0.0003	0.0004	0.0003	<0.001	<0.0010	0.002	0.0012	0.0008	0.0013	0.0005	0.0011
Iron	mg/L	0.3	AO	0.16	0.3	**6.7**	**5.36**	**6.95**	**7.15**	**12**	**3.3**	***0.17***	***0.17***	**0.68**	***0.21***	**5.47**	**0.77**
Lead	mg/L	0.01	MAC	0.003	0.005	0.00005	< 0.00009	0.00009	0.00004	<0.0005	<0.00050	<0.00050	0.00075	0.00003	0.00006	< 0.00002	< 0.00002
Magnesium	mg/L	-		-	NV	79.8	79.6	74.8	77.8	3.5	3.7	2.7	2.1	3.1	2	3.9	2.1
Manganese	mg/L	0.05	AO	0.03	NV	**0.093**	**0.091**	**0.087**	**0.099**	**0.39**	**0.23**	0.01	0.01	**0.15**	0.02	**0.2**	0
Mercury	mg/L	0.001	MAC	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002	<0.00002	-	<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		-	0.04	< 0.0002	< 0.0002	0.0003	0.0002	0.027	0.003	0.0029	0.0019	0.0005	0.0004	0.001	0.0005
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01	< 0.01	0.0074	0.005	0.001	0.0017	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		-	NV	7.3	8.7	7.6	11.6	1.4	0.9	0.86	0.4	0.5	0.4	0.9	0.4
Phosphorus-Total	mg/L	-		-	0.03	**5.94**	**4.03**	**11.9**	**4.46**	**1.2**	<0.10	**0.73**	**0.79**	**0.33**	**0.35**	**4.79**	**2.98**
Selenium	mg/L	0.01	MAC	0.003	0.1	0.003	0.004	0.002	<0.001	<0.002	<0.0020	0.0023	< 0.001	< 0.001	< 0.001	0	< 0.001
Silver	mg/L	-		-	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	mg/L	200	AO	105	NV	151	177	132	158	64	11	11	4.6	6.8	1.8	5.6	2.7
Strontium	mg/L	-		-	NV	2.68	3.04	2.33	2.69	0.26	0.27	0.24	-	-	-	0.39	0.16
Thallium	mg/L	-		-	0.0003	< 0.00005	< 0.005	< 0.00005	<0.00005	<0.00005	<0.000050	<0.000050	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		-	0.006	0.0015	0.0012	< 0.0001	0.0019	0.0015	0.0013	0.0015	0.003	0.0018	0.0019	**0.0087**	0.0021
Zinc	mg/L	5	AO	2.5	0.02	< 0.005	< 0.005	< 0.005	<0.005	0.006	<0.0050	<0.0050	< 0.005	< 0.005	0.01	0.01	< 0.005
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	7.8	14.1	4.9	11.9	-	7.1	8	10.1	7.8	8.6	13.8	-
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	7.2	6.97	7.19	7.13	-	6.92	7.81	7.62	7.36	8.33	7.28	-
Field Conductivity	µS/cm	-		-	NV	2068	2310	2360	2020	-	534	550	442	580	400	750	-

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	32-I 6-Oct-15	32-I 25-Apr-16	32-I 20-Oct-16	32-I 12-Apr-17	32-I 6-Oct-17	32-I 11-Apr-18	32-I 2-Oct-18	32-I 23-Apr-19	32-I 9-Oct-19	32-I 13-Apr-20	32-I 15-Oct-20	32-I 21-Apr-21
Alkalinity	mg/L	500	OG	349	NV	***354***	197	-	164	337	178	219	200		161	***369***	218
Conductivity	µS/cm	-		-	NV	687	391	-	342	654	364	515	423		339	698	416
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.7	7.84	-	7.93	7.42	7.83	7.55	7.83		7.73	7.53	7.62
TDS	mg/L	500	AO	368	NV	***389***	218	-	180	365	200	263	229		172	***389***	231
DOC	mg/L	5		3.5	NV	**9.1**	***4.2***	-	**5.7**	**16.3**	**6.2**	**8.9**	**6.4**		**5.9**	**10**	**10.3**
COD	mg/L	-		-	NV	312	183	-	444	265	170	152	282		33	108	1020
Phenols	mg/L	-		-	0.001	< 0.001	< 0.001	-	< 0.001	**0.006**	< 0.001	**0.002**	< 0.002		< 0.002	< 0.002	< 0.002
Chloride	mg/L	250	AO	131	NV	3	2	-	2	2	1.5	1.6	1.8		1.6	1.3	1.4
Ammonia, total	mg/L	-		-	NV	0.57	0.11	-	0.16	0.23	0.06	0.26	0.15		0.07	0.09	0.2
Unionized Ammonia	mg/L	-		-	0.02								< 0.01		< 0.01	< 0.01	
Fluoride	mg/L	2.4	MAC	0.7	NV	0.1	0.1	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.1	< 0.1	< 0.1
Sulphate	mg/L	500	AO	255	NV	13	7	-	9	7	5	22	7		4	3	4
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.1	< 0.1	-	0.2	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	10	MAC	4.0	NV	0.1	0.1	-	0.3	0.6	0.21	3.95	0.14		0.14	0.13	0.09
Bromide	mg/L	-		-	NV	< 0.4	< 0.4	-									
TKN	mg/L	-		-	NV	4.4	4.1	-	13	6.2	5.3	4.7	6.6		9.9	2.3	2.4
Hardness	mg/L	500	OG	361	NV	***381***	224	206	168	***378***	214	267	247		172	***403***	234
Aluminum	mg/L	0.1	OG	0.07	0.075	0.05	0.03	**0.78**	0.05	**0.09**	0.06	0.05	0.06		0.05	0.07	0.06
Antimony	mg/L	0.006	IMAC	0.002	0.02	0.0002	< 0.0001	0.0005	< 0.0001	0.0001	< 0.0001	0.0001	< 0.0001		< 0.0001	< 0.0001	0.0001
Arsenic	mg/L	0.025	IMAC	0.006	0.005	0.001	0.0003	0.0006	0.0001	0.001	0.0002	0.0002	0.0003		0.0002	0.0005	0.0004
Barium	mg/L	1	MAC	0.3	NV	0.03	0.01	0.02	0.01	0.03	0.013	0.025	0.016		0.013	0.035	0.019
Beryllium	mg/L	-		-	1.1	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002
Boron	mg/L	5	IMAC	1.3	0.2	0.023	< 0.005	0.031	0.016	0.027	0.011	0.022	0.014		0.013	0.025	0.01
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.00002	< 0.00002	0.00009	< 0.00002	< 0.000014	< 0.000014	< 0.000015	0.000024		< 0.000015	0.000052	0.000018
Calcium	mg/L	-		-	NV	147	85.8	78.4	64.3	145	82.2	102	94.6		65.9	154	89.5
Chromium	mg/L	0.05	MAC	0.013	0.001	**0.004**	< 0.0002	0.001	**0.013**	< 0.001	< 0.001	0.001	< 0.001	Dry	< 0.001	< 0.001	0.001
Chromium (VI)	mg/L			-													
Cobalt	mg/L	-		-	0.0009	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005		< 0.0001	< 0.005	< 0.005
Copper	mg/L	1	AO	0.5	0.005	0.0017	0.0008	0.0023	0.0007	0.0012	0.0011	0.0017	0.0011		0.002	0.0018	0.0015
Iron	mg/L	0.3	AO	0.16	0.3	**1.81**	**0.33**	**0.59**	0.07	**1.41**	***0.228***	0.029	**0.811**		0.067	0.141	**0.429**
Lead	mg/L	0.01	MAC	0.003	0.005	0.00003	< 0.00002	0.00038	< 0.00002	0.00003	< 0.00002	0.00003	0.00003		0.00004	< 0.00002	0.00006
Magnesium	mg/L	-		-	NV	3.6	2.3	2.5	1.8	3.7	2.11	2.8	2.46		1.79	4.19	2.47
Manganese	mg/L	0.05	AO	0.03	NV	**0.1**	***0.03***	0.01	***0.04***	**0.13**	***0.032***	0.006	**0.118**		0.024	**0.103**	**0.1**
Mercury	mg/L	0.001	MAC	0.0003	0.0002	< 0.00002	< 0.00002	-	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002		< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		-	0.04	0.0008	0.0003	0.003	0.0003	0.0009	< 0.0001	0.0003	0.0002		0.0001	0.0003	0.0001
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		-	NV	0.6	0.3	1.6	0.4	0.7	0.3	1.4	0.5		0.8	1.5	1.3
Phosphorus-Total	mg/L	-		-	0.03	**2.13**	**4.2**	-	**6.81**	**2.76**	**2.74**	**1.36**	**3.1**		**3.65**	**0.82**	**14.4**
Selenium	mg/L	0.01	MAC	0.003	0.1	< 0.001	< 0.001	0	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001
Silver	mg/L	-		-	0.0001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.0001	< 0.0001		< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	105	NV	7	1.7	7.1	1.7	2.6	1.4	1.6	1.4		1.2	2.1	1.4
Strontium	mg/L	-		-	NV	0.33	0.2	0.19	0.14	0.31	0.166	0.253	0.214		0.145	0.385	0.19
Thallium	mg/L	-		-	0.0003	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		-	0.006	0.002	0.0013	0.0031	0.0011	0.0029	0.0008	0.00115	0.0007		0.0011	0.0015	0.0011
Zinc	mg/L	5	AO	2.5	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	12.5	4.3	12.3	4.7	13.4			7.9		8.5	11.5	5.7
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	7.09	7.95	7.6	8.08	7.45	7.83	7.55	8.4		7.35	7.07	7.79
Field Conductivity	µS/cm	-		-	NV	515	335	370	284	575	383	485	430		382	650	440

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	32-I 18-Oct-21	32-I 20-Apr-22	32-I 12-Oct-22	32-I 19-Apr-23	32-I 12-Oct-23	33-II 20-Oct-16	33-II 12-Apr-17	33-II 5-Oct-17	33-II 10-Apr-18	33-II 2-Oct-18	33-II 22-Apr-19	33-II 8-Oct-19
Alkalinity	mg/L	500	OG	349	NV	***396***	180				238	250	242	265	232		
Conductivity	µS/cm	-		-	NV	689	370				478	489	488	468	480		
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.51	7.34				8.01	8.09	8.05	7.81	7.97		
TDS	mg/L	500	AO	368	NV	***412***	195				270	273	255	276	255		
DOC	mg/L	5		3.5	NV	**14.3**	**8.9**				2.2	2.5	4.5	2.8	2.4		
COD	mg/L	-		-	NV	220	214				8	105	119	128	30		
Phenols	mg/L	-		-	0.001	< 0.002	< 0.001				0.014	< 0.001	0.004	< 0.001	< 0.002		
Chloride	mg/L	250	AO	131	NV	2.4	1.3				3	3	3	2.8	4.2		
Ammonia, total	mg/L	-		-	NV	0.26	1.28				0.08	0.05	0.04	0.05	0.04		
Unionized Ammonia	mg/L	-		-	0.02	< 0.01	< 0.01										
Fluoride	mg/L	2.4	MAC	0.7	NV	< 0.1	< 0.1				0.1	0.1	< 0.1	< 0.1	< 0.1		
Sulphate	mg/L	500	AO	255	NV	2	4				11	11	9	9	11		
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.05	< 0.05				< 0.1	0.3	< 0.05	< 0.05	< 0.05		
Nitrate (N)	mg/L	10	MAC	4.0	NV	0.08	0.12				0.1	0.2	0.4	0.49	0.37		
Bromide	mg/L	-		-	NV						-						
TKN	mg/L	-		-	NV	5.7	5.1				3.5	4	1.1	2.4	0.4		
Hardness	mg/L	500	OG	361	NV	***414***	195				288	279	253	272	257		
Aluminum	mg/L	0.1	OG	0.07	0.075	**0.08**	0.02				0.08	0.09	0.06	0.05	0.05		
Antimony	mg/L	0.006	IMAC	0.002	0.02	< 0.0001	< 0.0001				0.0004	< 0.0001	< 0.0001	< 0.0001	< 0.0001		
Arsenic	mg/L	0.025	IMAC	0.006	0.005	0.0019	0.0003				0.0004	0.0003	0.0002	0.0002	0.0001		
Barium	mg/L	1	MAC	0.3	NV	0.039	0.018				0.07	0.1	0.05	0.068	0.057		
Beryllium	mg/L	-		-	1.1	< 0.002	< 0.002				< 0.002	< 0.002	< 0.002	< 0.002	< 0.002		
Boron	mg/L	5	IMAC	1.3	0.2	0.02	0.008				0.011	0.031	0.01	0.015	0.008		
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.000015	< 0.000015				< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015		
Calcium	mg/L	-		-	NV	159	74.2				93.4	88.3	84.2	90.9	86.9		
Chromium	mg/L	0.05	MAC	0.013	0.001	< 0.001	< 0.001	Dry	Destroyed	Destroyed	0.001	0.001	< 0.001	< 0.001	0.001	Broken	Broken
Chromium (VI)	mg/L			-			< 0.001										
Cobalt	mg/L	-		-	0.0009	< 0.005	< 0.005				0.005	< 0.005	< 0.005	0.006	0.008		
Copper	mg/L	1	AO	0.5	0.005	0.0008	0.0008				0.0005	0.0025	0.002	0.001	0.0007		
Iron	mg/L	0.3	AO	0.16	0.3	**3.15**	***0.205***				0.03	0.15	< 0.005	0.011	0.007		
Lead	mg/L	0.01	MAC	0.003	0.005	< 0.00002	< 0.00002				0.00009	0.00005	< 0.00002	< 0.00002	< 0.00002		
Magnesium	mg/L	-		-	NV	4.08	2.22				13.2	14.2	10.3	10.9	9.71		
Manganese	mg/L	0.05	AO	0.03	NV	**0.239**	**0.122**				0.05	**0.06**	0.01	0.013	0.012		
Mercury	mg/L	0.001	MAC	0.0003	0.0002	< 0.00002	< 0.00002				< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002		
Molybdenum	mg/L	-		-	0.04	0.0005	0.0002				0.0009	0.0019	0.0003	0.0003	0.0004		
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01				< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Potassium	mg/L	-		-	NV	1.9	1.3				1.2	1	1.1	0.8	1.1		
Phosphorus-Total	mg/L	-		-	0.03	**2.03**	**2.19**				3.66	16.9	7.83	15.1	2.71		
Selenium	mg/L	0.01	MAC	0.003	0.1	< 0.001	< 0.001				< 0.001	< 0.001	< 0.001	0.001	< 0.001		
Silver	mg/L	-		-	0.0001	< 0.0001	< 0.0001				< 0.00002	< 0.00002	< 0.00002	0.00003	< 0.0001		
Sodium	mg/L	200	AO	105	NV	2	1.2				4.1	3.3	2.6	2.7	2.5		
Strontium	mg/L	-		-	NV	0.363	0.165				0.23	0.2	0.22	0.213	0.217		
Thallium	mg/L	-		-	0.0003	< 0.00005	< 0.00005				< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005		
Vanadium	mg/L	-		-	0.006	0.0019	0.0007				0.001	0.0012	0.0014	0.0005	0.00062		
Zinc	mg/L	5	AO	2.5	0.02	< 0.005	< 0.005				< 0.005	< 0.005	< 0.005	< 0.005	< 0.005		
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	13.2	7.9				11.3	6.1	11.2				
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	6.98	7.48				7.87	7.84	7.69	7.81	7.97		
Field Conductivity	µS/cm	-		-	NV	740	357				460	370	425	509	477		

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	33-II 13-Apr-20	33-II 14-Oct-20	33-II 21-Apr-21	33-II 18-Oct-21	33-II 20-Apr-22	33-II 12-Oct-22	33-II 19-Apr-23	33-II 12-Oct-23	35 11-Apr-18	35 2-Oct-18	35 23-Apr-19	35 9-Oct-19
Alkalinity	mg/L	500	OG	349	NV		230	225	238	217	232	224	233	451	344	399	336
Conductivity	µS/cm	-		-	NV		471	466	458	465	452	459	454	1010	858	955	802
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5		7.95	7.98	7.89	7.81	7.83	8	7.42	7.39	7.63	7.8	7.78
TDS	mg/L	500	AO	368	NV		258	252	268	245	261	247	235	**571**	474	**511**	471
DOC	mg/L	5		3.5	NV		3.8	**5.2**	3	2	2	1.1	3.7	**9**	**10.5**	**6.7**	**7.2**
COD	mg/L	-		-	NV		645	144	159	44	228	113	123	44	555	575	725
Phenols	mg/L	-		-	0.001		< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001	< 0.001	< 0.002	< 0.002	< 0.002
Chloride	mg/L	250	AO	131	NV		4.5	4.4	5.2	3.9	5.3	3.6	4.3	45.7	35.1	44.3	46.1
Ammonia, total	mg/L	-		-	NV		0.1	0.09	0.1	0.87	1.09	0.19	0.33	0.02	0.05	0.06	0.08
Unionized Ammonia	mg/L	-		-	0.02		< 0.01		< 0.01	0.01	0.02	< 0.01	<0.01			< 0.01	< 0.01
Fluoride	mg/L	2.4	MAC	0.7	NV		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sulphate	mg/L	500	AO	255	NV		14	13	14	11	12	< 10	12	25	53	32	47
Nitrite (N)	mg/L	1	MAC	0.3	NV		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	<0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	10	MAC	4.0	NV		0.24	0.94	0.27	0.91	0.7	< 0.5	0.2	< 0.05	0.14	< 0.05	< 0.05
Bromide	mg/L	-		-	NV												
TKN	mg/L	-		-	NV		7.3	1.7	2.6	2.3	2.5	0.7	0.8	0.9	15.7	18.9	17.2
Hardness	mg/L	500	OG	361	NV		254	251	268	242	262	253	244	**534**	424	460	414
Aluminum	mg/L	0.1	OG	0.07	0.075		0.03	0.08	**0.17**	0.02	0.09	0.05	0.02	**0.09**	0.05	**0.09**	**0.08**
Antimony	mg/L	0.006	IMAC	0.002	0.02		0.0002	< 0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.006	0.005		0.0004	0.0004	0.0002	0.0002	0.0002	0.0002	0.0001	0.0002	0.0002	0.0002	0.0003
Barium	mg/L	1	MAC	0.3	NV		0.065	0.048	0.065	0.048	0.066	0.056	0.062	0.19	0.142	0.154	0.134
Beryllium	mg/L	-		-	1.1		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	5	IMAC	1.3	0.2		0.018	0.018	0.009	0.025	0.011	< 0.005	0.016	0.075	0.112	0.076	0.114
Cadmium	mg/L	0.005	MAC	0.001	0.0005		< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000010	< 0.000010	<0.000015	< 0.000014	< 0.000015	0.000016	< 0.000015
Calcium	mg/L	-		-	NV		84.9	85.1	91.8	80.8	89.9	85.8	83.6	157	125	135	121
Chromium	mg/L	0.05	MAC	0.013	0.001	Broken	< 0.001	0.001	0.001	< 0.001	< 0.001	< 0.001	<0.001	< 0.001	0.001	< 0.001	< 0.001
Chromium (VI)	mg/L			-						< 0.001	< 0.001	< 0.001	<0.01				
Cobalt	mg/L	-		-	0.0009		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.0002	< 0.005	< 0.005	< 0.005	< 0.005
Copper	mg/L	1	AO	0.5	0.005		0.0019	0.0053	0.0015	0.0008	0.001	0.0005	0.0012	0.0036	0.0047	**0.0059**	0.0023
Iron	mg/L	0.3	AO	0.16	0.3		< 0.005	0.092	0.253	< 0.005	0.108	< 0.005	0.019	0.012	0.012	0.055	0.012
Lead	mg/L	0.01	MAC	0.003	0.005		0.00003	0.00034	0.00032	0.00002	0.00016	< 0.00002	0.00003	< 0.00002	0.00002	0.00008	< 0.00002
Magnesium	mg/L	-		-	NV		10.1	9.39	9.33	9.77	8.99	9.44	8.58	34.5	27.2	29.7	27.2
Manganese	mg/L	0.05	AO	0.03	NV		**0.051**	**0.159**	0.017	0.018	0.037	0.016	0.003	**0.615**	**0.515**	**0.757**	**0.794**
Mercury	mg/L	0.001	MAC	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
Molybdenum	mg/L	-		-	0.04		0.0006	0.0007	0.0002	0.0002	0.0003	0.0002	0.0002	< 0.0001	0.0004	0.0002	0.0004
Nickel	mg/L	-		-	0.025		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.0003	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		-	NV		1.6	1.4	1.5	1.5	1.3	0.9	1.4	2.1	2.4	2	2.2
Phosphorus-Total	mg/L	-		-	0.03		16.2	4.52	18.4	6.98	12.4	5.92	6.47	**0.95**	**6.14**	**4.93**	**7.61**
Selenium	mg/L	0.01	MAC	0.003	0.1		< 0.001	< 0.001	< 0.001	0.002	< 0.001	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	< 0.0001	<0.0001	< 0.00002	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	105	NV		4.5	3.5	3.4	6.2	3.1	2.4	3.1	35	24.1	28.3	24.6
Strontium	mg/L	-		-	NV		0.221	0.212	0.207	0.292	0.201	0.193	0.201	0.778	0.615	0.679	0.605
Thallium	mg/L	-		-	0.0003		< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.005	< 0.00005	<0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		-	0.006		0.0008	0.0006	0.0011	0.0006	0.0008	< 0.0004	0.0008	0.0002	0.00102	0.0011	0.0008
Zinc	mg/L	5	AO	2.5	0.02		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV		12.2	6	11.9	7.9	13.1	5.6	11.4			8.3	11.7
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5		7.89	8	7.68	7.88	7.81	8.07	7.98	7.39	7.63	7.23	7.58
Field Conductivity	µS/cm	-		-	NV		520	510	491	462	516	552	519	1030	847	930	770

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	35 13-Apr-20	35 15-Oct-20	35 21-Apr-21	35 18-Oct-21	35 20-Apr-22	35 12-Oct-22	35 19-Apr-23	35 12-Oct-23	36 10-Apr-18	36 1-Oct-18	36 22-Apr-19	36 8-Oct-19
Alkalinity	mg/L	500	OG	349	NV	388	396	434	434	410	390	**505**	424	225	305	227	262
Conductivity	µS/cm	-		-	NV	936	882	1010	943	999	894	1200	954	471	619	508	629
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.69	7.84	7.8	7.57	7.6	7.85	7.63	7.5	7.48	7.57	7.74	7.51
TDS	mg/L	500	AO	368	NV	**502**	**512**	**569**	**566**	**542**	**505**	**673**	**508**	270	363	279	365
DOC	mg/L	5		3.5	NV	**6.1**	4.5	**7.6**	**5.8**	**5.6**	3.4	4	**7.1**	**14.8**	**14.4**	**11.1**	**10.3**
COD	mg/L	-		-	NV	360	696	601	723	801	154	425	110	418	2430	910	1070
Phenols	mg/L	-		-	0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001	< 0.001	**0.011**	< 0.002	< 0.002
Chloride	mg/L	250	AO	131	NV	46.9	45	54.9	63.5	54.3	41.4	72.2	48.9	10.3	24.3	12.7	20.7
Ammonia, total	mg/L	-		-	NV	0.02	0.1	0.08	0.09	0.26	0.02	0.29	2.21	0.2	0.35	0.2	0.18
Unionized Ammonia	mg/L	-		-	0.02	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	0.02			< 0.01	< 0.01
Fluoride	mg/L	2.4	MAC	0.7	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sulphate	mg/L	500	AO	255	NV	30	37	35	35	31	32	22	33	15	23	20	60
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	10	MAC	4.0	NV	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.08	<0.05	0.05	0.07	< 0.05	< 0.05
Bromide	mg/L	-		-	NV												
TKN	mg/L	-		-	NV	7.7	15.1	14.3	21.5	17.7	2.4	9.6	3.6	45.2	56.9	8.7	24.4
Hardness	mg/L	500	OG	361	NV	444	453	**506**	487	482	462	**626**	465	262	322	265	313
Aluminum	mg/L	0.1	OG	0.07	0.075	**0.08**	0.05	**0.14**	**0.08**	**0.24**	0.04	**0.11**	0.04	0.06	0.05	0.05	0.07
Antimony	mg/L	0.006	IMAC	0.002	0.02	< 0.0001	< 0.0001	0.0001	0.0003	0.0002	0.0003	0.0002	0.0003	< 0.0001	0.0002	< 0.0001	0.0002
Arsenic	mg/L	0.025	IMAC	0.006	0.005	0.0001	0.0002	0.0002	0.0003	0.0004	0.0002	0.0001	0.0002	0.0009	**0.0059**	0.0016	0.0038
Barium	mg/L	1	MAC	0.3	NV	0.148	0.158	0.174	0.18	0.179	0.158	0.23	0.159	0.088	0.169	0.117	0.176
Beryllium	mg/L	-		-	1.1	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	5	IMAC	1.3	0.2	0.081	0.103	0.083	0.083	0.074	0.097	0.095	0.111	0.027	0.039	0.032	0.05
Cadmium	mg/L	0.005	MAC	0.001	0.0005	0.000031	0.000043	0.000057	0.000097	0.000089	0.000114	0.000157	0.000099	< 0.000014	< 0.000015	< 0.000015	< 0.000015
Calcium	mg/L	-		-	NV	127	130	147	141	138	134	177	132	88.9	106	89	102
Chromium	mg/L	0.05	MAC	0.013	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)	mg/L			-						< 0.001	< 0.001	< 0.001	<0.01				
Cobalt	mg/L	-		-	0.0009	**0.0042**	**0.009**	**0.006**	**0.006**	**0.011**	**0.008**	**0.013**	**0.009**	< 0.005	< 0.005	**0.007**	< 0.005
Copper	mg/L	1	AO	0.5	0.005	**0.0081**	0.0039	**0.016**	0.0042	**0.0341**	0.0024	0.0048	0.0027	0.0008	0.0006	0.0008	0.0003
Iron	mg/L	0.3	AO	0.16	0.3	0.023	< 0.005	0.128	0.017	0.279	0.048	0.041	0.066	**1.46**	2	**1.19**	**0.59**
Lead	mg/L	0.01	MAC	0.003	0.005	0.00005	< 0.00002	0.00016	0.00003	0.00024	0.00003	< 0.00004	0.00003	0.00004	0.00007	0.00005	0.00003
Magnesium	mg/L	-		-	NV	30.8	31.5	33.8	32.7	33.3	31.1	44.7	32.9	9.75	13.9	10.4	14
Manganese	mg/L	0.05	AO	0.03	NV	**1.01**	**1.15**	**1.48**	**1.51**	**1.71**	**1.56**	**2.26**	**1.57**	**0.062**	**0.107**	**0.088**	**0.082**
Mercury	mg/L	0.001	MAC	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	mg/L	-		-	0.04	0.0002	0.0003	0.0002	0.0004	0.0002	0.0003	0.0002	0.0003	0.0007	0.0026	0.001	0.0027
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.0091	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		-	NV	2.1	2.5	2.2	2.5	2.3	2.4	2.4	2.5	1	1.8	1.2	1.9
Phosphorus-Total	mg/L	-		-	0.03	**1.61**	**6.32**	**9.52**	**8.17**	**8**	**2.08**	**4.1**	**2.38**	**10.3**	**14.6**	**3.88**	**13.2**
Selenium	mg/L	0.01	MAC	0.003	0.1	< 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	mg/L	-		-	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	< 0.00002	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	105	NV	31	28.1	34.1	29.2	34.1	27.9	43.5	31.2	8.9	8.8	8.3	8.8
Strontium	mg/L	-		-	NV	0.678	0.693	0.723	0.701	0.708	0.657	0.874	0.71	0.14	0.196	0.15	0.189
Thallium	mg/L	-		-	0.0003	< 0.00005	< 0.00005	0.00006	0.00013	0.00009	< 0.005	0.00013	0.00007	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		-	0.006	0.0008	0.0006	0.0018	0.0049	0.0043	0.0013	0.0006	0.001	0.0004	0.00313	0.0021	0.0044
Zinc	mg/L	5	AO	2.5	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	9.05	11.5	7.2	11.2	7.9	14.4	6.1	11.1			5.9	11.6
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	7.1	7.61	7.25	7.56	7.1	7.32	7.37	7.63	7.48	7.57	7.53	7.24
Field Conductivity	µS/cm	-		-	NV	1039	852	920	855	930	930	1451	1026	505	653	530	520

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	36 13-Apr-20	36 14-Oct-20	36 21-Apr-21	36 18-Oct-21	36 20-Apr-22	36 12-Oct-22	36 19-Apr-23	36 12-Oct-23	37 10-Apr-18	37 1-Oct-18	37 22-Apr-19	37 8-Oct-19
Alkalinity	mg/L	500	OG	349	NV	198	293	252	327	249	293	218	***405***	***438***	***463***	***385***	***361***
Conductivity	µS/cm	-		-	NV	460	661	557	685	568	654	494	814	895	937	874	836
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.72	7.78	7.95	7.65	7.67	7.59	7.81	7.35	7.43	7.42	7.48	7.44
TDS	mg/L	500	AO	368	NV	250	***368***	311	***424***	314	***386***	269	***428***	**538**	**569**	**531**	**530**
DOC	mg/L	5		3.5	NV	**12**	**22.4**	**10.6**	**18.9**	**9.8**	**11.6**	**10.9**	**21.4**	**65.4**	**71.8**	**50.6**	**57.6**
COD	mg/L	-		-	NV	211	336	232	233	27	194	214	282	280	468	650	195
Phenols	mg/L	-		-	0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001	< 0.001	**0.004**	< 0.002	< 0.002
Chloride	mg/L	250	AO	131	NV	12.4	17.9	14.8	20.2	13.7	14.1	10.5	13.8	13.1	13.3	11.3	13
Ammonia, total	mg/L	-		-	NV	0.11	0.22	0.12	0.21	2.23	0.18	0.29	0.32	0.52	0.8	0.65	0.55
Unionized Ammonia	mg/L	-		-	0.02	< 0.01	< 0.01		< 0.01	0.01	< 0.01	< 0.01	<0.01			< 0.01	< 0.01
Fluoride	mg/L	2.4	MAC	0.7	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sulphate	mg/L	500	AO	255	NV	22	31	22	47	22	47	55	30	27	41	77	81
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.07	0.11	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	10	MAC	4.0	NV	0.07	< 0.05	0.08	0.06	< 0.05	< 0.05	0.26	<0.05	< 0.05	< 0.05	< 0.05	0.07
Bromide	mg/L	-		-	NV												
TKN	mg/L	-		-	NV	3.5	6	4.6	5.3	2.2	3	3	4.8	13.8	8.8	9.8	2.1
Hardness	mg/L	500	OG	361	NV	227	336	300	***368***	306	351	249	***424***	***498***	**506**	***433***	***489***
Aluminum	mg/L	0.1	OG	0.07	0.075	0.05	0.05	0.06	0.07	0.03	0.05	0.05	0.05	**0.1**	**0.12**	**0.09**	**0.11**
Antimony	mg/L	0.006	IMAC	0.002	0.02	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	0.0001	0.0001	0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.006	0.005	0.0008	0.0012	0.0006	0.0012	0.0008	0.0012	0.0003	0.0009	0.0025	**0.0053**	0.0008	0.0015
Barium	mg/L	1	MAC	0.3	NV	0.104	0.177	0.125	0.159	0.156	0.154	0.089	0.178	0.248	0.281	0.192	0.254
Beryllium	mg/L	-		-	1.1	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	5	IMAC	1.3	0.2	0.039	0.057	0.025	0.078	0.028	0.143	0.077	0.187	0.024	0.033	0.02	0.028
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000010	0.00001	<0.000015	< 0.000014	< 0.000015	< 0.000015	< 0.000029
Calcium	mg/L	-		-	NV	74.7	112	97.8	124	98.6	117	82.5	142	180	184	159	176
Chromium	mg/L	0.05	MAC	0.013	0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	0.001	**0.004**	**0.002**	**0.003**
Chromium (VI)	mg/L			-						< 0.001	< 0.001	< 0.001	<0.01				
Cobalt	mg/L	-		-	0.0009	0.0002	**0.007**	< 0.005	< 0.005	< 0.005	**0.006**	< 0.005	0.0006	< 0.005	< 0.005	< 0.005	< 0.005
Copper	mg/L	1	AO	0.5	0.005	0.0016	0.0042	0.0035	0.0008	0.0015	0.0006	0.0006	0.0008	0.0011	0.0005	0.0012	0.0006
Iron	mg/L	0.3	AO	0.16	0.3	**0.832**	0.065	**0.702**	**1.9**	**1.31**	**2.32**	**0.503**	**2.22**	**15.1**	**21.2**	**10.1**	**11.1**
Lead	mg/L	0.01	MAC	0.003	0.005	0.00007	0.00007	0.00006	0.00003	0.00004	0.00004	0.00003	0.00005	0.00007	0.00008	0.00007	< 0.00009
Magnesium	mg/L	-		-	NV	9.85	13.9	13.6	14	14.4	14.5	10.3	16.8	11.6	11.3	8.73	11.9
Manganese	mg/L	0.05	AO	0.03	NV	**0.068**	***0.049***	**0.094**	**0.077**	**0.099**	**0.086**	***0.04***	**0.084**	**1.45**	**1.56**	**1.49**	**1.2**
Mercury	mg/L	0.001	MAC	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	mg/L	-		-	0.04	0.0011	0.0007	0.0008	0.0008	0.0011	0.0022	0.0006	0.0008	0.0021	0.0016	0.0013	0.0027
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.0016	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		-	NV	1.2	1.9	1.4	2.5	1.7	2.6	2	3.2	1	1.3	0.8	1.8
Phosphorus-Total	mg/L	-		-	0.03	**3.8**	**4.37**	**3.83**	**4.25**	**0.17**	**1.62**	**2.1**	**2.13**	**7.3**	**5.15**	**9.97**	**2.17**
Selenium	mg/L	0.01	MAC	0.003	0.1	< 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	mg/L	-		-	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	< 0.00002	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	105	NV	9.7	15.5	9.8	18.1	9.9	13.1	10.7	17	24.3	38.2	31	27.5
Strontium	mg/L	-		-	NV	0.138	0.214	0.176	0.22	0.183	0.205	0.135	0.269	0.317	0.35	0.277	0.341
Thallium	mg/L	-		-	0.0003	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.005	< 0.00005	<0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		-	0.006	0.001	0.0012	0.0014	0.0018	0.0011	0.0011	0.0026	0.0009	**0.0063**	**0.0138**	0.0034	**0.0075**
Zinc	mg/L	5	AO	2.5	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	0.013	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	8.5	10.8	3.9	11.9	5.2	13.5	4.3	12.1			6.1	12.3
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	7.36	7.27	7.64	7.32	7.55	7.42	7.73	7.46	7.43	7.42	7.29	7.17
Field Conductivity	µS/cm	-		-	NV	567	666	580	743	522	715	649	793	913	983	890	723

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	37 13-Apr-20	37 14-Oct-20	37 21-Apr-21	37 18-Oct-21	37 20-Apr-22	37 12-Oct-22	37 19-Apr-23	37 12-Oct-23	201 4-Nov-19	201 13-Apr-20	201 14-Oct-20	201 21-Apr-21
Alkalinity	mg/L	500	OG	349	NV	287	336	***392***	***389***	340	***378***	321	***366***	188	181	188	197
Conductivity	µS/cm	-		-	NV	729	751	827	744	759	779	742	774	398	397	399	405
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.54	7.75	7.82	7.52	7.52	7.65	7.79	7.3	8.08	7.99	7.95	8.03
TDS	mg/L	500	AO	368	NV	***427***	***444***	***485***	***489***	***413***	***499***	***444***	***405***	210	202	214	216
DOC	mg/L	5		3.5	NV	**31.8**	**48.5**	**29.8**	**20.4**	**49.1**	**13.4**	**21.1**	**59.5**	2.3	0.9	1.8	3.3
COD	mg/L	-		-	NV	153	172	186	197	160	165	197	169	700	94	90	69
Phenols	mg/L	-		-	0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001	< 0.002	< 0.002	< 0.002	< 0.002
Chloride	mg/L	250	AO	131	NV	9.6	8.5	10.1	9.5	9.1	10.8	9.6	10	3.3	4.3	5	4
Ammonia, total	mg/L	-		-	NV	0.41	0.44	0.27	0.65	0.67	0.39	0.36	6.32	0.07	0.04	0.05	0.05
Unionized Ammonia	mg/L	-		-	0.02	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	**0.03**	< 0.01	< 0.01	< 0.01	
Fluoride	mg/L	2.4	MAC	0.7	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
Sulphate	mg/L	500	AO	255	NV	78	57	44	40	38	50	11	48	8	9	10	9
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	10	MAC	4.0	NV	0.09	0.18	0.23	0.06	0.12	0.24	1.59	<0.05	1.39	1.62	1.46	1.49
Bromide	mg/L	-		-	NV												
TKN	mg/L	-		-	NV	2.7	2.8	2.8	3	2.9	2.2	2.7	9	6.9	1.6	1.8	2.2
Hardness	mg/L	500	OG	361	NV	***362***	***398***	***457***	***452***	***383***	***489***	***446***	***389***	215	204	216	215
Aluminum	mg/L	0.1	OG	0.07	0.075	0.07	**0.08**	**0.11**	**0.11**	0.07	**0.08**	**0.12**	0.07	0.06	0.05	0.03	0.05
Antimony	mg/L	0.006	IMAC	0.002	0.02	< 0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	0.0002	0.0002	0.0002	< 0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.006	0.005	0.001	0.0011	0.0005	0.0011	0.0007	0.0007	0.0006	0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Barium	mg/L	1	MAC	0.3	NV	0.131	0.158	0.168	0.198	0.135	0.213	0.157	0.147	0.054	0.045	0.055	0.049
Beryllium	mg/L	-		-	1.1	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	5	IMAC	1.3	0.2	0.013	0.023	0.014	0.024	0.011	0.019	0.01	0.023	0.005	0.007	0.012	0.008
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.000015	0.000015	< 0.000015	< 0.000015	0.000015	0.000015	< 0.000010	<0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015
Calcium	mg/L	-		-	NV	132	146	166	166	139	177	162	142	72.7	67.8	72	72.2
Chromium	mg/L	0.05	MAC	0.013	0.001	0.001	< 0.001	0.001	**0.002**	**0.002**	< 0.001	0.001	0.001	< 0.001	< 0.001	0.002	0.001
Chromium (VI)	mg/L			-						< 0.001	< 0.001	< 0.001	<0.01				
Cobalt	mg/L	-		-	0.0009	0.0008	< 0.005	< 0.005	< 0.005	**0.006**	< 0.005	< 0.005	0.0007	0.0003	< 0.0001	< 0.005	< 0.005
Copper	mg/L	1	AO	0.5	0.005	**0.0103**	0.0029	0.0043	0.0008	**0.0054**	0.001	0.0035	0.002	0.0012	0.0016	0.0009	0.0013
Iron	mg/L	0.3	AO	0.16	0.3	**0.517**	**0.422**	**0.913**	**10.8**	**0.506**	**5.28**	**2.54**	**2.99**	< 0.005	0.011	< 0.005	< 0.005
Lead	mg/L	0.01	MAC	0.003	0.005	0.00006	0.00042	0.00008	0.00007	0.00007	0.00003	0.00009	0.00003	0.00003	0.00005	< 0.00002	0.00003
Magnesium	mg/L	-		-	NV	7.87	8.11	10.1	9.11	8.46	11.1	10	8.17	8.02	8.39	8.87	8.51
Manganese	mg/L	0.05	AO	0.03	NV	**0.946**	**0.995**	**0.798**	**1.15**	**0.863**	**1.06**	**0.503**	**0.648**	**0.081**	< 0.001	< 0.001	< 0.001
Mercury	mg/L	0.001	MAC	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002	0.00005	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		-	0.04	0.0018	0.0016	0.001	0.001	0.0013	0.0016	0.0012	0.0012	0.0006	0.0001	0.0002	0.0002
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.0021	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		-	NV	0.8	1.1	1.3	1.3	0.9	1.7	1	1.2	1.5	1	1.4	1.1
Phosphorus-Total	mg/L	-		-	0.03	**1.29**	**0.96**	**1.46**	**0.93**	**1**	**0.63**	**1.55**	**0.59**	22	8.28	7.94	6.1
Selenium	mg/L	0.01	MAC	0.003	0.1	< 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	mg/L	-		-	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	105	NV	25	20.2	16.7	16.5	11	14.4	10.7	10.8	3.6	3.2	3.8	3.3
Strontium	mg/L	-		-	NV	0.265	0.279	0.284	0.288	0.235	0.299	0.268	0.262	0.116	0.115	0.129	0.12
Thallium	mg/L	-		-	0.0003	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.005	< 0.00005	<0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		-	0.006	0.0042	0.0049	0.0016	**0.0072**	0.003	0.004	0.0003	0.0028	0.0002	0.0002	0.0003	0.0003
Zinc	mg/L	5	AO	2.5	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	0.01	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	-	NV												
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005												
BOD(5 day)	mg/L	-	-	-	NV												
Field Temperature	°C	-	AO	-	NV	8	10.8	4	12.1	5.4	13.6	4.6	12.8	9.6	7.6	12.8	7
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	7.01	7.06	7.36	7.23	7.29	7.35	7.42	7.3	8.38	7.61	7.98	7.89
Field Conductivity	µS/cm	-		-	NV	990	700	760	830	686	892	920	687	367	450	370	377

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Overburden Ground Water Quality Data

PARAMETER	UNITS	ODWQS		RUP	PWQO	201 18-Oct-21	201 20-Apr-22	201 12-Oct-22	201 19-Apr-23	DUP 201 19-Apr-23	201 12-Oct-23
Alkalinity	mg/L	500	OG	349	NV	224	210	228	211	213	225
Conductivity	µS/cm	-		-	NV	463	458	461	452	458	444
pH	pH Units	6.5-8.5	OG	-	6.5 - 8.5	7.94	7.86	7.82	8.02	8.01	7.44
TDS	mg/L	500	AO	368	NV	267	240	260	244	243	229
DOC	mg/L	5		3.5	NV	2.1	1.8	2.3	1.2	1.3	3.4
COD	mg/L	-		-	NV	9	9	46	46	36	10
Phenols	mg/L	-		-	0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	<0.001
Chloride	mg/L	250	AO	131	NV	12.4	7	7.3	7.4	7.4	7.9
Ammonia, total	mg/L	-		-	NV	0.06	1.54	0.06	< 0.01	0.75	1.85
Unionized Ammonia	mg/L	-		-	0.02	< 0.01	0.03	< 0.01	< 0.01	0.02	0.04
Fluoride	mg/L	2.4	MAC	0.7	NV	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1
Sulphate	mg/L	500	AO	255	NV	14	11	11	19	39	11
Nitrite (N)	mg/L	1	MAC	0.3	NV	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5	<0.05
Nitrate (N)	mg/L	10	MAC	4.0	NV	1.45	1.53	1.79	< 0.5	< 0.5	<0.05
Bromide	mg/L	-		-	NV						
TKN	mg/L	-		-	NV	0.7	2	0.5	0.5	1.3	2
Hardness	mg/L	500	OG	361	NV	264	237	257	247	242	229
Aluminum	mg/L	0.1	OG	0.07	0.075	0.06	0.03	0.05	0.05	0.05	0.02
Antimony	mg/L	0.006	IMAC	0.002	0.02	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001
Arsenic	mg/L	0.025	IMAC	0.006	0.005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001
Barium	mg/L	1	MAC	0.3	NV	0.065	0.061	0.065	0.063	0.06	0.059
Beryllium	mg/L	-		-	1.1	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001
Boron	mg/L	5	IMAC	1.3	0.2	0.037	0.023	0.057	0.054	0.048	0.068
Cadmium	mg/L	0.005	MAC	0.001	0.0005	< 0.000015	< 0.000015	< 0.000010	< 0.000010	< 0.000010	<0.000015
Calcium	mg/L	-		-	NV	88.8	78.9	86.5	82.2	80.2	76.3
Chromium	mg/L	0.05	MAC	0.013	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001
Chromium (VI)	mg/L			-			< 0.001	< 0.001	< 0.001	< 0.001	<0.01
Cobalt	mg/L	-		-	0.0009	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.0003
Copper	mg/L	1	AO	0.5	0.005	0.0013	0.0032	0.0014	0.0009	0.0007	0.0014
Iron	mg/L	0.3	AO	0.16	0.3	0.022	< 0.005	0.031	< 0.005	< 0.005	<0.005
Lead	mg/L	0.01	MAC	0.003	0.005	< 0.00002	0.00003	0.00006	< 0.00002	< 0.00002	<0.00002
Magnesium	mg/L	-		-	NV	10.1	9.57	9.95	10.1	10	9.32
Manganese	mg/L	0.05	AO	0.03	NV	0.002	< 0.001	0.005	< 0.001	< 0.001	<0.001
Mercury	mg/L	0.001	MAC	0.0003	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002
Molybdenum	mg/L	-		-	0.04	0.0001	0.0002	0.0001	0.0001	0.0001	0.0001
Nickel	mg/L	-		-	0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.0004
Potassium	mg/L	-		-	NV	1.3	1.2	1.3	1.2	1.1	1.5
Phosphorus-Total	mg/L	-		-	0.03	1.93	3.5	1.36	1.49	1.69	1.26
Selenium	mg/L	0.01	MAC	0.003	0.1	< 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	<0.0001
Sodium	mg/L	200	AO	105	NV	5.4	4.2	6.6	5.5	5.4	5.9
Strontium	mg/L	-		-	NV	0.143	0.134	0.14	0.133	0.132	0.14
Thallium	mg/L	-		-	0.0003	< 0.00005	< 0.00005	< 0.005	< 0.00005	< 0.00005	<0.00005
Vanadium	mg/L	-		-	0.006	0.0003	0.0003	0.0003	< 0.0004	0.0003	0.0003
Zinc	mg/L	5	AO	2.5	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005
TSS	mg/L	-	-	-	NV						
Cyanide (Total)	mg/L	0.2	MAC	0.05	0.005						
BOD(5 day)	mg/L	-	-	-	NV						
Field Temperature	°C	-	AO	-	NV	11	7.9	14	9.9	9.9	13.1
Field pH	pH Units	6.5-8.5	OG	-	6.5-8.5	8.3	8.04	7.63	8.06	8.06	7.99
Field Conductivity	µS/cm	-		-	NV	452	450	555	403	403	422

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bold / Underlined for PWQO exceeded parameters

Bold / Red / Italics for RUP exceeded parameters

Bedrock Ground Water Quality Data

PARAMETER	UNITS	ODWQS		10-I 13-May-08	10-I 16-Aug-08	10-I 5-Jun-09	10-I 4-Aug-09	10-I 6-Oct-09	10-I 10-Jun-10	10-I 12-Oct-10	10-I 12-May-11	10-I 8-Nov-11	10-I 19-Apr-12	10-I 29-Oct-12	10-I 3-Jun-13
Alkalinity	mg/L	500	OG	232	251.08	230	240	235	238	243	228	245	250	250	235
Conductivity	µS/cm	-		3300	1840	2400	1460	1470	2600	791	2000	1590	4200	6300	4420
pH	pH Units	6.5-8.5	OG	7.16	7.54	7.68	7.71	7.46	7.68	7.66	7.86	7.88	7.71	7.61	7.5
TDS	mg/L	500	AO	**2150**	**1200**	**1560**	**949**	**953**	**1690**	**514**	**1030**	**835**	**1870**	**3180**	**1950**
DOC	mg/L	5		<1	1.2	3	1	1	< 1	< 1	1	1	0.8	1.8	1.9
COD	mg/L	-		6	4	1	< 2	9	11	2	22	25	23	90	29
Phenols	mg/L	-		0.002	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	<0.0010	0.013	< 0.001
Chloride	mg/L	250	AO	**1080**	**476**	**659**	**360**	**343**	**869**	156	**450**	**330**	**1100**	**1900**	**1120**
Ammonia, total	mg/L	-		0.2	0.99	1.48	0.88	0.49	1.71	0.54	1.8	1	2.3	4.1	1.46
Unionized Ammonia	mg/L	-													
Fluoride	mg/L	2.4	MAC	0.4	0.6	0.4	0.4	0.4	0.3	0.5	0.5	0.5	0.45	0.44	0.5
Sulphate	mg/L	500	AO	21	24	20	24	25	24	21	22	21	26	19	20
Nitrite (N)	mg/L	1	MAC	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.14	0.08	0.15	0.52	< 0.1
Nitrate (N)	mg/L	10	MAC	<0.1	<0.1	< 0.1	0.5	< 0.1	1.2	< 0.1	0.9	0.9	0.18	0.31	0.3
Bromide	mg/L	-		-	-	-	-	-	< 0.1	-	5	3	12	25	9.8
TKN	mg/L	-		2	1.4	1.7	1.1	0.6	2.1	0.7	2.1	2.1	3	5.3	1.91
Hardness	mg/L	500	OG	**790**	**460**	**552**	**416**	**658**	**640**	**472**	**520**	**450**	**570**	**1100**	**664**
Aluminum	mg/L	0.1	OG	0.04	<0.01	0.01	< 0.01	< 0.01	< 0.01	0.04	0.011	<0.005	<0.0050	<0.025	**0.14**
Antimony	mg/L	0.006	IMAC	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	<0.0005	0.0011	<0.0025	< 0.0001
Arsenic	mg/L	0.025	IMAC	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.005	<0.001	<0.001	<0.0010	<0.0050	0.0042
Barium	mg/L	1	MAC	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.06	0.045	0.084	0.18	0.09
Beryllium	mg/L	-		<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.005	<0.0005	<0.00050	<0.0025	< 0.002
Boron	mg/L	5	IMAC	0.4	0.231	0.2	0.2	0.1	0.3	< 0.1	0.24	0.26	0.3	0.4	0.268
Cadmium	mg/L	0.005	MAC	<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00050	< 0.00002
Calcium	mg/L	-		187	116	137	104	201	159	120	130	110	140	250	153
Chromium	mg/L	0.05	MAC	0.0003	0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	0.0002	<0.005	<0.005	<0.0050	-	0.004
Chromium (VI)	mg/L														
Cobalt	mg/L	-		0.0004	<0.0003	< 0.0003	< 0.0003	0.0003	< 0.0003	< 0.0003	<0.0005	<0.0005	<0.00050	<0.0025	< 0.0001
Copper	mg/L	1	AO	0.0003	0.0003	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0005	<0.001	0.001	<0.0010	<0.0050	0.0005
Iron	mg/L	0.3	AO	0.2	<0.1	0.1	< 0.1	0.2	0.1	< 0.1	<0.1	<0.1	<0.10	**1.3**	0.05
Lead	mg/L	0.01	MAC	0.002	0.001267	0.001	0.002	< 0.001	< 0.001	< 0.001	0.0006	<0.0005	<0.00050	<0.0025	0.00003
Magnesium	mg/L	-		79	41	51	38	38	59	42	48	43	56	120	68.6
Manganese	mg/L	0.05	AO	0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.007	0.007	0.008	0.014	0.001
Mercury	mg/L	0.001	MAC	<0.00002	<0.00005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00001	-	<0.00001	<0.00001	< 0.00002
Molybdenum	mg/L	-		<0.002	<0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.001	<0.001	<0.00050	<0.0025	0.0002
Nickel	mg/L	-		<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.001	<0.001	<0.0010	<0.0050	< 0.01
Potassium	mg/L	-		16.8	13.4	12.6	10.7	7	16	7	11	9.6	14	22	13.5
Phosphorus-Total	mg/L	-		<0.01	0.11	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	0.22	-	<0.10	0.11	0.26
Selenium	mg/L	0.01	MAC	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.002	<0.002	<0.0020	<0.010	< 0.01
Silver	mg/L	-		0.0002	0.000117	0.0001	< 0.0001	< 0.0001	0.0004	< 0.0001	<0.0001	0.0002	<0.00010	<0.00050	< 0.00002
Sodium	mg/L	200	AO	**357**	**203**	**229**	128	41	**327**	21	**210**	160	**350**	**730**	**429**
Strontium	mg/L	-		5.94	2.99	3.81	2.08	1.21	4.92	1.09	3.7	2.5	5.1	12	-
Thallium	mg/L	-		<0.0003	<0.0003	< 0.0003	< 0.0003	< 0.0003	0.0003	< 0.0003	0.00005	<0.00005	<0.000050	<0.00025	< 0.00005
Vanadium	mg/L	-		<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	0.0012	<0.00050	0.0033	0.0029
Zinc	mg/L	5	AO	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	<0.005	0.011	0.0074	<0.025	< 0.005
TSS	mg/L	-	-												
Cyanide (Total)	mg/L	0.2	MAC												
BOD(5 day)	mg/L	-	-												
Field Temperature	°C	-	AO	-	-	-	-	-	-	-	-	-	9.5	9.5	7.9
Field pH	pH Units	6.5-8.5	OG	-	-	-	-	-	-	-	-	-	7.29	7.3	7.88
Field Conductivity	µS/cm	-		-	-	-	-	-	-	-	-	-	2400	1670	889

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bedrock Ground Water Quality Data

PARAMETER	UNITS	ODWQS		10-I 29-Oct-13	10-I 1-May-14	10-I 24-Sep-14	10-I 27-Apr-15	10-I 5-Oct-15	10-I 25-Apr-16	10-I 19-Oct-16	10-I 12-Apr-17	10-I 6-Oct-17	10-I 10-Apr-18	10-I 1-Oct-18	10-I 22-Apr-19
Alkalinity	mg/L	500	OG	256	250	258	227	270	256	253	239	261	247	271	256
Conductivity	µS/cm	-		2860	3070	1980	8540	3500	1880	3850	1440	2590	1630	2350	3330
pH	pH Units	6.5-8.5	OG	7.73	7.7	7.82	7.42	7.69	7.77	7.73	7.71	7.66	7.91	7.81	7.78
TDS	mg/L	500	AO	**2320**	**1710**	**1670**	**1890**	**1760**	**726**	**1370**	**1180**	**1700**	**818**	**1189**	**1713**
DOC	mg/L	5		-	1.4	2.3	1.4	< 0.2	0.2	0.5	0.6	0.3	1.6	1.5	1.7
COD	mg/L	-		35	< 5	29	13	< 5	< 5	30	< 5	14	20	9	14
Phenols	mg/L	-		0.015	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.013	0.072	0.012	< 0.001	< 0.01	< 0.002
Chloride	mg/L	250	AO	**1310**	**888**	**882**	**1060**	**928**	**280**	**717**	**572**	**818**	**319**	**527**	**916**
Ammonia, total	mg/L	-		4.54	1.27	0.87	0.51	0.7	0.69	1.19	1.88	2.17	1.8	2.56	0.94
Unionized Ammonia	mg/L	-													< 0.01
Fluoride	mg/L	2.4	MAC	0.3	0.4	0.5	0.4	0.5	0.4	0.5	< 0.5	< 1	0.2	0.2	< 0.5
Sulphate	mg/L	500	AO	19	22	22	21	23	22	26	19	16	14	21	19
Nitrite (N)	mg/L	1	MAC	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	**1.4**	< 0.5	< 0.05	0.42	< 0.3
Nitrate (N)	mg/L	10	MAC	0.2	0.2	0.7	0.5	0.2	0.4	0.3	1	< 0.5	0.13	0.17	< 0.3
Bromide	mg/L	-		14.7	9.4	10.5	11.6	10.8	3						
TKN	mg/L	-		4.6	1.5	1.3	0.8	1.1	1	1.5	2.3	2.3	2.2	3	1.3
Hardness	mg/L	500	OG	**851**	**643**	**625**	**695**	**612**	377	**504**	492	**681**	373	**507**	**576**
Aluminum	mg/L	0.1	OG	0.07	0.03	**0.15**	0.05	**0.2**	0.03	0.04	0.07	0.08	**0.12**	0.06	0.08
Antimony	mg/L	0.006	IMAC	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0002	0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	**0.0271**	0.0074	0.0021	0.0002	0.0006	0.0004	0.0003	0.0005	0.0062	0.0001	0.0002	< 0.0001
Barium	mg/L	1	MAC	0.22	0.07	0.07	0.07	0.08	0.03	0.06	0.07	0.12	0.042	0.072	0.098
Beryllium	mg/L	-		< 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	mg/L	5	IMAC	0.508	0.196	0.284	0.223	0.332	0.111	0.27	0.062	0.372	0.153	0.252	0.27
Cadmium	mg/L	0.005	MAC	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015
Calcium	mg/L	-		193	151	150	164	141	92.6	112	137	153	97.5	124	139
Chromium	mg/L	0.05	MAC	0.006	0.007	0.007	0.024	0.003	< 0.0002	0.001	0.002	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (VI)	mg/L														
Cobalt	mg/L	-		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.008	< 0.005	< 0.005
Copper	mg/L	1	AO	0.0042	0.0022	0.0014	0.0012	0.0012	0.0004	0.0006	0.0014	0.0032	0.0008	0.0007	0.0012
Iron	mg/L	0.3	AO	**1.74**	0.12	0.05	0.02	0.16	0.12	< 0.005	0.05	**0.66**	0.043	0.007	< 0.005
Lead	mg/L	0.01	MAC	< 0.00002	0.00004	< 0.00002	0.00007	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Magnesium	mg/L	-		89.7	64.6	61.1	69	63.4	35.4	54.1	36.3	72.6	31.4	47.9	55.7
Manganese	mg/L	0.05	AO	0.013	0.006	< 0.001	0	< 0.001	0	< 0.001	0	0.01	< 0.001	< 0.001	< 0.001
Mercury	mg/L	0.001	MAC	< 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	mg/L	-		0.0002	0.0003	0.0002	0.0005	0.0001	0.0002	0.0001	0.0006	0.0003	< 0.0001	0.0003	0.0002
Nickel	mg/L	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		17.9	14.8	14	12.4	14.8	7.3	11.6	9	17.1	8.4	12.5	14.9
Phosphorus-Total	mg/L	-		0.07	0.04	0.18	0.11	0.16	0.16	0.09	0.13	0.11	0.13	0.1	0.11
Selenium	mg/L	0.01	MAC	**0.014**	< 0.001	0.004	0.002	0.004	< 0.001	0.006	< 0.001	0.005	0.002	0.004	0.003
Silver	mg/L	-		< 0.00002	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	**534**	**416**	**381**	**429**	**426**	132	**292**	**251**	**463**	197	**291**	**414**
Strontium	mg/L	-		-	-	6.15	6.78	6.99	1.28	4.63	0.98	6.85	2.4	3.93	5.55
Thallium	mg/L	-		< 0.00005	0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		0.0014	0.0024	0.005	0.002	0.001	0.0009	0.0009	0.0012	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Zinc	mg/L	5	AO	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-												
Cyanide (Total)	mg/L	0.2	MAC												
BOD(5 day)	mg/L	-	-												
Field Temperature	°C	-	AO	8.5	12.5	6.2	5.7	10.9	5.8	12	6.4	11.4			9.6
Field pH	pH Units	6.5-8.5	OG	6.89	7.62	7.87	7.99	7.44	7.85	7.72	7.82	7.85	7.91	7.81	7.56
Field Conductivity	µS/cm	-		870	1350	2600	1130	795	625	860	827	3045	1540	2200	3360

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bedrock Ground Water Quality Data

				10-I	10-I	10-I	10-I	10-I	10-I	10-I	10-I	10-I	10-I	11-I	11-I
PARAMETER	UNITS	ODWQS		8-Oct-19	13-Apr-20	15-Oct-20	21-Apr-21	18-Oct-21	20-Apr-22	12-Oct-22	19-Apr-23	19-Apr-23	12-Oct-23	13-May-08	5-Jun-09
												DUP			
Alkalinity	mg/L	500	OG	255	230	264	248	276	244	268	246	238	289	284	246
Conductivity	µS/cm	-		2680	1050	1570	7820	2040	1350	2930	3410	3770	1720	924	820
pH	pH Units	6.5-8.5	OG	7.8	7.85	7.76	7.69	7.68	7.47	7.75	7.76	7.9	7.37	7.61	8.02
TDS	mg/L	500	AO	**1549**	481	**835**	**4315**	**1167**	**654**	**1532**	**1771**	**1920**	**942**	**601**	**533**
DOC	mg/L	5		2.3	1.4	0.2	1.7	1.9	1.4	0.4	< 0.2	< 0.2	2.6	1	3
COD	mg/L	-		< 5	10	< 5	53	11	10	< 5	42	39	<5	3	1
Phenols	mg/L	-		< 0.002	0.003	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	< 0.001
Chloride	mg/L	250	AO	**815**	169	**341**	**2640**	**543**	**254**	**795**	**994**	**1070**	**370**	130	116
Ammonia, total	mg/L	-		0.6	0.43	0.55	5.03	0.55	1.9	0.55	2.5	2.45	0.68	0	0.38
Unionized Ammonia	mg/L	-		< 0.01	< 0.01	< 0.01		< 0.01	0.02	< 0.01	0.04	0.04	<0.01		
Fluoride	mg/L	2.4	MAC	< 1	< 0.1	0.1	< 1	0.3	< 0.1	1.4	< 1	< 1	0.2	1	0.4
Sulphate	mg/L	500	AO	< 10	23	18	15	22	20	22	14	< 10	16	26	22
Nitrite (N)	mg/L	1	MAC	< 0.5	< 0.05	< 0.05	< 0.5	0.11	< 0.05	< 0.3	< 0.05	< 0.5	0.05	<0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	< 0.5	0.18	0.19	< 0.5	0.09	0.26	< 0.3	1.58	< 0.5	<0.05	2.3	0.9
Bromide	mg/L	-												-	-
TKN	mg/L	-		0.8	0.6	0.8	7.2	0.7	2	0.9	3.7	3	0.9	0.3	0.7
Hardness	mg/L	500	OG	**530**	320	495	**1230**	480	337	389	314	**515**	415	117	121
Aluminum	mg/L	0.1	OG	0.08	0.05	0.05	0.07	0.02	0.02	0.04	0.05	0.05	0.07	0.04	0.02
Antimony	mg/L	0.006	IMAC	< 0.0002	< 0.0001	< 0.0001	0.0004	< 0.0001	< 0.0001	< 0.0001	0.0002	0.0002	<0.0001	<0.01	< 0.01
Arsenic	mg/L	0.025	IMAC	< 0.0005	< 0.0001	0.0002	< 0.0005	< 0.0003	< 0.0001	< 0.0003	< 0.0003	< 0.0003	0.0003	<0.01	< 0.01
Barium	mg/L	1	MAC	0.082	0.027	0.064	0.239	0.072	0.047	0.101	0.029	0.083	0.062	<0.1	< 0.1
Beryllium	mg/L	-		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	<0.1	< 0.1
Boron	mg/L	5	IMAC	0.36	0.139	0.211	0.54	0.285	0.174	0.336	0.189	0.29	0.246	0.724	0.3
Cadmium	mg/L	0.005	MAC	< 0.000059	< 0.000015	< 0.000015	< 0.000059	< 0.000029	< 0.000015	< 0.000029	< 0.000029	< 0.000029	<0.000015	<0.0001	< 0.0001
Calcium	mg/L	-		118	76.1	132	267	118	81.9	127	128	113	102	25	27
Chromium	mg/L	0.05	MAC	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	0.0004	0.0002
Chromium (VI)	mg/L								< 0.001	< 0.001	< 0.001	< 0.001	<0.01		
Cobalt	mg/L	-		< 0.005	< 0.0001	< 0.005	0.006	0.006	< 0.005	< 0.005	< 0.005	< 0.005	0.0002	<0.0003	< 0.0003
Copper	mg/L	1	AO	0.0004	0.0014	0.0003	0.0012	0.0003	0.0007	0.0004	0.0003	< 0.0002	0.0009	0.0012	0.0007
Iron	mg/L	0.3	AO	< 0.005	0.014	0.093	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	0.1	< 0.1
Lead	mg/L	0.01	MAC	< 0.0002	0.00003	< 0.00004	0.00028	< 0.00009	0.00003	< 0.00009	< 0.00009	< 0.00009	0.00003	0.002	< 0.001
Magnesium	mg/L	-		57.2	31.6	40	136	45	32.1	56.3	33.1	56.6	39	13	13
Manganese	mg/L	0.05	AO	< 0.001	0.002	0.006	0.008	< 0.001	< 0.001	0.001	0.001	0.001	<0.001	<0.01	0.01
Mercury	mg/L	0.001	MAC	< 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	mg/L	-		< 0.0004	0.0002	0.0002	0.0005	0.0003	0.0001	< 0.0002	< 0.0002	0.0003	0.0001	0.005	< 0.002
Nickel	mg/L	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.0002	<0.01	< 0.01
Potassium	mg/L	-		16.5	5.5	8.6	31.7	12.1	6.8	13.6	14.8	11	9.6	7.6	7.2
Phosphorus-Total	mg/L	-		0.1	0.05	0.05	1.47	0.08	0.19	0.11	0.1	0.11	0.08	<0.01	< 0.01
Selenium	mg/L	0.01	MAC	0.003	0.002	0.004	<0.02	0.004	0.002	0.004	< 0.001	<0.02	0.002	<0.01	< 0.01
Silver	mg/L	-		< 0.0002	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0003	<0.0001	0.0001	< 0.0001
Sodium	mg/L	200	AO	**388**	37.4	137	**1070**	**260**	110	**356**	18.6	**245**	161	162	130
Strontium	mg/L	-		5.07	1.21	2.34	16.6	3.49	1.81	4.95	1.03	4.21	2.58	1.83	0.991
Thallium	mg/L	-		< 0.00005	< 0.00005	< 0.00005	0.00009	< 0.00005	< 0.00005	< 0.005	< 0.00005	< 0.00005	<0.00005	<0.0003	< 0.0003
Vanadium	mg/L	-		< 0.0007	< 0.0001	< 0.0001	< 0.0007	< 0.0004	< 0.0001	< 0.0004	0.0001	< 0.0004	<0.0001	<0.001	< 0.001
Zinc	mg/L	5	AO	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	<0.01	< 0.01
TSS	mg/L	-	-												
Cyanide (Total)	mg/L	0.2	MAC												
BOD(5 day)	mg/L	-	-												
Field Temperature	°C	-	AO	10.4	6.4	10.9	5.6	10.2	7.8	11.8	4.9	4.9	11.8	-	-
Field pH	pH Units	6.5-8.5	OG	7.71	7.81	7.96	7.49	7.68	7.75	7.43	8.08	8.08	7.53	-	-
Field Conductivity	µS/cm	-		630	1800	960	1038	2471	1200	2793	712	712	693	-	-

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bedrock Ground Water Quality Data

PARAMETER	UNITS	ODWQS		11-I 4-Aug-09	11-I 10-Jun-10	11-I 12-May-11	11-I 8-Nov-11	11-I 29-Oct-12	11-I 3-Jun-13	11-I 29-Oct-13	11-I 1-May-14	11-I 24-Sep-14	11-I 27-Apr-15	11-I 5-Oct-15	11-I 25-Apr-16
Alkalinity	mg/L	500	OG	210	224	232	286	270	222	251	209	209	218	202	224
Conductivity	µS/cm	-		452	655	661	616	940	640	1080	521	521	744	443	680
pH	pH Units	6.5-8.5	OG	7.82	8.2	8.1	7.56	8.02	8.14	8.15	8.16	8.16	8.14	8.08	8.06
TDS	mg/L	500	AO	294	426	369	**515**	**529**	457	**618**	**520**	**520**	264	362	350
DOC	mg/L	5		1	1	1.3	1.4	1	2.3	-	2.2	2.2	1.6	0.3	0.6
COD	mg/L	-		< 2	13	22	27	9.6	80	18	12	12	< 5	7	115
Phenols	mg/L	-		< 0.001	< 0.001	<0.001	<0.001	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Chloride	mg/L	250	AO	18	100	48	130	110	132	193	176	176	21	86	47
Ammonia, total	mg/L	-		0.11	0.38	0.6	2	0.62	0.33	0.4	0.1	0.1	0.15	0.04	0.43
Unionized Ammonia	mg/L	-													
Fluoride	mg/L	2.4	MAC	0.2	0.4	0.3	0.5	0.45	0.4	0.5	0.3	0.3	0.2	0.2	0.2
Sulphate	mg/L	500	AO	15	20	23	33	30	26	27	17	17	13	13	13
Nitrite (N)	mg/L	1	MAC	< 0.1	< 0.1	<0.01	<0.01	0.014	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	1.1	0.9	1.1	2	2	0.9	1	1.1	1.1	1.5	1.1	1.3
Bromide	mg/L	-		-	1	<1	2	1.3	1.8	2.3	2.1	2.1	< 0.4	0.9	0.5
TKN	mg/L	-		0.2	0.7	1.3	1	1.2	0.49	0.7	0.3	0.3	0.5	0.3	0.6
Hardness	mg/L	500	OG	174	148	130	140	150	123	117	178	178	204	180	174
Aluminum	mg/L	0.1	OG	< 0.01	< 0.01	<5	<0.005	<0.0050	**2.53**	0.02	**0.66**	**0.66**	0.02	**1.48**	0.01
Antimony	mg/L	0.006	IMAC	< 0.01	< 0.01	**0.5**	0.0009	<0.00050	0.0006	0.0003	0.0013	0.0013	0.0004	0.0003	0.0003
Arsenic	mg/L	0.025	IMAC	< 0.01	< 0.005	0.002	0.001	<0.0010	0.0017	0.0028	0.0027	0.0027	0.0006	0.0004	0.0008
Barium	mg/L	1	MAC	< 0.1	< 0.1	0	0.045	0.042	0.03	0.04	0.03	0.03	0.05	0.04	0.05
Beryllium	mg/L	-		< 0.1	< 0.1	<0.5	<0.0005	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	5	IMAC	< 0.1	0.2	0.19	0.24	0.29	0.198	0.156	0.213	0.213	0.034	0.117	0.147
Cadmium	mg/L	0.005	MAC	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	0.00004	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Calcium	mg/L	-		50	38	30	31	33	25.2	22.8	44	44	60.7	50.9	45.8
Chromium	mg/L	0.05	MAC	0.0002	0.0002	<0.005	<0.005	-	0.001	0.035	0.002	0.002	0.001	0.002	< 0.0002
Chromium (VI)	mg/L														
Cobalt	mg/L	-		< 0.0003	0.0005	<0.5	<0.0005	<0.00050	< 0.0001	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Copper	mg/L	1	AO	0.0008	0.0005	<1	<0.001	<0.0010	0.0005	0.0014	0.0013	0.0013	0.0012	0.0014	0.0009
Iron	mg/L	0.3	AO	< 0.1	0.2	<100	<0.1	<0.10	**0.69**	< 0.005	0.2	0.2	< 0.005	**0.42**	< 0.005
Lead	mg/L	0.01	MAC	< 0.001	< 0.001	<0.5	<0.0005	<0.00050	0.00003	< 0.00002	< 0.00002	< 0.00002	0.00006	0.00012	0.00004
Magnesium	mg/L	-		12	13	14	14	17	14.6	14.7	16.5	16.5	12.8	12.7	14.5
Manganese	mg/L	0.05	AO	< 0.01	0.01	0.004	0.005	0.0065	0	0.003	0.003	0.003	0.002	0.001	< 0.001
Mercury	mg/L	0.001	MAC	< 0.00002	< 0.00002	< 0.00002	-	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00005
Molybdenum	mg/L	-		< 0.002	< 0.002	0.002	0.0021	0.002	0.0011	< 0.0001	0.0005	0.0005	0.0006	0.0003	0.001
Nickel	mg/L	-		< 0.01	< 0.01	0	0.001	<0.0010	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		3.4	5.2	6	6.4	7.1	6.1	7.7	5.7	5.7	2.2	3.3	5.1
Phosphorus-Total	mg/L	-		< 0.01	< 0.01	0.26	0.19	0.055	0.15	0.14	0.12	0.12	0.2	0.07	0.78
Selenium	mg/L	0.01	MAC	< 0.01	< 0.01	<0.002	<0.002	<0.0020	< 0.001	< 0.01	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Silver	mg/L	-		< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Sodium	mg/L	200	AO	33	91	90	110	150	116	197	130	130	17	69	84
Strontium	mg/L	-		0.68	0.989	0.96	1.1	1.2	-	-	1.29	1.29	0.69	0.76	1.02
Thallium	mg/L	-		< 0.0003	< 0.0003	<0.00005	<0.00005	<0.000050	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		< 0.001	< 0.001	<0.001	<0.0005	<0.00050	0.0022	0.0107	0.0044	0.0044	0.0015	0.0008	0.0009
Zinc	mg/L	5	AO	< 0.01	< 0.01	< 0.01	< 0.01	0.016	< 0.005	0.01	< 0.005	< 0.005	0.02	< 0.005	0.01
TSS	mg/L	-	-												
Cyanide (Total)	mg/L	0.2	MAC												
BOD(5 day)	mg/L	-	-												
Field Temperature	°C	-	AO	-	-	-	-	6.9	8.2	7	7.3	7	9.3	9.3	4.9
Field pH	pH Units	6.5-8.5	OG	-	-	-	-	7.61	7.11	7.89	8.34	8.34	8.38	7.92	8.28
Field Conductivity	µS/cm	-		-	-	-	-	1220	1029	660	490	610	520	415	585

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bedrock Ground Water Quality Data

PARAMETER	UNITS	ODWQS		11-I 19-Oct-16	11-I 12-Apr-17	11-I 6-Oct-17	11-I 10-Apr-18	11-I 1-Oct-18	11-I 22-Apr-19	11-I 8-Oct-19	11-I 13-Apr-20	11-I 15-Oct-20	11-I 21-Apr-21	11-I 18-Oct-21	11-I 20-Apr-22
Alkalinity	mg/L	500	OG	215	213	218	205	213	250	221	204	199	201	203	202
Conductivity	µS/cm	-		687	592	740	545	596	1060	833	638	490	471	434	551
pH	pH Units	6.5-8.5	OG	8.07	8.08	7.98	8.12	7.89	8.12	8.01	8.03	7.89	8.04	7.88	7.58
TDS	mg/L	500	AO	318	266	344	279	316	**558**	472	337	255	244	246	276
DOC	mg/L	5		1.1	**7.7**	1.2	1.7	1.4	1.5	1.9	1.5	2.5	3.1	2.4	1.7
COD	mg/L	-		5	< 5	19	32	6	16	< 5	6	< 5	12	10	9
Phenols	mg/L	-		0.014	0.004	0.003	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001
Chloride	mg/L	250	AO	46	27	62	34.7	44	183	140	61	22.7	16	14.1	35.7
Ammonia, total	mg/L	-		0.24	0.41	0.74	0.52	0.17	0.61	0.14	0.21	0.09	0.28	0.04	1.21
Unionized Ammonia	mg/L	-							< 0.01	< 0.01	< 0.01	< 0.01		< 0.01	0.02
Fluoride	mg/L	2.4	MAC	0.2	0.1	0.1	< 0.1	0.1	0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sulphate	mg/L	500	AO	13	13	10	11	15	14	10	13	13	12	13	12
Nitrite (N)	mg/L	1	MAC	< 0.1	0.3	< 0.05	0.08	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	10	MAC	1.5	1.6	1.7	1.64	1.65	0.44	0.66	1.02	1.57	1.73	2.05	1.7
Bromide	mg/L	-													
TKN	mg/L	-		0.4	0.6	0.8	1.1	0.3	0.9	0.3	0.5	0.4	0.5	0.3	1.4
Hardness	mg/L	500	OG	229	219	189	160	190	142	179	165	220	207	211	199
Aluminum	mg/L	0.1	OG	0.02	0.05	**0.66**	0.03	**0.19**	0.02	0.03	0.02	0.02	0.04	0.04	0.01
Antimony	mg/L	0.006	IMAC	0.0006	0.0002	0.0005	0.0003	0.0004	0.0004	0.0002	0.0003	0.0006	0.0004	0.0003	0.0003
Arsenic	mg/L	0.025	IMAC	0.0008	0.0003	0.0012	0.0008	0.0007	0.0005	0.0004	0.0005	0.0005	0.0006	0.0005	0.0005
Barium	mg/L	1	MAC	0.06	0.07	0.05	0.035	0.043	0.041	0.048	0.046	0.051	0.046	0.049	0.048
Beryllium	mg/L	-		< 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	mg/L	5	IMAC	0.065	0.025	0.121	0.094	0.098	0.261	0.223	0.168	0.04	0.042	0.043	0.075
Cadmium	mg/L	0.005	MAC	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015
Calcium	mg/L	-		69.4	68.3	52.9	41.6	54.4	34.3	46.4	42.9	65.8	61.4	62.7	56.1
Chromium	mg/L	0.05	MAC	0.001	0.002	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001
Chromium (VI)	mg/L														< 0.001
Cobalt	mg/L	-		< 0.005	< 0.005	< 0.005	0.016	0.013	< 0.005	< 0.005	0.0001	< 0.005	< 0.005	< 0.005	< 0.005
Copper	mg/L	1	AO	0.0005	0.0034	0.0015	0.0013	0.0008	0.0008	0.0005	0.0021	0.0008	0.0012	0.0006	0.0009
Iron	mg/L	0.3	AO	< 0.005	0.01	0.17	< 0.005	0.05	< 0.005	< 0.005	0.009	< 0.005	< 0.005	< 0.005	0.009
Lead	mg/L	0.01	MAC	0.00008	0.00004	0.00016	0.00415	0.00165	0.00005	0.00007	0.0001	< 0.00002	0.00006	0.00003	0.00004
Magnesium	mg/L	-		13.6	11.8	13.9	13.6	13.1	13.8	15.3	14.1	13.5	13	13.1	14.4
Manganese	mg/L	0.05	AO	0.007	< 0.001	0.001	< 0.001	< 0.001	0.008	0.004	0.008	< 0.001	< 0.001	0.001	< 0.001
Mercury	mg/L	0.001	MAC	< 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	mg/L	-		0.0004	0.0002	0.0011	0.0001	0.0009	0.0007	0.0003	0.0007	0.0004	0.0003	0.0003	0.0005
Nickel	mg/L	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		2.5	1.7	4.2	3.9	3.9	7.3	6.4	5.3	2.6	2.5	2.5	3.1
Phosphorus-Total	mg/L	-		0.29	0.21	0.36	0.83	0.15	0.53	0.12	0.18	0.06	0.07	0.03	0.44
Selenium	mg/L	0.01	MAC	0	< 0.001	0	0.003	0.002	0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	0.001
Silver	mg/L	-		< 0.00002	< 0.00002	< 0.00002	0.00005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	38	8	68	50.2	57.1	155	121	77.2	18.1	18.6	18.3	32.5
Strontium	mg/L	-		0.72	0.44	0.8	0.755	0.73	0.985	1.06	0.961	0.585	0.642	0.643	0.801
Thallium	mg/L	-		< 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	mg/L	-		0.0007	0.0009	0.0008	0.0003	0.0002	0.0001	0.0001	0.0001	0.0002	0.0002	< 0.0001	0.0002
Zinc	mg/L	5	AO	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-												
Cyanide (Total)	mg/L	0.2	MAC												
BOD(5 day)	mg/L	-	-												
Field Temperature	°C	-	AO	12.1	5.6	11.1			8.7	12.1	7.1	12.3	7.2	9.4	5.7
Field pH	pH Units	6.5-8.5	OG	7.98	7.79	7.88	8.12	7.89	7.83	7.96	7.93	7.98	8.26	7.01	8.18
Field Conductivity	µS/cm	-		480	351	660	517	585	530	424	634	410	540	761	540

Shading indicates detection

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ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bedrock Ground Water Quality Data

PARAMETER	UNITS	ODWQS		11-I 12-Oct-22	11-I 19-Apr-23	11-I 12-Oct-23	13-I 6-May-08	13-I 18-Aug-08	13-I 27-May-09	13-I 4-Aug-09	13-I 10-Jun-10	13-I 12-Oct-10	13-I 12-May-11	13-I 8-Nov-11	13-I 19-Apr-12
Alkalinity	mg/L	500	OG	217	215	221	212.18	210	206	204	213	209	222	237	210
Conductivity	µS/cm	-		643	616	538	446	438	432	407	399	455	499	2100	460
pH	pH Units	6.5-8.5	OG	7.9	7.91	7.4	7.77	7.98	7.88	8.12	7.99	8.03	8.18	6.79	8.03
TDS	mg/L	500	AO	321	373	279	400	290	285	281	265	259	257	264	268
DOC	mg/L	5		< 0.2	1.3	3.6	<1	1.3	**7**	1	1	< 1	0.9	0.8	0.8
COD	mg/L	-		< 5	121	72	<2	3	1	< 2	8	6	14	<4	37
Phenols	mg/L	-		< 0.001	< 0.001	<0.001	0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	<0.0010
Chloride	mg/L	250	AO	55.3	55.2	31.5	40	10.6	12	12	11	11	10	16	11
Ammonia, total	mg/L	-		0.13	0.6	<0.05	0.5	0.32	0.16	0.05	0.15	0.36	0.21	<0.1	0.4
Unionized Ammonia	mg/L	-		< 0.01	0.01	<0.01									
Fluoride	mg/L	2.4	MAC	0.2	< 0.1	<0.1	1.8	0.2	0.3	0.2	0.2	0.3	0.2	0.7	0.31
Sulphate	mg/L	500	AO	10	10	12	10	18.4	19	20	21	19	18	15	18
Nitrite (N)	mg/L	1	MAC	< 0.05	< 0.05	<0.05	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	0	<0.01	<0.010
Nitrate (N)	mg/L	10	MAC	1.24	2.06	<0.05	<0.1	<0.1	0.4	< 0.1	< 0.1	0.2	0.3	<0.1	<0.10
Bromide	mg/L	-					-	-	< 0.1	-	< 0.1	-	< 0.1	< 0.1	<1.0
TKN	mg/L	-		0.2	2.4	0.3	1.8	0.4	0.3	0.2	0.4	2	0.6	1.4	1
Hardness	mg/L	500	OG	225	218	219	66	148	199	194	181	224	210	160	200
Aluminum	mg/L	0.1	OG	< 0.01	**0.11**	0.02	<0.01	<0.01	0.01	< 0.01	< 0.01	< 0.01	<0.005	<0.005	<0.0050
Antimony	mg/L	0.006	IMAC	0.0003	0.0005	0.0004	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	<0.005	<0.00050
Arsenic	mg/L	0.025	IMAC	0.0005	0.0004	0.0004	<0.01	<0.01	< 0.01	< 0.01	< 0.005	< 0.005	<0.001	<0.001	<0.0010
Barium	mg/L	1	MAC	0.06	0.069	0.063	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.08	0.067	0.069
Beryllium	mg/L	-		< 0.002	< 0.002	<0.0001	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.005	<0.005	<0.00050
Boron	mg/L	5	IMAC	0.089	0.219	0.057	0.8	0.106	0.1	< 0.1	0.1	< 0.1	0.087	0.2	0.13
Cadmium	mg/L	0.005	MAC	< 0.000010	< 0.000010	<0.000015	<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010
Calcium	mg/L	-		65.1	56.9	65.2	14	34.7	50	48	46	57	56	41	52
Chromium	mg/L	0.05	MAC	< 0.001	< 0.001	<0.001	0.0001	0.000168	0.0002	0.0001	0.0001	0.0002	<0.005	<0.005	<0.0050
Chromium (VI)	mg/L			< 0.001	< 0.001	<0.01									
Cobalt	mg/L	-		< 0.005	< 0.005	0.0002	<0.0003	0.000443	0.0003	< 0.0003	< 0.0003	0.0004	0.0005	<0.0005	<0.00050
Copper	mg/L	1	AO	0.0006	0.0015	0.0014	0.0016	0.000969	0.0003	< 0.0001	< 0.0001	0.0012	0.001	<0.001	<0.0010
Iron	mg/L	0.3	AO	< 0.005	0.076	0.037	<0.1	<0.1	< 0.1	< 0.1	< 0.1	0.2	<0.1	<0.1	<0.10
Lead	mg/L	0.01	MAC	0.00005	0.0004	0.00028	0.002	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.0005	<0.0005	<0.00050
Magnesium	mg/L	-		15.2	18.4	13.6	7	14.9	18	18	16	20	17	15	18
Manganese	mg/L	0.05	AO	0.001	0.02	0.003	0.01	**0.0532**	0.05	0.04	0.02	**0.09**	**0.09**	**0.063**	**0.099**
Mercury	mg/L	0.001	MAC	< 0.00002	< 0.00002	<0.00002	0.00002	<0.00002	0.00006	< 0.00002	< 0.00002	< 0.00002	0.00002	0.00002	<0.00001
Molybdenum	mg/L	-		0.0005	0.0011	0.0004	0.003	<0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.001	<0.0005	0.00052
Nickel	mg/L	-		< 0.01	< 0.01	0.0004	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.001	<0.001	<0.0010
Potassium	mg/L	-		3.4	6.8	3	5.5	2.63	2.4	2.4	2.4	2	2	2.8	2.9
Phosphorus-Total	mg/L	-		0.1	1.92	0.14	0.02	0.01	0.01	< 0.01	< 0.01	1.5	1.2	1.7	<0.10
Selenium	mg/L	0.01	MAC	0.001	0.003	<0.001	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.002	<0.002	<0.0020
Silver	mg/L	-		< 0.0001	< 0.0001	<0.0001	<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010
Sodium	mg/L	200	AO	41	93	28.2	117	41	25	24	22	20	13	28	22
Strontium	mg/L	-		0.834	0.929	0.625	0.559	0.698	0.752	0.741	0.779	0.753	0.74	0.71	0.78
Thallium	mg/L	-		< 0.005	< 0.00005	<0.00005	<0.0003	<0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	<0.00005	<0.00005	<0.000050
Vanadium	mg/L	-		0.0002	0.0003	0.0001	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	0.00089
Zinc	mg/L	5	AO	< 0.005	< 0.005	<0.005	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.014	<0.005	<0.0050
TSS	mg/L	-	-												
Cyanide (Total)	mg/L	0.2	MAC												
BOD(5 day)	mg/L	-	-												
Field Temperature	°C	-	AO	11.5	7.5	8.4	-	-	-	-	-	-	-	-	9.7
Field pH	pH Units	6.5-8.5	OG	7.95	8.23	8.06	-	-	-	-	-	-	-	-	7.42
Field Conductivity	µS/cm	-		677	685	633	-	-	-	-	-	-	-	-	469

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bedrock Ground Water Quality Data

PARAMETER	UNITS	ODWQS		13-I 29-Oct-12	13-I 3-Jun-13	13-I 29-Oct-13	13-I 1-May-14	13-I 24-Sep-14	13-I 27-Apr-15	13-I 6-Oct-15	13-I 25-Apr-16	13-I 20-Oct-16	13-I 12-Apr-17	13-I 5-Oct-17	13-I 11-Apr-18
Alkalinity	mg/L	500	OG	220	210	209	206	208	217	220	213	215	215	215	220
Conductivity	µS/cm	-		460	451	457	442	455	462	461	454	465	455	461	448
pH	pH Units	6.5-8.5	OG	7.87	8	8.05	8.03	8.11	7.92	7.99	8.03	8.11	8.01	8	8.03
TDS	mg/L	500	AO	268	248	245	237	241	262	249	241	257	245	237	245
DOC	mg/L	5		0.7	2.4	-	1.8	2.7	2.6	1.2	0.6	1	1.7	1.3	1.7
COD	mg/L	-		22	70	< 5	< 5	< 5	< 5	< 5	< 5	6	< 5	< 5	15
Phenols	mg/L	-		<0.0010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.01	0.001	0.002	< 0.001
Chloride	mg/L	250	AO	10	10	8	7	7	9	8	7	7	7	6	6.2
Ammonia, total	mg/L	-		0.54 (1)	0.18	0.04	0.09	0.07	0.14	0.16	0.24	0.05	0.04	< 0.01	0.02
Unionized Ammonia	mg/L	-													
Fluoride	mg/L	2.4	MAC	0.22	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.1	< 0.1
Sulphate	mg/L	500	AO	17	17	17	17	17	20	16	16	16	16	14	14
Nitrite (N)	mg/L	1	MAC	0.014	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.05	< 0.05
Nitrate (N)	mg/L	10	MAC	<0.10	0.2	0.2	0.2	0.2	0.3	0.1	0.2	0.3	0.3	0.5	0.39
Bromide	mg/L	-		<1.0	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4				
TKN	mg/L	-		4.7	0.64	< 0.1	0.3	0.2	0.3	0.3	0.2	0.2	0.2	0.1	0.1
Hardness	mg/L	500	OG	210	238	238	220	226	240	228	224	256	234	226	236
Aluminum	mg/L	0.1	OG	<0.0050	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.03	0.04	0.05	0.04
Antimony	mg/L	0.006	IMAC	<0.00050	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	0.0003	< 0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	<0.0010	0.0003	0.0002	0.0001	0.0014	0.0002	0.0002	0.0002	0.0002	< 0.0001	0.0001	< 0.0001
Barium	mg/L	1	MAC	0.073	0.1	0.09	0.08	0.08	0.08	0.08	0.08	0.09	0.13	0.1	0.087
Beryllium	mg/L	-		<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	mg/L	5	IMAC	0.091	0.049	0.05	0.035	0.049	0.069	0.048	0.019	0.05	0.045	0.037	0.04
Cadmium	mg/L	0.005	MAC	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.000014	< 0.000014
Calcium	mg/L	-		54	64.2	64.9	59.5	61.2	65.8	61.1	60.3	68.7	61.9	60.3	64.6
Chromium	mg/L	0.05	MAC	-	< 0.0002	0.004	< 0.0002	0.001	0.001	0.002	< 0.0002	0	0.001	< 0.001	< 0.001
Chromium (VI)	mg/L														
Cobalt	mg/L	-		<0.00050	0.0004	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Copper	mg/L	1	AO	<0.0010	0.0005	0.0006	0.0009	0.0004	0.001	0.001	0.0004	0.0004	< 0.0001	0.0003	0.0002
Iron	mg/L	0.3	AO	<0.10	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.01	< 0.005	0.007
Lead	mg/L	0.01	MAC	<0.00050	0.00007	< 0.00002	0.00007	< 0.00002	0.00002	< 0.00002	< 0.00002	0.00008	< 0.00002	< 0.00002	< 0.00002
Magnesium	mg/L	-		18	18.8	18.4	17.3	17.7	18.3	18.3	17.7	20.4	19.2	18.3	18.2
Manganese	mg/L	0.05	AO	**0.08**	**0.106**	**0.077**	**0.075**	**0.056**	**0.067**	**0.126**	**0.051**	**0.061**	**0.066**	**0.078**	**0.053**
Mercury	mg/L	0.001	MAC	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		<0.00050	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	< 0.0001
Nickel	mg/L	-		0.0031	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		2.6	1.9	1.8	1.9	2.1	2.2	2.1	2	2.2	2	1.8	1.7
Phosphorus-Total	mg/L	-		1.6	2	0.05	0.15	0.32	0.11	0.59	0.39	0.11	0.16	0.1	0.12
Selenium	mg/L	0.01	MAC	<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	mg/L	-		<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Sodium	mg/L	200	AO	19	9.4	9.5	8.3	10	14.2	11	9.2	11.4	7.9	7	7.5
Strontium	mg/L	-		0.81	-	-	-	0.79	0.8	0.72	0.76	0.91	0.76	0.75	0.749
Thallium	mg/L	-		<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	mg/L	-		0.00051	0.0022	0.0013	0.0022	0.0047	0.0016	0.0008	0.0009	0.0006	0.001	0.0011	0.0003
Zinc	mg/L	5	AO	0.0063	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-												
Cyanide (Total)	mg/L	0.2	MAC												
BOD(5 day)	mg/L	-	-												
Field Temperature	°C	-	AO	8.5	9.5	8.9	12.8	9.4	8.6	10.8	6.9	10.5	7.8	10.8	
Field pH	pH Units	6.5-8.5	OG	8.02	7.45	7.28	8.03	7.92	6.66	7.69	8.13	7.59	7.44	7.95	8.03
Field Conductivity	µS/cm	-		500	467	500	460	550	3690	365	370	485	405	405	461

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bedrock Ground Water Quality Data

PARAMETER	UNITS	ODWQS		13-I 2-Oct-18	13-I 23-Apr-19	13-I 9-Oct-19	13-I 13-Apr-20	13-I 15-Oct-20	13-I 21-Apr-21	13-I 18-Oct-21	13-I 20-Apr-22	13-I 12-Oct-22	13-I 19-Apr-23	13-I 12-Oct-23	14-I 6-May-08
Alkalinity	mg/L	500	OG	205	206	205	198	208	215	219	215	219	212	227	227
Conductivity	µS/cm	-		459	475	455	460	455	468	438	471	460	463	463	2200
pH	pH Units	6.5-8.5	OG	8.03	8.05	7.95	7.94	7.92	7.96	7.84	7.5	7.9	7.92	7.38	7.82
TDS	mg/L	500	AO	239	242	237	230	246	250	251	246	254	246	239	**1370**
DOC	mg/L	5		1.6	2.1	2.5	1.4	3.1	3.2	2.5	1.5	0.7	0.6	3.1	2
COD	mg/L	-		5	< 5	< 5	< 5	< 5	14	6	< 5	< 5	< 5	8	<2
Phenols	mg/L	-		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001	0.003
Chloride	mg/L	250	AO	7.2	8.1	6.6	7.5	8.1	8.2	8.2	7.7	7.5	7	7.2	**597**
Ammonia, total	mg/L	-		0.03	0.33	0.05	< 0.01	0.01	0.25	0.04	1.6	< 0.01	0.24	<0.05	0.9
Unionized Ammonia	mg/L	-			< 0.01	< 0.01	< 0.01	< 0.01		< 0.01	0.02	< 0.01	< 0.01	<0.01	
Fluoride	mg/L	2.4	MAC	0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.4	< 0.1	0.1	0.8
Sulphate	mg/L	500	AO	17	17	15	16	17	18	18	16	15	152	15	<1
Nitrite (N)	mg/L	1	MAC	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.08	< 0.05	< 0.05	< 0.05	< 0.5	<0.05	<0.1
Nitrate (N)	mg/L	10	MAC	0.79	0.45	0.85	0.89	0.69	0.6	0.71	0.75	0.94	< 0.5	0.7	<0.1
Bromide	mg/L	-													-
TKN	mg/L	-		0.2	0.5	0.2	< 0.1	0.1	0.4	0.2	2	0.1	0.3	<0.1	1.4
Hardness	mg/L	500	OG	241	239	241	230	251	243	241	237	255	247	240	437
Aluminum	mg/L	0.1	OG	0.04	0.05	0.05	0.04	0.02	0.05	0.05	0.01	0.01	0.05	0.02	**0.25**
Antimony	mg/L	0.006	IMAC	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.01
Arsenic	mg/L	0.025	IMAC	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.01
Barium	mg/L	1	MAC	0.094	0.088	0.092	0.092	0.098	0.093	0.099	0.096	0.104	0.096	0.098	0.1
Beryllium	mg/L	-		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	<0.1
Boron	mg/L	5	IMAC	0.03	0.039	0.028	0.028	0.033	0.037	0.033	0.028	0.029	0.033	0.033	1.7
Cadmium	mg/L	0.005	MAC	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000010	< 0.000010	<0.000015	<0.0001
Calcium	mg/L	-		65.8	67	66.6	63.5	69.9	67.2	67.9	65.4	71.9	67.3	67.2	98
Chromium	mg/L	0.05	MAC	0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	0.0003
Chromium (VI)	mg/L										< 0.001	< 0.001	< 0.001	<0.01	
Cobalt	mg/L	-		< 0.005	< 0.005	< 0.005	0.0006	< 0.005	< 0.005	< 0.005	0.007	< 0.005	< 0.005	0.0007	0.0004
Copper	mg/L	1	AO	0.0011	0.0014	0.0003	0.0004	0.0007	0.0011	0.0007	0.0022	0.0004	0.0004	0.0008	0.0003
Iron	mg/L	0.3	AO	< 0.005	0.019	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.027	0.005	**1.3**
Lead	mg/L	0.01	MAC	0.00002	0.00002	< 0.00002	< 0.00002	< 0.00002	0.00006	< 0.00002	0.00002	0.00003	< 0.00002	0.00003	0.003
Magnesium	mg/L	-		18.5	17.5	18.2	17.3	18.6	18.2	17.4	17.8	18.4	19.1	17.6	47
Manganese	mg/L	0.05	AO	**0.078**	**0.076**	**0.083**	**0.065**	**0.052**	**0.061**	**0.075**	**0.068**	**0.073**	**0.053**	**0.061**	**0.06**
Mercury	mg/L	0.001	MAC	< 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	mg/L	-		0.0002	0.0002	0.0002	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	<0.002
Nickel	mg/L	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.0006	<0.01
Potassium	mg/L	-		1.7	1.9	1.8	1.7	1.9	2.1	1.9	1.9	2	1.9	1.8	14.1
Phosphorus-Total	mg/L	-		0.18	0.07	0.03	< 0.01	0.03	0.05	0.01	0.03	0.09	< 0.01	0.03	0.45
Selenium	mg/L	0.01	MAC	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	<0.001	<0.01
Silver	mg/L	-		< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001
Sodium	mg/L	200	AO	6.1	6.4	6.2	5.4	6.2	7.3	6.4	5.8	6.2	8	5.8	**256**
Strontium	mg/L	-		0.74	0.727	0.755	0.721	0.73	0.773	0.739	0.737	0.777	0.767	0.758	3.51
Thallium	mg/L	-		< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.005	< 0.00005	<0.00005	<0.0003
Vanadium	mg/L	-		0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002	0.0003	0.0003	0.0036	0.0003	<0.001
Zinc	mg/L	5	AO	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	<0.01
TSS	mg/L	-	-												
Cyanide (Total)	mg/L	0.2	MAC												
BOD(5 day)	mg/L	-	-												
Field Temperature	°C	-	AO		8.8	9.3	8.9	9.8	8.9	9.8	9.6	12.1	7.3	8.5	-
Field pH	pH Units	6.5-8.5	OG	8.03	7.74	7.8	7.89	7.84	7.5	7.81	7.87	7.81	8.04	8.05	-
Field Conductivity	µS/cm	-		456	450	365	451	418	432	487	450	490	562	536	-

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bedrock Ground Water Quality Data

PARAMETER	UNITS	ODWQS		14-I 25-May-09	14-I 4-Aug-09	14-I 8-Jun-10	14-I 19-Oct-10	14-I 12-May-11	14-I 8-Nov-11	14-I 19-Apr-12	14-I 29-Oct-12	14-I 3-Jun-13	14-I 29-Oct-13	14-I 1-May-14	14-I 24-Sep-14
Alkalinity	mg/L	500	OG	220	234	228	231	266	242	240	280	269	252	228	265
Conductivity	µS/cm	-		2090	1960	2000	1990	2490	740	2000	2100	2240	2220	1310	2120
pH	pH Units	6.5-8.5	OG	7.67	7.74	7.76	7.68	7.2	7.07	7.26	6.88	6.62	6.69	6.78	6.72
TDS	mg/L	500	AO	**1430**	**1360**	**1270**	**1300**	**990**	**1200**	**989**	**1070**	**1470**	**1210**	**739**	**1130**
DOC	mg/L	5		2	1	1	< 1	1.1	-	2.9	4.8	4.8	-	**32.6**	3.3
COD	mg/L	-		8	< 2	26	5	9	140	92	32	256	67	86	14
Phenols	mg/L	-		< 0.001	< 0.001	< 0.001	< 0.001	<0.001	0.003	<0.0010	<0.0010	< 0.001	< 0.001	0.006	0.007
Chloride	mg/L	250	AO	**481**	**606**	**560**	**642**	**460**	**590**	**430**	**460**	**760**	**568**	**294**	**544**
Ammonia, total	mg/L	-		1.9	1.91	2	2.2	3	<0.1	2	2.2	2.22	1.69	1.39	1.97
Unionized Ammonia	mg/L	-													
Fluoride	mg/L	2.4	MAC	1.3	1.1	1.2	1.5	1	1.2	1.07	1.23	1.3	0.8	0.7	1.4
Sulphate	mg/L	500	AO	4	4	< 1	3	<1	5	<1	<1	1	< 1	8	< 1
Nitrite (N)	mg/L	1	MAC	< 0.1	< 0.1	< 0.1	< 0.1	<0.01	0	<0.010	<0.010	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	0.5	< 0.1	< 0.1	< 0.1	<0.1	<0.1	<0.10	<0.10	< 0.1	< 0.1	0.2	< 0.1
Bromide	mg/L	-		6.4	-	7.1	-	5	6	5	6.3	12.1	< 0.4	3.4	6.4
TKN	mg/L	-		2.1	2.2	2.2	2.5	3	15	3.9	2.8	5.24	2	3	2.4
Hardness	mg/L	500	OG	382	331	324	327	300	320	390	360	398	425	267	338
Aluminum	mg/L	0.1	OG	< 0.01	< 0.01	0.01	< 0.01	<0.005	0.017	0.048	0.024	**0.42**	0.06	0.04	0.03
Antimony	mg/L	0.006	IMAC	< 0.01	< 0.01	< 0.01	< 0.01	<0.0005	<0.0005	<0.00050	<0.00050	< 0.0001	< 0.0001	0.0002	0.0001
Arsenic	mg/L	0.025	IMAC	< 0.01	< 0.01	< 0.005	< 0.005	<0.001	0.001	<0.0010	<0.0010	0.0052	0.0088	0.0052	0.0007
Barium	mg/L	1	MAC	0.1	< 0.1	< 0.1	< 0.1	0	0.11	0.11	0.095	0.09	0.12	0.07	0.09
Beryllium	mg/L	-		< 0.1	< 0.1	< 0.1	< 0.1	<0.005	<0.005	<0.00050	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	5	IMAC	2.3	1.8	1.5	1.6	2	2	1.7	2	1.93	2.03	1.19	1.9
Cadmium	mg/L	0.005	MAC	< 0.0001	< 0.0001	< 0.0001	0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Calcium	mg/L	-		82	70	68	70	67	69	85	80	85.6	97.1	69.1	76.9
Chromium	mg/L	0.05	MAC	0.0002	< 0.0001	0.0004	< 0.0001	<0.005	<0.005	<0.0050	-	0.005	0.01	0.004	0.008
Chromium (VI)	mg/L														
Cobalt	mg/L	-		0.0007	< 0.0003	< 0.0003	< 0.0003	<0.0005	<0.0005	<0.00050	<0.00050	< 0.0001	< 0.005	< 0.005	< 0.005
Copper	mg/L	1	AO	0.0004	< 0.0001	0.0001	0.0019	<0.001	<0.001	<0.0010	<0.0010	0.001	0.0021	0.0051	0.0027
Iron	mg/L	0.3	AO	<0.1	0.2	0.3	< 0.1	**0.45**	**1.9**	**1.6**	**0.79**	**0.44**	**3.84**	**9.17**	**2.03**
Lead	mg/L	0.01	MAC	0.002	0.003	< 0.001	0.002	<0.0005	<0.0005	<0.00050	<0.00050	0.00009	< 0.00002	0.0003	< 0.00002
Magnesium	mg/L	-		43	38	38	37	32	36	43	39	44.7	44.3	23	35.5
Manganese	mg/L	0.05	AO	**0.09**	0.03	0.02	0.02	0.029	**0.056**	**0.083**	0.049	**0.1**	**0.11**	**0.39**	**0.06**
Mercury	mg/L	0.001	MAC	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00001	-	<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		0.002	0.002	< 0.002	< 0.002	<0.001	0.0008	0.00069	0.00076	0.0007	0.0005	0.0004	0.0005
Nickel	mg/L	-		< 0.01	< 0.01	< 0.01	< 0.01	<0.001	<0.001	0.0012	<0.0010	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		14.9	16	15.7	15.5	12	12	12	13	14	12.8	8.7	12.2
Phosphorus-Total	mg/L	-		0.01	< 0.01	< 0.01	< 0.02	0.19	1	<0.10	0.08	0.51	0.03	0.06	0.08
Selenium	mg/L	0.01	MAC	< 0.01	< 0.01	< 0.01	< 0.01	<0.002	<0.002	<0.0020	<0.0020	< 0.01	< 0.01	< 0.001	0.007
Silver	mg/L	-		0.0002	< 0.0001	0.0002	0.0002	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Sodium	mg/L	200	AO	**300**	**299**	**303**	**309**	**270**	**320**	**260**	**300**	**398**	**328**	187	**294**
Strontium	mg/L	-		3.2	3.1	2.91	3.07	2.7	3.3	3	3.2	-	-	-	3.37
Thallium	mg/L	-		< 0.0003	< 0.0003	< 0.0003	< 0.0003	<0.00005	<0.00005	<0.000050	<0.000050	< 0.00005	< 0.00005	0.0001	< 0.00005
Vanadium	mg/L	-		< 0.001	< 0.001	< 0.001	< 0.001	0.001	0.0008	<0.00050	0.00078	0.0054	0.0025	0.0042	0.0082
Zinc	mg/L	5	AO	< 0.01	< 0.01	< 0.01	0.01	0.007	<0.005	0.024	<0.0050	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-												
Cyanide (Total)	mg/L	0.2	MAC												
BOD(5 day)	mg/L	-	-												
Field Temperature	°C	-	AO	-	-	-	-	-	-	14.2	7.3	12.4	7.1	13.6	10.9
Field pH	pH Units	6.5-8.5	OG	-	-	-	-	-	-	6.36	7.76	7.05	6.58	6.72	7.39
Field Conductivity	µS/cm	-		-	-	-	-	-	-	1973	2300	2224	2500	2310	1689

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bedrock Ground Water Quality Data

PARAMETER	UNITS	ODWQS		14-I 28-Apr-15	14-I 5-Oct-15	14-I 26-Apr-16	14-I 19-Oct-16	14-I 12-Apr-17	14-I 5-Oct-17	14-I 10-Apr-18	14-I 2-Oct-18	14-I 22-Apr-19	14-I 9-Oct-19	14-I 13-Apr-20	14-I 14-Oct-20
Alkalinity	mg/L	500	OG	254	249	379	463	386	**637**	443	**663**	435	449	440	464
Conductivity	µS/cm	-		2100	2320	743	1790	1170	1250	1800	3670	3840	3400	3380	3360
pH	pH Units	6.5-8.5	OG	6.92	7.06	6.96	6.94	7.06	6.86	7.2	7.25	7.09	7.14	7.1	7.22
TDS	mg/L	500	AO	**1110**	**1200**	430	**974**	**768**	**678**	**939**	**1973**	**2151**	**2040**	**1958**	**1832**
DOC	mg/L	5		2.5	0.6	3.7	**11.3**	**40.7**	**17**	**9.6**	**7.4**	4.1	3.8	**7.1**	2.4
COD	mg/L	-		25	15	175	121	381	345	367	340	65	117	370	54
Phenols	mg/L	-		0.026	< 0.001	< 0.001	0.013	0.055	0.062	0.029	0.073	< 0.002	0.004	< 0.002	< 0.002
Chloride	mg/L	250	AO	**523**	**602**	4	**288**	48	24	243	**774**	**1100**	**987**	**867**	**828**
Ammonia, total	mg/L	-		1.05	2.33	2.82	1.07	2.53	14.5	8.15	27.6	12.9	11.9	11.4	12.4
Unionized Ammonia	mg/L	-										0.02	< 0.01	< 0.01	0.02
Fluoride	mg/L	2.4	MAC	1	1	0.1	0.2	< 0.1	0.3	< 0.1	< 1	< 1	< 1	< 0.1	< 1
Sulphate	mg/L	500	AO	1	2	18	21	180	4	33	11	39	< 10	7	< 10
Nitrite (N)	mg/L	1	MAC	< 0.1	< 0.1	< 0.1	< 0.1	0.4	< 0.05	< 0.05	< 0.5	< 0.5	< 0.5	< 0.05	< 0.5
Nitrate (N)	mg/L	10	MAC	< 0.1	< 0.1	0.1	0.1	0.1	< 0.05	< 0.05	< 0.5	< 0.5	< 0.5	< 0.05	< 0.5
Bromide	mg/L	-		5.9	7.1	< 0.4									
TKN	mg/L	-		2.9	3.2	6.9	30.8	12.8	21.6	21.9	37	15.7	13.5	23.2	16
Hardness	mg/L	500	OG	360	435	370	**509**	**550**	**510**	**530**	**833**	**959**	**917**	**907**	**843**
Aluminum	mg/L	0.1	OG	0.03	0.04	0.04	**0.44**	**0.12**	**0.16**	0.1	0.08	**0.11**	**0.35**	**0.11**	0.09
Antimony	mg/L	0.006	IMAC	0.0001	0.0002	< 0.0001	0.001	0.0002	0.0001	0.0002	< 0.0001	< 0.0001	< 0.0002	< 0.0001	0.0002
Arsenic	mg/L	0.025	IMAC	0.0004	0.0003	0.0012	0.0045	0.0026	0.0021	0.0011	0.0005	0.0004	< 0.0005	< 0.0003	0.0003
Barium	mg/L	1	MAC	0.1	0.11	0.15	0.42	0.15	0.24	0.182	0.553	0.452	0.427	0.388	0.348
Beryllium	mg/L	-		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.004
Boron	mg/L	5	IMAC	1.89	1.64	0.088	0.541	0.307	0.947	0.303	0.685	1.08	1.25	1.25	1.21
Cadmium	mg/L	0.005	MAC	< 0.00002	< 0.00002	< 0.00002	0.00004	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000059	< 0.000029	< 0.000029
Calcium	mg/L	-		81.3	97.8	138	162	180	177	187	277	290	263	252	240
Chromium	mg/L	0.05	MAC	0.003	0.005	< 0.0002	0.004	0.006	< 0.001	< 0.001	0.002	0.001	0.002	< 0.001	< 0.002
Chromium (VI)	mg/L														
Cobalt	mg/L	-		< 0.005	< 0.005	< 0.005	0.006	0.009	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.0007	< 0.01
Copper	mg/L	1	AO	0.0026	0.0029	0.0009	0.0031	0.0005	0.0007	0.0063	0.0008	0.0062	0.0034	0.0041	0.0004
Iron	mg/L	0.3	AO	**4.1**	**6.86**	**7.74**	**22.1**	**36.9**	**124**	**45**	**85**	**5.29**	**47.3**	**39.7**	**33.9**
Lead	mg/L	0.01	MAC	0.00012	0.00012	0.00011	0.0029	0.00002	0.00078	0.00006	< 0.00002	0.0001	0.00144	< 0.00009	< 0.00009
Magnesium	mg/L	-		38.1	46.4	6.1	25.6	24.4	16.4	15.1	34.2	57	63.2	67.4	59.1
Manganese	mg/L	0.05	AO	**0.09**	**0.09**	**1.45**	**1.67**	**1.92**	**1.38**	**2.05**	**1.78**	**1.53**	**1.27**	**1.19**	**1.07**
Mercury	mg/L	0.001	MAC	< 0.00002	< 0.00002	< 0.00002	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		0.0004	0.0002	0.0002	0.0004	0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0004	< 0.0002	< 0.0002
Nickel	mg/L	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02
Potassium	mg/L	-		12.4	12.6	18.1	48.8	27.7	22	15.6	40.9	26.6	29.8	27.2	23.9
Phosphorus-Total	mg/L	-		0.1	0.08	1.56	17.6	1.47	2.45	1.18	1	0.25	0.79	3.71	0.33
Selenium	mg/L	0.01	MAC	0.01	**0.017**	< 0.001	0.009	< 0.001	< 0.001	< 0.001	0.004	**0.013**	**0.024**	**0.014**	0.01
Silver	mg/L	-		< 0.00002	< 0.00002	< 0.00002	0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	**294**	**277**	5	125	32	33	167	**400**	**353**	**411**	**417**	**352**
Strontium	mg/L	-		3.43	3.83	0.34	1.85	0.73	1.25	0.587	1.63	4.24	5.07	5.78	4.36
Thallium	mg/L	-		< 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	mg/L	-		0.0025	0.001	0.0029	0.0085	0.0027	0.0047	0.0004	0.00019	0.0001	< 0.0007	0.0005	< 0.0004
Zinc	mg/L	5	AO	< 0.005	< 0.005	< 0.005	0.01	< 0.005	0.02	0.006	< 0.005	< 0.005	0.016	< 0.005	< 0.01
TSS	mg/L	-	-												
Cyanide (Total)	mg/L	0.2	MAC												
BOD(5 day)	mg/L	-	-												
Field Temperature	°C	-	AO	10.5	13.7	5.2	16.8	9.5	16.5			14.1	13.2	9.3	13.4
Field pH	pH Units	6.5-8.5	OG	6.81	6.96	7.35	7.04	7.16	6.77	7.2	7.25	6.86	6.24	6.59	6.76
Field Conductivity	µS/cm	-		2400	1710	630	875	950	1250	1670	3380	3550	2220	>4000	2500

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bedrock Ground Water Quality Data

PARAMETER	UNITS	ODWQS		14-I 21-Apr-21	14-I 18-Oct-21	14-I 20-Apr-22	14-I 12-Oct-22	14-I 19-Apr-23	14-I 12-Oct-23	16-I 13-May-08	16-I 14-Aug-08	16-I 25-May-09	16-I 4-Aug-09	16-I 6-Oct-09	16-I 8-Jun-10
Alkalinity	mg/L	500	OG	460	**507**	**562**	468			475	**529**	**550**	472	488	391
Conductivity	µS/cm	-		3300	3190	4050	2730			1690	1510	1500	1490	1360	1230
pH	pH Units	6.5-8.5	OG	7.34	6.89	7.1	7.17			7.24	7.42	7.27	7.21	7.45	7.63
TDS	mg/L	500	AO	**1877**	**2083**	**2171**	**1455**			**996**	**1100**	**980**	**977**	**969**	**882**
DOC	mg/L	5		**5.7**	**5.9**	3.6	0.6			5	4.3	5	5	4	3
COD	mg/L	-		137	177	1460	87			13	11	12	10	14	5
Phenols	mg/L	-		0.004	< 0.002	0.032	< 0.001			<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001
Chloride	mg/L	250	AO	**826**	**1060**	**949**	**539**			95	177	114	103	147	133
Ammonia, total	mg/L	-		12.1	15.4	24	9.67			0.2	0.19	0.24	0.53	0.39	0.79
Unionized Ammonia	mg/L	-			0.06	0.03	0.02								
Fluoride	mg/L	2.4	MAC	< 0.1	< 1	< 1	1.1			<0.1	<0.1	< 0.1	< 0.1	0.1	< 0.1
Sulphate	mg/L	500	AO	19	< 10	< 10	17			245	223	190	212	192	145
Nitrite (N)	mg/L	1	MAC	< 0.05	< 0.5	< 0.5	< 0.3			<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	< 0.05	< 0.5	< 0.5	< 0.3			0.7	1.1	0.4	0.2	< 0.1	0.6
Bromide	mg/L	-								-	-	0.8	-	-	1.4
TKN	mg/L	-		15.3	15.8	59.2	13			0.6	0.7	0.6	1	0.6	0.9
Hardness	mg/L	500	OG	**817**	**788**	**881**	**704**			**714**	**743**	**671**	**659**	**684**	**586**
Aluminum	mg/L	0.1	OG	**0.17**	**0.11**	0.07	0.06			0.04	<0.01	< 0.01	< 0.01	< 0.01	< 0.01
Antimony	mg/L	0.006	IMAC	< 0.0001	0.0003	0.0013	0.0002			<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01
Arsenic	mg/L	0.025	IMAC	0.0004	0.0003	0.0006	< 0.0003			<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.005
Barium	mg/L	1	MAC	0.329	0.321	0.422	0.281			0.1	0.1097	0.1	0.1	< 0.1	0.1
Beryllium	mg/L	-		< 0.002	< 0.002	< 0.002	< 0.002			<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron	mg/L	5	IMAC	1.31	1.39	1.86	1.35			0.417	0.558	0.8	0.7	0.5	0.4
Cadmium	mg/L	0.005	MAC	< 0.000029	< 0.000029	< 0.000029	< 0.000029			<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Calcium	mg/L	-		226	217	227	196			210	209	188	183	188	164
Chromium	mg/L	0.05	MAC	0.001	0.001	0.001	< 0.001	Broken	Broken	0.0006	0.0009	0.0001	0.0001	0.0004	0.0004
Chromium (VI)	mg/L					< 0.001	< 0.001								
Cobalt	mg/L	-		< 0.005	< 0.005	0.007	< 0.005			0.0007	0.000327	0.0005	0.0005	0.0006	0.0005
Copper	mg/L	1	AO	0.001	0.0006	0.0006	0.0002			0.0018	0.002	0.0015	0.0016	0.0007	0.0007
Iron	mg/L	0.3	AO	**30.8**	**34.9**	**50.2**	**28.9**			0.2	<0.1	<0.1	< 0.1	< 0.1	< 0.1
Lead	mg/L	0.01	MAC	0.00085	0.0001	0.00011	< 0.00009			<0.001	<0.001	< 0.001	< 0.001	0.002	< 0.001
Magnesium	mg/L	-		61.4	59.8	76.2	51.8			46	54	49	49	52	43
Manganese	mg/L	0.05	AO	**0.909**	**0.882**	**1.05**	**0.773**			0.01	<0.01	<0.01	0.01	< 0.01	0.02
Mercury	mg/L	0.001	MAC	< 0.00002	< 0.00002	< 0.00002	< 0.00002			<0.00002	<0.00005	0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		< 0.0002	< 0.0002	0.0002	< 0.0002			<0.002	<0.002	< 0.002	< 0.002	< 0.002	< 0.002
Nickel	mg/L	-		< 0.01	< 0.01	< 0.01	< 0.01			<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		25.9	25.9	28.8	22.7			62.6	51.8	72.5	59.2	48.8	59.8
Phosphorus-Total	mg/L	-		0.93	0.7	19.5	0.34			<0.01	0.05	0.01	< 0.01	< 0.01	< 0.01
Selenium	mg/L	0.01	MAC	<0.02	<0.02	<0.03	< 0.02			<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver	mg/L	-		< 0.0001	< 0.0001	< 0.0001	< 0.0001			<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	0.0002
Sodium	mg/L	200	AO	**396**	**381**	**471**	**304**			53	78	61	71	66	75
Strontium	mg/L	-		5.24	4.86	6.98	4.19			1.71	2.5	1.43	2.41	2.53	1.9
Thallium	mg/L	-		< 0.00005	< 0.00005	< 0.00005	< 0.005			<0.0003	<0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003
Vanadium	mg/L	-		0.0005	0.0006	0.0012	0.0006			<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001
Zinc	mg/L	5	AO	0.007	< 0.005	0.005	< 0.005			<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01
TSS	mg/L	-	-												
Cyanide (Total)	mg/L	0.2	MAC												
BOD(5 day)	mg/L	-	-												
Field Temperature	°C	-	AO	9.1	12	11	13.4			-	-	-	-	-	-
Field pH	pH Units	6.5-8.5	OG	6.85	7.24	6.8	6.88			-	-	-	-	-	-
Field Conductivity	µS/cm	-		2400	1670	3840	2940			-	-	-	-	-	-

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bedrock Ground Water Quality Data

PARAMETER	UNITS	ODWQS		16-I 15-Oct-10	16-I 12-May-11	16-I 8-Nov-11	16-I 19-Apr-12	16-I 29-Oct-12	16-I 3-Jun-13	16-I 29-Oct-13	16-I 1-May-14	16-I 24-Sep-14	16-I 27-Apr-15	16-I 5-Oct-15	16-I 25-Apr-16
Alkalinity	mg/L	500	OG	418	418	219	430	390	437	379	345	333	318	332	326
Conductivity	µS/cm	-		1260	1260	992	1500	2400	1710	1990	1280	2670	1100	1630	878
pH	pH Units	6.5-8.5	OG	7.74	-	7.35	7.81	7.73	7.48	7.73	7.65	7.7	7.66	7.77	7.74
TDS	mg/L	500	AO	**801**	**732**	**732**	**1020**	**1080**	**955**	**1130**	**766**	**1930**	474	**885**	453
DOC	mg/L	5		2	2.1	-	1.7	1.9	**5.5**	-	2.9	2.2	2.5	0.8	1.4
COD	mg/L	-		3	8	8	10	12	< 5	< 5	< 5	5	< 5	< 5	< 5
Phenols	mg/L	-		< 0.001	<0.001	<0.001	<0.0010	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Chloride	mg/L	250	AO	147	98	98	140	**470**	211	**363**	182	**937**	42	**298**	35
Ammonia, total	mg/L	-		0.49	0.46	0.2	0.4	0.7	0.43	0.53	0.31	0.17	0.07	0.4	0.11
Unionized Ammonia	mg/L	-													
Fluoride	mg/L	2.4	MAC	0.1	0.1	0.1	0.12	0.15	0.3	0.2	0.2	0.3	0.1	0.2	0.1
Sulphate	mg/L	500	AO	118	100	100	120	89	134	132	103	101	73	98	63
Nitrite (N)	mg/L	1	MAC	< 0.1	<0.01	<0.01	0	0	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	0.3	0.2	0.2	0.26	0.71	0.6	0.3	1.1	0.4	1.6	0.7	1.1
Bromide	mg/L	-		-	<1	<1	2	5.7	2.9	3.7	1.9	11.5	< 0.4	3.2	< 0.4
TKN	mg/L	-		0.7	0.7	0.7	0.84	0.93	0.73	0.8	0.6	0.2	0.4	0.6	0.2
Hardness	mg/L	500	OG	**590**	480	480	**630**	500	**617**	**695**	480	**760**	362	**555**	357
Aluminum	mg/L	0.1	OG	< 0.01	<0.005	<0.005	<0.0050	<0.0050	0.06	0.05	0.03	0.05	0.03	0.04	0.03
Antimony	mg/L	0.006	IMAC	< 0.01	<0.005	<0.005	<0.00050	<0.00050	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	< 0.005	<0.001	<0.001	<0.0010	<0.0010	0.0028	0.0055	0.002	0.0008	0.0004	0.0005	0.0002
Barium	mg/L	1	MAC	< 0.1	0.11	0.12	0.1	0.1	0.12	0.17	0.09	0.13	0.07	0.11	0.07
Beryllium	mg/L	-		< 0.1	<0.005	<0.005	<0.00050	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	5	IMAC	< 0.1	0.48	0.5	0.5	0.3	0.495	0.638	0.289	0.598	0.2	0.415	0.145
Cadmium	mg/L	0.005	MAC	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002	0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Calcium	mg/L	-		159	140	160	160	140	175	183	141	178	115	157	112
Chromium	mg/L	0.05	MAC	< 0.0001	<0.005	<0.005	<0.0050	-	0.003	**0.109**	0.002	0.002	0.002	0.003	< 0.0002
Chromium (VI)	mg/L														
Cobalt	mg/L	-		< 0.0003	0.0006	<0.0005	0.0008	<0.00050	0.0009	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Copper	mg/L	1	AO	0.0011	0.002	0.002	<0.0010	0.0015	0.0013	0.0016	0.0014	0.0014	0.0015	0.0017	0.0009
Iron	mg/L	0.3	AO	< 0.1	<0.1	<0.1	**0.49**	0.13	0.01	**0.32**	0.03	0.04	0.01	0.06	0.01
Lead	mg/L	0.01	MAC	0.001	<0.0005	<0.0005	<0.00050	<0.00050	0.00003	< 0.00002	0.00002	< 0.00002	0.00002	0.00003	< 0.00002
Magnesium	mg/L	-		47	35	47	56	35	43.5	57.9	31.2	76.3	18.1	39.4	18.6
Manganese	mg/L	0.05	AO	0.01	0.025	0.016	0.04	0.04	0.05	**0.067**	0.032	0.004	0.002	0.01	< 0.001
Mercury	mg/L	0.001	MAC	< 0.00002	<0.00001	-	<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00003
Molybdenum	mg/L	-		0.006	<0.001	0.0006	0.00061	0.0013	0.0004	0.0003	0.0006	0.0006	0.0007	0.0005	0.0006
Nickel	mg/L	-		< 0.01	0.001	0.001	0.0013	0.0014	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		39.3	41	38	28	22	20.5	24.9	14.2	22.2	8.6	16.1	8.6
Phosphorus-Total	mg/L	-		0.007	0.034	0.05	<0.10	0.01	0.02	< 0.01	0.02	0.01	0.02	0.03	0.03
Selenium	mg/L	0.01	MAC	< 0.01	<0.002	<0.002	<0.0020	<0.0020	< 0.01	< 0.01	< 0.001	< 0.001	< 0.001	0	< 0.001
Silver	mg/L	-		0.0006	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Sodium	mg/L	200	AO	56	56	67	**250**	74	106	142	82.4	**411**	19	73	15
Strontium	mg/L	-		2.1	1.9	2.3	4.8	2	-	-	-	7.4	0.53	2.42	0.49
Thallium	mg/L	-		< 0.0003	<0.00005	<0.00005	<0.000050	<0.000050	< 0.00005	< 0.00005	0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		< 0.001	<0.001	<0.001	<0.00050	<0.00050	0.0046	0.0019	0.0034	0.007	0.0023	0.0008	0.001
Zinc	mg/L	5	AO	< 0.01	0.007	0.005	<0.0050	<0.0050	< 0.005	< 0.005	< 0.005	< 0.005	0.01	0.01	< 0.005
TSS	mg/L	-	-												
Cyanide (Total)	mg/L	0.2	MAC												
BOD(5 day)	mg/L	-	-												
Field Temperature	°C	-	AO	-	-	-	9.8	7.6	9.6	8.9	10.3	8.1	8.1	11.2	5.5
Field pH	pH Units	6.5-8.5	OG	-	-	-	6.88	7.46	7.67	7.09	7.65	7.65	7.55	7.31	7.87
Field Conductivity	µS/cm	-		-	-	-	2590	1552	1788	1920	1240	1630	850	995	580

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bedrock Ground Water Quality Data

															DUP
				16-I	16-I	16-I	16-I	16-I	16-I	16-I	16-I	16-I	16-I	16-I	16-I
PARAMETER	UNITS	ODWQS		19-Oct-16	22-Apr-19	4-Nov-19	13-Apr-20	14-Oct-20	21-Apr-21	18-Oct-21	20-Apr-22	12-Oct-22	19-Apr-23	12-Oct-23	12-Oct-23
Alkalinity	mg/L	500	OG	322		291	314	326	293	341	**552**	362	309	332	337
Conductivity	µS/cm	-		1940		870	958	1160	1570	2690	2000	862	950	858	903
pH	pH Units	6.5-8.5	OG	7.71		7.95	7.74	7.73	7.95	7.58	7.56	7.73	7.74	7.45	7.56
TDS	mg/L	500	AO	**1080**		**562**	**546**	**699**	**786**	**1657**	**1158**	**507**	488	453	479
DOC	mg/L	5		0.6		**5.4**	**5.6**	**5.1**	3.1	**5.8**	4.1	1.9	3.1	**5.2**	4.9
COD	mg/L	-		12		350	35	53	28	11	14	53	78	15	22
Phenols	mg/L	-		< 0.001		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001	<0.001
Chloride	mg/L	250	AO	**446**		51.3	32.9	92.9	**253**	**730**	170	19.2	77.3	29.6	40
Ammonia, total	mg/L	-		0.99		0.41	0.42	0.24	0.61	0.2	1.87	0.14	1.63	0.17	0.29
Unionized Ammonia	mg/L	-				< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	0.01	<0.01	<0.01
Fluoride	mg/L	2.4	MAC	0.2		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.5	< 0.1	< 0.1	<0.1	<0.1
Sulphate	mg/L	500	AO	74		123	121	145	93	120	215	67	34	75	77
Nitrite (N)	mg/L	1	MAC	< 0.1		< 0.05	< 0.05	< 0.05	0.23	0.58	< 0.3	< 0.05	< 0.05	<0.05	0.07
Nitrate (N)	mg/L	10	MAC	0.6		0.94	4.11	1.86	1.27	0.55	4.14	2.08	2.61	1.73	1.73
Bromide	mg/L	-													
TKN	mg/L	-		1.1		4.2	1.5	1	1.4	0.5	2.4	0.7	2.1	0.5	0.7
Hardness	mg/L	500	OG	464		460	428	**510**	397	**620**	**703**	422	384	364	370
Aluminum	mg/L	0.1	OG	0.03		0.08	0.07	0.06	0.07	0.04	0.07	0.04	0.07	0.03	0.04
Antimony	mg/L	0.006	IMAC	0.0003		0.0001	< 0.0001	0.0003	0.0004	0.0002	0.0008	0.0001	< 0.0001	<0.0001	<0.0001
Arsenic	mg/L	0.025	IMAC	0.0002		0.0002	0.0002	0.0002	0.0002	< 0.0003	0.0002	0.0001	< 0.0001	<0.0001	<0.0001
Barium	mg/L	1	MAC	0.11		0.137	0.089	0.093	0.12	0.167	0.507	0.134	0.139	0.099	0.1
Beryllium	mg/L	-		< 0.002		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	<0.0001
Boron	mg/L	5	IMAC	0.378		0.778	0.667	1.14	0.592	1.07	0.667	0.322	0.263	0.24	0.244
Cadmium	mg/L	0.005	MAC	< 0.00002		< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000029	< 0.000029	< 0.000010	< 0.000010	<0.000015	<0.000015
Calcium	mg/L	-		111		146	140	154	118	156	231	138	126	119	121
Chromium	mg/L	0.05	MAC	0.001	broken	< 0.001	< 0.001	< 0.001	0.001	< 0.001	0.013	< 0.001	< 0.001	0.001	0.001
Chromium (VI)	mg/L										**0.012**	< 0.001	< 0.001	<0.01	<0.01
Cobalt	mg/L	-		< 0.005		0.0025	0.0021	< 0.005	< 0.005	0.006	0.007	< 0.005	< 0.005	0.0005	0.0004
Copper	mg/L	1	AO	0.001		0.0024	0.0031	0.0033	0.0028	0.0024	0.0051	0.0017	0.0014	0.002	0.0018
Iron	mg/L	0.3	AO	< 0.005		< 0.005	0.01	< 0.005	0.103	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	<0.005
Lead	mg/L	0.01	MAC	< 0.00002		0.00002	< 0.00002	0.00029	0.00013	< 0.00009	< 0.00009	< 0.00002	< 0.00002	0.00002	<0.00002
Magnesium	mg/L	-		45		23	18.9	30.2	24.8	55.8	30.8	18.7	16.8	16.2	16.5
Manganese	mg/L	0.05	AO	< 0.001		**0.198**	**0.767**	**0.205**	**0.855**	**0.151**	**0.688**	**0.09**	0.033	0.007	0.007
Mercury	mg/L	0.001	MAC	0.00003		0.00005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002	<0.00002
Molybdenum	mg/L	-		0.0004		0.0044	0.0008	0.0008	0.0017	0.0006	0.0004	0.0009	0.0006	0.0008	0.0008
Nickel	mg/L	-		< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.0015	0.0015
Potassium	mg/L	-		14.7		12.4	8.4	13.9	14.8	25.1	118	32.7	15.3	23	23.4
Phosphorus-Total	mg/L	-		0.01		13	1.47	1.33	1.04	0.29	0.45	1.47	1.16	0.81	1.15
Selenium	mg/L	0.01	MAC	0.01		< 0.001	< 0.001	< 0.001	0.002	0.002	0.003	< 0.001	< 0.001	<0.001	0.001
Silver	mg/L	-		< 0.00002		< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001
Sodium	mg/L	200	AO	195		31	34.7	66.4	105	**364**	59.7	13.3	10.3	9.1	9.3
Strontium	mg/L	-		3.66		0.603	0.502	1.19	1.59	5.29	0.511	0.283	0.262	0.218	0.223
Thallium	mg/L	-		< 0.00005		< 0.00005	< 0.00005	0.00007	0.0001	< 0.00005	0.00008	< 0.005	< 0.00005	<0.00005	<0.00005
Vanadium	mg/L	-		0.001		0.0002	0.0002	0.0004	0.0001	< 0.0004	0.0003	0.0002	0.0002	0.0002	0.0002
Zinc	mg/L	5	AO	< 0.005		0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	<0.005
TSS	mg/L	-	-												
Cyanide (Total)	mg/L	0.2	MAC												
BOD(5 day)	mg/L	-	-												
Field Temperature	°C	-	AO	11.8		7.1	9.7	10	5.9	10.1	7.8	12	8.9	11.7	11.7
Field pH	pH Units	6.5-8.5	OG	7.49		7.68	6.63	7.65	7.42	7.66	7.3	7.26	7.56	7.44	7.44
Field Conductivity	µS/cm	-		800		835	868	720	625	1950	1822	886	1242	762	762

Shading indicates detection

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ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bedrock Ground Water Quality Data

PARAMETER	UNITS	ODWQS		26-I 6-May-08	26-I 18-Aug-08	26-I 25-May-09	26-I 4-Aug-09	26-I 10-Jun-10	26-I 6-Oct-10	26-I 12-May-11	26-I 8-Nov-11	26-I 19-Apr-12	26-I 29-Oct-12	26-I 3-Jun-13	26-I 29-Oct-13
Alkalinity	mg/L	500	OG	205	202	198	206	211	213	212	212	230	230	211	214
Conductivity	µS/cm	-		1120	1060	1080	951	914	934	862	3690	850	830	948	867
pH	pH Units	6.5-8.5	OG	7.73	7.87	7.88	7.97	8	7.93	8.06	7.42	7.92	7.78	8.02	8.16
TDS	mg/L	500	AO	**645**	**725**	**690**	**699**	**618**	**594**	490	433	454	443	481	470
DOC	mg/L	5		<1	1.4	1	< 1	1	1	1.1	1	0.9	0.8	2.8	-
COD	mg/L	-		<2	<2	< 2	< 2	8	2	8	11	<4.0	12	< 5	< 5
Phenols	mg/L	-		0.002	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	<0.0010	<0.0010	< 0.001	< 0.001
Chloride	mg/L	250	AO	211	219.9	245	249	206	185	170	140	130	120	152	159
Ammonia, total	mg/L	-		0.9	1.87	2.2	< 0.01	1.7	1.9	1.9	<0.1	1.7	1.9	1.43	1.26
Unionized Ammonia	mg/L	-													
Fluoride	mg/L	2.4	MAC	0.5	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.39	0.4	0.4
Sulphate	mg/L	500	AO	5	4.2	5	6	6	6	5	6	6	5	6	7
Nitrite (N)	mg/L	1	MAC	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.01	<0.01	<0.010	<0.010	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	<0.1	<0.1	< 0.1	< 0.1	0.4	< 0.1	<0.1	<0.1	<0.10	<0.10	< 0.1	< 0.1
Bromide	mg/L	-		-	-	2.4	-	< 0.1	-	2	1	1.3	1.4	1.9	1.8
TKN	mg/L	-		1.6	2.8	2.2	1.9	2.2	1.9	1.9	1.6	1.9	1.7 (1)	1.66	1.6
Hardness	mg/L	500	OG	235	224	268	267	269	264	200	170	200	200	224	207
Aluminum	mg/L	0.1	OG	<0.01	<0.01	< 0.01	< 0.01	< 0.01	0.03	<0.005	<0.005	<0.0050	<0.0050	0.02	0.02
Antimony	mg/L	0.006	IMAC	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	<0.0005	<0.00050	<0.00050	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	<0.01	<0.01	< 0.01	< 0.01	< 0.005	< 0.005	<0.001	<0.001	<0.0010	<0.0010	0.0012	0.0021
Barium	mg/L	1	MAC	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.021	0.02	0.023	0.018	0.02	0.02
Beryllium	mg/L	-		<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.0005	<0.0005	<0.00050	<0.00050	< 0.002	< 0.002
Boron	mg/L	5	IMAC	0.5	0.274	0.6	0.6	0.5	0.1	0.53	0.6	0.6	0.56	0.594	0.575
Cadmium	mg/L	0.005	MAC	<0.0001	<0.0001	< 0.0001	0.001	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002
Calcium	mg/L	-		47	54.1	53	54	60	56	43	35	40	41	46.1	43.4
Chromium	mg/L	0.05	MAC	<0.0001	0.000214	0.0002	< 0.0001	0.0001	0.0002	<0.005	<0.005	<0.0050	-	0.002	0.004
Chromium (VI)	mg/L														
Cobalt	mg/L	-		<0.0003	<0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	<0.0005	<0.0005	<0.00050	<0.00050	< 0.0001	< 0.005
Copper	mg/L	1	AO	<0.0001	0.000683	< 0.0001	< 0.0001	< 0.0001	0.0016	<0.001	<0.001	<0.0010	<0.0010	0.0003	0.0013
Iron	mg/L	0.3	AO	<0.1	<0.1	0.1	< 0.1	0.1	< 0.1	<0.1	<0.1	<0.10	<0.10	0.03	0.02
Lead	mg/L	0.01	MAC	<0.001	<0.001	0.001	0.001	< 0.001	< 0.001	<0.0005	<0.0005	<0.00050	<0.00050	< 0.00002	0.00005
Magnesium	mg/L	-		28	21.55	33	32	29	30	24	20	24	24	26.5	24.1
Manganese	mg/L	0.05	AO	<0.01	<0.01	<0.01	< 0.01	< 0.01	< 0.01	<0.002	<0.002	<0.0020	0.0024	0.002	0.002
Mercury	mg/L	0.001	MAC	0.00006	<0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00001	-	<0.00001	<0.00001	< 0.00002	< 0.00002
Molybdenum	mg/L	-		<0.002	<0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.001	<0.0005	<0.00050	<0.00050	< 0.0001	< 0.0001
Nickel	mg/L	-		<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.001	<0.001	<0.0010	<0.0010	< 0.01	< 0.01
Potassium	mg/L	-		12.4	13.4	13.9	13.9	16.7	12	11	9.2	11	11	11.8	10.2
Phosphorus-Total	mg/L	-		<0.01	0.01	0.01	< 0.01	< 0.01	< 0.02	0.015	<0.02	<0.10	<0.002	0.01	< 0.01
Selenium	mg/L	0.01	MAC	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.002	<0.002	<0.0020	<0.0020	< 0.01	< 0.01
Silver	mg/L	-		<0.0001	<0.0001	0.0001	< 0.0001	< 0.0001	0.0002	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002
Sodium	mg/L	200	AO	105	115	111	105	99	95	95	86	97	93	110	98.5
Strontium	mg/L	-		2.63	2.9	2.92	3.01	2.8	2.51	2.2	1.9	2.1	2.1	-	-
Thallium	mg/L	-		<0.0003	<0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	<0.00005	<0.00005	<0.000050	<0.000050	< 0.00005	< 0.00005
Vanadium	mg/L	-		<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	<0.00050	0.0011	0.0027	0.0009
Zinc	mg/L	5	AO	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.019	<0.005	<0.0050	<0.0050	< 0.005	< 0.005
TSS	mg/L	-	-												
Cyanide (Total)	mg/L	0.2	MAC												
BOD(5 day)	mg/L	-	-												
Field Temperature	°C	-	AO	-	-	-	-	-	-	-	-	11.1	8.9	11.1	10.8
Field pH	pH Units	6.5-8.5	OG	-	-	-	-	-	-	-	-	7.4	7.61	7.42	7.7
Field Conductivity	µS/cm	-		-	-	-	-	-	-	-	-	848	880	883	910

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bedrock Ground Water Quality Data

PARAMETER	UNITS	ODWQS		26-I 1-May-14	26-I 24-Sep-14	26-I 28-Apr-15	26-I 6-Oct-15	26-I 26-Apr-16	26-I 20-Oct-16	26-I 12-Apr-17	26-I 5-Oct-17	26-I 11-Apr-18	26-I 2-Oct-18	26-I 23-Apr-19	26-I 9-Oct-19
Alkalinity	mg/L	500	OG	217	208	212	207	227	211	219	220	210	215	211	214
Conductivity	µS/cm	-		886	846	903	961	805	930	919	881	912	799	959	943
pH	pH Units	6.5-8.5	OG	8.13	8.1	8.14	8.08	8.06	8.14	8.08	8.09	8.04	8.07	8.1	7.97
TDS	mg/L	500	AO	454	425	462	474	450	476	478	423	441	408	474	**520**
DOC	mg/L	5		1.8	2	**19.4**	< 0.2	0.5	0.7	1	1	1.9	1.1	1.7	2.4
COD	mg/L	-		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	6	7	8	< 5
Phenols	mg/L	-		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.016	< 0.001	0.003	< 0.001	< 0.002	< 0.002	< 0.002
Chloride	mg/L	250	AO	153	134	153	166	149	150	158	119	130	113	164	195
Ammonia, total	mg/L	-		1.6	1.57	1.58	1.46	1.3	1.5	1.57	1.46	1.58	1.39	1.63	1.59
Unionized Ammonia	mg/L	-												< 0.01	0.03
Fluoride	mg/L	2.4	MAC	0.3	0.5	0.4	0.3	0.4	0.3	0.6	0.3	0.2	0.4	0.2	< 0.1
Sulphate	mg/L	500	AO	6	6	6	6	5	5	6	5	5	5	6	1
Nitrite (N)	mg/L	1	MAC	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	10	MAC	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bromide	mg/L	-		1.6	1.6	1.8	1.9	1.7							
TKN	mg/L	-		1.7	1.6	1.9	1.5	1.4	1.6	1.7	1.4	1.7	1.5	1.7	1.8
Hardness	mg/L	500	OG	195	177	206	202	168	227	226	180	228	186	226	241
Aluminum	mg/L	0.1	OG	0.01	0.01	< 0.01	0.02	0.01	0.01	0.02	0.02	0.03	0.02	0.05	0.03
Antimony	mg/L	0.006	IMAC	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0003	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.0019	0.001	< 0.0001	0.0003	0.0003	0.0002	0.0004	0.0007	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Barium	mg/L	1	MAC	0.02	0.02	0.02	0.02	0.02	0.02	0.06	0.02	0.016	0.017	0.018	0.018
Beryllium	mg/L	-		< 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	mg/L	5	IMAC	0.464	0.546	0.507	0.513	0.558	0.567	0.533	0.576	0.471	0.516	0.467	0.494
Cadmium	mg/L	0.005	MAC	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000015
Calcium	mg/L	-		40.9	36.9	43.1	41.8	35	46.6	45.2	35.7	47.3	37.4	47.6	49.6
Chromium	mg/L	0.05	MAC	0.003	0.003	0.001	0.002	< 0.0002	0.001	0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001
Chromium (VI)	mg/L														
Cobalt	mg/L	-		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.009	< 0.005	< 0.005
Copper	mg/L	1	AO	0.001	0.0011	0.0013	0.0011	0.0008	0.0007	0.0006	0.0004	0.0013	0.0002	0.0009	0.0008
Iron	mg/L	0.3	AO	< 0.005	< 0.005	0.01	0.01	0.01	0.01	0.03	0.02	0.015	0.019	0.041	0.021
Lead	mg/L	0.01	MAC	0.00003	< 0.00002	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00005	< 0.00002
Magnesium	mg/L	-		22.7	20.7	23.9	23.6	19.7	26.9	27.5	22	26.7	22.5	26	28.5
Manganese	mg/L	0.05	AO	0.001	0.001	0.001	0.002	< 0.001	0.004	0.002	0.001	0.002	0.002	0.002	0.002
Mercury	mg/L	0.001	MAC	< 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	mg/L	-		< 0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001
Nickel	mg/L	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		10.3	9.8	10.8	10	9.4	11.7	12.3	10.7	10.7	9.9	11.2	12.6
Phosphorus-Total	mg/L	-		< 0.01	0.02	0.02	< 0.01	< 0.01	< 0.01	0.02	0.03	0.02	0.02	< 0.01	0.03
Selenium	mg/L	0.01	MAC	< 0.001	0.002	0.003	0.005	< 0.001	0.007	< 0.001	0.001	0.001	0.002	0.003	0.006
Silver	mg/L	-		< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	89.5	90.1	95.3	93.5	94	106	95.2	96.6	92.3	89	89.9	102
Strontium	mg/L	-		-	2.01	2.34	2.05	1.86	2.58	2.43	2.04	2.38	1.99	2.48	2.64
Thallium	mg/L	-		0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		0.0016	0.0048	0.0014	0.0006	0.0008	0.0006	0.0006	0.0009	< 0.0001	< 0.00007	< 0.0001	< 0.0001
Zinc	mg/L	5	AO	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.011	< 0.005
TSS	mg/L	-	-												
Cyanide (Total)	mg/L	0.2	MAC												
BOD(5 day)	mg/L	-	-												
Field Temperature	°C	-	AO	14	9.8	12	11.7	9.5	11.3	8.8	14.3			9.1	9.8
Field pH	pH Units	6.5-8.5	OG	8.26	8.15	7.85	7.88	8.44	8.01	8.09	7.07	8.04	8.07	7.1	8
Field Conductivity	µS/cm	-		800	1050	970	650	685	790	736	736	851	776	910	793

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bedrock Ground Water Quality Data

PARAMETER	UNITS	ODWQS		26-I 13-Apr-20	26-I 15-Oct-20	26-I 21-Apr-21	26-I 18-Oct-21	26-I 20-Apr-22	26-I 12-Oct-22	26-I 19-Apr-23	26-I 12-Oct-23	27-I 13-May-08	27-I 14-Aug-08	27-I 5-Jun-09	27-I 4-Aug-09
Alkalinity	mg/L	500	OG	210	222	230	240	233	245	248	258	206.16	198	198	204
Conductivity	µS/cm	-		953	953	903	932	906	747	873	781	3770	3640	3700	5020
pH	pH Units	6.5-8.5	OG	7.98	7.83	7.94	7.79	7.88	7.91	7.94	7.65	7.67	7.79	7.77	7.2
TDS	mg/L	500	AO	471	**507**	469	**525**	466	400	456	409	**2400**	**2450**	**2370**	**2410**
DOC	mg/L	5		1.4	1.2	2.5	1.7	1.2	< 0.2	0.6	2.8	<1	<1	4	< 1
COD	mg/L	-		< 5	< 5	13	< 5	< 5	< 5	< 5	7	5	8	< 1	2
Phenols	mg/L	-		< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001	0.001	<0.001	< 0.001	< 0.001
Chloride	mg/L	250	AO	160	164	141	174	138	81.2	128	94.5	**1170**	**1070**	**1190**	**1340**
Ammonia, total	mg/L	-		1.56	1.62	1.52	1.71	2	1.34	1.94	1.42	0.8	3.11	3.25	3.25
Unionized Ammonia	mg/L	-		0.01	0.02		0.03	0.02	0.03	0.04	0.01				
Fluoride	mg/L	2.4	MAC	< 0.1	0.1	0.2	0.2	< 0.1	0.4	0.2	0.5	1.1	1	1.5	1.2
Sulphate	mg/L	500	AO	6	5	6	7	6	5	51	3	<1	<1	< 1	< 1
Nitrite (N)	mg/L	1	MAC	< 0.05	< 0.05	0.07	0.14	< 0.05	< 0.05	< 0.05	<0.05	<0.1	<0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.6	<0.05	<0.1	0.1	< 0.1	< 0.1
Bromide	mg/L	-										-	-	-	13.7
TKN	mg/L	-		1.8	1.8	1.8	1.7	2	1.5	2.2	1.6	2.2	3.2	3.7	3.4
Hardness	mg/L	500	OG	224	246	229	250	230	176	231	179	318	334	320	354
Aluminum	mg/L	0.1	OG	0.03	0.03	0.03	0.03	< 0.01	< 0.01	0.04	0.01	0.07	<0.01	0.01	< 0.01
Antimony	mg/L	0.006	IMAC	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.01	<0.01	< 0.01	< 0.01
Arsenic	mg/L	0.025	IMAC	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.01	<0.01	< 0.01	< 0.01
Barium	mg/L	1	MAC	0.018	0.021	0.018	0.019	0.02	0.025	0.017	0.019	<0.1	<0.1	< 0.1	< 0.1
Beryllium	mg/L	-		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001	<0.1	<0.1	< 0.1	< 0.1
Boron	mg/L	5	IMAC	0.472	0.553	0.506	0.508	0.483	0.638	0.536	0.659	1.3	1.18	1.3	1.4
Cadmium	mg/L	0.005	MAC	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	0.000025	< 0.000010	<0.000015	<0.0001	<0.0001	< 0.0001	< 0.0001
Calcium	mg/L	-		45.7	49.3	47.6	51	46.8	36.8	46.4	36.6	65	67.3	67	71
Chromium	mg/L	0.05	MAC	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	0.0001	0.000132	0.0001	0.0008
Chromium (VI)	mg/L							< 0.001	< 0.001	< 0.001	<0.01				
Cobalt	mg/L	-		< 0.0001	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.0001	<0.0003	<0.0003	< 0.0003	< 0.0003
Copper	mg/L	1	AO	0.0017	0.0005	0.0011	0.0006	0.0003	0.0002	0.0002	0.0002	0.0017	0.002205	< 0.0001	0.0009
Iron	mg/L	0.3	AO	0.019	0.032	0.02	0.02	0.016	< 0.005	0.013	0.024	0.2	0.11	0.1	0.1
Lead	mg/L	0.01	MAC	0.00003	0.00007	0.00005	< 0.00002	< 0.00002	0.00003	< 0.00002	<0.00002	0.003	0.00259	0.002	0.003
Magnesium	mg/L	-		26.6	29.9	26.7	29.8	27.5	20.4	28	21.4	38	40.3	37	43
Manganese	mg/L	0.05	AO	0.002	0.002	0.002	0.003	0.002	< 0.001	0.001	0.002	<0.01	<0.01	< 0.01	< 0.01
Mercury	mg/L	0.001	MAC	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002	<0.00002	<0.00005	< 0.00002	< 0.00002
Molybdenum	mg/L	-		< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.002	<0.002	< 0.002	< 0.002
Nickel	mg/L	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.0004	<0.01	<0.01	< 0.01	< 0.01
Potassium	mg/L	-		11.4	12.9	11.7	12.6	11.6	10.2	11.3	10.6	21.6	23.2	20.4	25
Phosphorus-Total	mg/L	-		< 0.01	0.02	0.05	< 0.01	0.02	< 0.01	< 0.01	0.01	<0.01	0.64	< 0.01	< 0.01
Selenium	mg/L	0.01	MAC	0.003	0.003	0.002	0.004	0.003	0.002	0.003	0.002	<0.01	<0.01	< 0.01	< 0.01
Silver	mg/L	-		< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	0.0002	0.000168	0.0001	< 0.0001
Sodium	mg/L	200	AO	93.8	111	95.9	104	93.7	97.3	87.1	103	**627**	**682**	**576**	**711**
Strontium	mg/L	-		2.48	2.85	2.46	2.67	2.53	1.9	2.41	2.05	4.68	5.1	4.2	4.8
Thallium	mg/L	-		< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.005	< 0.00005	<0.00005	<0.0003	<0.0003	< 0.0003	< 0.0003
Vanadium	mg/L	-		< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0003	<0.0001	<0.001	<0.001	< 0.001	< 0.001
Zinc	mg/L	5	AO	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	<0.01	<0.01	< 0.01	< 0.01
TSS	mg/L	-	-												
Cyanide (Total)	mg/L	0.2	MAC												
BOD(5 day)	mg/L	-	-												
Field Temperature	°C	-	AO	10.9	10	9.5	10.3	9.5	12.1	10.1	11	-	-	-	-
Field pH	pH Units	6.5-8.5	OG	7.66	7.9	8.01	7.9	7.69	7.95	8.08	7.59	-	-	-	-
Field Conductivity	µS/cm	-		870	830	823	854	990	723	778	728	-	-	-	-

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bedrock Ground Water Quality Data

PARAMETER	UNITS	ODWQS		27-I 10-Jun-10	27-I 6-Oct-10	27-I 12-May-11	27-I 8-Nov-11	27-I 19-Apr-12	27-I 29-Oct-12	27-I 3-Jun-13	27-I 29-Oct-13	27-I 1-May-14	27-I 24-Sep-14	27-I 27-Apr-15	27-I 5-Oct-15
Alkalinity	mg/L	500	OG	203	195	198	204	200	200	192	194	199	191	193	194
Conductivity	µS/cm	-		3380	4120	3890	5020	3900	4100	4150	3980	3740	4070	4320	4000
pH	pH Units	6.5-8.5	OG	7.98	7.9	7.86	7.2	7.88	7.77	7.99	8.07	7.99	8	7.92	7.98
TDS	mg/L	500	AO	**2280**	**2200**	**2100**	**1980**	**1960**	**2030**	**2130**	**2170**	**2000**	**2130**	**2110**	**2070**
DOC	mg/L	5		< 1	< 1	0.5	-	0.5	0.5	1.8	-	1.2	1	1	0.4
COD	mg/L	-		12	<2	22	27	17	16	< 5	< 5	5	< 5	< 5	< 5
Phenols	mg/L	-		< 0.001	< 0.001	<0.001	<0.001	<0.0010	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Chloride	mg/L	250	AO	**2400**	**1170**	**1200**	**1100**	**1000**	**1100**	**1180**	**1300**	**1120**	**1210**	**1260**	**1170**
Ammonia, total	mg/L	-		3	3.1	3.3	<0.1	3	3.2	2.76	2.5	3	3.08	3	2.85
Unionized Ammonia	mg/L	-													
Fluoride	mg/L	2.4	MAC	1	1.2	1.2	1.3	1.23	1.21	1.2	1.3	1.4	1.2	1.2	1.3
Sulphate	mg/L	500	AO	< 1	< 1	<1	<1	<1	<1	< 1	< 1	< 1	< 1	< 1	< 1
Nitrite (N)	mg/L	1	MAC	< 0.1	< 0.1	<0.01	<0.01	<0.010	<0.010	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	10	MAC	< 0.1	< 0.1	<0.1	<0.1	<0.10	<0.10	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bromide	mg/L	-		< 0.1	-	12	13	12	13	11.2	15.6	13	15.3	15	14.5
TKN	mg/L	-		3.1	3.1	8.5	2.9	3.4	2.9	4.35	2.8	3.3	3.4	3.5	3
Hardness	mg/L	500	OG	352	342	350	-	340	370	393	349	300	357	324	361
Aluminum	mg/L	0.1	OG	< 0.01	0.02	<0.005	<0.005	<0.0050	<0.0050	0.03	0.03	0.02	0.02	0.02	0.02
Antimony	mg/L	0.006	IMAC	< 0.01	< 0.01	<0.0005	<0.0005	<0.00050	<0.00050	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.025	IMAC	< 0.005	< 0.005	0.002	<0.002	<0.0020	<0.0020	0.0103	0.0152	0.0134	0.0027	0.0002	0.0005
Barium	mg/L	1	MAC	< 0.1	< 0.1	0.05	0.047	0.044	0.049	0.06	0.05	0.04	0.05	0.04	0.05
Beryllium	mg/L	-		< 0.1	< 0.1	<0.0005	<0.0005	<0.00050	<0.00050	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	5	IMAC	1.1	1.1	1.3	1.2	1.1	1.3	1.36	1.3	1.12	1.15	1.11	1.22
Cadmium	mg/L	0.005	MAC	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Calcium	mg/L	-		79	74	76	69	71	79	84.4	76.1	65.4	77.4	69.5	78
Chromium	mg/L	0.05	MAC	< 0.0001	0.0004	<0.005	<0.005	<0.0050	-	0.008	0.003	0.016	0.02	0.001	0.002
Chromium (VI)	mg/L														
Cobalt	mg/L	-		< 0.0003	< 0.0003	<0.0005	<0.0005	<0.00050	<0.00050	< 0.0001	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Copper	mg/L	1	AO	< 0.0001	0.0009	<0.001	<0.001	<0.0010	<0.0010	0.0002	0.0036	0.0043	0.0064	0.0046	0.0036
Iron	mg/L	0.3	AO	0.1	0.2	<0.1	0.1	<0.10	0.2	0.13	0.12	0.25	0.1	0.07	0.11
Lead	mg/L	0.01	MAC	0.001	0.002	<0.0005	<0.0005	<0.00050	<0.00050	< 0.00002	0.00008	0.00007	< 0.00002	0.00035	0.00006
Magnesium	mg/L	-		38	38	40	39	40	43	44.3	38.7	33.3	39.7	36.6	40.4
Manganese	mg/L	0.05	AO	< 0.01	< 0.01	<0.002	0.002	0.002	0.002	0.002	0.002	0.005	0.002	0.002	0.002
Mercury	mg/L	0.001	MAC	< 0.00002	< 0.00002	<0.00001	-	<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		< 0.002	< 0.002	<0.0005	<0.0005	<0.00050	0.001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001
Nickel	mg/L	-		< 0.01	< 0.01	<0.001	<0.001	<0.0010	<0.0010	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		21.4	20.6	17	17	17	18	20	16.7	16.2	17.4	16.1	17.9
Phosphorus-Total	mg/L	-		< 0.01	< 0.02	0.03	-	<0.10	<0.002	0.1	< 0.01	0.02	< 0.01	0.03	< 0.01
Selenium	mg/L	0.01	MAC	< 0.01	< 0.01	<0.01	<0.01	<0.0040 (1)	<0.0040 (1)	< 0.1	< 0.01	< 0.001	**0.012**	< 0.02	**0.037**
Silver	mg/L	-		0.0001	0.0003	<0.0001	<0.0001	<0.00010	0.0001	< 0.00002	< 0.00002	0.00003	< 0.00002	< 0.00002	< 0.00002
Sodium	mg/L	200	AO	**766**	**698**	**640**	**640**	**660**	**670**	**682**	**626**	**640**	**669**	**601**	**645**
Strontium	mg/L	-		5.71	4.21	4.8	4.7	4.6	5	-	-	-	5.11	4.65	5.17
Thallium	mg/L	-		< 0.0003	< 0.0003	<0.00005	<0.00005	<0.000050	<0.000050	< 0.00005	< 0.00005	0.0001	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		< 0.001	< 0.001	0.004	0.001	<0.0010 (1)	<0.0010 (1)	0.0015	0.0009	0.0015	0.0042	0.0015	0.0004
Zinc	mg/L	5	AO	< 0.01	< 0.01	0.011	<0.005	<0.0050	<0.0050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-												
Cyanide (Total)	mg/L	0.2	MAC												
BOD(5 day)	mg/L	-	-												
Field Temperature	°C	-	AO	-	-	-	-	9.3	7.9	10.3	8.3	10.9	8.6	8.5	11
Field pH	pH Units	6.5-8.5	OG	-	-	-	-	7.49	7.75	7.65	7.53	7.99	8.07	7.91	7.78
Field Conductivity	µS/cm	-		-	-	-	-	3930	4300	4100	3900	4300	3900	4130	3000

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bedrock Ground Water Quality Data

PARAMETER	UNITS	ODWQS		27-I 25-Apr-16	27-I 20-Oct-16	27-I 12-Apr-17	27-I 5-Oct-17	27-I 10-Apr-18	27-I 1-Oct-18	27-I 22-Apr-19	27-I 8-Oct-19	27-I 13-Apr-20	27-I 14-Oct-20	27-I 21-Apr-21	27-I 18-Oct-21
Alkalinity	mg/L	500	OG	193	186	197	192	188	188	204	180	180	192	190	194
Conductivity	µS/cm	-		4690	5380	3860	4070	3980	4170	3820	4210	3810	3880	3840	3820
pH	pH Units	6.5-8.5	OG	7.93	7.93	8.04	8	7.92	7.75	7.98	7.92	7.95	7.84	7.94	7.92
TDS	mg/L	500	AO	**3160**	**2230**	**1960**	**1964**	**2765**	**2119**	**1914**	**2113**	**1964**	**2067**	**1996**	**2268**
DOC	mg/L	5		< 0.2	< 0.2	< 0.2	< 0.2	0.8	0.6	0.9	1.5	0.5	< 0.2	1.3	2
COD	mg/L	-		5	17	< 5	56	76	17	121	23	20	8	22	< 5
Phenols	mg/L	-		< 0.001	0.051	0.041	0.129	< 0.001	0.026	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Chloride	mg/L	250	AO	**1840**	**1220**	**1150**	**1070**	**1490**	**1250**	**1120**	**1200**	**1120**	**1170**	**1110**	**1350**
Ammonia, total	mg/L	-		2.98	3.35	2.88	3.1	2.91	3.03	2.87	3.11	2.86	2.99	2.83	3.12
Unionized Ammonia	mg/L	-								< 0.01	0.03	0.02	0.03		0.03
Fluoride	mg/L	2.4	MAC	3	1.3	< 1	< 1	< 1	0.9	1.1	< 1	< 1	< 1	0.8	< 1
Sulphate	mg/L	500	AO	< 30	< 5	13	< 10	< 10	< 1	< 10	< 10	< 10	< 10	< 1	13
Nitrite (N)	mg/L	1	MAC	< 3	< 0.5	< 1	< 0.5	< 0.5	0.07	< 0.5	< 0.5	< 0.5	< 0.5	0.35	< 0.5
Nitrate (N)	mg/L	10	MAC	< 3	< 0.5	< 1	< 0.5	< 0.5	< 0.05	< 0.5	< 0.5	< 0.5	< 0.5	< 0.05	< 0.5
Bromide	mg/L	-		20.8											
TKN	mg/L	-		3.2	4.5	3	3.2	3.3	3.4	3	3.3	3.3	3.4	3.1	3.2
Hardness	mg/L	500	OG	**597**	429	349	359	**587**	352	330	410	329	329	362	369
Aluminum	mg/L	0.1	OG	0.02	0.03	0.05	0.06	0.07	0.05	0.05	0.06	0.05	< 0.01	0.05	0.05
Antimony	mg/L	0.006	IMAC	< 0.0001	0.0003	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0002	0.0004	0.0005	0.0003
Arsenic	mg/L	0.025	IMAC	0.0005	0.0004	0.003	0.0074	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0003	< 0.0003	< 0.0005
Barium	mg/L	1	MAC	0.04	0.05	0.06	0.05	0.066	0.048	0.044	0.056	0.044	0.046	0.051	0.054
Beryllium	mg/L	-		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.004	< 0.002	< 0.002
Boron	mg/L	5	IMAC	1.16	1.36	1.33	1.26	1.92	1.11	1.16	1.31	1.18	1.25	1.25	1.25
Cadmium	mg/L	0.005	MAC	< 0.00002	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000059	< 0.000059	< 0.000029	< 0.000029	< 0.000059
Calcium	mg/L	-		123	90.4	72.5	74.2	120	73.4	71.9	87.5	69.7	68	77.2	78.4
Chromium	mg/L	0.05	MAC	< 0.0002	0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.002	0.001	< 0.001
Chromium (VI)	mg/L														
Cobalt	mg/L	-		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.0001	< 0.01	< 0.005	< 0.005
Copper	mg/L	1	AO	0.004	0.0057	0.0051	0.0028	0.0075	0.0006	0.0034	0.0046	0.0059	0.0004	0.0006	0.0005
Iron	mg/L	0.3	AO	0.1	0.06	0.12	0.11	< 0.005	0.098	0.089	0.123	0.091	0.076	0.073	0.108
Lead	mg/L	0.01	MAC	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00008	< 0.0002	< 0.0002	< 0.00009	< 0.00009	< 0.0002
Magnesium	mg/L	-		70.5	49.5	40.7	42.2	69.9	41.1	36.5	46.5	37.7	38.7	41	42.2
Manganese	mg/L	0.05	AO	< 0.001	0.004	0.003	0.002	0.004	0.002	0.002	0.003	0.002	< 0.002	0.002	0.003
Mercury	mg/L	0.001	MAC	0.00003	0.00003	0.00008	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0004	< 0.0004	< 0.0002	< 0.0002	< 0.0004
Nickel	mg/L	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	< 0.01	< 0.01
Potassium	mg/L	-		22.2	20.7	19.1	19.3	24.7	19	17.1	20.9	18.5	17.7	19.7	20.5
Phosphorus-Total	mg/L	-		0.02	0.22	0.03	0.02	0.06	0.03	0.01	0.01	< 0.01	0.02	0.02	0.02
Selenium	mg/L	0.01	MAC	< 0.001	**0.067**	< 0.001	**0.012**	0.002	**0.029**	**0.023**	**0.045**	**0.022**	**0.02**	<0.04	<0.03
Silver	mg/L	-		< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00007	< 0.0001	< 0.0001	< 0.0002	< 0.0002	< 0.0001	< 0.0001	< 0.0002
Sodium	mg/L	200	AO	**562**	**723**	**542**	**640**	**945**	**619**	**546**	**649**	**605**	**655**	**631**	**648**
Strontium	mg/L	-		4.52	6.16	4.78	5.2	7.91	4.95	4.56	5.86	4.71	4.89	5.08	5.24
Thallium	mg/L	-		< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.00018	0.00016	0.00023	0.00008
Vanadium	mg/L	-		0.0004	0.0002	0.0005	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0007	< 0.0007	< 0.0004	< 0.0004	< 0.0007
Zinc	mg/L	5	AO	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.01	< 0.005	< 0.005
TSS	mg/L	-	-												
Cyanide (Total)	mg/L	0.2	MAC												
BOD(5 day)	mg/L	-	-												
Field Temperature	°C	-	AO	7.1	10.1	7.5	10			7.1	9	9.1	8.5	6.9	8.9
Field pH	pH Units	6.5-8.5	OG	8.29	7.99	7.3	8.12	7.92	7.75	7.21	7.77	7.55	7.81	7.92	7.8
Field Conductivity	µS/cm	-		2610	3270	2991	3160	4860	3840	3560	2800	>4000	2900	2940	>4000

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bedrock Ground Water Quality Data

PARAMETER	UNITS	ODWQS		27-I 20-Apr-22	27-I 12-Oct-22	27-I 19-Apr-23	27-I 12-Oct-23	29-I 13-May-08	29-I 14-Aug-08	29-I 5-Jun-09	29-I 4-Aug-09	29-I 10-Jun-10	29-I 6-Oct-10	29-I 12-May-11	29-I 8-Nov-11
Alkalinity	mg/L	500	OG	187	190	190	196	235	221	228	231	231	226	240	226
Conductivity	µS/cm	-		3820	4110	3950	4210	1310	1150	1210	1150	1220	1150	1310	1150
pH	pH Units	6.5-8.5	OG	7.85	7.78	7.89	7.6	8.19	8.26	8.21	8.34	8.39	8.16	8.31	8.16
TDS	mg/L	500	AO	**1941**	**2125**	**2122**	**2370**	**705**	**853**	**746**	**787**	**750**	**794**	**595**	**697**
DOC	mg/L	5		0.3	< 0.2	< 0.2	1.4	<1	1.3	< 2	< 1	< 1	< 1	0.9	0.9
COD	mg/L	-		17	11	34	19	3	5	< 1	< 2	9	< 2	19	16
Phenols	mg/L	-		< 0.001	< 0.001	< 0.001	<0.001	0.002	0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001
Chloride	mg/L	250	AO	**1120**	**1160**	**1250**	**1300**	250	**267**	**251**	**304**	236	240	210	**260**
Ammonia, total	mg/L	-		3.03	2.22	3.05	3.63	1	1.11	0.84	1.2	0.9	1.2	1.1	<0.1
Unionized Ammonia	mg/L	-		0.03	0.03	0.03	<0.01								
Fluoride	mg/L	2.4	MAC	< 1	4	< 1	0.5	1.8	2.1	2.2	2.3	1.9	2.2	1.9	2.3
Sulphate	mg/L	500	AO	< 10	< 10	16	<1	1	<1	< 1	< 1	< 1	< 1	<1	<1
Nitrite (N)	mg/L	1	MAC	< 0.5	< 0.5	< 0.05	0.29	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.01	<0.01
Nitrate (N)	mg/L	10	MAC	< 0.5	< 0.5	2.02	<0.05	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	<0.1
Bromide	mg/L	-						-	-	-	2.9	2.5	-	3	3
TKN	mg/L	-		3.9	3.5	3.8	4.1	2	1	0.9	1.3	1.2	1.3	2	2
Hardness	mg/L	500	OG	330	416	375	395	53	60	48	50	45	52	50	53
Aluminum	mg/L	0.1	OG	0.01	0.02	0.04	0.02	0.02	0.0104	< 0.01	< 0.01	< 0.01	< 0.01	<0.005	0.009
Antimony	mg/L	0.006	IMAC	0.0002	0.0002	< 0.0001	<0.0001	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.0005	<0.0005
Arsenic	mg/L	0.025	IMAC	< 0.0003	< 0.0003	< 0.0003	<0.0003	<0.01	<0.01	< 0.01	< 0.01	< 0.005	< 0.005	<0.001	<0.001
Barium	mg/L	1	MAC	0.046	0.065	0.052	0.055	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.021	0.025
Beryllium	mg/L	-		< 0.002	< 0.002	< 0.002	<0.0001	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.0005	<0.0005
Boron	mg/L	5	IMAC	1.19	1.28	1.34	1.33	1.37	1.49	1.4	1.6	1.2	1.4	1.4	1.5
Cadmium	mg/L	0.005	MAC	< 0.000029	< 0.000029	< 0.000029	<0.000030	<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001
Calcium	mg/L	-		69.4	91.6	78.6	82.9	12	12.3	11	10	9	11	12	11
Chromium	mg/L	0.05	MAC	< 0.001	< 0.001	< 0.001	<0.001	0.0002	0.000285	< 0.0001	0.0001	0.0001	0.0004	<0.005	<0.005
Chromium (VI)	mg/L			< 0.001	< 0.001	< 0.001	<0.01								
Cobalt	mg/L	-		0.005	< 0.005	< 0.005	0.0002	<0.0003	<0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	<0.0005	<0.0005
Copper	mg/L	1	AO	0.0016	0.0003	< 0.0002	0.0003	0.0009	0.000636	0.0002	0.0019	0.0001	0.0011	<0.001	<0.001
Iron	mg/L	0.3	AO	0.107	0.113	0.114	0.122	<0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	<0.1
Lead	mg/L	0.01	MAC	< 0.00009	< 0.00009	< 0.00009	<0.00009	0.002	0.001633	0.001	0.002	< 0.001	< 0.001	<0.0005	<0.0005
Magnesium	mg/L	-		38.1	45.5	43.4	45.7	5	6.98	5	6	5	6	5.2	6.2
Manganese	mg/L	0.05	AO	0.002	0.002	0.002	0.003	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.002	<0.002
Mercury	mg/L	0.001	MAC	< 0.00002	< 0.00002	< 0.00002	<0.00002	<0.00002	<0.00005	0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00001	<0.00001
Molybdenum	mg/L	-		< 0.0002	< 0.0002	< 0.0002	<0.0002	<0.002	<0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0005	<0.0005
Nickel	mg/L	-		< 0.01	< 0.01	< 0.01	0.0014	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.001	<0.001
Potassium	mg/L	-		17.3	19.7	18.5	21.2	7.3	8.97	7.1	8.7	9.9	7.5	5.7	6.7
Phosphorus-Total	mg/L	-		0.02	0.01	< 0.01	<0.01	<0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.02	0.84	2.9
Selenium	mg/L	0.01	MAC	<0.03	< 0.02	<0.02	<0.001	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.002	<0.002
Silver	mg/L	-		0.0001	0.0016	< 0.0001	<0.0001	<0.0001	<0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.0001
Sodium	mg/L	200	AO	**578**	**683**	**621**	**741**	**212**	**262**	**223**	**272**	**239**	**249**	**220**	**260**
Strontium	mg/L	-		4.66	5.56	4.99	5.83	0.495	0.668	0.573	0.67	0.6	0.6	0.57	0.64
Thallium	mg/L	-		< 0.00005	< 0.005	< 0.00005	<0.00005	<0.0003	<0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	<0.00005	<0.00005
Vanadium	mg/L	-		< 0.0004	< 0.0004	0.0003	<0.0004	<0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.002	0.0021
Zinc	mg/L	5	AO	< 0.005	< 0.005	< 0.005	<0.005	<0.01	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.007	0.015
TSS	mg/L	-	-												
Cyanide (Total)	mg/L	0.2	MAC												
BOD(5 day)	mg/L	-	-												
Field Temperature	°C	-	AO	8.2	13.1	8.3	9.2	-	-	-	-	-	-	-	-
Field pH	pH Units	6.5-8.5	OG	7.84	7.71	7.75	7.78	-	-	-	-	-	-	-	-
Field Conductivity	µS/cm	-		3745	3928	3418	3492	-	-	-	-	-	-	-	-

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bedrock Ground Water Quality Data

PARAMETER	UNITS	ODWQS		29-I 19-Apr-12	29-I 29-Oct-12	29-I 3-Jun-13	29-I 29-Oct-13	29-I 1-May-14	29-I 24-Sep-14	29-I 28-Apr-15	29-I 5-Oct-15	29-I 25-Apr-16	29-I 20-Oct-16	29-I 12-Apr-17	29-I 5-Oct-17
Alkalinity	mg/L	500	OG	240	240	233	237	231	229	232	241	232	232	238	237
Conductivity	µS/cm	-		1300	1300	1240	1270	1170	1240	1180	1220	1170	1200	1220	1230
pH	pH Units	6.5-8.5	OG	8.26	8.18	8.36	8.44	8.38	8.41	8.38	8.37	8.38	8.4	8.39	8.38
TDS	mg/L	500	AO	**685**	**675**	**681**	**675**	**610**	**630**	**597**	**640**	**599**	**656**	**614**	**600**
DOC	mg/L	5		0.5	1.4	2	-	1.4	2.2	**8.5**	1	< 0.2	1.8	0.9	4.7
COD	mg/L	-		63	61	136	158	80	44	58	28	80	< 5	46	99
Phenols	mg/L	-		<0.0010	<0.0010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.078	0.003
Chloride	mg/L	250	AO	230	230	232	243	228	231	218	221	220	222	209	194
Ammonia, total	mg/L	-		1.5	2	0.96	1.02	1.16	1.13	1.09	1.01	1.08	1.05	1.09	1.19
Unionized Ammonia	mg/L	-													
Fluoride	mg/L	2.4	MAC	2.23	2.22	2.1	2.3	2.4	2.1	2.2	1.7	2.3	2.2	**2.8**	2.4
Sulphate	mg/L	500	AO	<1	<1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Nitrite (N)	mg/L	1	MAC	<0.010	<0.010	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05
Nitrate (N)	mg/L	10	MAC	<0.10	<0.10	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.05
Bromide	mg/L	-		2.7	3	3.3	3	2.8	3.3	2.7	2.7	2.7	-		
TKN	mg/L	-		3.1	1.6	2.1	1	1.5	1.6	1.7	1.6	1.7	1.6	1.4	2.1
Hardness	mg/L	500	OG	49	51	52	48	43	45	42	45	41	53	43	44
Aluminum	mg/L	0.1	OG	0.0066	0.0092	0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	**0.59**	< 0.01	0.03
Antimony	mg/L	0.006	IMAC	<0.00050	<0.00050	0.0002	< 0.0001	0.0001	0.0002	0.0001	< 0.0001	< 0.0001	0.0003	< 0.0001	0.0001
Arsenic	mg/L	0.025	IMAC	<0.0010	<0.0010	0.0024	0.0036	0.0031	0.0026	< 0.0001	0.0003	0.0005	0.0003	0.0006	0.0015
Barium	mg/L	1	MAC	0.027	0.022	0.03	0.02	0.02	0.02	0.02	0.02	0.015	0.022	0.03	0.027
Beryllium	mg/L	-		<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	mg/L	5	IMAC	1.5	1.5	1.7	1.7	1.4	1.5	1.4	1.6	1.42	1.7	1.7	1.6
Cadmium	mg/L	0.005	MAC	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.000014
Calcium	mg/L	-		9.9	11	10.7	10.3	9.6	9.7	9.4	9.7	8.88	11.5	8.59	8.8
Chromium	mg/L	0.05	MAC	<0.0050	-	0.005	0.002	0.006	0.008	0.001	0.002	< 0.0002	0.0009	0.001	< 0.001
Chromium (VI)	mg/L														
Cobalt	mg/L	-		<0.00050	<0.00050	< 0.0001	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Copper	mg/L	1	AO	<0.0010	<0.0010	0.0002	0.0016	0.0025	0.0024	0.0023	0.0021	0.0015	0.0026	0.0013	0.001
Iron	mg/L	0.3	AO	<0.10	<0.10	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	0.006	**0.322**	0.016	0.019
Lead	mg/L	0.01	MAC	<0.00050	<0.00050	0.0001	0.00006	0.00003	< 0.00002	0.00012	< 0.00002	< 0.00002	0.00017	< 0.00002	< 0.00002
Magnesium	mg/L	-		5.9	6	6	5.5	4.5	5	4.4	5.2	4.65	6.01	5.27	5.34
Manganese	mg/L	0.05	AO	<0.0020	<0.0020	0.001	0.001	< 0.001	0.001	0.001	0.001	< 0.001	0.011	0.001	0.001
Mercury	mg/L	0.001	MAC	<0.00001	<0.00001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	-		<0.00050	<0.00050	0.0002	< 0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel	mg/L	-		<0.0010	<0.0010	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		6.7	6.7	7.1	6.2	5.5	6.1	5.4	6.2	5.6	6.8	6.7	6.6
Phosphorus-Total	mg/L	-		<0.10	9.3	16.7	3.15	4.25	2.6	2.95	1.87	3.76	2.24	1.84	7.66
Selenium	mg/L	0.01	MAC	<0.0020	<0.0020	< 0.01	< 0.01	< 0.001	0.004	0.004	0.008	< 0.001	**0.012**	< 0.001	0.002
Silver	mg/L	-		<0.00010	<0.00010	0.00002	< 0.00002	0.00003	< 0.00002	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Sodium	mg/L	200	AO	**280**	**270**	**282**	**265**	**220**	**238**	**217**	**250**	**217**	**265**	**237**	**239**
Strontium	mg/L	-		0.58	0.62	-	-	-	0.61	0.56	0.64	0.566	0.682	0.585	0.607
Thallium	mg/L	-		<0.000050	<0.000050	< 0.00005	< 0.00005	0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	mg/L	-		<0.00050	0.0013	0.0028	0.0007	0.0019	0.0044	0.0011	0.0006	0.0007	0.0012	0.0006	0.0009
Zinc	mg/L	5	AO	<0.0050	<0.0050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-												
Cyanide (Total)	mg/L	0.2	MAC												
BOD(5 day)	mg/L	-	-												
Field Temperature	°C	-	AO	8.7	8.5	8.8	9.3	12.1	8	9.9	10.9	5.5	12	6.9	12
Field pH	pH Units	6.5-8.5	OG	8.06	8.43	7.6	8.39	8.76	8.61	8.61	8.37	8.73	8.27	8.6	7.21
Field Conductivity	µS/cm	-		1297	1380	1281	1300	1280	1260	1220	915	845	1015	955	1033

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bedrock Ground Water Quality Data

PARAMETER	UNITS	ODWQS		29-I 10-Apr-18	29-I 1-Oct-18	29-I 22-Apr-19	29-I 8-Oct-19	29-I 13-Apr-20	29-I 14-Oct-20	29-I 21-Apr-21	29-I 18-Oct-21	29-I 20-Apr-22	29-I 12-Oct-22	29-I 19-Apr-23	29-I 12-Oct-23
Alkalinity	mg/L	500	OG	234	289	251	228	221	238	234	247	199	242	220	256
Conductivity	µS/cm	-		1160	1200	1030	1170	1150	1230	1180	1170	975	1180	1150	1240
pH	pH Units	6.5-8.5	OG	8.32	8.1	8.27	8.26	8.22	8.13	8.19	8.18	8.2	8.15	8.26	7.91
TDS	mg/L	500	AO	**587**	**652**	**553**	**712**	**574**	**680**	**644**	**684**	**513**	**659**	**590**	**670**
DOC	mg/L	5		1	1	0.8	1.9	0.8	0.6	1.6	**5.2**	0.4	< 0.2	< 0.2	1.5
COD	mg/L	-		54	52	41	9	19	7	23	< 5	11	59	65	16
Phenols	mg/L	-		< 0.001	0.004	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	<0.001
Chloride	mg/L	250	AO	192	227	200	**295**	227	248	239	**261**	184	244	232	241
Ammonia, total	mg/L	-		1.14	1.09	0.94	1.06	0.9	1.08	0.44	1.19	1.25	1.41	3.78	1.8
Unionized Ammonia	mg/L	-				< 0.01	0.03	0.02	0.04		0.04	0.06	0.13	0.11	0.1
Fluoride	mg/L	2.4	MAC	2	2.4	1.7	2.2	1.7	2.1	1.9	**2.7**	1.2	2.1	1.6	2.1
Sulphate	mg/L	500	AO	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	35	<1
Nitrite (N)	mg/L	1	MAC	< 0.05	0.08	< 0.05	< 0.05	< 0.05	< 0.05	0.09	0.22	< 0.05	< 0.05	< 0.05	<0.05
Nitrate (N)	mg/L	10	MAC	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.09	< 0.05	< 0.05	< 0.05	< 0.05	0.12	<0.05
Bromide	mg/L	-													
TKN	mg/L	-		2.3	2	1.5	1.3	1.5	1.5	1	1.4	1.6	1.9	5.1	2.1
Hardness	mg/L	500	OG	43	41	39	47	37	48	45	46	37	47	44	58.3
Aluminum	mg/L	0.1	OG	0.03	< 0.01	0.01	0.02	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	0.01	**0.11**
Antimony	mg/L	0.006	IMAC	< 0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0002	0.0002
Arsenic	mg/L	0.025	IMAC	0.0001	< 0.0001	0.0001	< 0.0003	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001
Barium	mg/L	1	MAC	0.027	0.016	0.013	0.016	0.013	0.018	0.016	0.017	0.015	0.024	0.015	0.018
Beryllium	mg/L	-		< 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	mg/L	5	IMAC	1.56	1.43	1.26	1.65	1.28	1.7	1.57	1.64	1.29	1.66	1.58	1.7
Cadmium	mg/L	0.005	MAC	< 0.000014	< 0.000015	< 0.000015	< 0.000029	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000012	< 0.000012	<0.000015
Calcium	mg/L	-		8.96	8.27	8.58	9.82	7.65	9.75	9.33	9.45	7.71	9.98	9.15	13.9
Chromium	mg/L	0.05	MAC	< 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)	mg/L											< 0.001	< 0.001	< 0.001	<0.01
Cobalt	mg/L	-		< 0.005	< 0.005	< 0.005	< 0.005	< 0.0001	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.0001
Copper	mg/L	1	AO	0.003	0.0004	0.0015	0.0018	0.0026	0.0004	0.001	0.0006	0.0005	0.001	0.0002	0.0004
Iron	mg/L	0.3	AO	0.006	< 0.005	< 0.005	0.019	0.019	< 0.005	0.033	0.012	0.009	< 0.005	0.005	0.145
Lead	mg/L	0.01	MAC	< 0.00002	< 0.00002	0.00002	< 0.00009	< 0.00004	< 0.00004	0.00005	< 0.00004	< 0.00002	< 0.00004	< 0.00004	0.00012
Magnesium	mg/L	-		5.01	4.97	4.19	5.44	4.42	5.7	5.23	5.4	4.34	5.33	5.16	5.72
Manganese	mg/L	0.05	AO	0.001	0.001	0.001	0.001	0.001	< 0.001	0.001	0.001	0.001	< 0.001	< 0.001	0.008
Mercury	mg/L	0.001	MAC	< 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	mg/L	-		< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001
Nickel	mg/L	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.0003
Potassium	mg/L	-		5.9	6.2	5.2	6.8	5.4	7	6.4	6.9	5.3	6.6	5.7	6.9
Phosphorus-Total	mg/L	-		8.63	3	1.1	1.22	0.67	0.91	0.25	0.55	0.81	2.86	1.92	1.04
Selenium	mg/L	0.01	MAC	0.001	0.005	0.004	0.008	0.004	0.004	0.004	<0.02	0.004	0.005	0.005	<0.001
Silver	mg/L	-		< 0.00002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	<0.0001
Sodium	mg/L	200	AO	**231**	**228**	182	**254**	194	**263**	**241**	**248**	190	**244**	**204**	**254**
Strontium	mg/L	-		0.56	0.555	0.503	0.635	0.514	0.67	0.613	0.607	0.5	0.614	0.553	0.659
Thallium	mg/L	-		< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.005	< 0.00005	<0.00005
Vanadium	mg/L	-		0.0002	0.0003	0.0002	< 0.0004	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0003
Zinc	mg/L	5	AO	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005
TSS	mg/L	-	-												
Cyanide (Total)	mg/L	0.2	MAC												
BOD(5 day)	mg/L	-	-												
Field Temperature	°C	-	AO			8.6	11.1	8.2	10.5	6.4	9.3	8.2	13.9	5.8	11.5
Field pH	pH Units	6.5-8.5	OG	8.32	8.1	7.3	8.21	8.16	8.28	8.45	8.33	8.5	8.59	8.36	8.44
Field Conductivity	µS/cm	-		1080	1190	1100	1010	835	1050	1050	1030	1060	1236	1266	1284

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bedrock Ground Water Quality Data

PARAMETER	UNITS	ODWQS		33-I 20-Oct-16	33-I 12-Apr-17	33-I 6-Oct-17	33-I 11-Apr-18	33-I 2-Oct-18	33-I 22-Apr-19	33-I 8-Oct-19	33-I 13-Apr-20	33-I 14-Oct-20	33-I 21-Apr-21	33-I 18-Oct-21	33-I 20-Apr-22
Alkalinity	mg/L	500	OG	236	295	288	291	302	306	309	290	304	311	318	284
Conductivity	µS/cm	-		1610	2040	1960	1870	1830	1820	1820	1780	1750	1720	1710	1740
pH	pH Units	6.5-8.5	OG	8.14	8.11	7.98	8.04	8.04	8.13	7.95	8.02	7.94	8	8.06	8
TDS	mg/L	500	AO	**884**	**1030**	**909**	**934**	**942**	**920**	**1034**	**943**	**972**	**929**	**988**	**891**
DOC	mg/L	5		0.3	0.7	1.3	1.5	1.2	1.5	2.2	0.9	0.6	1.7	1.5	0.8
COD	mg/L	-		5	188	10	12	14	18	< 5	10	5	14	< 5	10
Phenols	mg/L	-		< 0.001	< 0.001	0.006	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001
Chloride	mg/L	250	AO	**395**	**412**	**323**	**359**	**380**	**379**	**455**	**399**	**384**	**370**	**416**	**366**
Ammonia, total	mg/L	-		1.38	1.84	1.77	1.58	1.47	1.59	1.52	1.53	1.59	1.52	1.57	1.75
Unionized Ammonia	mg/L	-							0.01	0.03	0.01	0.02		0.02	0.03
Fluoride	mg/L	2.4	MAC	0.8	1	0.7	1.2	< 0.1	< 0.1	< 1	0.9	1.3	1.3	1.7	1.1
Sulphate	mg/L	500	AO	29	24	10	11	10	6	< 10	2	1	1	< 1	< 1
Nitrite (N)	mg/L	1	MAC	< 0.1	< 0.1	< 0.05	< 0.05	0.21	< 0.05	< 0.5	< 0.05	< 0.05	< 0.05	0.34	< 0.05
Nitrate (N)	mg/L	10	MAC	0.2	0.3	< 0.05	< 0.05	0.07	< 0.05	< 0.5	< 0.05	< 0.05	0.07	< 0.05	< 0.05
Bromide	mg/L	-		-											
TKN	mg/L	-		1.8	5.8	2.1	1.9	2	2.2	2	2.2	2.1	2.1	2	2.2
Hardness	mg/L	500	OG	151	219	202	196	197	185	196	182	190	182	187	173
Aluminum	mg/L	0.1	OG	**0.19**	0.03	0.03	0.04	0.02	0.03	0.04	0.03	< 0.01	0.03	0.03	< 0.01
Antimony	mg/L	0.006	IMAC	0.0014	0.0001	0.0001	0.0002	< 0.0001	0.0001	< 0.0001	0.0001	0.0001	< 0.0001	0.0002	< 0.0001
Arsenic	mg/L	0.025	IMAC	0.0008	0.0026	0.0042	0.0017	0.0016	0.0014	0.0014	0.0009	0.0017	0.0007	0.001	0.0006
Barium	mg/L	1	MAC	0.08	0.1	0.05	0.036	0.035	0.031	0.033	0.033	0.034	0.031	0.031	0.031
Beryllium	mg/L	-		< 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	mg/L	5	IMAC	1.23	2.53	2.43	2.39	2.2	2.21	2.38	2.24	2.49	2.29	2.36	2.23
Cadmium	mg/L	0.005	MAC	0.00008	0.0001	0.0001	0.000049	0.000018	0.000023	< 0.000029	0.000019	0.000015	0.000022	< 0.000015	< 0.000015
Calcium	mg/L	-		36.4	43	39.7	38.6	38.4	37.3	39	35.9	36.7	36.5	37.1	33.6
Chromium	mg/L	0.05	MAC	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)	mg/L														< 0.001
Cobalt	mg/L	-		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0001	< 0.005	< 0.005	< 0.005	0.006
Copper	mg/L	1	AO	0.0022	0.0026	0.0031	0.004	0.0004	0.0022	0.0022	0.0055	0.0003	0.0011	0.0004	0.0006
Iron	mg/L	0.3	AO	0.09	0.05	0.01	0.013	0.022	0.005	0.005	0.012	0.194	0.005	0.006	0.007
Lead	mg/L	0.01	MAC	0.00017	< 0.00002	0.00006	0.00005	0.00003	< 0.00002	< 0.00009	0.00008	< 0.00004	0.00006	0.00004	< 0.00004
Magnesium	mg/L	-		14.7	27.1	25.1	24.2	24.5	22.3	23.9	22.5	23.9	22.2	22.9	21.8
Manganese	mg/L	0.05	AO	0.02	0.02	0.02	0.017	0.017	0.02	0.016	0.008	0.016	0.011	0.013	0.01
Mercury	mg/L	0.001	MAC	< 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	mg/L	-		0.019	0.0416	0.0319	0.0235	0.0187	0.0167	0.0122	0.0139	0.0134	0.0099	0.0077	0.0095
Nickel	mg/L	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		8.9	13.5	12.2	11.1	11.3	10.9	11.9	11.7	12.2	11.3	11.8	10.7
Phosphorus-Total	mg/L	-		0.97	4.95	0.08	0.11	0.07	0.1	0.15	0.09	0.08	0.13	0.07	0.07
Selenium	mg/L	0.01	MAC	0.01	< 0.001	0	0.007	0.008	0.008	**0.013**	0.007	0.006	0.005	<0.02	<0.02
Silver	mg/L	-		< 0.00002	< 0.00002	< 0.00002	0.00003	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	**254**	**331**	**322**	**313**	**295**	**278**	**317**	**296**	**328**	**298**	**305**	**285**
Strontium	mg/L	-		1.19	2.5	2.24	2.33	2.36	2.2	2.38	2.27	2.45	2.22	2.18	2.15
Thallium	mg/L	-		< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.00006	< 0.00005
Vanadium	mg/L	-		0.0009	0.0006	0.0006	< 0.0001	< 0.00007	< 0.0001	< 0.0004	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Zinc	mg/L	5	AO	< 0.005	< 0.005	< 0.005	0.005	< 0.005	0.006	< 0.005	0.005	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-												
Cyanide (Total)	mg/L	0.2	MAC												
BOD(5 day)	mg/L	-	-												
Field Temperature	°C	-	AO	10	7.2	13.5			11.2	13.6	6.3	9.9	6.2	10.6	8.4
Field pH	pH Units	6.5-8.5	OG	8.42	7.78	8.15	8.04	8.04	7.6	7.92	7.83	7.92	8.5	7.7	8.03
Field Conductivity	µS/cm	-		1150	1450	1690	1720	1730	1750	1403	2100	1410	1700	1660	1620

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bedrock Ground Water Quality Data

PARAMETER	UNITS	ODWQS		33-I 12-Oct-22	33-I 19-Apr-23	33-I 12-Oct-23	34 20-Oct-16	34 12-Apr-17	34 6-Oct-17	34 11-Apr-18	34 1-Oct-18	34 22-Apr-19	34 8-Oct-19	34 13-Apr-20	34 14-Oct-20
Alkalinity	mg/L	500	OG	299	289	315	309	353	255	217	303	226	288	190	274
Conductivity	µS/cm	-		1710	1750	1730	3210	4800	1510	1160	3200	1590	2880	743	2020
pH	pH Units	6.5-8.5	OG	7.96	8.03	7.73	8.06	8.01	7.97	7.88	7.99	8.1	8.01	8.04	8.08
TDS	mg/L	500	AO	**934**	**898**	**951**	**1780**	**2500**	**731**	**612**	**1864**	**792**	**1568**	382	**1159**
DOC	mg/L	5		< 0.2	< 0.2	1.8	0.4	0.4	1.1	1.4	0.7	1.2	1.9	1.4	0.4
COD	mg/L	-		9	16	6	6	24	7	7	14	11	14	5	15
Phenols	mg/L	-		< 0.001	< 0.001	<0.001	0.002	0.018	0.005	< 0.001	0.002	< 0.002	< 0.002	< 0.002	< 0.002
Chloride	mg/L	250	AO	**373**	**378**	**388**	**857**	**1380**	241	204	**891**	**339**	**851**	102	**487**
Ammonia, total	mg/L	-		1.51	1.51	2.48	2.28	3.1	1	0.94	1.46	1.55	2.61	0.45	1.57
Unionized Ammonia	mg/L	-		0.05	0.02	<0.01						< 0.01	0.03	< 0.01	0.03
Fluoride	mg/L	2.4	MAC	1.2	< 1	1.4	0.8	< 1	0.8	0.6	0.9	< 0.1	< 1	0.2	0.9
Sulphate	mg/L	500	AO	< 10	11	<1	16	< 10	14	18	8	18	< 10	24	11
Nitrite (N)	mg/L	1	MAC	< 0.5	< 0.05	0.06	< 0.5	< 1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.05	< 0.05
Nitrate (N)	mg/L	10	MAC	< 0.5	0.86	<0.05	< 0.5	< 1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.05	0.09
Bromide	mg/L	-					-								
TKN	mg/L	-		2	2	3.3	3.2	3.4	1.1	1.2	2.1	1.9	3.1	0.8	3.2
Hardness	mg/L	500	OG	184	186	176	301	443	196	158	289	200	249	175	206
Aluminum	mg/L	0.1	OG	< 0.01	0.04	<0.01	**0.12**	0.05	**0.25**	**0.29**	0.03	0.03	0.03	0.02	< 0.01
Antimony	mg/L	0.006	IMAC	< 0.0001	0.0002	<0.0001	0.0006	< 0.0001	0.0004	0.0005	0.0001	0.0003	< 0.0002	0.0001	0.0008
Arsenic	mg/L	0.025	IMAC	0.0012	0.0008	0.0016	0.0013	0.0049	0.0046	0.0008	0.0014	0.0015	0.002	0.0002	0.0022
Barium	mg/L	1	MAC	0.031	0.032	0.03	0.149	0.204	0.047	0.027	0.086	0.034	0.066	0.018	0.054
Beryllium	mg/L	-		< 0.002	< 0.002	<0.0001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	5	IMAC	2.41	2.48	2.43	1.75	2.1	0.92	0.663	1.84	0.732	1.52	0.32	1.43
Cadmium	mg/L	0.005	MAC	< 0.000012	< 0.000012	<0.000015	0.00003	0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000059	< 0.000015	< 0.000029
Calcium	mg/L	-		36.5	35.8	34.1	61.6	86.1	34.9	26.8	51.6	34.8	45.6	30.9	36
Chromium	mg/L	0.05	MAC	< 0.001	< 0.001	<0.001	0.0008	0.0014	< 0.001	0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (VI)	mg/L			< 0.001	< 0.001	<0.01									
Cobalt	mg/L	-		< 0.005	< 0.005	<0.0001	< 0.005	< 0.005	< 0.005	0.007	< 0.005	< 0.005	< 0.005	< 0.0001	< 0.005
Copper	mg/L	1	AO	0.0002	0.0002	0.0003	0.0044	0.0053	0.0028	0.0045	0.0008	0.0026	0.003	0.0009	0.001
Iron	mg/L	0.3	AO	0.267	0.019	**0.836**	0.042	0.26	0.077	0.089	< 0.005	< 0.005	**0.444**	< 0.005	0.166
Lead	mg/L	0.01	MAC	< 0.00004	< 0.00004	<0.00004	0.00019	< 0.00002	< 0.00002	0.00004	< 0.00002	0.00003	< 0.0002	0.00004	< 0.00009
Magnesium	mg/L	-		22.6	23.4	22.1	35.7	55.5	26.5	22.2	39	27.5	32.8	23.9	28.1
Manganese	mg/L	0.05	AO	0.013	0.013	0.011	0.038	0.037	0.001	0.001	0.024	< 0.001	0.033	< 0.001	0.019
Mercury	mg/L	0.001	MAC	< 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	mg/L	-		0.0077	0.0084	0.0059	0.0033	0.0016	0.0022	0.0013	0.001	0.0012	0.0014	0.0004	0.0013
Nickel	mg/L	-		< 0.01	< 0.01	<0.0002	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	-		11.4	10.9	11.6	14.8	18.7	9.4	7.6	15.6	8	12.5	4.7	11.4
Phosphorus-Total	mg/L	-		0.08	0.09	0.06	3.24	1.16	0.15	0.24	0.23	0.24	0.64	0.03	0.8
Selenium	mg/L	0.01	MAC	< 0.02	<0.01	<0.001	**0.04**	< 0.001	0.003	0.01	**0.021**	**0.014**	**0.021**	< 0.001	0.009
Silver	mg/L	-		0.0001	< 0.0001	<0.0001	< 0.00002	< 0.00002	< 0.00002	0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0001
Sodium	mg/L	200	AO	**308**	**276**	**307**	**603**	**592**	**251**	**202**	**674**	**227**	**449**	81.2	**418**
Strontium	mg/L	-		2.24	2.15	2.26	3.33	5.38	1.75	1.35	3.59	1.73	2.68	0.891	2.27
Thallium	mg/L	-		< 0.005	0.00009	<0.00005	0.00006	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.00019
Vanadium	mg/L	-		< 0.0001	0.0006	<0.0001	0.0007	0.0007	0.0005	0.0004	0.00023	0.0004	< 0.0007	0.0005	< 0.0004
Zinc	mg/L	5	AO	< 0.005	< 0.005	<0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-												
Cyanide (Total)	mg/L	0.2	MAC												
BOD(5 day)	mg/L	-	-												
Field Temperature	°C	-	AO	13	6.2	9.8	12.5	7.4	13.7			9.8	10.1	6.3	12.5
Field pH	pH Units	6.5-8.5	OG	8.17	7.97	7.99	7.86	7.73	7.89	7.88	7.99	7.28	7.72	7.89	7.98
Field Conductivity	µS/cm	-		1738	1911	1765	2870	2350	3420	1150	3350	3380	1815	1517	1610

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Bedrock Ground Water Quality Data

									DUP	
				34	34	34	34	34	34	34
PARAMETER	**UNITS**	**ODWQS**		**21-Apr-21**	**18-Oct-21**	**20-Apr-22**	**12-Oct-22**	**19-Apr-23**	**19-Apr-23**	**12-Oct-23**
Alkalinity	mg/L	500	OG	246	297	289	328	263	295	298
Conductivity	µS/cm	-		1860	2930	3650	4050	2510	3410	2010
pH	pH Units	6.5-8.5	OG	8.1	7.98	7.99	7.9	8.03	8.06	7.77
TDS	mg/L	500	AO	**1044**	**1789**	**1813**	**1971**	**1305**	**1735**	**1110**
DOC	mg/L	5		1.4	1.3	0.7	< 0.2	< 0.2	< 0.2	1.9
COD	mg/L	-		17	6	33	16	23	28	10
Phenols	mg/L	-		< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	<0.001
Chloride	mg/L	250	AO	**437**	**936**	**998**	**957**	**680**	**978**	**472**
Ammonia, total	mg/L	-		2.12	2.63	3.14	2.7	1.62	2.24	1.36
Unionized Ammonia	mg/L	-			0.05	0.03	0.02	0.02	0.03	0.04
Fluoride	mg/L	2.4	MAC	0.4	< 1	< 1	**4.1**	< 1	< 1	0.9
Sulphate	mg/L	500	AO	17	14	< 10	24	27	9	9
Nitrite (N)	mg/L	1	MAC	0.18	< 0.5	< 0.5	< 0.5	< 0.5	< 0.05	<0.05
Nitrate (N)	mg/L	10	MAC	< 0.05	< 0.5	< 0.5	< 0.5	< 0.5	1.7	<0.05
Bromide	mg/L	-								
TKN	mg/L	-		2.7	2.7	3.9	3.2	2.2	2.6	2
Hardness	mg/L	500	OG	260	318	353	361	341	352	164
Aluminum	mg/L	0.1	OG	0.03	0.03	0.01	0.01	0.04	0.05	0.03
Antimony	mg/L	0.006	IMAC	0.0009	0.0003	0.0006	0.0007	0.0003	0.0002	0.0001
Arsenic	mg/L	0.025	IMAC	0.001	0.0011	0.0008	0.0025	0.0017	0.0022	0.0016
Barium	mg/L	1	MAC	0.056	0.088	0.081	0.108	0.074	0.082	0.035
Beryllium	mg/L	-		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.0001
Boron	mg/L	5	IMAC	1.21	1.81	1.59	2.12	1.34	1.65	1.25
Cadmium	mg/L	0.005	MAC	< 0.000029	< 0.000029	< 0.000029	< 0.000029	< 0.000029	< 0.000029	<0.000015
Calcium	mg/L	-		47.1	57.3	62.2	66.5	60.9	61.7	29.9
Chromium	mg/L	0.05	MAC	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001
Chromium (VI)	mg/L					< 0.001	< 0.001	< 0.001	< 0.001	<0.01
Cobalt	mg/L	-		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.0001
Copper	mg/L	1	AO	0.0008	0.0005	0.0004	< 0.0002	0.0002	0.0002	0.0003
Iron	mg/L	0.3	AO	0.051	0.007	0.022	**1.59**	**0.975**	**1.16**	0.225
Lead	mg/L	0.01	MAC	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	0.00009
Magnesium	mg/L	-		34.5	42.5	48	47.4	46	48.2	21.7
Manganese	mg/L	0.05	AO	0.023	0.029	0.027	0.025	0.019	0.023	0.01
Mercury	mg/L	0.001	MAC	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	<0.00002
Molybdenum	mg/L	-		0.0011	0.0011	0.0008	0.0005	0.0005	0.0005	0.0006
Nickel	mg/L	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.0002
Potassium	mg/L	-		10.8	16.2	13.3	16.8	11	13	9.2
Phosphorus-Total	mg/L	-		0.15	0.22	0.48	0.21	0.17	0.06	0.2
Selenium	mg/L	0.01	MAC	<0.02	<0.03	<0.02	< 0.02	<0.02	<0.02	<0.001
Silver	mg/L	-		< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	<0.0001
Sodium	mg/L	200	AO	**348**	**542**	**514**	**654**	**348**	**456**	**266**
Strontium	mg/L	-		2.75	3.76	4.19	4.39	3.44	3.95	1.59
Thallium	mg/L	-		0.0003	0.00006	0.00007	< 0.005	0.00005	< 0.00005	<0.00005
Vanadium	mg/L	-		< 0.0004	< 0.0004	0.0001	< 0.0004	0.0009	0.0003	<0.0001
Zinc	mg/L	5	AO	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005
TSS	mg/L	-	-							
Cyanide (Total)	mg/L	0.2	MAC							
BOD(5 day)	mg/L	-	-							
Field Temperature	°C	-	AO	6	12	4.9	12.5	4.2	4.2	10.9
Field pH	pH Units	6.5-8.5	OG	7.85	7.92	7.85	7.57	8.03	8.03	8.18
Field Conductivity	µS/cm	-		2390	2340	1720	>3999	2510	2510	2100

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS Ontario Drinking Water Quality Objectives

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

AO Aesthetic Objective

OG Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Lechate Quality

PARAMETER	UNITS	ODWQS		Leachate 12-May-21
Alkalinity (as CaCO3)	mg/L	500	OG	**684**
Colour (TCU)	µS/cm	-		46
Conductivity (us/cm)	pH Units	-		3110
pH (Units)	mg/L	6.5-8.5	OG	7.81
TDS	mg/L	500	AO	**2332**
TSS	mg/L	-		40
Turbidity (NTU)	mg/L	5	OG	**136**
DOC	mg/L	5	AO	**48.5**
BOD	mg/L	-		14
COD	mg/L	-		191
Phenolics - Total	mg/L	2.4	MAC	0.07
Chloride	mg/L	250	AO	**412**
Cyanide	mg/L	0.2	MAC	
Flouride	mg/L	2.4	MAC	< 0.1
Unionized Ammonia	mg/L	-		0.73
Total Ammonia	mg/L	-		20.8
Sulphate	mg/L	500	OG	**602**
Nitrite	mg/L	1	MAC	< 0.05
Nitrate	mg/L	10	MAC	0.08
TKN	mg/L	-		25.9
Mercury	mg/L	0.001	MAC	< 0.00002
Hardness	mg/L	500	AO	**1360**
Aluminum	mg/L	0.1	OG	**0.21**
Antimony	mg/L	0.005	MAC	0.0024
Arsenic	mg/L	-		0.0058
Barium	mg/L	0.05	MAC	**0.239**
Beryllium	mg/L	-		< 0.002
Boron	mg/L	1	AO	**3.51**
Cadmium	mg/L	0.3	AO	0.000343
Calcium	mg/L	0.01	MAC	**463**
Chromium (Total)	mg/L	-		0.007
Cobalt	mg/L	0.05	AO	0.0148
Copper	mg/L	0.001	MAC	**0.0093**
Iron	mg/L	-		12.6
Lead	mg/L	-		0.0023
Magnesium	mg/L	-		48.1
Manganese	mg/L	-		3.58
Molybdenum	mg/L	0.01	MAC	0.0014
Nickel	mg/L	-		0.03
Potassium	mg/L	200	AO	45.7
Phosphorous - Total	mg/L	-		0.18
Selenium	mg/L	-		< 0.005
Silver	mg/L	-		0.0007
Sodium	mg/L	5	AO	**308**
Strontium	mg/L	-	-	1.97
Thalium	mg/L	0.2	MAC	< 0.0003
Vanadium	mg/L	-	-	0.0069
Zinc	mg/L	-	AO	0.183
Conductivity (us/cm)		-	OG	3145
pH (Units)		6.5-8.5		6.62
Temperature (°C)		-		9.8

Shading indicates detection

Bold text indicates values exceeding the ODWO.

ODWQS	Ontario Drinking Water Quality Objectives
MAC	Maximum Acceptable Concentration
IMAC	Interim Maximum Acceptable Concentration
AO	Aesthetic Objective
OG	Operatioal Guidelines

Bold / Highlighting for ODWQS exceeded parameters

Surface Water Quality Data

Parameter	PWQO	Trigger Concentrations		SW1	SW1	SW1	SW1	SW1	SW1	SW1	SW1	SW1	SW1	SW1	SW1
		SW1 / SW4	SW6	13-May-08	30-Jul-08	5-Nov-08	27-Apr-09	27-May-09	6-Aug-09	23-Apr-10	26-Aug-10	1-Nov-10	12-May-11	4-Jul-11	8-Nov-11
Alkalinity (as CaCO3)	-	-	-	198	318	294	187	233	365	199	350	258	209	286	209
Colour (TCU)	-	-	-	62	120	101	53	114	140	90	162	84	69	150	64
Conductivity (us/cm)	-	-	-	375	575	563	384	445	697	353	618	408	424	572	454
pH (Units)	6.5 - 8.5	-	-	7.26	7.8	7.7	7.92	7.74	7.55	7.82	7.76	7.79	8.02	7.82	7.92
TDS	-	-	-	244	374	366	250	289	453	229	402	265	226	332	251
TSS	-	-	-	<1	2	3	2	6	700	7	35	< 1	1	<1	<1
Turbidity (NTU)	-	-	-	28.6	6.4	4.2	2.9	5.7	159	1.9	8.6	1.3	1.1	4.5	1.2
DOC	-	27	12	14	**28**	23	11	**37**	**28**	16	**29**	20	11.9	26.9	16.5
BOD	-	-	-	4	2	2	2	4	4	4	< 2	2	<2	<2	<2
COD	-	-	-	33	67	52	26	57	575	37	39	45	38	81	47
Phenolics - Total	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
Chloride	-	-	-	9	12	17	11	11	25	11	16	16	11	13	16
Cyanide	0.005	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.002
Flouride	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1
Unionized Ammonia	0.02	0.02	0.02		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.02	<0.02	<0.02
Total Ammonia	-	-	-	<0.1	<0.1	0.04	0.07	0.2	0.09	< 0.01	0.14	0.1	<0.1	<0.1	<0.1
Sulphate	-	-	-	3	<1	<1	3	<1	<1	4	<1	<1	<1	<1	<1
Nitrite	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.01	<0.01	<0.01
Nitrate	-	-	-	<0.1	<0.1	0.2	<0.1	0.2	0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TKN	-	-	-	0.9	1.3	1.3	1.1	1.5	6.4	0.9	2.2	1.1	0.7	1.6	0.8
Mercury	0.0002	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	**0.0036**	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Hardness	-	-	-	208	347	316	201	257	417	223	442	282	210	-	240
Aluminum	0.075	-	-	0.04	0.02	0.01	0.02	0.07	**4.86**	**0.13**	0.02	0.02	0.005	0.016	<0.005
Antimony	0.02	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.0005	<0.0005	<0.0005
Arsenic	0.005	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	**0.01**	<0.005	<0.005	<0.005	<0.005	0.002	<0.001
Barium	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	0.5	<0.1	<0.1	<0.1	33	0.063	0.032
Beryllium	1.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Boron	0.2	0.04	0.09	**0.1**	<0.1	<0.1	<0.1	<0.1	**0.2**	<0.1	<0.1	<0.1	<0.1	0.017	0.01
Cadmium	0.0005	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	**0.0027**	0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Calcium	-	-	-	76	126	114	73	93	149	81	162	102	78.1	120	88.8
Chromium (Total)	0.001	-	-	0.0005	0.0003	0.0002	0.0002	0.0002	**0.0066**	0.0004	0.0003	0.0004	<0.005	<0.005	<0.005
Chromium (VI)	0.001														
Cobalt	0.0009	-	-	<0.0003	0.0004	0.0004	0.0003	0.0004	**0.0082**	0.0003	0.0006	< 0.0003	<0.0005	0.0007	<0.0005
Copper	0.005	-	-	0.0012	0.0004	0.0002	0.0011	0.0013	**0.0346**	0.0016	0.0001	0.0003	<0.001	<0.001	<0.001
Iron	0.3	2	0.11	0.1	**0.4**	0.2	< 0.1	**0.5**	**40**	**0.6**	1	**0.4**	0.23	**1.3**	0.3
Lead	0.005	-	-	<0.001	<0.001	< 0.001	< 0.001	< 0.001	**0.039**	<0.001	< 0.001	< 0.001	<0.0005	<0.0005	<0.0005
Magnesium	-	-	-	5	8	8	4	6	11	5	9	7	5.3	7.8	6
Manganese	-	0.87	0.08	0.04	0.19	0.04	0.02	0.25	7	0.16	0.4	0.12	0.71	1	0.1
Molybdenum	0.04	-	-	<0.002	<0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.002	< 0.002	< 0.002	<0.001	<0.001	<0.0005
Nickel	0.025	-	-	<0.01	<0.01	< 0.01	< 0.01	< 0.01	0.01	<0.01	< 0.01	< 0.01	<0.001	0.001	<0.001
Potassium	-	-	-	1.5	2.1	2	1.8	2.7	4.1	1.7	1.5	1.8	1200	1.9	0.9
Phosphorous - Total	0.03	-	-	0.02	**0.13**	**0.04**	0.03	**0.09**	**0.76**	0.03	**0.22**	**0.054**	**0.15**	**0.048**	**0.038**
Selenium	0.1	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.002	<0.002	<0.002
Silver	0.0001	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	**0.0005**	<0.0001	0.0001	0.0001	<0.0001	<0.0001	<0.0001
Sodium	-	-	-	5	8	8	6	7	15	5	6	5	3.9	5.8	5.2
Strontium	-	-	-	0.14	0.193	0.202	0.144	0.156	0.519	0.14	0.249	0.191	170	0.25	0.17
Thalium	0.0003	-	-	<0.0003	<0.0003	< 0.0003	< 0.0003	< 0.0003	**0.0018**	<0.0003	**0.0005**	< 0.0003	<0.00005	<0.00005	<0.00005
Vanadium	0.006	-	-	<0.001	<0.001	< 0.001	< 0.001	< 0.001	**0.034**	<0.001	< 0.001	< 0.001	<0.0005	0.001	<0.0005
Zinc	0.02	-	-	<0.01	<0.01	< 0.01	< 0.01	< 0.01	**0.19**	<0.01	< 0.01	< 0.01	<0.005	<0.005	<0.005
Conductivity (us/cm)	NV	-	-	-	389	399	382	363	549	324	604	342	421	484.3	462
Dissolved Oxygen	5	-	-	6.8	11.62	4.88	8.03	5.84	2.95	6.42	3.53	6.02	5.02	14	4.07
pH (Units)	6.5 - 8.5	-	-	7.28	8.37	7.3	7.21	7.4	7.37	7.26	7.39	7.44	7.82	7.57	7.21
Temperature (°C)	NV	-	-	15.2	24.1	11.6	19.01	13.05	15.89	15.51	16.2	5.9	14.7	17.8	7.5

Notes:

1. All results are expressed in mg/L unless otherwise stated.
2. PWQO = Provincial Water Quality Objective, 1994.
3. Bold text indicate values exceeding PWQO.
4. SW1-F, SW2B-F, and SW4-F are field filtered samples

Surface Water Quality Data

Parameter	PWQO	Trigger Concentrations SW1 / SW4	Trigger Concentrations SW6	SW1 19-Apr-12	SW1 29-Oct-12	SW1 3-Jun-13	SW1 27-Aug-13	SW1 29-Oct-13	SW1 1-May-14	SW1 9-Jul-14	SW1 24-Sep-14	SW1 28-Apr-15	SW1 - F 28-Apr-15	SW1 20-Jul-15	SW1 - F 20-Jul-15
Alkalinity (as CaCO3)	-	-	-	200	130	211	300	178	158	269	329	162	-	281	282
Colour (TCU)	-	-	-	55	100	128	145	80	51	150	120	47	-	140	155
Conductivity (us/cm)	-	-	-	390	600	427	623	420	334	537	689	344	-	565	563
pH (Units)	6.5 - 8.5	-	-	8.05	6.97	7.83	7.64	7.97	8.18	7.97	7.82	7.99	-	7.72	7.98
TDS	-	-	-	218	379	222	348	229	180	294	385	188	-	305	315
TSS	-	-	-	<1	<1	12	6	3	10	< 3	6	< 3	-	34	4
Turbidity (NTU)	-	-	-	0.8	1.1	2.2	3.2	0.4	4.1	1.3	4.5	0.4	-	5.6	1.1
DOC	-	27	12	13	26	**30**	**36**	19	12	25	24	16	-	26	23
BOD	-	-	-	-	<2.0	< 3	< 3	< 3	< 3	< 3	< 3	< 3	-	4	< 3
COD	-	-	-	29	72	49	88	43	28	62	75	25	-	79	78
Phenolics - Total	0.001	-	-	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001
Chloride	-	-	-	10	22	7	12	9	7	8	16	8	-	9	9
Cyanide	0.005	-	-	<0.002	<0.0020	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.005	<0.005
Flouride	-	-	-	<0.10	<0.10	<0.1	0.2	0.1	0.1	0.2	<0.1	0.1	-	<0.1	<0.1
Unionized Ammonia	0.02	0.02	0.02	-	-	<0.01	<0.005	0.02	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01
Total Ammonia	-	-	-	<0.01	0.04	0.01	0.17	< 0.005	0.06	0.17	0.34	0.03	-	0.12	0.09
Sulphate	-	-	-	<1	140	<1	8	20	5	<1	6	5	-	<1	<1
Nitrite	-	-	-	<0.010	<0.010	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1
Nitrate	-	-	-	<0.10	0.64	0.1	<0.1	<0.1	0.1	0.1	0.1	<0.1	-	0.2	0.1
TKN	-	-	-	1.3	1.5	1.15	1.7	0.6	0.6	1.2	1.9	0.6	-	1.8	1.6
Mercury	0.0002	-	-	<0.00002	<0.00001	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	-	0.00005	<0.00002
Hardness	-	-	-	210	-	212	356	227	176	302	394	189	190	304	328
Aluminum	0.075	-	-	0.005	0.022	0.05	**0.17**	0.04	0.07	0.04	0.07	0.03	0.02	**0.08**	0.07
Antimony	0.02	-	-	<0.00050	<0.00050	<0.0001	<0.0001	<0.0001	<0.0001	0	0	<0.0001	<0.0001	<0.0001	0.0003
Arsenic	0.005	-	-	<0.0010	<0.0010	0.001	0.002	0.0003	0.0002	0.001	0.002	0.0002	0.0003	0.001	0.001
Barium	-	-	-	0.031	0.064	0.035	0.075	0.03	0.027	0.047	0.089	0.027	0.029	0.057	0.059
Beryllium	1.1	-	-	<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	0.2	0.04	0.09	0.015	**0.14**	0.016	0.03	0.011	0.014	0.011	0.033	0.012	0.012	0.013	0.014
Cadmium	0.0005	-	-	<0.000	<0.000	0.00005	0.00002	< 0.00002	< 0.00002	< 0.00002	0.00004	< 0.00002	0.00008	0.00005	<0.00002
Calcium	-	-	-	80	120	77.2	129	82.5	63.9	110	141	69	69	110	119
Chromium (Total)	0.001	-	-	<0.0050	<0.0050	**0.004**	0.0004	0.0002	< 0.0002	< 0.0002	**0.0012**	0.0003	0.0003	< 0.0002	< 0.0002
Chromium (VI)	0.001														
Cobalt	0.0009	-	-	<0.00050	<0.00050	0.0001	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Copper	0.005	-	-	<0.0010	0.0027	0.0025	0.0012	0.0007	0.0008	0.0005	**0.0092**	0.0006	0.0024	0.0001	0.0001
Iron	0.3	2	0.11	0.17	0.11	**0.33**	**1.38**	0.09	0.12	**0.62**	**1.24**	0.04	0.03	**0.96**	**0.81**
Lead	0.005	-	-	<0.00050	<0.00050	0.00036	0.00018	0.00008	0.00012	0.0001	0.0005	0.00005	0.00002	0.00032	0.00006
Magnesium	-	-	-	5	8.9	4.64	8.29	5.04	3.88	6.53	10.3	4.1	4.15	6.81	7.33
Manganese	-	0.87	0.08	0.044	0.017	0.09	0.62	0.02	0.02	0.22	0.51	0.01	0.01	0.61	0.51
Molybdenum	0.04	-	-	<0.00050	0.00063	0.0006	0.0005	0.0003	0.0002	0.0003	0.0003	0.0002	0.0002	0.0004	0.0003
Nickel	0.025	-	-	<0.0010	0.0015	< 0.01	< 0.01	< 0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Potassium	-	-	-	<1	1.3	0.9	1.3	0.8	1.1	1.1	2.2	0.8	0.9	1.1	1.2
Phosphorous - Total	0.03	-	-	<0.10	<0.10	0.03	**0.08**	< 0.01	0.02	**0.06**	**0.09**	**0.34**	-	**0.09**	**0.08**
Selenium	0.1	-	-	<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	0.0001	-	-	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00008	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Sodium	-	-	-	4.9	12	3.9	7	4.4	4	5.1	9.6	4.4	4.5	6.2	6.8
Strontium	-	-	-	0.16	0.27	-	-	-		0.25	0.37	0.14	0.15	0.25	0.27
Thalium	0.0003	-	-	<0.000050	0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	0.006	-	-	<0.00050	0.0015	0.0007	0.001	0.0004	0.0008	0.0007	0.001	0.0008	0.0008	0.0006	0.0006
Zinc	0.02	-	-	<0.0050	<0.0050	< 0.005	< 0.005	< 0.005	0.01	< 0.005	**0.06**	< 0.005	0.02	0.02	0.01
Conductivity (us/cm)	NV	-	-	455	646	434	-	430	400	412	690	340	340	524	524
Dissolved Oxygen	5	-	-	4.4	4.82	4.73	-	-	5.05	5.28	3.89	-	-	2.64	2.64
pH (Units)	6.5 - 8.5	-	-	7.31	7.6	7.29	-	7.57	8.43	7.28	7.47	7.65	7.65	7.26	7.26
Temperature (°C)	NV	-	-	15.3	7.5	13	-	4.5	10.1	16	16.2	11.4	11.4	19.5	19.5

Notes:

1. All results are expressed in mg/L unless otherwise stated.
2. PWQO = Provincial Water Quality Objective, 1994.
3. Bold text indicate values exceeding PWQO.
4. SW1-F, SW2B-F, and SW4-F are field filtered samples

Surface Water Quality Data

Parameter	PWQO	Trigger Concentrations SW1 / SW4	Trigger Concentrations SW6	SW1 6-Oct-15	SW1 - F 6-Oct-15	SW1 26-Apr-16	SW1 - F 26-Apr-16	SW1 12-Apr-17	SW1 17-Jul-17	SW1 6-Oct-17	SW1 11-Apr-18	SW1 2-Oct-18	SW1 23-Apr-19	SW1 30-Jul-19	SW1 8-Oct-19
Alkalinity (as CaCO3)	-	-	-	320	-	162	-	131	214	440	140	67	152		
Colour (TCU)	-	-	-	185	-	58	-	59	115	160	34	13	53		
Conductivity (us/cm)	-	-	-	651	-	353	-	292	428	910	296	298	289		
pH (Units)	6.5 - 8.5	-	-	7.75	-	8	-	7.9	8.1	7.7	8	7.66	7.93		
TDS	-	-	-	372	-	182	-	152	224	519	159	166	165		
TSS	-	-	-	4	-	< 3	-	< 3	< 3	7	15	28	< 3		
Turbidity (NTU)	-	-	-	2.8	-	0.9	-	0	1	2	0.7	24.3	0.7		
DOC	-	27	12	**46**	-	11	-	8	20	27	8.4	22.2	10.2		
BOD	-	-	-	< 3	-	< 3	-	3	< 3	< 3	< 3	5	< 3		
COD	-	-	-	87	-	30	-	22	50	89	22	72	28		
Phenolics - Total	0.001	-	-	<0.001	-	<0.001	-	<0.001	**0.008**	**0.005**	< 0.001	**0.003**	< 0.002		
Chloride	-	-	-	14	-	8	-	8	5	23	6	14.2	7		
Cyanide	0.005	-	-	<0.005	-		-	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005		
Flouride	-	-	-	0.1	-	0.1	-	<0.1	<0.1	<0.1	< 0.1	< 0.1	< 0.1		
Unionized Ammonia	0.02	0.02	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	< 0.01	< 0.01	< 0.01		
Total Ammonia	-	-	-	0.58	0.55	0.2	0.21	0.03	0.08	1.03	0.03	0.06	0.03		
Sulphate	-	-	-	7	-	5	-	9	<1	7	5	46	4		
Nitrite	-	-	-	<0.1	-	<0.1	-	<0.1	<0.05	<0.05	< 0.05	< 0.05	< 0.05		
Nitrate	-	-	-	<0.1	-	0.1	-	<0.1	0.08	0.1	0.21	0.69	< 0.05		
TKN	-	-	-	2.4	2.2	0.7	1.1	0.6	1	2.4	0.4	1.3	0.6		
Mercury	0.0002	-	-	<0.00002	<0.00002	<0.00002	0.00003	<0.00002	<0.00002	<0.00002	< 0.00002	< 0.00002	< 0.00002		
Hardness	-	-	-	371	374	169	170	158	217	446	162	123	148		
Aluminum	0.075	-	-	**0.14**	0.05	0.03	0.02	0.03	0.03	**0.11**	0.05	**0.24**	0.03		
Antimony	0.02	-	-	0.0003	0.0002	<0.0001	<0.0001	<0.0001	0.0002	0	< 0.0001	0.0001	0.0002		
Arsenic	0.005	-	-	0.001	0.001	0.0002	0.0003	0.0002	0.001	0.003	< 0.0001	0.0005	0.0002		
Barium	-	-	-	0.069	0.066	0.026	0.025	0.026	0.042	0.109	0.027	0.042	0.024		
Beryllium	1.1	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	< 0.002	< 0.002	Dry	Dry
Boron	0.2	0.04	0.09	0.036	0.035	<0.005	<0.005	0.018	0.027	**0.124**	0.013	**0.082**	0.016		
Cadmium	0.0005	-	-	0.00013	<0.00002	<0.00002	<0.00002	0.000016	< 0.000014	0.000021	< 0.000014	0.000093	< 0.000015		
Calcium	-	-	-	132	133	61	61	49	78	151	55	45.4	55		
Chromium (Total)	0.001	-	-	0.0009	0.0002	0.0003	0.0003	<0.002	<0.001	< 0.001	< 0.001	0.001	< 0.001		
Chromium (VI)	0.001														
Cobalt	0.0009	-	-	< 0.005	< 0.005	< 0.005	< 0.005	0.0001	0.0002	0.0008	< 0.0001	0.0003	< 0.0001		
Copper	0.005	-	-	0.0036	0.0008	0.0003	0.0006	0.0006	0.0004	0.0011	0.0006	**0.006**	0.0011		
Iron	0.3	2	0.11	**1.96**	**1.45**	0.07	0.05	0.03	**0.31**	**0.93**	0.038	**0.624**	0.058		
Lead	0.005	-	-	0.00093	0.00003	< 0.00002	< 0.00002	< 0.00002	0.00004	0.00008	< 0.00002	0.00099	0.00005		
Magnesium	-	-	-	10	9.88	4.15	4.17	3.08	5.5	16.7	4.3	6.08	3.28		
Manganese	-	0.87	0.08	**0.91**	0.78	0.02	0.01	0	0.05	**1.06**	0.006	0.116	0.003		
Molybdenum	0.04	-	-	0.0001	0.0001	0.0002	0.0002	0.0023	0.0005	0.0011	0.0002	0.0005	0.0004		
Nickel	0.025	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	< 0.01	< 0.01	< 0.01		
Potassium	-	-	-	2.2	2.1	1.3	1.3	0.7	1	10.1	0.8	4	1.3		
Phosphorous - Total	0.03	-	-	**0.2**	**0.11**	0.02	0.01	**0.07**	**0.05**	**0.08**	< 0.01	**0.2**	0.02		
Selenium	0.1	-	-	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001		
Silver	0.0001	-	-	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.0001	0.0001		
Sodium	-	-	-	11.3	11	4.7	4.8	3.6	5	24.1	4.3	8.7	3.4		
Strontium	-	-	-	0.32	0.31	0.13	0.13	0.1	0.19	0.47	0.127	0.177	0.107		
Thalium	0.0003	-	-	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005		
Vanadium	0.006	-	-	0.0008	0.0005	0.0006	0.0005	0.0008	0.0006	0.0007	0.0008	0.0017	0.0009		
Zinc	0.02	-	-	0.01	< 0.005	< 0.005	< 0.005	**0.03**	0.02	0.01	**0.021**	**0.032**	0.007		
Conductivity (us/cm)	NV	-	-	475	475	340	-	288		933	933	933	300		
Dissolved Oxygen	5	-	-	-	-	-	-						7.5		
pH (Units)	6.5 - 8.5	-	-	7.34	7	8.01	-						7.85		
Temperature (°C)	NV	-	-	13.1	13	8.1	-						8.1		

Notes:

1. All results are expressed in mg/L unless otherwise stated.
2. PWQO = Provincial Water Quality Objective, 1994.
3. Bold text indicate values exceeding PWQO.
4. SW1-F, SW2B-F, and SW4-F are field filtered samples

Surface Water Quality Data

Parameter	PWQO	Trigger Concentrations SW1 / SW4	Trigger Concentrations SW6	SW 1 13-Apr-20	SW 1 20-Jul-20	SW1 15-Oct-20	SW1 21-Apr-21	SW1 19-Jul-21	SW1 23-Aug-21	SW1 18-Oct-21	SW1 20-Apr-22	SW1 21-Jul-22	SW1 12-Oct-22	SW1 19-Apr-23	SW1 28-Aug-23
Alkalinity (as CaCO3)	-	-	-	134		279	197	216	368	340	181	326		153	348
Colour (TCU)	-	-	-	46		145	63	23	153	179	49	131		75	145
Conductivity (us/cm)	-	-	-	332		576	413	426	692	635	366	631		348	680
pH (Units)	6.5 - 8.5	-	-	7.81		7.98	8.11	8.01	7.99	8.06	8.01	7.86		7.74	7.74
TDS	-	-	-	159		317	216	245	412	370	204	365		184	365
TSS	-	-	-	< 3		< 3	< 3	< 3	6	< 3	< 3	10		< 3	5
Turbidity (NTU)	-	-	-	0.7		1.2	0.7	1.2	5.9	0.9	0.4	10.3		1.1	4.8
DOC	-	27	12	5.8		25	14.7	22.7	**45.4**	16.1	12.1	**44.9**		17.5	**37.4**
BOD	-	-	-	< 3		< 3	< 3	< 3	47.4	< 3	< 3	< 3		< 3	<3
COD	-	-	-	23		70	33	57	< 3	83	18	95		29	85
Phenolics - Total	0.001	-	-	< 0.002		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001		< 0.001	<0.001
Chloride	-	-	-	9.4		13.2	11.7	9.3	16.2	14.9	10.9	13.1		11.6	13.9
Cyanide	0.005	-	-	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005		< 0.005	**0.006**
Flouride	-	-	-	< 0.1		< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1		< 0.1	<0.1
Unionized Ammonia	0.02	0.02	0.02	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	**0.03**	< 0.01		< 0.01	<0.01
Total Ammonia	-	-	-	0.17		0.07	0.04	0.05	0.31	0.11	1.54	1.09		0.24	0.15
Sulphate	-	-	-	7		< 1	1	2	1	< 1	2	3		6	<1
Nitrite	-	-	-	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	<0.05
Nitrate	-	-	-	0.15		< 0.05	< 0.05	0.13	0.27	< 0.05	< 0.05	0.14		< 0.05	0.08
TKN	-	-	-	0.7		1.4	0.6	1.1	2.1	1.5	2.2	2.6		0.9	1.8
Mercury	0.0002	-	-	< 0.00002		< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002		< 0.00002	<0.00002
Hardness	-	-	-	167		329	205	232	387	371	198	356		164	341
Aluminum	0.075	-	-	0.03		**0.08**	0.05	0.07	0.06	0.07	0.02	0.07		0.03	**0.1**
Antimony	0.02	-	-	0.0003		0.0004	< 0.0001	0.0005	0.0004	0.0003	0.0002	0.0002		0.0005	0.0001
Arsenic	0.005	-	-	0.0002		0.0007	0.0002	0.0007	0.0025	0.001	0.0002	0.0018		0.0003	0.0019
Barium	-	-	-	0.022		0.05	0.027	0.047	0.098	0.065	0.029	0.087		0.026	0.061
Beryllium	1.1	-	-	< 0.002	Dry	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	Dry	< 0.002	<0.0001
Boron	0.2	0.04	0.09	0.016		0.026	0.008	0.017	**0.043**	0.026	0.009	0.039		0.017	0.026
Cadmium	0.0005	-	-	< 0.000015		< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015		< 0.000015	<0.000015
Calcium	-	-	-	54		119	74	92.6	148	133	71.4	126		59	122
Chromium (Total)	0.001	-	-	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001	<0.001
Chromium (VI)	0.001										< 0.001	< 0.001		< 0.001	<0.001
Cobalt	0.0009	-	-	< 0.0001		0.0002	< 0.0001	0.0002	**0.0012**	0.0007	< 0.0001	**0.0014**		0.0001	0.0008
Copper	0.005	-	-	0.0009		0.0005	0.0004	0.0005	0.0003	0.0003	0.0005	0.0004		0.0009	0.0006
Iron	0.3	2	0.11	0.035		**0.307**	**0.098**	**0.378**	**1.57**	**0.78**	0.092	**2.38**		0.069	**0.977**
Lead	0.005	-	-	0.00003		0.00004	< 0.00002	0.00009	0.00008	0.00003	0.00003	0.00005		0.00008	0.00005
Magnesium	-	-	-	3.46		7.61	4.79	5.45	10.3	8.9	4.72	8.83		3.95	8.55
Manganese	-	0.87	0.08	0.007		0.122	0.022	0.082	**1.53**	0.342	0.021	**1.43**		0.014	**0.923**
Molybdenum	0.04	-	-	0.0003		0.0003	0.0002	0.0003	0.0004	0.0002	0.0002	0.0002		0.0003	0.0004
Nickel	0.025	-	-	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		< 0.01	0.0015
Potassium	-	-	-	1.1		2.2	1.1	1.1	2.9	1.8	1.4	3.3		1.3	1.6
Phosphorous - Total	0.03	-	-	< 0.01		**0.04**	**0.04**	**0.08**	**0.17**	**0.11**	0.02	**0.22**		**0.04**	**0.09**
Selenium	0.1	-	-	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001	<0.001
Silver	0.0001	-	-	< 0.0001		< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001		< 0.0001	<0.0001
Sodium	-	-	-	4.3		7.1	5.2	5	9.1	6.3	4.5	9.8		4.3	7.2
Strontium	-	-	-	0.109		0.239	0.152	0.192	0.351	0.292	0.149	0.317		0.124	0.285
Thalium	0.0003	-	-	< 0.00005		< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.00005	<0.00005
Vanadium	0.006	-	-	0.0008		0.0005	0.0003	0.0008	0.001	0.0006	0.0005	0.0009		0.0005	0.0007
Zinc	0.02	-	-	< 0.005		0.008	0.005	**0.023**	**0.027**	< 0.005	< 0.005	< 0.005		< 0.005	0.014
Conductivity (us/cm)	NV	-	-	369		532	420	4.64	1.3	689	315	510		315	652
Dissolved Oxygen	5	-	-	7.69		4.05	5.76	396	706		5.52	3.91		16.35	4.51
pH (Units)	6.5 - 8.5	-	-	7.5		7.35	7.95	7.04	7.02	7.45	8.02	7.25		7.91	7.35
Temperature (°C)	NV	-	-	8.3		10.6	7.9	18.8	20	11.6	10.1	19		8.8	15.5

Notes:

1. All results are expressed in mg/L unless otherwise stated.
2. PWQO = Provincial Water Quality Objective, 1994.
3. Bold text indicate values exceeding PWQO.
4. SW1-F, SW2B-F, and SW4-F are field filtered samples

Surface Water Quality Data

Parameter	PWQO	Trigger Concentrations SW1 / SW4	Trigger Concentrations SW6	SW1 12-Oct-23	SW1 24-Jan-25	SW2B 12-May-11	SW2B 8-Nov-11	SW2B 18-Apr-12	SW2B 3-Jun-13	SW2B 29-Oct-13	SW2B 1-May-14	SW2B 9-Jul-14	SW2B 24-Sep-14	SW2B 28-Apr-15	SW2B - F 28-Apr-15	SW2B 20-Jul-15
Alkalinity (as CaCO3)	-	-	-	356	232	217	213	210	225	192	161	388		173	-	272
Colour (TCU)	-	-	-	136	49	45	45	39	92	48	36	102		35	-	165
Conductivity (us/cm)	-	-	-	672	466	445	449	410	447	418	335	665		362	-	546
pH (Units)	6.5 - 8.5	-	-	8.18	8.06	7.92	8.04	8.01	7.76	7.95	8.18	7.24		7.95	-	7.66
TDS	-	-	-	390	255	236	249	229	227	221	182	427		196	-	304
TSS	-	-	-	9	<3	<1	4	<1	6	< 2	19	48		< 3	-	80
Turbidity (NTU)	-	-	-	1.9	3	0.7	2	1.5	1.1	0.5	5.6	10.1		0.3	-	24
DOC	-	27	12	**48.3**	13.7	8	10	7	18	12	9	20		12.5	-	21.2
BOD	-	-	-	<3	<3	<2	<2	-	< 3	< 3	< 3	< 3		< 3	-	3
COD	-	-	-	76	31	28	33	19	37	23	37	69		11	-	71
Phenolics - Total	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.001	<0.001	<0.001	<0.001		<0.001	-	<0.001
Chloride	-	-	-	14.3	14	11	14	10	5	7	6	7		8	-	8
Cyanide	0.005	-	-	<0.005	<0.005	<0.001	<0.001	<0.002	< 0.005	< 0.005	< 0.005	< 0.005		< 0.005	-	< 0.005
Flouride	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.10	<0.1	0.1	0.1	<0.1		0.1	-	<0.1
Unionized Ammonia	0.02	0.02	0.02	<0.01	<0.01	<0.02	<0.02	-	<0.01	<0.01	<0.01	<0.01		<0.01	-	<0.01
Total Ammonia	-	-	-	0.34	0.12	< 0.01	< 0.01	<0.01	< 0.01	< 0.005	0.03	0.48		0.04	-	0.43
Sulphate	-	-	-	5	4	<1	<1	<1	<1	9	4	<1		4	-	<1
Nitrite	-	-	-	<0.05	<0.05	<0.01	<0.01	<0.010	<0.1	<0.1	<0.1	<0.1		<0.1	-	<0.1
Nitrate	-	-	-	0.13	<0.05	<0.1	<0.1	<0.10	<0.1	<0.1	<0.1	<0.1		0.1	-	0.1
TKN	-	-	-	1.7	0.9	0.6	0.6	0.85	0.94	0.4	0.8	1.9		0.2	-	1.9
Mercury	0.0002	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002		<0.00002	-	<0.00002
Hardness	-	-	-	378	237	230	240	220	210	221	180	450		195	190	315
Aluminum	0.075	-	-	**0.1**	0.03	<0.005	<0.005	<0.005	0.02	0.03	0.03	0.07		0.02	0.02	**0.2**
Antimony	0.02	-	-	0.0002	0.0004	<0.00005	<0.0005	<0.00050	<0.0001	<0.0001	<0.0001	0.0002		<0.0001	<0.0001	0.0005
Arsenic	0.005	-	-	0.0018	0.0002	<0.001	<0.001	<0.0010	0.001	0.0002	0.0002	0.001		0.0001	0.0002	0.0016
Barium	-	-	-	0.071	0.035	0.034	0.026	0.032	0.032	0.023	0.023	0.095		0.023	0.025	0.079
Beryllium	1.1	-	-	<0.0001	<0.0001	<0.0005	<0.0005	<0.00050	<0.002	<0.002	<0.002	<0.002	Dry	<0.002	<0.002	<0.002
Boron	0.2	0.04	0.09	0.031	0.006	<0.01	<0.01	0.011	0.011	0.008	0.009	0.009		0.008	0.008	0.009
Cadmium	0.0005	-	-	0.000016	<0.000015	<0.0001	<0.0001	<0.00010	<0.00002	<0.00002	<0.00002	0.00002		<0.00002	<0.00002	0.00029
Calcium	-	-	-	136	85.5	83	88	84	76.9	80.9	66	168		71.3	69.3	114
Chromium (Total)	0.001	-	-	<0.001	<0.001	<0.0005	<0.0005	<0.0050	< 0.002	< 0.0002	< 0.0002	< 0.0002		0.0003	0.0003	**0.0012**
Chromium (VI)	0.001			<0.001	<0.001											
Cobalt	0.0009	-	-	0.0009	0.0003	<0.0005	<0.0005	<0.00050	0.0001	< 0.005	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005
Copper	0.005	-	-	0.0007	0.0004	<0.001	<0.001	<0.0010	0.0008	0.0007	0.0007	0.0007		0.0006	0.002	0.0029
Iron	0.3	2	0.11	**1.07**	**0.263**	0.3	0.3	**0.37**	**0.46**	0.06	0.29	**2.61**		0.012	0.011	**1.86**
Lead	0.005	-	-	0.00006	0.00007	<0.0005	<0.0005	<0.00050	0.00012	0.00008	0.00022	0.00014		0.00003	< 0.00002	0.0014
Magnesium	-	-	-	9.52	5.77	4.72	4.6	5.1	4.42	4.51	3.64	7.64		3.97	3.93	7.5
Manganese	-	0.87	0.08	0.608	0.087	0.068	0.057	0.066	0.14	0.02	0.06	1.22		0.004	0.004	0.68
Molybdenum	0.04	-	-	0.0004	0.0001	<0.001	<0.001	<0.00050	0.0004	0.0001	0.0001	0.0002		0.0001	0.0001	0.0005
Nickel	0.025	-	-	0.0019	0.0006	<0.001	<0.001	<0.0010	<0.01	<0.01	<0.01	<0.01		< 0.01	< 0.01	< 0.01
Potassium	-	-	-	2.2	1.3	1.1	0.8	<1	1	0.7	0.9	0.5		0.7	0.7	1.1
Phosphorous - Total	0.03	-	-	**0.1**	<0.1	**0.038**	0.02	<0.10	0.02	< 0.01	**0.06**	**0.15**		< 0.01	-	**0.17**
Selenium	0.1	-	-	<0.001	<0.001	<0.002	<0.002	<0.0020	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001
Silver	0.0001	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	< 0.00002	< 0.00002	< 0.00002	< 0.00002		< 0.00002	< 0.00002	0.0001
Sodium	-	-	-	6.9	5.4	3.8	4.4	4.6	3.3	3.5	3.4	5.7		3.8	3.8	6.1
Strontium	-	-	-	0.323	0.173	0.18	0.15	0.16	-	-	-	0.36		0.14	0.138	0.26
Thalium	0.0003	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050	< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.00005	< 0.00005	0.00009
Vanadium	0.006	-	-	0.0007	0.0003	<0.0005	<0.0005	<0.00050	0.0006	0.0003	0.001	0.0014		0.0009	0.0009	0.0019
Zinc	0.02	-	-	<0.005	<0.005	<0.005	<0.005	<0.0050	0.01	< 0.005	0.02	0.01		< 0.005	0.008	**0.023**
Conductivity (us/cm)	NV	-	-	774	-	445	453	450	455	450	400	594		400	400	-
Dissolved Oxygen	5	-	-	7.8	-	3.76	3.35	4.1	**7.1**	-	4.7	2.55		-	-	-
pH (Units)	6.5 - 8.5	-	-	7.78	-	7.47	8.01	7.29	7.35	7.8	8.11	6.67		7.1	7.1	-
Temperature (°C)	NV	-	-	11.8	-	15.4	7.5	15	13.4	3.5	10.1	17.5		11	11	-

Notes:

1. All results are expressed in mg/L unless otherwise stated.
2. PWQO = Provincial Water Quality Objective, 1994.
3. Bold text indicate values exceeding PWQO.
4. SW1-F, SW2B-F, and SW4-F are field filtered samples

Surface Water Quality Data

Parameter	PWQO	Trigger Concentrations SW1 / SW4	Trigger Concentrations SW6	SW2B - F 20-Jul-15	SW2B 6-Oct-15	SW2B 26-Apr-16	SW2B - F 26-Apr-16	SW2B 12-Apr-17	SW2B 17-Jul-17	SW2B 11-Apr-18	SW2B 23-Apr-19	SW2B 30-Jul-19	SW2B 8-Oct-19	SW 2B 13-Apr-20	SW 2B 20-Jul-20
Alkalinity (as CaCO3)	-	-	-	274		174	-	141	211	177	133			140	
Colour (TCU)	-	-	-	155		33	-	34	100	20	41			32	
Conductivity (us/cm)	-	-	-	544		363	-	306	424	314	297			329	
pH (Units)	6.5 - 8.5	-	-	7.95		7.98	-	7.98	7.97	7.99	7.95			7.85	
TDS	-	-	-	312		189	-	157	216	179	152			166	
TSS	-	-	-	10		< 3	-	< 3	< 3	< 3	< 3			< 3	
Turbidity (NTU)	-	-	-	3.3		0.3	-	0.5	0.6	0.7	0.4			0.5	
DOC	-	27	12	22.3		6.1	-	5.3	18.2	5.5	7.9			3.9	
BOD	-	-	-	< 3		< 3	-	< 2	< 3	< 3	< 3			< 3	
COD	-	-	-	59		13	-	14	46	15	24			12	
Phenolics - Total	0.001	-	-	<0.001		<0.001	-	<0.001	**0.005**	< 0.001	< 0.002			< 0.002	
Chloride	-	-	-	7.2		7.2	-	7.7	4.4	6.1	6.7			8.3	
Cyanide	0.005	-	-	< 0.005		-	-	< 0.005	< 0.005	< 0.005	< 0.005			< 0.005	
Flouride	-	-	-	<0.1		0.1	-	<0.1	<0.1	< 0.1	< 0.1			< 0.1	
Unionized Ammonia	0.02	0.02	0.02	<0.01		<0.01	<0.01	<0.01	<0.01	< 0.01	< 0.01			< 0.01	
Total Ammonia	-	-	-	0.12		0.02	0.03	0.02	0.04	0.02	0.02			0.02	
Sulphate	-	-	-	<1		3	-	6	<1	4	3			5	
Nitrite	-	-	-	<0.1		<0.1	-	<0.1	<0.05	< 0.05	< 0.05			< 0.05	
Nitrate	-	-	-	0.1		<0.1	-	<0.1	<0.05	0.23	< 0.05			0.11	
TKN	-	-	-	2		0.3	0.4	0.4	0.9	0.3	0.5			0.4	
Mercury	0.0002	-	-	<0.00002		<0.00002	<0.00002	<0.00002	<0.00002	< 0.00002	< 0.00002			< 0.00002	
Hardness	-	-	-	338		180	182	166	208	176	156			144	
Aluminum	0.075	-	-	**0.12**		0.02	0.02	0.04	0.03	0.03	0.04			0.03	
Antimony	0.02	-	-	0.0015		<0.0001	<0.0001	<0.0001	0.0001	< 0.0001	< 0.0001			0.0002	
Arsenic	0.005	-	-	0.0012		0.0002	0.0001	0.0002	0.0008	< 0.0001	0.0002			0.0001	
Barium	-	-	-	0.078		0.019	0.019	0.023	0.03	0.016	0.02			0.02	
Beryllium	1.1	-	-	<0.002	Dry	<0.002	<0.002	<0.002	<0.002	< 0.002	< 0.002	Dry	Dry	< 0.002	Dry
Boron	0.2	0.04	0.09	0.01		<0.005	<0.005	0.01	0.011	0.007	0.014			0.008	
Cadmium	0.0005	-	-	0.0002		<0.00002	<0.00002	0.000021	< 0.000014	< 0.000014	< 0.000015			< 0.000015	
Calcium	-	-	-	122		65.9	66.3	51.3	75.9	55.4	54.7			60.9	
Chromium (Total)	0.001	-	-	**0.0022**		0.0003	0.0002	< 0.002	< 0.001	< 0.001	0.001			< 0.001	
Chromium (VI)	0.001														
Cobalt	0.0009	-	-	< 0.005		< 0.005	< 0.005	<0.0001	0.0001	< 0.0001	< 0.0001			< 0.0001	
Copper	0.005	-	-	0.0015		0.0003	0.0004	0.0004	0.0003	0.0005	0.0008			0.0008	
Iron	0.3	2	0.11	**1.3**		0.019	0.015	0.012	0.282	0.009	0.042			0.029	
Lead	0.005	-	-	0.0008		< 0.00002	< 0.00002	< 0.00002	0.00003	< 0.00002	0.00006			< 0.00002	
Magnesium	-	-	-	7.96		3.83	4	3	4	3.57	3			3.54	
Manganese	-	0.87	0.08	0.472		0	0.005	0.001	0.029	0.001	0.005			0.006	
Molybdenum	0.04	-	-	0.0005		<0.0001	<0.0001	0.0002	0.0004	< 0.0001	0.0002			0.0001	
Nickel	0.025	-	-	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			< 0.01	
Potassium	-	-	-	1.1		0.9	0.9	0.8	0.8	0.7	1.2			0.8	
Phosphorous - Total	0.03	-	-	**0.14**		< 0.01	0.01	**0.04**	**0.05**	< 0.01	0.01			< 0.01	
Selenium	0.1	-	-	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001			< 0.001	
Silver	0.0001	-	-	0.00008		< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.0001			< 0.0001	
Sodium	-	-	-	6.5		3.6	3.6	3.4	3.5	3.2	2.9			3.7	
Strontium	-	-	-	0.28		0.123	0.124	0.095	0.16	0.099	0.101			0.115	
Thalium	0.0003	-	-	0.00006		< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005			< 0.00005	
Vanadium	0.006	-	-	0.0013		0.0005	0.0006	0.001	0.0006	0.0011	0.0009			0.0008	
Zinc	0.02	-	-	**0.024**		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.007			0.012	
Conductivity (us/cm)	NV	-	-	-		300	-	297			300			356	
Dissolved Oxygen	5	-	-	-		-	-				7.65			5.05	
pH (Units)	6.5 - 8.5	-	-	-		8.16	-				8.09			7.4	
Temperature (°C)	NV	-	-	-		8.3	-				8.6			8.4	

Notes:

1. All results are expressed in mg/L unless otherwise stated.
2. PWQO = Provincial Water Quality Objective, 1994.
3. Bold text indicate values exceeding PWQO.
4. SW1-F, SW2B-F, and SW4-F are field filtered samples

Surface Water Quality Data

Parameter	PWQO	Trigger Concentrations SW1 / SW4	Trigger Concentrations SW6	SW2B 15-Oct-20	SW2B 21-Apr-21	SW2B 19-Jul-21	SW2B 18-Oct-21	SW2B 20-Apr-22	SW2B 21-Jul-22	SW2B 12-Oct-22	SW2B 19-Apr-23	SW2B 28-Aug-23	SW2B 12-Oct-23	SW4 12-May-11	SW4 8-Nov-11
Alkalinity (as CaCO3)	-	-	-	291	209	222	348	185			154		277	214	224
Colour (TCU)	-	-	-	147	40	44	254	35			79		73	62	58
Conductivity (us/cm)	-	-	-	585	426	434	651	371			355		552	430	465
pH (Units)	6.5 - 8.5	-	-	7.87	8.1	7.96	8	7.99			7.35		7.99	8.09	7.95
TDS	-	-	-	321	226	251	371	195			186		318	233	257
TSS	-	-	-	6	< 3	< 3	6	< 3			< 3		63	3	<1
Turbidity (NTU)	-	-	-	2.2	0.5	1.1	3.7	0.3			11.8		6	2.3	1
DOC	-	27	12	21.8	9.2	18.3	17.3	8.8			18.3		22.9	11.5	15.2
BOD	-	-	-	4	< 3	4	6	< 3			< 3		<3	<2	<2
COD	-	-	-	53	16	42	77	10			62		42	37	42
Phenolics - Total	0.001	-	-	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001			< 0.001		<0.001	<0.001	<0.001
Chloride	-	-	-	9.3	10.7	8.8	14.4	10.5			13.8		7.2	10	13
Cyanide	0.005	-	-	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005			< 0.005		<0.005	<0.002	<0.002
Flouride	-	-	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1			< 0.1		<0.1	<0.1	<0.1
Unionized Ammonia	0.02	0.02	0.02	< 0.01	< 0.01	< 0.01	< 0.01	**0.06**			< 0.01		<0.01	<0.02	<0.02
Total Ammonia	-	-	-	0.06	0.02	0.07	0.12	2.37			0.09		0.17	<0.1	<0.1
Sulphate	-	-	-	< 1	2	2	2	2			5		21	<1	<1
Nitrite	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05			< 0.05		<0.05	<0.01	<0.01
Nitrate	-	-	-	< 0.05	< 0.05	0.1	< 0.05	< 0.05			0.06		0.23	<0.1	<0.1
TKN	-	-	-	1.2	0.4	0.9	1.3	2.8			1.7		1	0.7	0.7
Mercury	0.0002	-	-	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002			< 0.00002		<0.00002	<0.00002	<0.00002
Hardness	-	-	-	337	215	235	381	174			161		301	230	250
Aluminum	0.075	-	-	**0.08**	0.06	0.07	0.07	0.02			0.02		0.07	<0.005	<0.005
Antimony	0.02	-	-	0.0005	< 0.0001	0.0003	0.0004	0.0003			0.0004		0.0004	<0.0005	<0.0005
Arsenic	0.005	-	-	0.0008	0.0001	0.0005	0.0006	0.0001			0.0003		0.0008	<0.001	<0.001
Barium	-	-	-	0.046	0.022	0.041	0.059	0.021			0.032		0.045	0.03	0.027
Beryllium	1.1	-	-	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	Dry	Dry	< 0.002	Dry	<0.0001	<0.0005	<0.0005
Boron	0.2	0.04	0.09	0.016	< 0.005	0.013	0.018	< 0.005			0.009		0.022	0.014	0.01
Cadmium	0.0005	-	-	0.000016	< 0.000015	< 0.000015	< 0.000015	< 0.000015			< 0.000015		0.000048	<0.0001	<0.0001
Calcium	-	-	-	124	78.7	96.4	129	63.1			57		111	84	91.4
Chromium (Total)	0.001	-	-	0.001	< 0.001	< 0.001	< 0.001	< 0.001			< 0.001		<0.001	<0.005	<0.005
Chromium (VI)	0.001							< 0.001			< 0.001		<0.001		
Cobalt	0.0009	-	-	0.0005	< 0.0001	0.0002	0.0006	< 0.0001			0.0001		0.0005	<0.0005	<0.0005
Copper	0.005	-	-	0.0006	0.0003	0.0005	0.0007	0.0006			0.0008		0.0026	<0.001	<0.001
Iron	0.3	2	0.11	**0.837**	0.055	**0.329**	**0.727**	0.039			0.157		**0.879**	**0.4**	0.3
Lead	0.005	-	-	0.00008	< 0.00002	0.00004	0.0001	0.00004			0.0001		0.00021	<0.0005	<0.0005
Magnesium	-	-	-	6.55	4.55	5.25	8.23	3.88			4.58		6.01	4.6	4.7
Manganese	-	0.87	0.08	0.449	0.009	0.136	0.408	0.007			0.036		0.254	0.07	0.04
Molybdenum	0.04	-	-	0.0001	< 0.0001	0.0002	0.0001	< 0.0001			0.0004		0.0003	< 0.002	< 0.002
Nickel	0.025	-	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			< 0.01		0.0014	<0.001	<0.001
Potassium	-	-	-	1.5	0.8	1	1.4	1			1.6		1.1	1.3	0.8
Phosphorous - Total	0.03	-	-	**0.06**	0.02	**0.08**	**0.08**	0.02			**0.11**		**0.2**	**0.056**	0.029
Selenium	0.1	-	-	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001			< 0.001		<0.001	0.002	<0.002
Silver	0.0001	-	-	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001			< 0.0001		<0.0001	<0.0001	<0.0001
Sodium	-	-	-	4.5	4.4	4.6	5.2	3.4			4.4		3.5	4.4	4.2
Strontium	-	-	-	0.223	0.148	0.19	0.264	0.123			0.118		0.227	0.19	0.17
Thalium	0.0003	-	-	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005			< 0.00005		<0.00005	<0.00005	<0.00005
Vanadium	0.006	-	-	0.0007	0.0003	0.0006	0.0005	0.0005			0.0008		0.0015	< 0.001	< 0.001
Zinc	0.02	-	-	0.012	0.006	0.016	< 0.005	< 0.005			0.014		0.014	<0.005	<0.005
Conductivity (us/cm)	NV	-	-	546	450	2.44	685	390			311		497	428	467
Dissolved Oxygen	5	-	-	1.86	8.13	407		4.48			18.92		6.95	4.8	3.97
pH (Units)	6.5 - 8.5	-	-	7.28	8.26	7.16	7.41	8.08			7.76		6.87	7.86	7.01
Temperature (°C)	NV	-	-	10.6	8.3	18.8	10.5	11.2			8.2		12.6	19.2	8

Notes:

1. All results are expressed in mg/L unless otherwise stated.
2. PWQO = Provincial Water Quality Objective, 1994.
3. Bold text indicate values exceeding PWQO.
4. SW1-F, SW2B-F, and SW4-F are field filtered samples

Surface Water Quality Data

Parameter	PWQO	Trigger Concentrations SW1 / SW4	Trigger Concentrations SW6	SW4 18-Apr-12	SW4 29-Oct-12	SW4 3-Jun-13	SW4 29-Oct-13	SW4 31-Oct-13	SW4 1-May-14	SW4 9-Jul-14	SW4 24-Sep-14	SW4 28-Apr-15	SW4 - F 28-Apr-15	SW4 20-Jul-15	SW4 5-Oct-15
Alkalinity (as CaCO3)	-	-	-	210	130	224	189	129	191	309	305	184	-		336
Colour (TCU)	-	-	-	50	79	120	66	51	60	92	72	< 2	-		185
Conductivity (us/cm)	-	-	-	400	340	453	420	299	406	528	833	390	-		715
pH (Units)	6.5 - 8.5	-	-	8.08	7.14	7.98	8.12	7.9	8.2	7.83	8.03	8.09	-		7.98
TDS	-	-	-	230	199	222	228	155	227	329	488	213	-		396
TSS	-	-	-	2	<1	8	< 2	3	3	70	3	3	-		6
Turbidity (NTU)	-	-	-	1.9	0.7	3.4	0.4	0.78	0.4	31.9	3.3	2	-		2.3
DOC	-	27	12	10	12	23	17	15	14	19	20	20	-		**45**
BOD	-	-	-	-	<2.0	< 3	< 3	<4	< 3	< 3	< 3	< 3	-		4
COD	-	-	-	31	35	47	35	36	29	69	46	26	-		77
Phenolics - Total	0.001	-	-	<0.0010	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-		<0.001
Chloride	-	-	-	9	3	6	7	12	10	9	42	10	-		24
Cyanide	0.005	-	-	<0.002	<0.002	<0.005	<0.005	<0.010	<0.005	<0.005	<0.005	<0.005	-		<0.005
Flouride	-	-	-	<0.10	<0.10	<0.1	0.1	<0.06	0.1	0.2	0.2	0.1	-		0.1
Unionized Ammonia	0.02	0.02	0.02	<0.01	-	<0.01	<0.005	<0.005	0.02	<0.01	<0.01	<0.01	-		<0.01
Total Ammonia	-	-	-	<0.01	0.04	< 0.01	< 0.005	<0.1	< 0.01	0.26	0.07	0.04	-		0.02
Sulphate	-	-	-	<1	39	<1	14	3	7	1	70	5	-		10
Nitrite	-	-	-	<0.010	<0.010	<0.1	<0.1	<0.03	<0.1	<0.1	<0.1	<0.1	-		<0.1
Nitrate	-	-	-	<0.01	<0.10	<0.1	<0.1	<0.06	<0.1	<0.1	0.1	<0.1	-		<0.1
TKN	-	-	-	0.87	0.9	1	0.5	0.6	0.5	1.6	0.9	0.3	-		1.7
Mercury	0.0002	-	-	<0.00002	<0.00001	<0.00002	<0.00002	<0.00001	<0.00002	<0.00002	<0.00002	<0.00002	-		<0.00002
Hardness	-	-	-	220	190	197	230	147	219	310	416	206	213		365
Aluminum	0.075	-	-	<0.005	0.011	0.07	0.04	0.02	0.03	0.04	0.05	0.02	0.02		0.04
Antimony	0.02	-	-	<0.00050	<0.00050	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	0.0003	<0.0001	<0.0001		0
Arsenic	0.005	-	-	<0.0010	<0.0010	0.001	0.0002	0.001	0.0002	0.001	0.001	0.0003	0		0.001
Barium	-	-	-	0.028	0.019	0.029	0.025	0.025	0.051	0.136	0.094	0.043	0.046		0.059
Beryllium	1.1	-	-	<0.00050	<0.00050	<0.002	<0.002	<0.00002	<0.002	<0.002	<0.002	<0.002	<0.002	Dry	<0.002
Boron	0.2	0.04	0.09	0.012	0.028	0.014	0.011	0.007	**0.059**	0.038	**0.116**	0.033	0.034		**0.053**
Cadmium	0.0005	-	-	<0.00010	<0.00010	0.00004	<0.00002	0.000018	<0.00002	<0.00002	0.00003	<0.00002	0.00002		0.00016
Calcium	-	-	-	84	72	72	84.7	52.4	77.1	111	145	74	77		129
Chromium (Total)	0.001	-	-	<0.0050	<0.0050	< 0.002	0.0003	<0.0005	< 0.0002	< 0.0002	**0.0013**	0.0003	0.0003		0.0006
Chromium (VI)	0.001														
Cobalt	0.0009	-	-	<0.00050	<0.00050	0.0001	< 0.005	0.000027	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005		< 0.005
Copper	0.005	-	-	<0.0010	0.0011	0.0008	0.0008	<0.0005	0.0004	0.0002	**0.0052**	0.0004	0.0024		0.0043
Iron	0.3	2	0.11	**0.4**	<0.10	**0.79**	0.11	0.08	0.18	**4.25**	**0.72**	**0.31**	0.15		**1.69**
Lead	0.005	-	-	<0.00050	<0.00050	0.00006	0.00006	0.00036	<0.00002	<0.00002	0.00056	0.00003	<0.00002		0.00125
Magnesium	-	-	-	5.2	3.1	4.07	4.32	3.98	6.31	7.63	13.1	5.23	5.36		10.4
Manganese	-	0.87	0.08	0.05	0.02	0.09	0.01	0.01	0.02	0.29	0.23	0.02	0.02		0.55
Molybdenum	0.04	-	-	<0.00050	0.00065	0.0005	0.0002	0.00011	0.0005	0.0002	0.001	0.0003	0.0003		0.0004
Nickel	0.025	-	-	<0.0010	<0.0010	<0.01	<0.01	0.0006	<0.01	<0.01	<0.01	<0.01	<0.01		< 0.01
Potassium	-	-	-	<1	0.55	0.7	0.6	1.04	2.5	1.1	4.4	1.3	1.3		2.8
Phosphorous - Total	0.03	-	-	<0.10	<0.10	**0.05**	< 0.01	<0.009	0.01	**0.23**	**0.04**	0.01	-		**0.13**
Selenium	0.1	-	-	<0.0020	<0.0020	< 0.001	< 0.001	<0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001
Silver	0.0001	-	-	<0.00010	<0.00010	< 0.00002	< 0.00002	< 0.00001	< 0.00002	< 0.00002	0.00007	< 0.00002	< 0.00002		< 0.00002
Sodium	-	-	-	4.6	2.1	3.3	3.5	5.7	9.1	7.8	28.9	6.5	6.6		16.2
Strontium	-	-	-	0.16	0.12	-	-	-		0.25	0.33	0.16	0.17		0.28
Thalium	0.0003	-	-	<0.000050	<0.000050	< 0.00005	< 0.00005	< 0.0002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.00005
Vanadium	0.006	-	-	<0.00050	0.00065	0.0007	0.0004	0.00024	0.0003	0.0007	0.0006	0.0005	0.0005		0.0004
Zinc	0.02	-	-	<0.0050	<0.0050	< 0.005	< 0.005	0.01	0.01	0.01	**0.03**	< 0.005	0.01		< 0.005
Conductivity (us/cm)	NV	-	-	450	380	455	440	-	490	504	780	400	400		550
Dissolved Oxygen	5	-	-	4.34	7.94	7.5	-	-	3.9	1.74	3.51	-	-		-
pH (Units)	6.5 - 8.5	-	-	7.42	8.24	8.04	7.8	-	8.08	7.03	7.57	7.84	7.84		7.33
Temperature (°C)	NV	-	-	10.9	5.6	14.5	4.9	-	8.8	18.3	19.1	13.8	13.8		13.3

Notes:

1. All results are expressed in mg/L unless otherwise stated.
2. PWQO = Provincial Water Quality Objective, 1994.
3. Bold text indicate values exceeding PWQO.
4. SW1-F, SW2B-F, and SW4-F are field filtered samples

Surface Water Quality Data

Parameter	PWQO	Trigger Concentrations SW1 / SW4	Trigger Concentrations SW6	SW4 - F 5-Oct-15	SW4 26-Apr-16	SW4 - F 26-Apr-16	SW4 20-Oct-16	SW4 12-Apr-17	SW4 17-Jul-17	SW4 6-Oct-17	SW4 10-Apr-18	SW4 22-Apr-19	SW4 30-Jul-19	SW4 8-Oct-19	SW 4 13-Apr-20
Alkalinity (as CaCO3)	-	-	-	-	203	-	140	146	260	227	142	122			139
Colour (TCU)	-	-	-	-	56	-	580	61	125	120	34	52			44
Conductivity (us/cm)	-	-	-	-	442	-	1070	341	533	684	293	277			335
pH (Units)	6.5 - 8.5	-	-	-	8.06	-	7.29	7.89	8.02	7.48	8.06	7.97			7.86
TDS	-	-	-	-	234	-	760	183	275	384	164	146			166
TSS	-	-	-	-	< 3	-	100	< 3	6	65	< 3	< 3			< 3
Turbidity (NTU)	-	-	-	-	0.5	-	42.4	0.6	1.9	86.5	1.6	0.7			0.5
DOC	-	27	12	-	13	-	**42**	11	26	26	8.8	9.8			6.8
BOD	-	-	-	-	< 3	-	44	2	< 3	9	< 3	< 3			< 3
COD	-	-	-	-	32	-	196	28	62	106	24	30			20
Phenolics - Total	0.001	-	-	-	<0.001	-	**0.12**	<0.001	**0.01**	**0.01**	< 0.001	< 0.002			< 0.002
Chloride	-	-	-	-	12	-	22	12	9	41	5.9	7.3			9.4
Cyanide	0.005	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	< 0.005	< 0.005			< 0.005
Flouride	-	-	-	-	0.2	-	0.1	<0.1	<0.1	<0.1	< 0.1	< 0.1			< 0.1
Unionized Ammonia	0.02	0.02	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	< 0.01	< 0.01			< 0.01
Total Ammonia	-	-	-	0.03	0.04	0.05	0.09	0.02	0.06	0.76	0.03	< 0.01			0.02
Sulphate	-	-	-	-	8	-	421	16	1	17	5	4			7
Nitrite	-	-	-	-	<0.1	-	<0.1	<0.1	<0.05	<0.05	< 0.05	< 0.05			< 0.05
Nitrate	-	-	-	-	<0.1	-	0.1	<0.1	<0.05	<0.05	< 0.05	< 0.05			0.13
TKN	-	-	-	1.7	0.6	0.6	2.1	0.6	1.1	2.7	0.4	0.6			0.5
Mercury	0.0002	-	-	<0.00002	<0.00002	0.00003	<0.00002	<0.00002	<0.00002	<0.00002	< 0.00002	< 0.00002			< 0.00002
Hardness	-	-	-	395	212	207	571	177	254	329	166	143			166
Aluminum	0.075	-	-	0.04	0.02	0.02	**90**	0.04	0.04	**0.08**	0.05	0.03			0.03
Antimony	0.02	-	-	0	<0.0001	<0.0001	<0.0001	0.0001	0.0001	0.0001	< 0.0001	< 0.0001			0.0002
Arsenic	0.005	-	-	0.001	0.0003	0.0003	0.0011	0.0003	0.001	0.002	0.0002	0.0002			0.0002
Barium	-	-	-	0.061	0.046	0.044	0.113	0.053	0.078	0.14	0.031	0.031			0.031
Beryllium	1.1	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	< 0.002	Dry	Dry	< 0.002
Boron	0.2	0.04	0.09	**0.057**	0.034	0.029	**0.389**	**0.091**	**0.076**	**0.218**	0.014	0.027			0.028
Cadmium	0.0005	-	-	<0.00002	<0.00002	<0.00002	<0.00002	0.000015	<0.000014	0.000017	< 0.000014	< 0.000015			< 0.000015
Calcium	-	-	-	139	73	72	207	54	89	113	58.5	52.3			56
Chromium (Total)	0.001	-	-	< 0.0002	0.0002	0.0003	< 0.0002	< 0.002	< 0.001	< 0.001	< 0.001	0.001			< 0.001
Chromium (VI)	0.001														
Cobalt	0.0009	-	-	< 0.005	< 0.005	< 0.005	**0.0022**	0.0001	0.0004	**0.0014**	< 0.0001	< 0.0001			< 0.0001
Copper	0.005	-	-	0.0008	0.0002	0.0004	0.0013	0.0003	0.0003	0.0006	0.0004	0.0005			0.0005
Iron	0.3	2	0.11	**0.95**	0.14	0.1	**5.65**	0.06	**0.99**	**25.6**	0.104	0.091			0.061
Lead	0.005	-	-	< 0.00002	0.00006	< 0.00002	0.00023	< 0.00002	< 0.00002	0.00005	< 0.00002	< 0.00002			< 0.00002
Magnesium	-	-	-	11.3	6.79	6.52	13	4.76	7.79	11.2	4.67	3.47			3.84
Manganese	-	0.87	0.08	0.46	0.02	0.01	**2.1**	0	0.12	**0.9**	0.013	0.004			0.005
Molybdenum	0.04	-	-	0.0004	0.0005	0.0004	0.0008	0.0012	0.0018	0.0018	0.0002	0.0005			0.0004
Nickel	0.025	-	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			< 0.01
Potassium	-	-	-	3	2.5	2.3	8.4	1.7	2.5	11.6	0.8	1.4			1.2
Phosphorous - Total	0.03	-	-	**0.04**	0.01	0.01	**0.49**	0.03	**0.06**	**0.3**	< 0.01	0.02			< 0.01
Selenium	0.1	-	-	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001			< 0.001
Silver	0.0001	-	-	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	**0.0002**			< 0.0001
Sodium	-	-	-	17.6	9.8	9.2	10.7	7.4	8.8	17.1	4.7	3.9			5
Strontium	-	-	-	0.31	0.16	0.16	0.39	0.11	0.21	0.24	0.132	0.102			0.113
Thalium	0.0003	-	-	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005			< 0.00005
Vanadium	0.006	-	-	0.0002	0.0003	0.0003	0.0028	0.0004	0.0005	0.0015	0.0004	0.0003			0.0004
Zinc	0.02	-	-	0.01	< 0.005	< 0.005	0.02	< 0.005	< 0.005	**0.07**	0.017	0.013			0.005
Conductivity (us/cm)	NV	-	-	550	375	-	-	343		668	668	300			366
Dissolved Oxygen	5	-	-	-	-	-	-					8.19			6.34
pH (Units)	6.5 - 8.5	-	-	7.33	8.3	-	-					8.03			7.51
Temperature (°C)	NV	-	-	13.3	10	-	-					8.3			8

Notes:

1. All results are expressed in mg/L unless otherwise stated.
2. PWQO = Provincial Water Quality Objective, 1994.
3. Bold text indicate values exceeding PWQO.
4. SW1-F, SW2B-F, and SW4-F are field filtered samples

Surface Water Quality Data

Parameter	PWQO	Trigger Concentrations SW1 / SW4	Trigger Concentrations SW6	SW 4	SW4	SW4	SW4	SW4	SW4	SW4	SW4	SW4	SW4	SW4	SW5
				20-Jul-20	14-Oct-20	21-Apr-21	19-Jul-21	18-Oct-21	20-Apr-22	21-Jul-22	12-Oct-22	19-Apr-23	28-Aug-23	12-Oct-23	29-Mar-16
Alkalinity (as CaCO3)	-	-	-		253	215	210	272	188			163		205	131
Colour (TCU)	-	-	-		81	57	57	114	42			69		76	19
Conductivity (us/cm)	-	-	-		547	435	421	572	375			362		573	277
pH (Units)	6.5 - 8.5	-	-		7.92	8.08	8.03	8.06	7.97			7.76		8.02	8.05
TDS	-	-	-		297	232	237	325	205			192		334	146
TSS	-	-	-		3	3	< 3	< 3	< 3			< 3		8	< 3
Turbidity (NTU)	-	-	-		0.8	0.5	0.9	0.8	0.4			0.6		1.3	0.6
DOC	-	27	12		21.4	14.9	22.5	15.9	12			10.5		24.2	5
BOD	-	-	-		< 3	< 3	< 3	< 3	< 3			< 3		<3	< 3
COD	-	-	-		49	37	54	65	17			27		25	12
Phenolics - Total	0.001	-	-		< 0.002	< 0.002	< 0.002	< 0.002	< 0.001			< 0.001		<0.001	<0.001
Chloride	-	-	-		17.3	12	9.5	24.9	9.9			11.3		21.3	3
Cyanide	0.005	-	-		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005			< 0.005		<0.005	
Flouride	-	-	-		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1			< 0.1		<0.1	<0.1
Unionized Ammonia	0.02	0.02	0.02		< 0.01	< 0.01	< 0.01	< 0.01	0.01			< 0.01		<0.01	<0.01
Total Ammonia	-	-	-		0.04	0.02	0.04	0.06	2.23			0.53		0.07	0.03
Sulphate	-	-	-		2	2	3	9	3			6		69	7
Nitrite	-	-	-		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05			< 0.05		<0.05	<0.1
Nitrate	-	-	-		< 0.05	< 0.05	0.1	0.28	< 0.05			< 0.05		0.15	0.5
TKN	-	-	-		1.1	0.6	1	1.2	2.9			1.2		0.9	0.3
Mercury	0.0002	-	-		< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002			< 0.00002		<0.00002	<0.00002
Hardness	-	-	-		294	212	228	302	190			170		276	135
Aluminum	0.075	-	-		0.06	0.05	0.06	0.06	0.02			0.02		**0.08**	0.03
Antimony	0.02	-	-		0.0006	0.0002	0.0004	0.0003	0.0003			0.0005		0.0004	<0.0001
Arsenic	0.005	-	-		0.0004	0.0002	0.0005	0.0004	0.0002			0.0002		0.0004	0.0001
Barium	-	-	-		0.062	0.037	0.059	0.064	0.032			0.034		0.058	0.009
Beryllium	1.1	-	-	Dry	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	Dry	Dry	< 0.002	Dry	<0.0001	<0.002
Boron	0.2	0.04	0.09		**0.043**	0.021	**0.044**	**0.06**	0.019			0.033		**0.141**	<0.005
Cadmium	0.0005	-	-		< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015			< 0.000015		<0.000015	<0.00002
Calcium	-	-	-		105	76.1	84.6	104	67.9			61		97.8	50
Chromium (Total)	0.001	-	-		< 0.001	< 0.001	0.001	< 0.001	< 0.001			0.001		<0.001	< 0.0002
Chromium (VI)	0.001								< 0.001			< 0.001		<0.001	
Cobalt	0.0009	-	-		0.0002	0.0001	0.0003	0.0004	< 0.0001			0.0001		0.0003	< 0.005
Copper	0.005	-	-		0.0002	0.0003	0.0003	0.0005	0.0002			0.0006		0.001	0.0003
Iron	0.3	2	0.11		**0.643**	0.151	**0.598**	**0.337**	0.068			0.124		0.294	0.02
Lead	0.005	-	-		< 0.00002	< 0.00002	0.00003	0.00003	< 0.00002			0.00004		0.00007	< 0.00002
Magnesium	-	-	-		7.61	5.37	5.7	7.51	4.88			4.38		7.71	2.69
Manganese	-	0.87	0.08		0.097	0.013	0.138	0.037	0.006			0.011		0.025	0
Molybdenum	0.04	-	-		0.0003	0.0002	0.0006	0.0004	0.0002			0.0005		0.0023	0.0001
Nickel	0.025	-	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			< 0.01		0.0022	< 0.01
Potassium	-	-	-		2.2	1.4	1.4	3.7	1.4			1.6		3.3	0.6
Phosphorous - Total	0.03	-	-		0.03	**0.04**	**0.06**	0.03	0.02			0.03		<0.1	0.03
Selenium	0.1	-	-		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001			< 0.001		<0.001	< 0.001
Silver	0.0001	-	-		< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001			< 0.0001		<0.0001	< 0.00002
Sodium	-	-	-		10.1	6.8	5.7	12.3	5.2			5.4		11.9	1.7
Strontium	-	-	-		0.205	0.155	0.182	0.219	0.144			0.13		0.219	0.09
Thalium	0.0003	-	-		< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005			< 0.00005		<0.00005	< 0.00005
Vanadium	0.006	-	-		0.0003	0.0002	0.0005	0.0003	0.0002			0.0003		0.0005	0.0002
Zinc	0.02	-	-		0.006	0.005	0.014	< 0.005	< 0.005			< 0.005		0.008	< 0.005
Conductivity (us/cm)	NV	-	-		520	460	2.95	614	480			324		506	161
Dissolved Oxygen	5	-	-		3.84	7.36	395		6.12			15.4		12.83	12
pH (Units)	6.5 - 8.5	-	-		7.32	7.95	6.98	7.68	7.48			7.98		7.28	7.74
Temperature (°C)	NV	-	-		8.2	5.4	19.9	10.2	8.1			7.7		11	2.5

Notes:

1. All results are expressed in mg/L unless otherwise stated.
2. PWQO = Provincial Water Quality Objective, 1994.
3. Bold text indicate values exceeding PWQO.
4. SW1-F, SW2B-F, and SW4-F are field filtered samples

Surface Water Quality Data

Parameter	PWQO	Trigger Concentrations SW1 / SW4	Trigger Concentrations SW6	SW5 26-Apr-16	SW - 5 - F 26-Apr-16	SW5 12-Apr-17	SW5 17-Jul-17	SW5 10-Apr-18	SW5 22-Apr-19	SW5 30-Jul-19	SW5 8-Oct-19	SW 5 13-Apr-20	SW 5 20-Jul-20	SW5 14-Oct-20	SW5 21-Apr-21
Alkalinity (as CaCO3)	-	-	-	169	-	156	179	182	154			149		211	216
Colour (TCU)	-	-	-	23	-	28	42	13	21			17		23	22
Conductivity (us/cm)	-	-	-	344	-	318	355	350	325			325		433	411
pH (Units)	6.5 - 8.5	-	-	8.06	-	7.87	8.22	7.87	8.01			8.12		8.05	8.15
TDS	-	-	-	181	-	169	181	195	169			166		232	224
TSS	-	-	-	< 3	-	4	3	< 3	< 3			< 3		22	< 3
Turbidity (NTU)	-	-	-	0.8	-	0.5	1.2	1	1.6			0.7		10.3	1.9
DOC	-	27	12	7	-	6	11	5.6	7.6			5		10.9	8.6
BOD	-	-	-	< 3	-	< 2	< 3	< 3	< 3			< 3		< 3	< 3
COD	-	-	-	16	-	15	25	15	22			7		34	24
Phenolics - Total	0.001	-	-	<0.001	-	<0.001	**0.01**	< 0.001	< 0.002			< 0.1		< 0.002	< 0.002
Chloride	-	-	-	2	-	4	2	3.2	3.2			3.5		5.4	2.8
Cyanide	0.005	-	-		-	<0.005	<0.005	< 0.005	< 0.005			< 0.005		< 0.005	< 0.005
Flouride	-	-	-	0.1	-	<0.1	<0.1	< 0.1	< 0.1			< 0.1		< 0.1	< 0.1
Unionized Ammonia	0.02	0.02	0.02	<0.01	<0.01	<0.01	<0.01	< 0.01	< 0.01			< 0.01		< 0.01	< 0.01
Total Ammonia	-	-	-	0.03	0.04	0.01	0.04	0.08	0.03			0.01		0.03	0.02
Sulphate	-	-	-	6	-	7	2	5	4			7		2	3
Nitrite	-	-	-	<0.1	-	<0.1	<0.05	< 0.05	< 0.05			< 0.05		< 0.05	< 0.05
Nitrate	-	-	-	<0.1	-	<0.1	<0.05	0.05	0.22			0.13		0.07	< 0.05
TKN	-	-	-	0.3	0.6	0.4	0.5	0.3	0.5			0.3		0.7	0.4
Mercury	0.0002	-	-	<0.00002	0.00003	<0.00002	<0.00002	< 0.00002	< 0.00002			< 0.00002		< 0.00002	< 0.00002
Hardness	-	-	-	178	170	180	174	210	173			170		241	221
Aluminum	0.075	-	-	0.03	0.02	0.05	0.04	0.06	0.05			0.04		0.06	0.05
Antimony	0.02	-	-	<0.0001	<0.0001	<0.0001	0.0001	< 0.0001	< 0.0001			0.0002		0.0006	0.0002
Arsenic	0.005	-	-	0.0002	0.0002	0.0002	0.0002	< 0.0001	0.0002			0.0001		0.0004	0.0002
Barium	-	-	-	0.011	0.01	0.015	0.012	0.02	0.013			0.012		0.021	0.012
Beryllium	1.1	-	-	<0.002	<0.002	<0.002	<0.002	< 0.002	< 0.002	Dry	Dry	< 0.002	Dry	< 0.002	< 0.002
Boron	0.2	0.04	0.09	<0.005	<0.005	0.01	0.013	< 0.005	0.008			0.005		0.019	0.005
Cadmium	0.0005	-	-	<0.00002	<0.00002	< 0.000014	<0.000014	< 0.000014	< 0.000015			< 0.000015		0.000017	< 0.000015
Calcium	-	-	-	65	63	59	64	68.7	63.3			60.4		90	81.6
Chromium (Total)	0.001	-	-	< 0.0002	0.0002	< 0.002	< 0.001	< 0.001	< 0.001			< 0.001		< 0.001	< 0.001
Chromium (VI)	0.001														
Cobalt	0.0009	-	-	< 0.005	< 0.005	0.0001	0.0001	< 0.0001	0.0001			< 0.0001		0.0003	< 0.0001
Copper	0.005	-	-	0.0001	0.0002	0.0001	0.0004	0.0004	0.0004			0.0004		0.0004	0.0003
Iron	0.3	2	0.11	0.06	0.04	0.04	0.1	0.05	0.086			0.038		**1.03**	0.133
Lead	0.005	-	-	< 0.00002	< 0.00002	< 0.00002	0.00002	< 0.00002	< 0.00002			< 0.00002		0.00009	0.00003
Magnesium	-	-	-	3.58	3.44	2.92	3.33	4.48	2.9			3.29		3.87	4.12
Manganese	-	0.87	0.08	0	0	0	0.01	0.006	0.016			0.005		0.121	0.007
Molybdenum	0.04	-	-	0.0001	0.0001	0.0001	0.0001	< 0.0001	< 0.0001			< 0.0001		< 0.0001	< 0.0001
Nickel	0.025	-	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			< 0.01		< 0.01	< 0.01
Potassium	-	-	-	0.3	0.3	0.6	0.5	0.6	0.9			0.5		1.9	0.3
Phosphorous - Total	0.03	-	-	0.01	< 0.01	0.03	0.02	< 0.01	0.02			< 0.01		0.03	**0.06**
Selenium	0.1	-	-	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001			< 0.001		< 0.001	< 0.001
Silver	0.0001	-	-	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.0001			< 0.0001		< 0.0001	< 0.0001
Sodium	-	-	-	2	2	1.9	1.7	2.8	1.9			2.1		2.7	2.3
Strontium	-	-	-	0.13	0.12	0.1	0.13	0.143	0.107			0.107		0.176	0.149
Thalium	0.0003	-	-	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005			< 0.00005		< 0.00005	< 0.00005
Vanadium	0.006	-	-	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003			0.0002		0.0002	0.0002
Zinc	0.02	-	-	< 0.005	< 0.005	< 0.005	< 0.005	0.013	0.009			0.016		**0.021**	0.005
Conductivity (us/cm)	NV	-	-	275	-	317			461			362		410	410
Dissolved Oxygen	5	-	-	-	-				9.11			11.19		7.51	8.42
pH (Units)	6.5 - 8.5	-	-	7.6	-				7.92			7.95		7.72	7.65
Temperature (°C)	NV	-	-	4.3	-				6.1			8.4		11.6	5.3

Notes:

1. All results are expressed in mg/L unless otherwise stated.
2. PWQO = Provincial Water Quality Objective, 1994.
3. Bold text indicate values exceeding PWQO.
4. SW1-F, SW2B-F, and SW4-F are field filtered samples

Surface Water Quality Data

Parameter	PWQO	Trigger Concentrations		SW5	SW5	SW5	SW5	SW5	SW5	SW5	SW5	SW6	SW - 6 - F	SW6	SW6
		SW1 / SW4	SW6	19-Jul-21	18-Oct-21	20-Apr-22	21-Jul-22	12-Oct-22	19-Apr-23	28-Aug-23	12-Oct-23	26-Apr-16	26-Apr-16	29-Mar-16	8-Nov-16
Alkalinity (as CaCO3)	-	-	-	190	357	192			174			164	-	104	149
Colour (TCU)	-	-	-	42	21	17			27			30	-	26	74
Conductivity (us/cm)	-	-	-	360	867	365			353			355	-	226	480
pH (Units)	6.5 - 8.5	-	-	8.08	8.08	8.08			7.96			8.08	-	8.03	7.68
TDS	-	-	-	205	478	202			191			181	-	116	295
TSS	-	-	-	24	236	4			< 3			< 3	-	3	30
Turbidity (NTU)	-	-	-	30.2	48.5	0.5			0.8			0.5	-	1.1	1.6
DOC	-	27	12	13.3	5.4	7.6			11			8	-	6	**20**
BOD	-	-	-	6	14	< 3			< 3			< 3	-	< 3	< 3
COD	-	-	-	38	27	9			17			15	-	15	60
Phenolics - Total	0.001	-	-	< 0.002	< 0.002	< 0.001			< 0.001			<0.001	-	<0.001	**0.03**
Chloride	-	-	-	2.8	75.3	4.2			4.3			9	-	4	9
Cyanide	0.005	-	-	< 0.005	< 0.005	< 0.005			< 0.005				-		<0.005
Flouride	-	-	-	< 0.1	< 0.1	< 0.1			< 0.1			0.1	-	<0.1	0.1
Unionized Ammonia	0.02	0.02	0.02	< 0.01	0.02	**0.06**			**0.03**			<0.01	<0.01	<0.01	<0.01
Total Ammonia	-	-	-	0.03	3.8	3.56			0.9			0.02	0.05	0.03	0.04
Sulphate	-	-	-	3	5	6			6			4	-	5	83
Nitrite	-	-	-	< 0.05	0.18	< 0.05			< 0.05			<0.1	-	<0.1	<0.1
Nitrate	-	-	-	0.09	0.74	0.05			< 0.05			<0.1	-	0.3	0.1
TKN	-	-	-	1	5.9	5.6			1.2			0.3	0.5	0.4	0.5
Mercury	0.0002	-	-	< 0.00002	< 0.00002	< 0.00002			< 0.00002			<0.00002	0.00003	<0.00002	<0.00002
Hardness	-	-	-	197	431	193			177			167	171	106	251
Aluminum	0.075	-	-	0.04	**0.08**	0.02			0.02			0.02	0.02	0.04	0.03
Antimony	0.02	-	-	0.0004	0.0004	0.0003			0.0003			<0.0001	<0.0001	0.0001	0.0001
Arsenic	0.005	-	-	0.0004	0.0003	0.0001			0.0002			0.0002	0.0002	0.0001	0.001
Barium	-	-	-	0.018	0.045	0.012			0.012			0.017	0.017	0.012	0.058
Beryllium	1.1	-	-	< 0.002	< 0.002	< 0.002	Dry	Dry	< 0.002	Dry	Dry	<0.002	<0.002	<0.002	<0.002
Boron	0.2	0.04	0.09	0.016	0.021	< 0.005			0.006			<0.005	<0.005	0.007	0.026
Cadmium	0.0005	-	-	< 0.000015	0.000021	< 0.000015			< 0.000015			<0.00002	<0.00002	<0.00002	0.00015
Calcium	-	-	-	78.1	152	71.1			65.5			60	62	38	97
Chromium (Total)	0.001	-	-	< 0.001	< 0.001	< 0.001			< 0.001			< 0.0002	< 0.0002	< 0.0002	0.0006
Chromium (VI)	0.001					< 0.001			< 0.001						
Cobalt	0.0009	-	-	0.0002	0.0007	< 0.0001			< 0.0001			< 0.005	< 0.005	< 0.005	0.0001
Copper	0.005	-	-	0.0005	0.0034	0.0007			0.0004			0.0002	0.0004	0.0005	0.0019
Iron	0.3	2	0.11	**0.534**	**0.391**	0.049			0.065			0.03	0.02	0.03	**0.56**
Lead	0.005	-	-	0.00006	0.00018	0.00005			0.00003			< 0.00002	< 0.00002	0.00004	0.00022
Magnesium	-	-	-	3.23	6.98	3.83			3.29			3.95	4.04	2.57	7.78
Manganese	-	0.87	0.08	0.082	0.263	0.004			0.004			0	0	0.01	**0.43**
Molybdenum	0.04	-	-	< 0.0001	< 0.0001	< 0.0001			< 0.0001			0.0001	0.0002	0.0001	0.0005
Nickel	0.025	-	-	< 0.01	< 0.01	< 0.01			< 0.01			< 0.01	< 0.01	< 0.01	< 0.01
Potassium	-	-	-	1	3.2	0.7			0.6			0.3	0.4	0.5	0.5
Phosphorous - Total	0.03	-	-	**0.11**	**0.13**	0.02			0.03			0.01	0.01	0.03	0.03
Selenium	0.1	-	-	< 0.001	0.002	< 0.001			< 0.001			< 0.001	< 0.001	< 0.001	0.001
Silver	0.0001	-	-	< 0.0001	< 0.0001	< 0.0001			< 0.0001			< 0.00002	< 0.00002	< 0.00002	< 0.00002
Sodium	-	-	-	1.8	15.2	1.9			2.1			5.3	5.4	2.6	6
Strontium	-	-	-	0.153	0.356	0.131			0.12			0.16	0.16	0.08	0.2
Thalium	0.0003	-	-	< 0.00005	< 0.00005	< 0.00005			< 0.00005			< 0.00005	< 0.00005	< 0.00005	< 0.00005
Vanadium	0.006	-	-	0.0003	0.0003	0.0002			0.0002			0.0001	0.0001	0.0002	0.0002
Zinc	0.02	-	-	**0.025**	**0.048**	< 0.005			< 0.005			0.01	0.01	< 0.005	0.01
Conductivity (us/cm)	NV	-	-	5.37	918	375			315			270	-	131	570
Dissolved Oxygen	5	-	-	338		6.55			28.57			-	-	8	5
pH (Units)	6.5 - 8.5	-	-	7.16	7.45	8.13			8.37			8.35	-	7.65	7.27
Temperature (°C)	NV	-	-	23.9	9.8	4.6			4.9			2.1	-	2.7	7.1

Notes:

1. All results are expressed in mg/L unless otherwise stated.
2. PWQO = Provincial Water Quality Objective, 1994.
3. Bold text indicate values exceeding PWQO.
4. SW1-F, SW2B-F, and SW4-F are field filtered samples

Surface Water Quality Data

Parameter	PWQO	Trigger Concentrations SW1 / SW4	Trigger Concentrations SW6	SW6 12-Apr-17	SW6 10-Apr-18	SW6 22-Apr-19	SW6 30-Jul-19	SW6 8-Oct-19	SW 6 13-Apr-20	SW 6 20-Jul-20	SW 6 14-Oct-20	SW6 21-Apr-21	SW6 19-Jul-21	SW6 18-Oct-21	SW6 20-Apr-22
Alkalinity (as CaCO3)	-	-	-	141	171	140			145			214	249		185
Colour (TCU)	-	-	-	40	22	32			44			35	79		25
Conductivity (us/cm)	-	-	-	328	357	320			343			449	503		395
pH (Units)	6.5 - 8.5	-	-	7.86	7.92	7.95			7.89			8.03	7.93		7.99
TDS	-	-	-	171	188	162			172			238	280		207
TSS	-	-	-	< 3	< 3	< 3			< 3			90	5		4
Turbidity (NTU)	-	-	-	0.7	0.5	0.5			0.6			45.1	3.9		0.5
DOC	-	27	12	7	7.1	8.7			6.6			11.8	**22.1**		9.4
BOD	-	-	-	2	< 3	< 3			< 3			4	< 6		< 3
COD	-	-	-	14	16	17			6			49	62		12
Phenolics - Total	0.001	-	-	<0.001	< 0.001	**0.007**			**0.002**			< 0.002	< 0.002		< 0.001
Chloride	-	-	-	14	10.6	8.7			12			15.3	13.6		16.5
Cyanide	0.005	-	-	<0.005	< 0.005	< 0.005			< 0.005			< 0.005	< 0.005		< 0.005
Flouride	-	-	-	<0.1	< 0.1	< 0.1			< 0.1			< 0.1	< 0.1		< 0.1
Unionized Ammonia	0.02	0.02	0.02	<0.01	< 0.01	< 0.01			< 0.01			< 0.01	< 0.01		0.01
Total Ammonia	-	-	-	0.02	0.02	0.02			0.02			0.03	0.05		1.28
Sulphate	-	-	-	7	4	3			5			< 1	1		2
Nitrite	-	-	-	<0.1	< 0.05	< 0.05			< 0.05			< 0.05	< 0.05		< 0.05
Nitrate	-	-	-	<0.1	< 0.05	< 0.05			0.14			< 0.05	0.11		< 0.05
TKN	-	-	-	0.5	0.3	0.5			0.4			0.9	1.3		2.1
Mercury	0.0002	-	-	<0.00002	< 0.00002	< 0.00002			< 0.00002			< 0.00002	< 0.00002		< 0.00002
Hardness	-	-	-	172	199	162			169			227	270		185
Aluminum	0.075	-	-	0.03	0.04	0.04			0.03			0.05	0.07		0.02
Antimony	0.02	-	-	<0.0001	< 0.0001	< 0.0001			0.0002			0.0003	0.0004		0.0003
Arsenic	0.005	-	-	0.0002	< 0.0001	0.0001			0.0001			0.0001	0.0007		0.0001
Barium	-	-	-	0.031	0.023	0.027			0.023			0.031	0.072		0.022
Beryllium	1.1	-	-	<0.002	< 0.002	< 0.002	Dry	Dry	< 0.002	Dry	Dry	< 0.002	< 0.002	Dry	< 0.002
Boron	0.2	0.04	0.09	0.022	0.009	0.012			0.013			0.006	0.024		0.006
Cadmium	0.0005	-	-	0.000037	< 0.000014	< 0.000015			< 0.000015			< 0.000015	0.000018		< 0.000015
Calcium	-	-	-	55	61.4	57.6			59.4			81.3	97.6		66.7
Chromium (Total)	0.001	-	-	< 0.002	< 0.001	0.001			< 0.001			< 0.001	< 0.001		< 0.001
Chromium (VI)	0.001														< 0.001
Cobalt	0.0009	-	-	0.0001	< 0.0001	< 0.0001			0.0001			< 0.0001	**0.0011**		< 0.0001
Copper	0.005	-	-	0.0004	0.0003	0.0004			0.0009			0.0005	0.0004		0.0005
Iron	0.3	2	0.11	0.04	0.04	0.07			0.077			**0.118**	**3.96**		**0.141**
Lead	0.005	-	-	< 0.00002	**0.024**	< 0.00002			0.00002			0.00004	0.0001		0.00003
Magnesium	-	-	-	3.57	4.29	3.56			3.56			5.88	6.07		4.41
Manganese	-	0.87	0.08	0.03	0.01	0.013			0.016			0.013	**1.18**		0.028
Molybdenum	0.04	-	-	0.0002	< 0.0001	0.0002			0.0002			0.0003	0.0003		0.0002
Nickel	0.025	-	-	< 0.01	< 0.01	< 0.01			< 0.01			< 0.01	< 0.01		< 0.01
Potassium	-	-	-	0.6	0.4	0.8			0.4			0.4	0.4		0.5
Phosphorous - Total	0.03	-	-	0.03	< 0.01	0.01			< 0.01			**0.26**	**0.14**		0.03
Selenium	0.1	-	-	< 0.001	< 0.001	< 0.001			< 0.001			< 0.001	< 0.001		< 0.001
Silver	0.0001	-	-	< 0.00002	< 0.00002	**0.0002**			< 0.0001			< 0.0001	< 0.0001		< 0.0001
Sodium	-	-	-	5.7	5.3	4.1			4.7			6.4	6.1		5.2
Strontium	-	-	-	0.14	0.134	0.129			0.138			0.173	0.227		0.157
Thalium	0.0003	-	-	< 0.00005	< 0.00005	< 0.00005			< 0.00005			< 0.00005	< 0.00005		< 0.00005
Vanadium	0.006	-	-	0.0001	0.0002	0.0001			0.0002			< 0.0001	0.0005		0.0001
Zinc	0.02	-	-	0.01	< 0.005	0.011			< 0.005			0.01	**0.025**		0.005
Conductivity (us/cm)	NV	-	-	328	328	382			345			540	0.86		421
Dissolved Oxygen	5	-	-			5.4			6.69			7.34	474		4.1
pH (Units)	6.5 - 8.5	-	-			8.26			7.81			7.63	6.77		7.86
Temperature (°C)	NV	-	-			5.5			7			3.4	20.9		3.5

Notes:

1. All results are expressed in mg/L unless otherwise stated.
2. PWQO = Provincial Water Quality Objective, 1994.
3. Bold text indicate values exceeding PWQO.
4. SW1-F, SW2B-F, and SW4-F are field filtered samples

Surface Water Quality Data

Parameter	PWQO	Trigger Concentrations SW1 / SW4	Trigger Concentrations SW6	SW6 21-Jul-22	SW6 12-Oct-22	SW6 19-Apr-23	SW6 28-Aug-23	SW6 12-Oct-23	SW6 25-Jan-24
Alkalinity (as CaCO3)	-	-	-			210		174	223
Colour (TCU)	-	-	-			36		105	23
Conductivity (us/cm)	-	-	-			603		468	490
pH (Units)	6.5 - 8.5	-	-			7.8		7.96	8.07
TDS	-	-	-			314		257	261
TSS	-	-	-			9		70	<3
Turbidity (NTU)	-	-	-			4.3		5.5	1.2
DOC	-	27	12			9.1		**24.5**	9.1
BOD	-	-	-			< 3		4	<3
COD	-	-	-			21		54	14
Phenolics - Total	0.001	-	-			< 0.001		<0.001	<0.001
Chloride	-	-	-			62.7		25.2	26.3
Cyanide	0.005	-	-			< 0.005		<0.005	<0.005
Flouride	-	-	-			< 0.1		<0.1	<0.1
Unionized Ammonia	0.02	0.02	0.02			< 0.01		<0.01	<0.01
Total Ammonia	-	-	-			0.37		0.29	<0.05
Sulphate	-	-	-			1		32	3
Nitrite	-	-	-			< 0.05		<0.05	<0.05
Nitrate	-	-	-			< 0.05		0.13	<0.05
TKN	-	-	-			1.1		2.4	0.3
Mercury	0.0002	-	-			< 0.00002		<0.00002	<0.00002
Hardness	-	-	-			246		222	229
Aluminum	0.075	-	-			0.03		0.06	0.02
Antimony	0.02	-	-			0.0004		0.0003	0.0002
Arsenic	0.005	-	-			0.0002		0.0005	0.0001
Barium	-	-	-			0.03		0.044	0.027
Beryllium	1.1	-	-	Dry	Dry	< 0.002	Dry	<0.0001	<0.0001
Boron	0.2	0.04	0.09			0.035		0.032	0.011
Cadmium	0.0005	-	-			< 0.000015		0.000025	<0.000015
Calcium	-	-	-			89.9		78.1	82.6
Chromium (Total)	0.001	-	-			< 0.001		<0.001	<0.001
Chromium (VI)	0.001					< 0.001		<0.001	<0.001
Cobalt	0.0009	-	-			0.0002		0.0005	0.0002
Copper	0.005	-	-			0.0009		0.0019	0.0004
Iron	0.3	2	0.11			**0.155**		**0.5**	**0.162**
Lead	0.005	-	-			0.0002		0.00008	0.00006
Magnesium	-	-	-			5.19		6.55	5.45
Manganese	-	0.87	0.08			0.011		**0.352**	0.025
Molybdenum	0.04	-	-			0.0002		0.0007	0.0001
Nickel	0.025	-	-			< 0.01		0.0011	0.0003
Potassium	-	-	-			0.9		1.9	0.4
Phosphorous - Total	0.03	-	-			**0.05**		**0.2**	<0.1
Selenium	0.1	-	-			0.001		<0.001	<0.001
Silver	0.0001	-	-			< 0.0001		<0.0001	<0.0001
Sodium	-	-	-			20.8		6.5	9.1
Strontium	-	-	-			0.349		0.175	0.213
Thalium	0.0003	-	-			< 0.00005		<0.00005	<0.00005
Vanadium	0.006	-	-			0.0003		0.0004	0.0001
Zinc	0.02	-	-			< 0.005		0.012	<0.005
Conductivity (us/cm)	NV	-	-			537		418	-
Dissolved Oxygen	5	-	-			16.69		11.5	-
pH (Units)	6.5 - 8.5	-	-			7.87		7.15	-
Temperature (°C)	NV	-	-			6.9		10.7	-

Notes:

1. All results are expressed in mg/L unless otherwise stated.
2. PWQO = Provincial Water Quality Objective, 1994.
3. Bold text indicate values exceeding PWQO.
4. SW1-F, SW2B-F, and SW4-F are field filtered samples

VOC Summary Tables

Parameter	ODWQS	PWQO	14-I 6-May-08	14-I 25-May-09	14-I 5-Aug-09	14-I 8-Jun-10	14-I 19-Oct-10	14-I 12-May-11	14-I 8-Nov-11	14-I 19-Apr-12	14-I 29-Oct-12	14-I 3-Jun-13	14-I 29-Oct-13	14-I 1-May-14	14-I 24-Sep-14	14-I 28-Apr-15
Acetone	NV	NV	12	< 10	< 10	13	< 10	<10	<10	100	<25	< 30	< 30	< 30	< 2	< 30
Benzene	5	NV	< 0.4	< 0.2	< 0.2	0.3	< 0.2	<0.1	0.4	0.13	<0.25	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	-	0.9	-	-	-	< 0.4	< 0.4	<0.5	<0.5	<0.50	<1.3	< 2	< 0.5	< 0.5	< 0.3	< 0.5
Bromodichloro-methane	NV	200	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	<0.1	<0.1	<0.10	<0.25		< 2	< 2	< 0.1	< 2
Chloro-benzene	NV	15	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	<0.1	<0.1	<0.10	<0.25	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5
Chloro-ethane (Ethyl Chloride)	NV	NV	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	-	-	-	-	-	-	-	-	-
Chloro-ethene (Vinyl Chloride)	2	600	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.2	<0.20	1.1	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5
Chloro-methane (Methyl Chloride)	NV	700	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-	<0.5	-	<1.3	-	-	< 5	< 0.3	-
Dibromochloro-methane	NV	40	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	<0.2	<0.2	<0.20	<0.50	< 2	< 2	< 2	< 0.1	-
1,2-Dibromo-ethane (Ethylene Dibromide)	NV	5	< 0.3	< 0.3	< 0.3	< 0.2	< 0.2	<0.2	<0.2	<0.20	<0.50	< 0.2	< 0.2	< 0.2	< 0.1	< 0.2
Dibromo-methane (Methylene Bromide)	NV	NV	< 0.4	< 0.4	< 0.4	-	-	-	-	-	-	-	-	< 0.5	< 0.1	< 2
1,2-Dichloro-benzene	200	2.5	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	<0.2	<0.2	<0.20	<0.50	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5
1,3-Dichloro-benzene	NV	2.5	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	<0.2	<0.2	<0.20	<0.50	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5
1,4-Dichloro-benzene	5	4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	<0.2	<0.2	<0.20	<0.50	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5
1,1-Dichloro-ethane	NV	200	< 0.6	< 0.6	< 0.6	< 0.3	< 0.3	<0.1	<0.1	<0.10	<0.25	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5
1,2-Dichloro-ethane	5	100	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	<0.2	<0.2	<0.20	<0.50	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5
1,1-Dichloro-ethylene	14	40	< 0.3	< 0.3	< 0.3	< 0.5	< 0.5	<0.1	<0.1	<0.10	<0.25	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5
cis-1,2-Dichloro-ethylene	NV	200	< 0.7	< 0.7	< 0.7	< 0.5	< 0.5	<0.1	<0.1	<0.10	<0.25	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5
trans-1,2-Dichloro-ethylene	NV	200	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.1	<0.1	<0.10	<0.25	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloro-methane (Methylene Chloride)	50	100	< 5	< 5	< 5	< 5	< 5	<0.5	-	0.64	-	< 5	< 5	-	-	< 5
1,2-Dichloro-propane	NV	0.7	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	<0.1	<0.1	<0.10	<0.25	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5
cis-1,3-Dichloro-propylene	NV	NV	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	<0.2	<0.2	<0.20	<0.50	< 0.5	< 0.5	< 0.2	< 0.2	< 0.5
trans-1,3-Dichloro-propylene	NV	7	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	<0.2	<0.2	<0.20	<0.50	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5
Ethyl-benzene	2.4	8	0.4	< 0.3	< 0.3	0.3	< 0.2	<0.1	0.2	<0.10	0.25	< 0.5	< 0.5	< 20	2	< 0.5
Methyl-ethyl-ketone (MEK) (2-Butanone)	NV	400	< 10	< 10	< 10	< 10	< 10	<5	<5	<5.0	13	< 20	< 20	< 2	< 1	< 20
Methyl-isobutyl-ketone (MIK) (2-Hexone)	NV	NV	< 10	< 10	< 10	< 10	< 10	<5	<5	<5.0	<13	< 20	< 20	< 1.0	< 0.4	< 20
Methyl-tert-butyl-ether (MTBE)	NV	200	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.2	<0.2	<0.20	<0.50	< 2	< 2	< 20	< 1	< 2
Styrene	NV	4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.2	<0.20	<0.50	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5
1,1,1,2-Tetrachloro-ethane	NV	20	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	<0.1	<0.1	<0.20	<0.50	< 0.5	< 0.5	< 0.5	< 0.4	< 0.5
1,1,2,2-Tetrachloro-ethane	NV	70	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	<0.2	<0.2	<0.20	<0.50	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5
Tetrachloro-ethylene (PCE)	30	50	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	<0.1	<0.1	<0.10	<0.25	< 0.5	< 0.5	< 5	< 0.1	< 0.5
Tetrachloro-methane (Carbon Tetrachloride)	5	NV	< 0.3	< 0.3	< 0.3	< 0.2	< 0.2	<0.1	<0.1	<0.10	<0.25	< 0.2	< 0.2	< 1	< 0.3	< 0.2
Toluene	24	0.8	0.3	0.7	< 0.2	0.5	0.4	0.3	1.7	1.9	8.6	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5
Tribromo-methane (Bromoform)	NV	60	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	<0.2	<0.2	<0.20	<0.50	< 5	< 5	< 0.5	< 0.1	< 5
1,2,4-Trichloro-benzene	NV	0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	-	-	-	-	< 0.5	< 0.5	< 5	< 0.1	< 0.5
1,1,1-Trichloro-ethane	NV	10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.1	<0.1	<0.10	<0.25	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5
1,1,2-Trichloro-ethane	NV	800	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	<0.2	<0.2	<0.20	<0.50	< 0.5	< 0.5	< 0.5	< 0.2	< 0.5
Trichloro-ethylene (TCE)	5	20	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	<0.1	<0.1	-	<0.25	< 0.5	< 0.5	< 0.5	< 0.1	< 0.5
Trichlorofluoro-methane (Fluorotrichloro-methane)	NV	NV	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	<0.2	<0.2	<0.20	<0.50	< 5	< 5	< 0.5	< 0.5	< 5
Trichloro-methane (Chloroform)	NV	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.1	<0.1	0.29	<0.25	< 1	< 1	< 0.5	< 0.5	< 1
m&p-Xylene	NV	2	0.9	< 0.6	< 0.6	0.5	< 0.4	<0.1	0.3	<0.10	0.55	< 1.0	< 1.0	< 0.5	0.1	< 1.0
o-Xylene	NV	40	2	0.2	< 0.2	0.6	< 0.2	0.1	0.5	<0.10	0.37	< 0.5	< 0.5	-	-	< 0.5
Total Xylenes	90	NV														
2-Chloroethyvinyl Ether	NV	NV	< 10	< 10	< 10	< 10	< 10	-	-	-	-	-	-	-	-	-
Bis(2-ethylhexyl) Phthalate	NV	0.2														

Notes:
1. All results in µg/L unless otherwise stated.
2. ODWO = Ontario Drinking Water Objectives.
3. Shading indicates detection
4. Bold text indicates values exceeding the ODWO.
5. NV = no value.
6. "-" Indicates parameter not analyzed.

VOC Summary Tables

Parameter	ODWQS	PWQO	14-I 5-Oct-15	14-I 19-Oct-16	14-I 12-Apr-17	14-I 5-Oct-17	14-I 10-Apr-18	14-I 2-Oct-18	14-I 22-Apr-19	14-I 09-Oct-19	14-I 13-Apr-20	14-I 14-Oct-20	14-I 21-Apr-21	14-I 18-Oct-21	14-I 20-Apr-22	14-I 12-Oct-22
Acetone	NV	NV	< 30	50	120		70	< 30	< 30	< 30	< 30	< 30	30	< 30	< 30	< 30
Benzene	5	NV	< 0.5	< 0.5	< 0.5	< 30	< 0.5	0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.6	< 0.5
Bromomethane	-	0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	1.1	< 0.5	< 0.5	< 0.5
Bromodichloro-methane	NV	200	< 2	< 2	< 2	< 0.5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Chloro-benzene	NV	15	< 0.5	< 0.5	< 0.5		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloro-ethane (Ethyl Chloride)	NV	NV	-	-		< 0.5				< 3						
Chloro-ethene (Vinyl Chloride)	2	600	< 0.5	< 0.5	< 0.5		< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chloro-methane (Methyl Chloride)	NV	700	-	-		< 0.5	< 5	< 0.3	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Dibromochloro-methane	NV	40	-	< 2	< 2		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1,2-Dibromo-ethane (Ethylene Dibromide)	NV	5	< 0.2	< 0.2		< 2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dibromo-methane (Methylene Bromide)	NV	NV	< 2	-	< 0.2	< 0.2										
1,2-Dichloro-benzene	200	2.5	< 0.5	< 0.5	< 0.5		< 0.5	< 0.5							< 0.5	< 0.5
1,3-Dichloro-benzene	NV	2.5	< 0.5	< 0.5	< 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-Dichloro-benzene	5	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
1,1-Dichloro-ethane	NV	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-Dichloro-ethane	5	100	< 0.5	< 0.5	< 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-Dichloro-ethylene	14	40	< 0.5	< 0.5	< 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	200	< 0.5	-		< 0.5			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans-1,2-Dichloro-ethylene	NV	200	< 0.5	-					< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloro-methane (Methylene Chloride)	50	100	< 5	< 5	< 5		< 5	< 0.3					< 0.2	< 0.2		
1,2-Dichloro-propane	NV	0.7	< 0.5	< 0.5	< 0.5	< 5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis-1,3-Dichloro-propylene	NV	NV	< 0.5	-		< 0.5			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans-1,3-Dichloro-propylene	NV	7	< 0.5	-					< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethyl-benzene	2.4	8	< 0.5	< 0.5	< 0.5		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methyl-ethyl-ketone (MEK) (2-Butanone)	NV	400	< 20	< 20	< 20	< 0.5	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl-isobutyl-ketone (MIK) (2-Hexone)	NV	NV	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl-tert-butyl-ether (MTBE)	NV	200	< 2	< 2	< 2	< 20	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Styrene	NV	4	< 0.5	< 0.5	< 0.5	< 2	< 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	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	< 0.5
1,1,2,2-Tetrachloro-ethane	NV	70	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloro-ethylene (PCE)	30	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
Tetrachloro-methane (Carbon Tetrachloride)	5	NV	< 0.2	< 0.2		< 0.5									< 0.2	< 0.2
Toluene	24	0.8	< 0.5	17.4	1.3	2.7	< 0.5	< 0.5	< 0.5	< 0.5	1	< 0.5	0.9	1.9	0.6	< 0.5
Tribromo-methane (Bromoform)	NV	60	< 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
1,1,1-Trichloro-ethane	NV	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	< 0.5
1,1,2-Trichloro-ethane	NV	800	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloro-ethylene (TCE)	5	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	< 0.5
Trichlorofluoro-methane (Fluorotrichloro-methane)	NV	NV	< 5	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Trichloro-methane (Chloroform)	NV	NV	< 1	< 1		< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
m&p-Xylene	NV	2	< 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
o-Xylene	NV	40	< 0.5	< 0.5	< 0.5	< 1.0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Total Xylenes	90	NV											< 1.1	< 1.1	< 1.1	< 1.1
2-Chloroethyvinyl Ether	NV	NV	-	-		< 0.5										
Bis(2-ethylhexyl) Phthalate	NV	0.2														

Notes:
1. All results in µg/L unless otherwise stated.
2. ODWO = Ontario Drinking Water Objectives.
3. Shading indicates detection
4. Bold text indicates values exceeding the ODWO.
5. NV = no value.
6. "-" Indicates parameter not analyzed.

VOC Summary Tables

Parameter	ODWQS	PWQO	14-I 19-Apr-23	14-I 12-Oct-23	14-II 25-May-09	14-II 5-Aug-09	14-II 8-Jun-10	14-II 15-Oct-10	14-II 12-May-11	14-II 8-Nov-11	14-II 19-Apr-12	14-II 29-Oct-12	14-II 3-Jun-13	14-II 29-Oct-13	14-II 1-May-14	14-II 24-Sep-14
Acetone	NV	NV			18	25	< 10	< 10	<10	<10	<20	<50	< 30	< 30	< 30	< 2
Benzene	5	NV			< 0.2	< 0.2	< 0.2	< 0.2	<0.1	<0.1	<0.20	<0.50	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	-	0.9			-	-	< 0.4	< 0.4	<0.5	<0.5	<1.0	<2.5	< 2	< 0.5	< 0.5	< 0.3
Bromodichloro-methane	NV	200			< 0.3	< 0.3	< 0.3	< 0.3	<0.1	<0.1	<0.20	<0.50	-	< 2	< 2	< 0.1
Chloro-benzene	NV	15			< 0.3	< 0.3	< 0.3	< 0.3	<0.1	<0.1	<0.20	<0.50	< 0.5	< 0.5	< 0.5	< 0.2
Chloro-ethane (Ethyl Chloride)	NV	NV			< 0.4	< 0.4	< 0.4	< 0.4	-	-	-	-	-	-	-	-
Chloro-ethene (Vinyl Chloride)	2	600			< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.2	<0.40	<1.0	< 0.5	< 0.5	< 0.5	< 0.2
Chloro-methane (Methyl Chloride)	NV	700			< 0.3	< 0.3	< 0.3	< 0.3	-	<0.5	-	<2.5	-	-	< 5	< 0.3
Dibromochloro-methane	NV	40			< 0.4	< 0.4	< 0.4	< 0.4	<0.2	<0.2	<0.40	<1.0	< 2	< 2	< 2	< 0.1
1,2-Dibromo-ethane (Ethylene Dibromide)	NV	5			< 0.3	< 0.3	< 0.2	< 0.2	<0.2	<0.2	<0.40	<1.0	< 0.2	< 0.2	< 0.2	< 0.1
Dibromo-methane (Methylene Bromide)	NV	NV			< 0.4	< 0.4	-	-	-	-	-	-	-	-	< 0.5	< 0.1
1,2-Dichloro-benzene	200	2.5			< 0.4	< 0.4	< 0.4	< 0.4	<0.2	<0.2	<0.40	<1.0	< 0.5	< 0.5	< 0.5	< 0.1
1,3-Dichloro-benzene	NV	2.5			< 0.3	< 0.3	< 0.3	< 0.3	<0.2	<0.2	<0.40	<1.0	< 0.5	< 0.5	< 0.5	< 0.2
1,4-Dichloro-benzene	5	4			< 0.4	< 0.4	< 0.4	< 0.4	<0.2	<0.2	<0.40	<1.0	< 0.5	< 0.5	< 0.5	0.3
1,1-Dichloro-ethane	NV	200			< 0.6	< 0.6	< 0.3	< 0.3	<0.1	<0.1	<0.20	<0.50	< 0.5	< 0.5	< 0.5	< 0.1
1,2-Dichloro-ethane	5	100			< 0.4	< 0.4	< 0.4	< 0.4	<0.2	<0.2	<0.40	<1.0	< 0.5	< 0.5	< 0.5	< 0.1
1,1-Dichloro-ethylene	14	40			< 0.3	< 0.3	< 0.5	< 0.5	<0.1	<0.1	<0.20	<0.50	< 0.5	< 0.5	< 0.5	< 0.1
cis-1,2-Dichloro-ethylene	NV	200			< 0.7	< 0.7	< 0.5	< 0.5	<0.1	<0.1	<0.20	<0.50	< 0.5	< 0.5	< 0.5	< 0.1
trans-1,2-Dichloro-ethylene	NV	200			< 0.2	< 0.2	< 0.2	< 0.2	<0.1	<0.1	<0.20	<0.50	< 0.5	< 0.5	< 0.5	< 0.5
Dichloro-methane (Methylene Chloride)	50	100			< 5	< 5	< 5	< 5	<0.5	-	<1.0	-	< 5	< 5	-	
1,2-Dichloro-propane	NV	0.7			< 0.4	< 0.4	< 0.4	< 0.4	<0.1	<0.1	<0.20	<0.50	< 0.5	< 0.5	< 0.5	< 0.1
cis-1,3-Dichloro-propylene	NV	NV			< 0.4	< 0.4	< 0.4	< 0.4	<0.2	<0.2	<0.40	<1.0	< 0.5	< 0.5	< 0.2	< 0.2
trans-1,3-Dichloro-propylene	NV	7			< 0.3	< 0.3	< 0.3	< 0.3	<0.2	<0.2	<0.40	<1.0	< 0.5	< 0.5	< 0.5	< 0.1
Ethyl-benzene	2.4	8			< 0.3	< 0.3	< 0.2	< 0.2	0.2	0.2	<0.20	<0.50	< 0.5	< 0.5	< 20	< 1
Methyl-ethyl-ketone (MEK) (2-Butanone)	NV	400			141	< 10	< 10	< 10	<5	<5	<10	<25	< 20	< 20	2	2
Methyl-isobutyl-ketone (MIK) (2-Hexone)	NV	NV	broken	broken	< 10	< 10	< 10	< 10	<5	<5	<10	<25	< 20	< 20	< 1.0	< 0.4
Methyl-tert-butyl-ether (MTBE)	NV	200			< 0.5	< 0.5	< 0.5	< 0.5	1.1	1.1	1.6	1.4	< 2	< 2	< 20	< 1
Styrene	NV	4			< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.2	<0.40	<1.0	< 0.5	< 0.5	< 0.5	< 0.1
1,1,1,2-Tetrachloro-ethane	NV	20			< 0.3	< 0.3	< 0.3	< 0.3	<0.1	<0.1	<0.40	<1.0	< 0.5	< 0.5	< 0.5	< 0.4
1,1,2,2-Tetrachloro-ethane	NV	70			< 0.3	< 0.3	< 0.3	< 0.3	<0.2	<0.2	<0.40	<1.0	< 0.5	< 0.5	< 0.5	< 0.1
Tetrachloro-ethylene (PCE)	30	50			< 0.3	< 0.3	< 0.3	< 0.3	<0.1	<0.1	<0.20	<0.50	< 0.5	< 0.5	< 5	< 0.1
Tetrachloro-methane (Carbon Tetrachloride)	5	NV			< 0.3	< 0.3	< 0.2	< 0.2	<0.1	<0.1	<0.20	<0.50	< 0.2	< 0.2	< 1	< 0.3
Toluene	24	0.8			1.2	0.5	0.7	< 0.2	<0.2	0.5	<0.40	<1.0	< 0.5	< 0.5	< 0.5	< 0.2
Tribromo-methane (Bromoform)	NV	60			< 0.3	< 0.3	< 0.3	< 0.3	<0.2	<0.2	<0.40	<1.0	< 5	< 5	< 0.5	< 0.1
1,2,4-Trichloro-benzene	NV	0.5			< 0.5	< 0.5	< 0.5	< 0.5	-	-	-	-	< 0.5	< 0.5	< 5	< 0.1
1,1,1-Trichloro-ethane	NV	10			< 0.5	< 0.5	< 0.5	< 0.5	<0.1	<0.1	<0.20	<0.50	< 0.5	< 0.5	< 0.5	< 0.1
1,1,2-Trichloro-ethane	NV	800			< 0.4	< 0.4	< 0.4	< 0.4	<0.2	<0.2	<0.40	<1.0	< 0.5	< 0.5	< 0.5	< 0.2
Trichloro-ethylene (TCE)	5	20			< 0.4	< 0.4	< 0.4	< 0.4	<0.1	<0.1	-	<0.50	< 0.5	< 0.5	< 0.5	< 0.1
Trichlorofluoro-methane (Fluorotrichloro-methane)	NV	NV			< 0.3	< 0.3	< 0.3	< 0.3	<0.2	<0.2	<0.40	<1.0	< 5	< 5	< 0.5	< 0.5
Trichloro-methane (Chloroform)	NV	NV			< 0.5	< 0.5	< 0.5	< 0.5	<0.1	<0.1	<0.20	<0.50	< 1	< 1	< 0.5	< 0.5
m&p-Xylene	NV	2			< 0.6	< 0.6	0.7	< 0.4	0.4	0.4	<0.20	<0.50	< 1.0	< 1.0	< 0.5	< 0.1
o-Xylene	NV	40			< 0.2	< 0.2	< 0.2	< 0.2	0.4	0.1	<0.20	<0.50	< 0.5	< 0.5	-	-
Total Xylenes	90	NV														
2-Chloroethyvinyl Ether	NV	NV			< 10	< 10	< 10	< 10	-	-	-	-	-	-	-	-
Bis(2-ethylhexyl) Phthalate	NV	0.2														

Notes:
1. All results in µg/L unless otherwise stated.
2. ODWO = Ontario Drinking Water Objectives.
3. Shading indicates detection
4. Bold text indicates values exceeding the ODWO.
5. NV = no value.
6. "-" Indicates parameter not analyzed.

VOC Summary Tables

Parameter	ODWQS	PWQO	14-II 28-Apr-15	14-II 5-Oct-15	14-II 19-Oct-16	14-II 12-Apr-17	14-II 5-Oct-17	14-II 10-Apr-18	14-II 2-Oct-18	14-II 22-Apr-19	14-II 09-Oct-19	14-II 13-Apr-20	14-II 14-Oct-20	14-II 21-Apr-21	14-II 18-Oct-21	14-II 20-Apr-22
Acetone	NV	NV	<30	<30	< 30	< 30		30	< 30	< 30	< 30	< 30	< 30	< 30	50	< 30
Benzene	5	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 30	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	1.6
Bromomethane	-	0.9	< 2	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.8	< 0.5	< 0.5
Bromodichloro-methane	NV	200	-	-	< 2	< 2	< 0.5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Chloro-benzene	NV	15	-	-	< 0.5	< 0.5		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloro-ethane (Ethyl Chloride)	NV	NV	< 0.5	< 0.5	-		< 0.5				< 3					
Chloro-ethene (Vinyl Chloride)	2	600	-	-	< 0.5	< 0.5		< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chloro-methane (Methyl Chloride)	NV	700	-	-	-		< 0.5	< 5	< 0.3	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Dibromochloro-methane	NV	40	< 0.2	< 0.2	< 2	< 2		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1,2-Dibromo-ethane (Ethylene Dibromide)	NV	5	< 2	< 2	< 0.2		< 2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dibromo-methane (Methylene Bromide)	NV	NV	< 0.5	< 0.5		< 0.2	< 0.2									
1,2-Dichloro-benzene	200	2.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	< 0.5							< 0.5
1,3-Dichloro-benzene	NV	2.5	< 0.5	< 0.5	< 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-Dichloro-benzene	5	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
1,1-Dichloro-ethane	NV	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-Dichloro-ethane	5	100	< 0.5	< 0.5	< 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-Dichloro-ethylene	14	40	< 0.5	< 0.5	< 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	200	< 0.5	< 0.5	-		< 0.5			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans-1,2-Dichloro-ethylene	NV	200	< 5	< 5	-					< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloro-methane (Methylene Chloride)	50	100	< 0.5	< 0.5	< 5	< 5		< 5	< 0.3					< 0.2	< 0.2	
1,2-Dichloro-propane	NV	0.7	< 0.5	< 0.5	< 0.5	< 0.5	< 5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis-1,3-Dichloro-propylene	NV	NV	< 0.5	< 0.5	-		< 0.5			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans-1,3-Dichloro-propylene	NV	7	< 0.5	< 0.5	-					< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethyl-benzene	2.4	8	< 20	< 20	< 0.5	< 0.5		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methyl-ethyl-ketone (MEK) (2-Butanone)	NV	400	< 20	< 20	< 20	< 20	< 0.5	60	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl-isobutyl-ketone (MIK) (2-Hexone)	NV	NV	< 2	< 2	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl-tert-butyl-ether (MTBE)	NV	200	< 0.5	< 0.5	< 2	< 2	< 20	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Styrene	NV	4	< 0.5	< 0.5	< 0.5	< 0.5	< 2	< 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	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	< 0.5
1,1,2,2-Tetrachloro-ethane	NV	70	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloro-ethylene (PCE)	30	50	< 0.2	< 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
Tetrachloro-methane (Carbon Tetrachloride)	5	NV	< 0.5	< 0.5	< 0.2		< 0.5									< 0.2
Toluene	24	0.8	-	-	< 0.5	< 0.5		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tribromo-methane (Bromoform)	NV	60	< 0.5	< 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	< 0.5
1,1,1-Trichloro-ethane	NV	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	< 0.5
1,1,2-Trichloro-ethane	NV	800	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloro-ethylene (TCE)	5	20	< 5	< 5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoro-methane (Fluorotrichloro-methane)	NV	NV	< 1	< 1	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Trichloro-methane (Chloroform)	NV	NV	< 1.0	< 1.0	< 1		< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
m&p-Xylene	NV	2	< 0.5	< 0.5	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	NV	40	-	-	< 0.5	< 0.5	< 1.0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Total Xylenes	90	NV												< 1.1	< 1.1	< 1.1
2-Chloroethyvinyl Ether	NV	NV	-	-	-		< 0.5									
Bis(2-ethylhexyl) Phthalate	NV	0.2														

Notes:
1. All results in µg/L unless otherwise stated.
2. ODWO = Ontario Drinking Water Objectives.
3. Shading indicates detection
4. Bold text indicates values exceeding the ODWO.
5. NV = no value.
6. "-" Indicates parameter not analyzed.

VOC Summary Tables

Parameter	ODWQS	PWQO	14-II 12-Oct-22	14-II 19-Apr-23	14-II 12-Oct-23	14-III 6-May-08	14-III 15-Aug-08	14-III 25-May-09	14-III 5-Aug-09	14-III 8-Jun-10	14-III 15-Oct-10	14-III 12-May-11	14-III 8-Nov-11	14-III 19-Apr-12	14-III 29-Oct-12	14-III 3-Jun-13
Acetone	NV	NV	< 30	< 30	<30	< 10	< 10	13	22	11	< 10	<20	<30	<25	<200	< 30
Benzene	5	NV	< 0.5	< 0.5	<0.5	< 0.4	< 0.4	< 0.2	0.2	0.3	0.3	<0.2	<0.3	<0.25	<2.0	< 0.5
Bromomethane	-	0.9	< 0.5	< 0.5	<0.5	-	-	-	-	< 0.4	< 0.4	<1	<1	<1.3	<10	< 2
Bromodichloro-methane	NV	200	< 2	< 2	<2	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	<0.2	<0.3	<0.25	<2.0	-
Chloro-benzene	NV	15	< 0.5	< 0.5	<0.5	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	<0.2	<0.3	<0.25	<2.0	< 0.5
Chloro-ethane (Ethyl Chloride)	NV	NV				< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	-	-	-	-	-
Chloro-ethene (Vinyl Chloride)	2	600	< 0.2	< 0.2	<0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.4	<0.5	<0.50	<4.0	< 0.5
Chloro-methane (Methyl Chloride)	NV	700	< 5	< 5	<5	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-	2	-	<10	-
Dibromochloro-methane	NV	40	< 2	< 2	<2	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	<0.4	<0.5	<0.50	<4.0	< 2
1,2-Dibromo-ethane (Ethylene Dibromide)	NV	5	< 0.2	< 0.2	<0.2	< 0.3	< 0.3	< 0.3	< 0.3	< 0.2	< 0.2	<0.4	<0.5	<0.50	<4.0	< 0.2
Dibromo-methane (Methylene Bromide)	NV	NV				< 0.4	< 0.4	< 0.4	< 0.4	-	-	-	-	-	-	-
1,2-Dichloro-benzene	200	2.5	< 0.5	< 0.5	<0.5	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	<0.4	<0.5	<0.50	<4.0	< 0.5
1,3-Dichloro-benzene	NV	2.5	< 0.5	< 0.5	<0.5	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	<0.4	<0.5	<0.50	<4.0	< 0.5
1,4-Dichloro-benzene	5	4	< 0.5	< 0.5	<0.5	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	<0.4	<0.5	<0.50	<4.0	< 0.5
1,1-Dichloro-ethane	NV	200	< 0.5	< 0.5	<0.5	< 0.6	< 0.6	< 0.6	< 0.6	< 0.3	< 0.3	<0.2	<0.3	<0.25	<2.0	< 0.5
1,2-Dichloro-ethane	5	100	< 0.5	< 0.5	<0.5	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	<0.4	<0.5	<0.50	<4.0	< 0.5
1,1-Dichloro-ethylene	14	40	< 0.5	< 0.5	<0.5	< 0.3	< 0.3	< 0.3	< 0.3	< 0.5	< 0.5	<0.2	<0.3	<0.25	<2.0	< 0.5
cis-1,2-Dichloro-ethylene	NV	200	< 0.5	< 0.5	<0.5	< 0.7	< 0.7	< 0.7	< 0.7	< 0.5	< 0.5	<0.2	<0.3	<0.25	<2.0	< 0.5
trans-1,2-Dichloro-ethylene	NV	200	< 0.5	< 0.5	<0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<0.3	<0.25	<2.0	< 0.5
Dichloro-methane (Methylene Chloride)	50	100				< 5	< 5	< 5	< 5	< 5	< 5	<1	-	<1.3	-	< 5
1,2-Dichloro-propane	NV	0.7	< 0.5	< 0.5	<0.5	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	<0.2	<0.3	<0.25	<2.0	< 0.5
cis-1,3-Dichloro-propylene	NV	NV	< 0.5	< 0.5	<0.5	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	<0.4	<0.5	<0.50	<4.0	< 0.5
trans-1,3-Dichloro-propylene	NV	7	< 0.5	< 0.5	<0.5	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	<0.4	<0.5	<0.50	<4.0	< 0.5
Ethyl-benzene	2.4	8	< 0.5	< 0.5	<0.5	< 0.3	< 0.3	< 0.3	< 0.3	< 0.2	< 0.2	<0.2	<0.3	<0.25	<2.0	< 0.5
Methyl-ethyl-ketone (MEK) (2-Butanone)	NV	400	< 20	< 20	<20	< 10	< 10	< 10	< 10	< 10	< 10	<10	<10	<13	<100	< 20
Methyl-isobutyl-ketone (MIK) (2-Hexone)	NV	NV	< 20	< 20	<20	< 10	< 10	< 10	< 10	< 10	< 10	<10	<10	<13	<100	< 20
Methyl-tert-butyl-ether (MTBE)	NV	200	< 2	< 2	<2	<0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.4	<0.5	<0.50	<4.0	< 2
Styrene	NV	4	< 0.5	< 0.5	<0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.4	<0.5	<0.50	<4.0	< 0.5
1,1,1,2-Tetrachloro-ethane	NV	20	< 0.5	< 0.5	<0.5	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	<0.2	<0.3	<0.50	<4.0	< 0.5
1,1,2,2-Tetrachloro-ethane	NV	70	< 0.5	< 0.5	<0.5	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	<0.4	<0.5	<0.50	<4.0	< 0.5
Tetrachloro-ethylene (PCE)	30	50	< 0.5	< 0.5	<0.5	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	<0.2	<0.3	<0.25	<2.0	< 0.5
Tetrachloro-methane (Carbon Tetrachloride)	5	NV	< 0.2	< 0.2	<0.2	< 0.3	< 0.3	< 0.3	< 0.3	< 0.2	< 0.2	<0.2	<0.3	<0.25	<2.0	< 0.2
Toluene	24	0.8	< 0.5	< 0.5	<0.5	< 0.3	6.8	0.6	1.3	0.4	0.4	<0.4	<0.5	<0.50	<4.0	< 0.5
Tribromo-methane (Bromoform)	NV	60	< 5	< 5	<5	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	<0.4	<0.5	<0.50	<4.0	< 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
1,1,1-Trichloro-ethane	NV	10	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.2	<0.3	<0.25	<2.0	< 0.5
1,1,2-Trichloro-ethane	NV	800	< 0.5	< 0.5	<0.5	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	<0.4	<0.5	<0.50	<4.0	< 0.5
Trichloro-ethylene (TCE)	5	20	< 0.5	< 0.5	<0.5	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	<0.2	<0.3	-	<2.0	< 0.5
Trichlorofluoro-methane (Fluorotrichloro-methane)	NV	NV	< 5	< 5	<5	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	<0.4	<0.5	<0.50	<4.0	< 5
Trichloro-methane (Chloroform)	NV	NV	< 1	< 1	<1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.2	<0.3	<0.25	<2.0	< 1
m&p-Xylene	NV	2	< 1.0	< 1.0	<1	< 0.6	< 0.6	< 0.6	< 0.6	0.5	0.6	<0.2	<0.3	<0.25	<2.0	< 1.0
o-Xylene	NV	40	< 0.5	< 0.5	<0.5	< 0.2	< 0.2	< 0.2	0.2	0.3	0.3	<0.2	<0.3	<0.25	<2.0	< 0.5
Total Xylenes	90	NV	< 1.1	< 1.1	-											
2-Chloroethyvinyl Ether	NV	NV				< 10	< 10	< 10	< 10	< 10	< 10	-	-	-	-	-
Bis(2-ethylhexyl) Phthalate	NV	0.2														

Notes:
1. All results in µg/L unless otherwise stated.
2. ODWO = Ontario Drinking Water Objectives.
3. Shading indicates detection
4. Bold text indicates values exceeding the ODWO.
5. NV = no value.
6. "-" Indicates parameter not analyzed.

VOC Summary Tables

Parameter	ODWQS	PWQO	14-III 29-Oct-13	14-III 1-May-14	14-III 24-Sep-14	14-III 28-Apr-15	14-III 5-Oct-15	14-III 19-Oct-16	14-III 12-Apr-17	14-III 10-Apr-18	14-III 22-Apr-19	14-III 09-Oct-19	14-III 13-Apr-20	14-III 14-Oct-20	14-III 21-Apr-21	14-III 18-Oct-21
Acetone	NV	NV	< 30	< 30	< 2	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	60	50
Benzene	5	NV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.7	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	-	0.9	< 0.5	< 0.5	< 0.3	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	1.1	< 0.5
Bromodichloro-methane	NV	200	< 2	< 2	< 0.1	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Chloro-benzene	NV	15	< 0.5	< 0.5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloro-ethane (Ethyl Chloride)	NV	NV	-	-	-	-	-	-				< 3				
Chloro-ethene (Vinyl Chloride)	2	600	< 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	< 0.2
Chloro-methane (Methyl Chloride)	NV	700	-	< 5	< 0.3	-	-	-		< 5	< 5	< 5	< 5	< 5	< 5	< 5
Dibromochloro-methane	NV	40	< 2	< 2	< 0.1	-	-	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1,2-Dibromo-ethane (Ethylene Dibromide)	NV	5	< 0.2	< 0.2	< 0.1	< 0.2	< 0.2	< 0.2		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dibromo-methane (Methylene Bromide)	NV	NV	-	< 0.5	< 0.1	< 2	< 2	-	< 0.2							
1,2-Dichloro-benzene	200	2.5	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5						
1,3-Dichloro-benzene	NV	2.5	< 0.5	< 0.5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,4-Dichloro-benzene	5	4	< 0.5	< 0.5	0.3	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1-Dichloro-ethane	NV	200	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichloro-ethane	5	100	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1-Dichloro-ethylene	14	40	< 0.5	< 0.5	< 0.1	< 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	200	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	-			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans-1,2-Dichloro-ethylene	NV	200	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichloro-methane (Methylene Chloride)	50	100	< 5		-	< 5	< 5	< 5	< 5	< 5					< 0.2	< 0.2
1,2-Dichloro-propane	NV	0.7	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis-1,3-Dichloro-propylene	NV	NV	< 0.5	< 0.2	< 0.2	< 0.5	< 0.5	-			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans-1,3-Dichloro-propylene	NV	7	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	-			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethyl-benzene	2.4	8	< 0.5	< 20	1	< 0.5	< 0.5	0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methyl-ethyl-ketone (MEK) (2-Butanone)	NV	400	< 20	< 2	< 1	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl-isobutyl-ketone (MIK) (2-Hexone)	NV	NV	< 20	< 1.0	< 0.4	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl-tert-butyl-ether (MTBE)	NV	200	< 2	< 20	< 1	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Styrene	NV	4	< 0.5	< 0.5	< 0.1	< 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	20	< 0.5	< 0.5	< 0.4	< 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-Tetrachloro-ethane	NV	70	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloro-ethylene (PCE)	30	50	< 0.5	< 5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloro-methane (Carbon Tetrachloride)	5	NV	< 0.2	< 1	< 0.3	< 0.2	< 0.2	< 0.2								
Toluene	24	0.8	< 0.5	< 0.5	< 0.2	< 0.5	< 0.5	1.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tribromo-methane (Bromoform)	NV	60	< 5	< 0.5	< 0.1	< 5	< 5	< 5		< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2,4-Trichloro-benzene	NV	0.5	< 0.5	< 5	< 0.1	< 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-Trichloro-ethane	NV	10	< 0.5	< 0.5	< 0.1	< 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-Trichloro-ethane	NV	800	< 0.5	< 0.5	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloro-ethylene (TCE)	5	20	< 0.5	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoro-methane (Fluorotrichloro-methane)	NV	NV	< 5	< 0.5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Trichloro-methane (Chloroform)	NV	NV	< 1	< 0.5	< 0.5	< 1	< 1	< 1		< 1	< 1	< 1	< 1	< 1	< 1	< 1
m&p-Xylene	NV	2	< 1.0	< 0.5	< 0.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	NV	40	< 0.5	-	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Total Xylenes	90	NV													< 1.1	< 1.1
2-Chloroethyvinyl Ether	NV	NV	-	-	-	-	-	-								
Bis(2-ethylhexyl) Phthalate	NV	0.2														

Notes:
1. All results in µg/L unless otherwise stated.
2. ODWO = Ontario Drinking Water Objectives.
3. Shading indicates detection
4. Bold text indicates values exceeding the ODWO.
5. NV = no value.
6. "-" Indicates parameter not analyzed.

VOC Summary Tables

Parameter	ODWQS	PWQO	14-III 20-Apr-22	14-III 19-Apr-23	14-III 12-Oct-23	Leachate 12-May-21
Acetone	NV	NV	< 30			
Benzene	5	NV	< 0.5			< 0.5
Bromomethane	-	0.9	< 0.5			
Bromodichloro-methane	NV	200	< 2			
Chloro-benzene	NV	15	< 0.5			
Chloro-ethane (Ethyl Chloride)	NV	NV				
Chloro-ethene (Vinyl Chloride)	2	600	< 0.2			
Chloro-methane (Methyl Chloride)	NV	700	< 5			
Dibromochloro-methane	NV	40	< 2			
1,2-Dibromo-ethane (Ethylene Dibromide)	NV	5	< 0.2			
Dibromo-methane (Methylene Bromide)	NV	NV				
1,2-Dichloro-benzene	200	2.5	< 0.5			
1,3-Dichloro-benzene	NV	2.5	< 0.5			
1,4-Dichloro-benzene	5	4	< 0.5			
1,1-Dichloro-ethane	NV	200	< 0.5			
1,2-Dichloro-ethane	5	100	< 0.5			
1,1-Dichloro-ethylene	14	40	< 0.5			
cis-1,2-Dichloro-ethylene	NV	200	< 0.5			
trans-1,2-Dichloro-ethylene	NV	200	< 0.5			
Dichloro-methane (Methylene Chloride)	50	100				
1,2-Dichloro-propane	NV	0.7	< 0.5			
cis-1,3-Dichloro-propylene	NV	NV	< 0.5			
trans-1,3-Dichloro-propylene	NV	7	< 0.5	Broken	Broken	
Ethyl-benzene	2.4	8	< 0.5			< 0.5
Methyl-ethyl-ketone (MEK) (2-Butanone)	NV	400	< 20			
Methyl-isobutyl-ketone (MIK) (2-Hexone)	NV	NV	< 20			
Methyl-tert-butyl-ether (MTBE)	NV	200	< 2			
Styrene	NV	4	< 0.5			
1,1,1,2-Tetrachloro-ethane	NV	20	< 0.5			
1,1,2,2-Tetrachloro-ethane	NV	70	< 0.5			
Tetrachloro-ethylene (PCE)	30	50	< 0.5			
Tetrachloro-methane (Carbon Tetrachloride)	5	NV	< 0.2			
Toluene	24	0.8	< 0.5			16.5
Tribromo-methane (Bromoform)	NV	60	< 5			
1,2,4-Trichloro-benzene	NV	0.5	< 0.5			
1,1,1-Trichloro-ethane	NV	10	< 0.5			
1,1,2-Trichloro-ethane	NV	800	< 0.5			
Trichloro-ethylene (TCE)	5	20	< 0.5			
Trichlorofluoro-methane (Fluorotrichloro-methane)	NV	NV	< 5			
Trichloro-methane (Chloroform)	NV	NV	< 1			
m&p-Xylene	NV	2	< 1.0			< 1.0
o-Xylene	NV	40	< 0.5			< 0.5
Total Xylenes	90	NV	< 1.1			< 1.1
2-Chloroethyvinyl Ether	NV	NV				
Bis(2-ethylhexyl) Phthalate	NV	0.2				<5

Notes:
1. All results in µg/L unless otherwise stated.
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3. Shading indicates detection
4. Bold text indicates values exceeding the ODWO.
5. NV = no value.
6. "-" Indicates parameter not analyzed.

APPENDIX C

Ground Water Elevation Tables

Summary of Groundwater Elevations

Monitor No.	Ground Elevation (mASL)	Top of Pipe Elevation (mASL)	06-May-08		14-Aug-08		28-May-09		07-Aug-09		05-Oct-09		08-Jun-10		06-Oct-10	
			Water Level (mbtop)	mASL	Water Level (mbtop)	mASL	Water Level (mbtop)	mASL	Water Level (mbtop)	mASL	Water Level (mbtop)	mASL	Water Level (mbtop)	mASL	Water Level (mbtop)	mASL
7	272.19	273.10	6.1	267.0	6.4	266.8	6.2	266.9	6.5	266.6	6.7	266.4	6.4	266.8	6.4	266.7
8	270.87	271.65	4.4	267.3	4.7	267.0	4.6	267.1	4.9	266.7	5.1	266.6	4.7	267.0	4.8	266.9
9	266.20	267.04	1.1	266.0	1.0	266.1	1.0	266.1	1.2	265.9	1.2	265.9	1.0	266.0	1.0	266.0
10	270.69	271.58	1.7	269.8	2.0	269.5	2.1	269.4	2.3	269.2	2.2	269.3	1.9	269.7	2.1	269.4
11-I	272.10	272.88	9.1	263.8	9.8	263.1	7.2	265.8	5.3	267.6	8.8	264.1	5.0	267.9	8.6	264.3
11-II	*272.12*	*272.92*	*4.7*	*268.3*	-	-	*4.8*	*268.1*	*5.3*	*267.7*	*5.7*	*267.3*	*5.1*	*267.9*	*5.2*	*267.8*
12	*267.91*	*268.73*	*4.8*	*267.8*	*5.3*	*267.4*	*5.0*	*267.6*	*5.5*	*267.2*	*5.9*	*266.8*	*5.3*	*267.4*	*5.4*	*267.3*
13-I	267.00	268.42	1.8	266.6	1.5	266.9	1.3	267.2	1.8	266.6	-	-	1.4	267.0	1.5	266.9
13-II	267.86	268.62	1.3	267.3	1.6	267.0	1.4	267.2	2.0	266.6	-	-	1.5	267.1	1.7	266.9
14-I	*278.90*	*279.59*	9.1	267.9	9.4	267.6	9.9	267.1	10.4	266.6	-	-	10.1	266.9	10.2	266.8
14-II	*278.95*	*279.99*	*Blocked - Needs Repair*		-	-	*10.5*	*267.1*	*11.0*	*266.6*	-	-	*10.6*	*266.9*	*10.7*	*266.9*
14-III	279.05	280.03	9.7	268.0	10.0	267.7	10.6	267.1	11.1	266.6	11.1	266.6	10.7	266.9	10.8	266.8
16-I	272.63	273.50	5.8	267.3	6.2	266.9	6.0	267.1	6.4	266.7	6.6	266.6	6.2	266.9	6.3	266.9
16-II	272.64	273.03	6.1	267.1	6.2	267.0	6.0	267.2	6.4	266.8	6.6	266.6	6.2	267.0	6.2	267.0
17-I	*271.57*	*272.06*	*5.7*	*266.7*	*6.0*	*266.4*	*5.8*	*266.5*	*6.1*	*266.2*	-	-	*5.9*	*266.4*	*5.5*	*266.8*
17-II	271.78	272.63	5.7	267.1	6.0	266.8	5.8	266.9	6.2	266.6	-	-	6.0	266.8	6.1	266.7
19	269.40	270.22	3.4	266.9	3.6	266.7	3.5	266.8	3.8	266.5	-	-	3.6	266.7	3.7	266.6
25-I	*266.52*	*267.46*	*0.8*	*266.8*	*0.8*	*266.7*	*0.8*	*266.7*	*1.0*	*266.5*	-	-	*0.9*	*266.7*	*0.9*	*266.6*
25-II	*266.66*	*267.69*	*0.9*	*266.8*	*1.1*	*266.6*	*1.0*	*266.8*	*1.3*	*266.5*	-	-	*1.1*	*266.6*	*1.2*	*266.6*
26-I	266.80	267.31	1.1	266.3	1.1	266.3	1.0	266.4	1.3	266.1	-	-	1.2	266.2	1.1	266.3
26-II	*266.92*	*267.26*	*0.6*	*266.8*	*0.7*	*266.6*	*0.7*	*266.6*	*0.8*	*266.5*	-	-	*0.7*	*266.7*	*0.7*	*266.7*
26-III	266.88	267.20	0.6	266.7	0.7	266.6	0.7	266.6	0.8	266.5	-	-	0.6	266.7	0.6	266.7
27-I	265.95	266.87	1.6	265.4	1.7	265.2	1.6	265.4	1.8	265.2	-	-	1.7	265.2	1.7	265.3
27-II	265.94	266.86	1.0	265.9	1.1	265.8	1.2	265.8	1.4	265.5	-	-	1.0	265.9	1.2	265.7
29-I	265.33	266.29	0.5	265.9	0.7	265.7	0.7	265.7	0.9	265.5	-	-	0.7	265.7	0.6	265.9
29-II	*265.34*	*266.17*	*1.2*	*265.1*	*0.9*	*265.4*	*0.9*	*265.4*	*1.1*	*265.2*	*1.0*	*265.3*	*0.8*	*265.5*	*0.9*	*265.4*
29-III	265.34	266.30	1.0	265.4	1.2	265.3	1.1	265.3	1.3	265.1	1.2	265.3	1.1	265.4	1.1	265.4
30-I	266.85	268.00	1.0	266.6	1.1	266.5	2.1	265.5	1.3	266.3	-	-	1.0	266.6	1.1	266.5
31-I	266.26	267.64	1.0	267.0	1.3	266.7	1.5	266.6	1.2	266.8	-	-	1.1	267.0	1.2	266.9
32-I	266.92	268.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33-I	267.66	268.48	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33-II	267.66	268.46	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34	266.06	266.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	266.61	267.46	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	265.34	266.23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	265.15	266.19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
201	*267.69*	*268.41*	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1. Shaded cells indicate monitors located in the bedrock.
2. Italicized cells indicate monitors located in the deep overburden.
3. Unshaded and italicized cells indicate monitors located in the shallow overburden.
4. "-" measurement not obtained.
5. MASL - metres above sea level
6. MBTOP - metres below top of pipe

Summary of Groundwater Elevations

Monitor No.	Ground Elevation (mASL)	Top of Pipe Elevation (mASL)	12-May-11		08-Nov-11		18-Apr-12		06-Jun-13		29-Oct-13		01-May-14		24-Sep-14	
			Water Level (mbtop)	mASL	Water Level (mbtop)	mASL	Water Level (mbtop)	mASL	Water Level (mbtop)	mASL	Water Level (mbtop)	mASL	Water Level (mbtop)	mASL	Water Level (mbtop)	mASL
7	272.19	273.10	6.2	267.0	6.5	266.7	6.29	266.8	6.27	266.9	6.43	266.7	6.04	267.1	6.70	266.4
8	270.87	271.65	4.5	267.2	4.8	266.9	4.64	267.0	4.63	267.0	4.79	266.9	4.31	267.4	5.09	266.6
9	266.20	267.04	1.0	266.1	1.0	266.0	1.02	266.0	0.77	266.3	0.72	266.3	0.80	266.3	1.10	266.0
10	270.69	271.58	2.1	269.4	2.1	269.4	2.32	269.2	2.04	269.5	1.83	269.7	1.58	269.9	2.45	269.1
11-I	272.10	272.88	6.3	266.6	6.9	266.0	6.74	266.2	5.22	267.7	6.01	266.9	5.44	267.5	5.45	267.5
11-II	*272.12*	*272.92*	*4.8*	*268.2*	*5.2*	*267.8*	*4.94*	*268.0*	*4.94*	*268.0*	*5.23*	*267.7*	*4.61*	*268.3*	*5.64*	*267.3*
12	*267.91*	*268.73*	*5.0*	*267.7*	*5.5*	*267.2*	*5.16*	*267.5*	*5.15*	*267.5*	*5.37*	*267.3*	*4.78*	*267.9*	*5.71*	*266.9*
13-I	267.00	268.42	1.2	267.2	1.5	266.9	1.36	267.1	1.32	267.1	1.49	266.9	1.02	267.4	1.79	266.6
13-II	267.86	268.62	1.4	267.2	1.7	266.9	1.52	267.1	1.51	267.1	1.66	267.0	1.25	267.4	1.96	266.7
14-I	*278.90*	*279.59*	9.9	267.2	11.3	265.8	10.52	266.5	11.00	266.0	12.14	264.9	-	-	12.30	264.7
14-II	*278.95*	*279.99*	*10.4*	*267.2*	*11.8*	*265.8*	*11.57*	*266.0*	*11.56*	*266.0*	*11.71*	*265.9*	*11.24*	*266.3*	*12.01*	*265.6*
14-III	279.05	280.03	10.5	267.1	11.9	265.8	11.52	266.1	11.06	266.6	11.83	265.8	11.34	266.3	12.11	265.5
16-I	272.63	273.50	6.0	267.2	6.3	266.8	6.09	267.0	6.07	267.0	6.29	266.8	5.78	267.3	6.57	266.5
16-II	272.64	273.03	6.0	267.2	6.3	266.9	6.11	267.0	6.09	267.1	6.27	266.9	5.79	267.4	6.56	266.6
17-I	*271.57*	*272.06*	*5.2*	*267.1*	*5.5*	*266.8*	*5.35*	*267.0*	*5.33*	*267.0*	*5.49*	*266.8*	*5.08*	*267.2*	*5.76*	*266.6*
17-II	271.78	272.63	5.8	267.0	6.1	266.7	5.90	266.9	5.89	266.9	6.05	266.7	5.65	267.1	6.32	266.5
19	269.40	270.22	3.4	266.8	3.7	266.6	3.54	266.7	3.54	266.7	3.65	266.6	3.31	267.0	3.93	266.3
25-I	*266.52*	*267.46*	*0.7*	*266.9*	*0.9*	*266.6*	*0.77*	*266.8*	*0.77*	*266.8*	*0.87*	*266.7*	*0.52*	*267.0*	*1.15*	*266.4*
25-II	*266.66*	*267.69*	*0.9*	*266.8*	*1.2*	*266.6*	*1.02*	*266.7*	*1.02*	*266.7*	*1.11*	*266.6*	*0.75*	*267.0*	*1.37*	*266.4*
26-I	266.80	267.31	1.0	266.4	1.1	266.3	1.06	266.3	1.10	266.3	1.15	266.2	0.86	266.5	1.36	266.0
26-II	*266.92*	*267.26*	*0.5*	*266.9*	*0.7*	*266.6*	*0.58*	*266.8*	*0.56*	*266.8*	*0.66*	*266.7*	*0.33*	*267.0*	*0.92*	*266.4*
26-III	266.88	267.20	0.4	266.9	0.6	266.6	0.52	266.8	0.50	266.8	0.59	266.7	0.27	267.0	0.86	266.4
27-I	265.95	266.87	1.6	265.4	1.7	265.2	1.74	265.2	1.16	265.8	1.87	265.1	1.52	265.5	2.10	264.9
27-II	265.94	266.86	1.1	265.9	1.2	265.8	1.13	265.8	1.16	265.8	1.20	265.8	1.01	265.9	1.44	265.5
29-I	265.33	266.29	0.5	266.0	0.6	265.9	0.61	265.8	0.64	265.8	0.63	265.8	0.53	265.9	0.80	265.6
29-II	*265.34*	*266.17*	*0.8*	*265.5*	*0.9*	*265.4*	*0.91*	*265.4*	*0.91*	*265.4*	*0.88*	*265.4*	*0.81*	*265.5*	*1.07*	*265.2*
29-III	265.34	266.30	1.0	265.4	1.0	265.4	1.06	265.4	1.07	265.4	1.03	265.4	1.00	265.4	1.28	265.2
30-I	266.85	268.00	1.0	266.6	1.1	266.5	1.04	266.5	1.05	266.5	1.02	266.6	0.98	266.6	1.35	266.2
31-I	266.26	267.64	1.1	266.9	1.2	266.8	1.16	266.9	1.16	266.9	1.14	266.9	1.02	267.0	1.38	266.6
32-I	266.92	268.13	-	-	-	-	-	-	1.37	266.5	1.31	266.6	1.27	266.6	1.70	266.2
33-I	267.66	268.48	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33-II	267.66	268.46	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34	266.06	266.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	266.61	267.46	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	265.34	266.23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	265.15	266.19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
201	*267.69*	*268.41*	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1. Shaded cells indicate monitors located in the bedrock.
2. Italicized cells indicate monitors located in the deep overburden.
3. Unshaded and italicized cells indicate monitors located in the shallow overburden.
4. "-" measurement not obtained.
5. MASL - metres above sea level
6. MBTOP - metres below top of pipe

Summary of Groundwater Elevations

Monitor No.	Ground Elevation (mASL)	Top of Pipe Elevation (mASL)	27-Apr-15		05-Oct-15		25-Apr-16 / 26-Apr-16		19-Oct-16 / 20-Oct-16		12-Apr-17		5-Oct-17 / 6-Oct-17		10-Apr-18 / 11-Apr-18	
			Water Level (mbtop)	mASL	Water Level (mbtop)	mASL	Water Level (mbtop)	mASL	Water Level (mbtop)	mASL	Water Level (mbtop)	mASL	Water Level (mbtop)	mASL	Water Level (mbtop)	mASL
7	272.19	273.10	6.19	266.94	6.73	266.40	6.11	267.02	6.97	266.16	6.11	267.02	7.05	266.08	6.20	266.93
8	270.87	271.65	4.57	267.10	5.13	266.54	4.42	267.25	5.39	266.28	4.35	267.32	5.13	266.54	4.52	267.15
9	266.20	267.04	1	266.13	1.17	265.96	0.99	266.14	1.10	266.03	0.98	266.15	1.16	265.97	1.10	266.03
10	270.69	271.58	1.76	269.74	2.38	269.12	1.86	269.64	2.43	269.07	1.49	270.01	2.56	268.94	1.67	269.83
11-I	272.10	272.88	4.82	268.09	5.57	267.34	4.68	268.23	5.86	267.05	4.68	268.23	5.50	267.41	4.78	268.13
11-II	*272.12*	*272.92*	*4.86*	*268.10*	*5.61*	*267.35*	*4.73*	*268.23*	*5.89*	*267.07*	*4.68*	*268.28*	*5.54*	*267.42*	*4.83*	*268.13*
12	*267.91*	*268.73*	*4.95*	*267.60*	*5.67*	*266.88*	*4.89*	*267.66*	*5.94*	*266.61*	*4.75*	*267.80*	*5.64*	*266.91*	*4.92*	*267.63*
13-I	267.00	268.42	1.23	267.19	1.83	266.59	1.13	267.29	2.09	266.33	1.08	267.34	1.83	266.59	1.22	267.20
13-II	267.86	268.62	1.4	267.22	2.00	266.62	1.33	267.29	2.24	265.53	1.26	267.36	1.99	266.63	1.40	267.22
14-I	*278.90*	*279.59*	11.8	267.79	13.10	266.49	12.46	267.13	6.58	273.01	12.98	266.61	12.95	266.64	9.15	270.44
14-II	*278.95*	*279.99*	*11.45*	*268.00*	*12.97*	*266.48*	*12.28*	*267.71*	*9.07*	*270.92*	*12.23*	*267.76*	*12.96*	*267.03*	*8.20*	*271.79*
14-III	279.05	280.03	11.56	268.00	13.09	266.47	12.40	267.63	13.34	266.69	12.34	267.69	13.07	266.96	12.95	267.08
16-I	272.63	273.50	5.98	267.14	6.58	266.54	5.89	267.23	6.82	266.30	well destroyed		well destroyed		well destroyed	
16-II	272.64	273.03	5.99	267.17	6.58	266.58	5.90	267.26	6.84	266.32	5.86	267.30	6.63	266.53	6.00	267.16
17-I	*271.57*	*272.06*	*5.23*	267.08	*5.79*	266.52	*5.16*	267.15	*6.03*	266.28	*5.13*	267.18	*6.92*	265.39		272.31
17-II	271.78	272.63	-	-	6.35	266.41	5.72	267.04	6.58	266.18	5.68	267.08	6.38	266.38	5.79	266.97
19	269.40	270.22	3.45	266.82	3.96	266.31	3.36	266.91	4.18	266.09	3.33	266.94	3.96	266.31	3.44	266.83
25-I	*266.52*	*267.46*	*0.68*	*266.85*	*1.19*	266.34	*0.57*	266.96	*1.39*	266.14	*0.57*	266.96	*1.18*	266.35	*0.67*	266.86
25-II	*266.66*	*267.69*	*0.92*	*266.83*	*1.42*	266.33	*0.80*	266.95	*1.61*	266.14	*0.81*	266.94	*1.40*	266.35	*0.90*	266.85
26-I	266.80	267.31	1.01	266.38	1.43	265.96	0.95	266.44	1.61	265.78	1.02	266.37	1.41	265.98	0.99	266.40
26-II	*266.92*	*267.26*	*0.47*	*266.87*	*0.96*	266.38	*0.37*	266.97	*1.18*	266.16	*0.38*	266.96	*0.96*	266.38	*0.47*	266.87
26-III	266.88	267.20	0.42	266.87	0.90	266.39	0.31	266.98	1.12	266.17	0.32	266.97	0.90	266.39	0.42	266.87
27-I	265.95	266.87	1.62	265.37	1.92	265.07	1.60	265.39	2.23	264.76	1.70	265.29	1.96	265.03	1.70	265.29
27-II	265.94	266.86	1.07	265.89	1.49	265.47	1.05	265.91	1.63	265.33	1.05	265.91	1.46	265.50	1.07	265.89
29-I	265.33	266.29	0.57	265.86	0.85	265.58	0.49	265.94	1.05	265.38	1.53	264.90	0.86	265.57	0.70	265.73
29-II	*265.34*	*266.17*	*0.87*	*265.43*	*1.32*	*264.98*	*0.85*	*265.45*	*1.30*	*265.00*	*0.85*	*265.45*	*1.15*	*265.15*	*0.88*	*265.42*
29-III	265.34	266.30	1.03	265.40	1.25	265.18	1.03	265.40	1.43	265.00	1.13	265.30	1.26	265.17	1.02	265.41
30-I	266.85	268.00	1.02	266.56	1.41	266.17	1.00	266.58	1.74	265.84	0.98	266.60	1.52	266.06	1.17	266.41
31-I	266.26	267.64	1.14	266.87	1.39	266.62	1.14	266.87	1.64	266.37	1.13	266.88	1.46	266.55	1.26	266.75
32-I	266.92	268.13	1.13	266.76	1.48	266.41	1.17	266.72	1.86	266.03	1.17	266.72	1.59	266.30	1.22	266.67
33-I	267.66	268.48	-	-	-	-	-	-	10.56	257.95	3.15	265.36	1.99	266.52	3.04	265.47
33-II	267.66	268.46	-	-	-	-	-	-	1.80	266.71	0.70	267.81	1.51	267.00	0.82	267.69
34	266.06	266.94	-	-	-	-	-	-	0.34	266.60	0.00	266.94	0.10	266.84	0.20	266.74
35	266.61	267.46	-	-	-	-	-	-	-	-	-	-	-	-	1.11	266.35
36	265.34	266.23	-	-	-	-	-	-	-	-	-	-	-	-	1.13	265.10
37	265.15	266.19	-	-	-	-	-	-	-	-	-	-	-	-	1.27	264.92
201	*267.69*	*268.41*	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1. Shaded cells indicate monitors located in the bedrock.
2. Italicized cells indicate monitors located in the deep overburden.
3. Unshaded and italicized cells indicate monitors located in the shallow overburden.
4. "-" measurement not obtained.
5. MASL - metres above sea level
6. MBTOP - metres below top of pipe

Summary of Groundwater Elevations

Monitor No.	Ground Elevation (mASL)	Top of Pipe Elevation (mASL)	1-Oct-18 / 2-Oct-18		22-Apr-19 / 23-Apr-19		8-Oct-19 / 9-Oct-19		13-Apr-20		14-Oct-20 / 15-Oct-20		21-Apr-21		18-Oct-21	
			Water Level (mbtop)	mASL	Water Level (mbtop)	mASL	Water Level (mbtop)	mASL	Water Level (mbtop)	mASL	Water Level (mbtop)	mASL	Water Level (mbtop)	mASL	Water Level (mbtop)	mASL
7	272.19	273.10	6.89	266.24	6.01	267.09	6.85	266.25	6.00	267.10	6.48	266.62	6.23	266.87	6.56	266.54
8	270.87	271.65	5.28	266.39	4.26	267.39	5.25	266.40	4.26	267.39	4.87	266.78	4.58	267.07	4.96	266.69
9	266.20	267.04	1.30	265.83	1.05	265.99	1.04	266.00	1.12	265.92	0.95	266.09	0.93	266.11	0.96	266.08
10	270.69	271.58	2.50	269.00	1.43	270.15	2.41	269.17	1.59	269.99	3.85	267.73	1.65	269.93	1.93	269.65
11-I	272.10	272.88	3.68	269.23	4.70	268.18	5.67	267.21	4.67	268.21	5.25	267.63	4.87	268.01	5.36	267.52
11-II	*272.12*	*272.92*	*5.77*	*267.19*	*4.75*	*268.17*	*5.71*	*267.21*	*4.70*	*268.22*	*5.27*	*267.65*	*4.90*	*268.02*	*5.38*	*267.54*
12	*267.91*	*268.73*	*2.00*	*270.55*	*1.04*	*267.69*	*2.00*	*266.73*	*1.20*	*267.53*	*1.60*	*267.13*	*1.25*	*267.48*	*1.68*	*267.05*
13-I	267.00	268.42	1.14	267.28	1.00	267.42	1.96	266.46	0.99	267.43	1.56	266.86	1.29	267.13	1.64	266.78
13-II	267.86	268.62	2.10	266.52	1.18	267.44	2.13	266.49	1.17	267.45	1.73	266.89	1.41	267.21	1.79	266.83
14-I	*278.90*	*279.59*	14.21	265.38	12.48	267.11	13.66	265.93	12.52	267.07	12.84	266.75	Blocked		13.72	265.87
14-II	*278.95*	*279.99*	*12.58*	*267.41*	*12.68*	*267.31*	*13.62*	*266.37*	*12.67*	*267.32*	*13.23*	*266.76*	*12.94*	*267.05*	*Blocked*	
14-III	279.05	280.03	13.68	266.35	12.75	267.28	13.66	266.37	12.35	267.68	13.30	266.73	12.85	267.18	Blocked	
16-I	272.63	273.50	1.17	271.95	well destroyed		well destroyed		6.20	267.30	6.77	266.73	6.48	267.02	6.86	266.64
16-II	272.64	273.03	6.72	266.44	5.80	267.23	6.67	266.36	5.70	267.33	6.32	266.71	6.02	267.01	6.40	266.63
17-I	*271.57*	*272.06*	5.95	266.36	*5.04*	267.02	5.90	266.16	*5.10*	266.96	5.46	266.60	*5.16*	266.90	*5.50*	266.56
17-II	271.78	272.63	6.50	266.26	5.59	267.04	6.46	266.17	5.59	267.04	5.99	266.64	5.73	266.90	5.70	266.93
19	269.40	270.22	4.08	266.19	3.27	266.95	4.07	266.15	3.27	266.95	3.73	266.49	3.49	266.73	3.78	266.44
25-I	*266.52*	*267.46*	1.35	266.18	*0.50*	266.96	1.30	266.16	*0.50*	266.96	0.94	266.52	*0.72*	266.74	*1.02*	266.44
25-II	*266.66*	*267.69*	1.39	266.36	*0.74*	266.95	1.52	266.17	*0.68*	267.01	1.18	266.51	*0.93*	266.76	*1.24*	266.45
26-I	266.80	267.31	1.47	265.92	0.87	266.44	1.59	265.72	0.85	266.46	0.18	267.13	1.01	266.30	1.29	266.02
26-II	*266.92*	*267.26*	1.06	266.28	*0.33*	266.93	1.10	266.16	*0.32*	266.94	0.74	266.52	*0.51*	266.75	*0.79*	266.47
26-III	266.88	267.20	0.97	266.32	0.27	266.93	1.05	266.15	0.20	267.00	0.66	266.54	0.45	266.75	0.73	266.47
27-I	265.95	266.87	2.28	264.71	1.37	265.50	2.30	264.57	1.40	265.47	1.74	265.13	1.63	265.24	1.89	264.98
27-II	265.94	266.86	1.65	265.31	1.04	265.82	1.50	265.36	1.02	265.84	1.26	265.60	1.10	265.76	1.27	265.59
29-I	265.33	266.29	1.14	265.29	0.40	265.89	1.01	265.28	0.30	265.99	0.63	265.66	0.50	265.79	0.70	265.59
29-II	*265.34*	*266.17*	*1.55*	*264.75*	*0.90*	*265.27*	*1.56*	*264.61*	*0.86*	*265.31*	*0.95*	*265.22*	*0.89*	*265.28*	*0.99*	*265.18*
29-III	265.34	266.30	1.62	264.81	1.10	265.20	1.56	264.74	1.05	265.25	1.09	265.21	2.50	263.80	1.13	265.17
30-I	266.85	268.00	1.52	266.06	0.98	267.02	1.60	266.40	1.04	266.96	1.08	266.92	1.03	266.97	1.07	266.93
31-I	266.26	267.64	1.49	266.52	1.10	266.54	1.70	265.94	1.14	266.50	1.28	266.36	1.19	266.45	1.37	266.27
32-I	266.92	268.13	1.70	266.19	1.24	266.89	1.90	266.23	1.24	266.89	1.35	266.78	1.30	266.83	1.39	266.74
33-I	267.66	268.48	4.10	264.41	2.78	265.70	4.38	264.10	3.97	264.51	4.60	263.88	3.53	264.95	3.92	264.56
33-II	267.66	268.46	1.78	266.73	well damaged		well damaged		well damaged		1.10	267.36	0.80	267.66	1.19	267.27
34	266.06	266.94	0.16	266.78	0.00	266.94	0.34	266.60	0.00	266.94	0.08	266.86	0.00	266.94	0.07	266.87
35	266.61	267.46	1.20	266.26	1.00	266.46	1.39	266.07	1.00	266.46	1.15	266.31	1.07	266.39	1.13	266.33
36	265.34	266.23	1.52	264.71	0.95	265.28	1.47	264.76	1.00	265.23	1.07	265.16	1.03	265.20	1.17	265.06
37	265.15	266.19	1.48	264.71	0.88	265.31	1.49	264.70	0.99	265.20	1.05	265.14	1.03	265.16	1.18	265.01
201	*267.69*	*268.41*	-	-	-	-	-	-	*1.3*	*267.11*	*1.72*	*266.69*	*1.53*	*266.88*	*1.76*	*266.65*

Notes:

1. Shaded cells indicate monitors located in the bedrock.
2. Italicized cells indicate monitors located in the deep overburden.
3. Unshaded and italicized cells indicate monitors located in the shallow overburden.
4. "-" measurement not obtained.
5. MASL - metres above sea level
6. MBTOP - metres below top of pipe

Summary of Groundwater Elevations

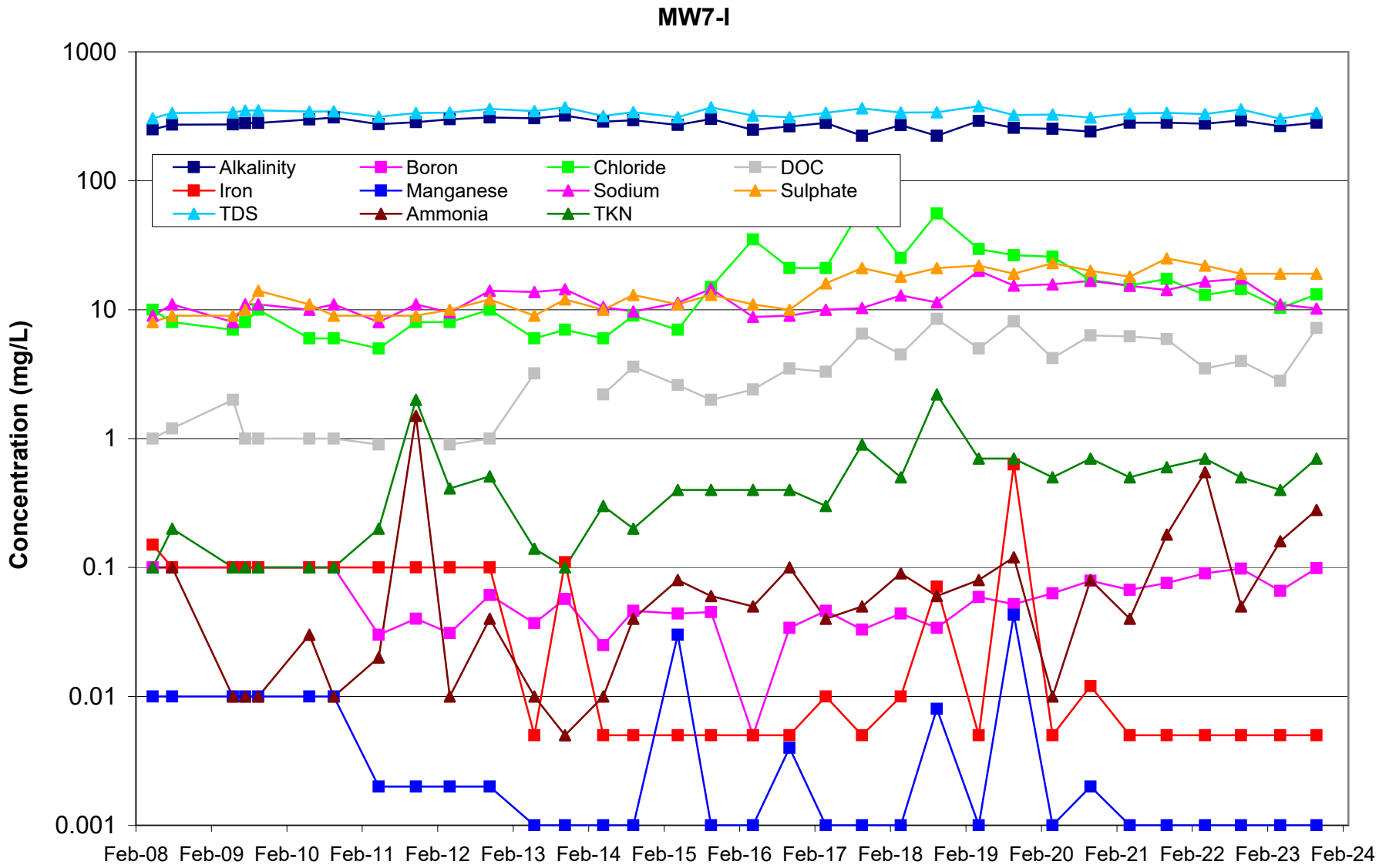
Monitor No.	Ground Elevation (mASL)	Top of Pipe Elevation (mASL)	20-Apr-22		12-Oct-22		19-Apr-23		12-Oct-23	
			Water Level (mbtop)	mASL	Water Level (mbtop)	mASL	Water Level (mbtop)	mASL	Water Level (mbtop)	mASL
7	272.19	273.10	6.15	266.95	6.90	266.20	6.06	267.04	6.57	266.53
8	270.87	271.65	4.49	267.16	5.29	266.36	4.45	267.20	4.97	266.68
9	266.20	267.04	0.94	266.10	1.19	265.85	0.97	266.07	1.00	266.04
10	270.69	271.58	1.66	269.92	2.46	269.12	1.71	269.87	1.90	269.68
11-I	272.10	272.88	4.78	268.10	5.74	267.14	4.79	268.09	5.41	267.47
11-II	*272.12*	*272.92*	*4.82*	*268.10*	*5.77*	*267.15*	*4.76*	*268.16*	*5.37*	*267.55*
12	*267.91*	*268.73*	*1.12*	*267.61*	*2.06*	*266.67*	*1.07*	*267.66*	*1.69*	*267.04*
13-I	267.00	268.42	1.18	267.24	2.00	266.42	1.06	267.36	1.65	266.77
13-II	267.86	268.62	1.35	267.27	2.15	266.47	1.24	267.38	1.80	266.82
14-I	*278.90*	*279.59*	Blocked		13.90	265.69	Blocked		Blocked	
14-II	*278.95*	*279.99*	*13.16*	*266.83*	*14.01*	*265.98*	*13.09*	*266.90*	*13.66*	*266.33*
14-III	279.05	280.03	Blocked		14.14	265.89	Blocked		Blocked	
16-I	272.63	273.50	6.40	267.10	7.19	266.31	6.27	267.23	6.86	266.64
16-II	272.64	273.03	5.93	267.10	6.73	266.30	5.81	267.22	6.40	266.63
17-I	*271.57*	*272.06*	*5.09*	266.97	*5.85*	266.21	*5.00*	267.06	*5.51*	266.55
17-II	271.78	272.63	5.64	266.99	6.37	266.26	5.54	267.09	5.76	266.87
19	269.40	270.22	3.42	266.80	4.12	266.10	3.34	266.88	3.79	266.43
25-I	*266.52*	*267.46*	*0.64*	266.82	*1.35*	266.11	*0.56*	266.90	*1.02*	266.44
25-II	*266.66*	*267.69*	*0.85*	266.84	*1.56*	266.13	*0.78*	266.91	*1.24*	266.45
26-I	266.80	267.31	1.02	266.29	1.54	265.77	0.98	266.33	1.21	266.10
26-II	*266.92*	*267.26*	*0.43*	266.83	*1.13*	266.13	*0.38*	266.88	*0.81*	266.45
26-III	266.88	267.20	0.39	266.81	1.07	266.13	0.36	266.84	0.78	266.42
27-I	265.95	266.87	1.76	265.11	2.08	264.79	1.67	265.20	1.93	264.94
27-II	265.94	266.86	1.06	265.80	1.65	265.21	1.06	265.80	1.28	265.58
29-I	265.33	266.29	0.56	265.73	0.90	265.39	0.56	265.73	0.70	265.59
29-II	*265.34*	*266.17*	*0.86*	*265.31*	*1.31*	*264.86*	*0.87*	*265.30*	*1.00*	*265.17*
29-III	265.34	266.30	1.10	265.20	1.47	264.83	1.07	265.23	1.15	265.15
30-I	266.85	268.00	1.02	266.98	1.65	266.35	1.02	266.98	1.14	266.86
31-I	266.26	267.64	1.15	266.49	1.63	266.01	0.83	266.81	1.00	266.64
32-I	266.92	268.13	1.31	266.82	1.87	266.26	Destroyed		Destroyed	
33-I	267.66	268.48	3.90	264.58	4.86	263.62	4.32	264.16	4.49	263.99
33-II	267.66	268.46	0.85	267.61	1.61	266.85	0.66	267.80	1.19	267.27
34	266.06	266.94	2.11	264.83	0.46	266.48	0.00	266.94	0.00	266.94
35	266.61	267.46	1.03	266.43	1.39	266.07	1.03	266.43	1.17	266.29
36	265.34	266.23	1.06	265.17	1.48	264.75	1.03	265.20	1.20	265.03
37	265.15	266.19	1.07	265.12	1.49	264.70	1.03	265.16	1.27	264.92
201	*267.69*	*268.41*	*1.44*	*266.97*	*2.10*	*266.31*	*1.37*	*267.04*	*1.78*	*266.63*

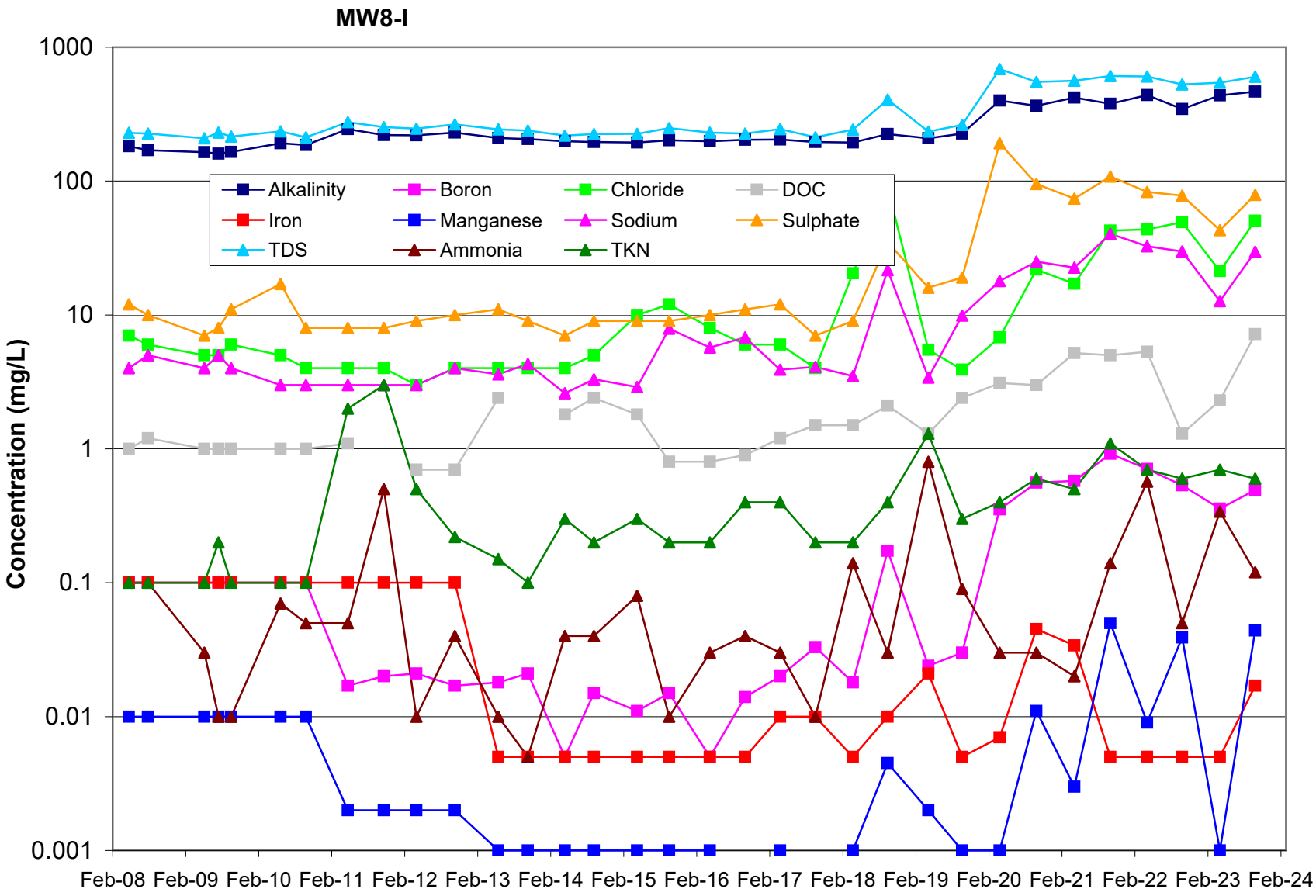
Notes:

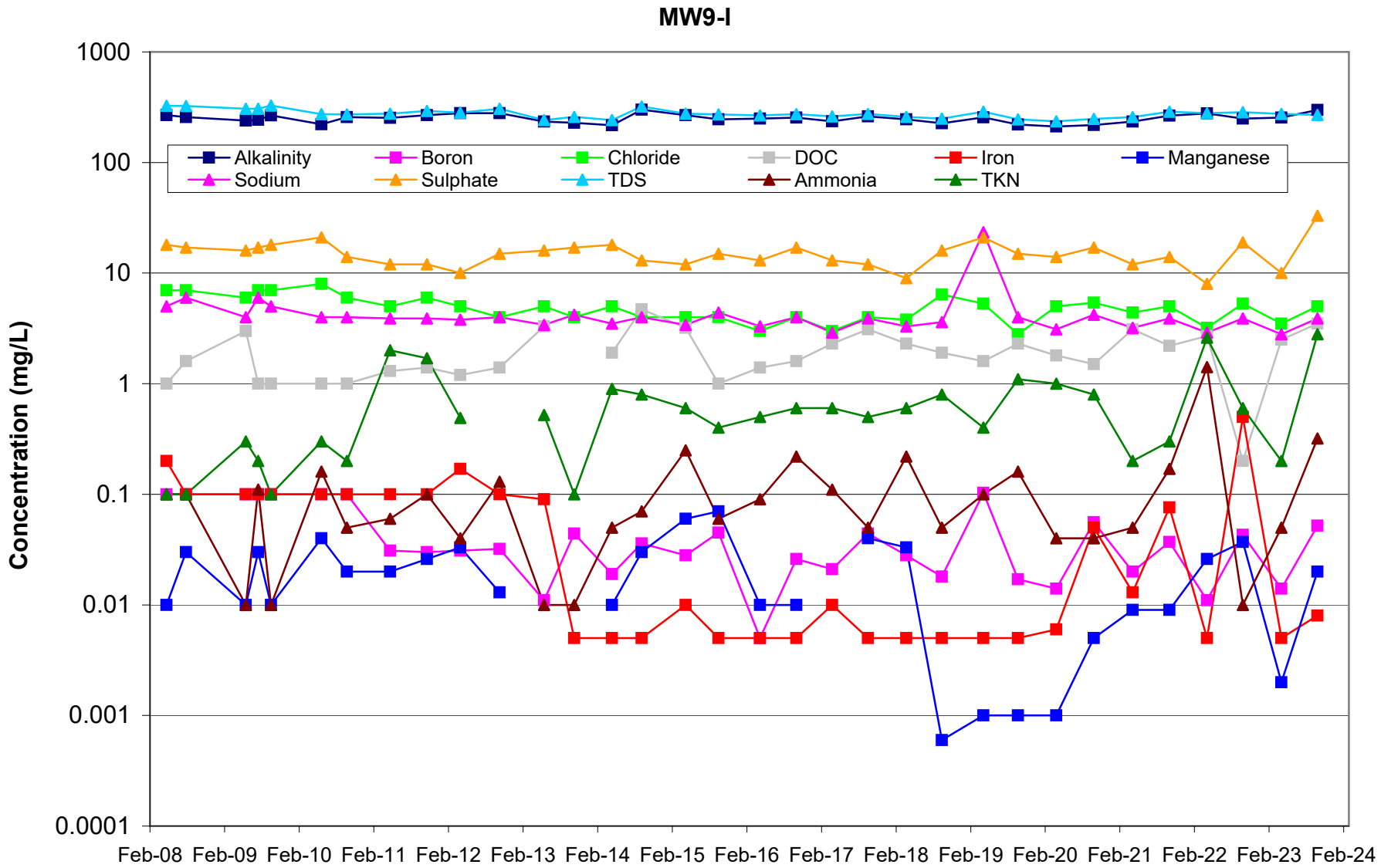
1. Shaded cells indicate monitors located in the bedrock.
2. Italicized cells indicate monitors located in the deep overburden.
3. Unshaded and italicized cells indicate monitors located in the shallow overburden.
4. "-" measurement not obtained.
5. MASL - metres above sea level
6. MBTOP - metres below top of pipe

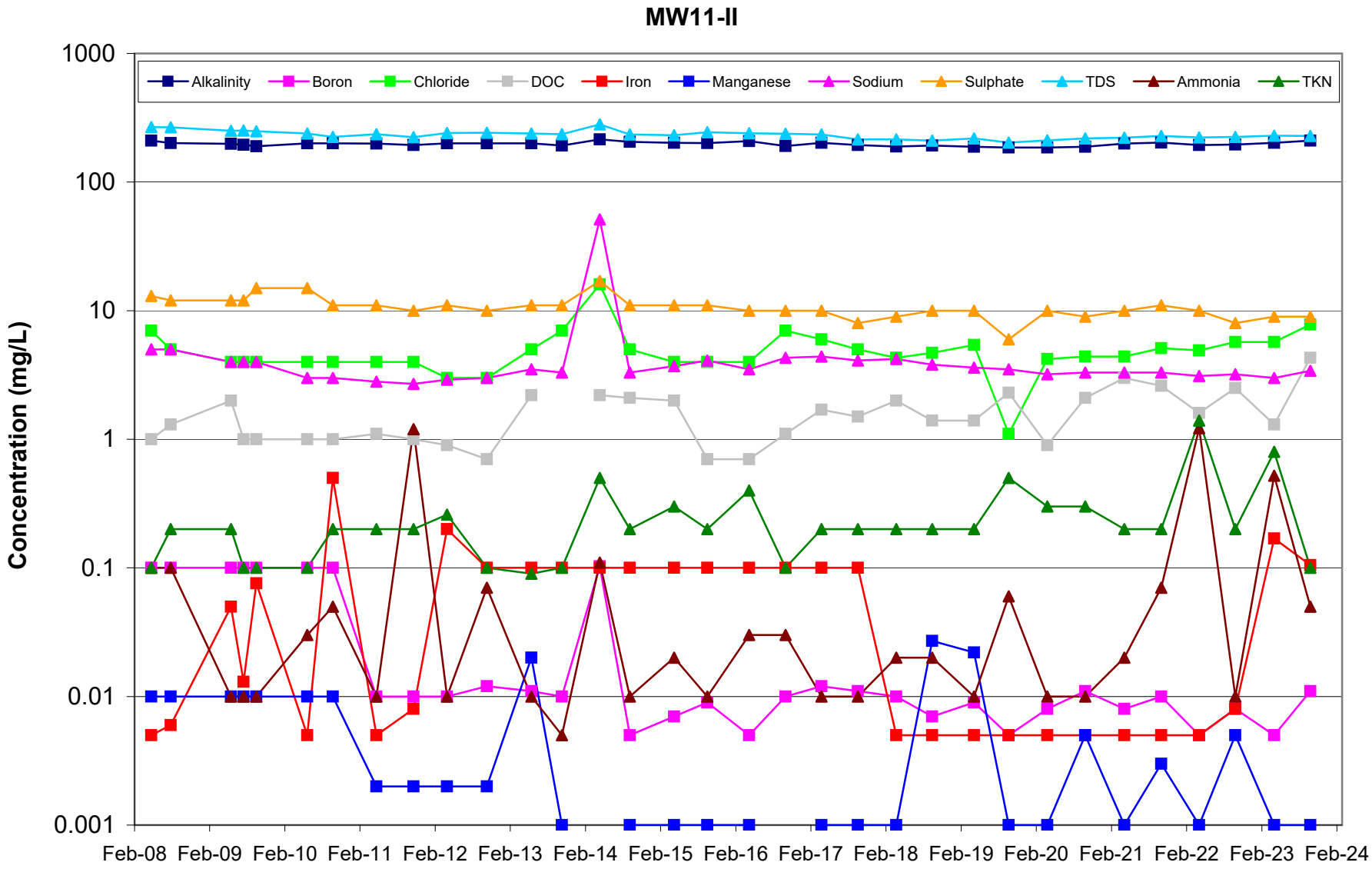
APPENDIX D

Chemistry Over Time Graphs

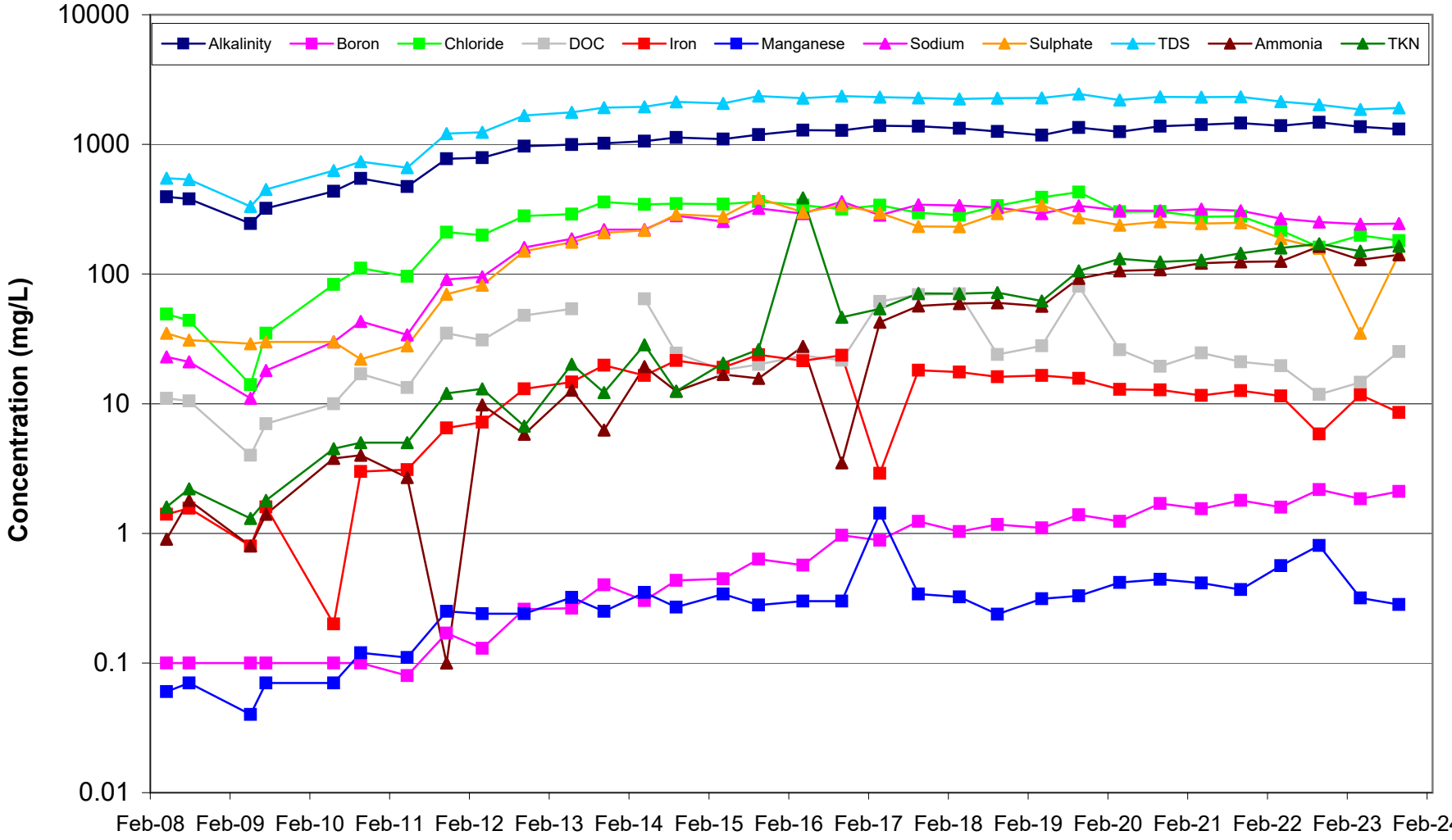

MW7-I
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN
Feb-08
Feb-09
Feb-10
Feb-11
Feb-12
Feb-13
Feb-14
Feb-15
Feb-16
Feb-17
Feb-18
Feb-19
Feb-20
Feb-21
Feb-22
Feb-23
Feb-24

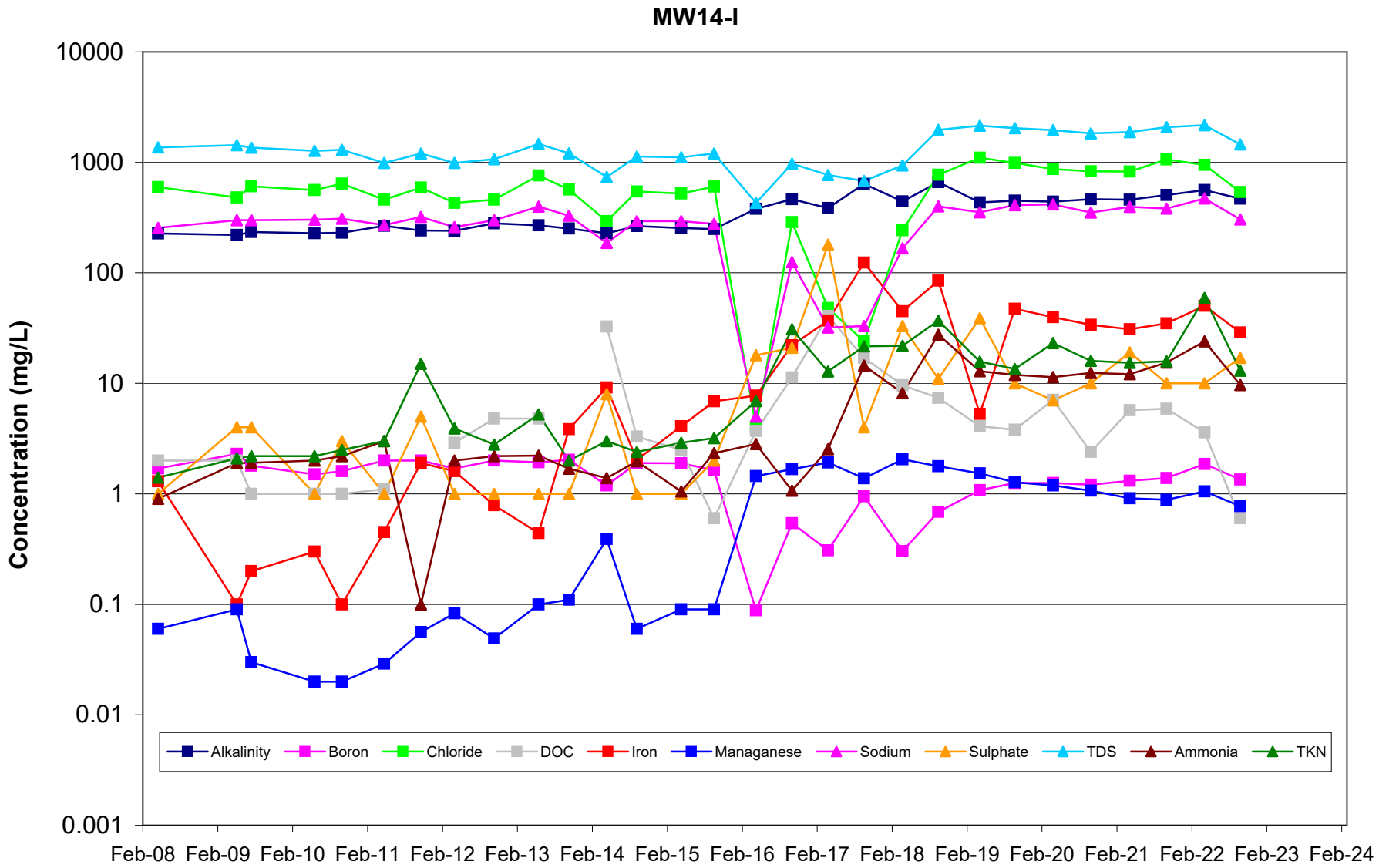

MW8-I
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN
Feb-08
Feb-09
Feb-10
Feb-11
Feb-12
Feb-13
Feb-14
Feb-15
Feb-16
Feb-17
Feb-18
Feb-19
Feb-20
Feb-21
Feb-22
Feb-23
Feb-24

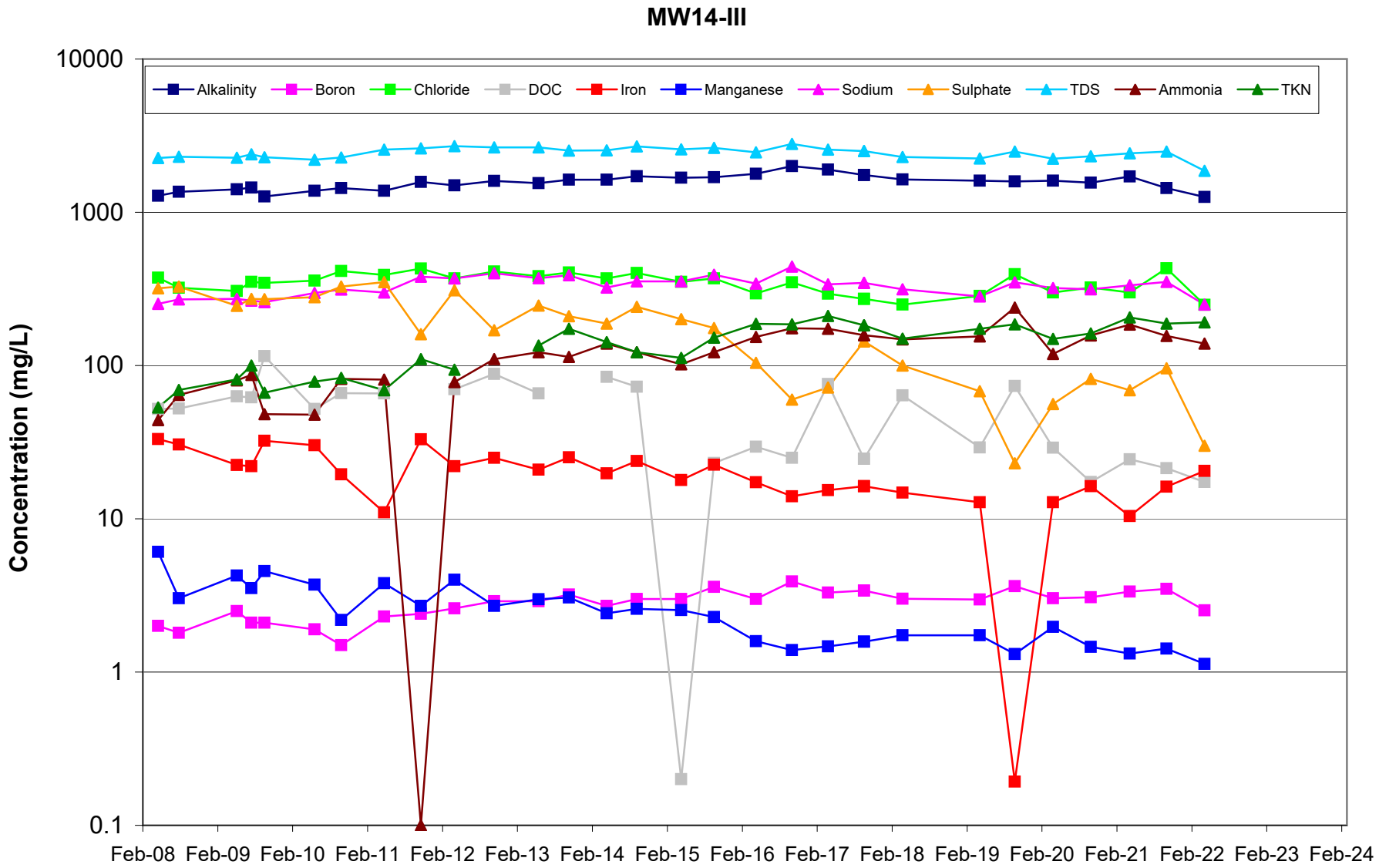

MW9-I
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
0.0001
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN
Feb-08
Feb-09
Feb-10
Feb-11
Feb-12
Feb-13
Feb-14
Feb-15
Feb-16
Feb-17
Feb-18
Feb-19
Feb-20
Feb-21
Feb-22
Feb-23
Feb-24

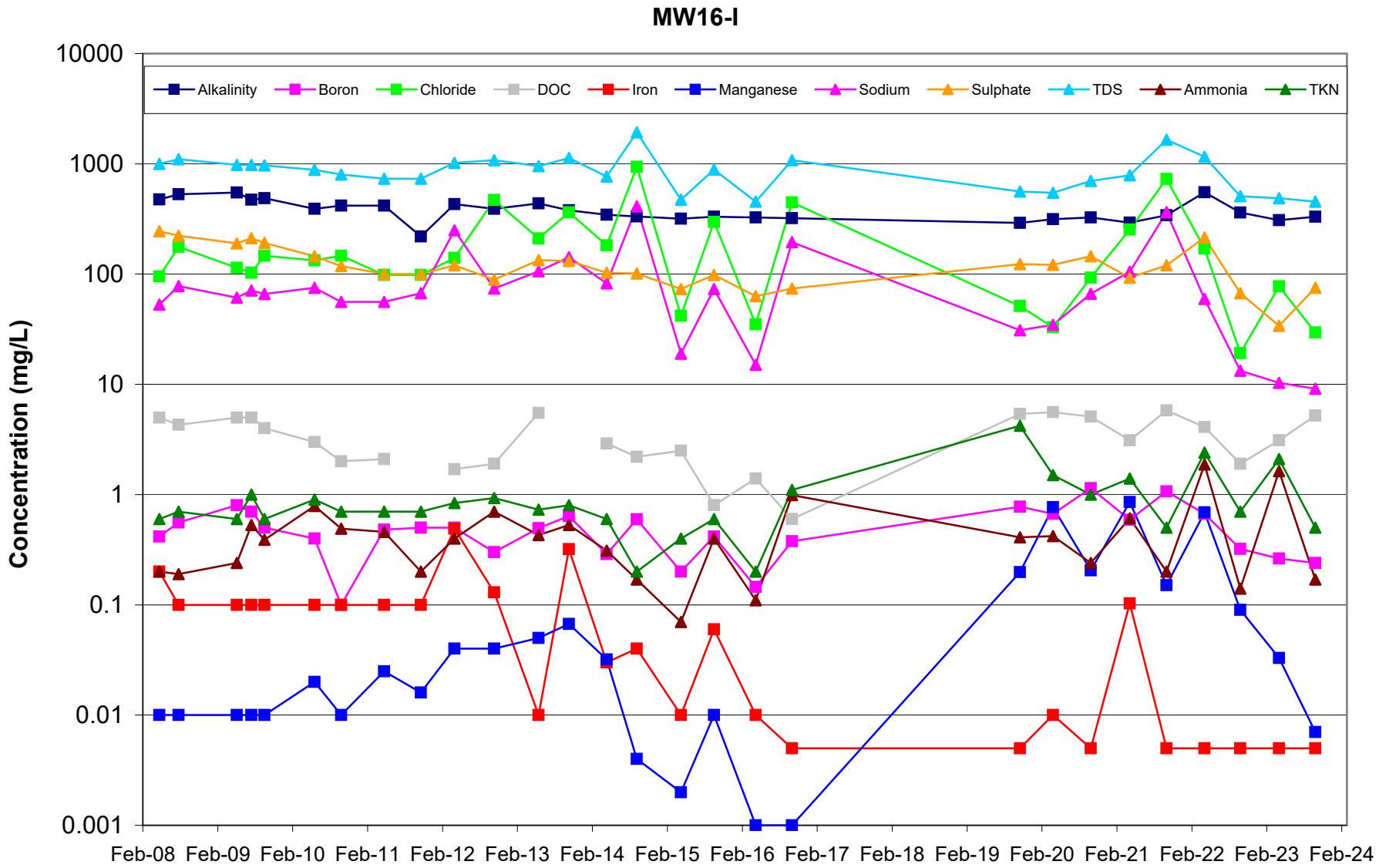

MW11-II
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Feb-08
Feb-09
Feb-10
Feb-11
Feb-12
Feb-13
Feb-14
Feb-15
Feb-16
Feb-17
Feb-18
Feb-19
Feb-20
Feb-21
Feb-22
Feb-23
Feb-24

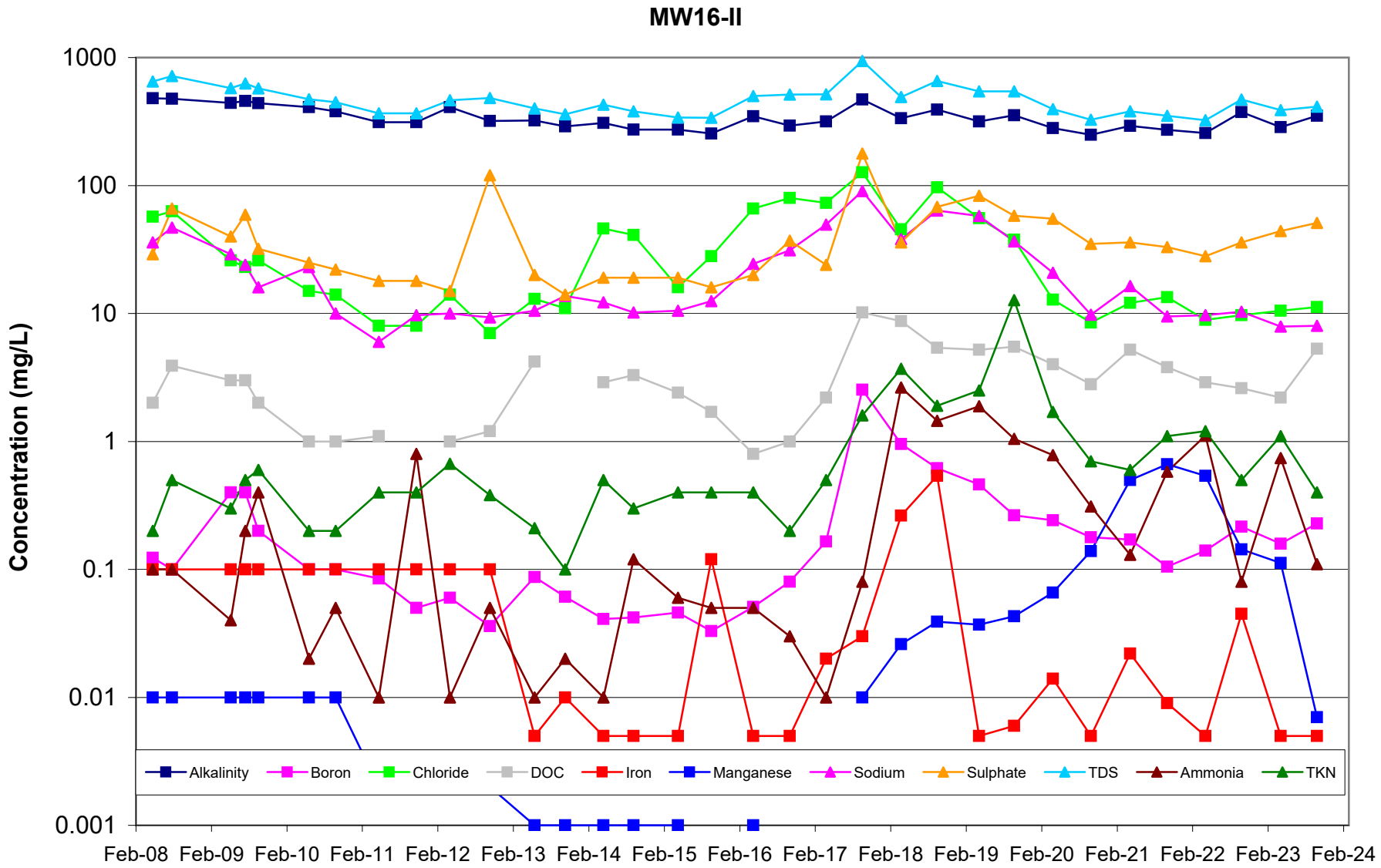
MW13-II

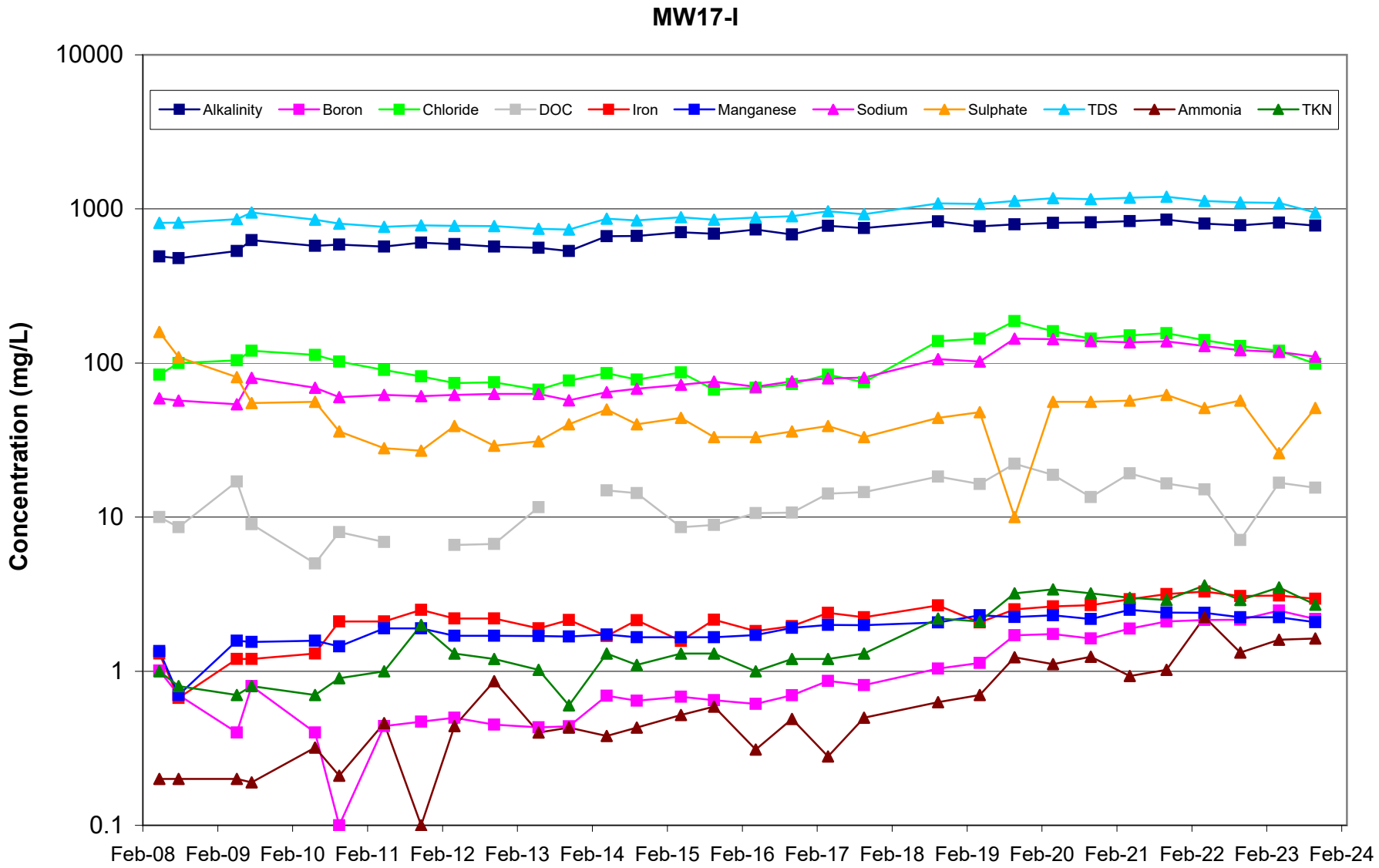

Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN
Concentration (mg/L)
10000
1000
100
10
1
0.1
0.01
Feb-08
Feb-09
Feb-10
Feb-11
Feb-12
Feb-13
Feb-14
Feb-15
Feb-16
Feb-17
Feb-18
Feb-19
Feb-20
Feb-21
Feb-22
Feb-23
Feb-24


MW14-I
Concentration (mg/L)
10000
1000
100
10
1
0.1
0.01
0.001
Feb-08
Feb-09
Feb-10
Feb-11
Feb-12
Feb-13
Feb-14
Feb-15
Feb-16
Feb-17
Feb-18
Feb-19
Feb-20
Feb-21
Feb-22
Feb-23
Feb-24
Alkalinity
Boron
Chloride
DOC
Iron
Managanese
Sodium
Sulphate
TDS
Ammonia
TKN


MW14-III
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN
Concentration (mg/L)
10000
1000
100
10
1
0.1
Feb-08
Feb-09
Feb-10
Feb-11
Feb-12
Feb-13
Feb-14
Feb-15
Feb-16
Feb-17
Feb-18
Feb-19
Feb-20
Feb-21
Feb-22
Feb-23
Feb-24


MW16-I
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN
Concentration (mg/L)
10000
1000
100
10
1
0.1
0.01
0.001
Feb-08
Feb-09
Feb-10
Feb-11
Feb-12
Feb-13
Feb-14
Feb-15
Feb-16
Feb-17
Feb-18
Feb-19
Feb-20
Feb-21
Feb-22
Feb-23
Feb-24


MW16-II
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Feb-08
Feb-09
Feb-10
Feb-11
Feb-12
Feb-13
Feb-14
Feb-15
Feb-16
Feb-17
Feb-18
Feb-19
Feb-20
Feb-21
Feb-22
Feb-23
Feb-24
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN


MW17-I
Concentration (mg/L)
10000
1000
100
10
1
0.1
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN
Feb-08
Feb-09
Feb-10
Feb-11
Feb-12
Feb-13
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Feb-18
Feb-19
Feb-20
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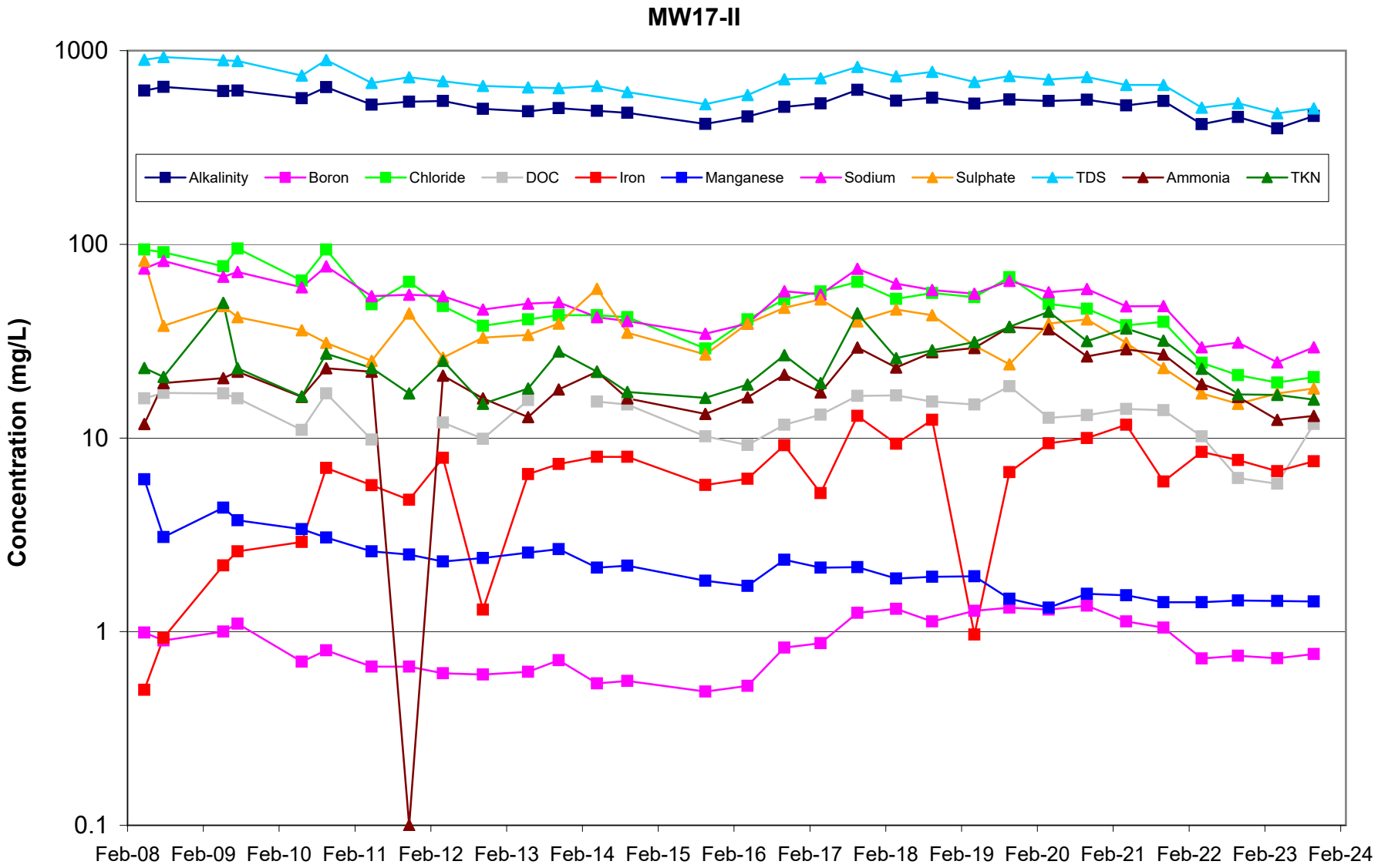
Feb-22
Feb-23
Feb-24


MW17-II
Concentration (mg/L)
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100
10
1
0.1
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN
Feb-08
Feb-09
Feb-10
Feb-11
Feb-12
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Feb-20
Feb-21
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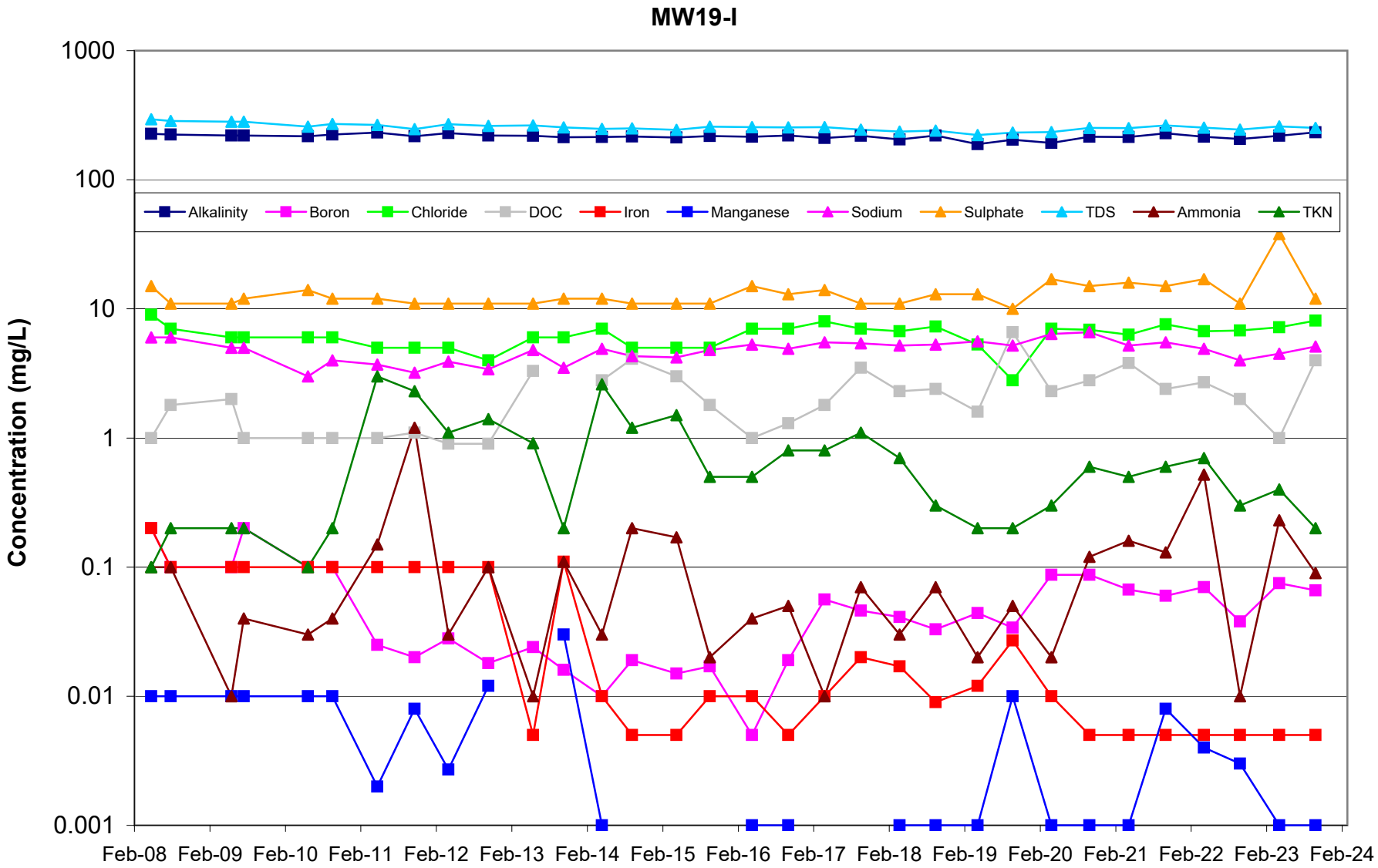
Feb-24


MW19-I
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN
Feb-08
Feb-09
Feb-10
Feb-11
Feb-12
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Feb-17
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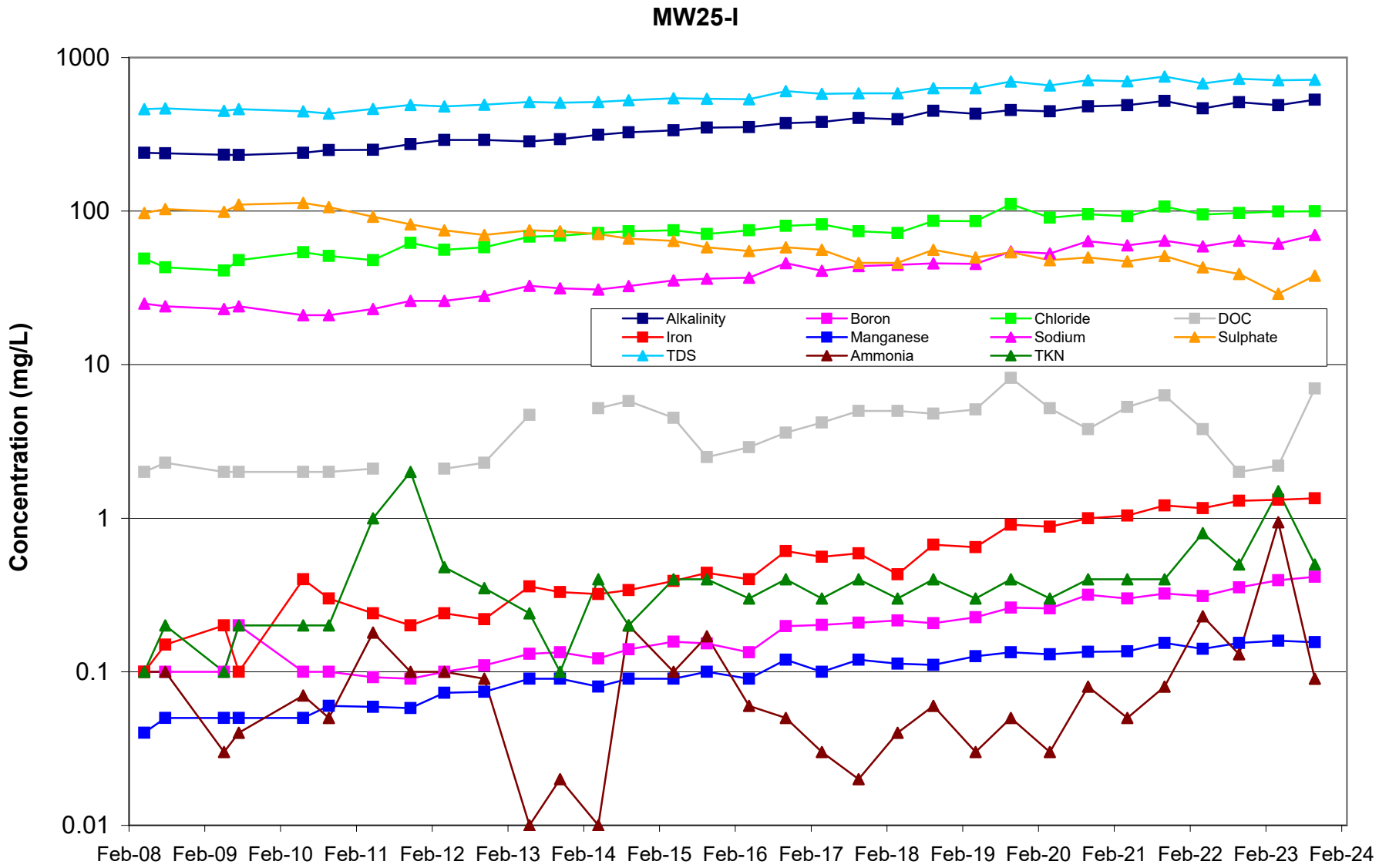
Feb-20
Feb-21
Feb-22
Feb-23
Feb-24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Concentration (mg/L)
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1
0.1
0.01
Feb-08
Feb-09
Feb-10
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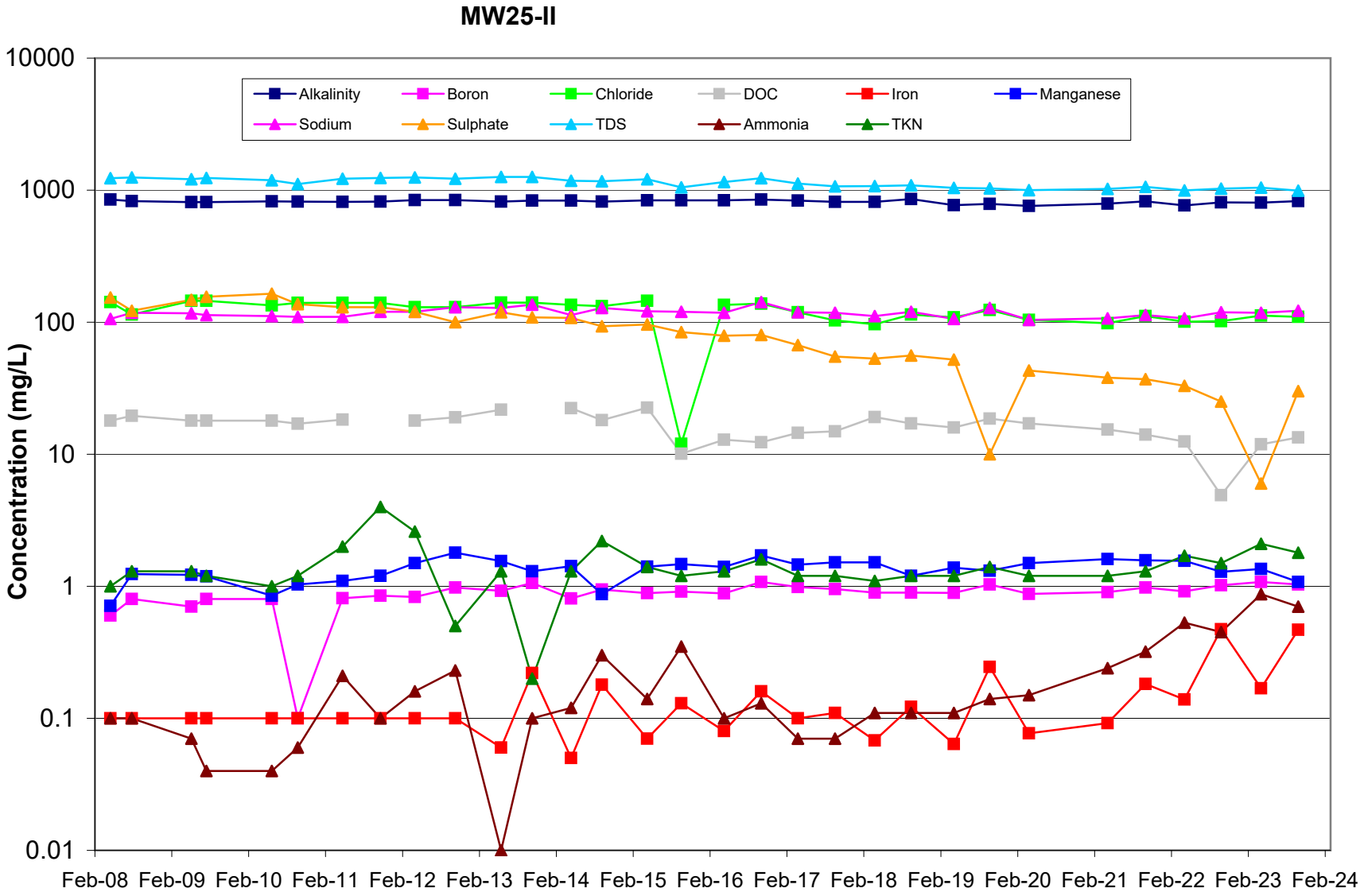
Feb-14
Feb-15
Feb-16
Feb-17
Feb-18
Feb-19
Feb-20
Feb-21
Feb-22
Feb-23
Feb-24
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN


MW25-II
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN
Concentration (mg/L)
10000
1000
100
10
1
0.1
0.01
Feb-08
Feb-09
Feb-10
Feb-11
Feb-12
Feb-13
Feb-14
Feb-15
Feb-16
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Feb-20
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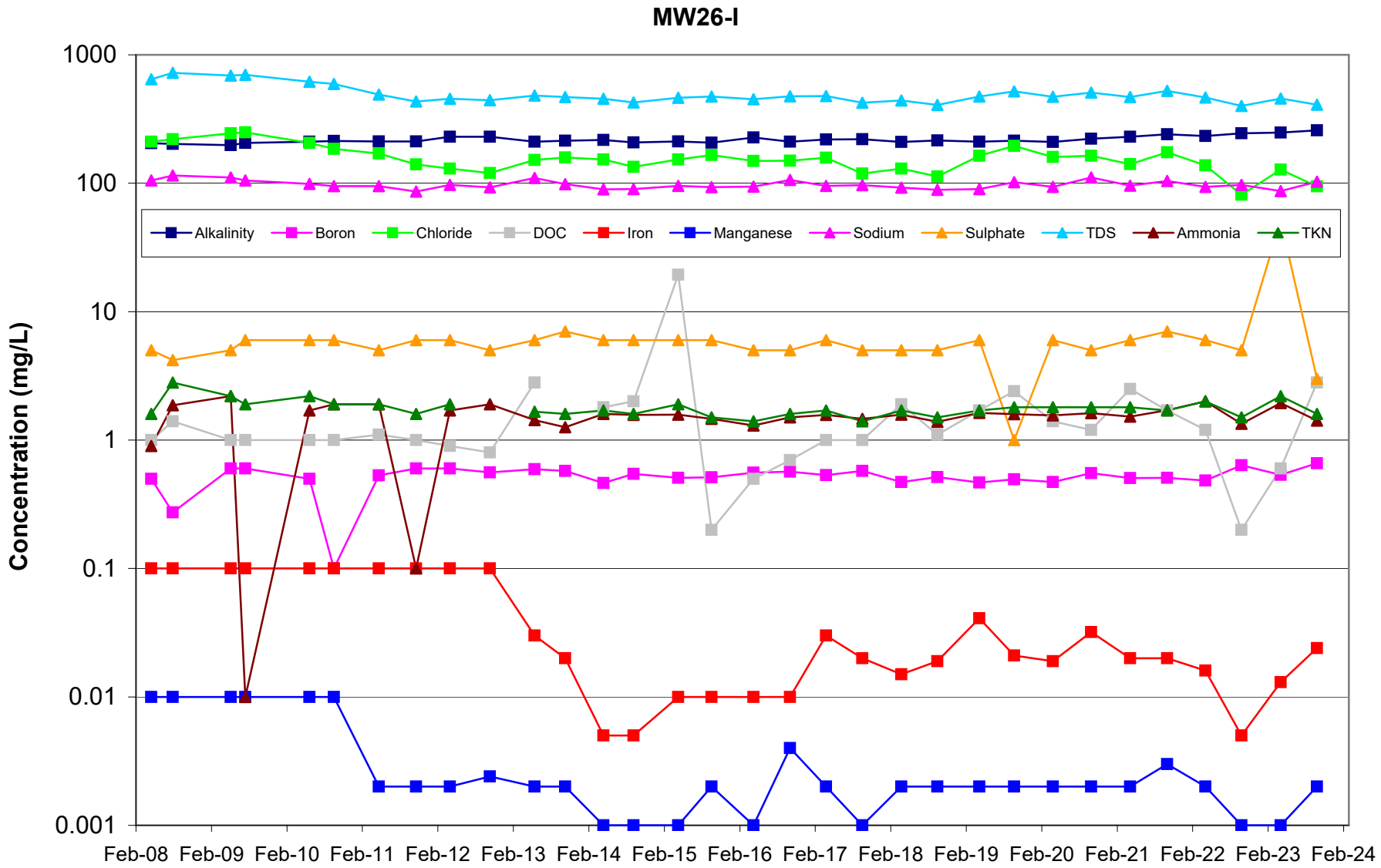
Feb-22
Feb-23
Feb-24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Concentration (mg/L)
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1
0.1
0.01
0.001
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN
Feb-08
Feb-09
Feb-10
Feb-11
Feb-12
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Feb-20
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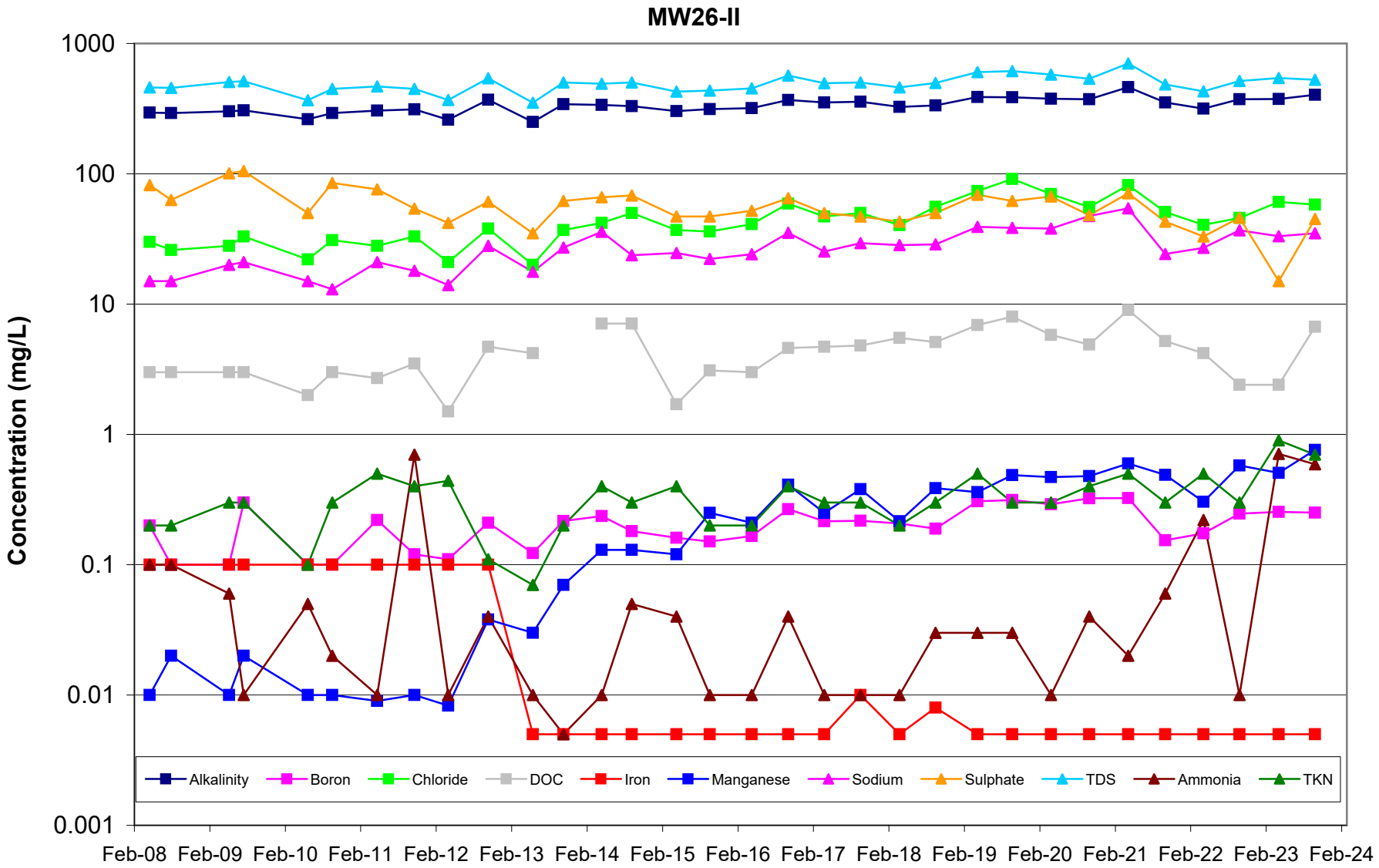
Feb-22
Feb-23
Feb-24


MW26-II
Concentration (mg/L)
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100
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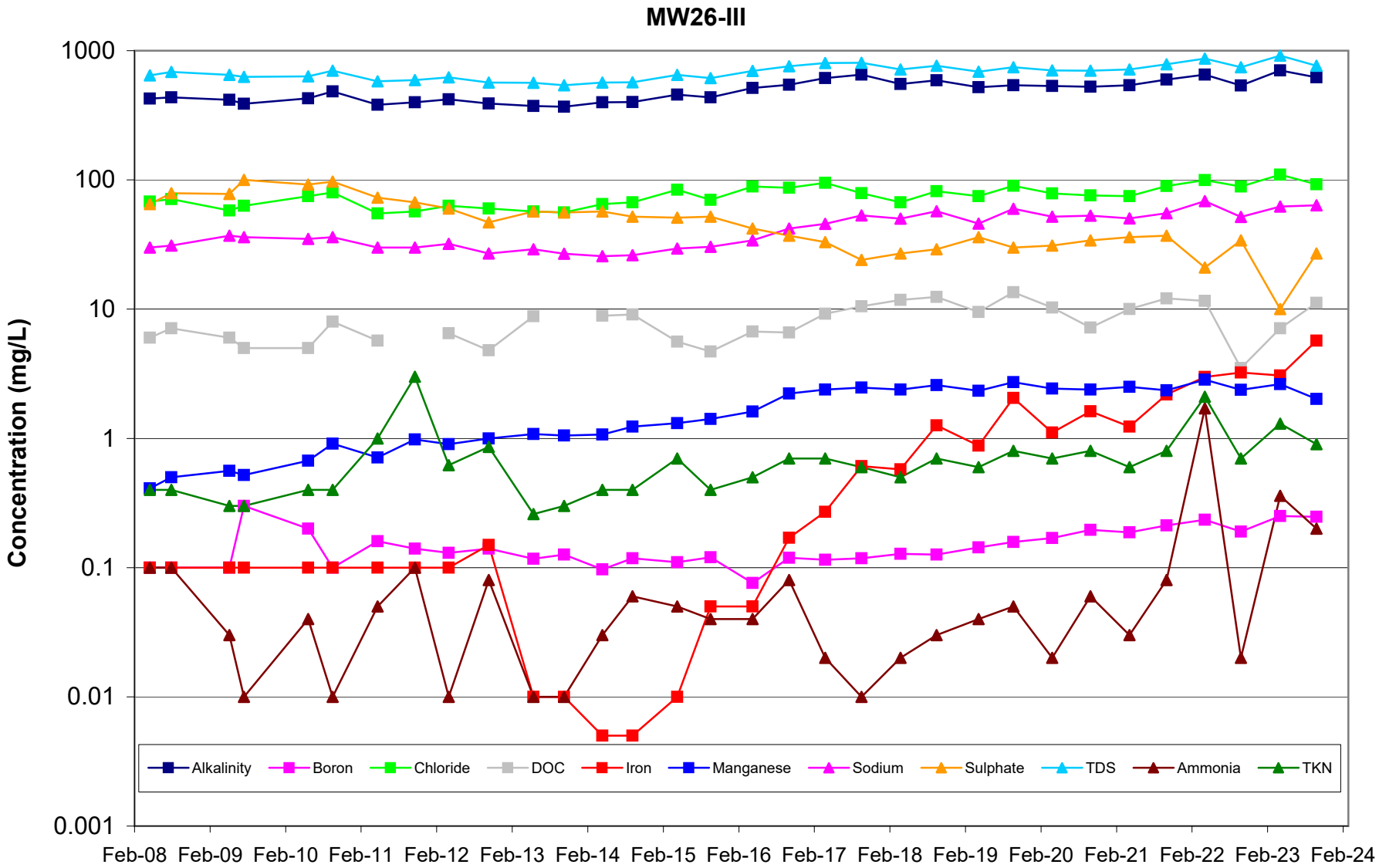
1
0.1
0.01
0.001
Feb-08
Feb-09
Feb-10
Feb-11
Feb-12
Feb-13
Feb-14
Feb-15
Feb-16
Feb-17
Feb-18
Feb-19
Feb-20
Feb-21
Feb-22
Feb-23
Feb-24
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN


MW26-III
Concentration (mg/L)
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1
0.1
0.01
0.001
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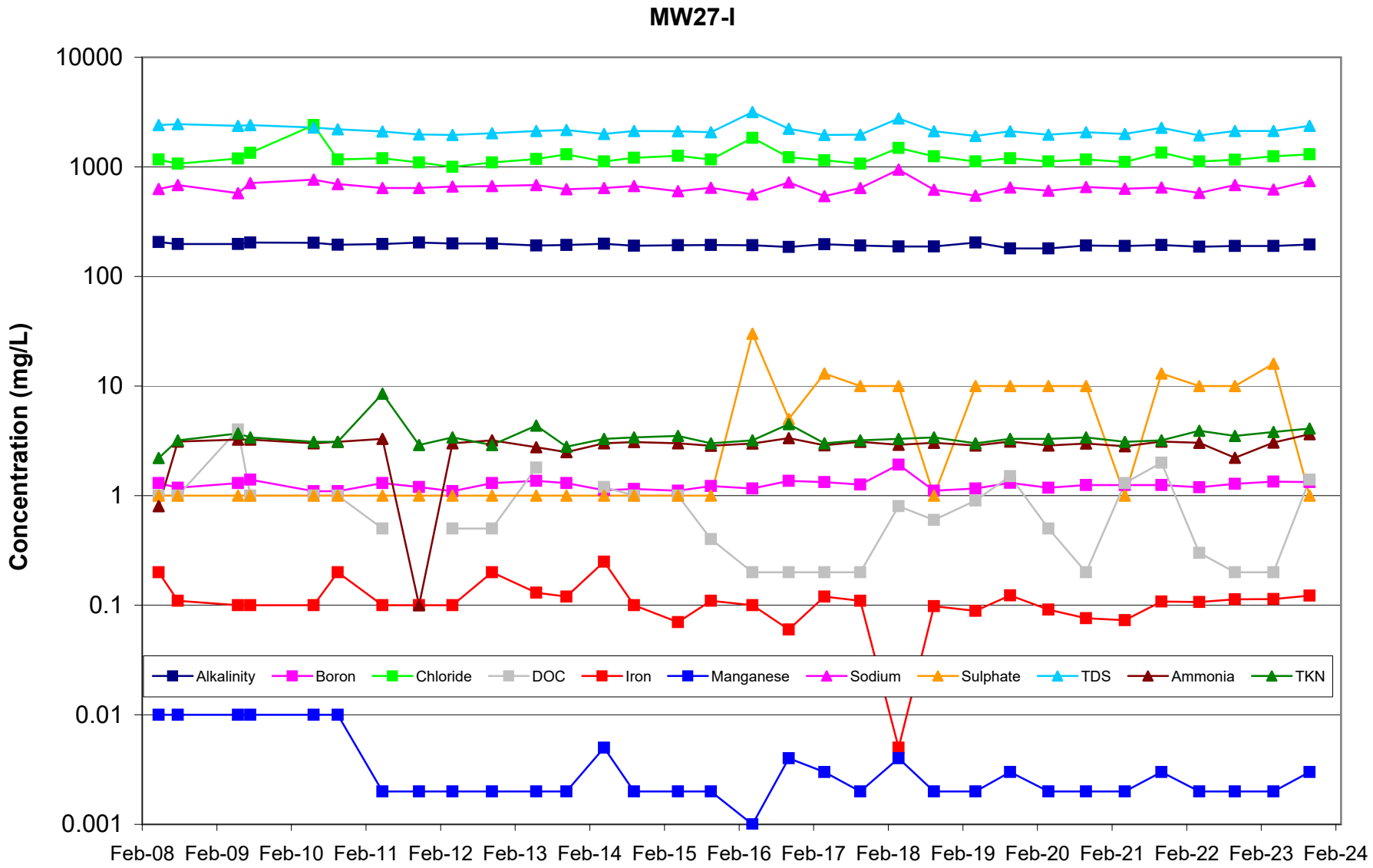
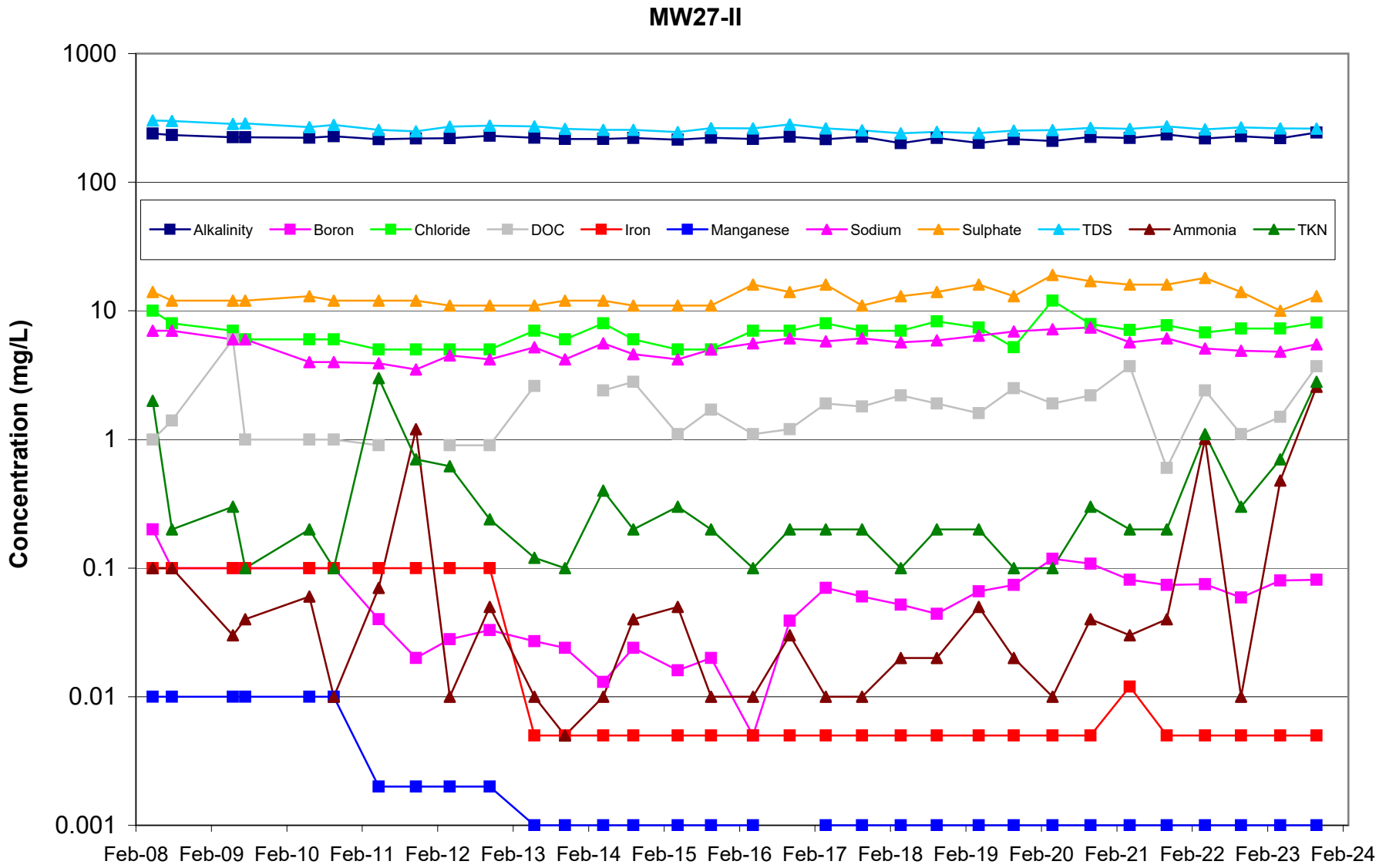
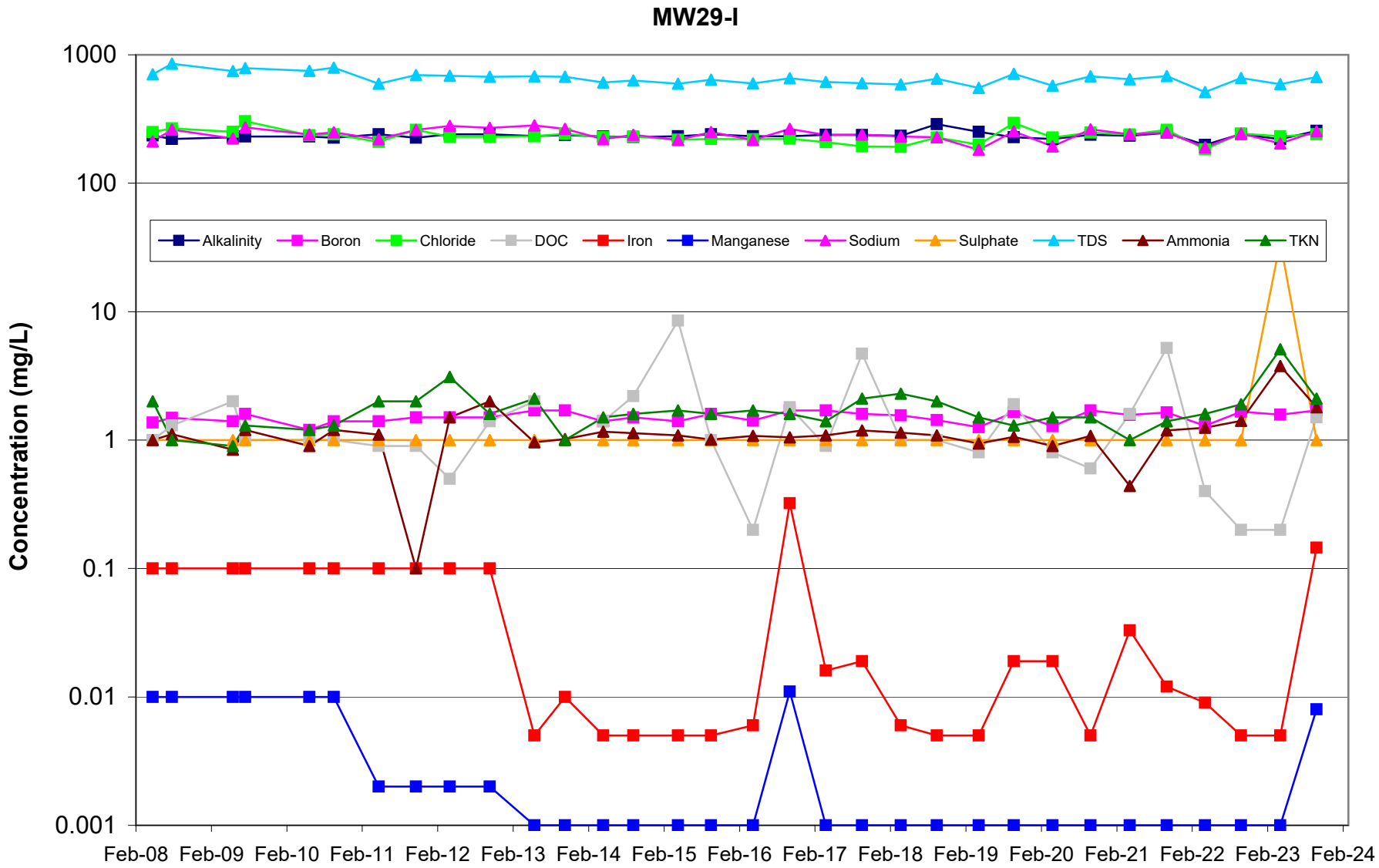
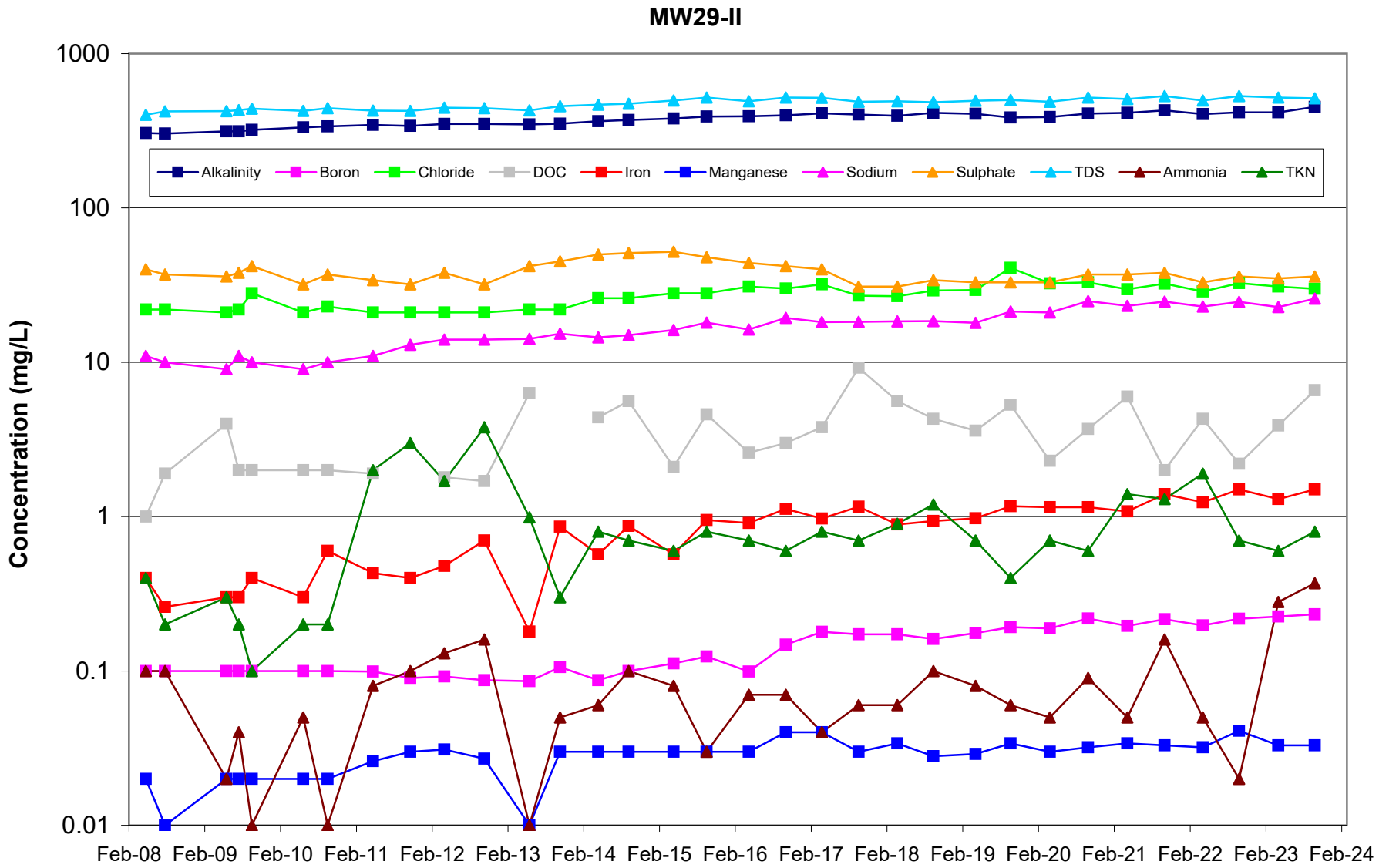
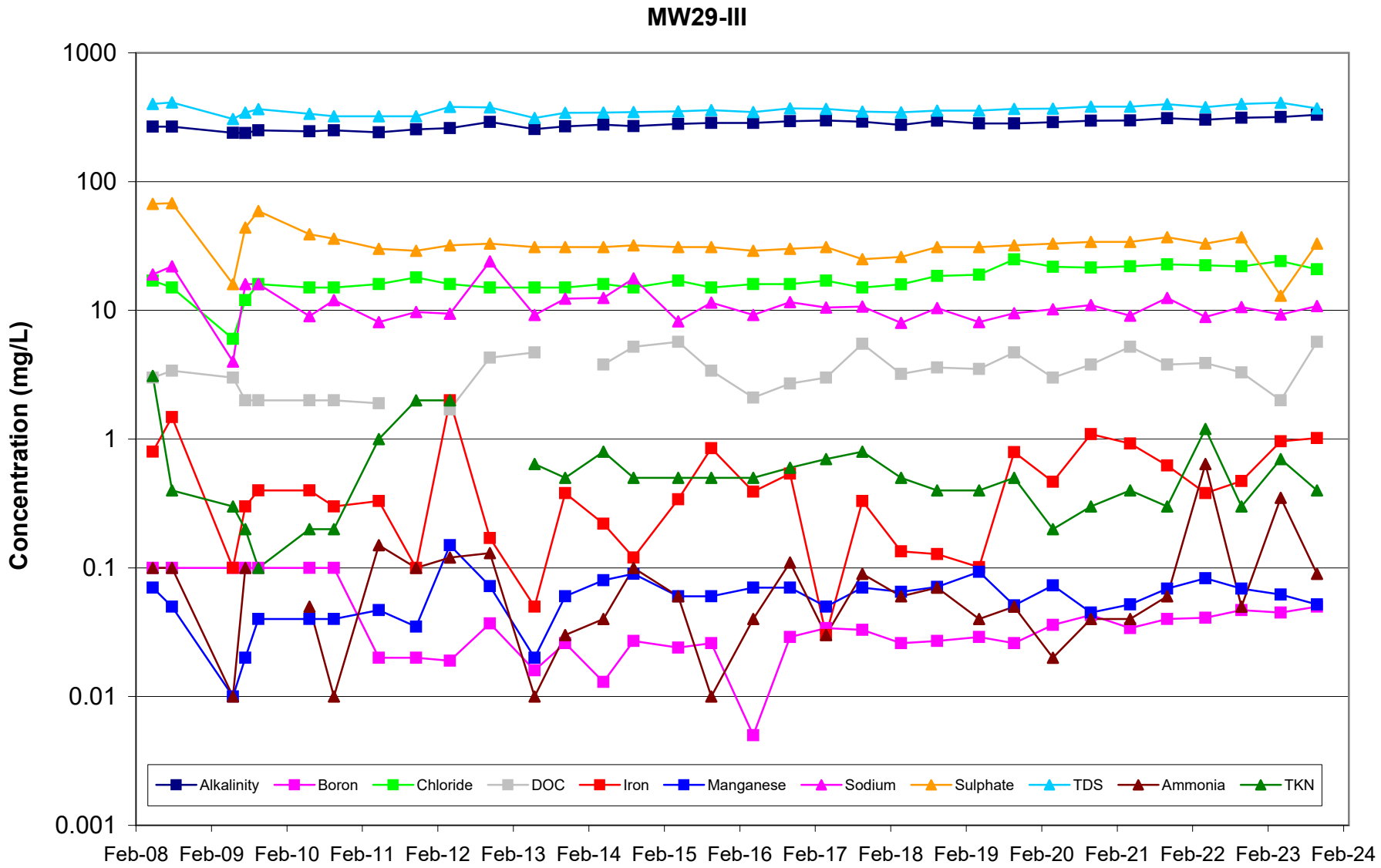
Feb-09
Feb-10
Feb-11
Feb-12
Feb-13
Feb-14
Feb-15
Feb-16
Feb-17
Feb-18
Feb-19
Feb-20
Feb-21
Feb-22
Feb-23
Feb-24
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN


MW27-I
Concentration (mg/L)
10000
1000
100
10
1
0.1
0.01
0.001
Feb-08
Feb-09
Feb-10
Feb-11
Feb-12
Feb-13
Feb-14
Feb-15
Feb-16
Feb-17
Feb-18
Feb-19
Feb-20
Feb-21
Feb-22
Feb-23
Feb-24
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN


MW27-II
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN
Feb-08
Feb-09
Feb-10
Feb-11
Feb-12
Feb-13
Feb-14
Feb-15
Feb-16
Feb-17
Feb-18
Feb-19
Feb-20
Feb-21
Feb-22
Feb-23
Feb-24


MW29-I
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN
Feb-08
Feb-09
Feb-10
Feb-11
Feb-12
Feb-13
Feb-14
Feb-15
Feb-16
Feb-17
Feb-18
Feb-19
Feb-20
Feb-21
Feb-22
Feb-23
Feb-24


MW29-II
Concentration (mg/L)
1000
100
10
1
0.1
0.01
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN
Feb-08
Feb-09
Feb-10
Feb-11
Feb-12
Feb-13
Feb-14
Feb-15
Feb-16
Feb-17
Feb-18
Feb-19
Feb-20
Feb-21
Feb-22
Feb-23
Feb-24


MW29-III
Concentration (mg/L)
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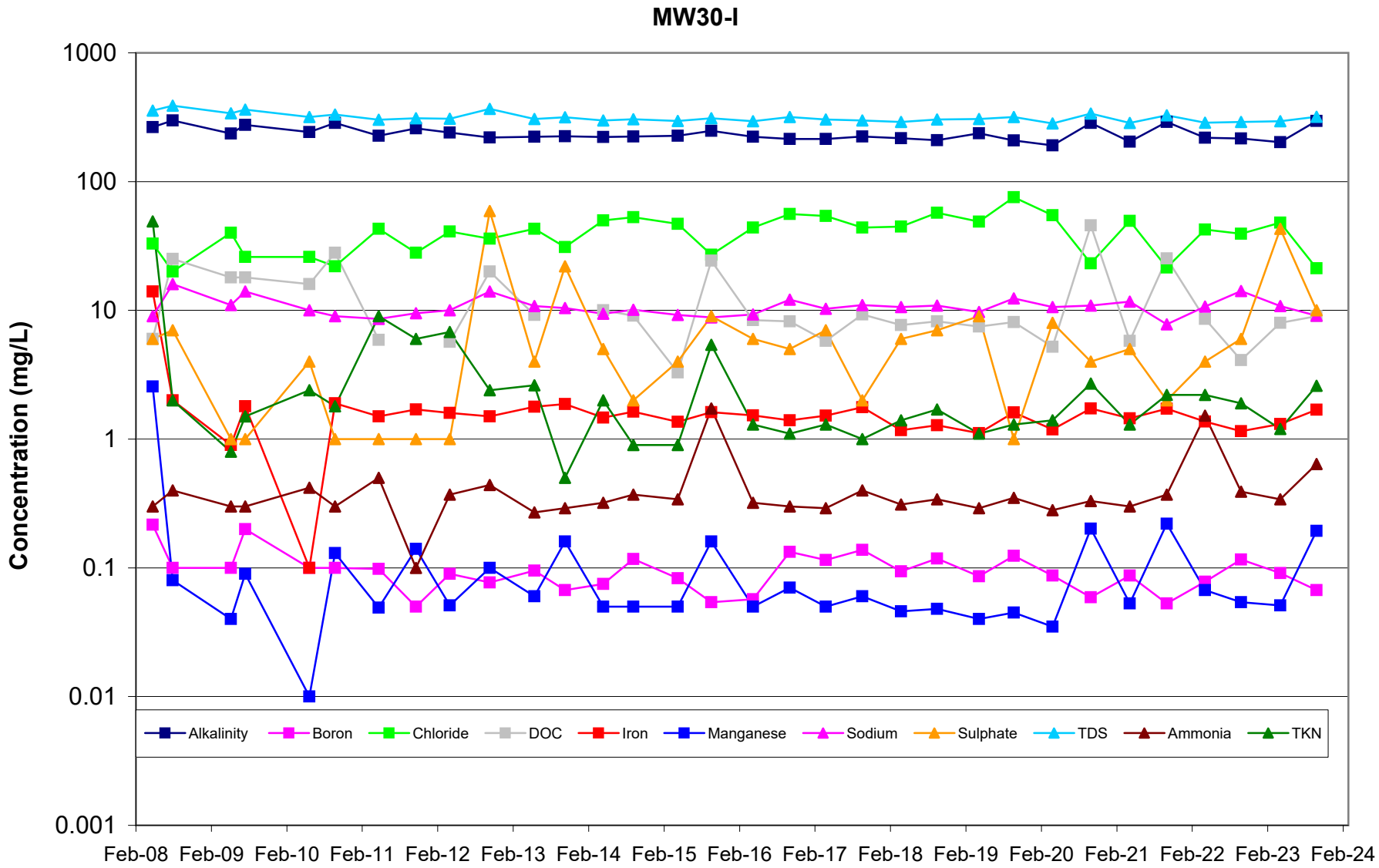
100
10
1
0.1
0.01
0.001
Feb-08
Feb-09
Feb-10
Feb-11
Feb-12
Feb-13
Feb-14
Feb-15
Feb-16
Feb-17
Feb-18
Feb-19
Feb-20
Feb-21
Feb-22
Feb-23
Feb-24
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN


MW30-I
Concentration (mg/L)
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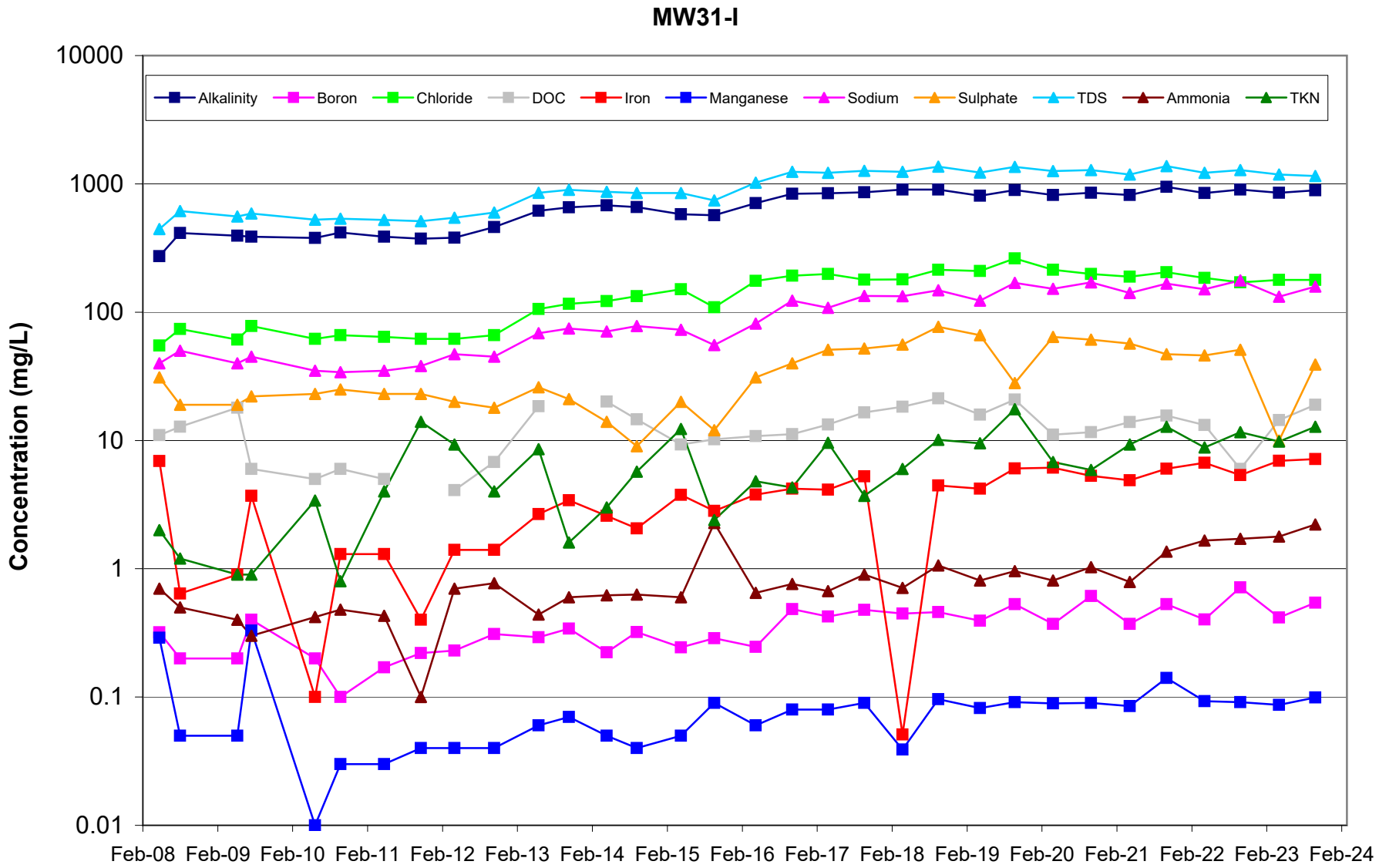
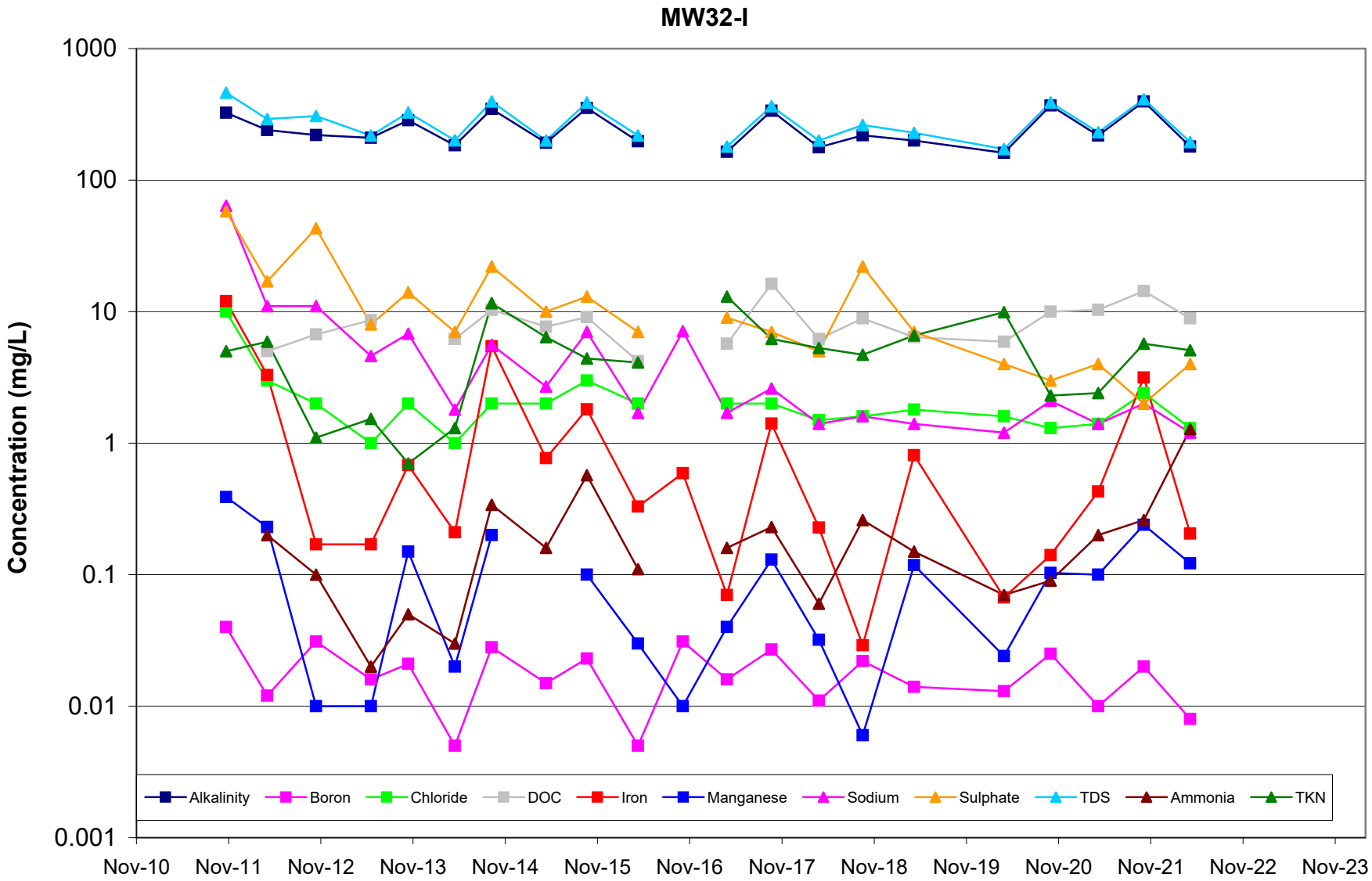
100
10
1
0.1
0.01
0.001
Feb-08
Feb-09
Feb-10
Feb-11
Feb-12
Feb-13
Feb-14
Feb-15
Feb-16
Feb-17
Feb-18
Feb-19
Feb-20
Feb-21
Feb-22
Feb-23
Feb-24
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN


MW31-I
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN
Concentration (mg/L)
10000
1000
100
10
1
0.1
0.01
Feb-08
Feb-09
Feb-10
Feb-11
Feb-12
Feb-13
Feb-14
Feb-15
Feb-16
Feb-17
Feb-18
Feb-19
Feb-20
Feb-21
Feb-22
Feb-23
Feb-24


MW32-I
Concentration (mg/L)
1000
100
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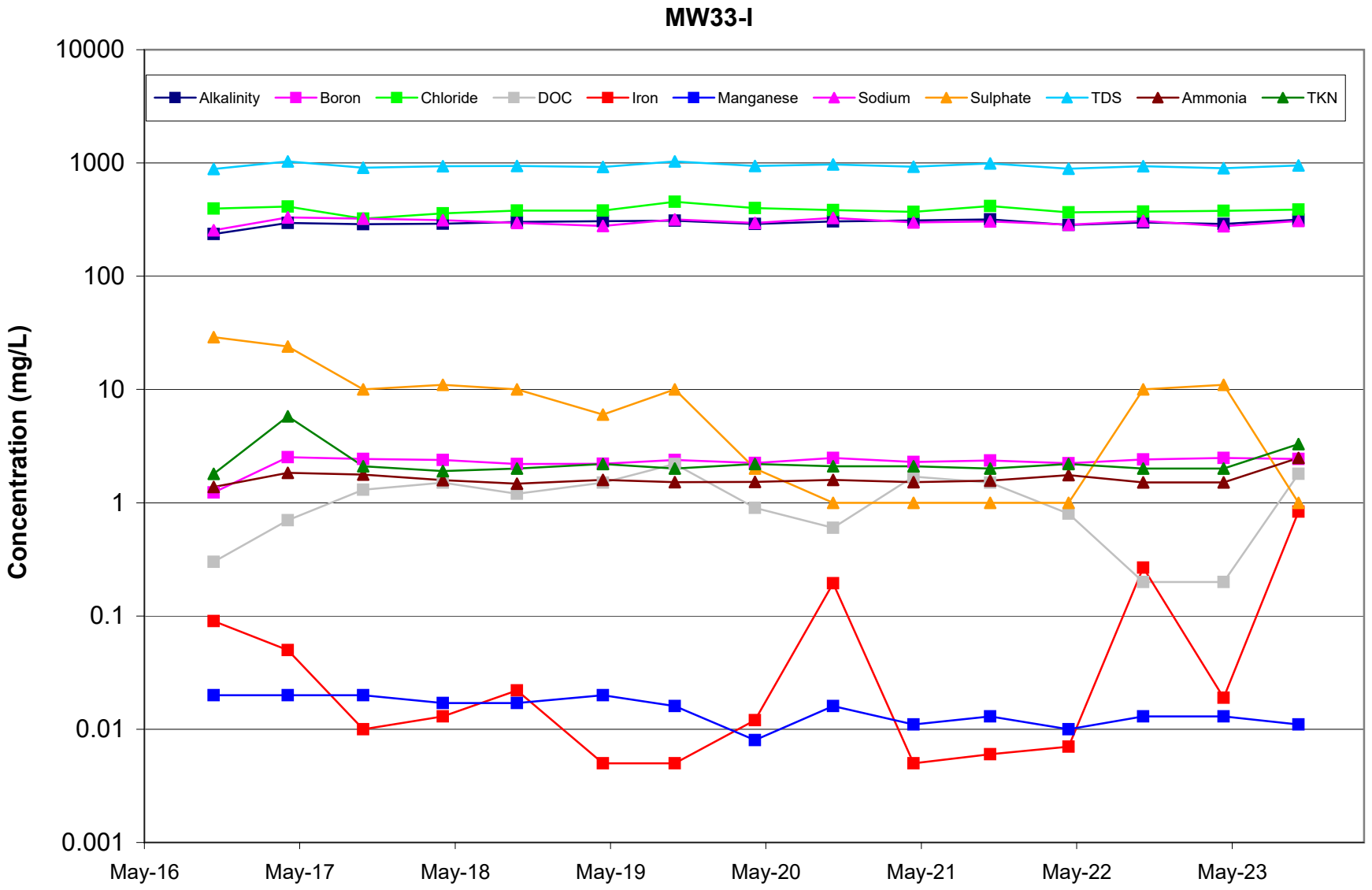
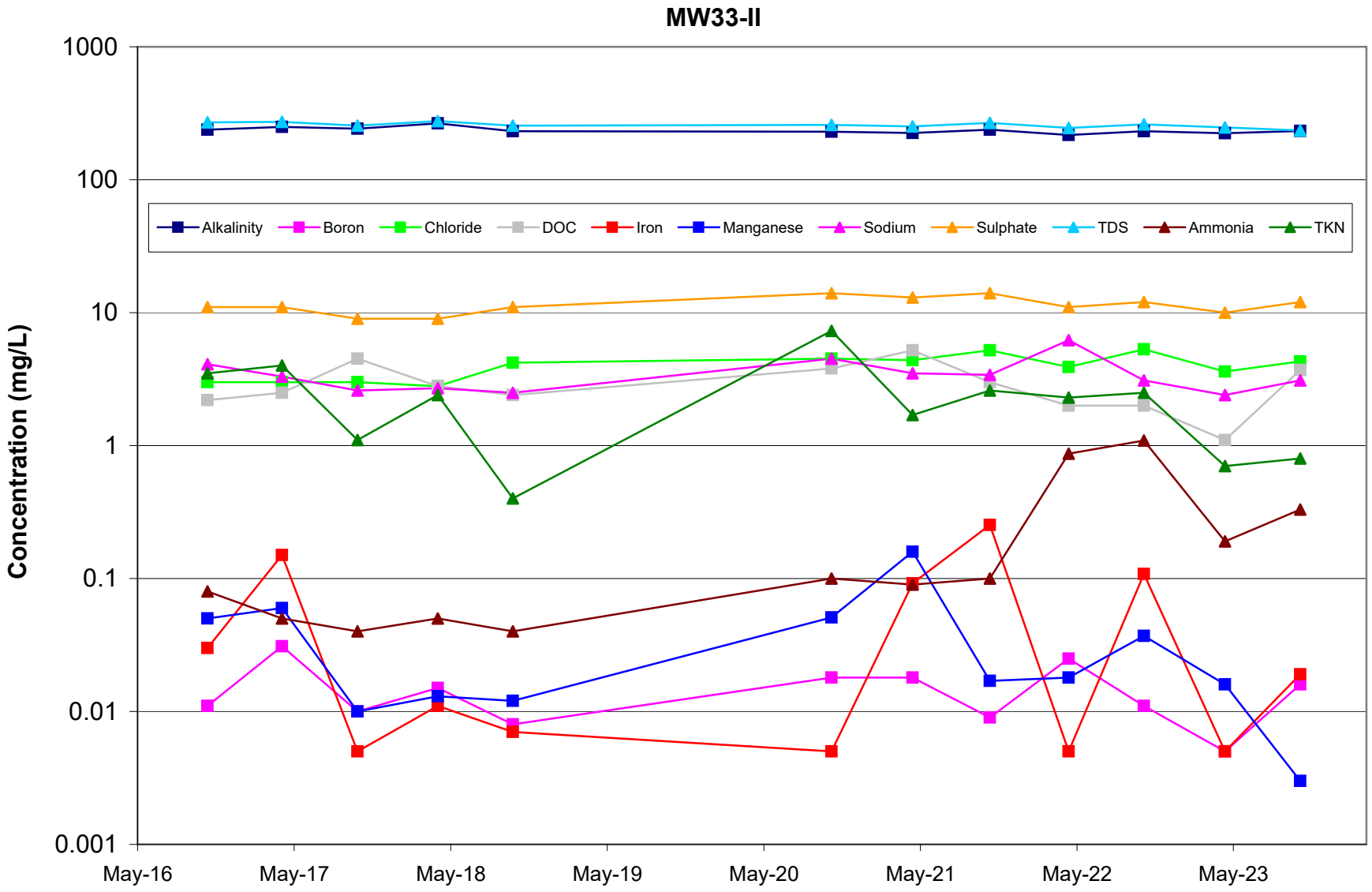
1
0.1
0.01
0.001
Nov-10
Nov-11
Nov-12
Nov-13
Nov-14
Nov-15
Nov-16
Nov-17
Nov-18
Nov-19
Nov-20
Nov-21
Nov-22
Nov-23
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN


MW33-I
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN
Concentration (mg/L)
10000
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


MW33-II
Concentration (mg/L)
1000
100
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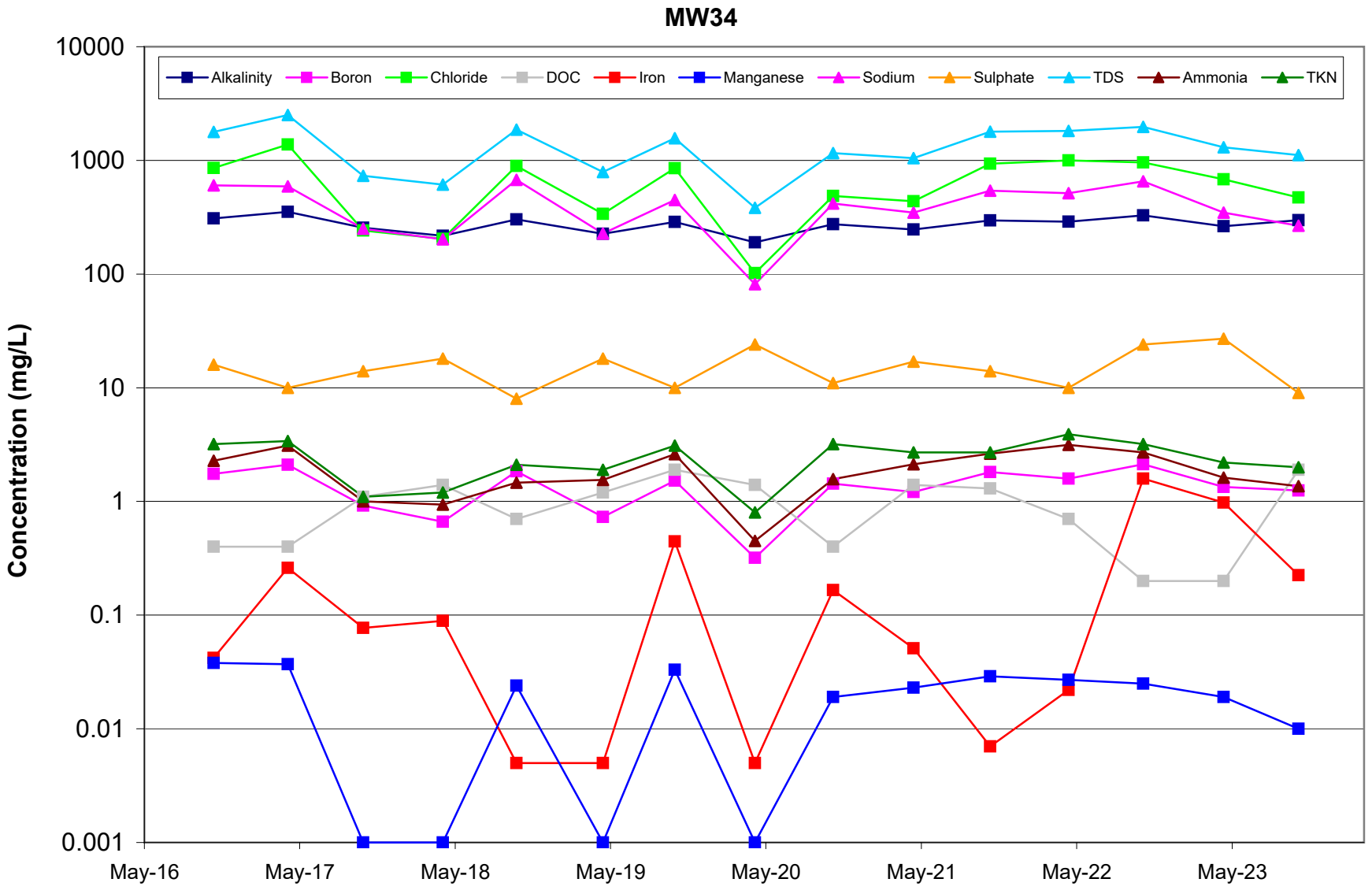
1
0.1
0.01
0.001
May-16
May-17
May-18
May-19
May-20
May-21
May-22
May-23
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN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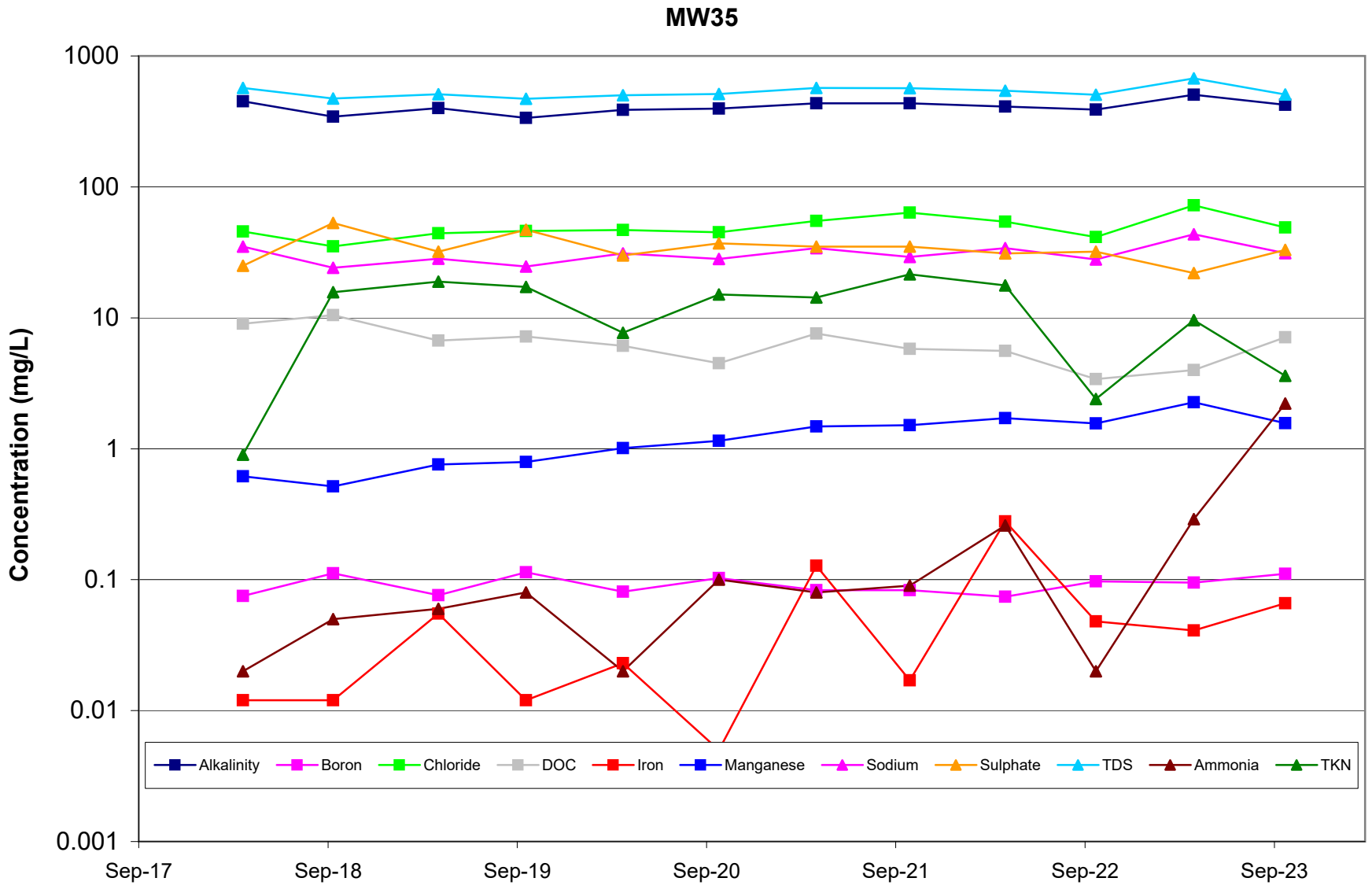
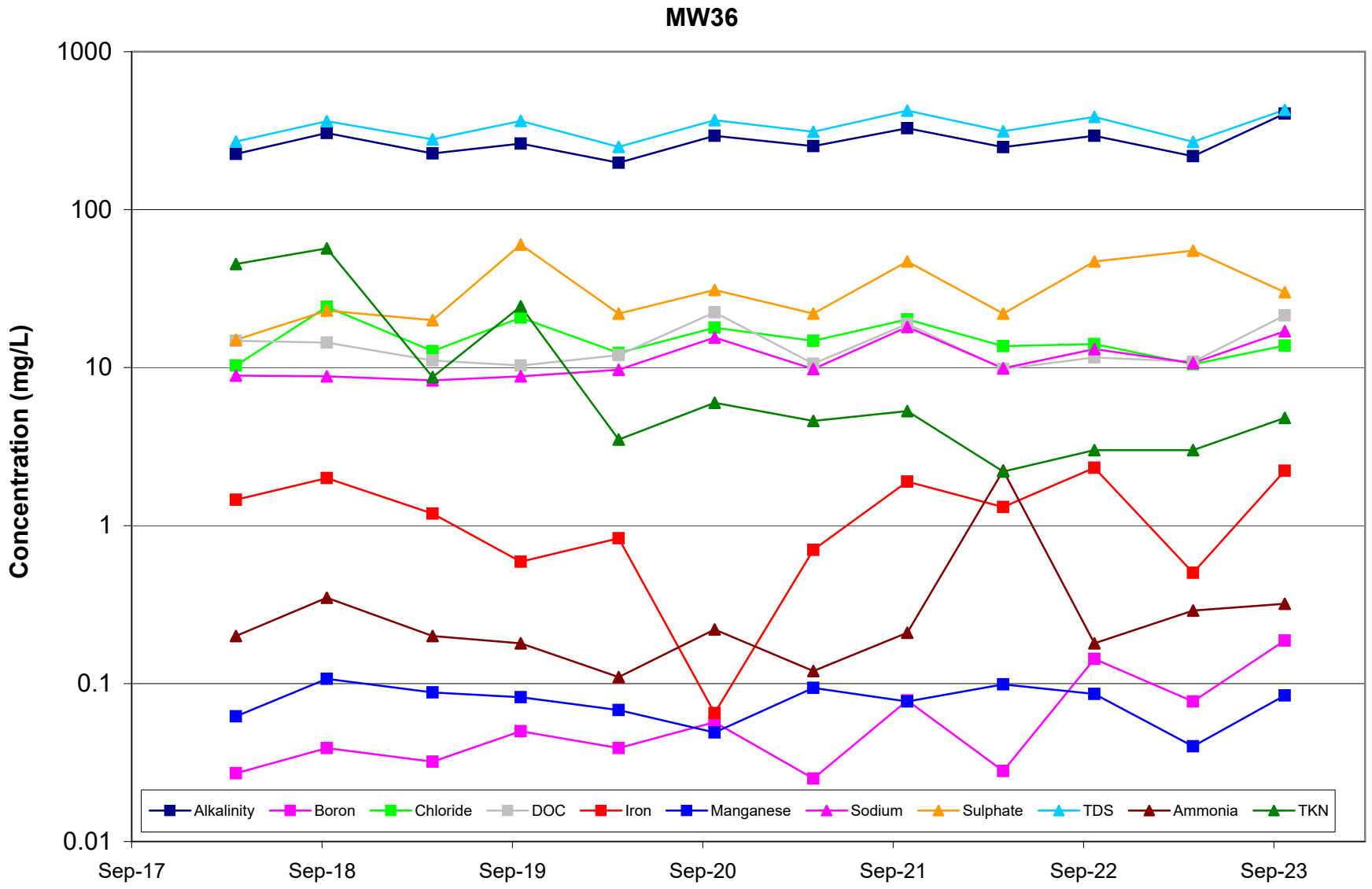
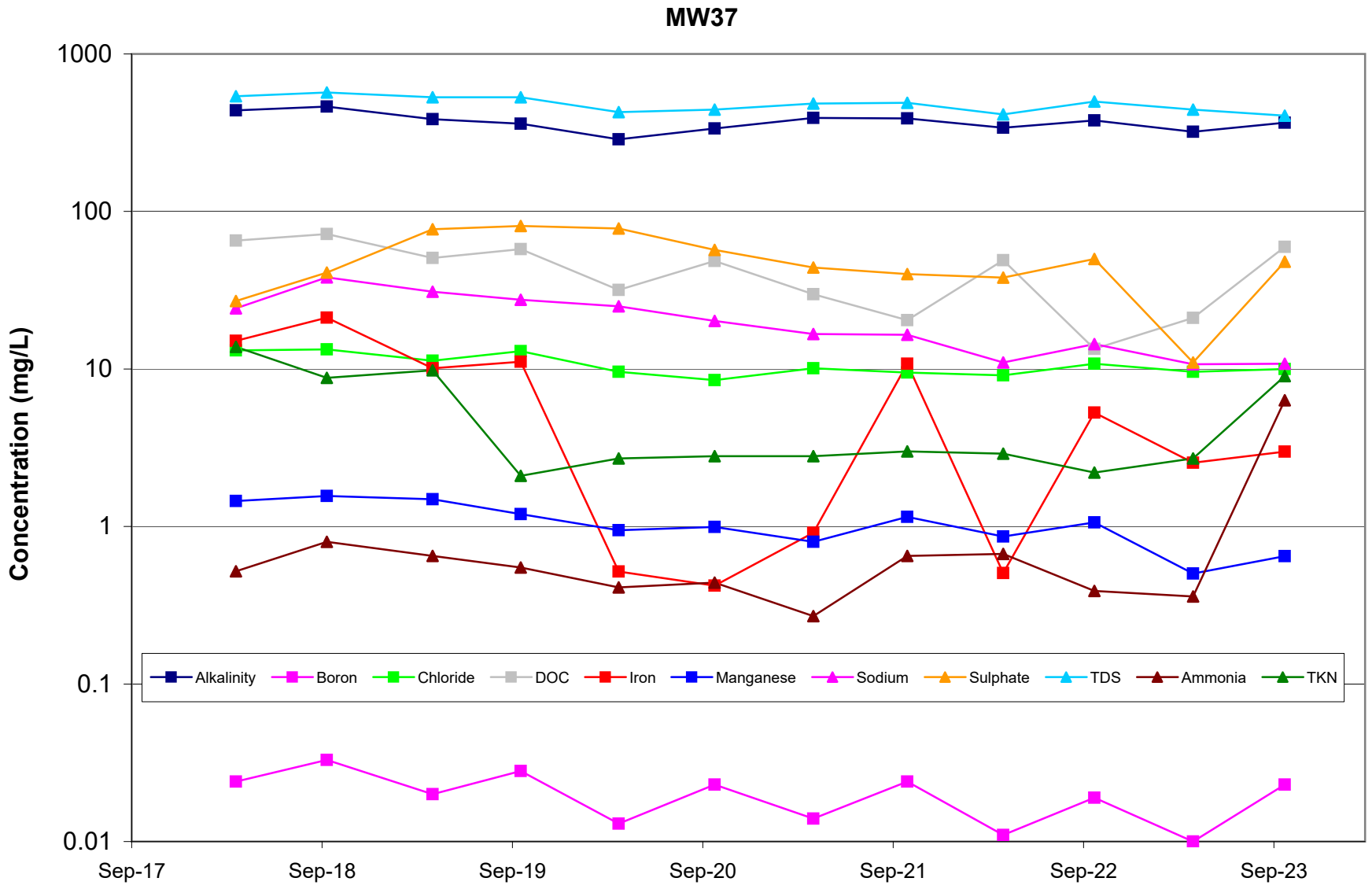
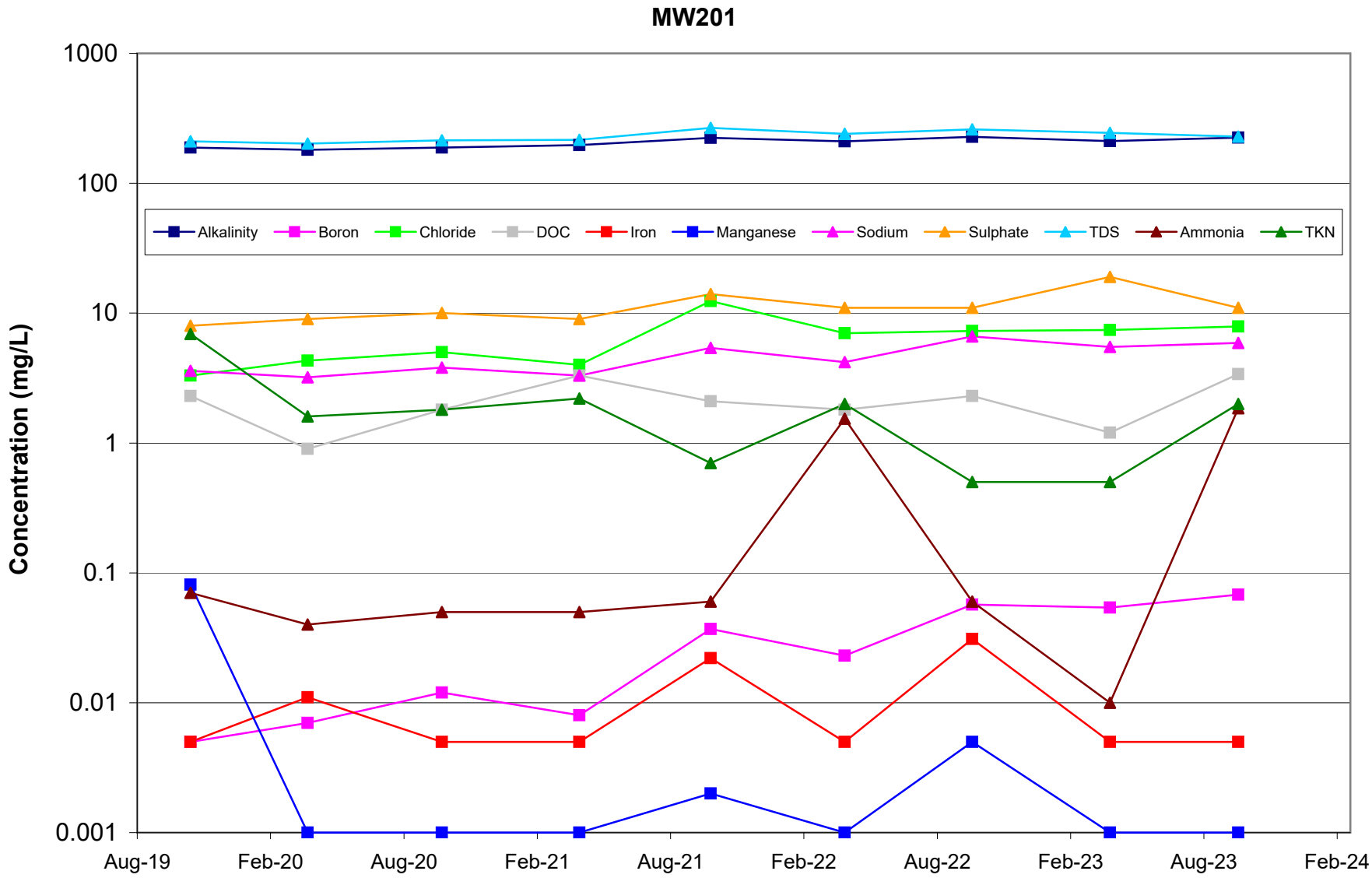
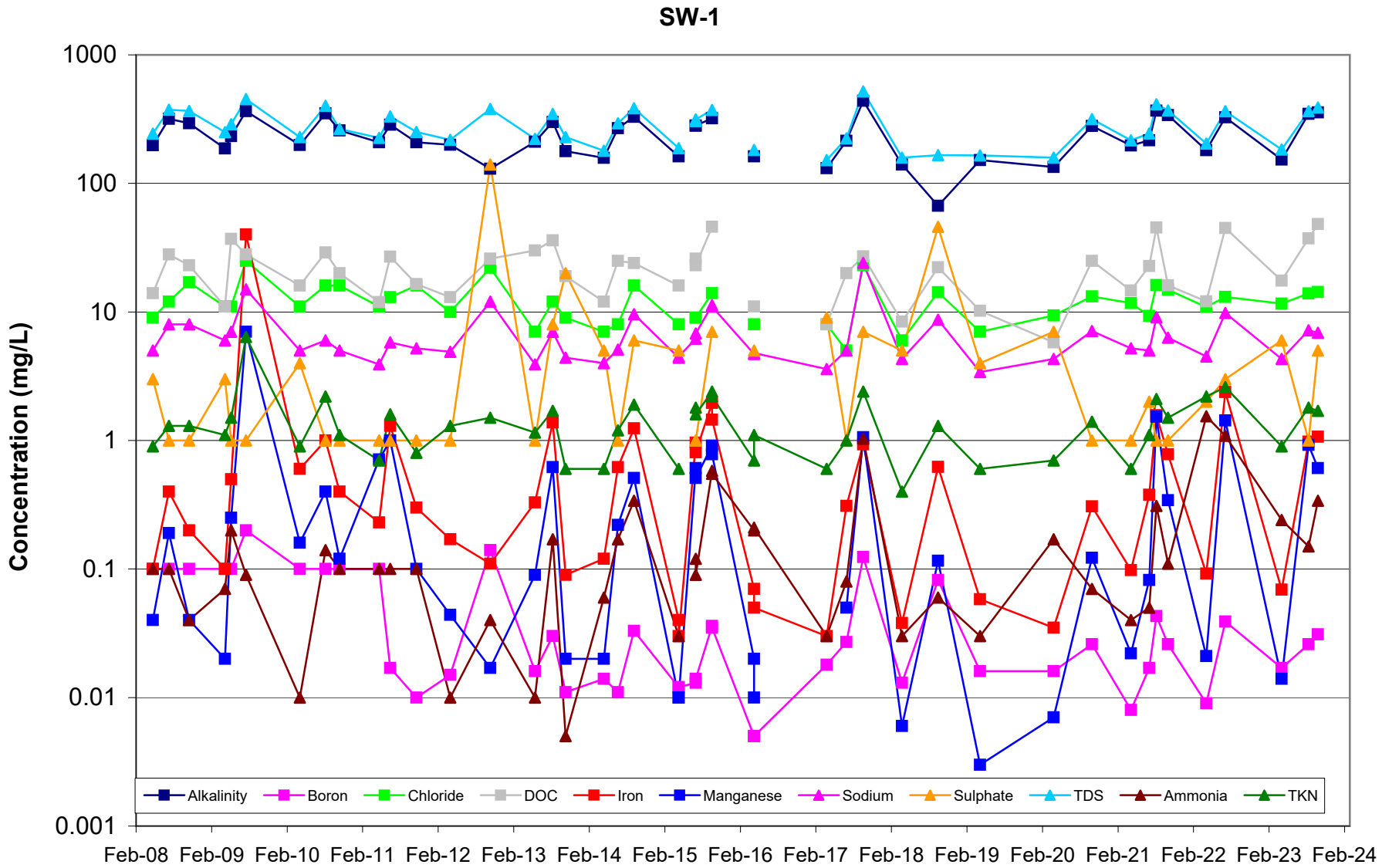
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN
Concentration (mg/L)
10000
1000
100
10
1
0.1
0.01
0.001
May-16
May-17
May-18
May-19
May-20
May-21
May-22
May-23

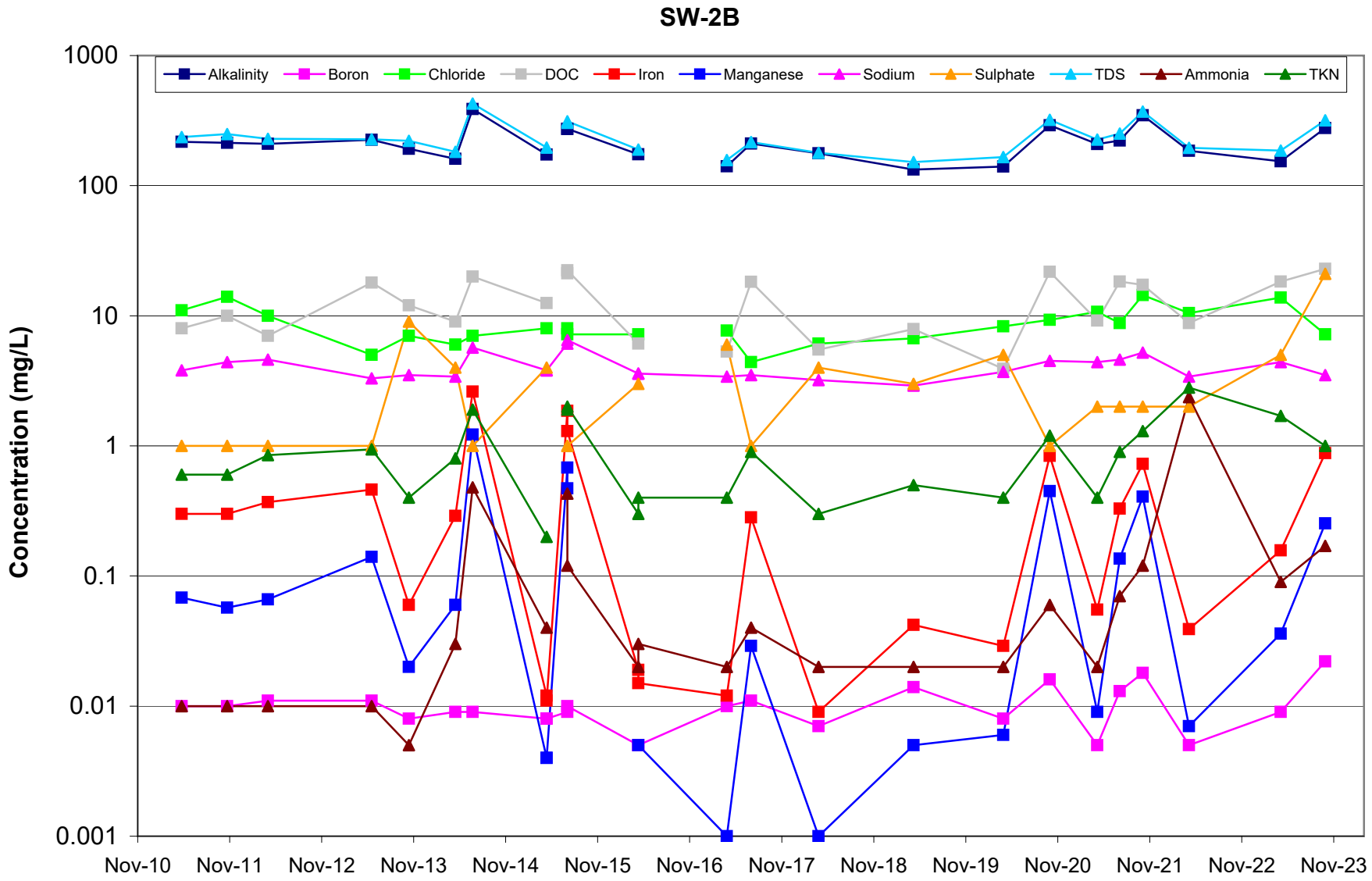

MW35
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Sep-17
Sep-18
Sep-19
Sep-20
Sep-21
Sep-22
Sep-23
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN

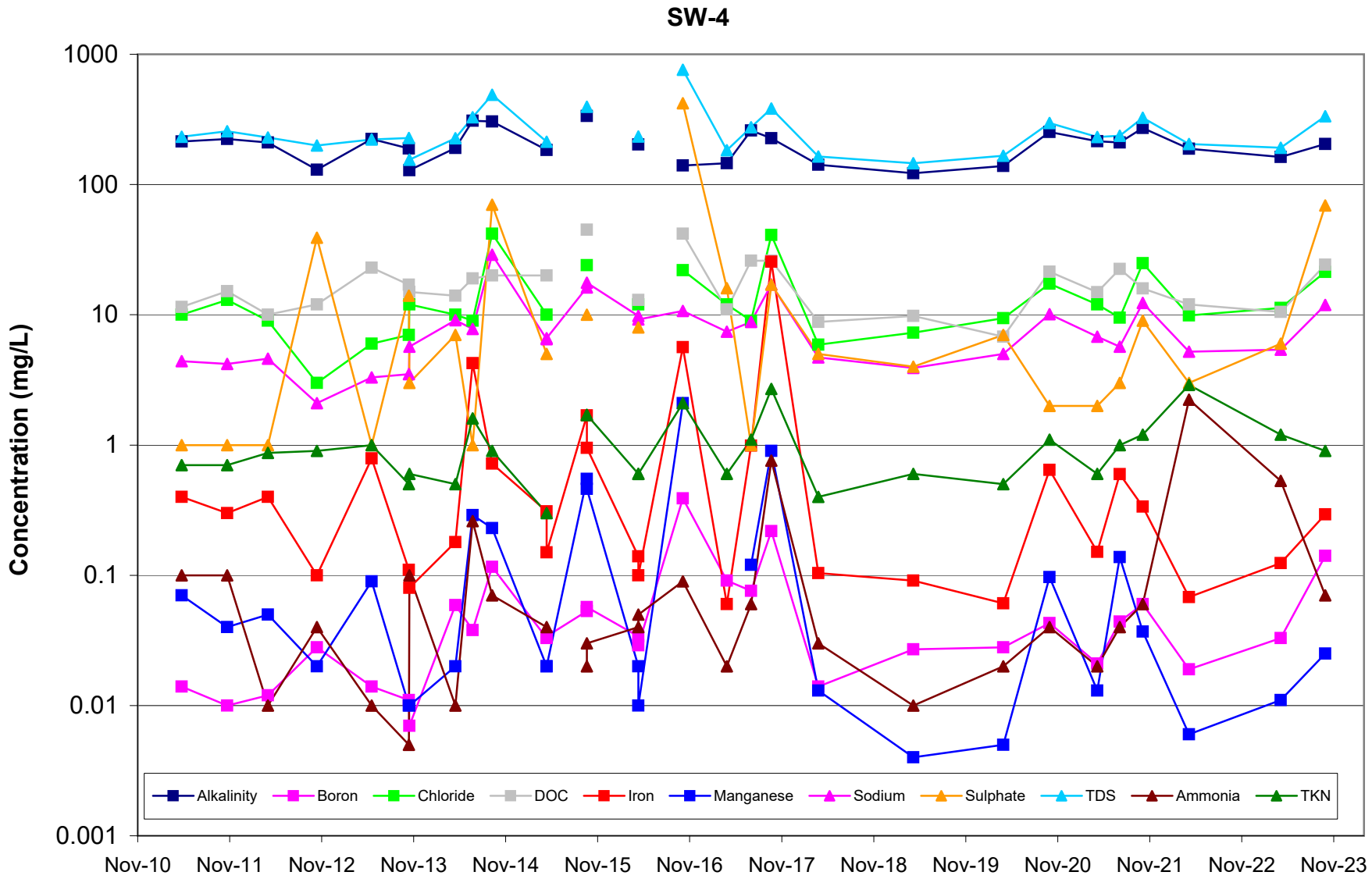

MW36
Concentration (mg/L)
1000
100
10
1
0.1
0.01
Sep-17
Sep-18
Sep-19
Sep-20
Sep-21
Sep-22
Sep-23
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN

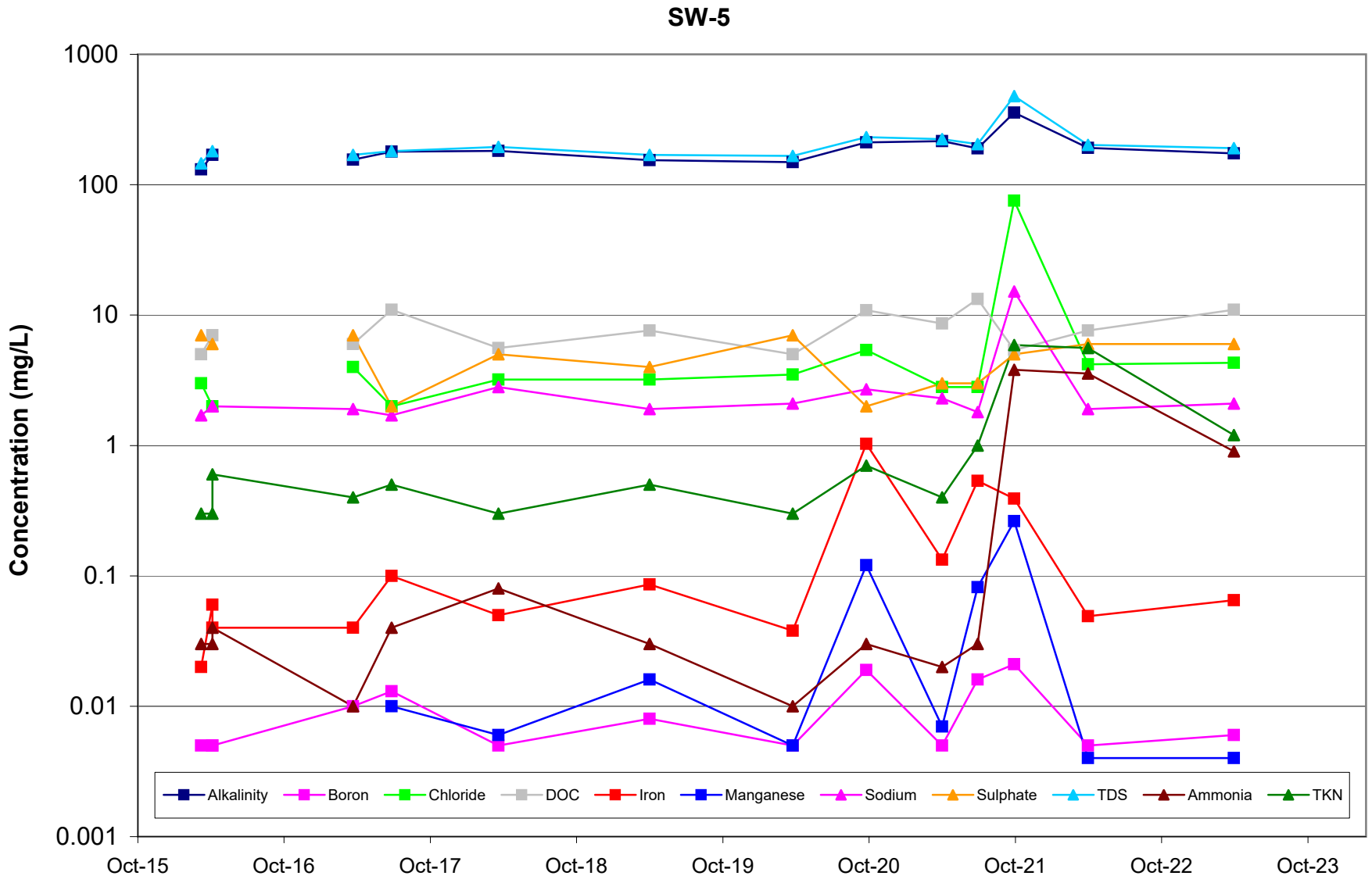

MW37
Concentration (mg/L)
1000
100
10
1
0.1
0.01
Sep-17
Sep-18
Sep-19
Sep-20
Sep-21
Sep-22
Sep-23
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN

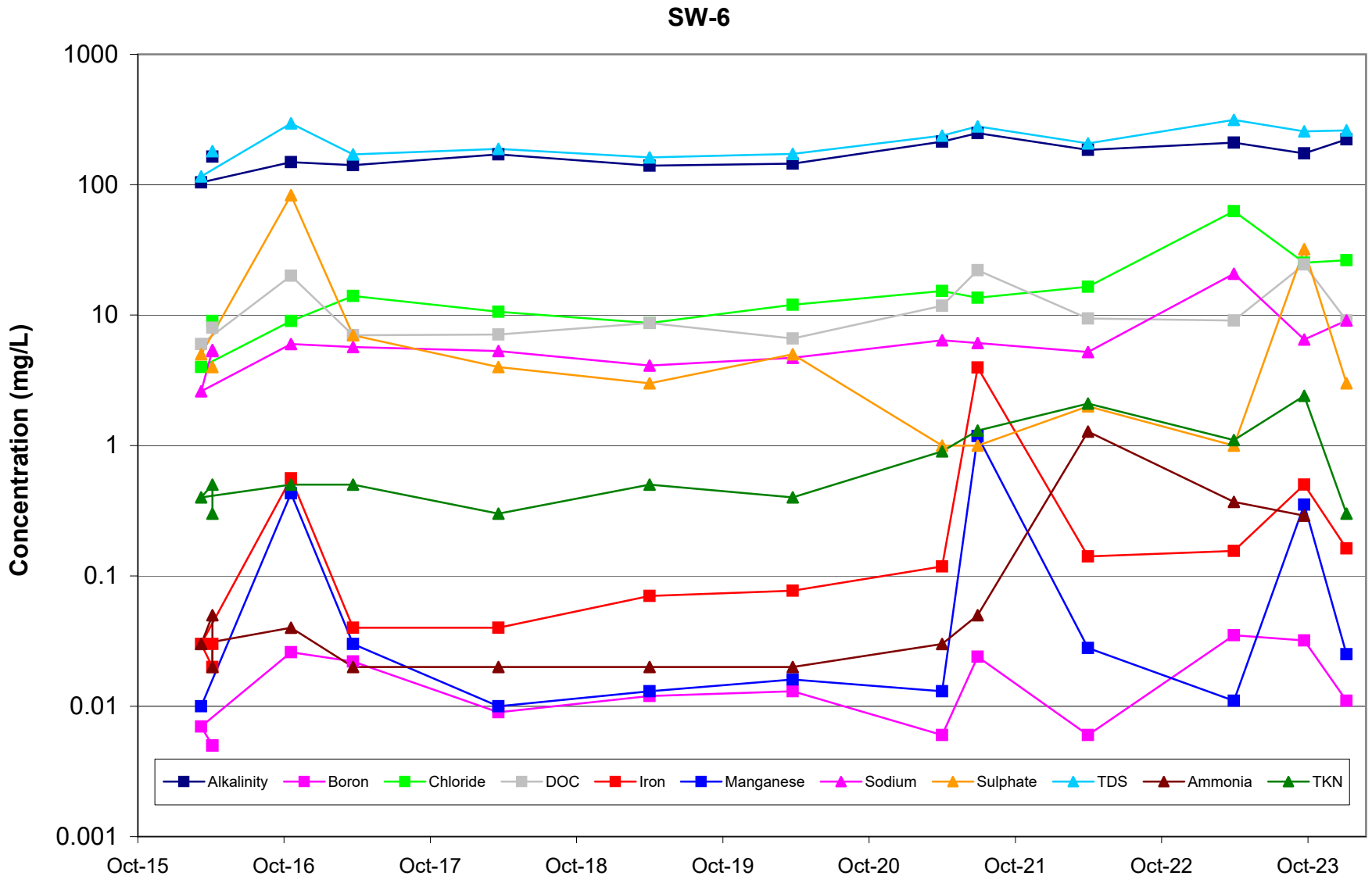

MW201
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN
Aug-19
Feb-20
Aug-20
Feb-21
Aug-21
Feb-22
Aug-22
Feb-23
Aug-23
Feb-24


SW-1
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Feb-08
Feb-09
Feb-10
Feb-11
Feb-12
Feb-13
Feb-14
Feb-15
Feb-16
Feb-17
Feb-18
Feb-19
Feb-20
Feb-21
Feb-22
Feb-23
Feb-24
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN


SW-2B
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Nov-10
Nov-11
Nov-12
Nov-13
Nov-14
Nov-15
Nov-16
Nov-17
Nov-18
Nov-19
Nov-20
Nov-21
Nov-22
Nov-23


SW-4
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Nov-10
Nov-11
Nov-12
Nov-13
Nov-14
Nov-15
Nov-16
Nov-17
Nov-18
Nov-19
Nov-20
Nov-21
Nov-22
Nov-23
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN


SW-5
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Oct-15
Oct-16
Oct-17
Oct-18
Oct-19
Oct-20
Oct-21
Oct-22
Oct-23
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
TKN


SW-6
Concentration (mg/L)
1000
100
10
1
0.1
0.01
0.001
Oct-15
Oct-16
Oct-17
Oct-18
Oct-19
Oct-20
Oct-21
Oct-22
Oct-23
Alkalinity
Boron
Chloride
DOC
Iron
Manganese
Sodium
Sulphate
TDS
Ammonia
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	Eldon Landfill Site
Location (e.g. street address, lot, concession)	311 Rockview Road
GPS Location (taken within the property boundary at front gate/ front entry)	659692 / 4934364
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.:	Landfill - A321004
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:		
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**
		Select Date
		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	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**	If no, the potential design and operational concerns/ exceptions are as follows (Type Here):	
6) The site meets compliance and assessment criteria.	◯ **Yes** ◯ **No**	See Section 5.7 of report for RUP exceedances	
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.

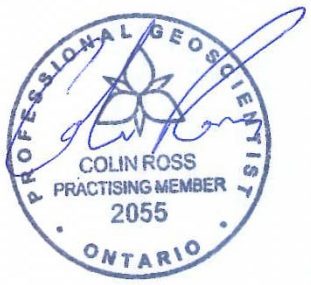
If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature and will be rectified for the next monitoring/reporting period. Where this is not the case, the circumstances 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:

17-Jan-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:**	Monitoring Well reductions are recommended as part of the 2023 monitoring program. Details of this revised program are listed in Section 8.0 of the 2020, 2021 & 2022 Annual Monitoring Reports for the Landfill Site.
○ **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 		
Signature:		**Date:**	17-Jan-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)	Butternut Creek Wetland
Distance(s)	on-site

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	
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**
SW2B, SW4, SW6 during summer event	location was dry and not sampled	Select Date
SW5 during summer and fall events	location was dry and not sampled	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
cyanide aluminum iron unionized ammonia total phosphorous	0.005mg/L 0.075 mg/L 0.3mg/L 0.02 mg/L 0.03 mg/L	>100% >100% >100% >100% >100%
Type Here	Type Here	Type Here
Type Here	Type Here	Type Here
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**	concentrations have been found to be elevated / exceeded historically in background locations with the exception of unionized ammonia, however, ammonia concentrations were noted at many locations including background locations to be elevated during the April monitoring event in the absence of other leachate indicator parameter such that the ammonia lab data is likely not representative.

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**	Some variability exists over time with respect to parameter concentrations however, there are no upward trends and it is noted that this feature is not directly connected with other surface water features.
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) attenuation is adequate to limit exceedances noted in GW monitors to be found in SW locations. A such, no remedial measures proposed
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	◯ **Yes** ◯ **No** ◯ **Not Applicable**	

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:

17-Jan-2024

Recommendations:

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

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

CEP Signature	
Relevant Discipline	Hydrogeology
Date:	17-Jan-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

GRAPHICS, SYMBOLS AND ABBREVIATIONS ON LOGS

SAMPLE TYPES and TESTS

SS	Split Spoon Sample	
SN	Non-Standard Split Spoon Sample	
ST	Shelby Tube Sample : (unconfined compression or unconsolidated undrained test)	- ◆
DS	Denision Type Sample	
PS	Piston Type Sample	
CS	Continuous Sample	
GS	Grab Sample	
WS	Wash Sample	
BQ	BQ Core Sample	
HQ	HQ Core Sample	
NQ	NQ Core Sample	
DT	Dynamic Penetration Test	
VT	Field Vane Test (undisturbed)	- +
VT	Field Vane Test (remoulded)	- ⊕

PENETRATION RESISTANCES

Standard Penetration Resistance(N Value)

The number of blows by a 63.6 kg (140 lb) hammer dropped 760 mm (30 in.) required to drive a 50 mm (2 in.) Split Spoon Sampler for a distance of 300 mm (12 in.).

ABBREVIATIONS

DTPL: Drier Than Plastic Limit
APL: About Plastic Limit
WTPL: Wetter Than Plasic Limit
K: Hydraulic Conductivity (m/s)
C_u: Undrained Shear Strength (kPa)
% REC : Percentage of Sample Recovered
% RQD : Indirect Measure of the Number of Fractures and Soundness of Rock Mass
▼ Approximate Water Table

GRAIN SIZE CLASSIFICATION

	%
trace, "eg. trace sand"	1 - 10
some, "eg. some sand"	10 - 20
adjective, "eg. sandy"	20 - 35
and, "eg. and sand"	35 - 50
noun, "eg. sand"	>50

Note: Classification Divisions Based on Modified M.I.T. Grain Size Scale

SOIL DESCRIPTIONS

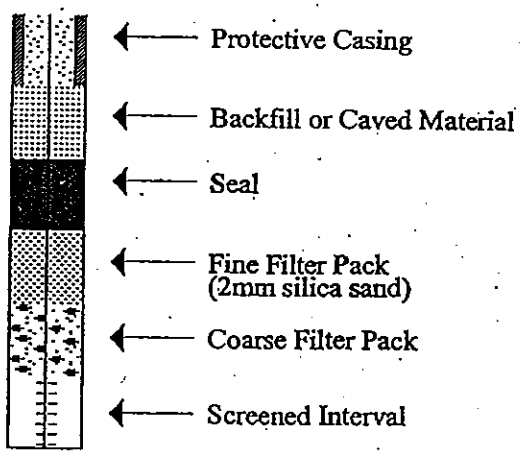
Cohesionless Soils

Relative Density	N Value
Very loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	over 50

Cohesive Soils

Consistency	C_u(kPa)	N Value
Very soft	0 to 12	0 to 2
Soft	12 to 25	2 to 4
Firm	25 to 50	4 to 8
Stiff	50 to 100	8 to 15
Very Stiff	100 to 200	15 to 30
Hard	over 200	over 30

MONITOR DETAILS



Gartner Lee Limited

BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: 7-I 1 of 1
Hydrogeological Investigations Eldon Landfill Property **FOR:** County of Victoria		**DATE:** 12 August 1997 **GEOLOGIST** BJS **ELEVATION** 306.4 m ASL

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
0.2		**TOPSOIL** Dark brown silty sand topsoil, moist loose.		1		SS	4	1.7	90			
1		**SAND** Light to medium brown sand, trace silt, moist, loose.		2		SS	5	1.9	90			
2				3		SS	7	2.3	90			
				4		SS	8	2.8	80			
3				5		SS	9	2.8	90			
4		-becoming compact below about 3.7 m.		6		SS	10	2.1	75			
		-increasing fine sand content below about 4.5 m.		7		SS	9	2.3	80			
5												
6		-becoming saturated below about 5.5 m.		8		SS	12	20.7	95			
7												
7.5		Borehole terminated at 7.49 m in sand on assumed bedrock surface.										

BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: 8-I 1 of 1
Hydrogeological Investigations Eldon Landfill Property FOR: County of Victoria		DATE: 12 August 1997 GEOLOGIST BJS ELEVATION 305.2 m ASL

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
1		**SILT** Dark brown silt, trace coarse sand and gravel, rootlets, moist, loose.		1		SS	8	12.7	75			
1.4				2		SS	8	13.2	50			
2		**SAND** Light brown to greyish brown fine sand, trace to some silt, trace medium sand, moist, compact.		3		SS	10	2.1	60			
				4		SS	12	3.8	65			
3				5		SS	13	10.5	75			
4				6		SS	11		0			
		-becoming saturated below about 4.5 m.		7		SS	8	20.4	60			
5												
5.8				8		SS	20	12	100			
6.1		**SILT AND SAND WITH GRAVEL** Medium brown medium to coarse sand and silt with gravel, saturated, compact. Borehole terminated at 6.12 m in silt and sand with gravel.										

BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: 9-I 1 of 1
Hydrogeological Investigations Eldon Landfill Property FOR: County of Victoria		DATE: 13 August 1997 GEOLOGIST BJS ELEVATION 300.5 m ASL

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
		SAND TO SANDY SILT Mottled grey and rust brown fine sand to sandy silt, saturated, loose to compact.		1		SS	5	17	50		■	▲
1.4	1			2		SS	12	21	60		■	▲
2.3	2	**SHALY LIMESTONE** Grey aphanitic to fine crystalline thin bedded limestone interbedded with shale, highly weathered.		3		SS	30		75		■	
		Borehole terminated at 2.30 m in weathered bedrock.										

BOREHOLE LOG

PROJECT: Eldon

BOREHOLE: 10-I 1 of 1

Hydrogeological Investigations
Eldon Landfill Property
FOR: County of Victoria

DATE: 15 August 1997
GEOLOGIST BJS
ELEVATION 305.1 m ASL

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
0.3		**TOPSOIL** Dark brown silty topsoil, trace fine sand, rootlets, moist to wet.		1		SS	33		70	0		
1		**SHALY LIMESTONE** Grey aphanitic to fine crystalline thin bedded limestone interbedded with shale, numerous shale stingers. Highly weathered to about 4.9 m.										
2				2		HQ			95	25		
3				3		HQ			98	34		
4												
5				4		HQ			100			
6												
7				5		HQ			100			
7.9		Borehole terminated at 7.87 m in shaly limestone bedrock.										

Printed: 14 Feb 00

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BOREHOLE LOG

PROJECT: Eldon

BOREHOLE: 11-I 1 of 1

Hydrogeological Investigations
Eldon Landfill Property
FOR: County of Victoria

DATE: 14 August 1997
GEOLOGIST PW
ELEVATION 306.5 m ASL

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)
0.2		**TOPSOIL** Dark brown to black fine to medium sand topsoil, rootlets, moist, loose.		1		SS	5	1	70			
1		**SAND** Brown medium sand, some fine sand, moist, very loose.		2		SS	3	4.2	70			
2.2		**SAND AND GRAVEL** Grey fine to coarse sand and fine to coarse gravel, trace silt, moist, compact to dense.		3		SS	3	4	70			
3				4		SS	25	2.8	70			
4		-becoming saturated below about 4.5 m.		5		SS	33	3.4	60			
5				6		SS	15	5.5	70			
6				7		SS	9	11.8	60			
7				8		SS	24	14.3	60			
8				9		SS	27	7.9	30			
9.0		**SHALY LIMESTONE** Light grey aphanitic to fine crystalline, medium bedded limestone thinly interbedded with shale, numerous shale stringers.		10		HQ			95	0		
10				11		HQ			98	65		
10.9		Borehole terminated at 10.85 m in shaly limestone bedrock.										

Printed: 14 Feb 00

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BOREHOLE LOG

PROJECT: Eldon

BOREHOLE: 11-II 1 of 1

Hydrogeological Investigations
Eldon Landfill Property
FOR: County of Victoria

DATE: 14 August 1997
GEOLOGIST PW
ELEVATION 306.5 m ASL

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
0.2		**TOPSOIL** Dark brown to black fine to medium sand topsoil, rootlets, moist, loose.										
1		**SAND** Brown medium sand, some fine sand, moist, very loose.										
2.2 2		**SAND AND GRAVEL** Grey fine to coarse sand and fine to coarse gravel, trace silt, moist, compact to dense.										
3												
4												
		-Becoming saturated below about 4.5 m.										
5												
6.1 6		Borehole terminated at 6.05 m in sand and gravel. **Soil statigraphy was inferred from borehole 11-I**										

Printed: 14 Feb 00

Gartner Lee Limited

BOREHOLE LOG

PROJECT: Eldon

BOREHOLE: 12-I 1 of 1

Hydrogeological Investigations
Eldon Landfill Property
FOR: County of Victoria

DATE: 12 August 1997
GEOLOGIST BJS
ELEVATION 306.1 m ASL

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)
0.7		**TOPSOIL** Reddish brown to black medium to coarse sand, trace gravel, moist, compact.		1		SS	14		65			
1		**SAND** Brown fine to medium sand, trace silt, moist, loose to compact.		2		SS	7		75			
2		-becoming grey below about 2.2 m.		3		SS	17		70			
				4		SS	13		75			
3				5		SS	21		80			
3.5		**SAND AND GRAVEL** Brown to grey medium to coarse sand and gravel, trace silt, moist, compact to dense.		6		SS	>50		70			
4				7		SS			0			
5		-Becoming saturated below about 5.2 m.		8		SS	17		90			
6												
6.2		Borehole terminated at 6.22 m in sand and gravel.										

Gartner Lee Limited

BOREHOLE LOG

PROJECT: Eldon

BOREHOLE: 13-I 1 of 1

Hydrogeological Investigations
Eldon Landfill Property
FOR: County of Victoria

DATE: 13 August 1997
GEOLOGIST BJS
ELEVATION 301.9 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION
0.8		**WASTE** Shingles, wood scaps, metal, plastic landfill waste.
1.0	1	**FILL** Medium brown medium sand fill, trace silt, moist, very loose.
1.4		**PEAT** Dark brown to black silty peat, wood fragments and rootlets, wet, very loose.
2.3	2	**SILTY SAND** Grey silty medium sand, saturated, compact.
	3	**SILT** Grey silt, trace sand and clay, saturated, firm. -becoming silty sand below about 3.6 m.
3.6		
	4	-changing back to silt below about 4.6 m.
4.6		
5.0	5	**SAND** Grey fine sand, trace to some silt, saturated, loose to compact.
	6	
	7	
	8	
9.3	9	**SAND AND GRAVEL** Reddish brown sand and gravel, poorly sorted, trace silt, saturated, dense.
	10	-Fine to medium sand with trace silt encountered at the bedrock surface.
11.1	11	**SHALY LIMESTONE** Dark grey aphanitic to fine crystalline, thin bedded limestone, thinly interbedded with shale, numerous shale stringers. Highly weathered to about 11.9 m.
	12	
	13	
13.4		Borehole terminated at 13.43 m in shaly limestone bedrock.

MONITOR DETAILS & NUMBER

SAMPLE NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD
1		SS	2	141.1	50	
2		SS	17	18.4	40	
3		SS	13	20.1	100	
4		SS	21	19.6	100	
5		SS	>50	20.9	75	
6		SS		24.7	95	
7		SS	17	20.3	60	
8		SS	16	19.3	100	
9		SS	20	9.5	99	83
10		SS	>50/0.15m	6.8	92	26
11		HQ				
12		HQ				

N VALUE: 15 30 45 60

WATER CONTENT (%): 10 20 30 40

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BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: 13-II 1 of 1
Hydrogeological Investigations Eldon Landfill Property FOR: County of Victoria		DATE: 13 August 1997 GEOLOGIST BJS ELEVATION 302.1 m ASL

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)
0.8		**WASTE** Shingles, wood scaps, metal, plastic landfill waste.										
1.0	1	**FILL** Medium brown medium sand fill, trace silt, moist.										
1.4		**PEAT** Dark brown to black silty peat, wood fragments and rootlets, wet.										
2.3	2	**SILTY SAND** Grey silty medium sand, saturated.										
	3	**SILT** Grey silt, trace sand and clay, saturated, soft.										
3.6		-becoming silty sand below about 3.6 m.										
	4											
4.7		Borehole terminated at 4.65 m in silt and sand. **Soil stratigraphy was inferred from borehole 13-II.**										

BOREHOLE LOG

PROJECT: Eldon

BOREHOLE: 14-I 1 of 2

Hydrogeological Investigations
Eldon Landfill Property
FOR: County of Victoria

DATE: 28 October 1998
GEOLOGIST BJS
ELEVATION 307.0 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION
0		**WASTE**
		Medium brown medium sand fill mixed with layers of waste consisting of: paper, plastic, metal, wood, glassm rags, moist, loose to dense.
1		
2		
3		
4		
5.2		**SILT**
		Greyish brown silt with some fine sand lenses, trace clay, WTPL, stiff.
6.4		**SAND**
7		Greyish brown fine sand with some silt, saturated, very loose to compact.
8		
9		-Increasing coarse sand content below about 9.0 m.
10		
11		
12		
13		-Sand and gravel from about 12.6 to 12.8 m.
14		-Changing to fine to medium sand, trace coarse sand, trace silt below about 14.0 m.

MONITOR DETAILS & NUMBER	SAMPLE NUMBER	INTERVAL TYPE	N VALUE	% WATER	% REC	% RQD	N VALUE (15 30 45 60)	WATER CONTENT (%) (10 20 30 40)
	1	SS	10		90			
	2	SS	6		60			
	3	SS	19		0			
	4	SS	41		50			
	5	SS	14		10			
	6	SS	5		5			
	7	SS	23		5			
	8	SS	8		70			
	9	SS	27		75			
	10	SS	24		80			
	11	SS	14		75			
	12	SS	6		75			
	13	SS	6		50			
	14	SS	24		60			
	15	SS	11		50			

BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: 14-I 2 of 2
Hydrogeological Investigations Eldon Landfill Property FOR: County of Victoria		DATE: 28 October 1998 GEOLOGIST BJS ELEVATION 307.0 m ASL

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
		SAND (continued)		16		SS	1		60			
16.3 16		SHALY LIMESTONE Dark grey aphanitic to fine crystalline, thin bedded limestone, thinly interbedded with shale, numerous shale stingers. Very weathered to about 17.3 m.		18		HQ			100	0		
17				17		SS	18		70	17		
				19		HQ			100	66		
18				20		HQ			100			
18.9		Borehole terminated at 18.85 m in shaly limestone.										

BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: 14-II 1 of 1
Hydrogeological Investigations Eldon Landfill Property FOR: County of Victoria		DATE: 31 October 1998 GEOLOGIST BJS ELEVATION 307.1 m ASL

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
1		**WASTE** Medium brown medium sand fill mixed with layers of waste consisting of: paper, plastic, metal, wood, glassm rags, moist, loose to dense.										
2												
3												
4												
5.2 5												
		SILT Greyish brown silt with some fine sand lenses, trace clay, WTPL, stiff.										
6												
6.4		**SAND** Greyish brown fine sand with some silt, saturated, very loose to compact.										
7												
8												
9		-Increasing coarse sand content below about 9.0 m.										
10												
11												
12												
13.1 13		-Sand and gravel from about 12.6 to 12.8 m.										
		Borehole terminated at 13.11 m in sand. **Soil stratigraphy was inferred from borehole 14-I.**										

BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: 14-III 1 of 1
Hydrogeological Investigations Eldon Landfill Property **FOR:** County of Victoria		**DATE:** 27 October 1998 **GEOLOGIST** BJS **ELEVATION** 307.1 m ASL

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)
1		**WASTE** Medium brown medium sand fill mixed with layers of waste consisting of: paper, plastic, metal, wood, glassm rags, moist, loose to dense.										
2												
3												
4												
5.2 5												
		SILT Greyish brown silt with some fine sand lenses, trace clay, WTPL, stiff.										
6.4 6												
		SAND Greyish brown fine sand with some silt, saturated, very loose to compact.										
7.6 7												
		Borehole terminated at 7.62 m in sand. **Soil stratigraphy was inferred from borehole 14-I.**										

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BOREHOLE LOG

PROJECT: Eldon

BOREHOLE: 15-I 1 of 2

Hydrogeological Investigations
Eldon Landfill Property
FOR: County of Victoria

DATE: 30 October 1998
GEOLOGIST BJS
ELEVATION 307.0 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	N VALUE	% WATER	% REC	% RQD	N VALUE (15 30 45 60)	WATER CONTENT (%) (10 20 30 40)
0		**WASTE** Medium brown medium sand fill mixed with layers of waste consisting of: paper, plastic, metal, wood, glassm rags, moist, loose to dense.		1		SS	20		25			
1				2		SS	6		0			
2				3		SS	5		10			
3				4		SS	10		25			
4.1		**SAND** Medium brown fine sand, trace silt, moist, compact.										
5				5		SS	19		40			
6		-Becoming grey below about 6.5 m.		6		SS	18		60			
7		-Grading to fine to medium sand, trace coarse sand below about 7.0 m.		7		SS	14		70			
8												
9		-becoming poorly sorted sand with some gravel from about 8.7 to 13.3 m.		8		SS	27		60			
10												
11				9		SS	29		75	0		
12				10		SS	43		85			
13.3		-becoming a fine sand below about 13.3 m.										
13				11		SS	11		85			
14.3		**SHALY LIMESTONE** Dark grey aphanitic to fine crystalline, thin bedded		12		HQ			100			
14				13		HQ			100	61		

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BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: 15-I 2 of 2
Hydrogeological Investigations Eldon Landfill Property FOR: County of Victoria		DATE: 30 October 1998 GEOLOGIST BJS ELEVATION 307.0 m ASL

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
16		limestone, thinly interbedded with shale, numerous shale stingers. Very weathered to about 14.5 m.		14		HQ			100	84		
16.7		Borehole terminated at 16.69 m in shaly limestone.										

BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: 15-II 1 of 1
Hydrogeological Investigations Eldon Landfill Property FOR: County of Victoria		DATE: 30 October 1998 GEOLOGIST BJS ELEVATION 307.2 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	N VALUE	% WATER	% REC	% RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
0		**WASTE** Medium brown medium sand fill mixed with layers of waste consisting of: paper, plastic, metal, wood, glassm rags, moist, loose to dense.										
1												
2												
3												
4.1		**SAND** Medium brown fine sand, trace silt, moist, compact.										
5												
6												
		-Becoming grey below about 6.5 m.										
7		-Grading to fine to medium sand, trace coarse sand below about 7.0 m.										
8												
8.7		-becoming poorly sorted sand with some gravel from about 8.7 to 13.3 m.										
9												
10												
11												
12.1		Borehole terminated at 12.12 m in sand.										
12		**Soil stratigraphy was inferred from borehole 15-I.**										

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BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: 15-III 1 of 1
Hydrogeological Investigations Eldon Landfill Property **FOR:** County of Victoria		**DATE:** 30 October 1998 **GEOLOGIST** BJS **ELEVATION** 307.1 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	N VALUE	% WATER	% REC	% RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
1		**WASTE** Medium brown medium sand fill mixed with layers of waste consisting of: paper, plastic, metal, wood, glassm rags, moist, loose to dense.										
2												
3												
4.1 4		**SAND** Medium brown fine sand, trace silt, moist, compact.										
5												
6												
7		-Becoming grey below about 6.5 m. -Grading to fine to medium sand, trace coarse sand below about 7.0 m.										
8.2 8		Borehole terminated at 8.23 m in sand. **Soil stratigraphy was inferred from borehole 15-I.**										

Log of Borehole MW16-I

Project No. MRK-00256269-A0

Drawing No. 7

Project: City of Kawartha Landfill Sites

Sheet No. 1 of 2

Location: Various Landfill Sites, Kawartha Lakes

Eldon Landfill

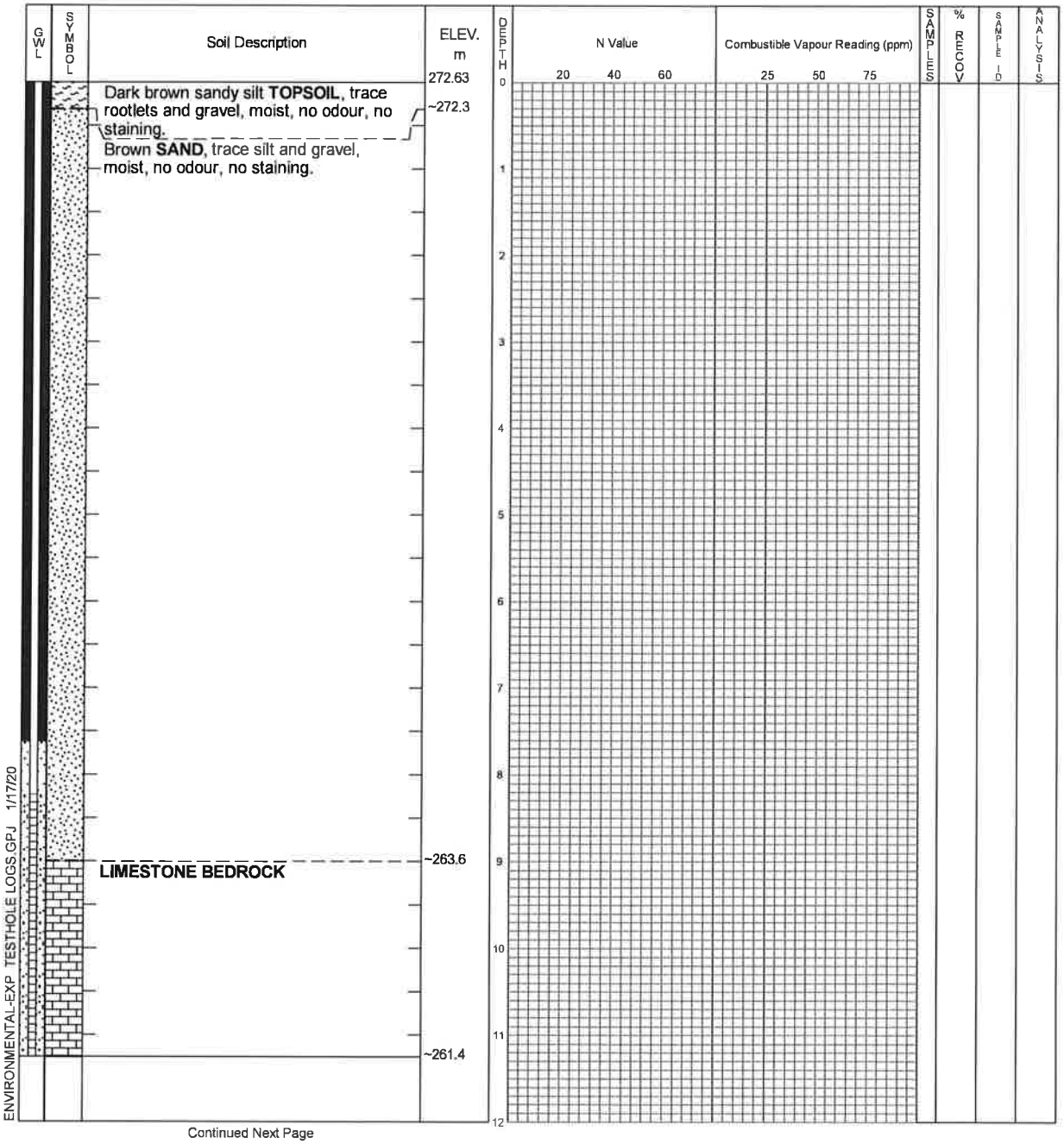
Date Drilled: October 19, 2019

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		



Continued Next Page

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

exp Services Inc.
Markham, Ontario
Telephone: 905.695.3217

Log of Borehole MW16-I

Project No. MRK-00256269-A0 Drawing No. 7

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

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value	Combustible Vapour Reading (ppm)	SAMPLES	% RECOV	SAMPLE ID	ANALYSIS
		End of Test hole at 11.25 mbgs.	260.63	12	20 40 60	25 50 75				
				13						
				14						
				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)

BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: 16-II 1 of 1
Hydrogeological Investigations Eldon Landfill Property FOR: County of Victoria		DATE: 29 October 1998 GEOLOGIST BJS ELEVATION 306.6 m ASL

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
0.3		**TOPSOIL** Dark brown fine sandy silt topsoil, trace rootlets, wet loose.										
1		**SAND** Medium brown fine sand, trace coarse sand, trace silt, moist, dense to very dense. -becoming poorly sorted sand, some gravel from about 1.5 to 4.4 m.										
2												
3												
4		-Gravelly between about 3.8 and 4.3 m. -becoming a fine to medium sand below about 4.4 m.										
5												
6												
7												
7.6		Borehole terminated at 7.62 m in sand. **Soil stratigraphy was inferred from borehole 16-I**										

BOREHOLE LOG

PROJECT: Eldon

BOREHOLE: 17-I 1 of 1

Hydrogeological Investigations
Eldon Landfill Property
FOR: County of Victoria

DATE: 28 April 1999
GEOLOGIST BJS
ELEVATION 306.4 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	N VALUE	% WATER	% REC	% RQD	N VALUE (15 30 45 60)	WATER CONTENT (%) (10 20 30 40)
		SAND WITH SOME GRAVEL Medium brown fine to coarse sand, some fine and coarse gravel, trace silt, moist, loose to compact.		1		SS	9		25			
1				2		SS	14		50			
				3		SS	33		40			
2.0		**SAND** Reddish brown fine sand with some silt, moist, compact.		4		SS	21		60			
3				5		SS	26		10			
4		-becoming medium brown in colour with a decreasing silt content below about 3.7 m.		6		SS	4		50			
4.5		**SAND WITH SOME GRAVEL** Medium brown fine to coarse sand with some fine and medium gravel, trace silt, moist becoming saturated below 5.2 m, compact to dense.		7		SS	39		70			
5				8		SS	28		60			
6				9		SS	40		50			
7				10		SS	36		40			
8				11		SS	39		50			
				12		SS	26		40			
9.1		**SAND** Medium brown fine sand with some silt, subtle laminations, saturated, dense.		13		SS	31		70			
10		-Decreasing silt content below about 9.9 m.		14		SS	35		75			
11				15		SS	28		80			
				16		SS	50		80			
12				17		SS	50		90			
12.8												
13		**STONEY SILT TILL** Grey silt, some medium and coarse sand, trace fine to coarse gravel, saturated, dense.										
14.0				18		SS			0			
		Borehole terminated at 13.95 on assumed bedrock surface.										

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BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: 17-II 1 of 1
Hydrogeological Investigations Eldon Landfill Property FOR: County of Victoria		DATE: 28 April 1999 GEOLOGIST BJS ELEVATION 306.3 m ASL

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
0		**SAND WITH SOME GRAVEL** Medium brown fine to coarse sand, some fine and coarse gravel, trace silt, moist, loose to compact.										
1												
2.0		**SAND** Reddish brown fine sand with some silt, moist, compact.										
2												
3												
4		-becoming medium brown in colour with a decreasing silt content below about 3.7 m.										
4.5		**SAND WITH SOME GRAVEL** Medium brown fine to coarse sand with some fine and medium gravel, trace silt, moist becoming saturated below 5.2 m, compact to dense.										
5												
6												
7												
7.5		Borehole terminated at 7.47 sand with some gravel. **Borehole was straight augered to 4.57 m without sampling. Stratigraphy was inferred from borehole 17-I.**										

BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: 18-I 1 of 1
Hydrogeological Investigations Eldon Landfill Property FOR: County of Victoria		DATE: 26 April 1999 GEOLOGIST BJS ELEVATION 303.1 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	N VALUE	% WATER	% REC	% RQD	N VALUE (15 30 45 60)	WATER CONTENT (%) (10 20 30 40)
0		**FILL** Medium brown fine to coarse sand fill, trace fine and coarse gravel, trace silt, trace refuse, moist, loose to compact.		1		SS	12		75			
1		-black in colour from about 1.5 to 2.1 m.		2		SS	6		40			
2				3		SS	4		50			
2.6				4		SS	27		60			
3.0		**SAND** Grey to dark grey fine sand with some silt, saturated, compact, grading to medium sand below about 2.7 m..		5		SS	12		75			
4		**SANDY SILT** Mottled grey and medium brown very fine sandy silt, saturated, compact. Occasional very thin sand seams.		6		SS	13		90			
4.5				7		SS	8		95			
5		**SILTY CLAY** Grey silty clay with occasional seams of fine sand, saturated, firm.		8		SS	25		60			
5.5		**SAND** Medium brown fine sand, trace silt, saturated, compact.		9		SS	14		75			
6				10		SS	22		50			
7				11		SS	11		50			
8				12		SS	32		50			
9				13		SS	24		40			
10				14		SS	40		70			
11				15		SS	29		100			
11.9				16		SS	8		50			
12		**STONEY SILT TILL** Grey silt, some fine to coarse sand and fine to coarse gravel, saturated, very stiff.		17		SS			0			
12.5		Borehole terminated at 12.50 on assumed bedrock surface.										

Replacement for orginal SSF Location 3 which had been damaged beyond repair. Location 3 was overdrilled and sealed to surface.

BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: 18-II 1 of 1
Hydrogeological Investigations Eldon Landfill Property FOR: County of Victoria		DATE: 27 April 1999 GEOLOGIST BJS ELEVATION 303.1 m ASL

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)
1		**FILL** Medium brown fine to coarse sand fill, trace fine and coarse gravel, trace silt, trace refuse, moist, loose to compact.										
2		-black in colour from about 1.5 to 2.1 m.										
2.6												
3.0		**SAND** Grey to dark grey fine sand with some silt, saturated, compact, grading to medium sand below about 2.7 m..										
3		**SANDY SILT** Mottled grey and medium brown very fine sandy silt, saturated, compact. Occasional very thin sand seams.										
4												
4.6		Borehole terminated at 4.57 m in sandy silt. **Borehole was straight augered to 4.57 m without sampling. Stratigraphy was inferred from borehole 18-I.**										

BOREHOLE LOG

PROJECT: Eldon

BOREHOLE: 19-I 1 of 1

Hydrogeological Investigations
Eldon Landfill Property
FOR: County of Victoria

DATE: 16 November 1999
GEOLOGIST EK
ELEVATION m ASL

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
0.3		**TOPSOIL** Dark brown sandy topsoil, rootlets, moist, loose.		1		SS	8		75			
1		**SAND** Reddish brown to brown fine to medium sand, trace to some silt, moist, loose to compact.		2		SS	7		71			
2		-Medium to coarse sand, trace of fine sand from about 0.8 to 1.4 m.		3		SS	13		67			
		-Grading back to fine to medium sand below about 1.4 m.		4		SS	16		79			
3.0		-Increasing coarse sand content and becoming wet below about 2.2 m.		5		SS	19		83			
4		**SAND WITH GRAVEL** Brown fine to medium gravel, trace fine gravel, saturated, compact.		6		SS	18		0			
		-0.05 m grey silt seam encountered at about 3.5 m.										
		-Increasing frequency of cobbles below about 3.6 m.										
5		-Sand fraction becoming fine to medium grained below about 4.5 m.		7		SS	8		25			
6												
				8		SS	15		0			
6.7		**STONEY SILT TILL** Grey silt, some fine to coarse sand and fine to coarse gravel, saturated, dense.										
7												
				9		SS	60		58			
8												
8.9		Borehole terminated at 8.87 m in stoney till on assumed bedrock.										

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BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: 20-I 1 of 1
Hydrogeological Investigations Eldon Landfill Property FOR: County of Victoria		DATE: 16 November 1999 GEOLOGIST EK ELEVATION m ASL

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
0.2		**TOPSOIL** Brown sandy silt topsoil, moist, loose.		1		SS	5		42			
1		**STONEY SILT TILL** Grey clayey silt, stoney, some fracturing observed with rust staining, moist, very dense.		2		SS			0			
1.6		Borehole terminated at 1.60 m in stoney till on assumed bedrock surface.		3		SS	100/ 0.08m		100			

BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: 21-I 1 of 1
Hydrogeological Investigations Eldon Landfill Property FOR: County of Victoria		DATE: 16 November 1999 GEOLOGIST EK ELEVATION m ASL

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
0.2		**TOPSOIL** Brown sandy silt topsoil, moist, loose.										
1		**STONEY SILT TILL** Grey clayey silt, stoney, some fracturing observed with rust staining, moist, very dense.										
1.6		Borehole terminated at 1.60 m in stoney till on assumed bedrock surface.		1		SS			100			

BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: 22-I 1 of 1
Hydrogeological Investigations Eldon Landfill Property FOR: County of Victoria		DATE: 16 November 1999 GEOLOGIST EK ELEVATION m ASL

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
0.2		**TOPSOIL** Brown sandy silt topsoil, moist, loose.										
1		**STONEY SILT TILL** Grey clayey silt, stoney, some fracturing observed with rust staining, moist, very dense.										
1.7		Borehole terminated at 1.65 m in stoney till on assumed bedrock surface.		1		SS			100			

BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: 23-I 1 of 1
Hydrogeological Investigations Eldon Landfill Property **FOR:** County of Victoria		**DATE:** 16 November 1999 **GEOLOGIST** EK **ELEVATION** m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	N VALUE	% WATER	% REC	% RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
0.2		**TOPSOIL** Brown sandy silt topsoil, moist, loose.										
1		**STONEY SILT TILL** Grey clayey silt, stoney, some fracturing observed with rust staining, moist, very dense.										
1.7		Borehole terminated at 1.65 m in stoney till on assumed bedrock surface.		1		SS			100			

BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: 24-I 1 of 1
Hydrogeological Investigations Eldon Landfill Property **FOR:** County of Victoria		**DATE:** 17 November 1999 **GEOLOGIST** EK **ELEVATION** m ASL

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
0.2		**TOPSOIL** Brown sandy silt topsoil, moist, loose.										
1		**STONEY SILT TILL** Grey clayey silt, stoney, some fracturing observed with rust staining, moist, very dense.		1		GS						
1.5		Borehole terminated at 1.45 m in stoney till on assumed bedrock surface.										

BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: MP1 1 of 1
Hydrogeological Investigations Eldon Landfill Property FOR: County of Victoria		DATE: 20 August 1997 GEOLOGIST BJS ELEVATION 300.6 m ASL

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
1.4		PEAT		1								
		Mini Piezometer terminated at 1.35 m in peat.										

BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: MP2 1 of 1
Hydrogeological Investigations Eldon Landfill Property FOR: County of Victoria		DATE: 20 August 1997 GEOLOGIST BJS ELEVATION 300.9 m ASL

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
0.7		**SANDY SILT** Red brown to greyish brown fine sandy silt, moist becoming wet below about 0.5 m. Mini Piezometer terminated at 0.70 m in sandy silt on assumed bedrock.										

BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: MP3 1 of 1
Hydrogeological Investigations Eldon Landfill Property FOR: County of Victoria		DATE: 20 August 1997 GEOLOGIST BJS ELEVATION m ASL

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
1.2		**PEAT**		1								
		Mini Piezometer terminated at 1.23 m in peat.										

BOREHOLE LOG

PROJECT: Eldon

BOREHOLE: MP4 1 of 1

Hydrogeological Investigations
Eldon Landfill Property
FOR: County of Victoria

DATE: 08 December 1998
GEOLOGIST BJS
ELEVATION 300.4 m ASL

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
0.6		**PEAT** Dark brown to black peat, wood and rootlets, saturated.										
0.9		**MARL** Olive green to grey marl, WTPL.		1								
		SAND Olive green to grey fine sand, some silt, saturated.										
2.1				2								
		Mini Piezometer terminated at 2.12 m in sand.										

Printed: 14 Feb 00

Gartner Lee Limited

BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: 25-I 1 of 1
Hydrogeological Investigations Eldon Landfill Property FOR: County of Victoria		DATE: 26 October 2000 GEOLOGIST TLC ELEVATION m ASL

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
1.0	1	**ROAD BASE FILL** Brown fine to medium sand fill, trace silt and fine gravel, occasional cobbles, moist, loose.		1		GS						
		SILTY SAND TO SANDY SILT Grey silty fine sand to sandy silt, wet, loose.		2		SS	7		17			
2.3	2			3		SS	9		8			
	3	-Evidence of peat at upper contact. -Silt content increasing with depth and becoming a grey silt with trace sand, saturated, below about 1.5 m.		4		SS	8		79			
3.9				5		SS	15		67			
	4	**CLAYEY SILT TO SILTY CLAY** Grey clayey silt to silty clay, saturated, soft.		6		SS	15		63			
5.1	5	-0.05 m medium sand seam with some coarse sand observed at 3.0 m. -Becoming grey silt with some clay seams below about 3.1 m, then begins to grade into sandy silt to silty fine below about 3.6 m.		7		SS	5		58			
	6			8		SS	5		100			
		FINE TO MEDIUM SAND Brownish grey fine to medium sand (clean), saturated, compact.		10		SS	14		100			
	7	-Gradational becoming finer with depth below about 4.7 m.										
	8	**FINE SAND** Brownish grey to grey very fine sand to fine sand (gradational), saturated, compact to dense.		11		SS	42		100			
	9			12		SS	39		63			
9.8		-Gradational coarse sand to medium sand to fine sand below about 9.1 m.										
	10	**WEATHERED LIMESTONE**										
10.7		Upper 0.3 m assumed to be weathered limestone/Till complex. Borehole terminated at 10.67 m in weathered limestone.		13		Spoon Bouncing						

BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: 25-II 1 of 1
Hydrogeological Investigations Eldon Landfill Property FOR: County of Victoria		DATE: 27 October 2000 GEOLOGIST TLC ELEVATION m ASL

DEPTH (m)		STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	N VALUE	% WATER	% REC	% RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
1.0	1		**ROAD BASE FILL** Brown fine to medium sand fill, trace silt and fine gravel, occasional cobbles, moist, loose.										
			SILTY SAND TO SANDY SILT Grey silty fine sand to sandy silt, wet, loose.										
2.3	2		-Evidence of peat at upper contact. -Silt content increasing with depth and becoming a grey silt with trace sand, saturated, below about 1.5 m.										
	3												
3.9	4		**CLAYEY SILT TO SILTY CLAY** Grey clayey silt to silty clay, saturated, soft.										
4.6			-0.05 m medium sand seam with some coarse sand observed at 3.0 m. -Becoming grey silt with some clay seams below about 3.1 m, then begins to grade into sandy silt to silty fine below about 3.6 m.										
			FINE TO MEDIUM SAND Brownish grey fine to medium sand (clean), saturated, compact.										
			Borehole terminated at 4.57 m in fine to medium sand.										
			Stratigraphy inferred from adjacent borehole 25-I.										

BOREHOLE LOG	PROJECT: Eldon	BOREHOLE: 25-III 1 of 1
Hydrogeological Investigations Eldon Landfill Property FOR: County of Victoria		DATE: 27 October 2000 GEOLOGIST TLC ELEVATION m ASL

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
1.0		**ROAD BASE FILL** Brown fine to medium sand fill, trace silt and fine gravel, occasional cobbles, moist, loose.										
2.3		**SILTY SAND TO SANDY SILT** Grey silty fine sand to sandy silt, wet, loose.										
3.4		-Evidence of peat at upper contact. -Silt content increasing with depth and becoming a grey silt with trace sand, saturated, below about 1.5 m.										
		CLAYEY SILT TO SILTY CLAY Grey clayey silt to silty clay, saturated, soft. Borehole terminated at 3.35 m in clayey silt to silty clay.										
		Stratigraphy inferred from adjacent borehole 25-I.										

MONITOR CONSTRUCTION DETAILS
GEOLOGICAL/HYDROGEOLOGICAL INVESTIGATION
ELDON LANDILL PROPERTY

Borehole Details			Monitor Details					Monitor Construction			
No.	Diameter (mm)	Ground Elevation (mASL)	No.	Type of Monitor	Diameter (mm)	MONITOR STICK UP (m)	Elevation of Top of Monitor (mASL)	Depth Interval of Screen (m)	Depth Interval of Filter Pack (m)	Depth Interval of Borehole Seal (m)	Depth Interval of Native / Backfill (m)
GL 7	200	306.41	I	S	51	0.93	307.34	7.08 - 4.03	7.08 - 3.30	3.30 - 3.02 0.90 - 0.00	3.02 - 0.90
GL 8	200	305.19	I	S	51	0.75	305.94	6.12 - 3.07	6.12 - 2.74	2.74 - 2.29 0.61 - 0.00	2.29 - 0.61
GL 9	200	300.54	I	S	51	0.71	301.25	2.30 - 0.78	2.30 - 0.61	0.61 - 0.00	
GL 10	96	305.06	I	S	51	0.79	305.85	7.87 - 1.77	7.87 - 1.22	1.22 - 0.00	
GL 11	96	306.45	I	P	51	0.73	307.18	10.85 - 9.32	10.85 - 9.14	9.14 - 0.00	
GL 11	200	306.45	II	S	51	0.76	307.21	6.05 - 3.00	6.05 - 2.77	2.77 - 2.33 0.30 - 0.00	2.33 - 0.30
GL 12	200	306.07	I	S	51	0.78	306.85	6.22 - 3.17	6.22 - 2.74	2.74 - 2.34 0.51 - 0.00	2.34 - 0.51
GL 13	96	301.88	I	P	51	0.85	302.73	13.43 - 11.91	13.43 - 11.58	11.58 - 0.00	
GL 13	200	302.14	II	S	51	0.77	302.91	4.65 - 1.60	4.65 - 1.24	1.24 - 0.00	
GL 14	96	307.04	I	P	51	0.71	307.75	18.85 - 17.33	18.85 - 17.07	17.07 - 5.18 0.61 - 0.00	5.18 - 0.61
GL 14	200	307.11	II	P	51	0.61	307.72	13.11 - 11.28	13.11 - 10.06	10.06 - 9.60 5.18 - 4.27 0.91 - 0.00	9.60 - 5.18 4.27 - 0.91
GL 14	200	307.13	III	S	51	0.66	307.79	7.62 - 4.57	7.62 - 4.27	4.27 - 3.76 0.61 - 0.00	3.76 - 0.16
GL 15	96	307.01	I	P	51	0.66	307.67	16.69 - 15.16 6.22 - 3.17	16.69 - 14.94 6.22 - 2.74	14.94 - 14.33 4.47 - 3.81 0.91 - 0.00	14.33 - 4.47 3.81 - 0.91
GL 15	200	307.15	II	P	51	0.73	307.88	12.12 - 10.59	12.12 - 9.75	9.75 - 9.45 4.27 - 3.66 0.91 - 0.00	9.45 - 4.27 3.66 - 0.91
GL 15	200	307.08	III	S	51	0.75	307.83	8.23 - 5.18	8.23 - 4.88	4.88 - 3.66 0.91 - 0.00	3.66 - 0.91
GL 16	96	306.52	I	P	51	0.77	307.29	11.25 - 9.73	11.25 - 9.45	9.45 - 8.84 0.91 - 0.00	8.84 - 0.91
GL 16	200	306.58	II	S	51	0.75	307.33	7.62 - 4.57	7.62 - 4.27	4.27 - 3.66 0.91 - 0.00	3.66 - 0.91
GL 17	200	306.31	I	P	51	0.73	307.04	12.65 - 11.13	12.80 - 10.67	10.67 - 0.00	13.95 - 12.80
GL 17	200	306.25	II	S	51	0.78	307.03	7.32 - 4.27	7.47 - 3.96	3.96 - 3.35 0.61 - 0.00	3.35 - 0.61
GL 18	200	303.11	I	P	51	0.76	303.87	11.74 - 10.22	11.89 - 9.75	9.75 - 0.00	12.50 - 11.89
GL 18	200	303.11	II	S	51	0.71	303.82	4.42 - 1.32	4.57 - 1.07	1.07 - 0.00	
GL 19	200	303.69	I	S	51	0.81	304.50	7.47 - 4.47	7.62 - 3.61	3.61 - 0.31	8.87 - 7.62 0.31 - 0.00
GL 25	200	300.79		P	51	0.9	301.69	9.75 - 8.23	8.23 - 7.62	7.62 - 0.00	10.67 - 9.75
GL 25	200	300.79		P	51	1.15	301.94	4.57 - 3.81	3.81 - 3.51	3.51 - 0.00	
GL 25	200	300.79		S	51	1.1	301.89	3.35 - 0.30		0.30 - 0.00	
MP 1	80	300.56		S	31	0.51	301.07	1.35 - 1.04			
MP 2	80	300.91		S	31	2.09	303.00	0.69 - 0.38			
MP 3	80	301.07		S	31	0.61	301.68	1.23 - 0.92			
MP 4	80	300.44		S	31	0.66	301.10	2.12 - 1.68			

DRILL HOLE # Eldon Landfill MW1a (deep) (29-I)

Date Drilled: Dec. 19, 2007
Rig: CME 55N
Contractor: Aardvark Drilling Inc.
Hammer Type: cathead

Location: Eldon Landfill
Elevation:
Co-ord: 658759 E, 4934175 N

Project No. 07-0384-00
Project: Kawartha Lakes
Client: City fo Kawartha Lakes

Depth (m)	Sample Type	Recovery	Number	Blows/0.15 m	Symbols	SOIL DESCRIPTION	Elevation	Depth
0						Ground Surface	0	0
						PEAT		
							-4	4
1						*SILTY SAND*		
2	SS	1		5				
							-10	10
3	SS	2		9		*SANDY SILT* grey, saturated		
4								
5								
6							-20	20
	SS	3		28		*SAND* saturated, some silt seams		
7							-25	25
8	SS	4		>50		*SANDY SILT TILL*		
							-28	28
	SS	5		>50		*BEDROCK*		
9								
10								
11								
12								
13								

Well Installation: Concrete; Raised Steel Casing, padlocked; Bentonite; #2 Silica Sand; 2" Slot 10 Screen

Moisture Content %
Wp |---X---| Wl
10 30 50 70 90

Pocket Penetrometer
kPa
100 200 300 400

SPT (N)
Blows/ft
10 20 30 40

Note: This borehole log has been prepared for geotechnical purposes and does not necessarily contain information suitable for an environmental assessment of the subsurface conditions.

Aardvark Drilling Inc.
25-C Lewis Road
Guelph, Ontario

DRILL HOLE # Eldon Landfill MW1b (29-II)

Date Drilled: Dec. 13, 2007
Rig: CME 55N
Contractor: Aardvark Drilling Inc.
Hammer Type: cathead

Location: Eldon Landfill
Elevation:
Co-ord: 658759 E, 4934175 N

Project No. 07-0384-00
Project: Kawartha Lakes
Client: City fo Kawartha Lakes

Depth (m)	Sample Type	Recovery	Number	Blows/0.15 m	Symbols	SOIL DESCRIPTION	Elevation	Depth	Well Installation
						Ground Surface	0	0	
						PEAT			Concrete
							-4	4	
						SILTY SAND			Raised Steel Casing, padlocked
							-10	10	
						SANDY SILT grey, saturated			Bentonite
							-20	20	
						SAND saturated, some silt seams			#2 Silca Sand
							-25	25	2" Slot 10 Screen
						SANDY SILT TILL			

Moisture Content %
Wp |—X—| Wl
10 30 50 70 90

Pocket Penetrometer
kPa
100 200 300 400

SPT (N)
Blows/ft
10 20 30 40

Note: This borehole log has been prepared for geotechnical purposes and does not necessarily contain information suitable for an environmental assessment of the subsurface conditions.

Aardvark Drilling Inc.
25-C Lewis Road
Guelph, Ontario

DRILL HOLE # Eldon Landfill MW1c (shallow) (29-III)

Date Drilled: Dec. 19, 2007
Rig: CME 55N
Contractor: Aardvark Drilling Inc.
Hammer Type: cathead

Location: Eldon Landfill
Elevation:
Co-ord: 658759 E, 4934175 N

Project No. 07-0384-00
Project: Kawartha Lakes
Client: City fo Kawartha Lakes

Depth (m)	Sample Type	Recovery	Number	Blows/0.15 m	Symbols	SOIL DESCRIPTION	Well Installation	Moisture Content % Wp |----X----| Wl 10 30 50 70 90	Pocket Penetrometer kPa 100 200 300 400 / SPT (N) Blows/ft 10 20 30 40
0						Ground Surface 0	Concrete		
						PEAT 0	Bentonite; Raised Steel Casing, padlocked		
1						-4			
						SILTY SAND 4	#2 Silca Sand		
2									
3						-10	2" Slot 10 Screen		
						SANDY SILT 10 grey, saturated			
4									

Note: This borehole log has been prepared for geotechnical purposes and does not necessarily contain information suitable for an environmental assessment of the subsurface conditions.

Aardvark Drilling Inc.
25-C Lewis Road
Guelph, Ontario

DRILL HOLE # Eldon Landfill MW 2 (shallow) (30-I)

Date Drilled: Dec. 19, 2007
Rig: CME 55N
Contractor: Aardvark Drilling Inc.
Hammer Type: cathead

Location: Eldon Landfill
Elevation:
Co-ord: 658759 E, 4934175 N

Project No. 07-0384-00
Project: Kawartha Lakes
Client: City fo Kawartha Lakes

Depth (m)	Sample Type	Recovery	Number	Blows/0.15 m	Symbols	SOIL DESCRIPTION		Well Installation	Moisture Content % Wp |—X—| Wl 10 30 50 70 90	Pocket Penetrometer ● kPa ● 100 200 300 400 / SPT (N) ■ Blows/ft ■ 10 20 30 40
0						Ground Surface	0	Concrete		
						PEAT	0			
								Bentonite		
1								Raised Steel Casing, padlocked		
						SILTY SAND	-4 4			
								#2 Silica Sand		
2										
3								2" Slot 10 Screen		
							-10			
						SANDY SILT grey, saturated	10			
4										

Note: This borehole log has been prepared for geotechnical purposes and does not necessarily contain information suitable for an environmental assessment of the subsurface conditions.

Aardvark Drilling Inc.
25-C Lewis Road
Guelph, Ontario

DRILL HOLE # Eldon Landfill MW 3 (shallow) (31-I)

Date Drilled: Dec. 19, 2007
Rig: CME 55N
Contractor: Aardvark Drilling Inc.
Hammer Type: cathead

Location: Eldon Landfill
Elevation:
Co-ord: 658759 E; 4934175 N

Project No. 07-0384-00
Project: Kawartha Lakes
Client: City fo Kawartha Lakes

Depth (m)	Sample Type	Recovery	Number	Blows/0.15 m	Symbols	SOIL DESCRIPTION	Well Installation	Moisture Content % Wp X Wl (10 30 50 70 90)	Pocket Penetrometer ♦ kPa ♦ (100 200 300 400) / SPT (N) ■ Blows/ft ■ (10 20 30 40)
0						Ground Surface 0	Concrete		
						PEAT 0			
						-4	Bentonite; Raised Steel Casing, padlocked		
1						*SILTY SAND* 4			
							#2 Silica Sand		
2									
						-10			
3						*SANDY SILT* 10 grey, saturated	2" Slot 10 Screen		
4									

Note: This borehole log has been prepared for geotechnical purposes and does not necessarily contain information suitable for an environmental assessment of the subsurface conditions.

Aardvark Drilling Inc.
25-C Lewis Road
Guelph, Ontario

MW 26

Ontario Ministry of the Environment

Well Tag Number: A 033850

A033850

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 Management Coordinator at 416-235-6203.
- All metre measurements shall be reported to 1/10th of a metre.
- Please print clearly in blue or black ink only.

Ministry Use Only: MUN | CON | LOT

Well Owner's Information and Location of Well Information

Field	Value
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)	705-878-1282
Address of Well Location (County/District/Municipality)	FLOOD LANDFILL VICTORIA CTY
Township	
Lot	
Concession	
RR#/Street Number/Name	311 ROCKVIEW RD.
City/Town/Village	
Site/Compartment/Block/Tract etc.	
GPS Reading NAD	83
Zone	17
Easting	659024
Northing	4913313
Unit Make/Model	
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
BLACK	PEAT			0	1.25
GREY	SAND	SILT		1.25	2
GREY	CLAY	SILT	CLAYEY SILT	2	3.75
BROWN	FINE SAND	SILT		3.75	7
GREY	SILT	SAND STONES	STONEY SILT TILL	7	8
GREY	LIMESTONE	SHALE	FRACTURED SHALEY LIMESTONE	8	14.6

Hole Diameter

Depth (Metres) From	To	Diameter Centimetres
0	8.2	20
8.2	14.6	10.2

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				
5	☐ Steel ☐ Fibreglass ☑ Plastic ☐ Concrete ☐ Galvanized	.4	7.75	11.6
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen (Outside diam)		Slot No.		
6.1	☐ Steel ☐ Fibreglass ☑ Plastic ☐ Concrete ☐ Galvanized	010	11.6	14.6
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	11	BENTONITE	
11	14.6	SAND	

Method of Construction

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

Water Use

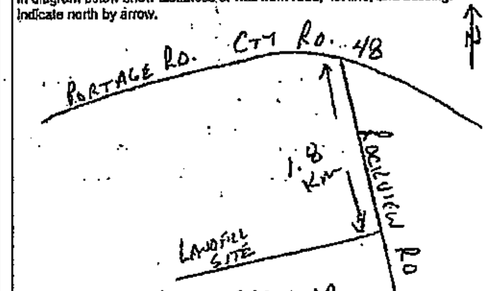
☐ Domestic ☐ Industrial ☐ Public Supply ☑ Other MONITORING
☐ Stock ☐ Commercial ☐ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

Final Status of Well

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

Location of Well

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



SEE ATTACHED MAP

Audit No. Z 37101

Date Well Completed (YYYY MM DD): 05 12 16

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

Date Delivered (YYYY MM DD):

Well Contractor/Technician Information

Field	Value
Name of Well Contractor	ALL-TERRAIN DRILLING LIMITED
Well Contractor's Licence No.	1129
Business Address (street name, number, city etc.)	3-661 COLBY DR. WATERLOO ONT N2V1C2
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)	06 01 27

Ministry Use Only

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

0506E (09/03) Contractor's Copy ☐ Ministry's Copy ☐ Well Owner's Copy ☑

Cette formule est disponible en français

MW 27-II

Ontario Ministry of the Environment

Well Record

Regulation 903 Ontario Water Resources Act

Well A 033849 (number below)

A033849

page 1 of 1

Instructions for Completing Form

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- **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	Mailing Address (Street Number/Name, RR, Lot, Concession)
CITY OF KAWARTHA	LAKES	50 WOLFE ST

County/District/Municipality	Township/City/Town/Village	Province	Postal Code	Telephone Number (include area code)
	LINDSAY	Ontario	K9V 2J2	705-878-1282

Address of Well Location (County/District/Municipality)	Township	Lot	Concession
ELDON LANDFILL VICTORIA CTY			

RR#/Street Number/Name	City/Town/Village	Site/Compartment/Block/Tract etc.
311 ROCKVIEW RD		

GPS Reading	NAD	Zone	Easting	Northing	Unit Make/Model	Mode of Operation
	83	17	658894	4934096	MAGELLAN	☐ Undifferentiated ☐ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Depth To
BLACK	PEAT			0	.3
BROWN	FINE SAND	SILT	SILTY FINE SAND	.3	1.2
BROWN	MED. SAND	SILT	SILTY MEDIUM SAND	1.2	4
GREY	LIMESTONE	SHALE	SHALEY LIMESTONE	4	16.3
	NESTED LOCATION - SECOND W/ 5 FT		WELL INSTALLED AT 4m SCREEN		

Hole Diameter

Depth From	Depth To (Metres)	Diameter (Centimetres)
0	4	20
4	16.3	10.2

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	Well thickness centimetres	Depth From	Depth To (Metres)
Casing				
5	☐ Steel ☐ Fibreglass ☑ Plastic ☐ Concrete ☐ Galvanized	.4	+.75m	13.3
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam 6.1	☐ Steel ☐ Fibreglass ☑ Plastic ☐ Concrete ☐ Galvanized	Slot No. .010	13.3	16.3
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	
If flowing give rate - (litres/min)	15		15	
If pumping discontinued, give reason.	20		20	
	25		25	
	30		30	
	40		40	
	50		50	
	60		60	

Plugging and Sealing Record

☑ Annular space ☐ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	12.5	BENTONITE	
12.5	16.3	SAND	

Method of Construction

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

Water Use

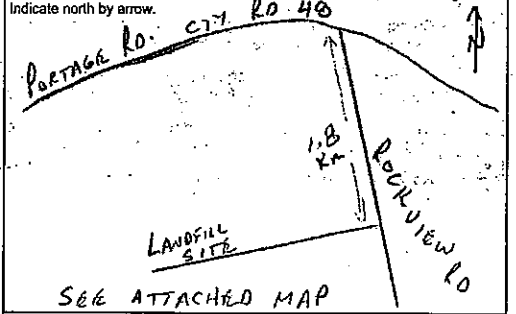
☐ Domestic ☐ Industrial ☐ Public Supply ☑ Other MONITORING
☐ Stock ☐ Commercial ☐ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

Final Status of Well

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

Location of Well

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



SEE ATTACHED MAP

Audit No. Z 37100

Date Well Completed YYYY MM DD: 05 12 14

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

Date Delivered YYYY MM DD

Well Contractor/Technician Information

Name of Well Contractor	Well Contractor's Licence No.
ALL-TERRAIN DRILLING LIMITED	1129

Business Address (street name, number, city etc.): 3-661 COLBY DR. WATERLOO ONT. N2V1C2

Name of Well Technician (last name, first name)	Well Technician's Licence No.
GRANT, DON / POLLICE MIKE	268

Signature of Technician/Contractor: X

Date Submitted YYYY MM DD: 06 01 29

Ministry Use Only

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

0506E (09/03) Contractor's Copy ☐ Ministry's Copy ☐ Well Owner's Copy ☑ *Cette formule est disponible en français*

MW. 28

Ontario | Ministry of the Environment

Well Tag A 033848 (place number below)

A033848

Well Record

Regulation 903 Ontario Water Resources Act

page 1 of 1

Instructions for Completing Form

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- Questions regarding completing this application can be directed to the Water Well Management Coordinator at 416-235-6203.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only: MUN | CON | LOT

Well Owner's Information and Location of Well Information

Field	Value
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)	705-878-1282
Address of Well Location (County/District/Municipality)	ELDON LANDFILL VICTORIA CTY
Township	
Lot	
Concession	
RR#/Street Number/Name	311 ROCKVIEW RD.
City/Town/Village	
Site/Compartment/Block/Tract etc.	
GPS Reading NAD	83
Zone	17
Easting	659291
Northing	4934266
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
BROWN	TOPSOIL			0	.3
BROWN	SAND	SILT	FINE TO COARSE SAND	.3	4.3
GREY	LIMESTONE	SHALE, CLAY	SHALEY LIMESTONE	4.3	7.8

Hole Diameter

Depth Metres From	Depth Metres To	Diameter Centimetres
0	4.5	20
4.5	7.8	10.2

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	☐ Steel ☐ Fibreglass ☑ Plastic ☐ Concrete ☐ Galvanized	.4	+.75	6.3
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen (Outside diam)		Slot No.		
6.1	☐ Steel ☐ Fibreglass ☑ Plastic ☐ Concrete ☐ Galvanized	.010	6.3	7.8
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	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	5.8	BENTONITE	
5.8	7.8	SAND	

Method of Construction

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

Water Use

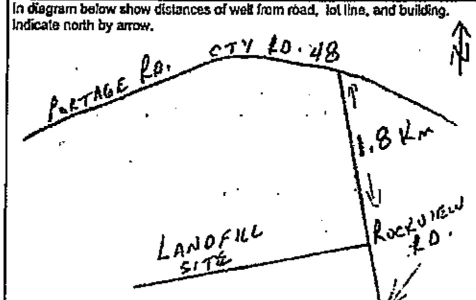
☐ Domestic ☐ Industrial ☐ Public Supply ☑ Other MONITORING ☐ Stock ☐ Commercial ☐ Not used ☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

Final Status of Well

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

Location of Well

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



SEE ATTACHED MAP

Audit No. Z 37099

Date Well Completed (YYYY MM DD): 05 12 07

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

Date Delivered (YYYY MM DD):

Well Contractor/Technician Information

Field	Value
Name of Well Contractor	ALL-TERRAIN DRILLING LIMITED
Well Contractor's Licence No.	1129
Business Address (street name, number, city etc.)	3-661 COLBY DR. WATERLOO ONT. 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 [signature]
Date Submitted (YYYY MM DD)	06 01 27

Ministry Use Only

Field	Value
Data Source	
Contractor	
Date Received	
Date of Inspection	
Remarks	
Well Record Number	

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Ontario Ministry of the Environment

Well Tag Number (Place sticker and print number below): ABANDONMENT NOT TAGGED - SSFC 5

Well Record
Regulation 903 Ontario Water Resources Act

page 1 of 1

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Ministry Use Only
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Well Owner's Information and Location of Well Information

First Name	Last Name	Mailing Address (Street Number/Name, RR, Lot, Concession)
CITY OF KAWARTHA LAKES		50 WOLFE ST.

County/District/Municipality	Township/City/Town/Village	Province	Postal Code	Telephone Number (include area code)
	LINDSAY	Ontario	K9V2T2	705-878-1282

Address of Well Location (County/District/Municipality)	Township	Lot	Concession
ELDON LANDFILL VICTORIA CTY			

RR#/Street Number/Name	City/Town/Village	Site/Compartment/Block/Tract etc.
311 ROCKVIEW RD.		

GPS Reading	NAD	Zone	Easting	Northing	Unit Make/Model	Mode of Operation
	83	17	659024	4931433 39	MACKELLAR	☐ Undifferentiated ☐ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Depth To (Metres)
	WITHIN 15 FT. OF NEW WELL TAG # A033850		2" ABS PLASTIC		
	MONITORING WELLS (1-4FT, 1-10FT) WERE PULLED				
	THE 4 FT HOLE WAS FILLED WITH BENTONITE. THE 10 FT				
	HOLE WAS OVERDRILLED WITH 4.25" I.D. HSA. (9" HOLE)				
	AND THE HOLE WAS FILLED WITH BENTONITE				

Hole Diameter

Depth From	Depth To (Metres)	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 From	Depth To (Metres)
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)	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	
If flowing give rate - (litres/min)	15		15	
If pumping discontinued, give reason.	20		20	
	25		25	
	30		30	
	40		40	
	50		50	
	60		60	

Plugging and Sealing Record

☐ Annular space ☒ Abandonment

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

Method of Construction

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

Water Use

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

Final Status of Well

☐ Water Supply ☐ Recharge well ☐ Unfinished ☒ Abandoned, (Other)
☐ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
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Location of Well

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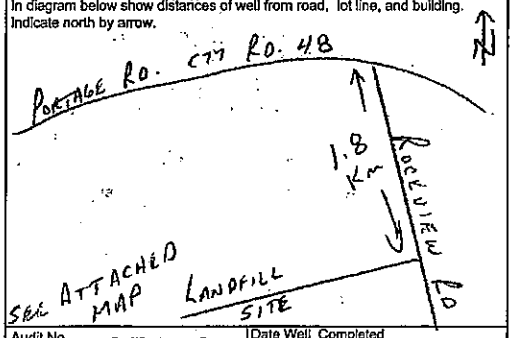


Audit No. Z 37102

Date Well Completed: 05 12 16 (YYYY MM DD)

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

Date Delivered (YYYY MM DD)

Well Contractor/Technician Information

Name of Well Contractor	Well Contractor's Licence No.
ALL TERRAIN DRILLING LIMITED	1129

Business Address (street name, number, city etc.): 3-661 COLBY DR. WATERLOO ONT N2V1C2

Name of Well Technician (last name, first name)	Well Technician's Licence No.
GRANT DON / POLLICE MIKE	2688

Signature of Technician/Contractor: X

Date Submitted (YYYY MM DD): 06 01 27

Ministry Use Only

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

0506E (09/03) Contractor's Copy ☐ Ministry's Copy ☐ Well Owner's Copy ☒ *Cette formule est disponible en français*

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

Log of Borehole: MW 33-I

Client: City of Kawartha Lakes
Project Name: Monitoring Well Installation
Project No.: 5210-001
Contractor: Canadian Environmental Drilling
Method: 8' Hollow Stem and 4.5' Air Hammer
Date Completed: September 6, 2016
Location: Eldon WDS
UTM: -
Elevation: -

SUBSURFACE PROFILE			SAMPLE					
Depth (ft) / (m)	Lithology	Description	Number	Type	% Recovery	SPT (n)/RQD	Well Installation	Remarks
-5 / -1								
0 / 0		Native Soil: Peat topsoil and boulders/cobbles	1	SS	33	7	J-Plug	Well installed with lockable casing and sample tubing
1			2	SS	42	9	Concrete	
5 / 2		Fine Sand: Brown, fine sand with trace silt, moist, soft.	3	SS	71	9		
			4	SS	79	10		
10 / 3		Silt: Grey silt with some fine sand and clay Dry to moist from 0.76 mBGS to 3.05 mBGS Moist to saturated from3.05 mBGS to 6.10 mBGS Some red staining between 0.76 mBGS and 1.37 mBGS Soft to firm	5	SS	100	4		
4								
15 / 5			6	SS	100	14		
20 / 6			-	SS	0	9	0.038 m diameter PVC standpipe	
7							Bentonite Chips	
25 / 8		Sand: Grey fine to medium sand, saturated, loose	7	SS	100	32		
30 / 9			8	SS	100	8		Water level= 8.55 mBGS (9.43 mTOP)
10								
35 / 11			9	SS	100	11		
12								
40								
13 / 45		Limestone: Limestone Bedrock encountered at 12.5 mBGS						
14								
		Borehole terminated at 15.85 mBGS in Limestone Bedrock						
50 / 15							Well Screen Sand	
16							0.038 m diameter, 3.05 m long PVC screen	Well depth = 15.42 mBGS (16.31 mTOP)
55								

Logged By: Cameron M.
Input By: Matt C.

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

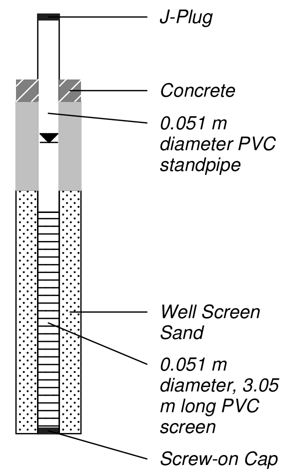
Log of Borehole: MW 33-II

Client: City of Kawartha Lakes | **Project Name:** Monitoring Well Installation | **Project No.:** 5210-001

Contractor: Canadian Environmental Drilling | **Method:** 8' Hollow Stem and 4.5' Air Hammer | **Date Completed:** September 6, 2016

Location: Eldon WDS | **UTM:** - | **Elevation:** -

SUBSURFACE PROFILE		SAMPLE					
Depth (ft) (m)	Description	Number	Type	% Recovery	SPT (n)/RQD	Well Installation	Remarks
0 – 0.05 m	Native Soil: Peat topsoil and boulders/cobbles	1	SS	33	7		Well installed with lockable casing and sample tubing
	Fine Sand: Brown, fine sand with trace silt, moist, soft.	2	SS	42	9		Water level= 0.87 mBGS (1.77 mTOP) on Sept 7, 2016
	Silt: Grey silt with some fine sand and clay Dry to moist from 0.76 mBGS to 3.05 mBGS Moist to saturated from3.05 mBGS to 6.10 mBGS Some red staining between 0.76 mBGS and 1.37 mBGS Soft to firm	3	SS	71	9		Well depth = 4.88 mBGS (5.79 mTOP)
		4	SS	79	10		
		5	SS	100	4		
		6	SS	100	14		
	Borehole terminated at 4.88 mBGS in silt						



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

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

Log of Borehole: MW 34-I

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

SUBSURFACE PROFILE			SAMPLE					
Depth (ft) (m)	Lithology	Description	Number	Type	% Recovery	SPT (n)/RQD	Well Installation	Remarks
-5 / -1							J-Plug	
0 / 0		Native Soil: Organics	1	SS	62.5		Concrete	Well installed with lockable casing and sample tubing
		Silty Sand: Brown silty fine sand, moist to saturated, soft to firm					0.038 m diameter PVC standpipe	Water level= 0.19 mBGS (1.15 mTOP) on Sept 7, 2016
1 / 1			2	SS	25		Bentonite Chips	
5 / 2		Sand and Silt: Grey fine sand and silt, moist, soft						
		Limestone: Limestone Bedrock encountered at 1.07 mBGS						
10 / 3							Well Screen Sand	
4							0.038 m diameter, 3.05 m long PVC screen	
15 / 5		Borehole terminated at 5.49 mBGS in Limestone Bedrock						Well depth = 5.18 mBGS (6.62 mTOP)
20 / 6							Screw-on Cap	

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

MW-35

BOREHOLE NO. BH18-1

PROJECT NAME: CITY OF KAWARTHA LAKES - ELDON LANDFILL
PROJECT NO.: 171-00763-00
CLIENT: CITY OF KAWARTHA LAKES
DATE COMPLETED: Feb 05, 2018
BOREHOLE TYPE: DIRECT PUSH/ 210 mm HOLLOW STEM AUGER
SUPERVISOR: TB
GROUND ELEVATION: NOT SURVEYED
REVIEWER: JSA

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
0.0	**PEAT:** Black fiberous PEAT, some sand, some silt, wet to saturated			DP1							Monitoring well installed with 50 mm inner diameter, schedule 40 PVC risers, with a 1.53 m length No. 10 screen size well screen. Groundwater level measured at 0.4 m below ground surface in monitoring well on completion of well installation.
0.8	**CLAYEY SAND:** Grey CLAYEY SAND, some silt, WTPL			DP2							
2.4	Borehole terminated at 2.4 m below ground surface in CLAYEY SAND.										

WSP GEOLOGIC (METRIC) ELDON BOREHOLE LOGS.GPJ JAGGER HIMS BASIC.GDT 2/6/18

MW-36

BOREHOLE NO. BH18-2

PROJECT NAME: CITY OF KAWARTHA LAKES - ELDON LANDFILL

PROJECT NO.: 171-00763-00

CLIENT: CITY OF KAWARTHA LAKES

DATE COMPLETED: Feb 05, 2018

BOREHOLE TYPE: DIRECT PUSH/ 210 mm HOLLOW STEM AUGER

SUPERVISOR: TB

GROUND ELEVATION: NOT SURVEYED

REVIEWER: JSA

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
0.0	**PEAT:** Black fiberous PEAT, some sand, some silt, wet to saturated			DP1							Monitoring well installed with 50 mm inner diameter, schedule 40 PVC risers, with a 1.53 m length No. 10 screen size well screen. Groundwater level measured at 0.1 m below ground surface in monitoring well on completion of well installation.
0.9	**CLAYEY SAND:** Grey CLAYEY SAND, some silt, WTPL			DP2							
2.6	Borehole terminated at 2.6 m below ground surface in CLAYEY SAND.										

WSP GEOLOGIC (METRIC) ELDON BOREHOLE LOGS.GPJ JAGGER HIMS BASIC.GDT 2/6/18

MW-37

BOREHOLE NO. BH18-3

PROJECT NAME: CITY OF KAWARTHA LAKES - ELDON LANDFILL
PROJECT NO.: 171-00763-00
CLIENT: CITY OF KAWARTHA LAKES
DATE COMPLETED: Feb 05, 2018
BOREHOLE TYPE: DIRECT PUSH/ 210 mm HOLLOW STEM AUGER
SUPERVISOR: TB
GROUND ELEVATION: NOT SURVEYED
REVIEWER: JSA

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
0.0	**TOPSOIL:** Black silty sand TOPSOIL, some organics (rootlets, fiberous, woody), wet										Monitoring well installed with 50 mm inner diameter, schedule 40 PVC risers, with a 1.53 m length No. 10 screen size well screen.
0.4	**CLAYEY SAND:** Brown to grey CLAYEY SAND, some silt, WTPL			DP1							
1.0											Groundwater level measured at 1.4 m below ground surface in monitoring well on completion of well installation.
2.0				DP2							
2.3	Borehole terminated at 2.3 m below ground surface in CLAYEY SAND.										
3.0											
4.0											

WSP GEOLOGIC (METRIC) ELDON BOREHOLE LOGS.GPJ JAGGER HIMS BASIC.GDT 2/6/18

Log of Borehole MW201

Project No. MRK-00256269-A0 | Drawing No. 8

Project: City of Kawartha Landfill Sites | Sheet No. 1 of 1

Location: Various Landfill Sites, Kawartha Lakes

Eldon Landfill

Date Drilled: October 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		

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
			267.69	0
		Brown silty sand **TOPSOIL**, some rootlets, moist, no odour, no staining.	~267.4	
		Brown sandy **SILT**, trace gravel, moist, no odour, no staining.		1
			~266.2	2
		Brown **SAND**, some gravel and cobbles, wet, no odour, no staining.		
			~264.5	3
		LIMESTONE BEDROCK	~264.2	
		End of Test hole at 3.51 mbgs.		4
				5
				6
				7
				8
				9
				10
				11
				12

N Value: 20 40 60 — 3 inches

Combustible Vapour Reading (ppm): 25 50 75

SAMPLES	% RECOV	SAMPLE ID	ANALYSIS
	60	SS1	
	20	SS2	
	80	SS3	
	60	SS4	
	20	SS5	

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)

APPENDIX G

ECA and MECP Communications

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDED PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A321004
Issue Date: September 28, 2011

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

Site Location: Eldon Waste Disposal Site
311 Rockview Road, RR 3 Rd Lot 26, Part 32, 33, Concession 6, South of Portage Road
Kawartha Lakes City,
K0M 2B0

You have applied in accordance with Section 27 of the Environmental Protection Act for approval of:

the use and operation of 8.1 hectare waste disposal/transfer/composting site within a total site area of 59.8 hectares.

This Certificate revokes all Terms and Conditions on Provisional Certificate of Approval No. A321004 , which was issued to the Township of Eldon on February 21, 1980, and subsequent notices of amendment issued to the Corporation of the City of Kawartha Lakes.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

"*Certificate* " means this entire provisional Certificate of Approval document, issued in accordance with section 39 of the *EPA,* and includes any schedules to it, the application and the supporting documentation listed in Schedule "A";

"Contaminating Life Span" means,

(a) in respect of a landfilling site, the period of time during which the site will produce contaminants at concentrations that could have an unacceptable impact if they were to be discharged from the site, and

(b) in respect of a landfilling site and a contaminant or group of contaminants, the period of time during which the site will produce the contaminant or a contaminant in the group at concentrations that could have an unacceptable impact if they were to be discharged from the site;

"Compost" means the material produced by an aerobic Composting of leaf and yard waste and which has been tested to show compliance with the Compost Quality Criteria set out in Schedule "B" of this *Certificate* and can be used as a soil additive or for other similar uses on an unrestricted basis;

"Composting" means an aerobic biological process, conducted under controlled engineered conditions, designed to decompose and stabilize organic matter. Simple exposure of solid organic waste under non-engineered conditions resulting in uncontrolled decay is not considered composting;

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

"District Manager" means the District Manager of the local district office of the *Ministry* in which the *Site* is geographically located;

"EPA " means *Environmental Protection Act* , R.S.O. 1990, c. E. 19, as amended;

"Finished Compost" means leaf and yard waste that has been Composted and fully cured and is considered ready for sampling and testing for compliance with the Compost Quality Criteria. Finished Compost is considered a waste until testing for the Compost Quality Criteria is completed and compliance with the criteria is demonstrated;

"Immature Compost" means leaf and yard waste which has been composted in windrows and screened. Composted leaf and yard waste is considered an Immature Compost until it has been fully cured and is ready for compliance testing for Compost Quality Criteria. Immature Compost is considered a waste;

"Leaf and Yard Waste" means waste consisting of leaves, yard brush, natural Christmas trees and other plant materials but not tree limbs or other woody materials in excess of 7 centimetres in diameter and wood waste as defined in *Ontario Regulation 347;*

"Ministry" means the Ontario Ministry of the Environment;

"NMA " means *Nutrient Management Act* , 2002, S.O. 2002, c. 4, as amended from time to time;

"Operator" means any person, other than the Owner's employees, authorized by the *Owner* as having the charge, management or control of any aspect of the *Site* and includes its successors or assigns;

"Owner" means any person that is responsible for the establishment or operation of the *Site* being approved by this *Certificate,* and includes the Corporation of the City of Kawartha Lakes its successors and assigns;

"OWRA " means the *Ontario Water Resources Act* , R.S.O. 1990, c. O.40, as amended;

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

"Provincial Officer" means any person designated in writing by the Minister as a provincial officer pursuant to Section 5 of the *OWRA* or Section 5 of the *EPA* or Section 17 of *PA* or Section 4 of *NMA* or Section 8 of *SDWA* .

"*Regional Director* " means the Regional Director of the local Regional Office of the *Ministry* in which the *Site* is located.

"*Regulation 347* " or "*Reg. 347* " means Regulation 347, R.R.O. 1990, made under the EPA, as amended;

"*SDWA*" means *Safe Drinking Water Act,* 2002, S.O. 2002, c. 32, as amended from time to time;

"rejected compost" means waste that has gone through the composting process but did not meet the time, temperature or turning requirements specified in Condition 11 (11) or exceeds the parameters listed in Schedule "B". Rejected compost is considered a waste and must be handled and disposed in accordance with Ontario Regulation 347;

"*Site* " means the entire 59.8 hectare waste disposal site, consisting of an 8.1 hectare landfilling area and the 65 m x 75 m composting area shown in Items No. 6 and No. 14 of Schedule "A", and includes buffer lands and contaminant attenuation zone, located at Lot 26, Concession 6 and Part of Lots 32 and 33, South of Portage Road, geographic Township of Eldon, City of Kawartha Lakes, approved by this *Certificate.*

"Trained personnel" means personnel knowledgeable in the following through instruction and/or practice:

a. relevant waste management legislation, regulations and guidelines;
b. major environmental concerns pertaining to the waste to be handled;
c. occupational health and safety concerns pertaining to the processes and wastes to be handled;
d. management procedures including the use and operation of equipment for the processes and wastes to be handled;
e. emergency response procedures;
f. specific written procedures for the control of nuisance conditions;
g. specific written procedures for refusal of unacceptable waste loads; and
h. the requirements of this *Certificate.*

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

TERMS AND CONDITIONS

1. GENERAL

Compliance

(1) The *Owner* and *Operator* shall ensure compliance with all the conditions of this

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

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

In Accordance

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

Interpretation

(4) Where there is a conflict between a provision of any document listed in Schedule "A" in this *Certificate,* and the conditions of this *Certificate,* the conditions in this *Certificate* shall take precedence.

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

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

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

Other Legal Obligations

(8) The issuance of, and compliance with, this *Certificate* does not:

(a) relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement; or

(b) limit in any way the authority of the *Ministry* to require certain steps be taken or to require the *Owner* and *Operator* to furnish any further information related to compliance with this *Certificate* .

Adverse Effect

(9) The *Owner* and *Operator* shall take steps to minimize and ameliorate any adverse effect on the natural environment or impairment of water quality resulting from the *Site,*

including such accelerated or additional monitoring as may be necessary to determine the nature and extent of the effect or impairment.

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

Change of Ownership

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

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

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

(13) In the event of any change in *Ownership* of the *Site,* other than change to a successor Owner, the *Owner* shall notify the successor of and provide the successor with a copy of this *Certificate,* and the *Owner* shall provide a copy of the notification to the *District Manager* and the *Director.*

Certificate of Requirement/Registration on Title

(14) The Owner shall:

(a) Within sixty (60) days of the date of the issuance of this *Certificate,* submit to the *Director* for review, two copies of a completed Certificate of Requirement with a registerable description of the *Site;* and

(b) Within 10 calendar days of receiving the Certificate of Requirement authorized by the *Director,* register the Certificate of Requirement in the appropriate Land Registry Office on title to the *Site* and submit to the *Director* and the *District Manager* the duplicate registered copy immediately following registration.

(15) Pursuant to Section 197 of the Environmental Protection Act, neither the *Owner* nor any person having an interest in the *Site* shall deal with the *Site* in any way without first

giving a copy of this *Certificate* to each person acquiring an interest in the *Site* as a result of the dealing.

Inspections by the Ministry

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

(a) to enter upon the premises where the approved works are located, or the location where the records required by the conditions of this *Certificate* are kept;

(b) to have access to, inspect, and copy any records required to be kept by the conditions of this *Certificate;*

(c) to inspect the *Site,* related equipment and appurtenances;

(d) to inspect the practices, procedures, or operations required by the conditions of this *Certificate;* and

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

Information and Record Retention

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

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

(a) an approval, waiver, or justification by the *Ministry* of any act or omission of any person that contravenes any term or condition of this *Certificate* or any statute, regulation or other legal requirement; or

(b) acceptance by the *Ministry* of the information's completeness or accuracy.

(19) The *Owner* shall ensure that a copy of this *Certificate,* in its entirety and including all its Notices of Amendment, and documentation listed in Schedule "A", are retained at the *Site* at all times.

2. SITE OPERATION

Operation

(1) The *Site* shall be operated and maintained at all time including management and disposal

of all waste in accordance with the *EPA, Regulation 347,* and the conditions of this *Certificate.* At no time shall the discharge of a contaminant that causes or is likely to cause an adverse effect be permitted.

Signs

(2) A sign shall be installed and maintained at the main entrance/exit to the *Site* on which is legibly displayed the following information:

(a) the name of the *Site* and *Owner;*
(b) the number of the *Certificate;*
(c) the name of the *Operator;*
(d) the normal hours of operation;
(e) the allowable and prohibited waste types;
(f) the telephone number to which complaints may be directed;
(g) a warning against unauthorized access;
(h) a twenty-four (24) hour emergency telephone number (if different from above); and
(i) a warning against dumping outside the *Site.*

(3) The *Owner* shall install and maintain signs to direct vehicles to working face and composting areas.

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

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

Burning Waste Prohibited

(5) Burning of waste at the *Site* is prohibited.

Site Access

(6) (a) Waste shall only be accepted from 8:00 a.m. to 8:00 p.m. seven days a week.
(b) The *Owner* may provide alternative hours of operation for the *Site* provided that the proper notice is given to the public and is posted at the gate to the *Site.*
(c) The *Owner* shall inform the *District Manager* of the changes to the hours of operation two (2) weeks prior to implementation.

(7) Equipment used for daily site preparation and closing activities may be operated one (1) hour before and one (1) hour after the hours of operation approved by this *Certificate.*

(8) With the prior written approval from the *District Manager,* the time periods may be extended to accommodate seasonal or unusual quantities of waste.

Site Security

(9) No waste shall be received, landfilled or removed from the *Site* unless a site supervisor or attendant is present and supervises the operations during operating hours. The *Site* shall be closed when a site attendant is not present to supervise landfilling operations.

(10) The *Site* shall be operated and maintained in a safe and secure manner. During non-operating hours, the *Site* entrance and exit gates shall be locked and the *Site* shall be secured against access by unauthorized persons.

3. EMPLOYEE TRAINING

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

4. COMPLAINTS RESPONSE PROCEDURE

(1) If at any time the *Owner* receives complaints regarding the operation of the *Site,* the *Owner* shall respond to these complaints according to the following procedure:

(a) The *Owner* shall record and number each complaint, either electronically or in a log book, and shall include the following information: the nature of the complaint, the name, address and the telephone number of the complainant if the complainant will provide this information and the time and date of the complaint;

(b) The *Owner,* upon notification of the complaint, shall initiate appropriate steps to determine 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 complete and retain in a centralized location, a report written within one (1) week of the complaint date, listing the actions taken to resolve the complaint and any recommendations for remedial measures, and managerial or operational changes to reasonably avoid the recurrence of similar incidents. This report shall be made available to Provincial Officers upon request.

5. EMERGENCY RESPONSE

(1) Any spills, fires or other emergency situations shall be forthwith reported directly to the *Ministry's* Spills Action Centre (1-800-268-6060) and shall be cleaned up immediately.

(2) In addition, the *Owner* shall submit, to the *District Manager* a written report within three (3) business days of the emergency situation, outlining the nature of the incident, remedial measures taken, handling of waste generated as a result of the emergency situation and the measures taken to prevent future occurrences at the *Site.*

(3) All wastes resulting from an emergency situation shall be managed and disposed of in accordance with *O.Reg. 347.*

(4) All equipment and materials required to handle the emergency situations shall be:
   (a) kept on hand at all times that waste landfilling and/or handling is undertaken at the *Site;* and
   (b) adequately maintained and kept in good repair.

(5) The *Owner* shall ensure that the emergency response personnel are familiar with the use of such equipment and its location(s).

6. RECORD KEEPING AND REPORTING

Daily Log Book

(1) A daily log shall be maintained in written format and shall include the following information:
   (a) the type, date and time of arrival, hauler, and quantity (tonnes) of all industrial and commercial waste and cover material received at the *Site;*
   (b) the area of the *Site* in which waste disposal operations are taking place;
   (c) a record of litter collection activities and the application of any dust suppressants;
   (d) a record of the daily inspections; and
   (e) a description of any out-of-service period of any control, treatment, disposal or monitoring facilities, the reasons for the loss of service, and action taken to restore and maintain service.

(2) Any information requested, by the *Director* or a *Provincial Officer,* concerning the *Site* and its operation under this *Certificate,* including but not limited to any records required to be kept by this *Certificate* shall be provided to the *Ministry,* upon request.

Daily Inspections and Log Book

(3) An inspection of the entire *Site* and all equipment on the *Site* shall be conducted each day the *Site* is in operation to ensure that: the *Site* is secure; that the operation of the *Site* is not causing any nuisances; that the operation of the *Site* is not causing any adverse effects on the environment and that the *Site* is being operated in compliance with this *Certificate.* Any deficiencies discovered as a result of the inspection shall be remedied immediately, including temporarily ceasing operations at the *Site* if needed.

(4) A record of the inspections shall be kept in a daily log book that includes:
   (a) the name and signature of person that conducted the inspection;
   (b) the date and time of the inspection;
   (c) the list of any deficiencies discovered;
   (d) the recommendations for remedial action; and
   (e) the date, time and description of actions taken.

(5) A record shall be kept in the daily log book of all refusals of waste shipments, the reason(s) for refusal, and the origin of the waste, if known.

Annual Report

(6) A written report on the development, operation and monitoring of the *Site,* shall be completed annually (the "Annual Report"). The Annual Report shall be submitted to the *District Manager,* by March 31st of the year following the period being reported upon.

(7) The Annual Report shall include the following:

(a) the results and an interpretive analysis of the results of all leachate, groundwater surface water and landfill gas monitoring, including an assessment of the need to amend the monitoring programs;

(b) an assessment of the operation and performance of all engineered facilities, the need to amend the design or operation of the *Site* , and the adequacy of and need to implement the contingency plans;

(c) site plans showing the existing contours of the *Site;* areas of landfilling operation during the reporting period; areas of intended operation during the next reporting period; areas of excavation during the reporting period; the progress of final cover, vegetative cover, and any intermediate cover application; previously existing site facilities; facilities installed during the reporting period; location of the composting pad; and site preparations and facilities planned for installation during the next reporting period;

(d) calculations of the volume of waste, daily and intermediate cover, and final cover deposited or placed at the *Site* during the reporting period and a calculation of the total volume of *Site* capacity used during the reporting period;

(e) a calculation of the remaining capacity of the *Site* and an estimate of the remaining *Site* life;

(f) a summary of the monthly and total annual quantity (tonnes) of waste received at the *Site* on a quarterly basis for final disposal and on a monthly basis for composting;

(g) a summary of finished compost transferred from the *Site* and the amount and destination of rejected compost.

(h) analytical results of samples taken from the finished compost;

(i) a summary of any complaints received and the responses made;

(j) a discussion of any operational problems encountered at the *Site* and corrective action taken;

(k) any changes to the Design and Operations Report and the Closure Plan that have been approved by the *Director* since the last *Annual Report;*

(l) a report on the status of all monitoring wells and a statement as to compliance with *Ontario Regulation 903;*

(m) any other information with respect to the *Site* which the *Regional Director* may require from time to time;

(n) an assessment of the groundwater quality as it relates to the RUPO and ODWO;

(o) an assessment of the surface water quality with respect to the PWQO/Guidelines; and

(p) a summary and analysis of all hydraulic and geochemical monitoring results.

7. LANDFILL DESIGN AND DEVELOPMENT

Approved Waste Types

(1) (a) Only solid non-hazardous municipal waste as defined under *Reg.* 347 shall be accepted at the *Site* for landfilling;

(b) The disposal of the putrescible municipal waste shall be limited to areas of Phase 1 and Phase 2 of the Site which are on the north side of the longitudinal axis of the esker that is located at the Site;

(c) Subject to the limitations of Condition 7 (1) (b), the disposal of waste referred to in Condition 7(1) (b) may continue until final contours are achieved.

(2) The *Owner* shall develop and implement a program to inspect waste to ensure that the waste received at the *Site* is of a type approved for acceptance under this *Certificate.*

(3) The *Owner* shall ensure that all loads of waste are properly inspected by *Trained personnel* prior to acceptance at the *Site* and that the waste vehicles are directed to the appropriate areas for disposal or transfer of the waste. The *Owner* shall notify the *District Manager,* in writing, of load rejections at the *Site* within one (1) business day from their occurrence.

Capacity

(4) The calculated theoretical maximum volumetric capacity of the *Site,* consisting of the waste, daily cover and intermediate cover, but excluding the final cover is 1,123,000 cubic metres.

(5) Phase I and Phase II are approved for the design, operation and use of 152,000 cubic meters (total air space volume including final cover) of the calculated theoretical maximum volumetric capacity of the *Site* as described in Items in Schedule "A".

(6) (a) The *Owner* shall bring the *Site* into compliance (as defined in condition 8 (2)) with respect to surface and groundwater prior to the development and use of the Phase III as detailed in Item 18 in Schedule "A".

(b) The *Owner* shall submit to the District Manager a Report with details of the monitoring showing compliance with respect to surface and groundwater.

(c) Within fourteen (14) days of receiving the written correspondence from the *District Manager* confirming that the *District Manager* is in agreement with the details and the *Site* is in compliance, the *Owner* shall forward a copy of the correspondences from the *District Manager* and all other correspondences and responses related to the request, to the *Director* requesting the *Certificate* be amended to approve the development and use of Phase III.

Service Area

(7) Only waste that is generated within the boundaries of the City of Kawartha Lakes may be accepted at the *Site.*

Cover

(8) Alternative materials to soil may be used as weekly and interim cover material, based on an application with supporting information and applicable fee for a trial use or permanent use, submitted by the *Owner* to the *Director,* copied to the *District Manager* and as approved by the *Director* via an amendment to this *Certificate.* The alternative material shall be non-hazardous according to *Reg. 347* and will be expected to perform at least as well as soil in relation to the following functions:

(a) Control of blowing litter, odours, dust, landfill gas, gulls, vectors, vermin and fires;

(b) Provision for an aesthetic condition of the landfill during the active life of the *Site;*

(c) Provision for vehicle access to the active tipping face; and

(d) Compatibility with the design of the *Site* for groundwater protection, leachate management and landfill gas management.

(9) Cover material shall be applied as follows:

(a) Periodic Cover - Weather permitting, deposited waste shall be covered at least twice weekly in a manner acceptable to the *District Manager* so that no waste is exposed to the atmosphere. Suitable stock pile of clean granular cover material, which shall be equivalent to 20% of the quantity of the required annual daily cover material shall be maintained at the *Site* as a contingency measure;

(b) Intermediate Cover - In areas where landfilling has been temporarily discontinued for six (6) months or more, a minimum thickness of 300 millimetre of soil cover or an approved thickness of alternative cover material shall be placed; and

(c) Final Cover - In areas where landfilling has been completed to final contours, a minimum 600 millimetre thick layer of soil of medium permeability and 150 millimetres of top soil (vegetative cover) shall be placed. Fill areas shall be progressively completed and rehabilitated as landfill development reaches final contours.

(10) (a) Contaminated soil, construction and demolition fines, petroleum hydrocarbon contaminated soils received at the *Site* shall be solid non-hazardous waste as per

Regulation 347, EPA.

(b) The quantity of the daily alternative cover material stored at the *Site* shall not exceed the 20% (percent) limit of the annual volume of waste received at the *Site*.

8. LANDFILL MONITORING

Landfill Gas

(1) (a) The *Owner* shall operate the *Site* in accordance with the landfill gas management program outlined in Section 4.4.4 of Item 6 of Schedule "A".

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

Compliance

(2) The *Site* shall be operated in such a way as to ensure compliance with the following:

(a) Reasonable Use Guideline B-7 for the protection of the groundwater at the *Site;* and

(b) Provincial Water Quality Objectives included in the July 1994 publication entitled *Water Management Policies, Guidelines, Provincial Water Quality Objectives*, as amended from time to time or limits set by the *Regional Director*, for the protection of the surface water at and off the *Site*.

Surface Water and Ground Water

(3) The *Owner* shall monitor surface water and ground water in accordance with the monitoring programs outlined in documents listed in the attached Schedule "A".

(4) A certified Professional Geoscientist or Engineer possessing appropriate hydrogeologic training and experience shall execute or directly supervise the execution of the groundwater monitoring and reporting program.

Groundwater Wells and Monitors

(5) The *Owner* shall ensure that all groundwater monitoring wells which form part of the

monitoring program are properly capped, locked and protected from damage.

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

(7) Any groundwater monitoring well included in the on-going monitoring program that 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 Report for the period during which the well was decommissioned.

Trigger Mechanisms and Contingency Plans

(8) (a) Trigger mechanisms shall be in accordance with documents in the Schedule "A".

(b) Contingency plan in the event of a confirmed exceedence of a site-specific trigger level relating to leachate mounding or groundwater or surface water impacts due to leachate shall be in accordance with documents in the of Schedule "A".

(9) In the event of a confirmed exceedence of a site-specific trigger level relating to leachate mounding or groundwater or surface water impacts due to leachate, the *Owner* shall immediately notify the *District Manager,* and an investigation into the cause and the need for implementation of remedial or contingency actions shall be carried out by the *Owner* in accordance with the approved trigger mechanisms and associated contingency plans. These actions shall be completed by November 2012.

(10) If monitoring results, investigative activities and/or trigger mechanisms indicate the need to implement contingency measures, the *Owner* shall ensure that the following steps are taken and completed by September 1, 2013:

(a) The *Owner* shall notify the *District Manager,* in writing of the need to implement contingency measures, no later than 30 days after confirmation of the exceedences;

(b) Detailed plans, specifications and descriptions for the design, operation and maintenance of the contingency measures shall be prepared and submitted by the *Owner* to the *District Manager* for approval; and

(c) The contingency measures shall be implemented by the *Owner* upon approval by the *District Manager* .

(11) The *Owner* shall ensure that any proposed changes to the site-specific trigger levels for leachate impacts to the surface water or groundwater, are approved in advance by the *Director* via an amendment to this *Certificate.*

Changes to the Monitoring Plan

(12) The *Owner* may request to make changes to the monitoring program(s) to the *District Manager* in accordance with the recommendations of the annual report. The *Owner* shall make clear reference to the proposed changes in separate letter that shall accompany the annual report.

(13) Within fourteen (14) days of receiving the written correspondence from the *District Manager* confirming that the *District Manager* is in agreement with the proposed changes to the environmental monitoring program, the *Owner* shall forward a letter identifying the proposed changes and a copy of the correspondences from the *District Manager* and all other correspondences and responses related to the changes to the monitoring program, to the *Director* requesting the *Certificate* be amended to approve the proposed changes to the environmental monitoring plan prior to implementation.

(14) In the event any other changes to the environmental monitoring program are proposed outside of the recommendation of the annual report, the *Owner* shall follow current ministry procedures for seeking approval for amending the *Certificate.*

9. CLOSURE PLAN

(1) At least 3 years prior to the anticipated date of closure of this *Site,* the *Owner* shall submit to the *Director* for approval, with copies to the *District Manager,* a detailed *Site* closure plan pertaining to the termination of landfilling operations at this *Site,* post-closure inspection, maintenance and monitoring, and end use. The plan shall include the following:

(a) a plan showing *Site* appearance after closure;
(b) a description of the proposed end use of the *Site;*
(c) a descriptions of the procedures for closure of the *Site,* including:
  (i) advance notification of the public of the landfill closure;
  (ii) posting of a sign at the *Site* entrance indicating the landfill is closed and identifying any alternative waste disposal arrangements;
  (iii) completion, inspection and maintenance of the final cover and landscaping;
  (iv) *Site* security;
  (v) removal of unnecessary landfill-related structures, buildings and facilities;
  (vi) final construction of any control, treatment, disposal and monitoring

facilities for leachate, groundwater, surface water and landfill gas; and

(vii) a schedule indicating the time-period for implementing sub-conditions (i) to (vi) above;

(d) descriptions of the procedures for post-closure care of the *Site,* including:

(i) operation, inspection and maintenance of the control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;

(ii) record keeping and reporting; and

(iii) complaint contact and response procedures;

(e) an assessment of the adequacy of and need to implement the contingency plans for leachate and methane gas; and

(f) an updated estimate of the contaminating life span of the *Site,* based on the results of the monitoring programs to date.

(2) The *Site* shall be closed in accordance with the closure plan as approved by the *Director.*

10. WASTE DIVERSION

(1) The *Owner* shall ensure that:

(a) all bins and waste storage areas are clearly labelled;

(b) all lids or doors on bins shall be kept closed during non-operating hours and during the high wind events; and

(c) if necessary to prevent litter, waste storage areas shall be covered during the high winds events.

(2) The *Owner* shall provide a segregated area for the storage of *Refrigerant Appliances* so that the following are ensured:

(a) all *Refrigerant Appliances* have been tagged to indicate that the refrigerant has been removed by a licensed technician. The tag number shall be recorded in the log book and shall remain affixed to the appliance until transferred from the *Site;* **or**

(b) all *Refrigerant Appliances* accepted at the *Site,* which have not been tagged by a licensed technician to verify that the equipment no longer contains refrigerants, are stored segregated, in a clearly marked area, in an upright position and in a manner which allows for the safe handling and transfer from the *Site* for removal of refrigerants as required by O.Reg. 189; and

(c) all *Refrigerant Appliances* received on-site shall either have the refrigerant removed prior to being transferred from the *Site* or shall be shipped off-site only to facilities where the refrigerants can be removed by a licensed technician in accordance with O.Reg. 189.

(3) Propane cylinders shall be stored in a segregated area in a manner which prevents cylinders from being knocked over or cylinder valves from breaking.

(4) The *Owner* shall transfer waste and recyclable materials from the *Site* as follows:
   (a) recyclable materials shall be transferred off-site once their storage bins are full;
   (b) scrap metal shall be transferred off-site at least twice a year;
   (c) tires shall be transferred off-site as soon as a load for the contractor hired by the *Owner* has accumulated or as soon as the accumulated volume exceeds the storage capacity of its bunker; and
   (d) immediately, in the event that waste is creating an odour or vector problem.

(5) The *Owner* shall notify the appropriate contractors that waste and recyclable wastes that are to be transferred off-site are ready for removal. Appropriate notice time, as determined by the contract shall be accommodated in the notification procedure.

(6) Collection, storage and transfer electronic waste in accordance shall be in accordance with the document titled "Organizing & Operating waste Electrical and Electronic Equipment (WEEE) collection sites" dated September 27, 2009" prepared by Ontario Electronic Stewardship.

11. COMPOSTING

(1) The *Owner* shall ensure that composting is conducted in accordance with the "Interim Guidelines for the Production and Use of Aerobic Compost in Ontario" dated November 1991 or its latest amendment.
(2) Waste accepted for composting shall be limited to leaf and yard waste. Leaf and yard waste received at the Site shall not exceed the maximum concentrations for metals listed in Schedule "B".
(3) Not more than 200 tonnes of leaf and yard waste shall be accepted in any given day and the total amount of leaf and yard waste accepted annually shall be limited to 2000 tonnes.
(4) No more than 2000 tonnes of leaf and yard waste, Immature Compost and finished compost shall be stored on *Site* at any one time.
(5) All activities associated with the composting operation shall take place on the designated pad constructed of wood chips.
(6) Waste shall be incorporated into windrows within thirty (30) days of receipt.
(7) The Owner may store *Finished Compost* on *Site* for a maximum of twelve (12) months after the curing phase is complete.
(8) Rejected compost shall be disposed of at a waste disposal site approved by the Ministry, or its equivalent if in jurisdictions outside of Ontario, to accept such waste.
(9) Windrows shall be arranged in a manner which allows equipment access for efficient turning of windrows and to allow access for emergency vehicles.
(10) Windrows shall be constructed at bulk densities and heights which promote aerobic conditions.

(11) All waste being composted shall be held at a temperature of at least 55 °C for a minimum of fifteen (15) cumulative days to ensure proper bacteria growth and pathogen inactivation. During this period, the temperature of the waste being composted shall be monitored and recorded on each day the *Site* is in operation. Windrows shall be turned a minimum of five (5) times and the temperature must reach 55 °C after the fifth turning. During the remainder of the composting process, the temperature shall be monitored and recorded on a weekly basis at a minimum.

(12) Compost shall be cured for a minimum of six (6) months.

(13) For the first two (2) years of operation, a representative composite sample of compost that has completed the curing phase shall be taken at least once per year and analyzed for the parameters listed in Schedule "B". After two (2) years of operation, the sampling schedule may be adjusted with the prior written consent of the *District Manager.*

(14) Finished compost may be released from the *Site* for unrestricted use. Rejected compost which meets the parameters listed in Schedule B, but does not meet the requirements of Condition 11 (11), may be returned to the composting process as waste for re-processing.

(15) At a minimum, the *Owner* shall keep daily records of the operations (e.g. windrow turning, screening, sampling etc) taking place that day, the atmospheric conditions and the windrow reading temperatures.

(16) With respect to the compost sampling required by Condition 11 (13), 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.

SCHEDULE "A"

1. Letter dated June 29, 1998 from the County of Victoria to Approvals Branch, Ministry of the Environment (MOE).

2. Letter dated October 21, 1997 from George Rocoski, Waste Reduction Branch, MOE, to Rancor Wood Recycling Inc.

3. Completed and signed form for Application for Approval of a Waste Disposal Site dated June 27, 1998 and attachments.

4. Comments from John Allen dated July 22, 1998 to Approvals Branch, MOE, regarding performance of similar alternative cover material at Brockville Landfill Site.

5. Comments dated July 27, 1998 on the use of construction/demolition material as an alternative landfill cover from Peterborough District Office, MOE, to Approvals Branch, MOE.

6. "Eldon Landfill Site Design and Operation Report," prepared for the Corporation of the County of Victoria, prepared by Gartner Lee Limited dated February, 2000.

7. "Geological and Hydrogeological Investigation Eldon Landfill Site," prepared for the Corporation of the County of Victoria Township prepared by Gartner Lee Limited dated February, 2000.

8. Application for a Provisional Certificate of Approval for a Waste Disposal Site, dated October 22, 2001, and signed by P. Jeffrey Seaton, P. Eng.

9. Letter dated November 6, 2001 from P. Jeffrey Seaton, City of Kawartha Lakes, to Ian Parrott, MOE, re: City of Kawartha Lakes Eldon Landfill, Certificate of Approval A321004, Request for Amendment to Operating Days.

10. Copy of May 6, 2000 Edition of the Ontario Gazette, containing the Order of the Commission for the City of Kawartha Lakes made under the Municipal Act, R.S.O. 1990, c.M. 45.

11. Application for a Provisional Certificate of Approval for a Waste Disposal Site dated January 27, 2006 and signed by Bill Pickard, Manager of Solid Waste Services, including the attached Plan 57R-8474, showing the location of the CAZ.

12. Application for a Provisional Certificate of Approval for a Waste Disposal Site dated February 1, 2008 and signed by Mr. Bill Pickard.

13. Design and Operations Report, City of Kawartha Lakes, Composting Facility at Eldon Landfill, prepared by Totten Sims Hubicki Associates, dated December 21, 2007.

14. Figure 2, Eldon Landfill Site, Proposed Compost Facility Location, dated November 2007.

15. Letter from K. Dechert, Totten Sims Hubicki Associates, to Environmental Assessment and Approvals Branch, dated May 5, 2008, re: addendum to Section 6 of the Design and Operations Report.

16. Application for a Provisional Certificate of Approval for a Waste Disposal Site dated October 1, 2007 and signed by Bill Pickard.

17. Letter from Terry La Chapelle, B.Sc., P.Geo, Senior Geologist, Gartner Lee Limited, dated October 1, 2007 addressed to the Environmental Assessment and Approval Branch, re: Application to Continue to Receive Municipal (Putrescible) Waste at the Eldon Landfill Site.

18. The report titled "Phase III Feasibility Assessment Eldon Waste Disposal Site" dated November 26, 2010, prepared by Cambium Environmental Inc.

19. Application for a Certificate of Approval for a Waste Disposal Site dated December 10, 2010 signed by David Kerr, Manager-Environmental Services, The Corporation of the City of Kawartha Lakes.

This Schedule "B" forms part of Certificate of Approval No. A321004.

SCHEDULE "B"

Parameter	Maximum concentration
Metals	
arsenic	13 ppm
cadmium	3 ppm
chromium	210 ppm
cobalt	34 ppm
copper	100 ppm
lead	150 ppm
mercury	0.8 ppm
molybdenum	5 ppm
nickel	62 ppm
selenium	2 ppm
zinc	500 ppm
Foreign material	
plastic particles greater than 3 mm in any direction	1%
non-biodegradable material greater than 3 mm in any direction	2 %

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

GENERAL

1. The reason for Conditions 1(1), (2), (4), (5), (6), (7), (8), (9), (10), (17), (18) and (19) is to clarify the legal rights and responsibilities of the *Owner* and *Operator* under this Certificate of Approval.

2. The reasons for Condition 1(3) 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 reasons for Condition 1(11) are to ensure that the *Site* is operated under the corporate name which appears on the application form submitted for this approval and to ensure that the *Director* is informed of any changes.

4. The reasons for Condition 1(12) are to restrict potential transfer or encumbrance of the *Site* without the approval of the *Director* and to ensure that any transfer of encumbrance can be made

only on the basis that it will not endanger compliance with this Certificate of Approval.

5. The reason for Condition 1(13) is to ensure that the successor is aware of its legal responsibilities.

6. Conditions 1 (14), (15) and (16) are included, pursuant to subsection 197(1) of the *EPA* , to provide that any persons having an interest in the *Site* are aware that the land has been approved and used for the purposes of waste disposal.

7. The reason for Condition 1(16) is to ensure that appropriate Ministry staff has ready access to the Site for inspection of facilities, equipment, practices and operations required by the conditions in this Certificate of Approval. This Condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the *Act* , the *OWRA* , the *PA* , the *NMA* and the *SDWA* .

SITE OPERATION

8. The reasons for Conditions 2(1), 2(4) and 6(3) are to ensure that the *Site* is operated, inspected and maintained in an environmentally acceptable manner and does not result in a hazard or nuisance to the natural environment or any person.

9. The reason for Conditions 2 (2) and 2(3) is to ensure that users of the *Site* are fully aware of important information and restrictions related to *Site* operations and access under this *Certificate.*

10. The reasons for Condition 2(5) are open burning of municipal waste is unacceptable because of concerns with air emissions, smoke and other nuisance affects, and the potential fire hazard and to make sure burning of brush and wood are carried out in accordance with Ministry guidelines.

11. The reasons for Condition 2(6), 2(7) and 2(8) are to specify the hours of operation for the landfill site and a mechanism for amendment of the hours of operation, as required.

12. The reasons for Condition 2(9) and 2(10) are to ensure that the *Site* is supervised by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person and to ensure the controlled access and integrity of the *Site* by preventing unauthorized access when the Site is closed and no site attendant is on duty.

EMPLOYEE TRAINING

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

COMPLAINTS RESPONSE PROCEDURE

14. The reason for Condition 4(1) is to ensure that any complaints regarding landfill operations at

this *Site* are responded to in a timely and efficient manner.

EMERGENCY RESPONSE

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

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

RECORD KEEPING AND REPORTING

17. The reason for Conditions 6(1) and 6(2) is to ensure that accurate waste records are maintained to ensure compliance with the conditions in this Certificate of Approval (such as fill rate, site capacity, record keeping, annual reporting, and financial assurance requirements), the *EPA* and its regulations.

18. The reason for Conditions 6(4) and 6(5) is to ensure that detailed records of *Site* inspections are recorded and maintained for inspection and information purposes.

19. The reasons for Conditions 6(6) and 6(7) are to ensure that regular review of site development, operations and monitoring data is documented and any possible improvements to site design, operations or monitoring programs are identified. An annual report is an important tool used in reviewing site activities and for determining the effectiveness of site design.

LANDFILL DESIGN AND DEVELOPMENT

20. The reason for Conditions 7(1) to 7(7) inclusive is to specify the approved areas from which waste may be accepted at the *Site* and the types and amounts of waste that may be accepted for disposal at the *Site,* based on the *Owner* 's application and supporting documentation.

21. Condition 7(8) is to provide the Owner the process for getting the approval for alternative daily and intermediate cover material.

22. The reasons for Condition 7(9) are to ensure that daily/weekly and intermediate cover are used to control potential nuisance effects, to facilitate vehicle access on the *Site,* and to ensure an acceptable site appearance is maintained. The proper closure of a landfill site requires the application of a final cover which is aesthetically pleasing, controls infiltration, and is suitable for the end use planned for the *Site.*

23. The reasons for Condition 7(10) is to ensure the *Owner* uses alternative daily cover material in accordance with Ministry standards, and to ensure the long-term protection of the health and safety of the public and the environment.

LANDFILL MONITORING

24. Reasons for Condition 8(1) are to ensure that off-site migration of landfill gas is monitored and all buildings at the *Site* are free of any landfill gas accumulation, which due to a methane gas component may be explosive and thus create a danger to any persons at the *Site*.

25. Condition 8(2) is included to provide the groundwater and surface water limits to prevent water pollution at the *Site*.

26. Conditions 8(3) and 8(4) are included to require the *Owner* to demonstrate that the *Site* is performing as designed and the impacts on the natural environment are acceptable. Regular monitoring allows for the analysis of trends over time and ensures that there is an early warning of potential problems so that any necessary remedial/contingency action can be taken.

27. Conditions 8(5), 8(6) and 8(7) are included to ensure the integrity of the groundwater monitoring network so that accurate monitoring results are achieved and the natural environment is protected.

28. Conditions 8(8) to 8(11) inclusive are added to ensure the *Owner* has a plan with an organized set of procedures for identifying and responding to potential issues relating to groundwater and surface water contamination at the *Site's* compliance point.

29. Conditions 8(12), 8(13) and 8(14) are included to streamline the approval of the changes to the monitoring plan.

CLOSURE PLAN

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

WASTE DIVERSION

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

COMPOSTING

32. Condition 11 was added to ensure that composting is undertaken in a manner which does not result in a nuisance or a hazard to the health and safety of the environment or people.

This Provisional Certificate of Approval revokes and replaces Certificate(s) of Approval No. A321004 issued on February 21, 1980 and associated notices.

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

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

The Notice should also include:

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

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

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto, Ontario
M5G 1E5

AND

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

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

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

DATED AT TORONTO this 28th day of September, 2011

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

RM/
c: District Manager, MOE Peterborough
Dave Bucholtz, Cambium Environmental Inc.

Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A321004
Notice No. 1
Issue Date: March 1, 2016

The Corporation of the City of Kawartha Lakes
12 Peel St
Lindsay, Ontario
K9V 5R8

Site Location: Eldon Waste Disposal Site
311 Rockview Road, RR 3 Rd Lot 26, Part 32, 33, Concession 6, South of Portage Road
Kawartha Lakes City,
K0M 2B0

You are hereby notified that I have amended Approval No. A321004 issued on September 28, 2011 for use and operation of a landfill site , as follows:

The definitions for Compost, Finished Compost, Immature Compost, Leaf and Yard Waste are hereby revoked and replaced with the following:

"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. 101/94. Compost is not considered a waste if testing for the compost quality criteria
is completed and compliance with the criteria is demonstrated; and

"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.

I. Schedule B is hereby removed.

II. Condition 7.(1)(b) and Condition 11 are hereby revoked and replaced with the following Conditions:

11. COMPOSTING OPERATIONS

(1) Waste accepted for composting or grinding/chipping shall be limited to leaf and yard waste, tree trunks, stumps, branches, leaves and brush, not to exceed 150 tonnes in any given day and not to exceed 500 tonnes annually.

(2) 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.

(3) 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.

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

(5) Coarse Leaf and Yard Waste that is segregated for grinding/chipping shall be processed once per year at a minimum.

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

(7) The Owner is permitted to use as a trial, for a period not exceeding 2 years from the issuance of this Approval, 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.

(8) 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.

II. Condition 12 is hereby added to the Approval:

12. The Owner shall locate the scales in a new temporary location in accordance with drawings provided by Angela Porteous, S.C., Regulatory Compliance Officer, City of Kawartha Lakes, in an email dated February 5, 2016, to permit disposal of waste in previously approved footprint and utilizing the approved capacity.

The reason for this amendment to the Approval is to improve composting operations at the Site and to permit for temporary re-location of the scale house so that remaining capacity can be utilized.

The following items are added to Schedule A:

20. Environmental Compliance Approval Application received on Mar 2, 2014, and letter dated October 21, 2013 addressed to Ms. Cathy Curlew, Senior Environmental Officer, MOECC, signed by Mr. David Kerr, P.Geo., Manager of Environmental Services, City of Kawartha Lakes.

21. Email dated February 5, 2016, from Angela Porteous, S.C., Regulatory Compliance Officer, City of Kawartha Lakes, containing drawings for scale house relocation.

This Notice shall constitute part of the approval issued under Approval No. A321004 dated September 28, 2011, as amended.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. 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;
2. 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:

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

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

This Notice must be served upon:

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

AND

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

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

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

DATED AT TORONTO this 1st day of March, 2016

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

NP/
c: District Manager, MOECC Peterborough
Heather Dzurko, The Corporation of the City of Kawartha Lakes

Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A321004
Notice No. 2
Issue Date: June 13, 2016

The Corporation of the City of Kawartha Lakes
12 Peel St Lindsay, P.O. Box 9000
Kawartha Lakes, Ontario
K9V 5R8

Site Location: Eldon Waste Disposal Site
311 Rockview Road, RR 3 Rd Lot 26, Part 32, 33, Concession 6, South of Portage Road
City of Kawartha Lakes
K0M 2B0

You are hereby notified that I have amended Approval No. A321004 issued on September 28, 2011 and amended on March 1, 2016 for use and operation of a 5.5 hectare waste disposal, transfer and composting site within a total site area of 100.5 hectares including contaminant attenuation zone , as follows:

In accordance with the Environmental Compliance Approval Application dated November 3, 2015, approval is hereby granted for use of Phase III in accordance with the supporting documentation, terms and conditions of this Environmental Compliance Approval;

For the purpose of this Environmental Compliance Approval:

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

"Contaminant Attenuation Zone" means lands described as:

- 43 ha parcel of land, Roll #165116004001600, E 1/2LT 25 Con 6, Eldon, City of Kawartha Lakes;
- 21.5 ha parcel of land, Roll #165116004007900, PT LT 33 Con S Portage Rd, Eldon, PT 4; and
- 16.8 ha parcel of land, Roll #165116004007805, PT LT 32 Con S Portage Rd, Eldon, PTS 1 & 2, 57R9894, S/T E12174, City of Kawartha Lakes.

I. The term *"rejected compost"* defined in the Approval issued on September 28, 2011 is hereby revoked.

II. Conditions 7.(6)(a), 7.(6)(b), and 7.(6)(c) are hereby revoked.

III. The following conditions are added to the Approval:

13. PHASE III DESIGN, DEVELOPMENT AND OPERATION

1. The Owner shall ensure that Phase III is designed and operated in accordance with Items 23 through 29 of Schedule A and terms and conditions of this Approval.

2. The final capacity of Phase III, including waste and daily cover, shall not exceed 143,900 cubic meters.

3. Liner and leachate collection system shall be designed, constructed and monitored in accordance with details outlined in Section 6.3, of Item 23, Schedule A and modifications outlined in Items 26 and 28, Schedule A, including addition of 4 vibrating wire piezometers, and two standpipes for monitoring leachate head on the geosynthetic clay liner.

4. a. Liner and leachate collection system construction shall be supervised by a licensed professional engineer or a geoscientist.

b. Within 60 days of completion of each section of the liner and leachate collection system, a construction and installation report prepared by a licensed professional engineer or a geoscientist, shall be submitted to the Director and District Manager. The report shall include but not be limited to field observations, any deviations from approved plans, quality control and quality assurance measures, and as built drawings.

5. The Owner shall carry out groundwater and surface water monitoring in accordance with the following table:

Monitoring station	Frequency	Parameters
Groundwater monitoring wells: 7-I, 8-I, 9-I, 10-I, 11-I, 11-II, 12-I, 13-I, 13-II, 14-I, 14-II, 15-I, 15-II, 15-III, 16-I, 17-I, 17-II, 18-I, 18-II, 19-I, 25-I, 25-III, 26-I, 26-II, 26-III, 27-I, 27-II, 28-I, 29-I, 29-II, 29-III, 30-I, 31-I, 32-I and 5 new monitoring wells specified in condition 13.6.	Spring and fall	Field parameters: water level, pH and conductivity Parameters listed in Table 2, Item 23, Schedule A. MW9-1 and MW8-1 sampled for all additional parameters in Table 4, Item 23, Schedule A.

Monitoring wells to be removed with development of Stage 1 (Phase III): 15-I, 15-II, 15-III, 18-I, 18-II, and 25-III		
Surface water monitoring stations: SW1, SW2B, SW4 and a new station upstream (north) side of the culvert crossing beneath the access road as shown on Figure 2, Item 26 Schedule A.	Spring, summer and fall	Field parameters: conductivity, dissolved oxygen, flow, pH, and temperature Laboratory parameters listed in Table 4, Item 23, Schedule A.

6. Within one year of issuance of this Approval, the Owner shall install, and add to the monitoring program, 5 additional groundwater monitoring wells at the following locations:

- two new background wells to the east of Phase III,
- between the proposed Stage 1 and the southern wetland,
- to the west of MW31, and
- to the west of MW29.

7. Following two years of monitoring at the new surface water monitoring stations, the Owner shall submit to the Director for approval, a detailed surface water trigger mechanism program.

Registration on Title for Contaminant Attenuation Zone

8. The Owner shall, within 120 calendar days from the date of issuance of this Approval, submit to the Director documents confirming that a contaminant attenuation zone (CAZ) has been established and shall provide:

a. documentation evidencing ownership of the CAZ obtained;

b. a completed Certificate of Requirement and supporting documents containing a registerable description of the CAZ; and

c. a letter signed by a member of the Law Society of Upper Canada; or other qualified legal practitioner acceptable to the Director, verifying the legal description of the CAZ.

9. Within ten calendar days of receiving a Certificate of Requirement signed or authorized by the Director, the Owner shall:

a. register the Certificate of Requirement in the appropriate Land Registry Office on the title to the property; and

b. submit to the Director a written verification that the Certificate of Requirement has been registered on title.

The following items are added to Schedule A:

22. Environmental Compliance Approval Application dated November 3, 2015.

23. Updated Design and Operations Plan, Eldon Waste Disposal Site, The Corporation of the City of Kawartha Lakes, dated November 2015, prepared by Golder Associates, signed by Frank Barone, Ph.D., P.Eng, including revised Figure 2 and 3 with the corrected CAZ size of 43 ha (not 88ha).

24. Memorandum dated January 20, 2016, from Laurel Rudd, Surface Water Evaluator, MOECC, containing surface water related comments.

25. Memorandum dated January 29, 2016, from Shawn Trimper, Hydrogeologist, MOECC, containing groundwater related comments.

26. Letter dated March 2, 2016, from Golder Associates, in response to surface water and groundwater related comments.

27. Letter dated April 22, 2016, from Nafiseh Pourhassani, MOECC, containing engineering related comments.

28. Letter dated May 6, 2016, from Golder Associates, in response to engineering related comments.

29. Letter dated May 27, 2016, from Angela Porteous, Kawartha Lakes in response to groundwater related comments.

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

Condition 13.1 is added to ensure that the site is constructed, maintained and operated as considered and approved by the Director.

Condition 13.2 is to specify the design capacity of Phase III.

Conditions 13.3 and 13.4 are added to ensure that the liner and leachate collection system are built, maintained and operated as approved.

Conditions 13.5, 13.6, and 13.7 are added to ensure the site is monitored regularly to prevent adverse impact.

Condition 13.8 and 13.9 are added to ensure that pursuant to s.197(2) of the EPA, any person having an interest

in the property in any way, is made aware of the existence of this Approval.

This Notice shall constitute part of the approval issued under Approval No. A321004 dated September 28, 2011 and subsequent amendments.

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:

1. 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;
2. 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:

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

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

This Notice must be served upon:

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

AND

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

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

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

DATED AT TORONTO this 13th day of June, 2016

Dale Gable, P.Eng.

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

NP/
c: District Manager, MOECC Peterborough
Frank Barone, Golder Associates

Public Works Department
12 Peel Street, Lindsay, Ontario, K9V 3L8
Tel: (705) 324-9411 ext. 2360, 1 888-822-2225
Fax: (705) 328-3122
ksnoddy@kawarthalakes.ca

Kerri Snoddy, C.Tech., *Regulatory Compliance Officer*

November 22, 2019

Mr. Glenn Rutherford
Senior Environmental Officer
Ministry of the Environment, Conservation and Parks
Peterborough District Office
300 Water Street, 2nd Floor South
Peterborough, ON, K9J 8M5

Dear Mr. Rutherford,

Re: Solid Non-Hazardous Waste Disposal Site Inspection Report for the Eldon Landfill October 3, 2019

This letter is in response to section 5.0 Action(s) Required regarding the inspection completed at the Eldon landfill site on October 3, 2019. Below is each Action Item with the City's response following in bolded font. While the Action items state the due date of the response is November 15, 2019 this due date was revised to be completed by November 30, 2019.

1. By November 15, 2019, provide to the undersigned Provincial Officer confirmation that the windblown litter clean-up has been completed.

   Litter clean up efforts have been made by landfill staff since the inspection on October 3, 2019 whenever possible. Staff will continue to clean up litter when possible throughout the winter when there is not a layer of snow cover, and then again in the spring. I inspected the site on November 13, 2019 and it appeared that there was significantly less wind blown litter around the landfill. I was told by staff that the majority of litter was removed from the ditches before the first snowfall.

2. By November 15, 2019, provide to the undersigned Provincial Officer confirmation that adequate daily cover is being completed as per the ECA.

   On November 13, 2019 I had a meeting with the contractor for cover and compaction at the site. We viewed the current tipping face and the contractor was informed that more cover material needed to be used. The contractor is now adequately covering the active tipping face to prevent future wind blown litter.

3. By November 15, 2019, provide to the undersigned Provincial Officer copies of the site inspection logs completed in 2019 and confirmation that site inspections will take place as per the ECA.

   The daily inspection logs completed for 2019 have been attached as separate documents. These have been completed as per ECA requirements.

4. By November 15, 2019, provide to the undersigned Provincial Officer records confirming methane gas monitoring has been undertaken at the site during site operational days in 2019.

   As per the ECA requirement, routine methane gas levels are currently conducted in the attendant shack on site. This is the only on site building. Landfill staff have a handheld gas metre available to them to bring to the site on each operating day. Training is conducted on how to use the handheld metre approximately once or twice per year at the semi-annual landfill staff training. Additional training on how to use the hand held metre will also be conducted at the upcoming staff training in December due to frequent staffing changes. While staff have been trained on how to use the metres and know that daily monitoring is required to take place there has been no formal procedure for documenting the readings. At the spring landfill staff training in 2019 staff were asked to start recording the readings on the daily log inspection forms. However, there is currently no defined area on the forms for them to record these values so it often does not get recorded on the forms. There were some readings recorded on the forms in 2019 attached and all methane levels were at 0% LEL. The 2020 daily log inspection forms will include a defined section for methane readings. This will also be reviewed at the upcoming staff training in December to ensure staff are recording the readings in the daily log inspections.

   If you have any questions please call me at (705) 324-9411, extension 2360.

   Yours truly,

   Kerri Snoddy
   Regulatory Compliance Officer

Ontario

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

Solid Non-Hazardous Waste Disposal Site Inspection Report

Client:	The Corporation of the City of Kawartha Lakes Mailing Address: 12 Peel St, Post Office Box, 9000, Lindsay, Ontario, Canada, K9V 5R8 Physical Address: 12 Peel St Lindsay, Kawartha Lakes, City, Ontario, Canada, K9V 5R8 Telephone: (705)324-9411, email: jrotas@kawarthalakes.ca Client #: 4353-78NJW9, Client Type: Municipal Government, NAICS: 913910 Additional Address Info: Lindsay		
Inspection Site Address:	Eldon Waste Disposal Site Address: 311 Rockview Road RR 3 Rd Lot 26 Part 32 33 Concession 6 South of Portage Road, Kawartha Lakes, City, K0M 2B0 District Office: Peterborough GeoReference: Map Datum: NAD83, Zone: 17, UTM Easting: 659180, UTM Northing: 4934229, , LIO GeoReference: Zone: 17, UTM Easting: 659335.75, UTM Northing: 4934380.0, Latitude: 44.545143, Longitude: -78.99418 Site #: 7648-8C6MET		
Contact Name:	Kerri Snoddy	**Title:**	Regulatory Compliance Officer
Contact Telephone:	(705)324-9411 **ext**2360	**Contact Fax:**	
Last Inspection Date:	2017/01/27		
Inspection Start Date:	2019/10/03	**Inspection Finish Date:**	2019/10/03
Region:	Eastern		

1.0 INTRODUCTION

The City of Kawartha Lakes operates a solid non-hazardous waste landfill site at 311 Rockview Road in the former Township of Eldon. The site is generally known as the Eldon Landfill Site.

The site has been in operation since 1980. Phases I and II were approved at that time and more recently Phase III of the landfill was approved and has been constructed for use. The site is approved as a 8.1 hectare waste disposal, transfer and composting site within a total site area of 100.5 hectares including a contaminant attenuation zone.

The Eldon Landfill Site accepts solid, non-hazardous wastes from a service area consisting of the City of Kawartha Lakes. The site is approved by Environmental Compliance Approval (ECA) A321004 was issued on September 28, 2011 and amended by notice March 1, 2016 and June 13, 2016

Site hours are as follows:

Winter hours
Wednesday: 9am to 5pm
Saturday: 11am to 5pm

Summer hours
Wednesday: 9am to 5pm
Saturday: 11am to 5pm
Sunday: 11am to 5pm
(In the summer this landfill is open from 11am to 5pm on holiday Mondays)

The inspection was undertaken to determine compliance with the Environmental Protection Act (EPA), Regulation 347 (O. Reg. 347), Amended ECA 321004 issued January 20, 2016, and other relevant ministry legislation, policies and guidelines.
The inspection was conducted by Provincial Officer Glenn Rutherford with Kerri Snoddy, Regulatory Compliance Officer, City of Kawartha Lakes, in attendance. At the time of the inspection, the landfill was closed to the public.

INSPECTION NOTE: Changes to the EPA effective October 2011 have resulted in Certificates of Approval (CofA) now being referred to as Environmental Compliance Approvals (ECA). The electronic template for this inspection report form has not been updated to reflect this change, however, the text entered in the report reflects this change in terminology.

2.0 INSPECTION OBSERVATIONS

Certificate of Approval Number(s):
ECA A321004 was issued on September 28, 2011
Notice 1 was issued March 1, 2016
Notice 2 was issued June 13, 2016

2.1 FINANCIAL ASSURANCE:

Specifics:
Financial Assurance is not required for this municipally owned site.

2.2 APPROVED AREA OF THE SITE:

Specifics:
The site is approved as a 8.1 hectare waste disposal, transfer and composting site within a total site area of 100.5 hectares including a contaminant attenuation zone.

The fill area is clearly defined by the lined landfill cell created for Phase III of the landfill.

2.3 APPROVED CAPACITY:

Specifics:
Phases I and II had an approved capacity of 152,000 cubic meters. Landfilling of Phases I and II are largely complete and it was estimated that final cover will be completed over the next two years.

The approved final capacity of Phase III of the site is 143,900 cubic meters. Landfilling in Phase III commenced about a month prior to the inspection.

2.4 ACCESS CONTROL:

Specifics:
The landfill site is located in a remote area surrounded by forest. The forested area is part of the contaminant attenuation zone.

The east side of the site closest to Rockview Road is fenced and gated. The gate was locked.

Adequate signage is posted at the site entrance.

2.5 COVER MATERIAL:

Specifics:
ECA Condition 7. (9) indicates that cover material is to be applied as follows:

Periodic Cover - Weather permitting, deposited waste shall be covered at least twice weekly in a manner acceptable to the District Manager so that no waste is exposed to the atmosphere.

No cover material had been applied to the tipping face at the time of the inspection. The landfill had been open to the public the previous day. It was not determined when the tipping face had last received daily cover but normal practice is to cover the tipping face at the end of each working day.

A significant amount of wind-blown litter was noted in the areas surrounding the waste handling area.

See Section 5. below, for required actions.

The 2018 AMR reported that in 2018 daily cover material consisted of partially composted leaf and yard waste mixed with sand on a 1:3 ratio, respectively.

2.6 WASTE BURNING:

Specifics:
The burning of waste is not an operational practice at this site.

2.7 GROUNDWATER/SURFACEWATER IMPACT:

Specifics:
No groundwater or surface water impacts were noted during the inspection. The native soils in the area appear to be well drained. In addition to the monitoring well network, surface water monitoring stations are located on Butternut Creek and in the wetland to the southeast.

Groundwater and surface water monitoring are undertaken at this site and reported in the annual monitoring report (AMR) for the site.

A request for a detailed groundwater and surface water review of the 2018 AMR by Eastern Region Tech Support has been submitted.

A brief review of the 2018 AMR was completed during the inspection. The following points were noted during the review:

- ECA Condition 6. (3) requires that "An inspection of the entire Site and all equipment on the Site shall be conducted each day the Site is in operation ...".
- The 2018 AMR indicates that only two site inspections were completed and that on both occasions the site was not open. The site log book is kept in the attendant's hut and was not observed during the inspection as the site was closed. Confirmation that site inspections are being completed in 2019 is requested. See Section 5, below, for required actions.
- Records of routine methane gas monitoring at the site are also requested. See Section 5, below, for required actions.
- The AMR recommends working with the ministry to determine suitable locations for boundary wells on the most recently acquired CAZ lands southwest of the site. The AMR suggests this be done to facilitate well installation in 2020. See Section 6, below, for a recommended action.
- The 2018 AMR also summarizes compliance with the reasonable use guideline (RUG) as follows:
    - West of the site, monitoring wells (MW36 and 37) installed for the assessment of RUG compliance are new and only two monitoring events are available. RUG exceedances were encountered for several parameters at MW37 in 2018. Additional monitoring is recommended by the consultant to determine if the RUG exceedances are long term or just seasonal variations.
    - North of the site, new CAZ boundary well MW5 was installed in 2018. RUG exceedances were found at this well for several parameters in limited sampling. The northern CAZ boundary well MW32-I also demonstrated RUG exceedances. The consultant recommended allowing for additional monitoring at the new well to take place to allow for further assessment and a better understanding of the groundwater trends.
    - For the southern monitoring wells, minor RUG exceedances were reported for well MW7-1. The City of Kawartha Lakes has acquired additional CAZ lands south of the landfill in 2015 and southwest of the landfill in 2017. New monitoring wells need to be established to groundwater trends in these areas.

  Overall, there are minor concerns with RUG exceedances at this site identified. Recommendations for further monitoring are made in the AMR to allow time to establish trends at the newer monitoring locations. A request for both groundwater and surface review of the 2018 AMR by Easter Region Tech Support staff has been made. It is expected that the groundwater review by the ministry will comment more definitively on the RUG situation at the site. A voluntary abatement plan can be established, if warranted, once Tech. Support comments on the AMR are received.

2.8 LEACHATE CONTROL SYSTEM:

Specifics:
Phases I and II of the landfill were designed and operated without a leachate collection system. Natural attenuation was intended as the method of leachate treatment. This has necessitated the acquisition of additional lands for the purpose of contaminant attenuation.

Phase III of the landfill was been approved with a leachate collection system. The leachate collection system for the Phase III - Stage 1 cell has been completed. Some wastes have now been placed in that cell beginning in the southwest end of the cell. The Stage 1 cell has been lined with a geosynthetic clay liner to collect leachate and convey it to a low point in the cell. From there, the leachate will be periodically pumped and transported off-site for treatment at the Lindsay WPCP.

2.9 METHANE GAS CONTROL SYSTEM:

Specifics:
Landfill gas is not actively managed at the site.

ECA condition 8. (1) requires the site be operated in accordance with the landfill gas management program which was outlined in the site's Design and Operations Report.

As well the ECA requires that on-site buildings be have adequate ventilation and that routine monitoring be undertaken to manage landfill gas. It was indicated during the inspection that routine monitoring of landfill gas levels is completed by landfill staff using portable gas meters on days when the site is open.

2.10 OTHER WASTES:

Specifics:
No unapproved waste types were noted at the site.

The site accepts leaf and yard waste for composting. All of the 148 tonnes of collected leaf and yard waste underwent partial composting and will be used as alternative daily cover.

The site does accept a number of other waste types for recycling or disposal off-site:

- used tires
- propane tanks
- scrap metal
- paper material
- containers
- electronics
- boat and bale wrap

All these waste types are approved for the site.

3.0 REVIEW OF PREVIOUS NON-COMPLIANCE ISSUES

The previous inspection completed in 2017 noted minor issues with signage related to directing site users around the site.

It is understood these issues were corrected.

4.0 SUMMARY OF INSPECTION FINDINGS (HEALTH/ENVIRONMENTAL IMPACT)

Was there any indication of a known or anticipated human health impact during the inspection and/or review of relevant material, related to this Ministry's mandate?
No

Specifics:
None were observed at the time of the inspection.
Was there any indication of a known or anticipated environmental impact during the inspection and/or review of relevant material ?
No

Specifics:
None were observed at the time of the inspection.
Was there any indication of a known or suspected violation of a legal requirement during the inspection and/or review of relevant material which could cause a human health impact or environmental impairment ?
Yes

Specifics:
Concerns related to daily cover and windblown litter at the site were noted above.

Was there any indication of a potential for environmental impairment during the inspection and/or the review of relevant material ?
No

Specifics:
None were observed at the time of the inspection.
Was there any indication of minor administrative non-compliance?
Yes

Specifics:
Completion of daily (operating day) of site inspections as per the ECA, as noted above.

5.0 ACTION(S) REQUIRED

1. By November 15, 2019, provide to the undersigned Provincial Officer confirmation that the windblown litter clean-up has been completed.

2. By November 15, 2019, provide to the undersigned Provincial Officer confirmation that adequate daily cover is being completed as per the ECA.

3. By November 15, 2019, provide to the undersigned Provincial Officer copies of the site inspection logs completed in 2019 and confirmation that site inspections will take place as per the ECA.

4. By November 15, 2019, provide to the undersigned Provincial Officer records confirming methane gas monitoring has been undertaken at the site during site operational days in 2019.

6.0 OTHER INSPECTION FINDINGS

The City of Kawartha Lakes is reminded to contact MECP to discuss proposed locations for boundary wells on the most recently acquired CAZ lands southwest of the site.

7.0 INCIDENT REPORT

Applicable
7182-BGZRNN

8.0 ATTACHMENTS

PREPARED BY:
Environmental Officer:
Name: **Glenn M Rutherford**
District Office: **Peterborough District Office**
Date: **2019/10/16**
Signature

REVIEWED BY:
District Supervisor:
Name: **Courtney Redmond**
District Office: **Peterborough District Office**
Date: **2019/10/29**

Signature:

File Storage Number: KL EL RO 610

Note:
"This inspection report does not in any way suggest that there is or has been compliance with applicable legislation and regulations as they may apply to this facility. It is, and remains, the responsibility of the owner and/or the operating authority to ensure compliance with all applicable legislative and regulatory requirements"

APPENDIX H

Sampling Protocols

FIELD SAMPLING PROTOCOL FOR CKL LANDFILL SITES

Last updated: November 19, 2018

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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 without 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^{o}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:

Volume (m^3) =3 x (F(m^2) *(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. B23-03044

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: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		8	9		
			Sample I.D.		B23-03044-1	B23-03044-2		
			Date Collected		19-Apr-23	19-Apr-23		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	24-Apr-23/O	436	254		
Conductivity @25°C	µmho/cm	1	SM 2510B	24-Apr-23/O	959	509		
pH @25°C	pH Units		SM 4500H	24-Apr-23/O	7.48	7.75		
Colour	TCU	2	SM 2120C	25-Apr-23/O	< 2	2		
Turbidity	NTU	0.1	SM 2130	25-Apr-23/O	568	7190		
TDS(ion sum calc.)	mg/L	1	Calc.	25-Apr-23/O	542	275		
Total Suspended Solids	mg/L	3	SM2540D	25-Apr-23/K	3880	19700		
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	24-Apr-23/O	2.3	2.5		
BOD(5 day)	mg/L	3	SM 5210B	25-Apr-23/K	< 3	< 3		
COD	mg/L	5	SM5220C	25-Apr-23/K	20	133		
Total Organic Carbon	mg/L	0.2	EPA 415.2	24-Apr-23/O	3.0	2.6		
Phenolics	mg/L	0.001	MOEE 3179	27-Apr-23/K	< 0.001	< 0.001		
Cyanide (Total)	mg/L	0.005	SM 4500CN	26-May-23/K	< 0.005	< 0.005		
Chloride	mg/L	0.5	SM4110C	26-Apr-23/O	21.3	3.5		
Fluoride	mg/L	0.1	SM4110C	26-Apr-23/O	< 0.1	< 0.1		
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	01-May-23/K	0.34	0.05		
Ammonia (N)-unionized	mg/L	0.01	CALC	01-May-23/K	< 0.01	< 0.01		
Sulphate	mg/L	1	SM4110C	26-Apr-23/O	43	10		
Nitrite (N)	mg/L	0.05	SM4110C	26-Apr-23/O	< 0.05	< 0.05		
Nitrate (N)	mg/L	0.05	SM4110C	26-Apr-23/O	1.57	0.20		
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	08-May-23/K	0.7	0.2		
Hardness (as CaCO3)	mg/L	1	SM 3120	25-Apr-23/O	538	291		
Aluminum	mg/L	0.01	SM 3120	25-Apr-23/O	0.10	0.07		
Antimony	mg/L	0.0001	EPA 200.8	27-Apr-23/O	0.0001	< 0.0001		
Arsenic	mg/L	0.0001	EPA 200.8	27-Apr-23/O	< 0.0001	< 0.0001		
Barium	mg/L	0.001	SM 3120	25-Apr-23/O	0.128	0.068		
Beryllium	mg/L	0.002	SM 3120	25-Apr-23/O	< 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

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Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

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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: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		8	9		
			Sample I.D.		B23-03044-1	B23-03044-2		
			Date Collected		19-Apr-23	19-Apr-23		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Boron	mg/L	0.005	SM 3120	25-Apr-23/O	0.357	0.014		
Cadmium	mg/L	0.000010	EPA 200.8	27-Apr-23/O	< 0.000010	0.000015		
Calcium	mg/L	0.02	SM 3120	25-Apr-23/O	182	88.0		
Chromium	mg/L	0.001	SM 3120	25-Apr-23/O	< 0.001	< 0.001		
Chromium (VI)	mg/L	0.001	MOE E3056	28-Apr-23/O	0.002	< 0.001 [1]		
Cobalt	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005		
Copper	mg/L	0.0001	EPA 200.8	27-Apr-23/O	0.0019	0.0009		
Iron	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005		
Lead	mg/L	0.00002	EPA 200.8	27-Apr-23/O	< 0.00002	0.00002		
Magnesium	mg/L	0.02	SM 3120	25-Apr-23/O	20.1	17.3		
Manganese	mg/L	0.001	SM 3120	25-Apr-23/O	< 0.001	0.002		
Mercury	mg/L	0.00002	SM 3112 B	28-Apr-23/O	< 0.00002	< 0.00002		
Molybdenum	mg/L	0.0001	EPA 200.8	27-Apr-23/O	0.0001	0.0002		
Nickel	mg/L	0.01	SM 3120	25-Apr-23/O	< 0.01	< 0.01		
Potassium	mg/L	0.1	SM 3120	25-Apr-23/O	1.1	1.1		
Phosphorus-Total	mg/L	0.01	E3516.2	08-May-23/K	0.73	1.18		
Phosphorus	mg/L	0.1	SM 3120	25-Apr-23/O	< 0.1	< 0.1		
Selenium	mg/L	0.001	EPA 200.8	27-Apr-23/O	< 0.001	< 0.001		
Silver	mg/L	0.0001	EPA 200.8	27-Apr-23/O	< 0.0001	< 0.0001		
Sodium	mg/L	0.2	SM 3120	25-Apr-23/O	12.7	2.8		
Strontium	mg/L	0.001	SM 3120	25-Apr-23/O	0.305	0.247		
Tin	mg/L	0.05	SM 3120	25-Apr-23/O	< 0.05	< 0.05		
Thallium	mg/L	0.00005	EPA 200.8	27-Apr-23/O	< 0.00005	< 0.00005		
Titanium	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005		
Uranium	mg/L	0.00005	EPA 200.8	27-Apr-23/O	0.00069	0.00105		
Vanadium	mg/L	0.0001	EPA 200.8	27-Apr-23/O	0.0003	0.0003		
Zinc	mg/L	0.005	SM 3120	25-Apr-23/O	< 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

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Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: --- **REPORT No. B23-03044**

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: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		8	9		
			Sample I.D.		B23-03044-1	B23-03044-2		
			Date Collected		19-Apr-23	19-Apr-23		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Anion Sum	meq/L		Calc.	25-Apr-23/O	10.3	5.39		
Cation Sum	meq/L		Calc.	25-Apr-23/O	11.3	5.96		
% Difference	%		Calc.	25-Apr-23/O	4.54	5.07		
Ion Ratio	AS/CS		Calc.	25-Apr-23/O	0.913	0.904		
Conductivity (calc.)	µmho/cm		Calc.	25-Apr-23/O	955	520		
Sodium Adsorption Ratio	-		Calc.	25-Apr-23/O	0.238	0.0704		
TDS(calc.)/EC(actual)	-		Calc.	25-Apr-23/O	0.565	0.540		
Langelier Index(25°C)	S.I.		Calc.	25-Apr-23/O	0.907	0.656		

1 Chromium (VI) result is based on total Chromium

Steve Garrett
Director of Laboratory Services

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Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B23-03046 (i)

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: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		7	10	11-I	11-II
			Sample I.D.		B23-03046-1	B23-03046-2	B23-03046-3	B23-03046-4
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	24-Apr-23/O	265	246	215	202
Conductivity @25°C	µmho/cm	1	SM 2510B	24-Apr-23/O	596	3410	616	428
pH @25°C	pH Units		SM 4500H	24-Apr-23/O	7.82	7.76	7.91	7.90
TDS(ion sum calc.)	mg/L	1	Calc.	25-Apr-23/O	303	1771	373	229
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	24-Apr-23/O	2.8	< 0.2	1.3	1.3
COD	mg/L	5	SM5220C	25-Apr-23/K	12	42	121	< 5
Phenolics	mg/L	0.001	MOEE 3179	28-Apr-23/K	< 0.001	< 0.001	< 0.001	< 0.001
Chloride	mg/L	0.5	SM4110C	25-Apr-23/O	10.3	994	55.2	5.7
Fluoride	mg/L	0.1	SM4110C	25-Apr-23/O	< 0.1	< 1	< 0.1	< 0.1
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	01-May-23/K	0.16	2.50	0.60	0.52
Ammonia (N)-unionized	mg/L	0.01	CALC	01-May-23/K	< 0.01	0.04	0.01	< 0.01
Sulphate	mg/L	1	SM4110C	25-Apr-23/O	21	19	14	10
Nitrite (N)	mg/L	0.05	SM4110C	25-Apr-23/O	< 0.05	< 0.5	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	25-Apr-23/O	3.53	< 0.5	1.58	2.06
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	17-May-23/K	0.4	3.7	2.4	0.8
Hardness (as CaCO3)	mg/L	1	SM 3120	25-Apr-23/O	267	314	218	236
Aluminum	mg/L	0.01	SM 3120	25-Apr-23/O	0.08	0.05	0.11	0.05
Antimony	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001	0.0002	0.0005	< 0.0001
Arsenic	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001	< 0.0003	0.0004	< 0.0001
Barium	mg/L	0.001	SM 3120	25-Apr-23/O	0.107	0.029	0.069	0.047
Beryllium	mg/L	0.002	SM 3120	25-Apr-23/O	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	0.005	SM 3120	25-Apr-23/O	0.066	0.189	0.219	< 0.005
Cadmium	mg/L	).000010	EPA 200.8	03-May-23/O	< 0.000010	< 0.000029	< 0.000010	< 0.000010
Calcium	mg/L	0.02	SM 3120	25-Apr-23/O	90.2	128	56.9	79.4
Chromium	mg/L	0.001	SM 3120	25-Apr-23/O	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (VI)	mg/L	0.001	MOE E3056	05-May-23/O	< 0.001 1	< 0.001 1	< 0.001 1	< 0.001 1
Cobalt	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	< 0.005	< 0.005

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Director of Laboratory Services

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C.O.C.: ---

REPORT No. B23-03046 (i)

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: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		7	10	11-I	11-II
			Sample I.D.		B23-03046-1	B23-03046-2	B23-03046-3	B23-03046-4
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Copper	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0020	0.0003	0.0015	0.0012
Iron	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	0.076	< 0.005
Lead	mg/L	0.00002	EPA 200.8	03-May-23/O	< 0.00002	< 0.00009	0.00040	< 0.00002
Magnesium	mg/L	0.02	SM 3120	25-Apr-23/O	10.1	33.1	18.4	9.02
Manganese	mg/L	0.001	SM 3120	25-Apr-23/O	< 0.001	0.001	0.020	< 0.001
Mercury	mg/L	0.00002	SM 3112 B	01-May-23/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0003	< 0.0002	0.0011	0.0001
Nickel	mg/L	0.01	SM 3120	25-Apr-23/O	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	0.1	SM 3120	25-Apr-23/O	1.6	14.8	6.8	0.6
Phosphorus-Total	mg/L	0.01	E3516.2	17-May-23/K	< 0.01	0.10	1.92	< 0.01
Phosphorus	mg/L	0.1	SM 3120	25-Apr-23/O	< 0.1	< 0.1	< 0.1	< 0.1
Selenium	mg/L	0.001	EPA 200.8	03-May-23/O	< 0.001	< 0.001	0.003	< 0.001
Silver	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	0.2	SM 3120	25-Apr-23/O	11.0	18.6	93.0	3.0
Strontium	mg/L	0.001	SM 3120	25-Apr-23/O	0.126	1.03	0.929	0.134
Tin	mg/L	0.05	SM 3120	25-Apr-23/O	< 0.05	< 0.05	< 0.05	< 0.05
Titanium	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/L	0.00005	EPA 200.8	03-May-23/O	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Uranium	mg/L	0.00005	EPA 200.8	03-May-23/O	0.00078	0.00029	0.00141	0.00037
Vanadium	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0002	< 0.0004	0.0001	0.0003
Zinc	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Anion Sum	meq/L		Calc.	25-Apr-23/O	6.27	33.4	6.26	4.55
Cation Sum	meq/L		Calc.	25-Apr-23/O	5.85	29.5	8.58	4.85
% Difference	%		Calc.	25-Apr-23/O	3.45	6.05	15.0	3.21
Ion Ratio	AS/CS		Calc.	25-Apr-23/O	1.07	1.13	0.730	0.938
Conductivity (calc.)	µmho/cm		Calc.	25-Apr-23/O	547	3193	704	435
Sodium Adsorption Ratio	-		Calc.	25-Apr-23/O	0.293	7.26	2.74	0.0851

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112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		7	10	11-I	11-II
			Sample I.D.		B23-03046-1	B23-03046-2	B23-03046-3	B23-03046-4
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
TDS(calc.)/EC(actual)	-		Calc.	25-Apr-23/O	0.508	0.519	0.606	0.535
Langelier Index(25°C)	S.I.		Calc.	25-Apr-23/O	0.756	0.745	0.546	0.673

1 Chromium (VI) result is based on total Chromium

2 Elevated RL due to Bromide interference

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. B23-03046 (i)

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: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		12	13-I	13-II	14-II
			Sample I.D.		B23-03046-5	B23-03046-6	B23-03046-7	B23-03046-8
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	24-Apr-23/O	201	212	1370	727
Conductivity @25°C	µmho/cm	1	SM 2510B	24-Apr-23/O	430	463	3440	1660
pH @25°C	pH Units		SM 4500H	24-Apr-23/O	7.84	7.92	7.28	7.48
TDS(ion sum calc.)	mg/L	1	Calc.	25-Apr-23/O	228	246	1863	927
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	24-Apr-23/O	0.4	0.6	14.6	7.7
COD	mg/L	5	SM5220C	25-Apr-23/K	6	< 5	359	65
Phenolics	mg/L	0.001	MOEE 3179	28-Apr-23/K	< 0.001	< 0.001	< 0.001	< 0.001
Chloride	mg/L	0.5	SM4110C	25-Apr-23/O	5.7	7.0	199	87.9
Fluoride	mg/L	0.1	SM4110C	25-Apr-23/O	< 0.1	< 0.1	< 1	< 1
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	01-May-23/K	0.26	0.24	129	14.8
Ammonia (N)-unionized	mg/L	0.01	CALC	01-May-23/K	< 0.01	< 0.01	0.25	0.05
Sulphate	mg/L	1	SM4110C	25-Apr-23/O	9	16	152	35
Nitrite (N)	mg/L	0.05	SM4110C	25-Apr-23/O	< 0.05	< 0.05	< 0.5	< 0.5
Nitrate (N)	mg/L	0.05	SM4110C	25-Apr-23/O	1.71	0.93	< 0.5	< 0.5
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	17-May-23/K	0.3	0.3	150	19.1
Hardness (as CaCO3)	mg/L	1	SM 3120	25-Apr-23/O	238	247	943	665
Aluminum	mg/L	0.01	SM 3120	25-Apr-23/O	0.04	0.05	0.14	0.12
Antimony	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001	< 0.0001	0.0004	0.0001
Arsenic	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001	< 0.0001	0.0007	0.0003
Barium	mg/L	0.001	SM 3120	25-Apr-23/O	0.044	0.096	0.311	0.556
Beryllium	mg/L	0.002	SM 3120	25-Apr-23/O	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	0.005	SM 3120	25-Apr-23/O	0.005	0.033	1.85	1.83
Cadmium	mg/L	).000010	EPA 200.8	03-May-23/O	< 0.000010	< 0.000010	< 0.000029	< 0.000012
Calcium	mg/L	0.02	SM 3120	25-Apr-23/O	80.1	67.3	282	215
Chromium	mg/L	0.001	SM 3120	25-Apr-23/O	< 0.001	< 0.001	0.002	< 0.001
Chromium (VI)	mg/L	0.001	MOE E3056	05-May-23/O	< 0.001 1	< 0.001 1	< 0.001	< 0.001 1
Cobalt	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	0.006	0.022

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Steve Garrett
Director of Laboratory Services

C.O.C.: ---

REPORT No. B23-03046 (i)

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: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		12	13-I	13-II	14-II
			Sample I.D.		B23-03046-5	B23-03046-6	B23-03046-7	B23-03046-8
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Copper	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0007	0.0004	0.0002	0.0054
Iron	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	0.027	11.7	0.617
Lead	mg/L	0.00002	EPA 200.8	03-May-23/O	< 0.00002	< 0.00002	< 0.00009	0.00005
Magnesium	mg/L	0.02	SM 3120	25-Apr-23/O	9.21	19.1	57.8	31.1
Manganese	mg/L	0.001	SM 3120	25-Apr-23/O	< 0.001	0.053	0.317	3.05
Mercury	mg/L	0.00002	SM 3112 B	01-May-23/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0001	0.0002	< 0.0002	0.0002
Nickel	mg/L	0.01	SM 3120	25-Apr-23/O	< 0.01	< 0.01	< 0.01	0.02
Potassium	mg/L	0.1	SM 3120	25-Apr-23/O	0.7	1.9	93.4	21.7
Phosphorus-Total	mg/L	0.01	E3516.2	17-May-23/K	0.04	< 0.01	9.28	0.27
Phosphorus	mg/L	0.1	SM 3120	25-Apr-23/O	< 0.1	< 0.1	0.2	< 0.1
Selenium	mg/L	0.001	EPA 200.8	03-May-23/O	< 0.001	< 0.001	0.002	0.001
Silver	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	0.2	SM 3120	25-Apr-23/O	2.9	8.0	243	96.5
Strontium	mg/L	0.001	SM 3120	25-Apr-23/O	0.132	0.767	1.24	0.758
Tin	mg/L	0.05	SM 3120	25-Apr-23/O	< 0.05	< 0.05	< 0.05	< 0.05
Titanium	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/L	0.00005	EPA 200.8	03-May-23/O	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Uranium	mg/L	0.00005	EPA 200.8	03-May-23/O	0.00032	0.00100	0.00060	0.00205
Vanadium	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0003	0.0003	0.0036	0.0008
Zinc	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Anion Sum	meq/L		Calc.	25-Apr-23/O	4.49	4.83	36.2	17.7
Cation Sum	meq/L		Calc.	25-Apr-23/O	4.90	5.33	32.4	18.2
% Difference	%		Calc.	25-Apr-23/O	4.35	4.98	5.53	1.30
Ion Ratio	AS/CS		Calc.	25-Apr-23/O	0.917	0.905	1.12	0.974
Conductivity (calc.)	µmho/cm		Calc.	25-Apr-23/O	436	469	2662	1529
Sodium Adsorption Ratio	-		Calc.	25-Apr-23/O	0.0821	0.223	3.44	1.63

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Steve Garrett
Director of Laboratory Services

C.O.C.: ---

REPORT No. B23-03046 (i)

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: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		12	13-I	13-II	14-II
			Sample I.D.		B23-03046-5	B23-03046-6	B23-03046-7	B23-03046-8
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
TDS(calc.)/EC(actual)	-		Calc.	25-Apr-23/O	0.531	0.532	0.542	0.558
Langelier Index(25°C)	S.I.		Calc.	25-Apr-23/O	0.614	0.642	1.36	1.17

1 Chromium (VI) result is based on total Chromium

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DATE RECEIVED: 20-Apr-23
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SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		16-I	16-II	17-I	17-II
			Sample I.D.		B23-03046-9	B23-03046-10	B23-03046-11	B23-03046-12
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	24-Apr-23/O	309	286	814	397
Conductivity @25°C	µmho/cm	1	SM 2510B	24-Apr-23/O	950	676	1910	879
pH @25°C	pH Units		SM 4500H	24-Apr-23/O	7.74	7.81	7.42	7.66
TDS(ion sum calc.)	mg/L	1	Calc.	25-Apr-23/O	488	388	1095	474
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	24-Apr-23/O	3.1	2.2	16.7	5.8
COD	mg/L	5	SM5220C	25-Apr-23/K	78	23	106	28
Phenolics	mg/L	0.001	MOEE 3179	28-Apr-23/K	< 0.001	< 0.001	< 0.001	< 0.001
Chloride	mg/L	0.5	SM4110C	25-Apr-23/O	77.3	10.5	120	19.3
Fluoride	mg/L	0.1	SM4110C	25-Apr-23/O	< 0.1	< 0.1	< 1	< 0.1
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	01-May-23/K	1.63	0.74	1.60	12.4
Ammonia (N)-unionized	mg/L	0.01	CALC	01-May-23/K	0.01	< 0.01	< 0.01	0.05
Sulphate	mg/L	1	SM4110C	25-Apr-23/O	57	34	44	26
Nitrite (N)	mg/L	0.05	SM4110C	25-Apr-23/O	< 0.05	< 0.05	< 0.5	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	25-Apr-23/O	2.37	2.61	< 0.5	0.47
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	17-May-23/K	2.1	1.1	3.5	16.7
Hardness (as CaCO3)	mg/L	1	SM 3120	25-Apr-23/O	384	304	843	379
Aluminum	mg/L	0.01	SM 3120	25-Apr-23/O	0.07	0.08	0.13	0.07
Antimony	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001	< 0.0001	0.0003	< 0.0001
Arsenic	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001	< 0.0001	0.0006	0.0010
Barium	mg/L	0.001	SM 3120	25-Apr-23/O	0.139	0.166	0.518	0.319
Beryllium	mg/L	0.002	SM 3120	25-Apr-23/O	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	0.005	SM 3120	25-Apr-23/O	0.263	0.159	2.47	0.729
Cadmium	mg/L	).000010	EPA 200.8	03-May-23/O	< 0.000010	0.000028	< 0.000012	< 0.000010
Calcium	mg/L	0.02	SM 3120	25-Apr-23/O	126	103	271	122
Chromium	mg/L	0.001	SM 3120	25-Apr-23/O	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (VI)	mg/L	0.001	MOE E3056	05-May-23/O	< 0.001 1	< 0.001 1	< 0.001	< 0.001 1

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Steve Garrett
Director of Laboratory Services

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DATE RECEIVED: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		16-I	16-II	17-I	17-II
			Sample I.D.		B23-03046-9	B23-03046-10	B23-03046-11	B23-03046-12
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Cobalt	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	0.027	0.005
Copper	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0014	0.0017	0.0063	0.0004
Iron	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	0.005	3.10	6.73
Lead	mg/L	0.00002	EPA 200.8	03-May-23/O	< 0.00002	0.00003	0.00007	0.00002
Magnesium	mg/L	0.02	SM 3120	25-Apr-23/O	16.8	11.4	40.2	18.0
Manganese	mg/L	0.001	SM 3120	25-Apr-23/O	0.033	0.112	2.24	1.44
Mercury	mg/L	0.00002	SM 3112 B	01-May-23/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0006	0.0004	0.0007	0.0004
Nickel	mg/L	0.01	SM 3120	25-Apr-23/O	< 0.01	< 0.01	0.02	< 0.01
Potassium	mg/L	0.1	SM 3120	25-Apr-23/O	15.3	49.0	7.5	17.8
Phosphorus-Total	mg/L	0.01	E3516.2	17-May-23/K	1.16	0.09	0.03	0.02
Phosphorus	mg/L	0.1	SM 3120	25-Apr-23/O	< 0.1	< 0.1	< 0.1	< 0.1
Selenium	mg/L	0.001	EPA 200.8	03-May-23/O	< 0.001	< 0.001	0.002	< 0.001
Silver	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	0.2	SM 3120	25-Apr-23/O	10.3	7.9	118	24.6
Strontium	mg/L	0.001	SM 3120	25-Apr-23/O	0.262	0.199	0.770	0.413
Tin	mg/L	0.05	SM 3120	25-Apr-23/O	< 0.05	< 0.05	< 0.05	< 0.05
Titanium	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/L	0.00005	EPA 200.8	03-May-23/O	< 0.00005	0.00005	0.00005	< 0.00005
Uranium	mg/L	0.00005	EPA 200.8	03-May-23/O	0.00079	0.00067	0.00303	0.00052
Vanadium	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0002	0.0002	0.0009	0.0002
Zinc	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Anion Sum	meq/L		Calc.	25-Apr-23/O	9.72	6.91	20.6	9.05
Cation Sum	meq/L		Calc.	25-Apr-23/O	8.51	7.68	22.4	9.52
% Difference	%		Calc.	25-Apr-23/O	6.62	5.29	4.30	2.52
Ion Ratio	AS/CS		Calc.	25-Apr-23/O	1.14	0.899	0.918	0.951
Conductivity (calc.)	µmho/cm		Calc.	25-Apr-23/O	866	685	1790	813

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Director of Laboratory Services

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WATERWORKS NO.

	Client I.D.			16-I	16-II	17-I	17-II
	Sample I.D.			B23-03046-9	B23-03046-10	B23-03046-11	B23-03046-12
	Date Collected			19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**			
Sodium Adsorption Ratio	-		Calc.	25-Apr-23/O	0.229	0.198	1.77	0.550
TDS(calc.)/EC(actual)	-		Calc.	25-Apr-23/O	0.514	0.573	0.573	0.539
Langelier Index(25°C)	S.I.		Calc.	25-Apr-23/O	0.868	0.827	1.25	0.883

1 Chromium (VI) result is based on total Chromium

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SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		19	25-I	25-II	26-I
			Sample I.D.		B23-03046-13	B23-03046-14	B23-03046-15	B23-03046-16
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	24-Apr-23/O	219	490	805	248
Conductivity @25°C	µmho/cm	1	SM 2510B	24-Apr-23/O	483	1270	1780	873
pH @25°C	pH Units		SM 4500H	24-Apr-23/O	7.79	7.57	7.26	7.94
TDS(ion sum calc.)	mg/L	1	Calc.	25-Apr-23/O	259	711	1047	456
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	24-Apr-23/O	1.0	2.2	11.9	0.6
COD	mg/L	5	SM5220C	25-Apr-23/K	8	19	56	< 5
Phenolics	mg/L	0.001	MOEE 3179	28-Apr-23/K	< 0.001	< 0.001	< 0.001	< 0.001
Chloride	mg/L	0.5	SM4110C	25-Apr-23/O	7.2	99.5	112	128
Fluoride	mg/L	0.1	SM4110C	25-Apr-23/O	< 0.1	< 1	< 1	0.2
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	01-May-23/K	0.23	0.94	0.87	1.94
Ammonia (N)-unionized	mg/L	0.01	CALC	01-May-23/K	< 0.01	< 0.01	< 0.01	0.04
Sulphate	mg/L	1	SM4110C	25-Apr-23/O	17	38	29	6
Nitrite (N)	mg/L	0.05	SM4110C	25-Apr-23/O	< 0.05	< 0.5	< 0.5	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	25-Apr-23/O	1.98	< 0.5	< 0.5	< 0.05
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	17-May-23/K	0.4	1.5	2.1	2.2
Hardness (as CaCO3)	mg/L	1	SM 3120	25-Apr-23/O	262	597	830	231
Aluminum	mg/L	0.01	SM 3120	25-Apr-23/O	0.07	0.11	0.14	0.04
Antimony	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001	0.0001	0.0002	< 0.0001
Arsenic	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001	< 0.0001	0.0002	< 0.0001
Barium	mg/L	0.001	SM 3120	25-Apr-23/O	0.060	0.218	0.332	0.017
Beryllium	mg/L	0.002	SM 3120	25-Apr-23/O	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	0.005	SM 3120	25-Apr-23/O	0.075	0.394	1.08	0.536
Cadmium	mg/L	).000010	EPA 200.8	03-May-23/O	< 0.000010	< 0.000012	< 0.000012	< 0.000010
Calcium	mg/L	0.02	SM 3120	25-Apr-23/O	87.6	173	254	46.4
Chromium	mg/L	0.001	SM 3120	25-Apr-23/O	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (VI)	mg/L	0.001	MOE E3056	05-May-23/O	< 0.001 1	< 0.001 1	< 0.001 1	< 0.001 1

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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. B23-03046 (i)

Report To:

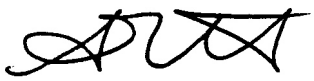
City of Kawartha Lakes
PO Box 9000, 12 Peel St
Lindsay ON K9V 5R8
Attention: Kayla Pantaleo

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		19	25-I	25-II	26-I
			Sample I.D.		B23-03046-13	B23-03046-14	B23-03046-15	B23-03046-16
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Cobalt	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	0.016	< 0.005
Copper	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0009	0.0002	0.0081	0.0002
Iron	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	1.32	0.169	0.013
Lead	mg/L	0.00002	EPA 200.8	03-May-23/O	< 0.00002	< 0.00004	0.00004	< 0.00002
Magnesium	mg/L	0.02	SM 3120	25-Apr-23/O	10.4	40.0	47.4	28.0
Manganese	mg/L	0.001	SM 3120	25-Apr-23/O	< 0.001	0.159	1.35	0.001
Mercury	mg/L	0.00002	SM 3112 B	01-May-23/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0001	0.0002	0.0002	< 0.0001
Nickel	mg/L	0.01	SM 3120	25-Apr-23/O	< 0.01	0.01	0.03	< 0.01
Potassium	mg/L	0.1	SM 3120	25-Apr-23/O	1.1	3.0	2.3	11.3
Phosphorus-Total	mg/L	0.01	E3516.2	17-May-23/K	0.07	0.14	0.36	< 0.01
Phosphorus	mg/L	0.1	SM 3120	25-Apr-23/O	< 0.1	< 0.1	< 0.1	< 0.1
Selenium	mg/L	0.001	EPA 200.8	03-May-23/O	< 0.001	0.001	0.002	0.003
Silver	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	0.2	SM 3120	25-Apr-23/O	4.5	61.3	118	87.1
Strontium	mg/L	0.001	SM 3120	25-Apr-23/O	0.153	0.868	0.652	2.41
Tin	mg/L	0.05	SM 3120	25-Apr-23/O	< 0.05	< 0.05	< 0.05	< 0.05
Titanium	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/L	0.00005	EPA 200.8	03-May-23/O	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Uranium	mg/L	0.00005	EPA 200.8	03-May-23/O	0.00038	0.00075	0.00196	< 0.00005
Vanadium	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0002	0.0003	0.0006	< 0.0001
Zinc	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	0.005	< 0.005
Anion Sum	meq/L		Calc.	25-Apr-23/O	5.06	13.4	19.8	8.70
Cation Sum	meq/L		Calc.	25-Apr-23/O	5.45	14.7	21.8	8.70
% Difference	%		Calc.	25-Apr-23/O	3.68	4.78	4.79	0.00545
Ion Ratio	AS/CS		Calc.	25-Apr-23/O	0.929	0.909	0.909	1.00
Conductivity (calc.)	µmho/cm		Calc.	25-Apr-23/O	486	1255	1743	860



Steve Garrett
Director of Laboratory Services

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

C.O.C.: ---

REPORT No. B23-03046 (i)

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: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		19	25-I	25-II	26-I
			Sample I.D.		B23-03046-13	B23-03046-14	B23-03046-15	B23-03046-16
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Sodium Adsorption Ratio	-		Calc.	25-Apr-23/O	0.121	1.09	1.78	2.49
TDS(calc.)/EC(actual)	-		Calc.	25-Apr-23/O	0.536	0.560	0.587	0.522
Langelier Index(25°C)	S.I.		Calc.	25-Apr-23/O	0.640	1.02	1.06	0.539

1 . Chromium (VI) result is based on total Chromium

2 . Elevated RL due to Bromide interference

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Director of Laboratory Services

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DATE RECEIVED: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		26-II	26-III	27-I	27-II
			Sample I.D.		B23-03046-17	B23-03046-18	B23-03046-19	B23-03046-20
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	24-Apr-23/O	375	702	190	220
Conductivity @25°C	µmho/cm	1	SM 2510B	24-Apr-23/O	978	1620	3950	491
pH @25°C	pH Units		SM 4500H	24-Apr-23/O	7.69	7.42	7.89	7.91
TDS(ion sum calc.)	mg/L	1	Calc.	25-Apr-23/O	543	915	2122	262
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	24-Apr-23/O	2.4	7.1	< 0.2	1.5
COD	mg/L	5	SM5220C	25-Apr-23/K	19	62	34	18
Phenolics	mg/L	0.001	MOEE 3179	28-Apr-23/K	< 0.001	< 0.001	< 0.001	< 0.001
Chloride	mg/L	0.5	SM4110C	25-Apr-23/O	60.8	110	1250	7.3
Fluoride	mg/L	0.1	SM4110C	25-Apr-23/O	< 0.1	< 1	< 1	< 0.1
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	01-May-23/K	0.71	0.36	3.05	0.48
Ammonia (N)-unionized	mg/L	0.01	CALC	01-May-23/K	< 0.01	< 0.01	0.03	< 0.01
Sulphate	mg/L	1	SM4110C	25-Apr-23/O	51	15	< 10	16
Nitrite (N)	mg/L	0.05	SM4110C	25-Apr-23/O	< 0.05	< 0.5	< 0.5	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	25-Apr-23/O	0.60	< 0.5	< 0.5	2.02
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	17-May-23/K	0.9	1.3	3.8	0.7
Hardness (as CaCO3)	mg/L	1	SM 3120	25-Apr-23/O	473	851	375	268
Aluminum	mg/L	0.01	SM 3120	25-Apr-23/O	0.09	0.14	0.04	0.05
Antimony	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001	0.0005	< 0.0003	< 0.0001
Barium	mg/L	0.001	SM 3120	25-Apr-23/O	0.177	0.380	0.052	0.067
Beryllium	mg/L	0.002	SM 3120	25-Apr-23/O	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	0.005	SM 3120	25-Apr-23/O	0.254	0.250	1.34	0.080
Cadmium	mg/L	).000010	EPA 200.8	03-May-23/O	0.000020	< 0.000012	< 0.000029	< 0.000010
Calcium	mg/L	0.02	SM 3120	25-Apr-23/O	143	235	78.6	89.6
Chromium	mg/L	0.001	SM 3120	25-Apr-23/O	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (VI)	mg/L	0.001	MOE E3056	05-May-23/O	< 0.001 1	< 0.001 1	< 0.001 1	< 0.001 1

R.L. = Reporting Limit
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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Steve Garrett
Director of Laboratory Services

C.O.C.: ---

REPORT No. B23-03046 (i)

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: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		26-II	26-III	27-I	27-II
			Sample I.D.		B23-03046-17	B23-03046-18	B23-03046-19	B23-03046-20
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Cobalt	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	0.030	< 0.005	< 0.005
Copper	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0053	0.0014	< 0.0002	0.0010
Iron	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	3.06	0.114	< 0.005
Lead	mg/L	0.00002	EPA 200.8	03-May-23/O	< 0.00002	< 0.00004	< 0.00009	< 0.00002
Magnesium	mg/L	0.02	SM 3120	25-Apr-23/O	28.0	64.2	43.4	10.8
Manganese	mg/L	0.001	SM 3120	25-Apr-23/O	0.507	2.63	0.002	< 0.001
Mercury	mg/L	0.00002	SM 3112 B	01-May-23/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0003	0.0003	< 0.0002	0.0001
Nickel	mg/L	0.01	SM 3120	25-Apr-23/O	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	0.1	SM 3120	25-Apr-23/O	1.4	2.3	18.5	1.3
Phosphorus-Total	mg/L	0.01	E3516.2	17-May-23/K	0.03	0.95	< 0.01	< 0.01
Phosphorus	mg/L	0.1	SM 3120	25-Apr-23/O	< 0.1	< 0.1	< 0.1	< 0.1
Selenium	mg/L	0.001	EPA 200.8	03-May-23/O	< 0.001	0.001	<0.02 [2]	< 0.001
Silver	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	0.2	SM 3120	25-Apr-23/O	33.2	62.1	621	4.8
Strontium	mg/L	0.001	SM 3120	25-Apr-23/O	0.316	0.603	4.99	0.156
Tin	mg/L	0.05	SM 3120	25-Apr-23/O	< 0.05	< 0.05	< 0.05	< 0.05
Titanium	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/L	0.00005	EPA 200.8	03-May-23/O	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Uranium	mg/L	0.00005	EPA 200.8	03-May-23/O	0.00471	0.0123	0.00034	0.00038
Vanadium	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0003	0.0005	< 0.0004	0.0003
Zinc	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Anion Sum	meq/L		Calc.	25-Apr-23/O	10.3	17.4	39.0	5.08
Cation Sum	meq/L		Calc.	25-Apr-23/O	10.9	20.0	35.0	5.60
% Difference	%		Calc.	25-Apr-23/O	2.95	6.97	5.38	4.92
Ion Ratio	AS/CS		Calc.	25-Apr-23/O	0.943	0.870	1.11	0.906
Conductivity (calc.)	µmho/cm		Calc.	25-Apr-23/O	968	1586	3835	494

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Steve Garrett
Director of Laboratory Services

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REPORT No. B23-03046 (i)

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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: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

	Client I.D.			26-II	26-III	27-I	27-II
	Sample I.D.			B23-03046-17	B23-03046-18	B23-03046-19	B23-03046-20
	Date Collected			19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**			
Sodium Adsorption Ratio	-		Calc.	25-Apr-23/O	0.665	0.926	14.0	0.129
TDS(calc.)/EC(actual)	-		Calc.	25-Apr-23/O	0.555	0.567	0.537	0.533
Langelier Index(25°C)	S.I.		Calc.	25-Apr-23/O	0.947	1.13	0.542	0.772

1 Chromium (VI) result is based on total Chromium

2 Elevated RL due to Bromide interference

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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DATE RECEIVED: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		29-I	29-II	29-III	30
			Sample I.D.		B23-03046-21	B23-03046-22	B23-03046-23	B23-03046-24
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	24-Apr-23/O	220	417	318	202
Conductivity @25°C	µmho/cm	1	SM 2510B	24-Apr-23/O	1150	926	735	561
pH @25°C	pH Units		SM 4500H	24-Apr-23/O	8.26	7.78	7.88	7.92
TDS(ion sum calc.)	mg/L	1	Calc.	25-Apr-23/O	590	520	410	294
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	24-Apr-23/O	< 0.2	3.9	2.0	8.0
COD	mg/L	5	SM5220C	25-Apr-23/K	65	186	43	50
Phenolics	mg/L	0.001	MOEE 3179	28-Apr-23/K	< 0.001	< 0.001	< 0.001	< 0.001
Chloride	mg/L	0.5	SM4110C	25-Apr-23/O	232	31.0	24.1	48.0
Fluoride	mg/L	0.1	SM4110C	25-Apr-23/O	1.6	< 0.1	< 0.1	< 0.1
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	01-May-23/K	3.78	0.28	0.35	0.34
Ammonia (N)-unionized	mg/L	0.01	CALC	01-May-23/K	0.11	< 0.01	< 0.01	< 0.01
Sulphate	mg/L	1	SM4110C	25-Apr-23/O	< 10	35	35	13
Nitrite (N)	mg/L	0.05	SM4110C	25-Apr-23/O	< 0.5	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	25-Apr-23/O	< 0.5	0.12	0.12	0.17
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	17-May-23/K	5.1	0.6	0.7	1.2
Hardness (as CaCO3)	mg/L	1	SM 3120	25-Apr-23/O	44	486	403	279
Aluminum	mg/L	0.01	SM 3120	25-Apr-23/O	0.01	0.10	0.08	0.05
Antimony	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0002	< 0.0001	< 0.0001	< 0.0001
Arsenic	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001	0.0004	0.0001	0.0002
Barium	mg/L	0.001	SM 3120	25-Apr-23/O	0.015	0.184	0.163	0.142
Beryllium	mg/L	0.002	SM 3120	25-Apr-23/O	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	0.005	SM 3120	25-Apr-23/O	1.58	0.225	0.045	0.091
Cadmium	mg/L	).000010	EPA 200.8	03-May-23/O	< 0.000012	< 0.000010	< 0.000010	< 0.000010
Calcium	mg/L	0.02	SM 3120	25-Apr-23/O	9.15	151	127	75.7
Chromium	mg/L	0.001	SM 3120	25-Apr-23/O	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (VI)	mg/L	0.001	MOE E3056	05-May-23/O	< 0.001 1	< 0.001 1	< 0.001 1	< 0.001 1

R.L. = Reporting Limit
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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. B23-03046 (i)

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: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		29-I	29-II	29-III	30
			Sample I.D.		B23-03046-21	B23-03046-22	B23-03046-23	B23-03046-24
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Cobalt	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Copper	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0002	0.0003	0.0003	0.0001
Iron	mg/L	0.005	SM 3120	25-Apr-23/O	0.005	1.30	0.959	1.31
Lead	mg/L	0.00002	EPA 200.8	03-May-23/O	< 0.00004	< 0.00002	< 0.00002	0.00003
Magnesium	mg/L	0.02	SM 3120	25-Apr-23/O	5.16	26.4	20.9	21.8
Manganese	mg/L	0.001	SM 3120	25-Apr-23/O	< 0.001	0.033	0.062	0.051
Mercury	mg/L	0.00002	SM 3112 B	01-May-23/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001	0.0002	0.0002	< 0.0001
Nickel	mg/L	0.01	SM 3120	25-Apr-23/O	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	0.1	SM 3120	25-Apr-23/O	5.7	2.0	1.6	1.9
Phosphorus-Total	mg/L	0.01	E3516.2	17-May-23/K	1.92	9.69	1.04	0.32
Phosphorus	mg/L	0.1	SM 3120	25-Apr-23/O	< 0.1	< 0.1	< 0.1	< 0.1
Selenium	mg/L	0.001	EPA 200.8	03-May-23/O	0.005	< 0.001	< 0.001	0.001
Silver	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	0.2	SM 3120	25-Apr-23/O	204	22.8	9.3	10.8
Strontium	mg/L	0.001	SM 3120	25-Apr-23/O	0.553	0.353	0.288	0.770
Tin	mg/L	0.05	SM 3120	25-Apr-23/O	< 0.05	< 0.05	< 0.05	< 0.05
Titanium	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/L	0.00005	EPA 200.8	03-May-23/O	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Uranium	mg/L	0.00005	EPA 200.8	03-May-23/O	0.00008	0.00259	0.00039	< 0.00005
Vanadium	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001	< 0.0001	0.0001	0.0001
Zinc	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Anion Sum	meq/L		Calc.	25-Apr-23/O	11.0	9.94	7.77	5.67
Cation Sum	meq/L		Calc.	25-Apr-23/O	9.90	10.8	8.56	6.16
% Difference	%		Calc.	25-Apr-23/O	5.37	4.25	4.84	4.15
Ion Ratio	AS/CS		Calc.	25-Apr-23/O	1.11	0.918	0.908	0.920
Conductivity (calc.)	µmho/cm		Calc.	25-Apr-23/O	1095	924	747	572

Steve Garrett
Director of Laboratory Services

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REPORT No. B23-03046 (i)

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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: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		29-I	29-II	29-III	30
			Sample I.D.		B23-03046-21	B23-03046-22	B23-03046-23	B23-03046-24
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Sodium Adsorption Ratio	-		Calc.	25-Apr-23/O	13.4	0.450	0.202	0.281
TDS(calc.)/EC(actual)	-		Calc.	25-Apr-23/O	0.513	0.561	0.557	0.523
Langelier Index(25°C)	S.I.		Calc.	25-Apr-23/O	0.0912	1.12	1.02	0.662

1 Chromium (VI) result is based on total Chromium

2 Elevated RL due to Bromide interference

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SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
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WATERWORKS NO.

			Client I.D.		31	33-I	33-II	34
			Sample I.D.		B23-03046-25	B23-03046-26	B23-03046-27	B23-03046-28
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	24-Apr-23/O	853	289	224	263
Conductivity @25°C	µmho/cm	1	SM 2510B	24-Apr-23/O	2110	1750	459	2510
pH @25°C	pH Units		SM 4500H	24-Apr-23/O	7.35	8.03	8.00	8.03
TDS(ion sum calc.)	mg/L	1	Calc.	25-Apr-23/O	1181	898	247	1305
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	24-Apr-23/O	14.4	< 0.2	1.1	< 0.2
COD	mg/L	5	SM5220C	25-Apr-23/K	4340	16	113	23
Phenolics	mg/L	0.001	MOEE 3179	28-Apr-23/K	< 0.001	< 0.001	< 0.001	< 0.001
Chloride	mg/L	0.5	SM4110C	25-Apr-23/O	178	378	3.6	680
Fluoride	mg/L	0.1	SM4110C	25-Apr-23/O	< 1	< 1	< 0.1	< 1
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	01-May-23/K	1.78	1.51	0.19	1.62
Ammonia (N)-unionized	mg/L	0.01	CALC	01-May-23/K	< 0.01	0.02	< 0.01	0.02
Sulphate	mg/L	1	SM4110C	25-Apr-23/O	43	< 10	11	< 10
Nitrite (N)	mg/L	0.05	SM4110C	25-Apr-23/O	< 0.5	< 0.5	< 0.05	< 0.5
Nitrate (N)	mg/L	0.05	SM4110C	25-Apr-23/O	< 0.5	< 0.5	0.86	< 0.5
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	17-May-23/K	9.8	2.0	0.7	2.2
Hardness (as CaCO3)	mg/L	1	SM 3120	25-Apr-23/O	875	186	253	341
Aluminum	mg/L	0.01	SM 3120	25-Apr-23/O	0.14	0.04	0.05	0.04
Antimony	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0002	0.0002	< 0.0001	0.0003
Arsenic	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0011	0.0008	0.0002	0.0017
Barium	mg/L	0.001	SM 3120	25-Apr-23/O	0.604	0.032	0.056	0.074
Beryllium	mg/L	0.002	SM 3120	25-Apr-23/O	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	0.005	SM 3120	25-Apr-23/O	0.416	2.48	< 0.005	1.34
Cadmium	mg/L	).000010	EPA 200.8	03-May-23/O	< 0.000029	< 0.000012	< 0.000010	< 0.000029
Calcium	mg/L	0.02	SM 3120	25-Apr-23/O	227	35.8	85.8	60.9
Chromium	mg/L	0.001	SM 3120	25-Apr-23/O	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (VI)	mg/L	0.001	MOE E3056	05-May-23/O	< 0.001 1	< 0.001 1	< 0.001 1	< 0.001 1

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Steve Garrett
Director of Laboratory Services

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B23-03046 (i)

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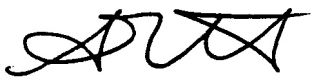
City of Kawartha Lakes
PO Box 9000, 12 Peel St
Lindsay ON K9V 5R8
Attention: Kayla Pantaleo

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		31	33-I	33-II	34
			Sample I.D.		B23-03046-25	B23-03046-26	B23-03046-27	B23-03046-28
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Cobalt	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Copper	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0004	0.0002	0.0005	0.0002
Iron	mg/L	0.005	SM 3120	25-Apr-23/O	6.95	0.019	< 0.005	0.975
Lead	mg/L	0.00002	EPA 200.8	03-May-23/O	0.00009	< 0.00004	< 0.00002	< 0.00009
Magnesium	mg/L	0.02	SM 3120	25-Apr-23/O	74.8	23.4	9.44	46.0
Manganese	mg/L	0.001	SM 3120	25-Apr-23/O	0.087	0.013	0.016	0.019
Mercury	mg/L	0.00002	SM 3112 B	01-May-23/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0003	0.0084	0.0002	0.0005
Nickel	mg/L	0.01	SM 3120	25-Apr-23/O	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	0.1	SM 3120	25-Apr-23/O	7.6	10.9	0.9	11.0
Phosphorus-Total	mg/L	0.01	E3516.2	17-May-23/K	11.9	0.09	5.92	0.17
Phosphorus	mg/L	0.1	SM 3120	25-Apr-23/O	< 0.1	< 0.1	< 0.1	< 0.1
Selenium	mg/L	0.001	EPA 200.8	03-May-23/O	0.002	<0.01 [2]	0.001	<0.02 [2]
Silver	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	0.2	SM 3120	25-Apr-23/O	132	276	2.4	348
Strontium	mg/L	0.001	SM 3120	25-Apr-23/O	2.33	2.15	0.193	3.44
Tin	mg/L	0.05	SM 3120	25-Apr-23/O	< 0.05	< 0.05	< 0.05	< 0.05
Titanium	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/L	0.00005	EPA 200.8	03-May-23/O	< 0.00005	0.00009	< 0.00005	0.00005
Uranium	mg/L	0.00005	EPA 200.8	03-May-23/O	0.00009	0.00013	0.00368	0.00060
Vanadium	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0019	< 0.0001	0.0006	< 0.0004
Zinc	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Anion Sum	meq/L		Calc.	25-Apr-23/O	23.0	16.4	4.86	24.4
Cation Sum	meq/L		Calc.	25-Apr-23/O	23.8	16.0	5.19	22.3
% Difference	%		Calc.	25-Apr-23/O	1.78	1.40	3.24	4.59
Ion Ratio	AS/CS		Calc.	25-Apr-23/O	0.965	1.03	0.937	1.10
Conductivity (calc.)	µmho/cm		Calc.	25-Apr-23/O	1937	1662	465	2412



Steve Garrett
Director of Laboratory Services

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DATE RECEIVED: 20-Apr-23
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SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		31	33-I	33-II	34
			Sample I.D.		B23-03046-25	B23-03046-26	B23-03046-27	B23-03046-28
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Sodium Adsorption Ratio	-		Calc.	25-Apr-23/O	1.94	8.81	0.0665	8.19
TDS(calc.)/EC(actual)	-		Calc.	25-Apr-23/O	0.560	0.513	0.539	0.520
Langelier Index(25°C)	S.I.		Calc.	25-Apr-23/O	1.12	0.552	0.850	0.721

1 Chromium (VI) result is based on total Chromium

2 Elevated RL due to Bromide interference

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			Client I.D.		35	36	37	201
			Sample I.D.		B23-03046-29	B23-03046-30	B23-03046-31	B23-03046-32
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	24-Apr-23/O	505	218	321	211
Conductivity @25°C	µmho/cm	1	SM 2510B	24-Apr-23/O	1200	494	742	452
pH @25°C	pH Units		SM 4500H	24-Apr-23/O	7.63	7.81	7.79	8.02
TDS(ion sum calc.)	mg/L	1	Calc.	25-Apr-23/O	673	269	444	244
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	24-Apr-23/O	4.0	10.9	21.1	1.2
COD	mg/L	5	SM5220C	25-Apr-23/K	425	214	197	46
Phenolics	mg/L	0.001	MOEE 3179	28-Apr-23/K	< 0.001	< 0.001	< 0.001	< 0.001
Chloride	mg/L	0.5	SM4110C	25-Apr-23/O	72.2	10.5	9.6	7.4
Fluoride	mg/L	0.1	SM4110C	25-Apr-23/O	< 1	< 0.1	< 0.1	< 0.1
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	01-May-23/K	0.29	0.29	0.36	< 0.01
Ammonia (N)-unionized	mg/L	0.01	CALC	01-May-23/K	< 0.01	< 0.01	< 0.01	< 0.01
Sulphate	mg/L	1	SM4110C	25-Apr-23/O	27	22	55	11
Nitrite (N)	mg/L	0.05	SM4110C	25-Apr-23/O	< 0.5	< 0.05	0.07	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	25-Apr-23/O	< 0.5	0.08	0.26	1.59
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	17-May-23/K	9.6	3.0	2.7	0.5
Hardness (as CaCO3)	mg/L	1	SM 3120	25-Apr-23/O	626	249	446	247
Aluminum	mg/L	0.01	SM 3120	25-Apr-23/O	0.11	0.05	0.12	0.05
Antimony	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0002	< 0.0001	0.0002	< 0.0001
Arsenic	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0001	0.0003	0.0006	< 0.0001
Barium	mg/L	0.001	SM 3120	25-Apr-23/O	0.230	0.089	0.157	0.063
Beryllium	mg/L	0.002	SM 3120	25-Apr-23/O	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	0.005	SM 3120	25-Apr-23/O	0.095	0.077	0.010	0.054
Cadmium	mg/L	).000010	EPA 200.8	03-May-23/O	0.000157	0.000010	< 0.000010	< 0.000010
Calcium	mg/L	0.02	SM 3120	25-Apr-23/O	177	82.5	162	82.2
Chromium	mg/L	0.001	SM 3120	25-Apr-23/O	< 0.001	< 0.001	0.001	< 0.001
Chromium (VI)	mg/L	0.001	MOE E3056	05-May-23/O	< 0.001 1	< 0.001 1	< 0.001	< 0.001 1

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			Client I.D.		35	36	37	201
			Sample I.D.		B23-03046-29	B23-03046-30	B23-03046-31	B23-03046-32
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Cobalt	mg/L	0.005	SM 3120	25-Apr-23/O	0.013	< 0.005	< 0.005	< 0.005
Copper	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0048	0.0006	0.0035	0.0009
Iron	mg/L	0.005	SM 3120	25-Apr-23/O	0.041	0.503	2.54	< 0.005
Lead	mg/L	0.00002	EPA 200.8	03-May-23/O	< 0.00004	0.00003	0.00009	< 0.00002
Magnesium	mg/L	0.02	SM 3120	25-Apr-23/O	44.7	10.3	10.0	10.1
Manganese	mg/L	0.001	SM 3120	25-Apr-23/O	2.26	0.040	0.503	< 0.001
Mercury	mg/L	0.00002	SM 3112 B	01-May-23/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0002	0.0006	0.0012	0.0001
Nickel	mg/L	0.01	SM 3120	25-Apr-23/O	0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	0.1	SM 3120	25-Apr-23/O	2.4	2.0	1.0	1.2
Phosphorus-Total	mg/L	0.01	E3516.2	17-May-23/K	4.10	2.10	1.55	1.49
Phosphorus	mg/L	0.1	SM 3120	25-Apr-23/O	< 0.1	< 0.1	< 0.1	< 0.1
Selenium	mg/L	0.001	EPA 200.8	03-May-23/O	< 0.001	< 0.001	< 0.001	< 0.001
Silver	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	0.2	SM 3120	25-Apr-23/O	43.5	10.7	10.7	5.5
Strontium	mg/L	0.001	SM 3120	25-Apr-23/O	0.874	0.135	0.268	0.133
Tin	mg/L	0.05	SM 3120	25-Apr-23/O	< 0.05	< 0.05	< 0.05	< 0.05
Titanium	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/L	0.00005	EPA 200.8	03-May-23/O	0.00013	< 0.00005	< 0.00005	< 0.00005
Uranium	mg/L	0.00005	EPA 200.8	03-May-23/O	0.00592	0.00647	0.00303	0.00035
Vanadium	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0009	0.0006	0.0026	0.0003
Zinc	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Anion Sum	meq/L		Calc.	25-Apr-23/O	12.7	5.12	7.85	4.76
Cation Sum	meq/L		Calc.	25-Apr-23/O	14.6	5.51	9.56	5.20
% Difference	%		Calc.	25-Apr-23/O	6.83	3.70	9.77	4.42
Ion Ratio	AS/CS		Calc.	25-Apr-23/O	0.872	0.929	0.822	0.915
Conductivity (calc.)	µmho/cm		Calc.	25-Apr-23/O	1199	499	787	462

Steve Garrett
Director of Laboratory Services

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

C.O.C.: ---

REPORT No. B23-03046 (i)

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: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		35	36	37	201
			Sample I.D.		B23-03046-29	B23-03046-30	B23-03046-31	B23-03046-32
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Sodium Adsorption Ratio	-		Calc.	25-Apr-23/O	0.756	0.295	0.221	0.153
TDS(calc.)/EC(actual)	-		Calc.	25-Apr-23/O	0.559	0.545	0.598	0.539
Langelier Index(25°C)	S.I.		Calc.	25-Apr-23/O	1.10	0.621	1.04	0.826

1 Chromium (VI) result is based on total Chromium

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Steve Garrett
Director of Laboratory Services

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CERTIFICATE OF ANALYSIS

Final Report

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SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
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WATERWORKS NO.

			Client I.D.		DUP	DUP - 1	DUP - 2	DUP - 3
			Sample I.D.		B23-03046-33	B23-03046-34	B23-03046-35	B23-03046-36
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	24-Apr-23/O	238	295	199	213
Conductivity @25°C	µmho/cm	1	SM 2510B	24-Apr-23/O	3770	3410	435	458
pH @25°C	pH Units		SM 4500H	24-Apr-23/O	7.90	8.06	8.00	8.01
TDS(ion sum calc.)	mg/L	1	Calc.	25-Apr-23/O	1920	1735	226	243
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	24-Apr-23/O	< 0.2	< 0.2	1.7	1.3
COD	mg/L	5	SM5220C	25-Apr-23/K	39	28	< 5	36
Phenolics	mg/L	0.001	MOEE 3179	28-Apr-23/K	< 0.001	< 0.001	< 0.001	< 0.001
Chloride	mg/L	0.5	SM4110C	25-Apr-23/O	1070	978	5.5	7.4
Fluoride	mg/L	0.1	SM4110C	25-Apr-23/O	< 1	< 1	< 0.1	< 0.1
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	01-May-23/K	2.45	2.24	0.04	0.75
Ammonia (N)-unionized	mg/L	0.01	CALC	01-May-23/K	0.04	0.03	< 0.01	0.02
Sulphate	mg/L	1	SM4110C	25-Apr-23/O	19	< 10	9	11
Nitrite (N)	mg/L	0.05	SM4110C	25-Apr-23/O	< 0.5	< 0.5	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	25-Apr-23/O	< 0.5	< 0.5	1.70	1.50
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	17-May-23/K	3.0	2.6	0.2	1.3
Hardness (as CaCO3)	mg/L	1	SM 3120	25-Apr-23/O	515	352	237	242
Aluminum	mg/L	0.01	SM 3120	25-Apr-23/O	0.05	0.05	0.04	0.05
Antimony	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0002	0.0002	< 0.0001	< 0.0001
Arsenic	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0003	0.0022	< 0.0001	< 0.0001
Barium	mg/L	0.001	SM 3120	25-Apr-23/O	0.083	0.082	0.044	0.060
Beryllium	mg/L	0.002	SM 3120	25-Apr-23/O	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	0.005	SM 3120	25-Apr-23/O	0.290	1.65	0.008	0.048
Cadmium	mg/L	).000010	EPA 200.8	03-May-23/O	< 0.000029	< 0.000029	< 0.000010	< 0.000010
Calcium	mg/L	0.02	SM 3120	25-Apr-23/O	113	61.7	79.9	80.2
Chromium	mg/L	0.001	SM 3120	25-Apr-23/O	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (VI)	mg/L	0.001	MOE E3056	05-May-23/O	< 0.001 1	< 0.001 1	< 0.001 1	< 0.001 1

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Steve Garrett
Director of Laboratory Services

C.O.C.: ---

REPORT No. B23-03046 (i)

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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: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		DUP	DUP - 1	DUP - 2	DUP - 3
			Sample I.D.		B23-03046-33	B23-03046-34	B23-03046-35	B23-03046-36
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Cobalt	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Copper	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0002	0.0002	0.0005	0.0007
Iron	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	1.16	< 0.005	< 0.005
Lead	mg/L	0.00002	EPA 200.8	03-May-23/O	< 0.00009	< 0.00009	< 0.00002	< 0.00002
Magnesium	mg/L	0.02	SM 3120	25-Apr-23/O	56.6	48.2	9.08	10.0
Manganese	mg/L	0.001	SM 3120	25-Apr-23/O	0.001	0.023	< 0.001	< 0.001
Mercury	mg/L	0.00002	SM 3112 B	01-May-23/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0003	0.0005	< 0.0001	0.0001
Nickel	mg/L	0.01	SM 3120	25-Apr-23/O	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	0.1	SM 3120	25-Apr-23/O	11.0	13.0	0.7	1.1
Phosphorus-Total	mg/L	0.01	E3516.2	17-May-23/K	0.11	0.06	0.03	1.69
Phosphorus	mg/L	0.1	SM 3120	25-Apr-23/O	< 0.1	< 0.1	< 0.1	< 0.1
Selenium	mg/L	0.001	EPA 200.8	03-May-23/O	<0.02 [2]	<0.02 [2]	< 0.001	< 0.001
Silver	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0003	0.0001	< 0.0001	< 0.0001
Sodium	mg/L	0.2	SM 3120	25-Apr-23/O	245	456	3.0	5.4
Strontium	mg/L	0.001	SM 3120	25-Apr-23/O	4.21	3.95	0.131	0.132
Tin	mg/L	0.05	SM 3120	25-Apr-23/O	< 0.05	< 0.05	< 0.05	< 0.05
Titanium	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/L	0.00005	EPA 200.8	03-May-23/O	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Uranium	mg/L	0.00005	EPA 200.8	03-May-23/O	0.00026	0.00012	0.00033	0.00033
Vanadium	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0004	< 0.0004	0.0003	0.0003
Zinc	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Anion Sum	meq/L		Calc.	25-Apr-23/O	35.4	33.5	4.44	4.79
Cation Sum	meq/L		Calc.	25-Apr-23/O	33.2	27.3	4.88	5.09
% Difference	%		Calc.	25-Apr-23/O	3.30	10.2	4.75	2.98
Ion Ratio	AS/CS		Calc.	25-Apr-23/O	1.07	1.23	0.909	0.942
Conductivity (calc.)	µmho/cm		Calc.	25-Apr-23/O	3443	3141	433	458

Steve Garrett
Director of Laboratory Services

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C.O.C.: ---

REPORT No. B23-03046 (i)

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: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		DUP	DUP - 1	DUP - 2	DUP - 3
			Sample I.D.		B23-03046-33	B23-03046-34	B23-03046-35	B23-03046-36
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Sodium Adsorption Ratio	-		Calc.	25-Apr-23/O	7.71	10.6	0.0837	0.150
TDS(calc.)/EC(actual)	-		Calc.	25-Apr-23/O	0.509	0.509	0.521	0.530
Langelier Index(25°C)	S.I.		Calc.	25-Apr-23/O	0.920	0.807	0.769	0.810

1 Chromium (VI) result is based on total Chromium

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CERTIFICATE OF ANALYSIS

Final Report

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SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		DUP - 4			
			Sample I.D.		B23-03046-37			
			Date Collected		19-Apr-23			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	24-Apr-23/O	501			
Conductivity @25°C	µmho/cm	1	SM 2510B	24-Apr-23/O	1270			
pH @25°C	pH Units		SM 4500H	24-Apr-23/O	7.70			
TDS(ion sum calc.)	mg/L	1	Calc.	25-Apr-23/O	711			
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	24-Apr-23/O	2.5			
COD	mg/L	5	SM5220C	25-Apr-23/K	19			
Phenolics	mg/L	0.001	MOEE 3179	28-Apr-23/K	< 0.001			
Chloride	mg/L	0.5	SM4110C	25-Apr-23/O	98.3			
Fluoride	mg/L	0.1	SM4110C	25-Apr-23/O	< 1			
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	01-May-23/K	0.08			
Ammonia (N)-unionized	mg/L	0.01	CALC	01-May-23/K	< 0.01			
Sulphate	mg/L	1	SM4110C	25-Apr-23/O	39			
Nitrite (N)	mg/L	0.05	SM4110C	25-Apr-23/O	< 0.5			
Nitrate (N)	mg/L	0.05	SM4110C	25-Apr-23/O	< 0.5			
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	17-May-23/K	0.4			
Hardness (as CaCO3)	mg/L	1	SM 3120	25-Apr-23/O	587			
Aluminum	mg/L	0.01	SM 3120	25-Apr-23/O	0.10			
Antimony	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001			
Arsenic	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001			
Barium	mg/L	0.001	SM 3120	25-Apr-23/O	0.216			
Beryllium	mg/L	0.002	SM 3120	25-Apr-23/O	< 0.002			
Boron	mg/L	0.005	SM 3120	25-Apr-23/O	0.385			
Cadmium	mg/L	0.000010	EPA 200.8	03-May-23/O	< 0.000012			
Calcium	mg/L	0.02	SM 3120	25-Apr-23/O	170			
Chromium	mg/L	0.001	SM 3120	25-Apr-23/O	< 0.001			
Chromium (VI)	mg/L	0.001	MOE E3056	05-May-23/O	< 0.001 [1]			

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			Client I.D.		DUP - 4			
			Sample I.D.		B23-03046-37			
			Date Collected		19-Apr-23			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Cobalt	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005			
Copper	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001			
Iron	mg/L	0.005	SM 3120	25-Apr-23/O	1.23			
Lead	mg/L	0.00002	EPA 200.8	03-May-23/O	< 0.00004			
Magnesium	mg/L	0.02	SM 3120	25-Apr-23/O	39.3			
Manganese	mg/L	0.001	SM 3120	25-Apr-23/O	0.149			
Mercury	mg/L	0.00002	SM 3112 B	01-May-23/O	< 0.00002			
Molybdenum	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0002			
Nickel	mg/L	0.01	SM 3120	25-Apr-23/O	0.01			
Potassium	mg/L	0.1	SM 3120	25-Apr-23/O	2.9			
Phosphorus-Total	mg/L	0.01	E3516.2	17-May-23/K	0.11			
Phosphorus	mg/L	0.1	SM 3120	25-Apr-23/O	< 0.1			
Selenium	mg/L	0.001	EPA 200.8	03-May-23/O	0.001			
Silver	mg/L	0.0001	EPA 200.8	03-May-23/O	< 0.0001			
Sodium	mg/L	0.2	SM 3120	25-Apr-23/O	59.8			
Strontium	mg/L	0.001	SM 3120	25-Apr-23/O	0.850			
Tin	mg/L	0.05	SM 3120	25-Apr-23/O	< 0.05			
Titanium	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005			
Thallium	mg/L	0.00005	EPA 200.8	03-May-23/O	< 0.00005			
Uranium	mg/L	0.00005	EPA 200.8	03-May-23/O	0.00075			
Vanadium	mg/L	0.0001	EPA 200.8	03-May-23/O	0.0003			
Zinc	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005			
Anion Sum	meq/L		Calc.	25-Apr-23/O	13.6			
Cation Sum	meq/L		Calc.	25-Apr-23/O	14.5			
% Difference	%		Calc.	25-Apr-23/O	3.10			
Ion Ratio	AS/CS		Calc.	25-Apr-23/O	0.940			
Conductivity (calc.)	µmho/cm		Calc.	25-Apr-23/O	1249			

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Director of Laboratory Services

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DATE RECEIVED: 20-Apr-23
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SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		DUP - 4			
			Sample I.D.		B23-03046-37			
			Date Collected		19-Apr-23			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Sodium Adsorption Ratio	-		Calc.	25-Apr-23/O	1.07			
TDS(calc.)/EC(actual)	-		Calc.	25-Apr-23/O	0.559			
Langelier Index(25°C)	S.I.		Calc.	25-Apr-23/O	1.15			

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Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		14-II			
			Sample I.D.		B23-03046-8			
			Date Collected		19-Apr-23			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Dichloroethane,1,1-	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Dichloroethylene,1,1-	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Dichloroethane,1,2-	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Dichlorobenzene,1,2-	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Dichloropropane,1,2-	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Dichlorobenzene,1,3-	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Dichlorobenzene,1,4-	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Tetrachloroethane,1,1,1,2-	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Tetrachloroethane,1,1,2,2-	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Trichloroethane,1,1,1-	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Trichloroethane,1,1,2-	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Trichlorobenzene,1,2,4-	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Acetone	µg/L	30	EPA 8260	26-Apr-23/R	< 30			
Bromodichloromethane	µg/L	2	EPA 8260	26-Apr-23/R	< 2			
Bromomethane	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Bromoform	µg/L	5	EPA 8260	26-Apr-23/R	< 5			
Benzene	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Dichloroethene, cis-1,2-	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Dichloropropene, cis-1,3-	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Carbon Tetrachloride	µg/L	0.2	EPA 8260	26-Apr-23/R	< 0.2			
Monochlorobenzene (Chlorobenzene)	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Chloroform	µg/L	1	EPA 8260	26-Apr-23/R	< 1			
Dibromochloromethane	µg/L	2	EPA 8260	26-Apr-23/R	< 2			
Ethylbenzene	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Dibromoethane,1,2- (Ethylene Dibromide)	µg/L	0.2	EPA 8260	26-Apr-23/R	< 0.2			
Methyl Ethyl Ketone	µg/L	20	EPA 8260	26-Apr-23/R	< 20			

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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
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B23-03046 (ii)

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: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		14-II			
			Sample I.D.		B23-03046-8			
			Date Collected		19-Apr-23			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Methyl-t-butyl Ether	µg/L	2	EPA 8260	26-Apr-23/R	< 2			
Methyl Isobutyl Ketone	µg/L	20	EPA 8260	26-Apr-23/R	< 20			
Dichloromethane (Methylene Chloride)	µg/L	5	EPA 8260	26-Apr-23/R	< 5			
Xylene, m,p-	µg/L	1.0	EPA 8260	26-Apr-23/R	< 1.0			
Xylene, o-	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Xylene, m,p,o-	µg/L	1.1	EPA 8260	26-Apr-23/R	< 1.1			
Styrene	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Dichloroethene, trans-1,2-	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Dichloropropene, trans-1,3-	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Trichloroethylene	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Trichlorofluoromethane	µg/L	5	EPA 8260	26-Apr-23/R	< 5			
Toluene	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Tetrachloroethylene	µg/L	0.5	EPA 8260	26-Apr-23/R	< 0.5			
Vinyl Chloride	µg/L	0.2	EPA 8260	26-Apr-23/R	< 0.2			

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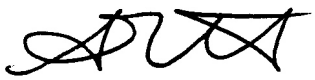
Attention: Kayla Pantaleo

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		SW1	SW2B	SW4	SW5
			Sample I.D.		B23-03043-1	B23-03043-2	B23-03043-3	B23-03043-4
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	24-Apr-23/O	153	154	163	174
Conductivity @25°C	µmho/cm	1	SM 2510B	24-Apr-23/O	348	355	362	353
pH @25°C	pH Units		SM 4500H	24-Apr-23/O	7.74	7.35	7.76	7.96
Colour	TCU	2	SM 2120C	25-Apr-23/O	75	79	69	27
Turbidity	NTU	0.1	SM 2130	25-Apr-23/O	1.1	11.8	0.6	0.8
TDS(ion sum calc.)	mg/L	1	Calc.	25-Apr-23/O	184	186	192	191
Total Suspended Solids	mg/L	3	SM2540D	25-Apr-23/K	< 3	< 3	< 3	< 3
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	24-Apr-23/O	17.5	18.3	10.5	11.0
BOD(5 day)	mg/L	3	SM 5210B	27-Apr-23/K	< 3	< 3	< 3	< 3
COD	mg/L	5	SM5220C	25-Apr-23/K	29	62	27	17
Total Organic Carbon	mg/L	0.2	EPA 415.2	24-Apr-23/O	18.8	19.1	11.3	12.8
Phenolics	mg/L	0.001	MOEE 3179	27-Apr-23/K	< 0.001	< 0.001	< 0.001	< 0.001
Cyanide (Total)	mg/L	0.005	SM 4500CN	26-May-23/K	< 0.005	< 0.005	< 0.005	< 0.005
Chloride	mg/L	0.5	SM4110C	24-Apr-23/O	11.6	13.8	11.3	4.3
Fluoride	mg/L	0.1	SM4110C	24-Apr-23/O	< 0.1	< 0.1	< 0.1	< 0.1
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	01-May-23/K	0.24	0.09	0.53	0.90
Ammonia (N)-unionized	mg/L	0.01	CALC	01-May-23/K	< 0.01	< 0.01	< 0.01	0.03
Sulphate	mg/L	1	SM4110C	24-Apr-23/O	6	5	6	6
Nitrite (N)	mg/L	0.05	SM4110C	24-Apr-23/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	24-Apr-23/O	< 0.05	0.06	< 0.05	< 0.05
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	09-May-23/K	0.9	1.7	1.2	1.2
Hardness (as CaCO3)	mg/L	1	SM 3120	25-Apr-23/O	164	161	170	177
Aluminum	mg/L	0.01	SM 3120	26-Apr-23/O	0.03	0.02	0.02	0.02
Aluminum (total)	mg/L	0.01	SM 3120	25-Apr-23/O	0.03	0.03	0.03	0.03
Antimony	mg/L	0.0001	EPA 200.8	02-May-23/O	0.0005	0.0004	0.0005	0.0003
Arsenic	mg/L	0.0001	EPA 200.8	02-May-23/O	0.0003	0.0003	0.0002	0.0002
Barium	mg/L	0.001	SM 3120	25-Apr-23/O	0.026	0.032	0.034	0.012



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Steve Garrett
Director of Laboratory Services

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B23-03043

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: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		SW1	SW2B	SW4	SW5
			Sample I.D.		B23-03043-1	B23-03043-2	B23-03043-3	B23-03043-4
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Beryllium	mg/L	0.002	SM 3120	25-Apr-23/O	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	0.005	SM 3120	25-Apr-23/O	0.017	0.009	0.033	0.006
Cadmium	mg/L	0.000015	EPA 200.8	02-May-23/O	< 0.000015	< 0.000015	< 0.000015	< 0.000015
Calcium	mg/L	0.02	SM 3120	25-Apr-23/O	59.0	57.0	61.0	65.5
Chromium	mg/L	0.001	SM 3120	25-Apr-23/O	< 0.001	< 0.001	0.001	< 0.001
Chromium (VI)	mg/L	0.001	MOE E3056	03-May-23/O	< 0.001 [1]	< 0.001 [1]	< 0.001 [1]	< 0.001 [1]
Cobalt	mg/L	0.0001	EPA 200.8	02-May-23/O	0.0001	0.0001	0.0001	< 0.0001
Copper	mg/L	0.0001	EPA 200.8	02-May-23/O	0.0009	0.0008	0.0006	0.0004
Iron	mg/L	0.005	SM 3120	25-Apr-23/O	0.069	0.157	0.124	0.065
Lead	mg/L	0.00002	EPA 200.8	02-May-23/O	0.00008	0.00010	0.00004	0.00003
Magnesium	mg/L	0.02	SM 3120	25-Apr-23/O	3.95	4.58	4.38	3.29
Manganese	mg/L	0.001	SM 3120	25-Apr-23/O	0.014	0.036	0.011	0.004
Mercury	mg/L	0.00002	SM 3112 B	26-Apr-23/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	0.0001	EPA 200.8	02-May-23/O	0.0003	0.0004	0.0005	< 0.0001
Nickel	mg/L	0.01	SM 3120	25-Apr-23/O	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	mg/L	0.1	SM 3120	25-Apr-23/O	1.3	1.6	1.6	0.6
Phosphorus-Total	mg/L	0.01	E3516.2	09-May-23/K	0.04	0.11	0.03	0.03
Phosphorus	mg/L	0.1	SM 3120	25-Apr-23/O	< 0.1	< 0.1	< 0.1	< 0.1
Selenium	mg/L	0.001	EPA 200.8	02-May-23/O	< 0.001	< 0.001	< 0.001	< 0.001
Silver	mg/L	0.0001	EPA 200.8	02-May-23/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	mg/L	0.2	SM 3120	25-Apr-23/O	4.3	4.4	5.4	2.1
Strontium	mg/L	0.001	SM 3120	25-Apr-23/O	0.124	0.118	0.130	0.120
Tin	mg/L	0.05	SM 3120	25-Apr-23/O	< 0.05	< 0.05	< 0.05	< 0.05
Titanium	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	< 0.005	< 0.005	< 0.005
Thallium	mg/L	0.00005	EPA 200.8	02-May-23/O	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Uranium	mg/L	0.00005	EPA 200.8	02-May-23/O	0.00064	0.00102	0.00152	0.00029
Vanadium	mg/L	0.0001	EPA 200.8	02-May-23/O	0.0005	0.0008	0.0003	0.0002

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Steve Garrett
Director of Laboratory Services

C.O.C.: ---

REPORT No. B23-03043

Report To:

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PO Box 9000, 12 Peel St
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Attention: Kayla Pantaleo

Caduceon Environmental Laboratories
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Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		SW1	SW2B	SW4	SW5
			Sample I.D.		B23-03043-1	B23-03043-2	B23-03043-3	B23-03043-4
			Date Collected		19-Apr-23	19-Apr-23	19-Apr-23	19-Apr-23
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Zinc	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005	0.014	< 0.005	< 0.005
Anion Sum	meq/L		Calc.	25-Apr-23/O	3.52	3.59	3.71	3.73
Cation Sum	meq/L		Calc.	25-Apr-23/O	3.77	3.79	3.92	3.85
% Difference	%		Calc.	25-Apr-23/O	3.50	2.69	2.79	1.53
Ion Ratio	AS/CS		Calc.	25-Apr-23/O	0.932	0.948	0.946	0.970
Conductivity (calc.)	µmho/cm		Calc.	25-Apr-23/O	354	359	368	361
Sodium Adsorption Ratio	-		Calc.	25-Apr-23/O	0.142	0.144	0.177	0.0647
TDS(calc.)/EC(actual)	-		Calc.	25-Apr-23/O	0.528	0.523	0.531	0.540
Langelier Index(25°C)	S.I.		Calc.	25-Apr-23/O	0.317	-0.216	0.364	0.618

1 Chromium (VI) result is based on total Chromium

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Director of Laboratory Services

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Tel: 705-252-5743
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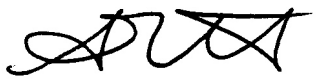
DATE RECEIVED: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		SW6			
			Sample I.D.		B23-03043-5			
			Date Collected		19-Apr-23			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	24-Apr-23/O	210			
Conductivity @25°C	µmho/cm	1	SM 2510B	24-Apr-23/O	603			
pH @25°C	pH Units		SM 4500H	24-Apr-23/O	7.80			
Colour	TCU	2	SM 2120C	25-Apr-23/O	36			
Turbidity	NTU	0.1	SM 2130	25-Apr-23/O	4.3			
TDS(ion sum calc.)	mg/L	1	Calc.	25-Apr-23/O	314			
Total Suspended Solids	mg/L	3	SM2540D	25-Apr-23/K	9			
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	24-Apr-23/O	9.1			
BOD(5 day)	mg/L	3	SM 5210B	27-Apr-23/K	< 3			
COD	mg/L	5	SM5220C	25-Apr-23/K	21			
Total Organic Carbon	mg/L	0.2	EPA 415.2	24-Apr-23/O	10.3			
Phenolics	mg/L	0.001	MOEE 3179	27-Apr-23/K	< 0.001			
Cyanide (Total)	mg/L	0.005	SM 4500CN	26-May-23/K	< 0.005			
Chloride	mg/L	0.5	SM4110C	24-Apr-23/O	62.7			
Fluoride	mg/L	0.1	SM4110C	24-Apr-23/O	< 0.1			
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	01-May-23/K	0.37			
Ammonia (N)-unionized	mg/L	0.01	CALC	01-May-23/K	< 0.01			
Sulphate	mg/L	1	SM4110C	24-Apr-23/O	1			
Nitrite (N)	mg/L	0.05	SM4110C	24-Apr-23/O	< 0.05			
Nitrate (N)	mg/L	0.05	SM4110C	24-Apr-23/O	< 0.05			
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	09-May-23/K	1.1			
Hardness (as CaCO3)	mg/L	1	SM 3120	25-Apr-23/O	246			
Aluminum	mg/L	0.01	SM 3120	26-Apr-23/O	0.03			
Aluminum (total)	mg/L	0.01	SM 3120	25-Apr-23/O	0.10			
Antimony	mg/L	0.0001	EPA 200.8	02-May-23/O	0.0004			
Arsenic	mg/L	0.0001	EPA 200.8	02-May-23/O	0.0002			
Barium	mg/L	0.001	SM 3120	25-Apr-23/O	0.030			



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DATE RECEIVED: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		SW6			
			Sample I.D.		B23-03043-5			
			Date Collected		19-Apr-23			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Beryllium	mg/L	0.002	SM 3120	25-Apr-23/O	< 0.002			
Boron	mg/L	0.005	SM 3120	25-Apr-23/O	0.035			
Cadmium	mg/L	0.000015	EPA 200.8	02-May-23/O	< 0.000015			
Calcium	mg/L	0.02	SM 3120	25-Apr-23/O	89.9			
Chromium	mg/L	0.001	SM 3120	25-Apr-23/O	< 0.001			
Chromium (VI)	mg/L	0.001	MOE E3056	03-May-23/O	< 0.001	1		
Cobalt	mg/L	0.0001	EPA 200.8	02-May-23/O	0.0002			
Copper	mg/L	0.0001	EPA 200.8	02-May-23/O	0.0009			
Iron	mg/L	0.005	SM 3120	25-Apr-23/O	0.155			
Lead	mg/L	0.00002	EPA 200.8	02-May-23/O	0.00020			
Magnesium	mg/L	0.02	SM 3120	25-Apr-23/O	5.19			
Manganese	mg/L	0.001	SM 3120	25-Apr-23/O	0.011			
Mercury	mg/L	0.00002	SM 3112 B	26-Apr-23/O	< 0.00002			
Molybdenum	mg/L	0.0001	EPA 200.8	02-May-23/O	0.0002			
Nickel	mg/L	0.01	SM 3120	25-Apr-23/O	< 0.01			
Potassium	mg/L	0.1	SM 3120	25-Apr-23/O	0.9			
Phosphorus-Total	mg/L	0.01	E3516.2	09-May-23/K	0.05			
Phosphorus	mg/L	0.1	SM 3120	25-Apr-23/O	< 0.1			
Selenium	mg/L	0.001	EPA 200.8	02-May-23/O	0.001			
Silver	mg/L	0.0001	EPA 200.8	02-May-23/O	< 0.0001			
Sodium	mg/L	0.2	SM 3120	25-Apr-23/O	20.8			
Strontium	mg/L	0.001	SM 3120	25-Apr-23/O	0.349			
Tin	mg/L	0.05	SM 3120	25-Apr-23/O	< 0.05			
Titanium	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005			
Thallium	mg/L	0.00005	EPA 200.8	02-May-23/O	< 0.00005			
Uranium	mg/L	0.00005	EPA 200.8	02-May-23/O	0.00059			
Vanadium	mg/L	0.0001	EPA 200.8	02-May-23/O	0.0003			

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

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: --- **REPORT No. B23-03043**

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: 20-Apr-23
DATE REPORTED: 29-May-23
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Eldon Landfill
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		SW6			
			Sample I.D.		B23-03043-5			
			Date Collected		19-Apr-23			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Zinc	mg/L	0.005	SM 3120	25-Apr-23/O	< 0.005			
Anion Sum	meq/L		Calc.	25-Apr-23/O	5.99			
Cation Sum	meq/L		Calc.	25-Apr-23/O	6.17			
% Difference	%		Calc.	25-Apr-23/O	1.46			
Ion Ratio	AS/CS		Calc.	25-Apr-23/O	0.971			
Conductivity (calc.)	µmho/cm		Calc.	25-Apr-23/O	603			
Sodium Adsorption Ratio	-		Calc.	25-Apr-23/O	0.599			
TDS(calc.)/EC(actual)	-		Calc.	25-Apr-23/O	0.520			
Langelier Index(25°C)	S.I.		Calc.	25-Apr-23/O	0.656			

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

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: -

REPORT No: 23-022749 - Rev. 0

Report To:
City of Kawartha Lakes
PO Box 9000
322 Kent Street West
Lindsay, ON K9V 4T7

CADUCEON Environmental Laboratories
110 West Beaver Creek Rd
Unit #14
Richmond Hill, ON L4B 1J9

Attention: Kayla Pantaleo

DATE RECEIVED: 2023-Aug-29
DATE REPORTED: 2023-Sep-12
SAMPLE MATRIX: Surface Water

CUSTOMER PROJECT: Eldon Landfill
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	1	OTTAWA	PCURIEL	2023-Aug-30	A-IC-01	SM 4110B
BOD5 (Liquid)	1	KINGSTON	JWOLFE	2023-Aug-31	BOD-001	SM 5210B
COD (Liquid)	1	KINGSTON	EHINCH	2023-Aug-31	COD-001	SM 5220D
Colour (Liquid)	1	OTTAWA	MDON	2023-Aug-31	A-COL-01	SM 2120C
Cond/pH/Alk Auto (Liquid)	1	OTTAWA	SBOUDREAU	2023-Aug-30	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
Cyanide Total (Liquid)	1	KINGSTON	JMACINNES	2023-Sep-07	CN-001	SM 4500-CN-E
DOC/DIC (Liquid)	1	OTTAWA	VKASYAN	2023-Aug-30	C-OC-01	EPA 415.2
Ion Balance (Calc.)	1	OTTAWA	STAILLON		CP-028	MECP E3196
Chromium VI (Liquid)	1	OTTAWA	STAILLON	2023-Sep-06	D-CRVI-01	MECP E3056
ICP/MS Total (Liquid)	1	OTTAWA	TPRICE	2023-Sep-06	D-ICPMS-01	EPA 6020
ICP/OES Total (Liquid)	1	OTTAWA	APRUDYVUS	2023-Sep-05	D-ICP-01	SM 3120B
ICP/OES (Liquid)	1	OTTAWA	NHOGAN	2023-Sep-01	D-ICP-01	SM 3120B
Mercury (Liquid)	1	OTTAWA	TBENNETT	2023-Aug-31	D-HG-02	SM 3112B
Ammonia & o-Phosphate (Liquid)	1	KINGSTON	KDIBBITS	2023-Sep-06	NH3-001	SM 4500NH3
Phenols (Liquid)	1	KINGSTON	JMACINNES	2023-Sep-11	PHEN-01	MECP E3179
Total Organic Carbon (TOC)	1	OTTAWA	VKASYAN	2023-Aug-30	C-OC-01	EPA 415.2
TP & TKN (Liquid)	1	KINGSTON	KDIBBITS	2023-Sep-11	TPTKN-001	MECP E3516.2
TSS (Liquid)	1	KINGSTON	AMANIYA	2023-Sep-08	TSS-001	SM 2540D
Turbidity (Liquid)	1	OTTAWA	MDON	2023-Aug-31	A-TURB-01	SM 2130B

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.	SW1
			Sample I.D.	23-022749-1
			Date Collected	2023-08-28
Parameter	Units	R.L.		-
Alkalinity(CaCO3) to pH4.5	mg/L	5		348
pH @25°C	pH units	-		7.74
Conductivity @25°C	uS/cm	1		680
Colour	TCU	2		145
Turbidity	NTU	0.1		4.8
Fluoride	mg/L	0.1		<0.1
Chloride	mg/L	0.5		13.9
Nitrate (N)	mg/L	0.05		0.08
Nitrite (N)	mg/L	0.05		<0.05
Sulphate	mg/L	1		<1
BOD5	mg/L	3		<3
Total Suspended Solids	mg/L	3		5
Phosphorus (Total)	mg/L	0.01		0.09
Total Kjeldahl Nitrogen	mg/L	0.1		1.8
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05		0.15
Ammonia (N)-unionized	mg/L	0.01		<0.01
Dissolved Organic Carbon	mg/L	0.2		37.4
Total Organic Carbon	mg/L	0.2		50.2
Cyanide (Total)	mg/L	0.005		0.006
Phenolics	mg/L	0.001		<0.001
COD	mg/L	5		85

Michelle Dubien
Data Specialist

		Client I.D.	SW1
		Sample I.D.	23-022749-1
		Date Collected	2023-08-28
Parameter	**Units**	**R.L.**	-
Aluminum	mg/L	0.01	0.10
Hardness (as CaCO3)	mg/L	-	341
Aluminum (Total)	mg/L	0.01	0.06
Barium (Total)	mg/L	0.001	0.061
Boron (Total)	mg/L	0.005	0.026
Calcium (Total)	mg/L	0.02	122
Iron (Total)	mg/L	0.005	0.977
Magnesium (Total)	mg/L	0.02	8.55
Manganese (Total)	mg/L	0.001	0.923
Phosphorus (Total)	mg/L	0.1	<0.1
Potassium (Total)	mg/L	0.1	1.6
Sodium (Total)	mg/L	0.2	7.2
Strontium (Total)	mg/L	0.001	0.285
Tin (Total)	mg/L	0.05	<0.05
Titanium (Total)	mg/L	0.005	<0.005
Zinc (Total)	mg/L	0.005	0.014
Antimony (Total)	mg/L	0.0001	0.0001
Arsenic (Total)	mg/L	0.0001	0.0019
Beryllium (Total)	mg/L	0.0001	<0.0001
Cadmium (Total)	mg/L	0.000015	<0.000015
Chromium (Total)	mg/L	0.001	<0.001

Michelle Dubien
Data Specialist

			Client I.D.	SW1
			Sample I.D.	23-022749-1
			Date Collected	2023-08-28
Parameter	Units	R.L.		-
Cobalt (Total)	mg/L	0.0001		0.0008
Copper (Total)	mg/L	0.0001		0.0006
Lead (Total)	mg/L	0.00002		0.00005
Molybdenum (Total)	mg/L	0.0001		0.0004
Nickel (Total)	mg/L	0.0002		0.0015
Selenium (Total)	mg/L	0.001		<0.001
Silver (Total)	mg/L	0.0001		<0.0001
Thallium (Total)	mg/L	0.00005		<0.00005
Uranium (Total)	mg/L	0.00005		0.00061
Vanadium (Total)	mg/L	0.0001		0.0007
Chromium (VI)	mg/L	0.001		<0.001
Mercury	mg/L	0.00002		<0.00002
Anion Sum	meq/L	-		7.35
Cation Sum	meq/L	-		7.26
% Difference	%	-		0.662
Ion Ratio	-	-		1.01
Sodium Adsorption Ratio	-	-		0.170
TDS (Ion Sum Calc)	mg/L	1		365
TDS(calc.)/EC(actual)	-	-		0.537
Conductivity Calc	µmho/cm	-		658
Conductivity Calc / Conductivity	-	-		0.968

Michelle Dubien
Data Specialist

		Client I.D.	SW1
		Sample I.D.	23-022749-1
		Date Collected	2023-08-28
Parameter	**Units**	**R.L.**	-
Langelier Index(25°C)	-	-	0.916
Saturation pH (25°C)	-	-	6.82
pH (Client Data)	pH units	-	7.35
Temperature (Client Data)	°C	-	15.5

Michelle Dubien
Data Specialist

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: -

REPORT No: 23-028563 - 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-13
DATE REPORTED: 2023-Nov-01
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: Eldon Landfill
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	2	OTTAWA	VKASYAN	2023-Oct-25	A-IC-01	SM 4110B
BOD5 (Liquid)	2	KINGSTON	JWOLFE2	2023-Oct-26	BOD-001	SM 5210B
COD (Liquid)	2	KINGSTON	EHINCH	2023-Oct-20	COD-001	SM 5220D
Colour (Liquid)	2	OTTAWA	MDON	2023-Oct-19	A-COL-01	SM 2120C
Cond/pH/Alk Auto (Liquid)	2	OTTAWA	SBOUDREAU	2023-Oct-19	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
Cyanide Total (Liquid)	2	KINGSTON	JMACINNES	2023-Oct-19	CN-001	SM 4500-CN-E
Cyanide WAD (Liquid)	2	KINGSTON	JMACINNES	2023-Oct-19	CN-001	SM 4500-CN-E
DOC/DIC (Liquid)	2	OTTAWA	VKASYAN	2023-Oct-25	C-OC-01	EPA 415.2
Ion Balance (Calc.)	2	OTTAWA	ASCHNEIDER		CP-028	MECP E3196
Chromium VI (Liquid)	2	OTTAWA	STAILLON	2023-Oct-23	D-CRVI-01	MECP E3056
ICP/MS (Liquid)	2	OTTAWA	TPRICE	2023-Oct-20	D-ICPMS-01	EPA 200.8
ICP/OES (Liquid)	2	OTTAWA	APRUDYVUS	2023-Oct-19	D-ICP-01	SM 3120B
Mercury (Liquid)	2	OTTAWA	TBENNETT	2023-Oct-19	D-HG-02	SM 3112B
Ammonia & o-Phosphate (Liquid)	2	KINGSTON	KDIBBITS	2023-Oct-24	NH3-001	SM 4500NH3
Phenols (Liquid)	2	KINGSTON	JMACINNES	2023-Oct-30	PHEN-01	MECP E3179
Total Organic Carbon (TOC)	2	OTTAWA	VKASYAN	2023-Oct-27	C-OC-01	EPA 415.2
TP & TKN (Liquid)	2	KINGSTON	KDIBBITS	2023-Oct-23	TPTKN-001	MECP E3516.2
TSS (Liquid)	1	KINGSTON	TSUNNY	2023-Oct-23	TSS-001	SM 2540D
Turbidity (Liquid)	2	OTTAWA	MDON	2023-Oct-19	A-TURB-01	SM 2130B

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Michelle Dubien
Data Specialist

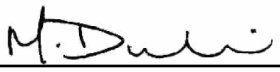
			Client I.D.	8	9
			Sample I.D.	23-028563-1	23-028563-2
			Date Collected	2023-10-12	2023-10-12
Parameter	**Units**	**R.L.**		-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5		465	298
pH @25°C	pH units	-		7.26	7.42
Conductivity @25°C	uS/cm	1		1120	521
TDS (Calc. from Cond.)	mg/L	3		602	270
Colour	TCU	2		3	<2
Turbidity	NTU	0.1		646	15400
Fluoride	mg/L	0.1		<0.1	<0.1
Chloride	mg/L	0.5		50.6	5.0
Nitrate (N)	mg/L	0.05		1.97	0.09
Nitrite (N)	mg/L	0.05		<0.05	<0.05
Sulphate	mg/L	1		79	33
BOD5	mg/L	3		<3	<3
Total Suspended Solids	mg/L	3		11300	
Phosphorus (Total)	mg/L	0.01		0.71	7.44
Total Kjeldahl Nitrogen	mg/L	0.1		0.6	2.8
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05		0.12	0.32
Ammonia (N)-unionized	mg/L	0.01		<0.01	<0.01
Dissolved Organic Carbon	mg/L	0.2		7.2	3.5
Total Organic Carbon	mg/L	0.2		7.4	5.0
Cyanide (Total)	mg/L	0.005		<0.005	<0.005
Cyanide (WAD)	mg/L	0.005		<0.005	<0.005

Michelle Dubien
Data Specialist

			Client I.D.	8	9
			Sample I.D.	23-028563-1	23-028563-2
			Date Collected	2023-10-12	2023-10-12
Parameter	**Units**	**R.L.**		-	-
Phenolics	mg/L	0.001		<0.001	<0.001
COD	mg/L	5		10	49
Hardness (as CaCO3)	mg/L	0.02		559	258
Aluminum	mg/L	0.01		0.06	0.02
Barium	mg/L	0.001		0.191	0.057
Boron	mg/L	0.005		0.493	0.052
Calcium	mg/L	0.02		188	76.1
Iron	mg/L	0.005		0.017	0.008
Magnesium	mg/L	0.02		21.6	16.6
Manganese	mg/L	0.001		0.044	0.020
Phosphorus	mg/L	0.1		<0.1	<0.1
Potassium	mg/L	0.1		2.3	2.5
Sodium	mg/L	0.2		29.6	3.9
Strontium	mg/L	0.001		0.365	0.376
Tin	mg/L	0.05		<0.05	<0.05
Titanium	mg/L	0.005		<0.005	<0.005
Zinc	mg/L	0.005		0.006	<0.005
Antimony	mg/L	0.0001		0.0001	0.0001
Arsenic	mg/L	0.0001		<0.0001	<0.0001
Beryllium	mg/L	0.0001		<0.0001	<0.0001
Cadmium	mg/L	0.000015		<0.000015	0.000039

Michelle Dubien
Data Specialist

			Client I.D.	8	9
			Sample I.D.	23-028563-1	23-028563-2
			Date Collected	2023-10-12	2023-10-12
Parameter	**Units**	**R.L.**		-	-
Chromium	mg/L	0.001		<0.001	<0.001
Cobalt	mg/L	0.0001		0.0016	0.0002
Copper	mg/L	0.0001		0.0057	0.0008
Lead	mg/L	0.00002		0.00004	<0.00002
Molybdenum	mg/L	0.0001		0.0002	0.0113
Nickel	mg/L	0.0002		0.0030	0.0011
Selenium	mg/L	0.001		<0.001	<0.001
Silver	mg/L	0.0001		<0.0001	<0.0001
Thallium	mg/L	0.00005		<0.00005	<0.00005
Uranium	mg/L	0.00005		0.00092	0.00067
Vanadium	mg/L	0.0001		0.0003	0.0004
Chromium (VI)	mg/L	0.01		<0.01	<0.01
Mercury	mg/L	0.00002		<0.00002	<0.00002
Anion Sum	meq/L	-		12.5	6.78
Cation Sum	meq/L	-		12.5	5.44
% Difference	%	-		0.0721	11.0
Ion Ratio	-	-		0.999	1.25
Sodium Adsorption Ratio	-	-		0.545	0.106
TDS (Ion Sum Calc)	mg/L	1		658	317
TDS(calc.)/EC(actual)	-	-		0.587	0.608
Conductivity Calc	µmho/cm	-		1110	555



Michelle Dubien
Data Specialist

			Client I.D.	8	9
			Sample I.D.	23-028563-1	23-028563-2
			Date Collected	2023-10-12	2023-10-12
Parameter	**Units**	**R.L.**		-	-
Conductivity Calc / Conductivity	-	-		0.994	1.06
Langelier Index(25°C)	-	-		0.728	0.333
Saturation pH (25°C)	-	-		6.53	7.09
pH (Client Data)	pH units	-		7.18	7.42
Temperature (Client Data)	°C	-		13.2	13.3

Michelle Dubien
Data Specialist

CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured. Canadian owned.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: -

REPORT No: 23-029053 - 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-13
DATE REPORTED: 2023-Nov-13
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: Eldon Landfill
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	36	OTTAWA	PCURIEL	2023-Oct-24	A-IC-01	SM 4110B
COD (Liquid)	36	KINGSTON	EHINCH	2023-Oct-23	COD-001	SM 5220D
Cond/pH/Alk Auto (Liquid)	36	OTTAWA	SBOUDREAU	2023-Oct-24	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
DOC/DIC (Liquid)	36	OTTAWA	VKASYAN	2023-Oct-27	C-OC-01	EPA 415.2
Ion Balance (Calc.)	36	OTTAWA	TPRICE		CP-028	MECP E3196
Chromium VI (Liquid)	36	OTTAWA	STAILLON	2023-Oct-25	D-CRVI-01	MECP E3056
ICP/MS (Liquid)	36	OTTAWA	TPRICE	2023-Oct-23	D-ICPMS-01	EPA 200.8
ICP/OES (Liquid)	36	OTTAWA	APRUDYVUS	2023-Oct-23	D-ICP-01	SM 3120B
Mercury (Liquid)	36	OTTAWA	TBENNETT	2023-Oct-23	D-HG-02	SM 3112B
Ammonia (Liquid)	36	KINGSTON	KDIBBITS	2023-Oct-31	NH3-001	SM 4500NH3
Phenols (Liquid)	36	KINGSTON	JMACINNES	2023-Nov-01	PHEN-01	MECP E3179
TP & TKN (Liquid)	36	KINGSTON	KDIBBITS	2023-Nov-03	TPTKN-001	MECP E3516.2
VOC-Volatiles Full (Water)	1	RICHMOND_HILL	FLENA	2023-Oct-26	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.	7	10	11-I	11-II	12
	Sample I.D.	23-029053-1	23-029053-2	23-029053-3	23-029053-4	23-029053-5
	Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12	2023-10-12
Parameter	**Units** / **R.L.**	-	-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L / 5	282	289	221	210	223
TDS (Calc. from Cond.)	mg/L / 3	337	942	279	228	231
Conductivity @25°C	uS/cm / 1	649	1720	538	442	447
pH @25°C	pH units / -	7.68	7.37	7.40	7.30	7.30
Fluoride	mg/L / 0.1	<0.1	0.2	<0.1	<0.1	<0.1
Chloride	mg/L / 0.5	13.1	370	31.5	7.8	6.9
Nitrate (N)	mg/L / 0.05	7.52	<0.05	<0.05	2.09	1.68
Nitrite (N)	mg/L / 0.05	0.13	0.05	<0.05	<0.05	<0.05
Sulphate	mg/L / 1	19	16	12	9	9
Phosphorus (Total)	mg/L / 0.01	0.05	0.08	0.14	0.03	0.12
Total Kjeldahl Nitrogen	mg/L / 0.1	0.7	0.9	0.3	<0.1	0.1
Ammonia (N)-Total (NH3+NH4)	mg/L / 0.05	0.28	0.68	<0.05	<0.05	<0.05
Ammonia (N)-unionized	mg/L / 0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dissolved Organic Carbon	mg/L / 0.2	7.2	2.6	3.6	4.3	3.2
Phenolics	mg/L / 0.001	<0.001	<0.001	<0.001	<0.001	<0.001
COD	mg/L / 5	11	<5	72	5	5
Hardness (as CaCO3)	mg/L / 0.02	311	415	219	222	233
Aluminum	mg/L / 0.01	0.03	0.07	0.02	0.02	0.02
Barium	mg/L / 0.001	0.161	0.062	0.063	0.044	0.046
Boron	mg/L / 0.005	0.099	0.246	0.057	0.011	0.011
Calcium	mg/L / 0.02	104	102	65.2	75.3	78.8

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			Client I.D.	7	10	11-I	11-II	12
			Sample I.D.	23-029053-1	23-029053-2	23-029053-3	23-029053-4	23-029053-5
			Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12	2023-10-12
Parameter	Units	R.L.		-	-	-	-	-
Iron	mg/L	0.005		<0.005	<0.005	0.037	<0.005	<0.005
Magnesium	mg/L	0.02		12.3	39.0	13.6	8.20	8.85
Manganese	mg/L	0.001		0.001	<0.001	0.003	<0.001	0.001
Phosphorus	mg/L	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Potassium	mg/L	0.1		4.1	9.6	3.0	0.8	0.9
Sodium	mg/L	0.2		10.2	161	28.2	3.4	3.2
Strontium	mg/L	0.001		0.164	2.58	0.625	0.137	0.141
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		0.006	<0.005	<0.005	<0.005	<0.005
Antimony	mg/L	0.0001		<0.0001	<0.0001	0.0004	<0.0001	<0.0001
Arsenic	mg/L	0.0001		<0.0001	0.0003	0.0004	<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		0.0003	0.0002	0.0002	0.0002	0.0002
Copper	mg/L	0.0001		0.0039	0.0009	0.0014	0.0008	0.0009
Lead	mg/L	0.00002		0.00003	0.00003	0.00028	0.00002	0.00003
Molybdenum	mg/L	0.0001		0.0003	0.0001	0.0004	<0.0001	0.0001
Nickel	mg/L	0.0002		0.0007	<0.0002	0.0004	<0.0002	<0.0002
Selenium	mg/L	0.001		<0.001	0.002	<0.001	<0.001	<0.001

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			Client I.D.	7	10	11-I	11-II	12
			Sample I.D.	23-029053-1	23-029053-2	23-029053-3	23-029053-4	23-029053-5
			Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12	2023-10-12
Parameter	Units	R.L.		-	-	-	-	-
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	<0.00005	<0.00005
Uranium	mg/L	0.00005		0.00085	0.00012	0.00095	0.00037	0.00035
Vanadium	mg/L	0.0001		0.0003	<0.0001	0.0001	0.0004	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	-		6.94	16.5	5.55	4.76	4.97
Cation Sum	meq/L	-		6.77	15.7	5.69	4.60	4.83
% Difference	%	-		1.28	2.75	1.25	1.71	1.40
Ion Ratio	-	-		1.03	1.06	0.975	1.03	1.03
Sodium Adsorption Ratio	-	-		0.251	3.44	0.829	0.0980	0.0923
TDS (Ion Sum Calc)	mg/L	1		366	871	286	240	249
TDS(calc.)/EC(actual)	-	-		0.563	0.507	0.532	0.543	0.558
Conductivity Calc	µmho/cm	-		642	1620	535	442	459
Conductivity Calc / Conductivity	-	-		0.989	0.944	0.994	1.00	1.03
Langelier Index(25°C)	-	-		0.693	0.347	0.115	0.0673	0.113
Saturation pH (25°C)	-	-		6.99	7.02	7.28	7.23	7.19
pH (Client Data)	pH units	-		7.74	7.53	8.06	7.60	7.92
Temperature (Client Data)	°C	-		11.9	11.8	8.4	9.8	12.7

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Parameter	Units	R.L.	Client I.D.	13-I	13-II	14-II	16-I	16-II
			Sample I.D.	23-029053-6	23-029053-7	23-029053-8	23-029053-9	23-029053-10
			Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12	2023-10-12
				-	-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5		227	1310	763	332	351
TDS (Calc. from Cond.)	mg/L	3		239	1910	918	453	413
Conductivity @25°C	uS/cm	1		463	3410	1680	858	788
pH @25°C	pH units	-		7.38	7.22	7.36	7.45	7.38
Fluoride	mg/L	0.1		0.1	<0.1	<0.1	<0.1	<0.1
Chloride	mg/L	0.5		7.2	181	86.4	29.6	11.2
Nitrate (N)	mg/L	0.05		0.70	0.05	0.24	1.73	1.91
Nitrite (N)	mg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	1		15	143	30	75	51
Phosphorus (Total)	mg/L	0.01		0.03	7.42	0.08	0.81	0.14
Total Kjeldahl Nitrogen	mg/L	0.1		<0.1	164	22.5	0.5	0.4
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05		<0.05	141	17.9	0.17	0.11
Ammonia (N)-unionized	mg/L	0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Dissolved Organic Carbon	mg/L	0.2		3.1	25.2	14.7	5.2	5.3
Phenolics	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001
COD	mg/L	5		8	351	64	15	7
Hardness (as CaCO3)	mg/L	0.02		240	832	630	364	381
Aluminum	mg/L	0.01		0.02	0.09	0.07	0.03	0.04
Barium	mg/L	0.001		0.098	0.312	0.558	0.099	0.110
Boron	mg/L	0.005		0.033	2.10	1.77	0.240	0.228
Calcium	mg/L	0.02		67.2	254	206	119	126

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			Client I.D.	13-I	13-II	14-II	16-I	16-II
			Sample I.D.	23-029053-6	23-029053-7	23-029053-8	23-029053-9	23-029053-10
			Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12	2023-10-12
Parameter	Units	R.L.		-	-	-	-	-
Iron	mg/L	0.005		0.005	8.55	0.603	<0.005	<0.005
Magnesium	mg/L	0.02		17.6	47.9	28.1	16.2	16.1
Manganese	mg/L	0.001		0.061	0.283	2.92	0.007	0.007
Phosphorus	mg/L	0.1		<0.1	0.2	<0.1	<0.1	<0.1
Potassium	mg/L	0.1		1.8	117	23.8	23.0	20.9
Sodium	mg/L	0.2		5.8	245	106	9.1	8.0
Strontium	mg/L	0.001		0.758	1.31	0.733	0.218	0.236
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	0.0004	0.0001	<0.0001	0.0001
Arsenic	mg/L	0.0001		<0.0001	0.0010	0.0003	<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	0.002	<0.001	0.001	<0.001
Cobalt	mg/L	0.0001		0.0007	0.0059	0.0274	0.0005	0.0003
Copper	mg/L	0.0001		0.0008	0.0005	0.0058	0.0020	0.0019
Lead	mg/L	0.00002		0.00003	0.00006	0.00006	0.00002	<0.00002
Molybdenum	mg/L	0.0001		0.0002	0.0002	0.0001	0.0008	0.0004
Nickel	mg/L	0.0002		0.0006	0.0074	0.0240	0.0015	0.0007
Selenium	mg/L	0.001		<0.001	<0.001	0.001	<0.001	<0.001

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			Client I.D.	13-I	13-II	14-II	16-I	16-II
			Sample I.D.	23-029053-6	23-029053-7	23-029053-8	23-029053-9	23-029053-10
			Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12	2023-10-12
Parameter	**Units**	**R.L.**		-	-	-	-	-
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	<0.00005	<0.00005
Uranium	mg/L	0.00005		0.00106	0.00026	0.00192	0.00089	0.00082
Vanadium	mg/L	0.0001		0.0003	0.0045	0.0011	0.0002	0.0002
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	-		5.11	34.2	18.3	9.16	8.53
Cation Sum	meq/L	-		5.12	40.7	19.2	8.28	8.51
% Difference	%	-		0.144	8.62	2.41	5.07	0.123
Ion Ratio	-	-		0.997	0.841	0.953	1.11	1.00
Sodium Adsorption Ratio	-	-		0.164	3.70	1.83	0.208	0.179
TDS (Ion Sum Calc)	mg/L	1		254	1960	966	479	452
TDS(calc.)/EC(actual)	-	-		0.549	0.576	0.576	0.559	0.574
Conductivity Calc	µmho/cm	-		474	3150	1620	817	782
Conductivity Calc / Conductivity	-	-		1.02	0.922	0.965	0.952	0.992
Langelier Index(25°C)	-	-		0.130	1.23	1.06	0.585	0.563
Saturation pH (25°C)	-	-		7.25	5.99	6.30	6.86	6.82
pH (Client Data)	pH units	-		8.05	7.01	6.80	7.44	7.23
Temperature (Client Data)	°C	-		8.5	9.8	12.0	11.7	12.2

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Parameter	Units	R.L.	Client I.D.	17-I	17-II	19	25-I	25-II
			Sample I.D.	23-029053-11	23-029053-12	23-029053-13	23-029053-14	23-029053-15
			Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12	2023-10-12
				-	-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5		780	460	233	531	828
TDS (Calc. from Cond.)	mg/L	3		946	504	252	716	991
Conductivity @25°C	uS/cm	1		1720	947	487	1320	1800
pH @25°C	pH units	-		7.45	7.44	7.37	7.45	7.32
Fluoride	mg/L	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Chloride	mg/L	0.5		98.8	20.6	8.1	99.7	110
Nitrate (N)	mg/L	0.05		0.08	<0.05	1.79	<0.05	<0.05
Nitrite (N)	mg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	1		51	18	12	38	30
Phosphorus (Total)	mg/L	0.01		0.04	0.08	0.10	0.14	0.16
Total Kjeldahl Nitrogen	mg/L	0.1		2.7	15.8	0.2	0.5	1.8
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05		1.63	13.0	0.09	0.09	0.70
Ammonia (N)-unionized	mg/L	0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Dissolved Organic Carbon	mg/L	0.2		15.5	11.8	4.0	7.0	13.4
Phenolics	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001
COD	mg/L	5		70	32	6	21	58
Hardness (as CaCO3)	mg/L	0.02		779	395	256	587	707
Aluminum	mg/L	0.01		0.08	0.04	0.02	0.06	0.06
Barium	mg/L	0.001		0.459	0.350	0.064	0.225	0.297
Boron	mg/L	0.005		2.18	0.766	0.066	0.415	1.03
Calcium	mg/L	0.02		251	128	85.8	172	208

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			Client I.D.	17-I	17-II	19	25-I	25-II
			Sample I.D.	23-029053-11	23-029053-12	23-029053-13	23-029053-14	23-029053-15
			Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12	2023-10-12
Parameter	**Units**	**R.L.**		-	-	-	-	-
Iron	mg/L	0.005		2.95	7.58	0.005	1.35	0.469
Magnesium	mg/L	0.02		36.9	18.3	10.1	38.3	45.4
Manganese	mg/L	0.001		2.08	1.43	<0.001	0.156	1.08
Phosphorus	mg/L	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Potassium	mg/L	0.1		7.9	19.2	1.8	3.2	3.9
Sodium	mg/L	0.2		110	29.4	5.1	69.8	122
Strontium	mg/L	0.001		0.699	0.461	0.170	0.900	0.666
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		0.0002	0.0001	<0.0001	<0.0001	0.0002
Arsenic	mg/L	0.0001		0.0006	0.0013	<0.0001	<0.0001	0.0003
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		0.0289	0.0057	0.0002	0.0008	0.0162
Copper	mg/L	0.0001		0.0048	0.0013	0.0015	0.0003	0.0114
Lead	mg/L	0.00002		0.00005	0.00004	0.00003	0.00002	<0.00002
Molybdenum	mg/L	0.0001		0.0006	0.0003	0.0002	0.0002	0.0002
Nickel	mg/L	0.0002		0.0188	0.0071	0.0003	0.0153	0.0230
Selenium	mg/L	0.001		0.002	<0.001	<0.001	0.001	0.002

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			Client I.D.	17-I	17-II	19	25-I	25-II
			Sample I.D.	23-029053-11	23-029053-12	23-029053-13	23-029053-14	23-029053-15
			Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12	2023-10-12
Parameter	**Units**	**R.L.**		-	-	-	-	-
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	<0.00005	<0.00005
Uranium	mg/L	0.00005		0.00269	0.00043	0.00045	0.00073	0.00162
Vanadium	mg/L	0.0001		0.0009	0.0003	0.0003	0.0003	0.0014
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	-		19.5	10.2	5.27	14.2	20.3
Cation Sum	meq/L	-		20.9	10.6	5.39	15.0	19.6
% Difference	%	-		3.63	2.24	1.10	2.65	1.52
Ion Ratio	-	-		0.930	0.956	0.978	0.948	1.03
Sodium Adsorption Ratio	-	-		1.71	0.643	0.138	1.25	2.00
TDS (Ion Sum Calc)	mg/L	1		1030	528	271	741	1020
TDS(calc.)/EC(actual)	-	-		0.598	0.558	0.556	0.561	0.564
Conductivity Calc	µmho/cm	-		1690	908	499	1290	1670
Conductivity Calc / Conductivity	-	-		0.977	0.959	1.03	0.976	0.925
Langelier Index(25°C)	-	-		1.23	0.749	0.228	0.929	1.04
Saturation pH (25°C)	-	-		6.22	6.69	7.14	6.52	6.28
pH (Client Data)	pH units	-		6.83	7.33	7.79	7.27	7.07
Temperature (Client Data)	°C	-		11.2	13.5	11.8	11.5	11.3

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Parameter	Units	R.L.	Client I.D.	26-I	26-II	26-III	27-I	27-II
			Sample I.D.	23-029053-16	23-029053-17	23-029053-18	23-029053-19	23-029053-20
			Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12	2023-10-12
				-	-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5		258	404	622	196	243
TDS (Calc. from Cond.)	mg/L	3		409	527	765	2370	261
Conductivity @25°C	uS/cm	1		781	989	1410	4210	504
pH @25°C	pH units	-		7.65	7.49	7.40	7.60	7.47
Fluoride	mg/L	0.1		0.5	<0.1	<0.1	0.5	<0.1
Chloride	mg/L	0.5		94.5	57.9	92.3	1300	8.1
Nitrate (N)	mg/L	0.05		<0.05	0.43	<0.05	<0.05	1.76
Nitrite (N)	mg/L	0.05		<0.05	<0.05	<0.05	0.29	<0.05
Sulphate	mg/L	1		3	45	27	<1	13
Phosphorus (Total)	mg/L	0.01		0.01	0.03	0.77	<0.01	0.04
Total Kjeldahl Nitrogen	mg/L	0.1		1.6	0.7	0.9	4.1	2.8
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05		1.42	0.59	0.20	3.63	2.57
Ammonia (N)-unionized	mg/L	0.01		0.01	<0.01	<0.01	<0.01	<0.01
Dissolved Organic Carbon	mg/L	0.2		2.8	6.7	11.2	1.4	3.7
Phenolics	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001
COD	mg/L	5		7	15	64	19	7
Hardness (as CaCO3)	mg/L	0.02		179	474	701	395	265
Aluminum	mg/L	0.01		0.01	0.04	0.06	0.02	0.03
Barium	mg/L	0.001		0.019	0.174	0.321	0.055	0.070
Boron	mg/L	0.005		0.659	0.251	0.247	1.33	0.081
Calcium	mg/L	0.02		36.6	144	189	82.9	89.0

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			Client I.D.	26-I	26-II	26-III	27-I	27-II
			Sample I.D.	23-029053-16	23-029053-17	23-029053-18	23-029053-19	23-029053-20
			Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12	2023-10-12
Parameter	Units	R.L.		-	-	-	-	-
Iron	mg/L	0.005		0.024	<0.005	5.69	0.122	<0.005
Magnesium	mg/L	0.02		21.4	27.8	55.5	45.7	10.4
Manganese	mg/L	0.001		0.002	0.760	2.02	0.003	<0.001
Phosphorus	mg/L	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Potassium	mg/L	0.1		10.6	1.7	2.5	21.2	1.8
Sodium	mg/L	0.2		103	35.0	63.5	741	5.5
Strontium	mg/L	0.001		2.05	0.343	0.568	5.83	0.170
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	<0.0001	<0.0001
Arsenic	mg/L	0.0001		<0.0001	<0.0001	0.0008	<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	<0.000030	<0.000015
Chromium	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	mg/L	0.0001		<0.0001	0.0087	0.0298	0.0002	0.0002
Copper	mg/L	0.0001		0.0002	0.0064	0.0007	0.0003	0.0013
Lead	mg/L	0.00002		<0.00002	<0.00002	0.00004	<0.00009	0.00005
Molybdenum	mg/L	0.0001		<0.0001	0.0003	0.0003	<0.0002	0.0001
Nickel	mg/L	0.0002		0.0004	0.0064	0.0079	0.0014	0.0003
Selenium	mg/L	0.001		0.002	0.001	0.002	<0.001	<0.001

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Parameter	Units	R.L.	Client I.D.	26-I	26-II	26-III	27-I	27-II
			Sample I.D.	23-029053-16	23-029053-17	23-029053-18	23-029053-19	23-029053-20
			Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12	2023-10-12
				-	-	-	-	-
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	<0.00005	<0.00005
Uranium	mg/L	0.00005		<0.00005	0.00634	0.0106	0.00016	0.00042
Vanadium	mg/L	0.0001		<0.0001	0.0003	0.0010	<0.0004	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	-		7.91	10.7	15.6	40.5	5.46
Cation Sum	meq/L	-		8.50	11.1	17.2	40.9	5.71
% Difference	%	-		3.62	1.82	4.92	0.527	2.19
Ion Ratio	-	-		0.930	0.964	0.906	0.990	0.957
Sodium Adsorption Ratio	-	-		3.35	0.700	1.04	16.2	0.148
TDS (Ion Sum Calc)	mg/L	1		427	557	811	2310	283
TDS(calc.)/EC(actual)	-	-		0.546	0.564	0.576	0.548	0.561
Conductivity Calc	µmho/cm	-		793	986	1400	4130	524
Conductivity Calc / Conductivity	-	-		1.02	0.997	0.992	0.982	1.04
Langelier Index(25°C)	-	-		0.162	0.781	0.977	0.287	0.362
Saturation pH (25°C)	-	-		7.49	6.71	6.42	7.31	7.11
pH (Client Data)	pH units	-		7.59	6.99	6.79	7.78	7.91
Temperature (Client Data)	°C	-		11.0	10.8	10.6	9.2	10.3

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			Client I.D.	29-I	29-II	29-III	30	31
			Sample I.D.	23-029053-21	23-029053-22	23-029053-23	23-029053-24	23-029053-25
			Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12	2023-10-12
Parameter	Units	R.L.		-	-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5		256	451	330	296	891
TDS (Calc. from Cond.)	mg/L	3		670	514	370	319	1150
Conductivity @25°C	uS/cm	1		1240	965	713	614	2090
pH @25°C	pH units	-		7.91	7.46	7.55	7.16	7.22
Fluoride	mg/L	0.1		2.1	<0.1	<0.1	<0.1	<0.1
Chloride	mg/L	0.5		241	29.9	20.8	21.2	178
Nitrate (N)	mg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Nitrite (N)	mg/L	0.05		<0.05	<0.05	<0.05	0.06	<0.05
Sulphate	mg/L	1		<1	36	33	10	39
Phosphorus (Total)	mg/L	0.01		1.04	7.83	1.34	0.71	4.46
Total Kjeldahl Nitrogen	mg/L	0.1		2.1	0.8	0.4	2.6	12.8
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05		1.80	0.37	0.09	0.64	2.21
Ammonia (N)-unionized	mg/L	0.01		0.10	<0.01	<0.01	<0.01	<0.01
Dissolved Organic Carbon	mg/L	0.2		1.5	6.6	5.7	9.0	19.0
Phenolics	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001
COD	mg/L	5		16	39	16	160	478
Hardness (as CaCO3)	mg/L	0.02		58.3	475	369	329	927
Aluminum	mg/L	0.01		0.11	0.04	0.03	0.05	0.07
Barium	mg/L	0.001		0.018	0.177	0.163	0.140	0.686
Boron	mg/L	0.005		1.70	0.233	0.050	0.067	0.543
Calcium	mg/L	0.02		13.9	149	116	105	243

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Parameter	Units	R.L.	Client I.D.	29-I	29-II	29-III	30	31
			Sample I.D.	23-029053-21	23-029053-22	23-029053-23	23-029053-24	23-029053-25
			Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12	2023-10-12
				-	-	-	-	-
Iron	mg/L	0.005		0.145	1.50	1.02	1.69	7.15
Magnesium	mg/L	0.02		5.72	25.0	19.3	16.3	77.8
Manganese	mg/L	0.001		0.008	0.033	0.052	0.194	0.099
Phosphorus	mg/L	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Potassium	mg/L	0.1		6.9	2.3	2.0	1.6	11.6
Sodium	mg/L	0.2		254	25.8	10.8	9.1	158
Strontium	mg/L	0.001		0.659	0.367	0.276	0.620	2.69
Tin	mg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Titanium	mg/L	0.005		0.008	<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		0.0002	<0.0001	<0.0001	0.0001	0.0002
Arsenic	mg/L	0.0001		<0.0001	0.0002	0.0003	0.0005	0.0009
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		0.0001	0.0004	0.0006	0.0004	0.0015
Copper	mg/L	0.0001		0.0004	0.0007	0.0006	0.0006	0.0003
Lead	mg/L	0.00002		0.00012	0.00003	<0.00002	0.00005	0.00004
Molybdenum	mg/L	0.0001		<0.0001	0.0002	0.0002	0.0001	0.0002
Nickel	mg/L	0.0002		0.0003	0.0050	0.0018	0.0007	0.0074
Selenium	mg/L	0.001		<0.001	<0.001	<0.001	0.001	<0.001

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			Client I.D.	29-I	29-II	29-III	30	31
			Sample I.D.	23-029053-21	23-029053-22	23-029053-23	23-029053-24	23-029053-25
			Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12	2023-10-12
Parameter	**Units**	**R.L.**		-	-	-	-	-
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	<0.00005	<0.00005
Uranium	mg/L	0.00005		0.00009	0.00197	0.00046	0.00010	<0.00005
Vanadium	mg/L	0.0001		0.0003	<0.0001	0.0001	0.0008	0.0019
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	-		12.0	10.6	7.86	6.72	23.6
Cation Sum	meq/L	-		12.5	10.8	7.95	7.16	26.3
% Difference	%	-		2.07	0.804	0.571	3.19	5.41
Ion Ratio	-	-		0.960	0.984	0.989	0.938	0.897
Sodium Adsorption Ratio	-	-		14.5	0.515	0.244	0.219	2.26
TDS (Ion Sum Calc)	mg/L	1		679	541	400	343	1250
TDS(calc.)/EC(actual)	-	-		0.548	0.561	0.561	0.559	0.599
Conductivity Calc	µmho/cm	-		1250	944	719	635	2050
Conductivity Calc / Conductivity	-	-		1.01	0.978	1.01	1.03	0.982
Langelier Index(25°C)	-	-		-0.0219	0.815	0.678	0.199	1.04
Saturation pH (25°C)	-	-		7.93	6.64	6.87	6.96	6.18
pH (Client Data)	pH units	-		8.44	7.47	7.67	7.39	7.13
Temperature (Client Data)	°C	-		11.5	10.8	11.4	12.2	11.9

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			Client I.D.	33-I	33-II	34	35	36
			Sample I.D.	23-029053-26	23-029053-27	23-029053-28	23-029053-29	23-029053-30
			Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12	2023-10-12
Parameter	**Units**	**R.L.**		-	-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5		315	233	298	424	405
TDS (Calc. from Cond.)	mg/L	3		951	235	1110	508	428
Conductivity @25°C	uS/cm	1		1730	454	2010	954	814
pH @25°C	pH units	-		7.73	7.42	7.77	7.50	7.35
Fluoride	mg/L	0.1		1.4	<0.1	0.9	<0.1	<0.1
Chloride	mg/L	0.5		388	4.3	472	48.9	13.8
Nitrate (N)	mg/L	0.05		<0.05	0.20	<0.05	<0.05	<0.05
Nitrite (N)	mg/L	0.05		0.06	<0.05	<0.05	<0.05	0.11
Sulphate	mg/L	1		<1	12	9	33	30
Phosphorus (Total)	mg/L	0.01		0.06	6.47	0.20	2.38	2.13
Total Kjeldahl Nitrogen	mg/L	0.1		3.3	0.8	2.0	3.6	4.8
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05		2.48	0.33	1.36	2.21	0.32
Ammonia (N)-unionized	mg/L	0.01		<0.01	<0.01	0.04	0.02	<0.01
Dissolved Organic Carbon	mg/L	0.2		1.8	3.7	1.9	7.1	21.4
Phenolics	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001
COD	mg/L	5		6	123	10	110	282
Hardness (as CaCO3)	mg/L	0.02		176	244	164	465	424
Aluminum	mg/L	0.01		<0.01	0.02	0.03	0.04	0.05
Barium	mg/L	0.001		0.030	0.062	0.035	0.159	0.178
Boron	mg/L	0.005		2.43	0.016	1.25	0.111	0.187
Calcium	mg/L	0.02		34.1	83.6	29.9	132	142

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			Client I.D.	33-I	33-II	34	35	36
			Sample I.D.	23-029053-26	23-029053-27	23-029053-28	23-029053-29	23-029053-30
			Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12	2023-10-12
Parameter	Units	R.L.		-	-	-	-	-
Iron	mg/L	0.005		0.836	0.019	0.225	0.066	2.22
Magnesium	mg/L	0.02		22.1	8.58	21.7	32.9	16.8
Manganese	mg/L	0.001		0.011	0.003	0.010	1.57	0.084
Phosphorus	mg/L	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Potassium	mg/L	0.1		11.6	1.4	9.2	2.5	3.2
Sodium	mg/L	0.2		307	3.1	266	31.2	17.0
Strontium	mg/L	0.001		2.26	0.201	1.59	0.710	0.269
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	0.0003	0.0001
Arsenic	mg/L	0.0001		0.0016	0.0001	0.0016	0.0002	0.0009
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	0.000099	<0.000015
Chromium	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	mg/L	0.0001		<0.0001	0.0002	0.0001	0.0090	0.0006
Copper	mg/L	0.0001		0.0003	0.0012	0.0003	0.0027	0.0008
Lead	mg/L	0.00002		<0.00004	0.00003	0.00009	0.00003	0.00005
Molybdenum	mg/L	0.0001		0.0059	0.0002	0.0006	0.0003	0.0008
Nickel	mg/L	0.0002		<0.0002	0.0003	<0.0002	0.0091	0.0016
Selenium	mg/L	0.001		<0.001	<0.001	<0.001	0.001	<0.001

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			Client I.D.	33-I	33-II	34	35	36
			Sample I.D.	23-029053-26	23-029053-27	23-029053-28	23-029053-29	23-029053-30
			Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12	2023-10-12
Parameter	Units	R.L.		-	-	-	-	-
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	0.00007	<0.00005
Uranium	mg/L	0.00005		0.00008	0.00336	0.00019	0.00518	0.0133
Vanadium	mg/L	0.0001		<0.0001	0.0008	<0.0001	0.0010	0.0009
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	-		17.3	5.04	19.5	10.5	9.11
Cation Sum	meq/L	-		17.6	5.08	15.2	10.9	9.43
% Difference	%	-		0.763	0.328	12.3	1.86	1.74
Ion Ratio	-	-		0.985	0.993	1.28	0.964	0.966
Sodium Adsorption Ratio	-	-		10.1	0.0855	9.02	0.629	0.359
TDS (Ion Sum Calc)	mg/L	1		960	254	989	539	468
TDS(calc.)/EC(actual)	-	-		0.553	0.560	0.492	0.565	0.575
Conductivity Calc	µmho/cm	-		1770	471	1820	962	820
Conductivity Calc / Conductivity	-	-		1.02	1.04	0.903	1.01	1.01
Langelier Index(25°C)	-	-		0.258	0.277	0.217	0.774	0.646
Saturation pH (25°C)	-	-		7.47	7.14	7.55	6.73	6.70
pH (Client Data)	pH units	-		7.99	7.98	8.18	7.63	7.46
Temperature (Client Data)	°C	-		9.8	11.4	10.9	11.1	12.1

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Parameter	Units	R.L.	Client I.D.	37	201	DUP	DUP-1	DUP-2
			Sample I.D.	23-029053-31	23-029053-32	23-029053-33	23-029053-34	23-029053-35
			Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12	2023-10-12
				-	-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5		366	225	271	337	220
TDS (Calc. from Cond.)	mg/L	3		405	229	273	479	228
Conductivity @25°C	uS/cm	1		774	444	528	903	441
pH @25°C	pH units	-		7.30	7.44	7.42	7.56	7.45
Fluoride	mg/L	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Chloride	mg/L	0.5		10.0	7.9	<0.5	40.0	6.9
Nitrate (N)	mg/L	0.05		<0.05	<0.05	<0.05	1.73	1.70
Nitrite (N)	mg/L	0.05		<0.05	<0.05	0.43	0.07	<0.05
Sulphate	mg/L	1		48	11	<1	77	9
Phosphorus (Total)	mg/L	0.01		0.59	1.26	6.28	1.15	0.13
Total Kjeldahl Nitrogen	mg/L	0.1		9.0	2.0	2.0	0.7	0.2
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05		6.32	1.85	0.40	0.29	0.06
Ammonia (N)-unionized	mg/L	0.01		0.03	0.04	<0.01	<0.01	<0.01
Dissolved Organic Carbon	mg/L	0.2		59.5	3.4	3.3	4.9	3.3
Phenolics	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001
COD	mg/L	5		169	10	40	22	6
Hardness (as CaCO3)	mg/L	0.02		389	229	255	370	237
Aluminum	mg/L	0.01		0.07	0.02	0.02	0.04	0.02
Barium	mg/L	0.001		0.147	0.059	0.061	0.100	0.047
Boron	mg/L	0.005		0.023	0.068	0.060	0.244	0.011
Calcium	mg/L	0.02		142	76.3	73.1	121	79.8

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			Client I.D.	37	201	DUP	DUP-1	DUP-2
			Sample I.D.	23-029053-31	23-029053-32	23-029053-33	23-029053-34	23-029053-35
			Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12	2023-10-12
Parameter	Units	R.L.		-	-	-	-	-
Iron	mg/L	0.005		2.99	<0.005	0.015	<0.005	<0.005
Magnesium	mg/L	0.02		8.17	9.32	17.6	16.5	9.05
Manganese	mg/L	0.001		0.648	<0.001	0.056	0.007	0.001
Phosphorus	mg/L	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Potassium	mg/L	0.1		1.2	1.5	2.9	23.4	1.0
Sodium	mg/L	0.2		10.8	5.9	4.2	9.3	3.3
Strontium	mg/L	0.001		0.262	0.140	0.437	0.223	0.147
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		0.0002	0.0001	<0.0001	<0.0001	<0.0001
Arsenic	mg/L	0.0001		0.0005	<0.0001	<0.0001	<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		0.0007	0.0003	0.0005	0.0004	0.0002
Copper	mg/L	0.0001		0.0020	0.0014	0.0003	0.0018	0.0006
Lead	mg/L	0.00002		0.00003	<0.00002	<0.00002	<0.00002	<0.00002
Molybdenum	mg/L	0.0001		0.0012	0.0001	0.0002	0.0008	0.0001
Nickel	mg/L	0.0002		0.0021	0.0004	0.0014	0.0015	<0.0002
Selenium	mg/L	0.001		<0.001	<0.001	<0.001	0.001	<0.001

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Data Specialist

			Client I.D.	37	201	DUP	DUP-1	DUP-2
			Sample I.D.	23-029053-31	23-029053-32	23-029053-33	23-029053-34	23-029053-35
			Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12	2023-10-12
Parameter	**Units**	**R.L.**		-	-	-	-	-
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	<0.00005	<0.00005
Uranium	mg/L	0.00005		0.00235	0.00036	0.00063	0.00087	0.00035
Vanadium	mg/L	0.0001		0.0028	0.0003	0.0005	0.0002	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	-		8.60	4.95	5.46	9.59	4.90
Cation Sum	meq/L	-		8.92	5.00	5.39	8.41	4.90
% Difference	%	-		1.83	0.581	0.692	6.57	0.0156
Ion Ratio	-	-		0.964	0.988	1.01	1.14	1.00
Sodium Adsorption Ratio	-	-		0.238	0.170	0.115	0.210	0.0941
TDS (Ion Sum Calc)	mg/L	1		453	249	263	497	249
TDS(calc.)/EC(actual)	-	-		0.585	0.561	0.498	0.551	0.564
Conductivity Calc	µmho/cm	-		790	467	488	846	461
Conductivity Calc / Conductivity	-	-		1.02	1.05	0.924	0.937	1.04
Langelier Index(25°C)	-	-		0.555	0.243	0.285	0.707	0.261
Saturation pH (25°C)	-	-		6.75	7.20	7.14	6.85	7.19
pH (Client Data)	pH units	-		7.30	7.99	7.62	7.44	7.92
Temperature (Client Data)	°C	-		12.8	13.1	13.3	11.7	12.7

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Parameter	Units	R.L.	Client I.D. DUP-3	Sample I.D. 23-029053-36	Date Collected 2023-10-12
			-		
Alkalinity(CaCO3) to pH4.5	mg/L	5	475		
TDS (Calc. from Cond.)	mg/L	3	602		
Conductivity @25°C	uS/cm	1	1120		
pH @25°C	pH units	-	7.53		
Fluoride	mg/L	0.1	<0.1		
Chloride	mg/L	0.5	45.3		
Nitrate (N)	mg/L	0.05	2.07		
Nitrite (N)	mg/L	0.05	<0.05		
Sulphate	mg/L	1	71		
Phosphorus (Total)	mg/L	0.01	0.83		
Total Kjeldahl Nitrogen	mg/L	0.1	0.7		
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05	0.14		
Ammonia (N)-unionized	mg/L	0.01	<0.01		
Dissolved Organic Carbon	mg/L	0.2	7.1		
Phenolics	mg/L	0.001	<0.001		
COD	mg/L	5	20		
Hardness (as CaCO3)	mg/L	0.02	586		
Aluminum	mg/L	0.01	0.07		
Barium	mg/L	0.001	0.201		
Boron	mg/L	0.005	0.545		
Calcium	mg/L	0.02	195		

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			Client I.D.	DUP-3
			Sample I.D.	23-029053-36
			Date Collected	2023-10-12
Parameter	Units	R.L.		-
Iron	mg/L	0.005		0.008
Magnesium	mg/L	0.02		23.9
Manganese	mg/L	0.001		0.061
Phosphorus	mg/L	0.1		<0.1
Potassium	mg/L	0.1		2.6
Sodium	mg/L	0.2		33.7
Strontium	mg/L	0.001		0.410
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		<0.0001
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		0.0016
Copper	mg/L	0.0001		0.0057
Lead	mg/L	0.00002		0.00003
Molybdenum	mg/L	0.0001		0.0002
Nickel	mg/L	0.0002		0.0031
Selenium	mg/L	0.001		<0.001

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Parameter	Units	R.L.	Client I.D. DUP-3 Sample I.D. 23-029053-36 Date Collected 2023-10-12 -
Silver	mg/L	0.0001	<0.0001
Thallium	mg/L	0.00005	<0.00005
Uranium	mg/L	0.00005	0.00098
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	-	12.4
Cation Sum	meq/L	-	13.3
% Difference	%	-	3.36
Ion Ratio	-	-	0.935
Sodium Adsorption Ratio	-	-	0.606
TDS (Ion Sum Calc)	mg/L	1	666
TDS(calc.)/EC(actual)	-	-	0.595
Conductivity Calc	µmho/cm	-	1140
Conductivity Calc / Conductivity	-	-	1.01
Langelier Index(25°C)	-	-	1.02
Saturation pH (25°C)	-	-	6.51
pH (Client Data)	pH units	-	7.18
Temperature (Client Data)	°C	-	13.2

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			Client I.D.	14-II
			Sample I.D.	23-029053-8
			Date Collected	2023-10-12
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

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			Client I.D.	14-II
			Sample I.D.	23-029053-8
			Date Collected	2023-10-12
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

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Data Specialist

CADUCEON ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: -

REPORT No: 23-028573 - 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-13
DATE REPORTED: 2023-Nov-03
SAMPLE MATRIX: Surface Water

CUSTOMER PROJECT: Eldon Landfill
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	4	OTTAWA	VKASYAN	2023-Oct-31	A-IC-01	SM 4110B
BOD5 (Liquid)	4	KINGSTON	JWOLFE2	2023-Oct-26	BOD-001	SM 5210B
COD (Liquid)	4	KINGSTON	EHINCH	2023-Oct-20	COD-001	SM 5220D
Colour (Liquid)	4	OTTAWA	MDON	2023-Oct-19	A-COL-01	SM 2120C
Cond/pH/Alk Auto (Liquid)	4	OTTAWA	SBOUDREAU	2023-Oct-19	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
Cyanide Total (Liquid)	4	KINGSTON	JMACINNES	2023-Oct-19	CN-001	SM 4500-CN-E
Cyanide WAD (Liquid)	4	KINGSTON	JMACINNES	2023-Oct-19	CN-001	SM 4500-CN-E
DOC/DIC (Liquid)	4	OTTAWA	VKASYAN	2023-Oct-24	C-OC-01	EPA 415.2
Ion Balance (Calc.)	4	OTTAWA	ASCHNEIDER		CP-028	MECP E3196
Chromium VI (Liquid)	4	OTTAWA	STAILLON	2023-Oct-23	D-CRVI-01	MECP E3056
ICP/MS Total (Liquid)	4	OTTAWA	TPRICE	2023-Oct-20	D-ICPMS-01	EPA 6020
ICP/OES Total (Liquid)	4	OTTAWA	APRUDYVUS	2023-Oct-19	D-ICP-01	SM 3120B
ICP/OES (Liquid)	4	OTTAWA	NHOGAN	2023-Oct-18	D-ICP-01	SM 3120B
Mercury (Liquid)	4	OTTAWA	TBENNETT	2023-Oct-19	D-HG-02	SM 3112B
Ammonia & o-Phosphate (Liquid)	4	KINGSTON	KDIBBITS	2023-Oct-26	NH3-001	SM 4500NH3
Phenols (Liquid)	4	KINGSTON	JMACINNES	2023-Oct-30	PHEN-01	MECP E3179
Total Organic Carbon (TOC)	4	OTTAWA	VKASYAN	2023-Oct-30	C-OC-01	EPA 415.2
TP & TKN (Liquid)	4	KINGSTON	KDIBBITS	2023-Nov-01	TPTKN-001	MECP E3516.2
TSS (Liquid)	4	KINGSTON	KKHUTSYYEVA	2023-Oct-20	TSS-001	SM 2540D
Turbidity (Liquid)	4	OTTAWA	MDON	2023-Oct-19	A-TURB-01	SM 2130B

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Michelle Dubien
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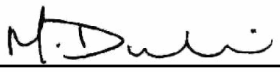
Parameter	Units	R.L.	Client I.D.	SW1	SW2B	SW4	SW6
			Sample I.D.	23-028573-1	23-028573-2	23-028573-3	23-028573-4
			Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12
				-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5		356	277	205	174
Conductivity @25°C	uS/cm	1		672	552	573	468
pH @25°C	pH units	-		8.18	7.99	8.02	7.96
Colour	TCU	2		136	73	76	105
Turbidity	NTU	0.1		1.9	6.0	1.3	5.5
Fluoride	mg/L	0.1		<0.1	<0.1	<0.1	<0.1
Chloride	mg/L	0.5		14.3	7.2	21.3	25.2
Nitrate (N)	mg/L	0.05		0.13	0.23	0.15	0.13
Nitrite (N)	mg/L	0.05		<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	1		5	21	69	32
BOD5	mg/L	3		<3	<3	<3	4
Total Suspended Solids	mg/L	3		9	63	8	70
Phosphorus (Total)	mg/L	0.01		0.09	0.12	0.02	0.20
Total Kjeldahl Nitrogen	mg/L	0.1		1.7	1.0	0.9	2.4
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05		0.34	0.17	0.07	0.29
Ammonia (N)-unionized	mg/L	0.01		<0.01	<0.01	<0.01	<0.01
Dissolved Organic Carbon	mg/L	0.2		48.3	22.9	24.2	24.5
Total Organic Carbon	mg/L	0.2		52.2	22.5	23.4	24.4
Cyanide (Total)	mg/L	0.005		<0.005	<0.005	<0.005	<0.005
Cyanide (WAD)	mg/L	0.005		<0.005	<0.005	<0.005	<0.005
Phenolics	mg/L	0.001		<0.001	<0.001	<0.001	<0.001



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Data Specialist

			Client I.D.	SW1	SW2B	SW4	SW6
			Sample I.D.	23-028573-1	23-028573-2	23-028573-3	23-028573-4
			Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12
Parameter	**Units**	**R.L.**		-	-	-	-
COD	mg/L	5		76	42	25	54
Aluminum	mg/L	0.01		0.10	0.07	0.08	0.06
Hardness (as CaCO3)	mg/L	-		378	301	276	222
Aluminum (Total)	mg/L	0.01		0.04	0.06	0.04	0.03
Barium (Total)	mg/L	0.001		0.071	0.045	0.058	0.044
Boron (Total)	mg/L	0.005		0.031	0.022	0.141	0.032
Calcium (Total)	mg/L	0.02		136	111	97.8	78.1
Iron (Total)	mg/L	0.005		1.07	0.879	0.294	0.500
Magnesium (Total)	mg/L	0.02		9.52	6.01	7.71	6.55
Manganese (Total)	mg/L	0.001		0.608	0.254	0.025	0.352
Phosphorus (Total)	mg/L	0.1		0.1	0.2	<0.1	0.2
Potassium (Total)	mg/L	0.1		2.2	1.1	3.3	1.9
Sodium (Total)	mg/L	0.2		6.9	3.5	11.9	6.5
Strontium (Total)	mg/L	0.001		0.323	0.227	0.219	0.175
Tin (Total)	mg/L	0.05		<0.05	<0.05	<0.05	<0.05
Titanium (Total)	mg/L	0.005		<0.005	<0.005	<0.005	<0.005
Zinc (Total)	mg/L	0.005		<0.005	0.014	0.008	0.012
Antimony (Total)	mg/L	0.0001		0.0002	0.0004	0.0004	0.0003
Arsenic (Total)	mg/L	0.0001		0.0018	0.0008	0.0004	0.0005
Beryllium (Total)	mg/L	0.0001		<0.0001	<0.0001	<0.0001	<0.0001
Cadmium (Total)	mg/L	0.000015		0.000016	0.000048	<0.000015	0.000025

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Parameter	Units	R.L.	Client I.D.	SW1	SW2B	SW4	SW6
			Sample I.D.	23-028573-1	23-028573-2	23-028573-3	23-028573-4
			Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12
				-	-	-	-
Chromium (Total)	mg/L	0.001		<0.001	<0.001	<0.001	<0.001
Cobalt (Total)	mg/L	0.0001		0.0009	0.0005	0.0003	0.0005
Copper (Total)	mg/L	0.0001		0.0007	0.0026	0.0010	0.0019
Lead (Total)	mg/L	0.00002		0.00006	0.00021	0.00007	0.00008
Molybdenum (Total)	mg/L	0.0001		0.0004	0.0003	0.0023	0.0007
Nickel (Total)	mg/L	0.0002		0.0019	0.0014	0.0022	0.0011
Selenium (Total)	mg/L	0.001		<0.001	<0.001	<0.001	<0.001
Silver (Total)	mg/L	0.0001		<0.0001	<0.0001	<0.0001	<0.0001
Thallium (Total)	mg/L	0.00005		<0.00005	<0.00005	<0.00005	<0.00005
Uranium (Total)	mg/L	0.00005		0.00179	0.00326	0.00420	0.00072
Vanadium (Total)	mg/L	0.0001		0.0007	0.0015	0.0005	0.0004
Chromium (VI)	mg/L	0.001		<0.001	<0.001	<0.001	<0.001
Mercury	mg/L	0.00002		<0.00002	<0.00002	<0.00002	<0.00002
Anion Sum	meq/L	-		7.63	6.20	6.13	4.87
Cation Sum	meq/L	-		8.01	6.27	6.14	4.83
% Difference	%	-		2.45	0.598	0.136	0.356
Ion Ratio	-	-		0.952	0.988	0.997	1.01
Sodium Adsorption Ratio	-	-		0.155	0.0884	0.312	0.190
TDS (Ion Sum Calc)	mg/L	1		390	318	334	257
TDS(calc.)/EC(actual)	-	-		0.580	0.577	0.583	0.548
Conductivity Calc	µmho/cm	-		706	574	595	476

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		Client I.D.	SW1	SW2B	SW4	SW6
		Sample I.D.	23-028573-1	23-028573-2	23-028573-3	23-028573-4
		Date Collected	2023-10-12	2023-10-12	2023-10-12	2023-10-12
Parameter	**Units**	**R.L.**	-	-	-	-
Conductivity Calc / Conductivity	-	-	1.05	1.04	1.04	1.02
Langelier Index(25°C)	-	-	1.41	1.03	0.878	0.661
Saturation pH (25°C)	-	-	6.77	6.96	7.14	7.30
pH (Client Data)	pH units	-	7.78	6.81	7.28	7.15
Temperature (Client Data)	°C	-	11.8	12.6	11.0	10.7

Michelle Dubien
Data Specialist

APPENDIX J

Site Inspection Forms

CITY OF KAWARTHA LAKES
OPERATING LANDFILL INSPECTION FORM

LANDFILL: Eldon

Inspected by: Alan Turner - Azimuth

Date: April 19, 2023

Time: 8:30 am

Weather Conditions: 0°C - 5°C, cloudy

A. GENERAL OBSERVATIONS

A.1 Landfill Site: Good Condition

A.2 Status of Landfill Development/Construction Activities: Good condition

A.3 Tipping Face: Good condition

A.4 Residential Container Station: Labelled, organized.

A.5 Maintenance and Administration Building: N/A - Did not inspect

A.6 Weigh Scale Inspection Building: N/A - Did not inspect.

A.7 Reuse Centre: N/A - Did not inspect

A.8 HHW Facility: N/A - Did not inspect

A.9 Leaf & Yard Waste Composting Facility: Good, organized & signed.

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? yes

B.2 Are staff wearing adequate safety equipment? yes

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? Good

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?

E. LEACHATE COLLECTION SYSTEM

E.1 Are manholes free of litter and debris? Yes

E.2 Condition of manholes/need repairs? Good

F. MAIN ENTRANCE AND INTERNAL ROADS:

F.1 Is the main entrance or internal roads in need of repair or maintenance work?

Entrance driveway needs grading, lots of potholes.

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?

Debris in treeline surrounding waste mound, Debris on site fencing near entrance.

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? Yes

L.2 Is the landfill operations equipment in good working order? Yes

L.3 Is the waste being spread, compacted and covered in accordance with the Maintenance & Operations Report? Yes

M. SITE SECURITY AND SAFETY PROTOCOLS

M.1 Are waste loads being adequately inspected (weigh scale/inspection building, residential container station, tipping face)? _____

N/A

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? __

N/A - Did not inspect buildings / weight scale.

M.3 Location and condition of medical emergency kits (eye wash stations and first aid kits). _____

N/A

M.4 Staff knowledge of emergency procedures/numbers? N/A

N. OTHER COMMENTS:

MW 14-I and MW 14-III damaged / destroyed.
MW 32 destroyed, casing fallen over, tubing pulled out of ground.

O. RECOMMENDATIONS:

Two new wells on top of mound to replace MW 14-I. MW-14-III.
New well to replace MW 32.

CITY OF KAWARTHA LAKES
OPERATING LANDFILL INSPECTION FORM

LANDFILL: Eldon

Inspected by: Alan Turner - Azimuth

Date: October 12, 2023

Time: 10:00 am

Weather Conditions: 10°C Sunny - Partly cloudy

A. GENERAL OBSERVATIONS

A.1 Landfill Site: Good condition

A.2 Status of Landfill Development/Construction Activities: Good condition

A.3 Tipping Face: Good condition

A.4 Residential Container Station: Labelled, designated areas

A.5 Maintenance and Administration Building: N/A - Did not inspect, landfill closed at time on site.

A.6 Weigh Scale Inspection Building: N/A - Did not inspect, landfill closed at tim on site.

A.7 Reuse Centre: N/A - Did not inspect

A.8 HHW Facility: N/A - Did not inspect.

A.9 Leaf & Yard Waste Composting Facility: Good condition, signed well and well kept / organized.

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? yes - Landfill was closed at the tim on site.

B.2 Are staff wearing adequate safety equipment? N/A - Landfill was closed while on site.

C. LANDFILL COVER:

C.1 Any evidence of leachate seeps or erosion of landfill cover on waste disposal fill area? No, everything is well maintained

C.2 Condition of North Slope? Good.

C.3 Condition of vegetation? Good, tall grasses & shrubs.

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?

E. LEACHATE COLLECTION SYSTEM

E.1 Are manholes free of litter and debris? Yes, maintained.

E.2 Condition of manholes/need repairs? Good, no repairs needed.

F. MAIN ENTRANCE AND INTERNAL ROADS:

F.1 Is the main entrance or internal roads in need of repair or maintenance work? Roads are in fine condition.

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, fine condition.

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? Debris in treeline & fencing near tipping face. Nothing significant beyond that.

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, fine condition

K.2 Are the traffic and information signs in good condition?

Yes, fine condition

L. LANDFILL OPERATIONS:

L.1 Is there sufficient material for daily and interim cover?

Yes

L.2 Is the landfill operations equipment in good working order?

Yes, although site was closed day of site visit

L.3 Is the waste being spread, compacted and covered in accordance with the Maintenance & Operations Report?

Yes.

M. SITE SECURITY AND SAFETY PROTOCOLS

M.1 Are waste loads being adequately inspected (weigh scale/inspection building, residential container station, tipping face)?

Landfill was closed during site V.S.T.

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?

Landfill was closed during site V.S.T, did not inspect buildings & weight scale.

M.3 Location and condition of medical emergency kits (eye wash stations and first aid kits).

N/A

M.4 Staff knowledge of emergency procedures/numbers? Landfill was Closed during site V.S.T.

N. OTHER COMMENTS:

MW 14-1 & MW 14-111 damaged / destroyed.
MW 32 destroyed, casing fallen over, tubing out of ground, well pipe destroyed.

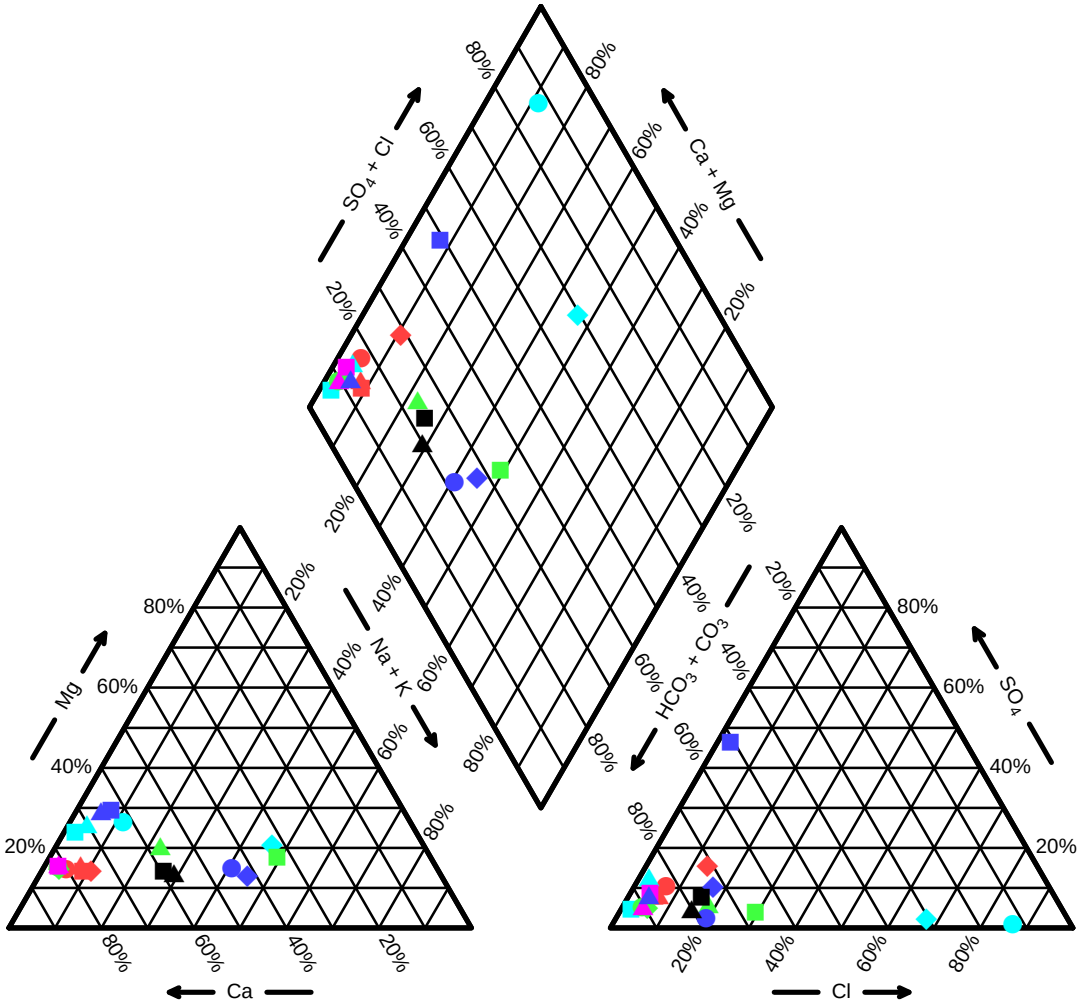
O. RECOMMENDATIONS:

Replace MW 14-1, 14-111 on Mound.
Replace MW 32 Northwest of mound.

APPENDIX K

Piper Diagrams

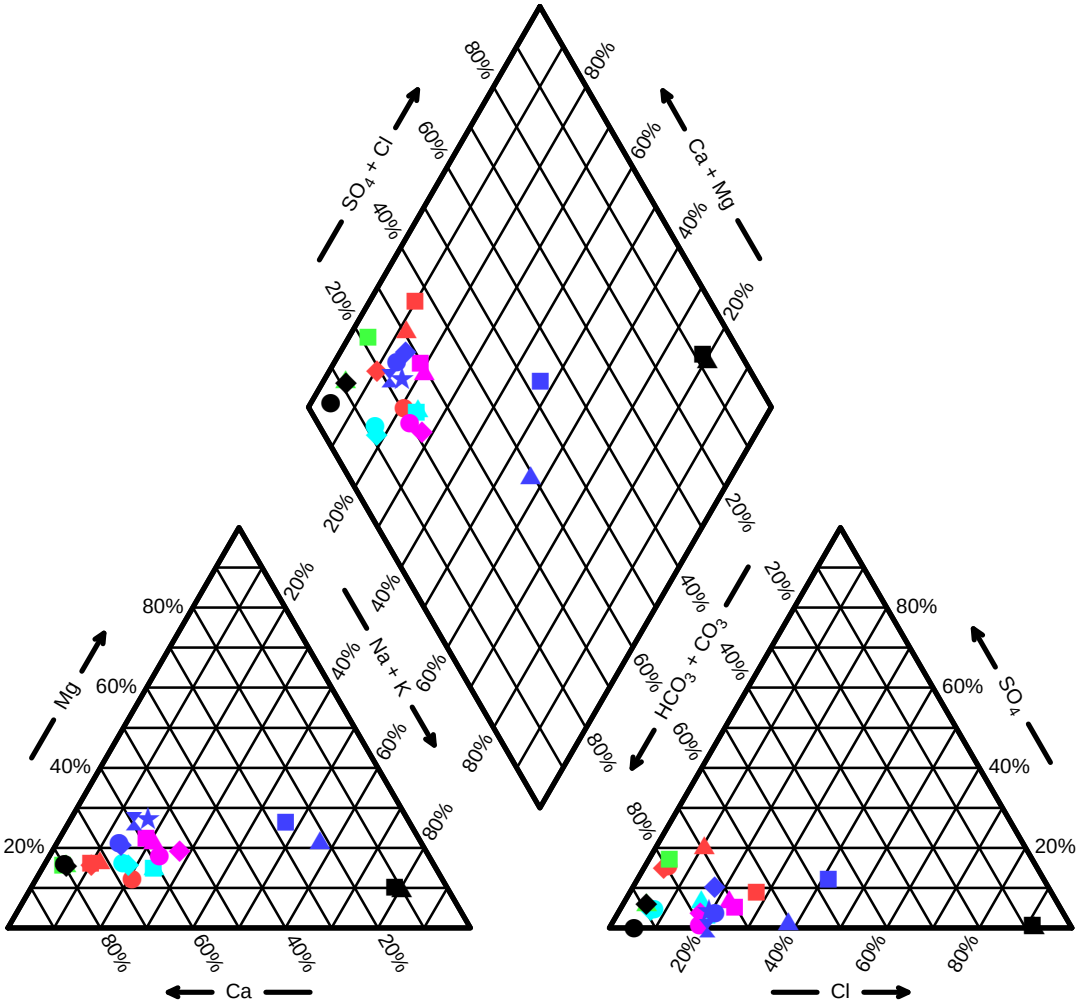
Piper Diagram



Legend

- 7 2023-04-19
- 7 2023-10-12
- 8 2023-04-19
- 8 2023-10-12
- 9 2023-04-19
- 9 2023-10-12
- 10 2023-04-19
- 10 2023-10-12
- 11-I 2023-04-19
- 11-I 2023-10-12
- 11-II 2023-04-19
- 11-II 2023-10-12
- 12 2023-04-19
- 12 2023-10-12
- 13-I 2023-04-19
- 13-I 2023-10-12
- 13-II 2023-04-19
- 13-II 2023-10-12
- 14-II 2023-04-19
- 14-II 2023-10-12

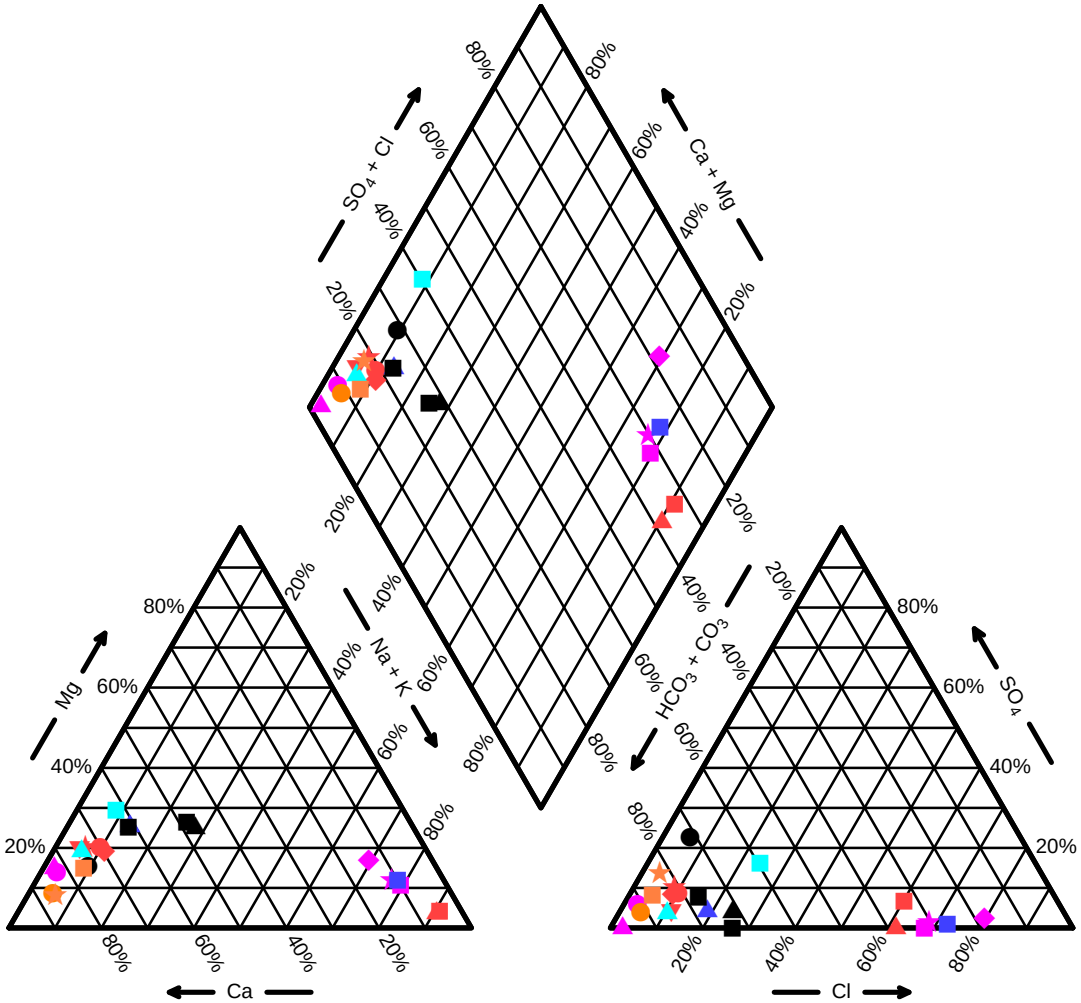
Piper Diagram



Legend

- 16-I 2023-04-19
- 16-I 2023-10-12
- 16-II 2023-04-19
- 16-II 2023-10-12
- 17-I 2023-04-19
- 17-I 2023-10-12
- 17-II 2023-04-19
- 17-II 2023-10-12
- 19 2023-04-19
- 19 2023-10-12
- 25-I 2023-04-19
- 25-I 2023-10-12
- 25-II 2023-04-19
- 25-II 2023-10-12
- 26-I 2023-04-19
- 26-I 2023-10-12
- 26-II 2023-04-19
- 26-II 2023-10-12
- 26-III 2023-04-19
- 26-III 2023-10-12
- 27-I 2023-04-19
- 27-I 2023-10-12
- 27-II 2023-04-19
- 27-II 2023-10-12

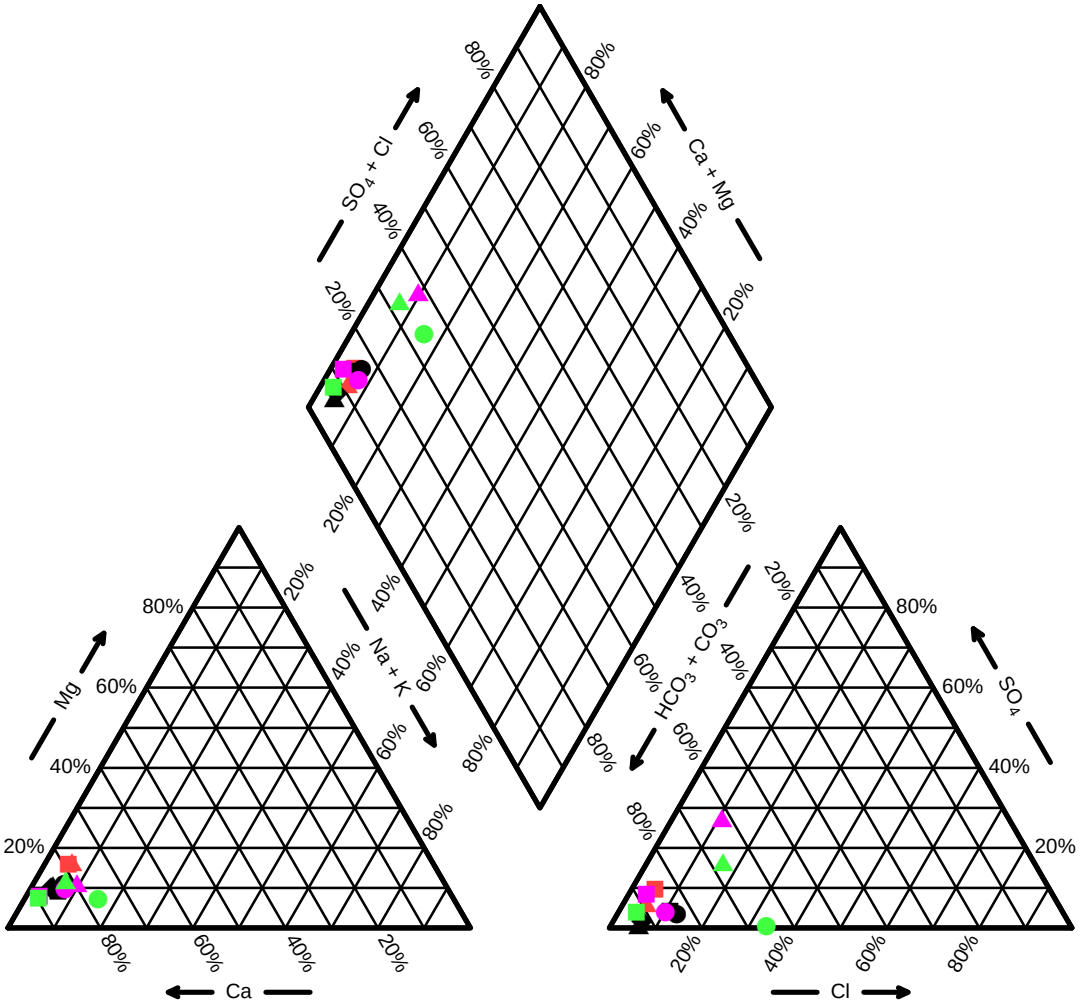
Piper Diagram

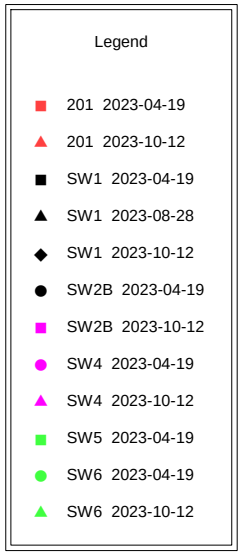


Legend

- 29-I 2023-04-19
- 29-I 2023-10-12
- 29-II 2023-04-19
- 29-II 2023-10-12
- 29-III 2023-04-19
- 29-III 2023-10-12
- 30 2023-04-19
- 30 2023-10-12
- 31 2023-04-19
- 31 2023-10-12
- 33-I 2023-04-19
- 33-I 2023-10-12
- 33-II 2023-04-19
- 33-II 2023-10-12
- 34 2023-04-19
- 34 2023-10-12
- 35 2023-04-19
- 35 2023-10-12
- 36 2023-04-19
- 36 2023-10-12
- 37 2023-04-19
- 37 2023-10-12

Piper Diagram





APPENDIX L

Surface Water Photos

SW-1: April 19, 2023

SW-1: October 12, 2023

SW-1: August 28, 2023

SW-2B: April 19 2023

SW-2B: October 12 2023

SW-2B: August 28, 2023

SW-4: April 19, 2023

SW-4: October 12, 2023

SW-4: August 28, 2023

SW-5: April 19, 2023

SW-5: October 12, 2023

SW-5: August 28, 2023

SW-6: April 19, 2023

SW-6: October 12 2023

SW-6: August 28, 2023