



# 2023 ANNUAL GROUNDWATER AND SURFACE WATER MONITORING REPORT

## NEW LISKEARD WASTE DISPOSAL SITE

THE CITY OF TEMISKAMING SHORES  
P.O. BOX 2050, 325 FARR DRIVE  
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PROJECT NO.: TY131010

DATE: APRIL 2024

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# 1 INTRODUCTION

WSP Canada Inc. (WSP), formerly known as Wood Environment & Infrastructure Solutions, was retained by The City of Temiskaming Shores (the City) to prepare the 2023 annual groundwater and surface water monitoring report for the New Liskeard Waste Disposal Site (the Site). The following report provides a detailed evaluation and summary of the 2023 monitoring data and was completed to constitute the 2023 Annual Monitoring Report to be submitted to the Ministry of the Environment, Conservation and Parks (MECP) in accordance with Condition F(3) of Environmental Compliance Approval (ECA) No. A-500-1115044194, provided in Appendix A. This document also includes a review of the historical and current groundwater and surface water flow and geochemical data, geochemical trends, as well as an evaluation of the groundwater quality with respect to MECP Guideline B-7, as well as a trigger level monitoring program.

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## 1.1 SITE LOCATION

The Site is located approximately 3 kilometres (km) west of New Liskeard, Ontario, West ½ of Lot 5, Concession 2, within the City of Temiskaming Shores, in the District of Temiskaming. The Universal Transverse Mercator (UTM) coordinates of the Site are 596760 Easting and 5262520 Northing, Zone 17, relative to the North American Datum (NAD) 83 (collected via handheld Global Positioning System (GPS), accuracy +/- 5 metres (m)). The location of the Site is presented on Figure 1.

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## 1.2 OWNERSHIP AND KEY PERSONNEL

Contact information for the Site contact representative and the Competent Environmental Practitioner (CEP) for both groundwater and surface water is outlined below.

Site Contact Representative:

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The City of Temiskaming Shores  
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## 1.3 DESCRIPTION AND DEVELOPMENT OF THE SITE

The Site ceased accepting waste in June 2009, at which time the final waste contours were achieved, and has since been inactive, but was formerly operated under C of A No. A571505, provided in Appendix A, issued in May 2000, and amended in April 2005, April 2007, October 2012 and December 2013. The Site was in operation prior to the issuance of the C of A and is reported to have been in operation for over 90 years prior to the current state of inactivity, before which time the area was used as a limestone quarry (Story Environmental Inc. (Story), 2013). The Site was approved to accept domestic, commercial and non-hazardous solid industrial waste. The former C of A specified an approved landfill area of 2.02 hectares (ha) within a total Site area of 32 ha, however it is reported that the historical waste fill area extended outside of the approved fill area footprint and is currently approximately 5.9 ha.

The 2012 amendment to the C of A approved the construction of solar panels within the Contaminant Attenuation Zone (CAZ), the location of which is shown on Figure 2. Condition 30 of the C of A states that solar panels can be installed in this area, as long as they do not interfere with the ongoing groundwater monitoring program or functioning of the CAZ. Construction activities in this area were initiated in 2013. The most recent C of A amendment (i.e., December 2013) acknowledges the ongoing Environmental Assessment process and potential expansion of the Site.

The Site began accepting waste on 17 October 2023, and is currently operated under Environmental Compliance Approval (ECA) No. A-500-1115044194 issued December 2, 2021, revoking the former Compliance Approval (C of A) No. A571505. The ECA allows for the use of a 7.7 hectares (ha) waste fill area within a total Site area of 32 ha, and a maximum capacity not to exceed 366,845 cubic meters (m<sup>3</sup>) (Appendix A). The Site is approved to accept domestic, commercial, and industrial solid non-hazardous waste as defined under Ontario Regulation 347. At the request of the City, the 2023 monitoring program was completed in accordance with the former C of A due the landfill's continued state of inactivity. As per Condition H.6 of the ECA, a letter requesting permission from the District Manager for deviation from the monitoring plan requirements, as detailed in the ECA, has been provided in Appendix A.

Construction activities for the approved Site expansion have been ongoing since October 2022, and the Site started accepting waste on 17 October 2023, as per the City. In 2022, construction activities consisted of clearing and grubbing, internal roadway construction, drainage ditches and leachate pond construction, as well as foundation work for the weigh scale. Also, the waste historically deposited outside the waste footprint area was excavated and deposited within the approved waste footprint in 2022, in compliance with condition G(2)(2) of the New Liskeard ECA. During the 2023 monitoring period, construction activities comprised of removing the existing storage building, adding the weigh scale, scale house and new equipment storage building. In addition, the seepage pond and ditching have also been completed over the 2023 monitoring period. There are no construction activities scheduled for the 2024 monitoring period. The approved landfill expansion boundaries, as well as the current Site facilities are illustrated on the Site Operations Plan (Figure 2).

As reported by the City, no landfill operations issues were encountered, or complaints received regarding the Site during 2023.



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### 1.3.1 WASTE QUANTITIES RECEIVED

A weigh scale was installed at the Site, daily records are kept in order to estimate the amount of uncompacted waste received at the Site. The New Liskeard Landfill accepted approximately 1,761.48 tonnes of uncompacted waste in 2023. Estimates of uncompacted waste are illustrated below in Table 1.

All refrigerators received at the New Liskeard Landfill are tagged by licensed technicians, indicating that all potential ozone depleting substances (i.e., refrigerants) have been removed.

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### 1.3.2 ON-SITE RESOURCE RECOVERY ACTIVITIES

Designated resource recovery areas are available at the landfill.

Tires: Tires are accepted at the Site in a designated area and stockpiled for shipment to a recycler. The number of tires collected from the landfill during 2023 and sent for recycling is unknown, as the City is not provided with this information under the new Full Producer Responsibility Program.

Scrap Metal: Scrap metal is accepted at the Site in a designated area and is sorted and removed from the Site regularly for recycling. Approximately 10.12 tonnes of scrap metal was transferred off-Site during 2023.

Table 1 – Waste Quantities Received in 2023

WASTE DESCRIPTION	TOTAL ANNUAL UNCOMPACTED WASTE (TONNES)
Residential/Commercial Waste	1,729.68
Yard Waste	28.01
Contaminated Waste	1.85
Ozone Depleting or Freon Containing Item	0.07
Asbestos	1.87
ANNUAL TOTAL	1,761.48

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### 1.3.3 SITE CAPACITY

Updated aerial photography or topographical surveys for the Site will be completed annually in order to accurately track the landfill capacity consumed and remaining, as well as the associated estimated remaining life span of the Site. The landfill volume consumed/remaining, and predictions of remaining life span can be estimated based on the final contours provided in the Site's D&O Plan (Wood, 2020a) and updated ground contour plan. The approved final contours for the Site are provided on Figures 6 and 7 of the D&O Plan (Wood, 2020a).

Bulk density can also be used to estimate landfill volume consumed; however an accurate estimate can only be calculated on the years that a Site survey is undertaken. The estimate weigh scale statistics from 2023 indicate that there were 1,761.48 tonnes of landfilled waste in 2023. A conversion factor of 0.593 tonnes per cubic meter (tonnes/m<sup>3</sup>) is used to estimate the volume of waste, which is based on prior experience with other landfills in northern Ontario. Using the tonnes of landfilled waste during 2023 and an estimated bulk density for waste of 0.593 tonnes/m<sup>3</sup>, the total landfill volume consumed during 2023 is estimated to be approximately 2,970 m<sup>3</sup> based on general assumptions of waste composition.

The Site has a maximum landfill volume of 366,845 m<sup>3</sup>, not including the final cover volume. The approved final contour plan includes the placement of a 0.6 m thick layer of low permeable soil underlying a 0.15 m thick layer of

vegetated topsoil. The total volume of the final landfill cover is estimated to be 33,675 m<sup>3</sup>. The remaining landfill capacity for the disposal of waste based on the 2023 weigh scale statistics, is therefore calculated to be 363,875 m<sup>3</sup>.

In order to determine the remaining Site life, an annual waste disposal volume is required. As the Site has only been operational since October 17<sup>th</sup>, 2023, the assumed annual waste disposal volume was calculated using the 2023 combined waste volume estimates from the Haileybury Landfill (closed on October 17<sup>th</sup>, 2023) and the New Liskeard Landfill. Both the Haileybury and New Liskeard Landfills service the same geographical areas within the municipal boundary of the City of Temiskaming Shores, which includes the communities of New Liskeard, Haileybury and Dymond Township, as well as the Town of Cobalt. Therefore, the annual waste disposal volume for the geographical area of the City of Temiskaming Shores is estimated to be 17,656 m<sup>3</sup> in 2023. Based on the remaining landfill capacity for waste disposal of 363,875 m<sup>3</sup> and an annual waste disposal volume of 17,656 m<sup>3</sup>, the Site has a remaining life span of approximately 21 years.

It is recommended that an updated topographical survey be undertaken during the 2024 monitoring period to accurately track the consumed and remaining landfill capacity.

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## 1.4 MONITORING AND REPORTING PROGRAM OBJECTIVES AND REQUIREMENTS

Previous investigations resulted in the instrumentation of the Site with a variety of groundwater monitoring wells. A total of 50 monitoring wells were previously used for monitoring purposes; two additional historical wells were historically confirmed destroyed (OW-19-I and OW-19-II). Twenty-three (23) of the historical monitoring wells currently comprising the monitoring network are sampled three times annually (OW-1R-I, OW-1R-III, OW-10-I, OW-10-II, OW-11-I, OW-11-II, OW-12-I, OW-12-II, OW-13-I, OW-16-I, OW-16-II, OW-16-III, OW-17-I, OW-17-II, OW-17-III, OW-23-I, OW-23-II, OW-24-I, OW-24-II, OW-24-III, OW-25-I, OW-25-II and OW-25-III). Nine additional wells are not sampled, but are retained for water level measurements (OW-1R-II, OW-13-II, OW-14-I, OW-14-II, OW-18-I, OW-20-I, OW-20-II, OW-21 and OW-22-I).

Adjustments were made to the monitoring well network during both 2014 and 2017, including the decommissioning of various historical wells, the re-installation of wells that had been damaged or destroyed, and the installation of additional monitoring wells to the network for inclusion in the annual monitoring program. As part of the 2014 monitoring well installation program, a new well nest, OW-30, was installed in order to delineate the southern extent of the landfill-derived groundwater plume at the downgradient CAZ boundary. Two wells were installed at this location, in the moderate depth and deep aquifers, and both wells were added to the annual monitoring well network. Four additional downgradient wells were installed along the CAZ boundary in 2017, comprising well nest OW-31, with shallow and moderate depth overburden installations, and the addition of deep bedrock wells OW-30-III and OW-25-IV at the associated well nests. In addition, a deep bedrock installation, OW-10-III, was installed at well nest OW-10 in 2017.

Static groundwater levels are measured at each well in the monitoring network during each of the three annual monitoring events. In addition to the above monitoring well network, seven residential supply wells are sampled once annually, during the spring (WS-7, WS-8, WS-9, WS-13, WS-14, WS-15 and WS-16). The locations of groundwater monitoring wells and residential supply wells, with respect to the landfill area, are presented on Figure 3.

An annual surface water monitoring program was initiated in 2017, but was not a requirement of the former C of A. Surface water monitoring is completed at six stations (SW-1 through SW-6), situated at upstream, mid-Site and downstream locations on various watercourses in the vicinity of the Site. Sampling is currently undertaken three times annually, in conjunction with the groundwater monitoring program. Surface water sampling locations are presented on Figure 4. The sampling frequency was reduced from eight sampling events to three over the 2023 monitoring period to align with the new ECA requirements. As the program has been conducted since 2017, a statistically valid dataset (i.e., at least eight data points over a minimum of 2 years) has been established for the monitoring network.

Although landfill gas monitoring was not a requirement at the Site, WSP observed evidence of methane gas in well OW-18 during the 2014 monitoring efforts. It was subsequently decided that a landfill gas monitoring program would be initiated in 2015, in order to measure and track potential landfill gas production within the waste deposits. Landfill gas measurements are now completed three times annually in OW-18, in conjunction with the groundwater monitoring program.

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## 2 PHYSICAL SETTING

### 2.1 GEOLOGY AND HYDROGEOLOGY

Borehole logs, including those prepared by others, detailing soil and groundwater conditions for the monitoring well network are provided in Appendix B. In summary, the borehole logs indicate subsurface conditions at the Site consisting of silt over shallow limestone bedrock in the vicinity of the fill area. It is anticipated that the limestone unit is similar in hydraulic properties to the silt unit, and that the two units generally behave as one. As illustrated on the hydrogeological cross section provided on Figure 4, overburden increases in thickness with distance from the fill area towards the northeast, and comprises mostly silt, which varies in sand and clay content depending on location. Bedrock in the vicinity of the northeast CAZ boundary, and further to the northeast, is reported by Jagger Hims Limited to be an assumed mafic igneous, as opposed to the limestone type which was noted by others elsewhere on the site. The deeper bedrock unit to the northeast of the Site was encountered at depths of up to approximately 23 m below ground surface, but was not instrumented; rather, a deep silt/bedrock contact unit was instrumented in the multi-level wells in this area.

As described above, supplemental boreholes were drilled in 2017, at locations along the downgradient boundary of the CAZ and at a background location. A total of five boreholes were drilled, each adjacent to existing well nests, with the purpose of developing additional hydrogeologic data of the shallow and deep groundwater flow systems. The boreholes were identified as OW-10-III, OW-25-IV, OW-30-III, OW-31-I and OW-31-II, and locations are indicated on Figure 2. Borehole logs of these new installations are also included in Appendix B.

Boreholes were advanced through the overburden using a track mounted CME 55 drill outfitted with hollow stem augers. As bedrock was encountered, at selected locations the boreholes were cored using a diamond HQ coring bit. At one location, OW-10-III, bedrock in the open borehole was tested for hydraulic conductivity at three depth intervals, using standard Lugeon testing methods. At all locations, the boreholes were completed with a PVC monitoring well with the screens set to intercept a specific zone of interest. Hydraulic conductivity calculations are summarized in Appendix C.

Packer testing of OW-10-III indicated tight bedrock at the completion depth of 16.1 m, and the estimated hydraulic conductivity was  $4.3 \times 10^{-8}$  m/s. In the shallower reaches of the rock, between 3 m depth and 8.2 m depth, the hydraulic conductivity was initially  $1.5 \times 10^{-7}$  m/s, increasing up to  $4.0 \times 10^{-6}$  m/s at the highest pressure step of 60 psi. The increase in hydraulic conductivity with pressure steps may indicate an uplifting or washing out of bedded limestone. As such, the initial estimate of  $1.5 \times 10^{-7}$  m/s is considered representative of the hydraulic conductivity of the upper bedrock horizon at this test location.

Hydraulic testing was also carried out on OW-30-III and OW-25-IV. This testing was performed by adding water to the top of the well casing and recording the subsequent fall of water levels with respect to time to a near static condition. Estimation utilized a calculation method by Hvorslev, with calculations presented in Appendix C. At OW-25-IV, the well was installed to straddle the overburden-bedrock contact. The calculated hydraulic conductivity was  $8.9 \times 10^{-8}$  m/s.

At OW-30-II, the hydraulic testing interval was deep bedrock, between approximately 26.7 m depth and 30.4 m depth. The calculated hydraulic conductivity was  $7.3 \times 10^{-8}$  m/s.

In general, the limestone bedrock has a hydraulic conductivity on the order of  $7 \times 10^{-8}$  m/s, with a higher value in the upper weathered reaches of the bedrock, on the order of  $1.5 \times 10^{-7}$  m/s. The overburden and bedrock test location exhibited a hydraulic conductivity of  $8.9 \times 10^{-8}$  m/s, which is in the same range of the bedrock-only test locations. This would tend to support the previous assumptions that the bedrock and overburden have hydraulic conductivities in the same order of magnitude and would effectively act as a single hydraulic unit.

Static water levels were recorded by WSP at each of the wells during the spring, summer and fall 2023 groundwater monitoring events. Appendix D presents the groundwater elevations measured during the 2023 groundwater monitoring events. Figures 5A through 5F present the inferred groundwater elevation contours and groundwater flow directions for both the shallow and deep aquifers for each of the three 2023 monitoring events. In general, the recorded static groundwater levels indicate groundwater flow across the Site towards the northeast in both the shallow and deep groundwater flow systems. Groundwater elevations in the vicinity of the Site mimic the topography of the area, decreasing to the northeast within the fill area, then flattening out across the CAZ, and subsequently decreasing steeply from the northeast corner of the CAZ to Highway 65.

Based on September and July 2017 data, the hydraulic gradient of the groundwater in the shallow aquifer through the fill area and the CAZ for the Site is approximately 0.045 m/m to 0.050 m/m. The deep aquifer hydraulic gradient is similar, at approximately 0.038 m/m to 0.050 m/m. Downgradient of the CAZ, the hydraulic gradient steepens to a typical value of approximately 0.2 m/m.

Groundwater contaminant velocity was calculated historically for the above groundwater conditions. The typical gradient of groundwater movement through the CAZ is 0.05 m/m. Assuming a soil porosity of 0.3, and the overburden hydraulic conductivity calculated above ( $8.9 \times 10^{-8}$  m/s), a contaminant velocity of 47 cm per year is calculated. Using the higher hydraulic conductivity calculated from the upper bedrock/overburden contact ( $1.5 \times 10^{-7}$  m/s), a velocity of 79 cm per year is calculated.

Groundwater that leaves the CAZ experiences higher gradients as it moves toward Highway 65. For example, the overburden velocity would increase to 1.9 m per year, and deep groundwater movement at the bedrock contact would increase to 3.2 m per year.

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## 2.2 SURFACE WATER FEATURES

The Site is situated on a limestone ridge which forms a portion of the watershed divide separating the South Wabi Creek catchment, located west of the Site, from the Wabi Creek catchment, located east of the Site. South Wabi Creek is situated approximately one km from the Site. There is no surface water on-Site, however an unnamed tributary, with headwaters near the northeast corner of the CAZ, flows away from the Site to the northeast, discharging to the Wabi River approximately 1.5 km downstream.

# 3 DESCRIPTION OF MONITORING PROGRAM

## 3.1 MONITORING LOCATIONS

Monitoring locations for groundwater and surface water are illustrated on Figures 2 and 3, respectively. Detailed monitoring locations are provided in Tables 1 through 3. Monitoring well elevations for top of casing are provided in Appendix D.

Table 1 – Monitoring Well Locations On-Site

MONITORING LOCATION	EASTING ZONE 16 NAD 83	NORTHING ZONE 16 NAD 83	COLLECTION METHOD	ACCURACY	COLLECTION PERSONNEL	DATE COLLECTED
OW-1R Nest	596848	5262959	Handheld GPS	+/- 5 m	Trained WSP field crew	26-27 May 2013
OW-10 Nest	596724	5263229				
OW-11 Nest	597001	5263159				
OW-12 Nest	597007	5262919				
OW-13 Nest	596602	5262921				
OW-14 Nest	596977	5262674				
OW-16 Nest	597372	5263132				
OW-17 Nest	597359	5263362				
OW-18	596771	5262904				
OW-20 Nest	596970	5262468				
OW-21-I	597141	5262527				
OW-22-I	596974	5262607				
OW-23 Nest	597678	5263239				
OW-24 Nest	597372	5263251				
OW-25 Nest	597370	5263000				
OW-30 Nest	597401	5262836				8 Sept 2014
OW-31 Nest	597398	5262893				13 June 2017

Table 2 – Residential Supply Well Locations

MONITORING LOCATION	EASTING ZONE 16 NAD 83	NORTHING ZONE 16 NAD 83	COLLECTION METHOD	ACCURACY	COLLECTION PERSONNEL	DATE COLLECTED
WS-7	597484	5263623	Handheld GPS	+/- 5 m	Trained WSP field crew	26-27 May 2013
WS-8	597497	5263589				
WS-9	597857	5263155				
WS-13	597321	5263658				
WS-14	597770	5263282				
WS-15	597818	5263188				
WS-16	597744	5263356				

Table 3 – Surface Water Monitoring Locations

MONITORING LOCATION	EASTING ZONE 16 NAD 83	NORTHING ZONE 16 NAD 83	COLLECTION METHOD	ACCURACY	COLLECTION PERSONNEL	DATE COLLECTED
SW-1	595598	5262440	Handheld GPS	+/- 5 m	Trained WSP field crew	1 May 2017
SW-2	597779	5263227				
SW-3	598065	5263297				
SW-4	598707	5263742				
SW-5	598717	5263939				
SW-6	598864	5263692				

Table 4 presents a summary of the available construction details and respective on-Site positions of the sampled groundwater monitoring wells. Most construction details are based on borehole logs prepared by others (Appendix B).

Table 4 – Sampled Groundwater Monitoring Well Construction Details

WELL ID	CONDITION	TOTAL DEPTH (mbgs)	SCREENED INTERVAL (mbgs)	UNIT SCREENED	ON-SITE POSITION
OW-1R-I	Good	20.3	17.3 – 20.3	Limestone Bedrock	Source
OW-1R-III	Good	4.2	1.2 – 4.2	Silty Sand / Limestone Bedrock	Source
OW-10-I	Good	5.5	4.0 – 5.5	Limestone Bedrock	Crossgradient
OW-10-II	Good	2.4	0.9 – 2.4	Silt	Crossgradient
OW-10-III	Good	18.1	12.1 – 18.1	Limestone Bedrock	Crossgradient
OW-11-I	Good	5.5	4.0 – 5.5	Limestone Bedrock	Downgradient

WELL ID	CONDITION	TOTAL DEPTH (mbgs)	SCREENED INTERVAL (mbgs)	UNIT SCREENED	ON-SITE POSITION
OW-11-II	Heaved	2.3	0.8 – 2.3	Silt / Bedrock	Downgradient
OW-12-I	Good	5.5	4.0 – 5.5	Limestone Bedrock	Downgradient
OW-12-II	Good	2.2	0.7 – 2.2	Silt / Bedrock	Downgradient
OW-13-I	Good	10.8	7.8 – 10.8	Limestone Bedrock	Upgradient
OW-16-I	Good	23.1	20.1 – 23.1	Silty Sand	CAZ Boundary
OW-16-II	Good	7.5	4.5 – 7.5	Silt	CAZ Boundary
OW-16-III	Good	4.0	1.0 – 4.0	Silty Sand / Silt	CAZ Boundary
OW-17-I	Good	11.9	8.9 – 11.9	Silty Sand	Downgradient of CAZ
OW-17-II	Good	7.5	4.5 – 7.5	Sandy Silt	Downgradient of CAZ
OW-17-III	Good	3.2	0.2 – 3.2	Silty Clay / Sand	Downgradient of CAZ
OW-23-I	Good	18.1	15.1 – 18.1	Sandy Silt	Downgradient Sentinel
OW-23-II	Good	13.0	10.0 – 13.0	Clayey Silt / Sandy Silt	Downgradient Sentinel
OW-24-I	Good	18.7	17.2 – 18.7	Sand	CAZ Boundary
OW-24-II	Good	8.4	6.9 – 8.4	Silty Clay / Sandy Silt	CAZ Boundary
OW-24-III	Good	4.9	3.4 – 4.9	Silty Clay / Clayey Silt	CAZ Boundary
OW-25-I	Good	22.8	21.3 – 22.8	Silt	CAZ Boundary
OW-25-II	Good	9.1	7.6 – 9.1	Silt	CAZ Boundary
OW-25-III	Good	4.0	2.5 – 4.0	Silt	CAZ Boundary
OW-25-IV	Good	30.3	27.3 – 30.3	Bedrock	CAZ Boundary
OW-30-I	Good	20.3	17.3 – 20.3	Silty Sand	CAZ Boundary
OW-30-II	Good	7.8	4.8 – 7.8	Silty Sand	CAZ Boundary
OW-30-III	Good	30.4	27.4 – 30.4	Sandstone	CAZ Boundary
OW-31-I	Good	7.6	4.6 – 7.6	Sand and Gravel	CAZ Boundary
OW-31-II	Good	15.9	12.9 – 15.9	Silty Sand / Sand and Gravel	CAZ Boundary



According to the groundwater elevation data collected to date, well nest OW-10 is considered unlikely to be impacted by landfill leachate since it is located north of the Site (i.e., crossgradient). Based on this conclusion, well nest OW-10 has historically been considered to be representative of background (i.e., non-impacted) water quality conditions, and allows a detailed evaluation of the Site to be undertaken with respect to MECP Guideline B-7.

Well nest OW-1R is situated immediately downgradient of the historical fill area, and wells OW-1R-I and OW-1R-III are therefore considered to be source monitoring locations. OW-13-I is situated immediately upgradient of the fill area, however this location is not appropriate for use as a background monitoring location given its close proximity to the waste deposits. Well nests OW-11 and OW-12 are situated at the historical downgradient property boundary, prior to the establishment of the CAZ. These wells are representative of downgradient groundwater quality, however additional property is available downgradient of these well nests for continued natural attenuation.

The downgradient CAZ boundary is monitored by a variety of multi-level well nests, including OW-30, OW-31, OW-25, OW-16 and OW-24, which are situated at slightly increasing distances from the fill area. Well nest OW-17 is situated slightly further downgradient from OW-24, and is outside of the CAZ, immediately south of the hydro corridor. An additional well nest, OW-23, is situated further downgradient, much outside of the CAZ, and is intended to be a downgradient sentinel monitoring well nest, situated upgradient of Highway 65 and the associated residential supply well monitoring locations.

Table 5 presents a summary of the surface water monitoring locations. Surface water monitoring station SW-1 is situated on South Wabi Creek, at the Rockley Road crossing located west of the Site and is therefore considered to be representative of upstream water quality conditions. Surface water stations SW-2, SW-3 and SW-4 are all situated on the unnamed tributary to the Wabi River, whose headwaters originate in the vicinity of the CAZ. These three monitoring stations are located at varying distances downstream of the CAZ. Surface water stations SW-5 and SW-6 are situated on the Wabi River, upstream and downstream of the confluence with the unnamed tributary, respectively. Locations of all surface water sampling stations are indicated on Figure 4.

**Table 5 – Surface Water Monitoring Stations Summary**

STATION ID	WATERCOURSE	POSITION
SW-1	South Wabi Creek	Upstream
SW-2	Unnamed Tributary to the Wabi River	Downstream
SW-3	Unnamed Tributary to the Wabi River	Downstream
SW-4	Unnamed Tributary to the Wabi River	Downstream
SW-5	Wabi River	Downstream
SW-6	Wabi River	Downstream

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## 3.2 MONITORING FREQUENCY

As per previous annual monitoring events, groundwater was sampled three times annually by WSP, during the spring, summer and fall. Landfill gas monitoring was conducted concurrently with groundwater sampling.

Sampling events occurred on the following dates:

- Spring – 19-20 June 2023;
- Summer – 28-30 August 2023; and,
- Fall – 16-18 October 2023.

Surface water sampling was undertaken on three occasions during 2023, on the following dates:

- 19 June 2023;
- 30 August 2023; and,
- 17 October 2023.

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## 3.3 FIELD AND LABORATORY PARAMETERS AND ANALYSIS

Geochemical analyses for general chemistry, metals and nitrogen cycle parameters were completed on all groundwater samples collected. Geochemical analyses for surface water samples comprised those listed in Column 3 of Schedule 5 of the MECP Landfill Standards Guideline during the three sampling events. A detailed list of laboratory parameters is included in Appendix E. Field parameters comprised temperature, pH, conductivity and dissolved oxygen. Static water level measurements were also recorded. Steam flow measurements were recorded during each surface water monitoring event, with the exception of stations SW1, SW5, and SW6 given the width of the watercourses where an accurate measurement cannot be recorded. All field equipment was maintained and calibrated appropriately prior to each use.

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## 3.4 MONITORING PROCEDURES AND METHODS

Monitoring and sample collection followed typical industry standard practices and WSP standard operating procedures (SOPs). Each groundwater monitoring well was purged prior to sampling to ensure the sample was representative of the formation water. Dedicated well instrumentation (Waterra Tube and foot valve system) was used to obtain water samples from the groundwater monitoring wells, and samples were immediately transferred to laboratory-prepared sample vials and bottles. Samples identified for heavy metals analysis were field-filtered using a single use 0.45 µm filter unit, and the remaining samples were preserved following standard laboratory protocols as established in the MECP "Guidance on Sampling for Use at Contaminated Sites in Ontario" (revised December 1996). Care was taken during collection of surface water samples to ensure that a representative sample was collected, and that underlying sediments were not disturbed.

Samples were submitted under chain of custody, in a temperature-controlled setting (i.e., in a cooler, on ice) to a Canadian Association for Laboratory Accreditation (CALA) accredited laboratory sub-contractor, SGS Laboratories (SGS), in Lakefield, Ontario for analysis. The analytical results were subsequently forwarded to WSP. Laboratory analytical reports for 2023 are provided in Appendix E.

The 2023 groundwater monitoring data were reviewed by comparison to the current MECP Ontario Drinking Water Standards (ODWS). Environmental compliance of groundwater quality was evaluated according to MECP Guideline B-7. The 2023 surface water monitoring data were reviewed by comparison to the current MECP Provincial Water Quality Objectives (PWQO), as well as the Canadian Water Quality Guidelines (CWQG) and the Aquatic Protection Values (APV) from Table 3.1 of the 2011 MECP document Rationale for the Development of Soil and Groundwater Standards for use at Contaminated Sites in Ontario.

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## 3.5 QUALITY ASSURANCE FOR SAMPLING AND ANALYSIS

WSP uses recognized industry standards, including the Canadian Council of Ministers of the Environment (CCME) Subsurface Assessment Handbook for Contaminated Sites and MECP's manual *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario* for conducting environmental assessments. For quality assurance, all work is supervised and internally reviewed by senior staff members.

Field sampling equipment decontamination was completed in accordance with accepted protocols. As a minimum, sampling equipment was washed with detergent solution and rinsed with distilled water between sampling locations. Decontamination procedures were undertaken to prevent any cross-contamination between monitoring locations and sampling sites. Screening instruments were calibrated prior to each use.

As a minimum, for every ten groundwater or surface water samples collected, one field duplicate sample was collected and included in the laboratory submission for analysis. Three groundwater field duplicate samples were collected during the summer and fall sampling events; four groundwater field duplicate samples were collected during the spring sampling event, including one from a residential monitoring location. One duplicate sample was collected during each of the surface water monitoring events.

Samples were submitted to a CALA accredited laboratory that is MECP certified for the analysis of drinking water samples. Laboratory blanks and duplicates were used to ensure sample integrity. Relative Percent Differences (RPDs) were calculated and discussed where applicable. Samples were placed in appropriate sample containers provided by the laboratory and preserved (as required based on type of analysis) until delivered (shipped by courier) to the laboratory for analysis. A chain of custody form accompanied samples at all points of handling.

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## 4 MONITORING RESULTS

### 4.1 HISTORICAL DATA

Historical groundwater data are provided in Appendix F. Water quality data dating back to 2011 and 2002 are presented for monitoring wells and residential supply wells, respectively. All available groundwater quality data (i.e., dating back to either September 2014 or September 2017, depending on location) are presented for the more recently installed monitoring wells. Similarly, seven years of historical data are available for the surface water monitoring stations; surface water data dating back to 2017 are provided in Appendix G.

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### 4.2 DATA QUALITY EVALUATION

The analytical laboratory employed to perform the laboratory analyses (SGS) is accredited by the Standards Council of Canada/Canadian Association for Laboratory Accreditation in accordance with ISO/IEC 17025:1999 – “*General Requirements for the Competence of Testing and Calibration Laboratories*” for the tested parameters and has met the standards for proficiency testing developed by the Standards Council of Canada for parameters set out in the Soil, Ground Water and Sediment Standards.

Sample analysis dates provided on the laboratory analytical reports issued by SGS indicate that all sample analyses were performed within the required sample/extract hold times, as indicated by the dates presented in columns for each sample parameter on the analytical report.

The measured cooler temperatures when received by the laboratory were within acceptable limits (< 10 degrees Celsius), with the exception of groundwater and residential samples during the spring monitoring event (i.e., work order CA15728-JUN23 and CA15726-JUN23, respectively). These samples were delivered to the laboratory with an average temperature of 12°C for the groundwater samples and 13°C for the residential samples. Temperatures above 10°C are more conducive to chemical and biological activity in the sample, which can lead degradation or transformation of target contaminants. Therefore, results for samples delivered to the laboratory above 10°C should be qualified and considered estimated, especially biological, and organic samples.

The laboratory minimum detection limits were reported to be at or lower than the required MECP reporting detection limits for the parameters analyzed. A comparison of the internal laboratory duplicate samples indicates that all samples and the respective duplicates are within acceptable limits.

As a quality control measure, groundwater and surface water duplicate samples were collected during each sampling event. All duplicate data are provided in Appendix E and are summarized in Appendices F and G. When compared to concentrations reported in the original samples, groundwater and surface water duplicate water quality data reported that all parameters were within an acceptable range with respect to relative percent difference (i.e., the industry standard of less than 50%), with the exceptions of organic nitrogen and aluminum during the spring event; fluoride, total kjeldahl nitrogen (TKN), aluminum, arsenic, chromium, copper, molybdenum, nickel, tin, and titanium during the summer event; organic nitrogen, TKN, aluminum, copper and nickel during the fall event; chemical oxygen demand (COD), total dissolved solids (TDS), total suspended solids (TSS), and mercury in surface water during various sampling events throughout the year; and, dissolved organic carbon (DOC), aluminum, copper, nickel and zinc during the residential sampling event in the spring.

A breakdown of parameters by event and sample is provided in the associated tables in Appendices F and G. This deviation in duplicate water quality data with respect to relative percent difference is not interpreted to be indicative of a sampling or laboratory bias and does not impact the findings of this report.

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## 4.3 GROUNDWATER FLOW MONITORING

As discussed in Section 2.1, the recorded static groundwater levels indicate groundwater flow across the Site towards the northeast in both the shallow and deep groundwater flow systems. Static groundwater elevations are presented in Appendix D; groundwater elevations, inferred groundwater elevation contours and groundwater flow directions for the 2023 groundwater monitoring events are illustrated on Figures 5A through 5F.

In addition to the current groundwater elevation data, historical groundwater elevations were reviewed in order to identify any trends or inconsistencies in the data. Overall, the reported static groundwater elevations are consistent with those recorded during historical sampling efforts. A time-elevation graph was developed for monitoring wells from 2000 to 2023, presented in Appendix H. The available groundwater elevation data indicate relatively stable elevations over time at monitoring locations.

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## 4.4 GROUNDWATER QUALITY MONITORING

Samples were collected from all targeted wells during all three 2023 monitoring events, with the exception of OW-25-IV which was dry during the spring event; OW-17-III and OW-25-IV which were dry during the summer event; and OW-17-III which was dry during the fall event. Monitoring well OW-16-III, OW-23-I, and OW-24-III were damaged and not sampled during the 2023 monitoring period.

A photographic inventory of the monitoring wells is provided in Appendix I. The condition of each monitoring well was confirmed during each 2023 monitoring event, monitoring well OW-16-III was reported to be damaged below ground surface since 2022. Monitoring well OW-23-I was reported to be destroyed in spring 2023, likely as a result of tree clearing activities in the area. Monitoring well OW-24-III was reported to be damaged below ground surface in spring 2023. No other noticeable requirement for maintenance or repair were observed. During the fall 2020 event, OW-11-I was noted as having heaved historically but is still in operable condition.

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### 4.4.1 BACKGROUND WATER QUALITY

Background water quality at the Site has historically been represented by well nest OW-10, situated crossgradient to the fill area. Until 2017, this multi-level well nest was comprised of a moderate depth limestone bedrock installation (OW-10-I) and a shallow overburden installation (OW-10-II). As previously discussed, a third monitoring well was completed at this nest during 2017, comprising a deep bedrock installation (OW-10-III). This deep installation is considered representative of background water quality conditions in the deep bedrock aquifer and is used for determination of compliance in deep downgradient installations.

Groundwater quality in this well nest is similar in the shallow and the moderate depth installations and is characterized by low concentrations of chloride and most metals parameters, moderate concentrations of alkalinity, dissolved organic carbon (DOC) and sulphate, and high concentrations of hardness, organic nitrogen and total dissolved solids (TDS), in comparison to the ODWS. Concentrations of some parameters, including fluoride boron and iron, are particularly higher in OW-10-I, as compared to OW-10-II. Water quality in OW-10-III is generally similar, with exceptions including elevated concentrations of sodium and fluoride, and lower

concentrations of calcium, hardness and TDS, in comparison to the historical installations at this nest. It is noted that the fall 2017 results for OW-10-III appear to be indicative of residual drilling effects, despite efforts to thoroughly develop the well prior to initial sampling. All results, including event-specific exceedances of the ODWS, are presented in the associated data summary tables in Appendix F.

Aluminum concentrations quantified at the three background monitoring locations appear to be returning to within the historical range in 2023, since elevated concentrations were recorded in 2021. As similar trends in aluminum were apparent at various downgradient locations during 2022, it is important to note that these conditions are the result of background conditions. Although additional data are required in order to further assess this potential trend, any elevated aluminum concentrations reported during 2023 are not interpreted to be landfill-derived.

Based on the inferred groundwater flow direction, concentrations of landfill indicator parameters quantified at this location are considered to be representative of regional background water quality in the aquifers intersected by the well screens. Hardness, organic nitrogen, and TDS were quantified at levels exceeding the ODWS at well nest OW-10 during at least one of the monitoring events in 2023. Hardness and organic nitrogen are operational guidelines, intended to ensure efficient and effective treatment and distribution of water, and to aid in water source selection. TDS is an aesthetic objective, established to assess potential taste, odour or colour problems that may interfere with good water quality control practices. Exceedances of these parameters do not constitute a health hazard and can likely be attributed to elevated compounds produced by natural processes occurring in the aquifer.

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#### 4.4.2 UPGRADIENT WATER QUALITY

The 2023 groundwater quality in OW-13-I, situated upgradient of, but immediately adjacent to, the waste fill area, is characterized by concentrations of most parameters at levels slightly elevated as compared to background, with the exceptions of boron, which is lower as compared to background water quality. No substantial impact to groundwater quality is apparent at this location.

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#### 4.4.3 SOURCE WATER QUALITY

Source groundwater quality conditions are measured by monitoring wells OW-1R-I and OW-1R-III, situated immediately downgradient of the waste fill area. Similar groundwater quality is reported in both the shallow (OW-1R-III) and deep (OW-1R-I) wells and is characterized by significantly elevated concentrations of most analytical parameters, when compared to background concentrations. A number of parameters exceeded the ODWS at this source location, as presented in the associated data summary tables in Appendix F.

Concentrations of fluoride were quantified below background water quality at this well nest during 2023; therefore, any elevated concentrations of fluoride quantified at downgradient locations are interpreted to be associated with background water quality conditions and not landfill-derived.

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#### 4.4.4 MID-SITE DOWNGRAIENT WATER QUALITY

As discussed above, well nests OW-11 and OW-12, formerly representative of the downgradient property boundary, are now situated mid-Site with respect to the CAZ. Multi-level well nests at both locations are comprised of a shallow installation (OW-11-II and OW-12-II) and a moderate depth installation (OW-11-I and OW-12-I), instrumented similarly to background well nest OW-10 (i.e., shallow overburden and limestone aquifer).

Groundwater quality in the shallow installations is noticeably degraded in comparison to the moderate depth installations at both locations. In addition, OW-12 indicates a slightly greater impact in both the shallow and moderate depth wells, as compared to OW-11. Groundwater quality in both shallow wells is characterized by elevated concentrations of alkalinity, chloride, DOC, hardness, TDS, organic nitrogen, boron, sodium, and manganese in comparison to background water quality. Groundwater quality in both moderate depth wells is characterized by elevated concentrations of chloride and sodium, concentrations of alkalinity, hardness, DOC and TDS similar to those quantified at background, and concentrations of sulphate lower than background. An improvement in water quality is apparent at these locations, as compared to well nest OW-1R. Parameters exceeding the ODWS are presented in Appendix F.

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#### 4.4.5 DOWNGRAIENT CAZ BOUNDARY WATER QUALITY

Downgradient water quality at the CAZ boundary is measured by multi-level well nests OW-30, OW-31, OW-25, OW-16 and OW-24, which are considered to be representative of the downgradient property boundary, as well as OW-17, which is situated slightly downgradient of the CAZ boundary. Well nests OW-25, OW-16, OW-24 and OW-17 include wells installed in the shallow, moderate depth and deep aquifers. Well nest OW-30 includes wells installed in the moderate depth and deep aquifers. Deeper bedrock installations were added to both OW-25 and OW-30 during 2017. Well nest OW-31 was also added to the monitoring network in 2017, comprising moderate depth and deep installations. Given the groundwater flow direction, the OW-25, OW-31 and OW-30 nests are situated in closest proximity to the waste deposits. The OW-30 well nest was installed in 2014 in order to delineate the southern extent of the landfill-derived groundwater plume at the downgradient CAZ boundary. Similarly, the OW-31 nest and deeper bedrock installations at adjacent nests were installed in 2017 in order to further delineate the plume in this area. All 2023 water quality results, including any exceedances of the ODWS, are presented in the data summary tables in Appendix F.

Differing water quality is apparent in the three installations at well nest OW-30. Groundwater quality in moderate depth well OW-30-II is characterized by elevated concentrations of sodium, fluoride, and boron, and lower concentrations of alkalinity, chloride, hardness, TDS, and calcium, in comparison to background. Water quality in deep overburden well OW-30-I is characterized by elevated concentrations of fluoride, boron and sodium, and low concentrations of alkalinity, hardness, calcium, and manganese, when compared to background water quality. Concentrations of aluminum and iron have returned to within the historical range over the 2023 monitoring period in deep overburden well OW-30-I, since exhibiting elevated concentrations in 2022. Groundwater in OW-30-III, a deeper bedrock installation, is characterized by elevated concentrations of DOC, barium, iron and manganese, and low concentrations of TDS, and boron, as compared to background. Concentrations during the summer 2023 monitoring event differ from the natural range of fluctuation since 2019, however fall concentrations have returned within the natural range.

Water quality differs slightly in recently installed wells OW-31-I and OW-31-II, which are moderate depth and deep overburden installations, respectively. Groundwater quality at well nest OW-31 is characterized by slightly

elevated concentrations of most metal parameters, including fluoride, sulphate, and TDS, and low concentrations of alkalinity, chloride, hardness, calcium, and boron, when compared to background water quality at similar depths. Elevated concentrations of nitrate are also exhibited in OW-31-I, relative to background. Concentrations of most leachate indicator parameters are slightly elevated within the deep installation (OW-31-II) when compared to the moderate depth installation (OW-31-I), with the exception of hardness and TDS concentrations which are lower in OW-31-II. Concentrations of certain leachate indicator parameters (i.e., chloride, barium, and boron) are generally similar to the moderate depth background water quality within both installations.

Groundwater quality in the OW-25 well nest differs between each of the four wells. Water quality in deep overburden well OW-25-I is characterized by concentrations of most parameters at levels similar to or lower than background, with the exceptions of slightly elevated concentrations of DOC, barium and total ammonia. Groundwater quality in moderate depth well OW-25-II is characterized by slightly elevated concentrations of fluoride, nitrate, barium, boron, chloride, sulphate and sodium, and concentrations of alkalinity, hardness, and TDS at levels lower than background. Water quality in shallow well OW-25-III is characterized by elevated concentrations of fluoride, alkalinity, barium, iron, manganese, sodium; remaining parameters were quantified at levels similar to or lower than background groundwater quality. Recently installed deep bedrock monitoring well OW-25-IV has quantified water quality to date characterized by elevated concentrations of chloride, DOC, fluoride, boron, and sodium, and low concentrations of TDS, sulphate, hardness, and barium.

Groundwater quality also differs with depth in the OW-16 well nest. Deep overburden well OW-16-I indicates water quality characterized by elevated concentrations of all leachate indicator parameters, with the exception of hardness, when compared to background water quality. Groundwater quality in OW-16-II (moderate depth) is characterized by low concentrations of alkalinity, hardness, sulphate, TDS and calcium, and elevated concentrations of chloride, fluoride, nitrate, barium, boron, and sodium, relative to background. Shallow well OW-16-III, has not been sampled since 2021, however water quality at this location has historically been characterized by elevated concentrations of organic nitrogen, barium, and manganese, as well as low concentrations of TDS and sulphate.

Groundwater quality in well nest OW-24 is more consistent with depth, as compared to that discussed above for well nests OW-25 and OW-16. Groundwater quality in shallow, moderate depth and deep wells (OW-24-III, OW-24-II and OW-24-I, respectively) is characterized by concentrations of indicator parameters alkalinity, DOC, and barium slightly elevated compared to background water quality at their respective depths. Chloride concentrations are also slightly elevated in moderate depth well OW-24-II when compared to background. Sodium, chloride, alkalinity, and barium are slightly elevated in OW-24-II and OW-24-III (historically) in comparison to background concentrations. Fluoride concentrations reported in OW-24-II are slightly elevated relative to background concentrations.

Downgradient of the CAZ, groundwater quality in well nest OW-17 is characterized by concentrations of most indicator parameters at levels similar to, or lower than, background water quality. Parameters slightly elevated above background concentrations include iron and manganese in the deep installation (OW-17-I), as well as barium in the moderate depth installation (OW-17-II). Water quality is relatively consistent in all three wells, however concentrations of some indicator parameters, particularly fluoride, barium, boron, and sodium, are slightly higher in OW-17-II, as compared to the shallow (historically) and deep wells (OW-17-III and OW-17-I, respectively).



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#### 4.4.6 DOWNGRAIDENT SENTINEL WATER QUALITY

The 2023 groundwater quality in sentinel well nest OW-23 is characterized by concentrations similar to or lower than background. Concentrations of chloride, fluoride, boron, DOC and sodium, are slightly elevated in OW-23-II in comparison to background water quality. Given the installation depth of OW-23-II, both wells are considered to be representative of the deep aquifer. It is important to note that this well nest is immediately adjacent to Highway 65 and could be potentially impacted by activities along the highway corridor, such as road salting.

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#### 4.4.7 FIELD PARAMETER MEASUREMENTS

Field parameters were measured at all monitoring wells sampled, comprising temperature, pH, conductivity and dissolved solids, and are presented in Appendix J.

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#### 4.4.8 RESIDENTIAL SUPPLY WELL MONITORING

Samples were collected from six of the seven residential supply wells during the spring 2023 monitoring event. Samples were obtained at WS-7, WS-8, WS-9, WS-13, WS-14, and WS-16 during the 2023 sampling effort. The results of the 2023 monitoring event are summarized and compared to the ODWS, with any exceedances identified by bold entries (Appendix F). For locations at which no sample was collected during 2023 (i.e., WS-15), the discussion of water quality below applies to the 2022 results. Samples were not collected from residential supply wells WS-15 during the 2023 sampling event due to access issues.

Analytical parameters at the residential supply wells are generally reported at levels similar to, or lower than, those quantified at the background wells. Chloride is elevated at WS-7, WS-8, WS-9, WS-13 and WS-15, but is not interpreted to be landfill-related given the low boron concentrations, particularly at WS-7 and WS-8. Exceedances of the ODWS were quantified for high hardness at five of the seven locations during the 2023 sampling event. Hardness concentrations exceeded the ODWS at WS-15 in 2022. A low hardness exceedance at WS-9 was quantified in 2023. Other exceedances included organic nitrogen at WS-15 in 2022, no exceedances were quantified at the locations sampled in 2023. Iron exceeded the ODWS at five of the seven locations, including WS-15 in 2022. Organic nitrogen, iron and manganese have also exceeded the ODWS at various residential monitoring locations throughout the historical monitoring record.

Barium is slightly elevated in five of the seven locations when compared to background concentrations, as well as the deep aquifer CAZ boundary monitoring wells, with the exception of OW-30-III. In comparison to the remainder of the downgradient monitoring network, monitoring well OW-30-III is also characterized by low concentrations of fluoride and sodium, therefore these concentrations are not interpreted to be a result of landfill-derived impacts, but the result of geochemical processes (i.e., groundwater type) within the deep sedimentary rock aquifer, further discussed in Section 5.1.1. Concentrations of barium within the residential supply wells are quantified at levels at least 10-times lower than the ODWS limit of 1.0 mg/L. Barium is naturally occurring in sedimentary rocks, elevated barium concentrations exhibited within the residential water supply wells are therefore not interpreted to be a result of landfill-derived impacts, but naturally occurring.

Hardness exceeded the ODWS at the background monitoring well nest OW-10, and at similar or higher concentrations than those reported at the residential supply well locations. Iron, manganese and organic nitrogen are often naturally elevated in groundwater throughout northern Ontario. Hardness, iron and organic nitrogen are operational guidelines (non-health related) and specifically address potential treatment issues if the groundwater

is used as a communal water supply. Manganese is an aesthetic objective (non-health related), set by appearance effects since excessive concentrations may impart an undesirable colour to laundered goods, plumbing fixtures and the water itself, and may produce a bitter astringent taste in water and beverages.

No atypical data points were recorded during the current monitoring period. WS-16 previously reported unusually low concentrations of parameters such as hardness and iron during the 2019 monitoring event; however, concentrations of these parameters have since returned within the historical range. Although a consistent sampling point was used during 2019, as compared to historical monitoring events, it should be confirmed that the sampling point is still positioned prior to a water treatment system in order to ensure that an untreated sample is obtained for analysis.

It is noted that inconsistent results have been reported at WS-9 over time. An incomplete monitoring record is available for WS-9, however available data indicate a reduction in concentrations for a number of parameters between the 2013 and 2014 monitoring events, and a concurrent spike in sodium concentrations. No samples were obtained at this location between 2009 and 2013, during 2015 or 2016, as well as 2020 and 2022, but 2017 through 2019, 2021, and 2023 data indicate a reduction in the concentrations of parameters such as hardness and a number of metals parameters including iron and manganese, as well as an increase in the concentration of sodium. It is possible that this inconsistent water quality is the result of a water treatment system at the residence, which is either no longer bypassed at the tap used during sampling or was installed between the 2013 and 2014 monitoring events. None of the inconsistent water quality results at this monitoring location are interpreted to be attributed to the landfill.

In summary, a review of the 2023 geochemical data from the residential water supply wells located downgradient of the Site indicates that these locations are not experiencing any evidence of a landfill-derived impact.

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## 4.5 SURFACE WATER QUALITY MONITORING

As a result of dry conditions, samples could not be obtained from surface water station SW-3 during the spring monitoring event in 2023. A photographic inventory of the monitoring stations is provided in Appendix I.

The 2023 surface water quality results indicate similar water quality at stations SW-1, SW-5 and SW-6, which generally quantify lower concentrations of indicator parameters than stations SW-2, SW-3 and SW-4. Stations SW-2 and SW-3 are characterized by elevated concentrations of alkalinity, total dissolved solids (TDS), and chloride, while the remaining parameters are generally similar to or lower than background water quality. Concentrations of indicator parameters at SW-4 are significantly higher than those at the remaining monitoring stations and appear to be consistently elevated based on the data available to date. The 2023 data indicate stable results at all locations. The consistently elevated concentrations of indicator parameters at SW-4 are not interpreted to be landfill-related; the results at all other stations indicate no impact to surface water quality. Station- and event-specific exceedances of the PWQO, APV and CWQG are provided in Appendix G.

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### 4.5.1 FIELD PARAMETER MEASUREMENTS

Field parameter and flow measurements were undertaken at the monitoring stations, comprising temperature, pH, conductivity, and dissolved oxygen, and are presented in Appendix J.

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## 4.6 LANDFILL GAS MONITORING

Landfill gas monitoring was undertaken during the summer and fall monitoring events at OW-18 in order to monitor the potential hazards associated with production of landfill gas within the capped waste deposits at the Site and is presented below in Table 6. The elevated concentrations of methane gas measured are an indication of the generation of landfill gas occurring within the capped landfill.

The presence of methane gas concentrations between 5% and 15% by volume, is known to be explosive in air, while concentrations greater than 15% in air are known to be flammable; thus, for safety reasons, workers should be informed of the explosive nature of methane accumulations and any work in this vicinity should be conducted with this knowledge.

Table 6 – 2023 Landfill Gas Measurements

DATE	METHANE (%CH <sub>4</sub> )	CARBON DIOXIDE (%CO <sub>2</sub> )	OXYGEN (%O <sub>2</sub> )	BALANCE GASES (%)
20 June 2023	65.2	34.7	0.0	0.0
18 August 2023	64.7	35.3	0.0	0.0
16 October 2023	64.0	35.9	0.0	0.0

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# 5 ASSESSMENT, INTERPRETATION AND DISCUSSION

## 5.1 GROUNDWATER QUALITY

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### 5.1.1 GROUNDWATER CHEMISTRY ANALYSIS

The groundwater major ion chemistry analysis for the 2023 monitoring events is presented in Tri-Linear Piper Plots on Figures 6A through 6D. Tables depicting the calculations used to quantify the geochemical data are presented in Appendix K. The Piper diagram plots the major ions as percentages of milli-equivalents (meq) in two base triangles. The total cations and the total anions are set equal to 100% and the data points in the two triangles are projected onto an adjacent grid.

Tri-Linear Piper Plots for the on-Site monitoring wells are presented on Figures 6A through 6C for the spring, summer and fall 2023 monitoring events, respectively. The positioning of the downgradient property boundary wells in comparison to background wells and source wells indicates varying groundwater types and varying degrees of groundwater impact, depending on well nest location and installation depth. All wells plotted vary in placement, with no wells indicating an identical water type with respect to either source or background. The deep bedrock background well (i.e., OW-10-III) indicates a water type dissimilar to that of the two shallower background installations (i.e., OW-10-I and OW-10-II) and actually indicates a water type similar to that of the source water quality, as opposed to the shallow and moderate depth background water quality. These generally noisy data are attributed to the variation in chemistry between the limestone aquifer, the deeper bedrock aquifer, and the upper silty sand aquifer, which makes characterization of leachate effects difficult.

Shallow downgradient monitoring wells OW-16-III (historically), OW-24-III, and OW-17-III demonstrate a strong shift away from source water quality, indicating a substantial improvement in groundwater quality compared to source wells. Negligible landfill derived impacts are interpreted. Similarly, OW-25-III is situated in even closer proximity to background wells OW-10-I and OW-10-II, indicating a slightly different water type as compared to other shallow downgradient wells, but evidently no landfill-derived impact at this location. Results for OW-31-I indicate independent placement on the diagram, indicating a slightly different water type than source, background or other downgradient wells.

Moderate depth wells (i.e., OW-30-II, OW-31-II, OW-25-II, OW-16-II, OW-24-II and OW-17-II) in downgradient CAZ boundary well nests are placed sporadically on the Piper diagram, with no wells placed in immediate proximity to background. OW-17-II is placed near the source wells on the diagram; however, it is noted that there is no interpreted landfill-derived impact at this location. OW-25-II, OW-30-I, and OW-31-II indicate a similar water type, dissimilar to that of both source and background.

The deep wells, including deep background well OW-10-III, indicate widely varying water types depending on well nest location. Deep wells OW-24-I, OW-17-I, and OW-30-III well nests indicate a similar shift away from source water quality as the shallow wells discussed above, as well as moderate depth well OW-24-II, and therefore indicate no apparent landfill-derived impact. The positions of OW-25-I, OW-25-IV, and OW-16-I, however, are

inconclusive, and appear to indicate a variable water type at depth. Additional data are required before the water type, or types, of the deep overburden and bedrock aquifers can be confirmed.

Figure 6D presents the Tri-Linear Piper Plot for the residential supply well locations, as compared to the background and source monitoring wells at the Site. Residential supply wells are situated away from both the shallow and moderate depth background wells and the source wells on the Piper diagram, indicating that these wells are characterized by a dissimilar water type when compared to both the shallow to moderate depth background water quality and the leachate-impacted groundwater quality in the immediate vicinity of the waste deposits. As indicated above, deep bedrock background monitoring well OW-10-III demonstrates a water type that plots close to source on the Piper diagram; however, this is not indicative of an impact to groundwater quality, but rather is characteristic of the deep bedrock aquifer in the vicinity of the Site with a balance of mineralization that appears to resemble leachate impacted water. That the residential supply wells are positioned at a distance from the source wells, and in closer proximity to background wells, illustrates a lack of landfill-derived impact at these downgradient wells. Based on the six residential locations from which samples were obtained in 2023, it is likely that residential supply wells are similar in water type to that of the unimpacted deep bedrock aquifer.

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## 5.1.2 GROUNDWATER TREND ANALYSIS

The current and previous groundwater elevation and water quality data were reviewed with the objective of identifying any apparent trends or inconsistencies in the present monitoring record. With respect to groundwater elevations, the data available indicate that the seasonal water table fluctuation has been relatively consistent since 2000 (Appendix H).

A series of time-concentration graphs were developed for several select landfill indicator parameters (including alkalinity, barium, boron, chloride, DOC, hardness and TDS) for each monitoring well location from 2007 to 2023. These time-concentration graphs are presented in Appendix H. Historical groundwater quality data generally indicate consistent concentrations of most parameters over time. Source wells OW-1R-I and OW-1R-III indicate high concentrations of all parameters graphed throughout the monitoring record, as well as high ranges of fluctuation, as compared to other monitoring wells. Concentrations of alkalinity and barium within both the shallow and deep source wells indicate an increasing trend over the monitoring record. Trends in boron concentrations within both the shallow and deep installations appear to be stabilizing over the 2023 monitoring event after exhibiting an increasing trend since 2009 and 2015 respectively. Hardness and TDS concentrations appear to be stabilizing over recent years since exhibiting a decreasing trend from 2009 and 2007, respectively. This is not surprising, given their source location immediately downgradient of the fill area. Hardness concentrations within both the shallow and deep source well installations recorded during the summer 2021 event are interpreted to be anomalous as concentration have returned within the historical range during subsequent events.

All other monitoring wells demonstrate consistent concentrations of parameters over time, with little fluctuation observed, with the exception of OW-16-III, which indicates relatively high concentrations of alkalinity, barium and DOC, as well as high ranges of fluctuation for all three parameters. Concentrations of indicator parameters at this location indicated an increase between 2011 and 2015, but appear to have stabilized since 2016. These trends in alkalinity, DOC and barium are unexpected for this downgradient location, and trends in this well should continue to be observed as additional sampling efforts are undertaken. Concentrations of barium exhibit an increasing trend within shallow installation OW-25-III, as well as moderate depth installations OW-24-II and OW-17-II over the monitoring record. Barium concentrations within the CAZ boundary well locations generally exceed concentrations

recorded within the mid-Site well locations (i.e., well nest OW-11 and OW-12) over recent years, particularly OW-12-I. Moderate depth installation OW-17-II has been exhibiting an increasing concentration in barium since 2014. Shallow installation OW-12-II exhibits an increasing trend in boron concentrations over the monitoring record.

Other downgradient wells are behaving as anticipated, with low and stable concentrations of all parameters recorded throughout the monitoring record. Various anomalous concentrations are apparent in recently installed monitoring wells (i.e., 2014 and 2017 installations) during the initial sampling round at each location (i.e., the fall 2014 or fall 2017 monitoring event, depending on installation date). These initial concentrations are interpreted to be the result of residual impacts of drilling, and do not appear to be representative of actual water quality conditions at these locations, as compared to concentrations quantified during subsequent events. As discussed previously, parameters such as hardness demonstrate what are interpreted to be anomalous concentrations in MW-25-IV during the fall 2019 monitoring event. It is noted that all wells quantified slightly elevated boron concentrations during the summer 2020, as well as the spring 2022 event in both the shallow and deep aquifers. Concentrations of boron, throughout the monitoring network, have returned within the historical range over the 2023 monitoring period.

A series of graphs were also developed for select indicator parameters (including alkalinity, barium, boron, chloride, copper and zinc) for each residential supply well location from 2002 to 2023. Groundwater quality data are stable throughout the monitoring record at all locations, with the exception of various anomalous results that have been reported for some parameters, as well as the relatively recent changes in water quality observed at WS-9, discussed previously.

Alkalinity is relatively stable at all locations from 2002 to 2022, with a slight increasing trend at WS-7, WS-8, and WS-13. Boron is also stable, with the exception of one anomalous concentration reported at WS-13 during 2002; boron concentrations have been low and stable at this location since that time. Boron concentrations are elevated at WS-9 and WS-15, in comparison to remaining residential monitoring locations, but are stable and indicate a slight decreasing trend since 2009 despite elevated concentration in 2021. Chloride is stable at all locations, with the exception of WS-7 and WS-8 which are elevated compared to the remaining residential monitoring locations and exhibit fluctuating concentrations over the monitoring record. An anomalous result was quantified at WS-7 during 2008.

Various anomalous results for barium have been reported, however all are atypically low, as compared to the remainder of the monitoring record at each location; no atypically high barium concentrations have been quantified. Low barium concentrations were reported at WS-14 during 2003, at WS-7 from 2003 to 2004 and also from 2007 through 2009, at WS-9 during 2014 and from 2017 through 2021, and at WS-16 during 2019. The low barium concentrations reported at WS-9 appear to be indicative of a new trend at this location. Lower barium concentrations were recorded in 2021 throughout the residential monitoring locations, with the exception of WS-9 and WS-13; concentrations have since returned within the historical range of fluctuation.

Copper is generally low and stable at all locations, however anomalous values were reported at WS-7, WS-13, WS-14 and WS-15 in 2010, 2002, 2009 and 2007, respectively. Copper concentrations at WS-15 in 2022 are potentially anomalous, however additional data is required in order to confirm these results. Copper concentrations appear to have been slightly elevated at WS-13 prior to 2007 but have since stabilized at a low level. Zinc concentrations were elevated at all locations during 2003 but are generally stable with the exception of anomalies quantified at WS-15 and WS-9 during 2007 and 2013, respectively. High zinc concentrations were reported consistently at WS-16 between 2015 and 2018, as well as 2022, but a low zinc concentration, at a level similar to historical results, were quantified at this location during 2019 and 2023.

Fluoride concentrations are variable with a high range of fluctuation across the well network, however the trend for each well is stable throughout the monitoring period (2007 to 2023). There is some noise in the data, however the stable trend is apparent for both the deep groundwater and the shallow groundwater. No pattern of concentration with respect to well position in the flow system was identified, suggesting that the quantification of fluoride is not related to landfill impacts.

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### 5.1.3 GUIDELINE B-7 CALCULATIONS

In September 1986, a policy was introduced by the MECP to assist in the evaluation of groundwater impacts, especially for the case of landfill and/or lagoon operations. The policy was entitled “The Incorporation of the Reasonable Use Concept into MECP Groundwater Management Activities” and is referred to now as Guideline B-7 (formerly Policy 15-08) or the “Reasonable Use” policy. Simply stated, the policy sets groundwater contaminant discharge criteria for landfills and/or lagoons that may impair local water quality; the criteria are based on maintaining the protection of groundwater resources on the adjacent lands or properties.

The contaminant discharge criteria, which represent the maximum acceptable levels of contaminants that should not be exceeded, are established using a simple mathematical relationship that incorporates background (existing) water quality and the highest provincial water quality standards for the adjacent land use. Under Guideline B-7, water quality impacts will not be allowed to exceed the maximum calculated discharge criteria at the landfill (or Site) property boundaries.

In order to apply Guideline B-7, the appropriate resource use of the adjacent properties must be selected. At the New Liskeard Landfill Site, the highest end use for groundwater on the adjacent properties is for drinking water purposes, for which the ODWS – Table 1 through Table 4 have been established. The purpose of the ODWS is to protect public health through the provision of safe drinking water. Water intended for human consumption shall not contain unsafe concentrations of toxic chemicals (health related parameters). Health related standards are established for parameters that, when present above a certain concentration, have known or suspected adverse health effects. At the same time, water should also be aesthetically acceptable. Colour, odour and turbidity are parameters that, when controlled, result in water that is clear, colourless and without objectionable or unpleasant taste or odour (non-health related parameters). In addition, operational guidelines have been established for non-health related parameters that need to be controlled to ensure efficient and effective treatment and distribution of the water. As well, Guideline B-7 requires the identification of background water quality conditions in the underlying aquifer.

The background geochemical profile (based on the geometric mean of all results from OW-10-I, OW-10-II and OW-10-III) and the resultant values were applied along with the ODWS, to complete a Guideline B-7 analysis for all of the downgradient groundwater monitoring wells for select landfill indicator parameters. Appendix L presents the Guideline B-7 calculations for the 2023 monitoring results that have been developed using ten years of valid background analytical data observed in the shallow, moderate depth and deep aquifers, in OW-10-II, OW-10-I and OW-10-III, respectively. The initial sampling event at OW-10-III is not considered valid and has therefore not been included in the Guideline B-7 analysis for the deep aquifer.

It should be noted that these Guideline B-7 values are much lower (i.e., more stringent) than the ODWS, and a well-by-well comparison of the performance of each of the parameters at the downgradient groundwater monitoring wells is also presented in Appendix L for the 2023 monitoring events; exceedances are indicated by bold and shaded entries. In the event that the background concentration of a parameter exceeds the ODWS, the

background level is considered the maximum allowable concentration not to be exceeded. This is the case for hardness during all three monitoring events in the shallow, moderate and deep aquifers.

Several parameters were added to the list of Guideline B-7 calculations in 2023 as a result of the application of the trigger level monitoring program. These parameters include fluoride, alkalinity (high), hardness (high), and manganese, as well as organic nitrogen for the deep aquifer wells. Comparing concentrations observed in the downgradient groundwater monitoring wells during the 2023 sampling events to the maximum allowable concentration at the contaminant attenuation zone boundary (Appendix L), seven non-health related (alkalinity, hardness, DOC, manganese, organic nitrogen, sodium and TDS) and one health related (fluoride) parameter exceedances are noted.

The following non-health related exceedances of the Guideline B-7 were noted during the 2023 monitoring period:

- Alkalinity was detected at concentrations exceeding the maximum concentration in the shallow and deep aquifer during the summer sampling event;
- Hardness was detected at concentrations exceeding the maximum concentration in the shallow and deep aquifer during one or more sampling events;
- DOC was detected at concentrations exceeding the maximum concentration in the moderate aquifer during the summer sampling event, and in the deep aquifer during all three sampling events;
- Manganese was detected at concentrations exceeding the maximum concentration in all three aquifers in 2023 during one or more sampling events;
- Organic nitrogen was detected at concentrations exceeding the maximum concentration in the deep aquifer during all three sampling events;
- Sodium was detected at concentrations exceeding the maximum concentration in the moderate depth aquifer during the spring and fall sampling events; and,
- TDS quantified Guideline B-7 exceedances in the shallow, moderate depth and deep aquifers.

Fluoride exceedances were quantified in the shallow, moderate depth and deep aquifers during the 2023 monitoring period. Fluoride concentrations are elevated within the background water quality, and concentrations observed within the downgradient monitoring wells exceed source water quality concentrations therefore, elevated fluoride concentration are not interpreted to be landfill-derived.

Exceedances of the Guideline B-7 maximum allowable concentrations have been recorded during the present monitoring review in all downgradient CAZ boundary well nests. Two exceedances were quantified at the sentinel well nest OW-23, for organic nitrogen, during the summer and fall 2023 monitoring events. Fluoride exceedances were also quantified during all three monitoring events, at OW-23-II. Guideline B-7 exceedances cannot necessarily be attributed to a landfill-derived impact to groundwater quality at this time, in the absence of additional data. Given the current interpretation previously discussed, that variable water types exist downgradient of the Site depending on aquifer depth, it is possible that some of the Guideline B-7 exceedances quantified during the present review represent unimpacted groundwater quality at depth within the overburden, or at an increased depth within the underlying bedrock. Although an effort has been made during the current review to compare downgradient wells of similar installation depths to a background monitoring well installed at a similar depth and within a similar stratigraphic unit, the variation in stratigraphy across the Site results in a variety of water types which appear to be dissimilar as a result of differing residence time within the aquifer.



It is WSP's opinion that the 2023 Guideline B-7 results are potentially misleading with respect to an assessment of Site compliance, given a number of factors. Many of the Guideline B-7 exceedances quantified were only marginally above the maximum concentration. There is a notable reduction in the number of Guideline B-7 exceedances with distance downgradient.

It was noted that DOC concentrations are elevated near the toe of the landfill, with concentrations gradually decreasing with distance. Trend graphs for this parameter, however, illustrate significant data noise with downgradient wells indicating concentrations similar to background concentrations. Attenuation to near background levels appears to be occurring on average, with noisy data spikes for some locations exceeding the narrow B-7 compliance band for this parameter. As such, DOC is not a reliable indicator of annual compliance and the stable trend of DOC concentrations at the downgradient limits suggest that the status for this parameter is unlikely to change in the near future.

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#### 5.1.4 TRIGGER LEVEL MONITORING PROGRAM

A three-tiered trigger level monitoring program was developed for the Site, as outlined in the Surface and Groundwater Monitoring Program, New Liskeard Waste Disposal Site (Wood, 2020b). The program consists of routine monitoring (Tier I), confirmation monitoring (Tier II), and compliance monitoring (Tier III). Tier II (confirmation monitoring) is triggered if observed concentrations for one or more parameters exceed the Tier I trigger concentrations during two consecutive monitoring events at a single CAZ boundary well.

The trigger parameters for the Site include boron, alkalinity, chloride, hardness, TDS, manganese, sodium, and fluoride, as well as organic nitrogen for the deep aquifer. Fluoride has been included at the request of the MECP, however, fluoride was previously determined to be elevated at well nest OW-10 (i.e., background) and a poor leachate indicator parameter, so it has limited use as a diagnostic parameter. The trigger monitoring program is evaluated at downgradient CAZ boundary monitoring well nests OW-16, OW-17, OW-24, OW-25, OW-30 and OW-31.

Trigger concentrations are set at 80 percent of the Guideline B-7 Maximum Concentration (formerly known as Reasonable Use Concept (RUC), when background concentrations do not exceed 80 percent of the RUC. Where background concentrations exceed 80 percent of the RUC, the highest background concentration recorded during any monitoring event is used as the trigger concentration. The trigger concentrations and related exceedances are presented in Appendix L.

By the present assessment, trigger level exceedances were quantified for alkalinity, hardness, TDS, manganese, sodium, fluoride and organic nitrogen at one or more trigger locations during one or more monitoring events in 2023. No trigger level exceedances were quantified at OW-25-I during the 2023 monitoring period. No trigger level exceedances were quantified for boron or chloride during the 2023 monitoring period.

Alkalinity exceedances were quantified at monitoring wells OW-25-III and OW-24-II in the shallow and moderate depth aquifers, respectively, during all three monitoring events in 2023. Alkalinity concentrations consistently exceeded at OW-16-I throughout the 2023 monitoring period, in the deep aquifer. Concentrations of alkalinity have been stable throughout the monitoring record at all above noted locations.

Hardness exceedances were quantified in the deep aquifer monitoring wells OW-24-I and OW-17-I during one or more sampling events, as well as at OW-25-III during the fall event in 2023. Concentrations of hardness are stable over the monitoring record and are similar to background water quality. Fall 2023 hardness concentrations at

OW-25-III is the highest since 2007, however, source water quality concentrations have been stable since 2015, after exhibiting a decreasing trend.

Alkalinity and hardness concentrations are slightly elevated compared to background water quality, however, as discussed in Section 5.1.1, the placement of the above noted wells on the tri-linear piper plots suggests dissimilar water quality from both source and background water quality, which might be more indicative of dissimilar water type as opposed to landfill leachate impacts.

TDS exceedances were only quantified in the deep aquifer monitoring wells at OW-16-I, OW-23-II, OW-30-I, OW-30-III, and OW-31-II during one or more monitoring events in 2023. TDS concentration for OW-30-III during the summer event is elevated compared to the locations natural range and fall concentrations have returned within the monitoring wells' natural range of fluctuation, therefore this concentration is likely anomalous. TDS appears to be stable throughout the monitoring network since 2017, following a decreasing trend. Concentrations of TDS within the downgradient CAZ monitoring wells are similar or lower than background concentrations, therefore an exceedance of this parameter might not necessarily be indicative of landfill derived impacts.

Manganese exceedances were only quantified within the shallow downgradient CAZ well OW-25-III during the fall monitoring event in 2023. Manganese concentrations exhibit an increasing trend over the monitoring record in OW-1R-III. Concentrations of manganese recorded within OW-25-III have been elevated compared to mid-Site well nests OW-11 and OW-12 over recent year, which could be indicative of the leachate plume migration and a shift in redox conditions with distance from the landfill. A time-concentration graph is provided in Appendix H.

Sodium exceedances were quantified in both the moderate depth and deep aquifers during the 2023 monitoring period. Moderate depth monitoring well OW-25-II exceeded the trigger concentration during all three monitoring events, while monitoring wells OW-16-I, OW-30-I, and OW-31-II, representative of the deep downgradient water quality exceeded during one or more events in 2023. Sodium concentrations are stable in the source water quality over the monitoring record. Elevated concentrations sodium within the downgradient monitoring wells are potentially attributable to landfill leachate but may also result from variation between the aquifers and increased residence times.

Fluoride concentrations recorded within the downgradient monitoring wells exceeded the maximum concentrations recorded in the source water quality. Fluoride concentrations are also elevated in the background water quality, therefore, exceedances of this parameter at the downgradient locations are not interpreted to be landfill derived. A time-concentration graph is provided in Appendix H.

Organic nitrogen quantified exceedances for the deep aquifer monitoring wells OW-16-I during the summer and fall events, and OW-23-II in the fall of 2023. Organic nitrogen has consistently been elevated at OW-16-I throughout the monitoring record and 2023 concentrations remain within the well historical range. Organic nitrogen exhibits a large range of fluctuation in the source water quality and with no apparent trends. However, similar to DOC, this parameter is generally attenuated to near background concentrations with increasing distance from Site but exhibits significant data noise. As such, organic nitrogen might not be a reliable indicator of annual compliance. A time-concentration graph is provided in Appendix H.

Given the variation in chemistry between the limestone aquifer, the deeper bedrock aquifer, and the upper silty sand aquifer, certain trigger parameters might not be suitable for the assessment of landfill leachate impacts to groundwater quality, namely alkalinity, hardness, and sodium.

The compliance of the Site with respect to groundwater quality as determined by the trigger level monitoring program is currently misleading. As discussed previously, a number of parameters are potentially indicative of a

difference in water type, as opposed to landfill derived impacts. The monitoring plan also indicates that the current background monitoring well nest (i.e., OW-10) is not considered representative of background water quality conditions as it is located hydrologically cross-gradient to the landfill area. Therefore, the trigger level monitoring program should be reviewed following the addition of the proposed background monitoring well nest (Wood, 2020b).

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## 5.2 SURFACE WATER QUALITY

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### 5.2.1 SURFACE WATER TREND ANALYSIS

The 2023 surface water quality data were reviewed with the objective of identifying any apparent seasonal trends or inconsistencies in the present monitoring record. A series of time-concentration graphs were developed for several select landfill indicator parameters (including alkalinity, chloride, conductivity, pH, sulphate and TDS) for each surface water monitoring location for the 2017 through 2023 sampling periods. These time-concentration graphs are presented in Appendix H.

The 2017-2023 surface water data indicate no apparent trends. Concentrations of the select parameters are stable throughout the monitoring period at all stations, with the exception of anomalous chloride, conductivity, sulphate and TDS results quantified at SW-2 during the July 2017 event. These results are interpreted to be anomalous as compared to the remainder of the available monitoring record. Stations SW-5 and SW-6 indicate almost identical trends, indicating no change in water quality downstream of the input of the unnamed tributary to the Wabi River, despite consistently elevated concentrations of all parameters quantified at SW-4. Sulphate concentrations at SW-4 have returned within the historical range of fluctuation in 2023, after exhibiting peak concentrations over the 2022 monitoring period. It is noted that that elevated sulphate concentrations were also recorded at SW-2 in September 2022, however no flow was recorded between these stations in August, September, and October 2022. Peak TDS concentrations were recorded at SW-4 in June 2023, while upstream concentrations remain stable. Given that dissimilar trends are apparent for SW-4 and SW-2, the water quality conditions at SW-4 are interpreted to be the result of a source downstream of SW-2, confirming a lack of landfill-derived impact to surface water downstream of the CAZ boundary.

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### 5.2.2 TRIGGER LEVEL MONITORING PROGRAM

The trigger parameters for the Site, as indicated in the Surface and Groundwater Monitoring Program, New Liskeard Waste Disposal Site (Wood, 2020b) include chloride and boron, to be evaluated at downstream surface water station SW-2. Trigger concentrations are set at 80 percent of the CWQG of each parameter. If the background concentration for a select trigger parameter exceeds CWQG during the particular period, the trigger concentration will be set at the maximum background concentration (Wood, 2020b). As per the trigger level monitoring program, any single exceedance of the surface water trigger concentration at a single trigger location will trigger confirmation monitoring. The trigger concentrations are 96 mg/L for chloride and 1.2 mg/L for boron.

By the present assessment, no trigger level exceedances for chloride or boron were quantified at SW-2 during the 2023 monitoring period. The Site is therefore in compliance with respect to surface water quality, as determined by the trigger level monitoring program.

The monitoring plan also indicates that the current upstream station SW-1 is not considered representative of background surface water quality conditions given the difference in catchment size, stream order, and landcover, from that of the downstream exposure area. Therefore, the trigger level monitoring program should be reviewed following the addition of the proposed control surface water monitoring station (Wood, 2020b).

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### 5.3 ADEQUACY OF THE MONITORING PROGRAM

It is WSP's opinion that the current groundwater and surface water monitoring programs are adequate with respect to the characterization of Site conditions, the evaluation of Site performance and the assessment of Site compliance; however, additional groundwater data are required in order to better characterize water quality conditions at depth within the various stratigraphic units encountered across the Site. At the request of the City, the 2023 monitoring program was conducted in accordance with the former C of A requirements and the monitoring program be updated as per the Site's new ECA (issued December 2021), with implementation for the 2024 monitoring period. In accordance with the Condition H(6) of the ECA, a letter to the District Manager proposing this deviation from the monitoring program is provided in Appendix A. The Monitoring and Screening Checklist is provided in Appendix M.

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## 6 CONCLUSION

Based on the results of the current (2023) monitoring program, the following conclusions have been made:

- 1 The landfill became fully operation on 17 October 2023, with an estimated 1,761.48 tonnes of uncompacted waste was landfilled at the Site in 2023, equating to a waste volume of approximately 2,970 m<sup>3</sup>. A remaining total landfill capacity of 363,875 m<sup>3</sup> and remaining Site life of approximately 21 years has been estimated based on the available data.
- 2 Groundwater movement at the Site, as determined by water table elevations recorded at each of the monitoring wells, was determined as being directed away from the fill area to the northeast in both the shallow and deep aquifers. Well nest OW-10 is situated (hydraulically) in a position considered to be representative of background conditions since it is located north of (i.e., crossgradient to) the Site. This monitoring well configuration allows a detailed evaluation of the New Liskeard Landfill Site to be undertaken with respect to MECP Guideline B-7.
- 3 Groundwater quality suggests impacts (when compared to background) are occurring due to landfill-derived leachate in source and mid-Site wells, but a noticeable improvement in water quality is apparent with increased distance downgradient. There appear to be a number of dissimilar water types representative of unimpacted groundwater quality, which differ depending on aquifer depth and stratigraphic unit. The unimpacted deep bedrock aquifer presents a water type similar to that of source wells, confirming that the interpretation of downgradient water quality results must take into consideration well installation depth and stratigraphic unit, as deep background conditions could potentially be misinterpreted as impacts to water quality.
- 4 Based on a review of the 2023 residential supply well geochemical data, a landfill-derived impact to groundwater quality at these downgradient locations is not interpreted.
- 5 Surface water quality results compiled to date indicate no landfill-derived impact to surface water downstream of the CAZ. No trigger level exceedances were quantified at the surface water compliance station SW-2 during the 2023 monitoring program. Therefore, the Site is therefore in compliance with respect to surface water quality.
- 6 The current (2023) groundwater monitoring record indicates that the Site is continuing to operate as designed, as a natural attenuation type facility. There is an interpreted improvement in water quality with increased distance downgradient, even between the well nests situated along the downgradient CAZ. The current water quality results indicate minor exceedances of Guideline B-7 in addition to the trigger level monitoring program in the shallow, moderate depth and deep downgradient aquifers; however, these results are not interpreted to be indicative of groundwater impacts at depth, but rather differing water types in the deep aquifers, associated with increased residence time, and the varying stratigraphic units encountered across the Site.
- 7 As per Condition 10 of the ECA, the requirement for an extension of the CAZ is not recommended at this time as the Site is continuing to operate as designed.

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## 7 RECOMMENDATIONS

The following recommendations should be considered for inclusion in next year's monitoring program:

- 1 It is recommended that the monitoring program be updated as per the Site's new ECA (issued December 2021), with implementation for the 2024 monitoring period, as the Site is operational as of 17 October 2023.
- 2 The City should continue to monitor groundwater and surface water so that seasonal variations for certain parameters could be documented and understood. This would also facilitate the continuation of Guideline B-7 calculations and trigger level monitoring program for certain groundwater parameters.
- 3 Groundwater elevations should be measured during each groundwater sampling round to further confirm groundwater flow directions and establish seasonal fluctuations.
- 4 It is recommended that landfill gas monitoring be continued at OW-18 concurrently with the three regularly scheduled annual groundwater monitoring events during all future monitoring programs, in order to measure any potential landfill gas production within the waste deposits.
- 5 Monitoring well OW-16-III, which was reported to be damaged during the 2022 monitoring period, monitoring well OW-23-I was reported to be destroyed in spring 2023 and OW-24-III was reported to be damaged below ground surface in spring 2023. All three monitoring wells should be repaired or abandoned in accordance with O.Reg. 903. A replacement should be installed if the well cannot be repaired.
- 6 A topographical survey should be undertaken in 2024 in order to facilitate an accurate calculation of the remaining capacity and Site life.
- 7 Landfill gas monitoring should be performed at the newly established Site facilities (i.e., weigh scale, scale house and equipment building) to monitor for the potential subsurface migration of landfill gas.

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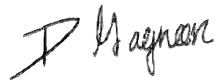
## 8 CLOSURE

This report has been prepared for the exclusive use of the City for specific application to this Site. The annual monitoring report was prepared in accordance with the verbal and written requests from the City and generally accepted assessment practices, restricting the investigations to the assessment of the environmental compliance associated with the Site. No other warranty, expressed or implied is made.

Respectfully Submitted,

WSP Canada Inc.,

Prepared by:



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Environmental Scientist

Reviewed by:



Larry Rodricks, P.Eng.  
Senior Principal Engineer



Dirk Scheurlen, C. Tech  
Senior Technical Consultant

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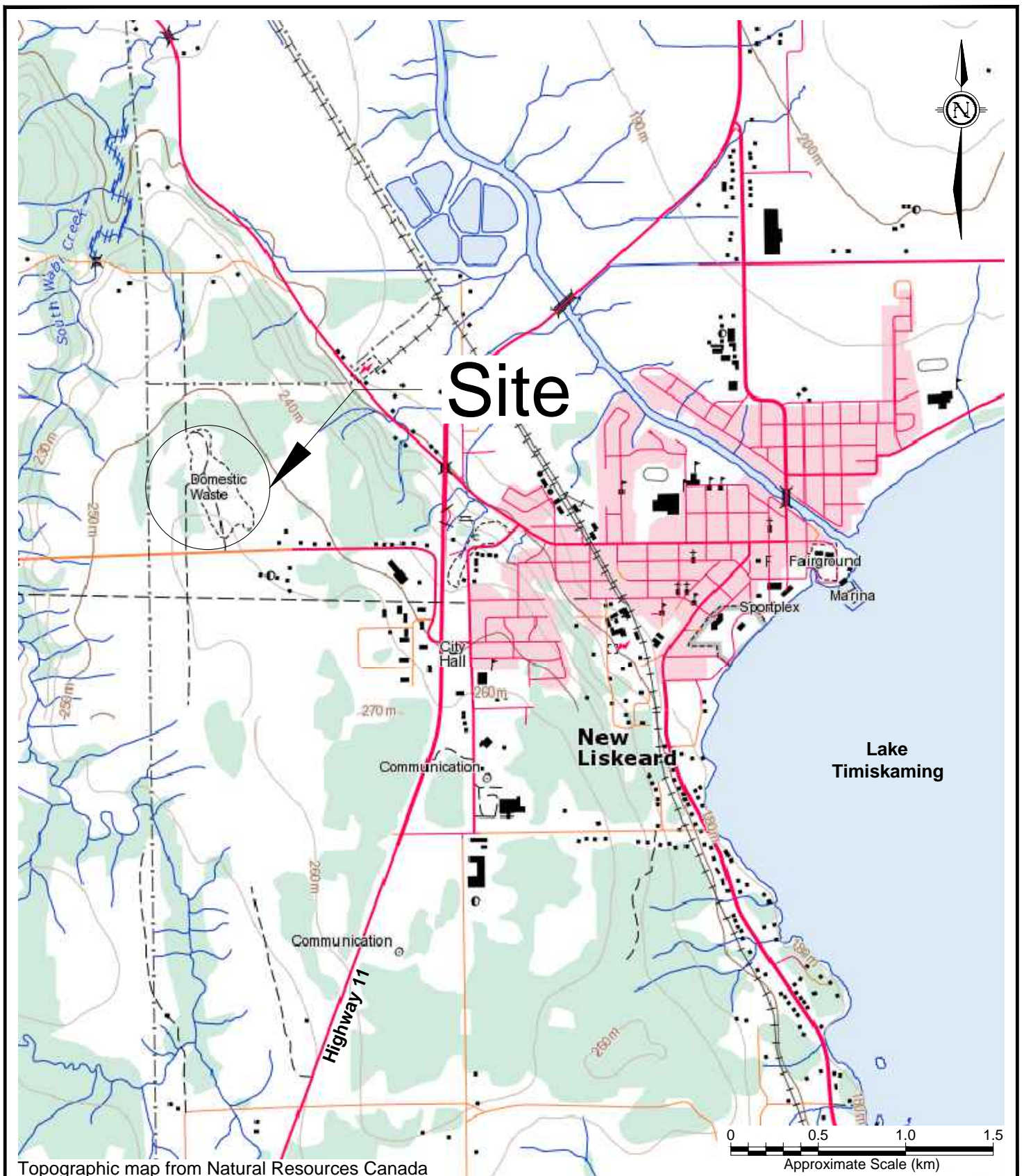
## 9 REFERENCES

- Story Environmental Inc., 2013, 2012 Annual Monitoring Report, New Liskeard Landfill Site, Corporation of the City of Temiskaming Shores, June 2013.
- Wood Environment and Infrastructure Solutions, 2020a, Design & Operations Plan and Closure Plan, New Liskeard Waste Disposal Site, New Liskeard, Ontario, The City of Temiskaming Shores, February 2020.
- Wood Environment and Infrastructure Solutions, 2020b, Surface and Groundwater Monitoring Program, New Liskeard Waste Disposal Site, New Liskeard, Ontario, The City of Temiskaming Shores, November 2020.



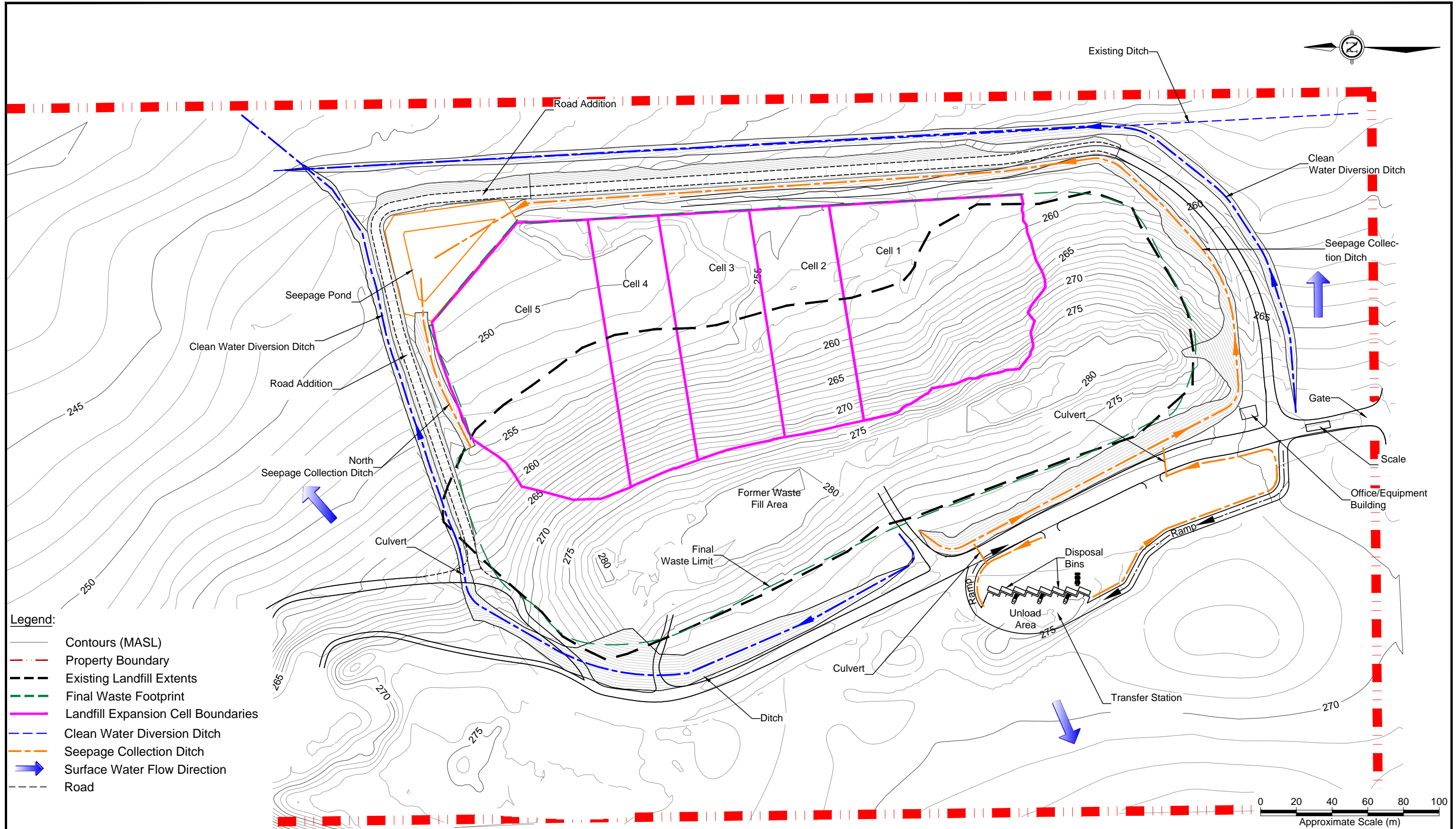
# Figures





Topographic map from Natural Resources Canada

<p>WSP Canada Inc. 33 Mackenzie Street, Suite 100 Sudbury, Ontario, P3C 4Y1</p>		 		<p>The City of Temiskaming Shores</p>		
<p>PROJECT 2023 Annual Groundwater &amp; Surface Water Monitoring Report New Liskeard Waste Disposal Site, New Liskeard, Ontario</p>			<p>DWN BY: KKJ</p>	<p>CHK'D BY: DS</p>	<p>DATE: April 2024</p>	
<p>TITLE Site Location Map</p>			<p>REV. NO.: 1</p>	<p>SCALE: as shown</p>	<p>PROJECT NO: TY131010.1000</p>	
					<p>FIGURE NO: 1</p>	

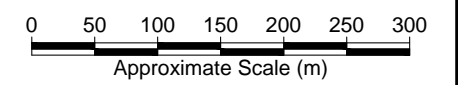
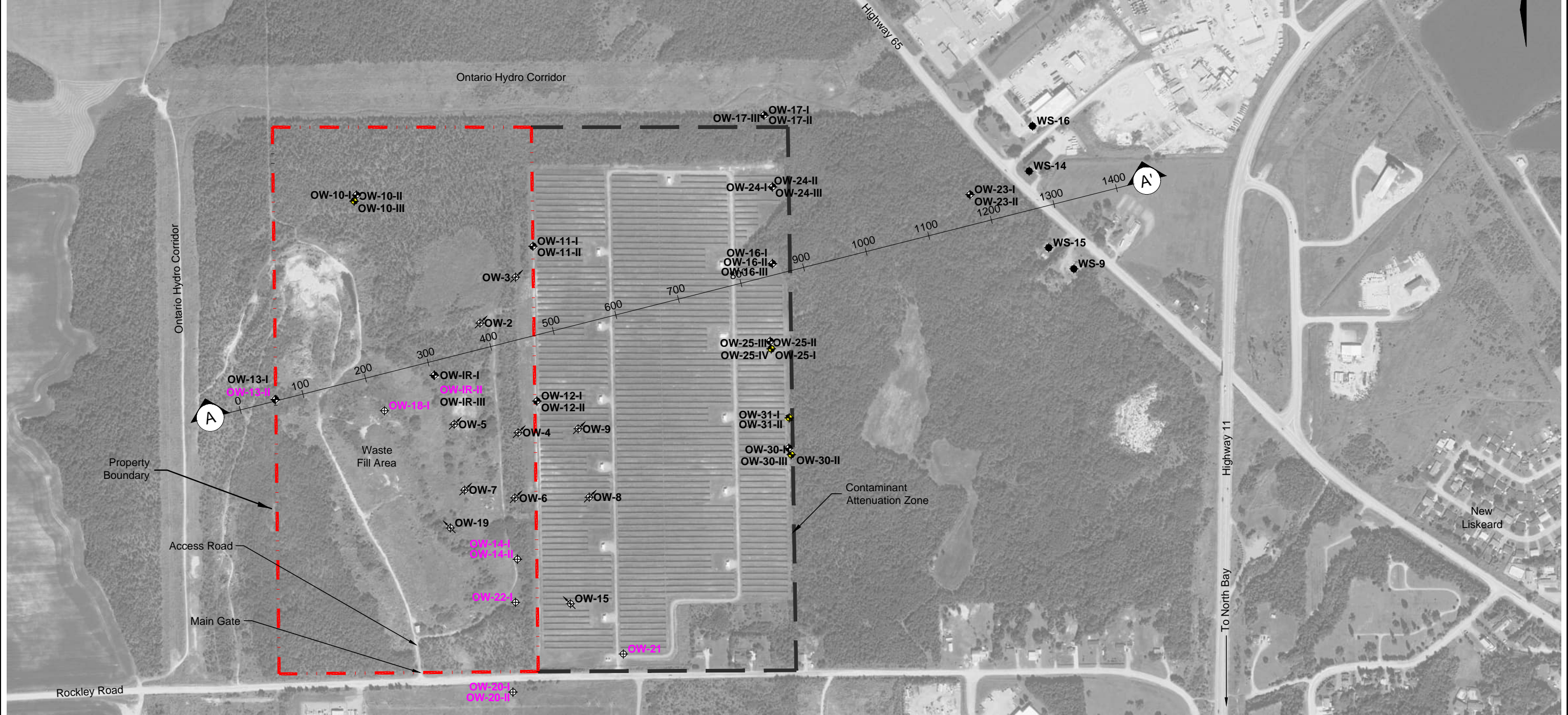


- Legend:**
- Contours (MASL)
  - - - Property Boundary
  - - - Existing Landfill Extents
  - - - Final Waste Footprint
  - Landfill Expansion Cell Boundaries
  - - - Clean Water Diversion Ditch
  - - - Seepage Collection Ditch
  - ➔ Surface Water Flow Direction
  - - - Road

**Notes:**  
 1. Contours survey provided by Story Environmental, on the 22 August 2019.  
 2. Property line and landfill boundary based on S.R.Q 2007 survey.



CLIENT LOGO 	CLIENT: <b>The City of Temiskaming Shores</b>	COMPANY LOGO 	DWN BY: KJ CHKD BY: DS DATUM: NAD 83 PROJECTION: ZONE 17 SCALE: as shown	PROJECT <b>2023 Annual Groundwater &amp; Surface Water Monitoring Report</b> <b>New Liskeard Waste Disposal Site, New Liskeard, Ontario</b>	DATE: April 2024 PROJECT NO: TY131010.1000
	WSP Canada Inc. 33 Mackenzie Street, Suite 100 Sudbury, Ontario, P3C 4Y1		TITLE <b>2023 New Liskeard Site Operation Plan</b>	REV. NO.: 1 FIGURE No. 2	

- Legend:**
- Residential Well
  - ◆ Monitoring Well Sampled (historical)
  - ◆ Monitoring Well Sampled (Wood 2017)
  - ◆ Groundwater Level Only
  - ⊗ Monitoring Well (destroyed)
  - ⊗ Monitoring Well (decommissioned September 2014)





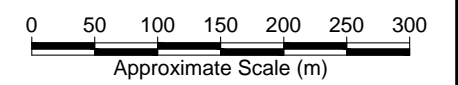
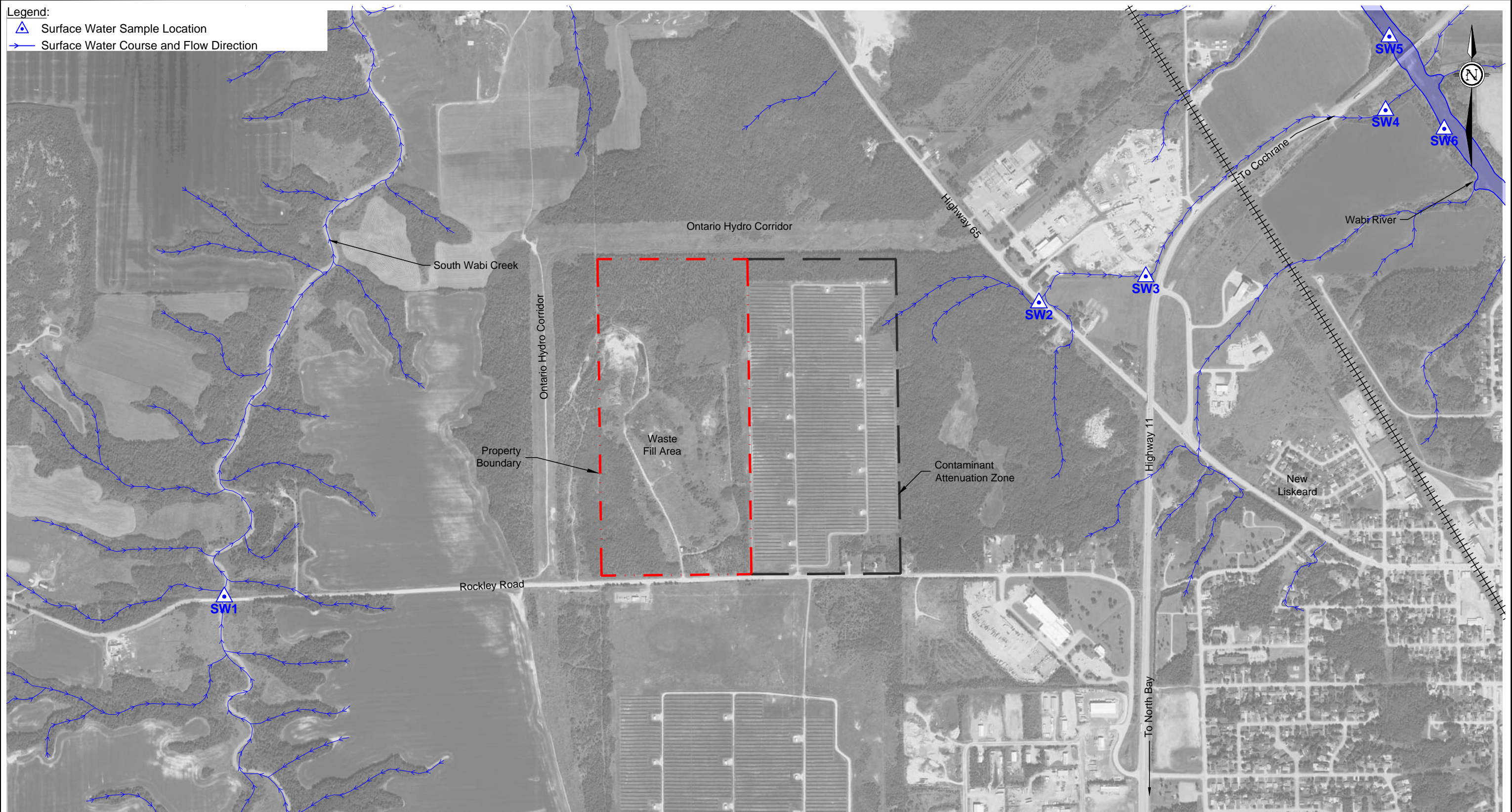
**Notes:**

1. Property line based on S.R.Q 2007 survey.
2. Air image taken from Google Earth.
3. Northern property boundaries are approximate.



<p>CLIENT LOGO</p> 	<p>CLIENT:</p> <p><b>The City of Temiskaming Shores</b></p>	<p>COMPANY LOGO</p> 
<p>WSP Canada Inc.</p> <p>33 Mackenzie Street, Suite 100 Sudbury, Ontario, P3C 4Y1</p>		


DWN BY: KJ	PROJECT	DATE: April 2024
CHKD BY: DS	<p>2023 Annual Groundwater &amp; Surface Water Monitoring Report</p> <p>New Liskeard Waste Disposal Site, New Liskeard, Ontario</p>	PROJECT NO: TY131010.1000
DATUM: NAD 83		REV. NO.: 1
PROJECTION: ZONE 17	TITLE	FIGURE No. 3
SCALE: as shown	<p><b>Groundwater Monitoring Location Plan</b></p>	

**Legend:**  
 Surface Water Sample Location  
 Surface Water Course and Flow Direction



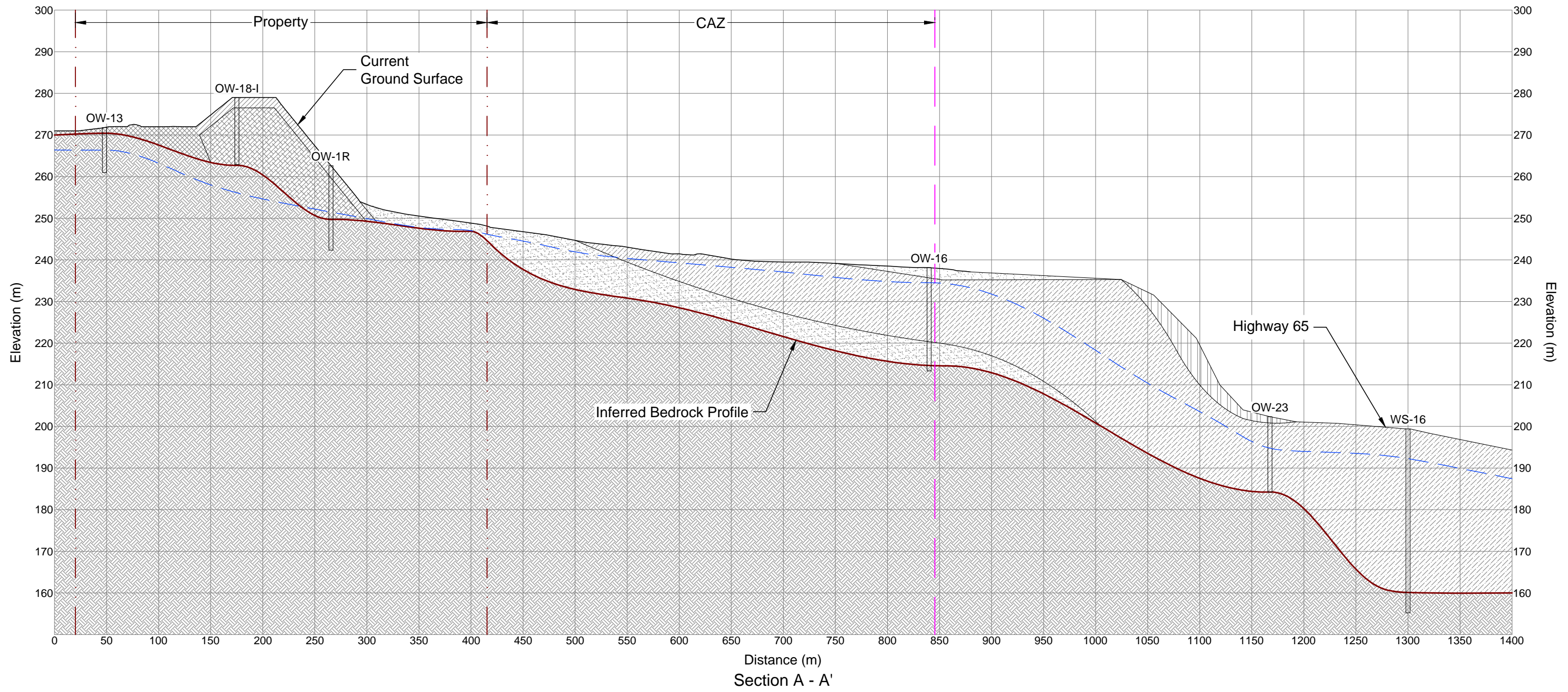
**Notes:**  
 1. Property line based on S.R.Q 2007 survey.  
 2. Air image taken from Google Earth.  
 3. Northern property boundaries are approximate.

 CLIENT: The City of Temiskaming Shores	 COMPANY: WSP Canada Inc. 33 Mackenzie Street, Suite 100 Sudbury, Ontario, P3C 4Y1
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 COMPANY LOGO	DWN BY: KJ CHKD BY: DS DATUM: NAD 83 PROJECTION: ZONE 17 SCALE: as shown	PROJECT: 2023 Annual Groundwater & Surface Water Monitoring Report New Liskeard Waste Disposal Site, New Liskeard, Ontario TITLE: Surface Water Monitoring Location Plan	DATE: April 2024 PROJECT NO.: TY131010.1000 REV. NO.: 1 FIGURE No.: 4
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**Legend:**

- Fill
- Clay
- Refuse
- Silty Sand
- Till
- Clayey Silt
- Bedrock
- Property Boundary
- Contaminant Attenuation Zone
- Inferred Shallow Groundwater Elevation



**Notes:**

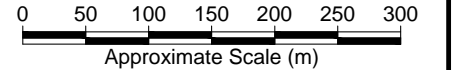
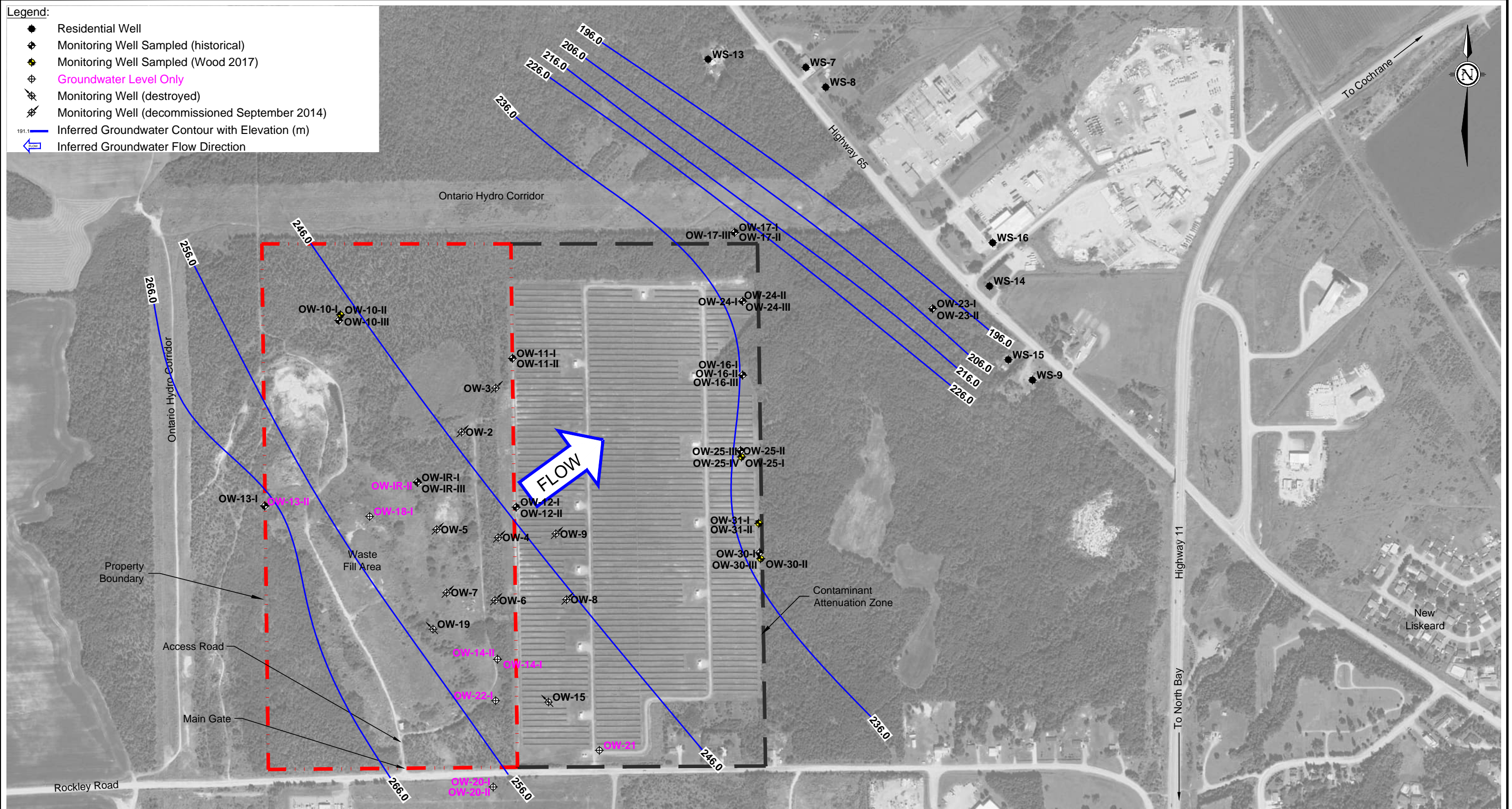
1. Existing refuse and bedrock profiles interpolated from historical survey data and investigative drilling.
2. Vertical exaggeration factor of four (4) shown.

<p>CLIENT LOGO</p>	<p>CLIENT:</p> <p><b>The City of Temiskaming Shores</b></p>	<p>COMPANY LOGO</p>
<p><b>WSP Canada Inc.</b></p> <p>33 Mackenzie Street, Suite 100 Sudbury, Ontario, P3C 4Y1</p>		<p>DWN BY: KJ</p> <p>CHKD BY: DS</p> <p>DATUM: NAD 83</p> <p>PROJECTION: ZONE 17</p> <p>SCALE: as shown</p>

<p>PROJECT</p> <p><b>2023 Annual Groundwater &amp; Surface Water Monitoring Report</b></p> <p><b>New Liskeard Waste Disposal Site, New Liskeard, Ontario</b></p>	<p>DATE: April 2024</p> <p>PROJECT NO: TY131010.1000</p> <p>REV. NO.: 1</p> <p>FIGURE No. 5</p>
<p>TITLE</p> <p><b>Hydrogeological Cross Section</b></p>	



**Legend:**

- Residential Well
- ◆ Monitoring Well Sampled (historical)
- ◆ Monitoring Well Sampled (Wood 2017)
- ◆ Groundwater Level Only
- ⊕ Monitoring Well (destroyed)
- ⊕ Monitoring Well (decommissioned September 2014)
- 191.1 — Inferred Groundwater Contour with Elevation (m)
- ← Inferred Groundwater Flow Direction



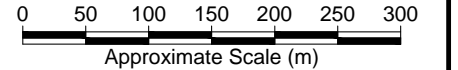
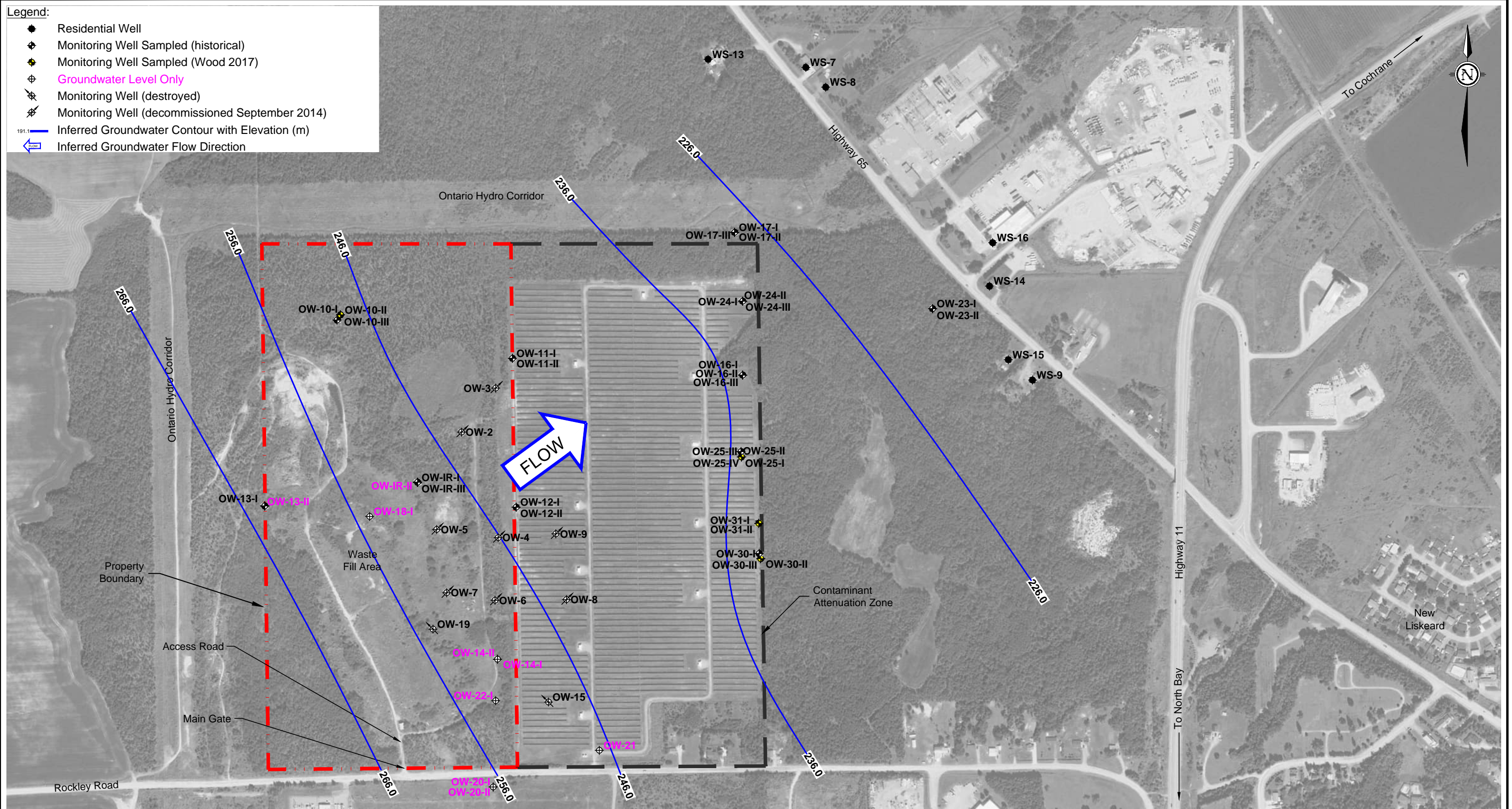
**Notes:**

1. Property line based on S.R.Q 2007 survey.
2. Air image taken from Google Earth.
3. Northern property boundaries are approximate.

<p>CLIENT LOGO</p> 	<p>CLIENT:</p> <p><b>The City of Temiskaming Shores</b></p>	<p>COMPANY LOGO</p> 
<p><b>WSP Canada Inc.</b></p> <p>33 Mackenzie Street, Suite 100 Sudbury, Ontario, P3C 4Y1</p>		



<p>DWN BY: KJ</p> <p>CHKD BY: DS</p> <p>DATUM: NAD 83</p> <p>PROJECTION: ZONE 17</p> <p>SCALE: as shown</p>	<p>PROJECT</p> <p><b>2023 Annual Groundwater &amp; Surface Water Monitoring Report</b></p> <p><b>New Liskeard Waste Disposal Site, New Liskeard, Ontario</b></p> <p>TITLE</p> <p><b>Inferred Shallow Groundwater Contour Plan</b></p> <p><b>June 2023</b></p>	<p>DATE: April 2024</p> <p>PROJECT NO: TY131010.1000</p> <p>REV. NO.: 1</p> <p>FIGURE No. 6A</p>
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- Legend:**
- Residential Well
  - ◆ Monitoring Well Sampled (historical)
  - ◆ Monitoring Well Sampled (Wood 2017)
  - ◆ Groundwater Level Only
  - ⊕ Monitoring Well (destroyed)
  - ⊕ Monitoring Well (decommissioned September 2014)
  - 191.1 Inferred Groundwater Contour with Elevation (m)
  - ← Inferred Groundwater Flow Direction



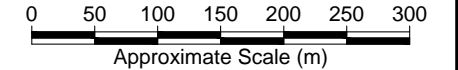
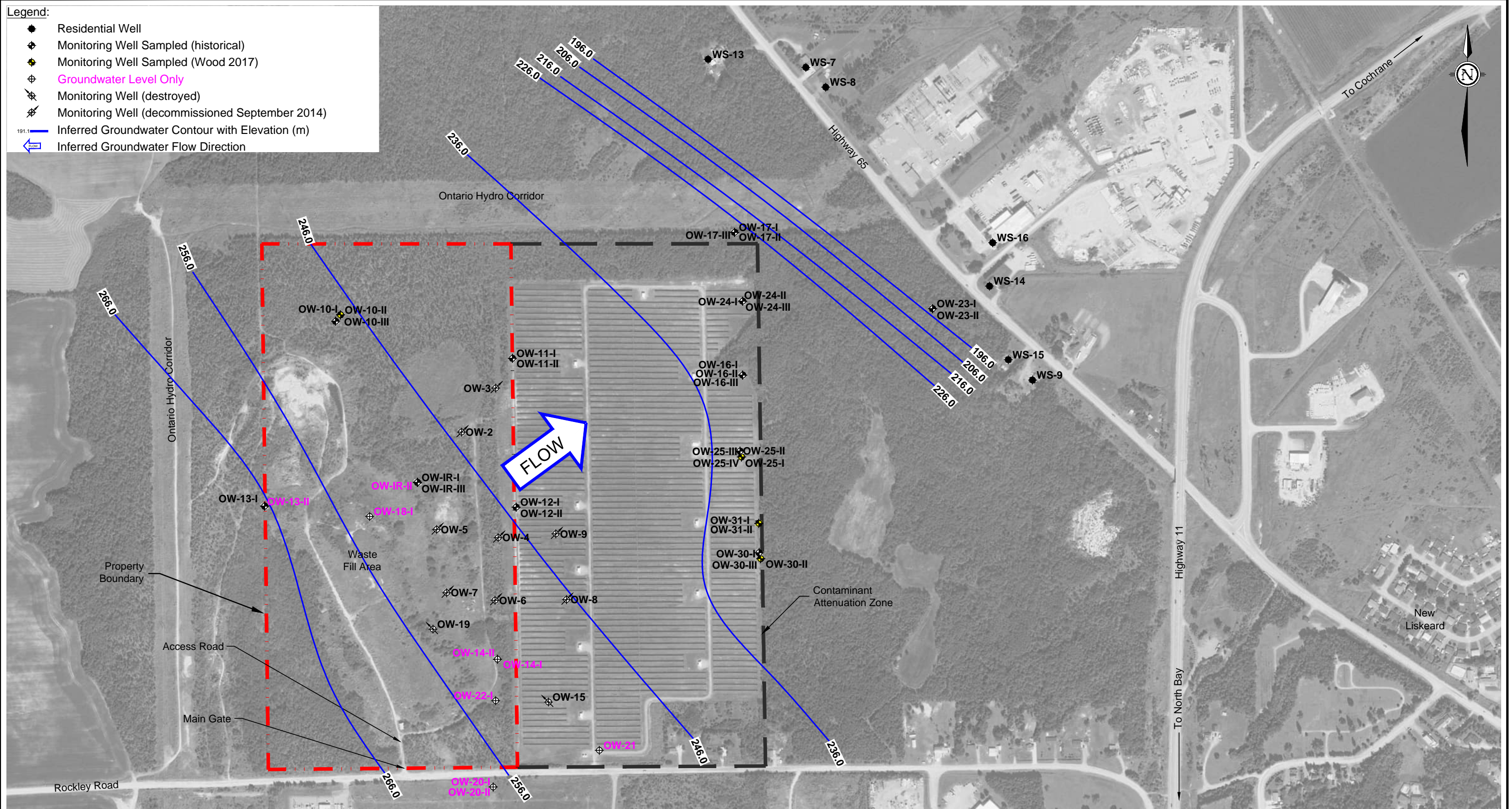
**Notes:**

1. Property line based on S.R.Q 2007 survey.
2. Air image taken from Google Earth.
3. Northern property boundaries are approximate.

<p>CLIENT LOGO</p> 	<p>CLIENT:</p> <p><b>The City of Temiskaming Shores</b></p>	<p>COMPANY LOGO</p> 	<p>DWN BY: KJ</p> <p>CHKD BY: DS</p> <p>DATUM: NAD 83</p> <p>PROJECTION: ZONE 17</p> <p>SCALE: as shown</p>
<p>PROJECT</p> <p><b>2023 Annual Groundwater &amp; Surface Water Monitoring Report</b></p> <p><b>New Liskeard Waste Disposal Site, New Liskeard, Ontario</b></p>		<p>TITLE</p> <p><b>Inferred Deep Groundwater Contour Plan</b></p> <p><b>June 2023</b></p>	
		<p>DATE: April 2024</p> <p>PROJECT NO: TY131010.1000</p> <p>REV. NO.: 1</p> <p>FIGURE No. 6B</p>	



- Legend:**
- Residential Well
  - ◆ Monitoring Well Sampled (historical)
  - ◆ Monitoring Well Sampled (Wood 2017)
  - ◆ Groundwater Level Only
  - ⊕ Monitoring Well (destroyed)
  - ⊕ Monitoring Well (decommissioned September 2014)
  - 191.1 — Inferred Groundwater Contour with Elevation (m)
  - ← Inferred Groundwater Flow Direction



**Notes:**

1. Property line based on S.R.Q 2007 survey.
2. Air image taken from Google Earth.
3. Northern property boundaries are approximate.



**CLIENT:** The City of Temiskaming Shores

**COMPANY LOGO:** WSP Canada Inc.  
33 Mackenzie Street, Suite 100  
Sudbury, Ontario, P3C 4Y1

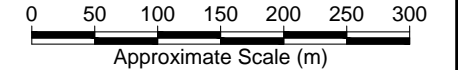
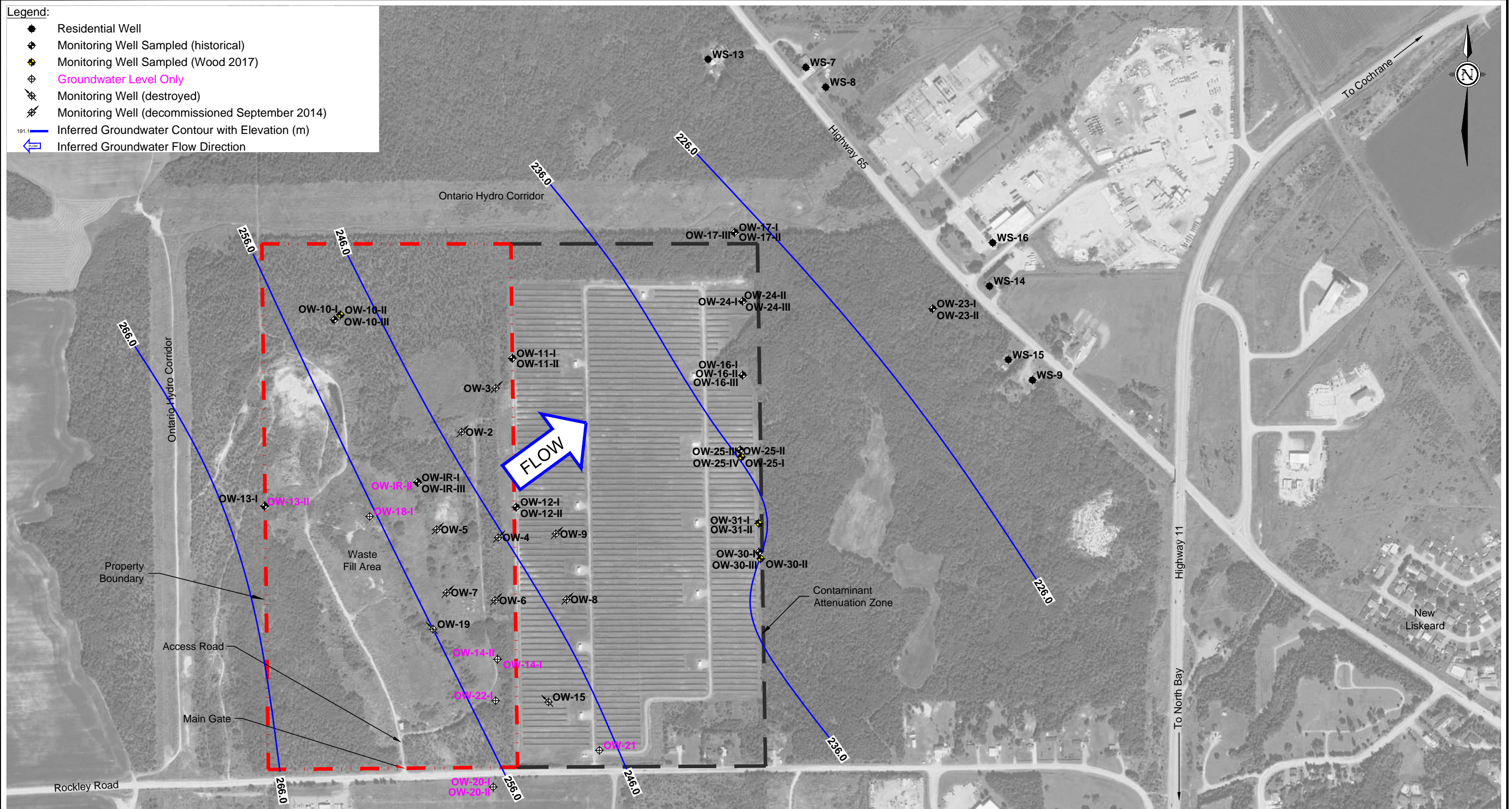
<b>DWN BY:</b>	KJ
<b>CHKD BY:</b>	DS
<b>DATUM:</b>	NAD 83
<b>PROJECTION:</b>	ZONE 17
<b>SCALE:</b>	as shown

**PROJECT:** 2023 Annual Groundwater & Surface Water Monitoring Report  
New Liskeard Waste Disposal Site, New Liskeard, Ontario

**TITLE:** Inferred Shallow Groundwater Contour Plan  
August 2023

<b>DATE:</b>	April 2024
<b>PROJECT NO.:</b>	TY131010.1000
<b>REV. NO.:</b>	1
<b>FIGURE No.:</b>	6C

- Legend:**
- Residential Well
  - ◆ Monitoring Well Sampled (historical)
  - ◆ Monitoring Well Sampled (Wood 2017)
  - ◆ Groundwater Level Only
  - ⊕ Monitoring Well (destroyed)
  - ⊕ Monitoring Well (decommissioned September 2014)
  - 191.1 — Inferred Groundwater Contour with Elevation (m)
  - ← Inferred Groundwater Flow Direction




**Notes:**

1. Property line based on S.R.Q 2007 survey.
2. Air image taken from Google Earth.
3. Northern property boundaries are approximate.



**CLIENT:** The City of Temiskaming Shores

**COMPANY LOGO:** 

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Sudbury, Ontario, P3C 4Y1

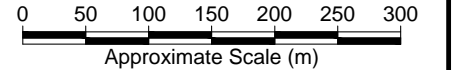
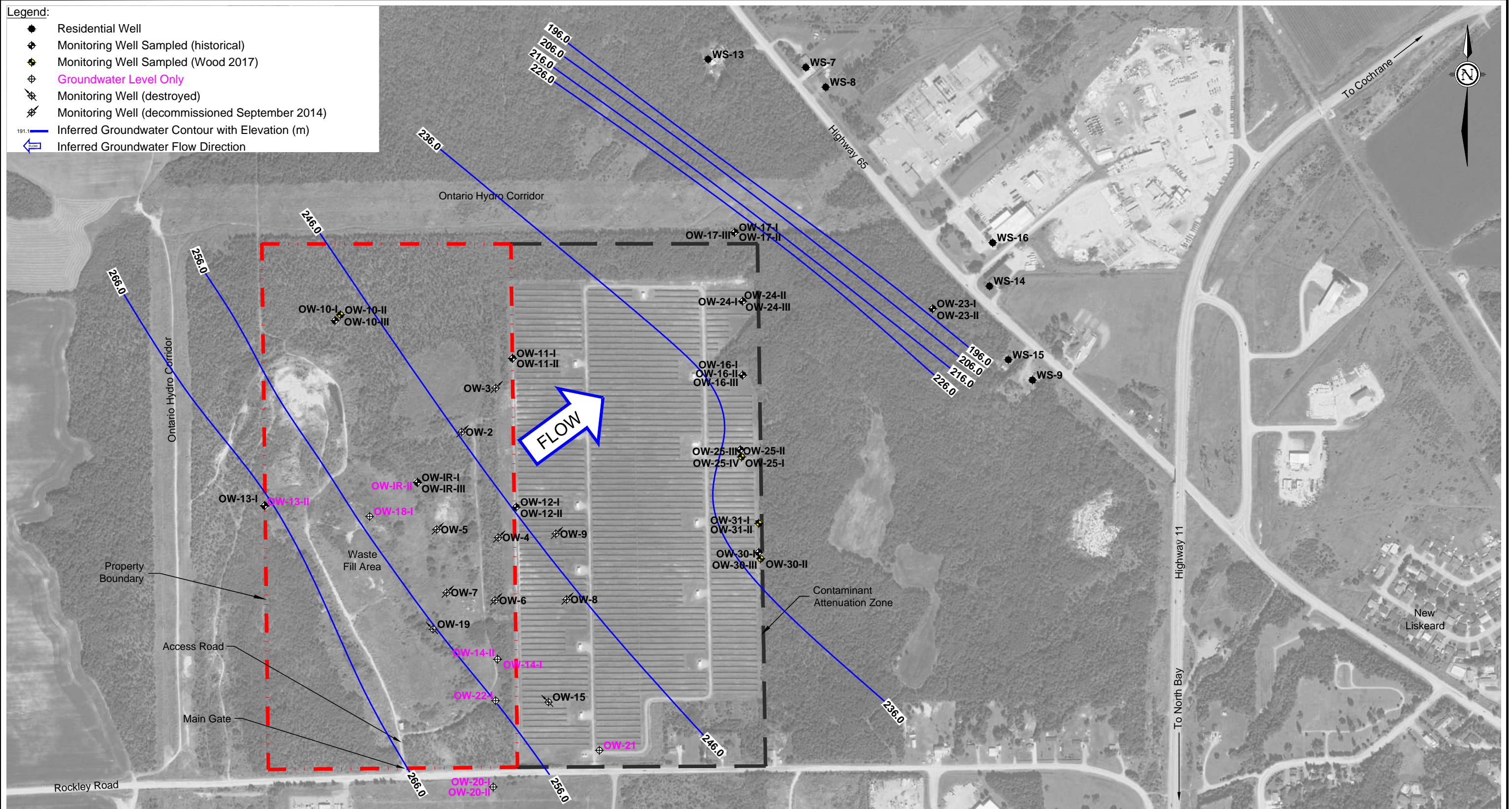
<b>DWN BY:</b>	KJ
<b>CHKD BY:</b>	DS
<b>DATUM:</b>	NAD 83
<b>PROJECTION:</b>	ZONE 17
<b>SCALE:</b>	as shown

**PROJECT:** 2023 Annual Groundwater & Surface Water Monitoring Report  
New Liskeard Waste Disposal Site, New Liskeard, Ontario

**TITLE:** Inferred Deep Groundwater Contour Plan  
August 2023

<b>DATE:</b>	April 2024
<b>PROJECT NO.:</b>	TY131010.1000
<b>REV. NO.:</b>	1
<b>FIGURE No.:</b>	6D

- Legend:**
- Residential Well
  - ◆ Monitoring Well Sampled (historical)
  - ◆ Monitoring Well Sampled (Wood 2017)
  - ◆ Groundwater Level Only
  - ⊕ Monitoring Well (destroyed)
  - ⊕ Monitoring Well (decommissioned September 2014)
  - 191.1 — Inferred Groundwater Contour with Elevation (m)
  - ← Inferred Groundwater Flow Direction



**Notes:**

1. Property line based on S.R.Q 2007 survey.
2. Air image taken from Google Earth.
3. Northern property boundaries are approximate.



**CLIENT:** The City of Temiskaming Shores

**COMPANY LOGO:**

WSP Canada Inc.  
33 Mackenzie Street, Suite 100  
Sudbury, Ontario, P3C 4Y1

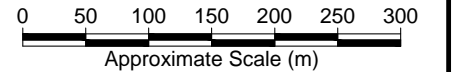
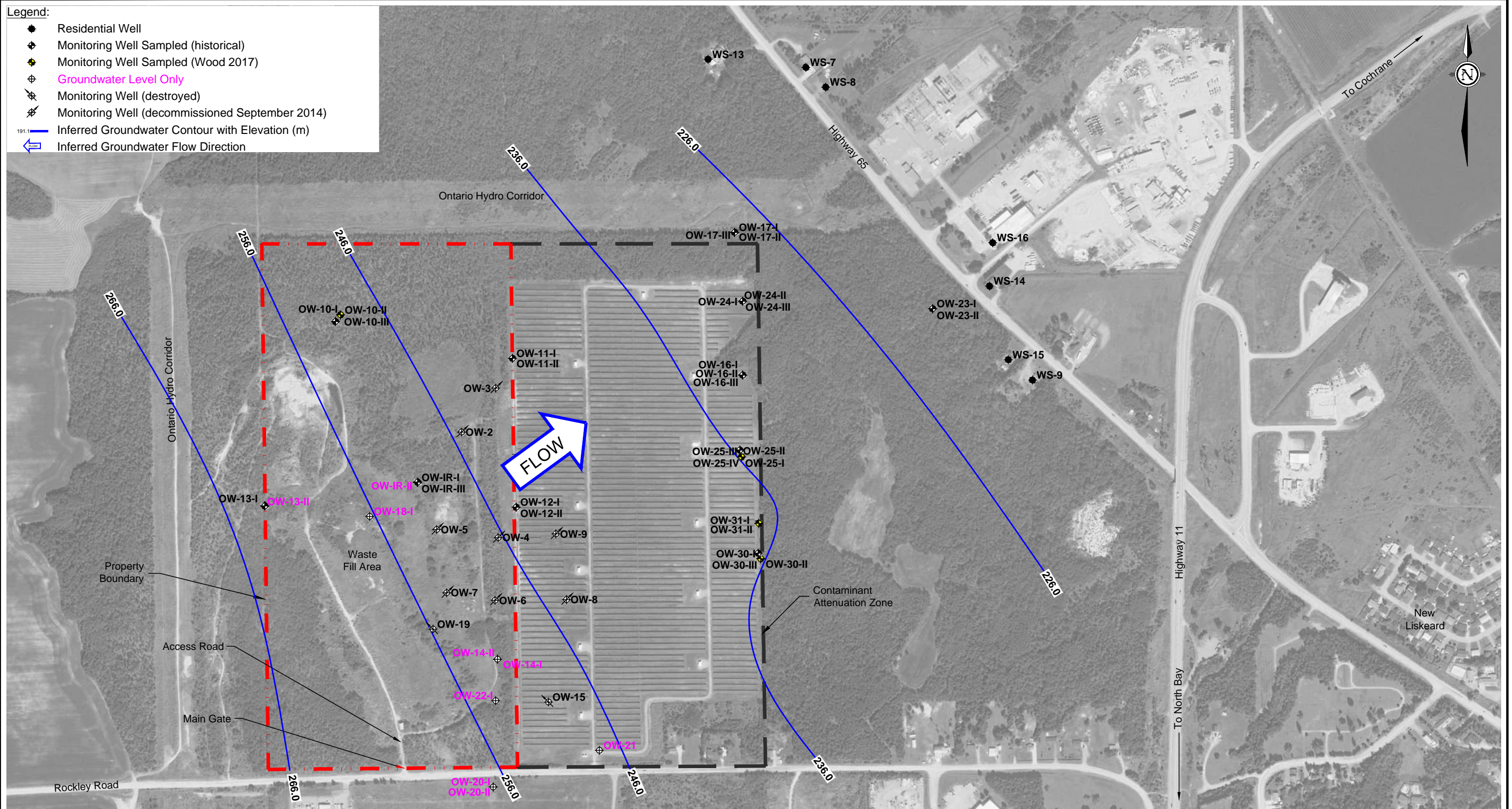
<b>DWN BY:</b>	KJ
<b>CHKD BY:</b>	DS
<b>DATUM:</b>	NAD 83
<b>PROJECTION:</b>	ZONE 17
<b>SCALE:</b>	as shown

**PROJECT:** 2023 Annual Groundwater & Surface Water Monitoring Report  
New Liskeard Waste Disposal Site, New Liskeard, Ontario

**TITLE:** Inferred Shallow Groundwater Contour Plan  
October 2023

<b>DATE:</b>	April 2024
<b>PROJECT NO.:</b>	TY131010.1000
<b>REV. NO.:</b>	1
<b>FIGURE No.:</b>	6E

- Legend:**
- Residential Well
  - ◆ Monitoring Well Sampled (historical)
  - ◆ Monitoring Well Sampled (Wood 2017)
  - ◆ Groundwater Level Only
  - ⊕ Monitoring Well (destroyed)
  - ⊕ Monitoring Well (decommissioned September 2014)
  - 191.1 Inferred Groundwater Contour with Elevation (m)
  - ← Inferred Groundwater Flow Direction



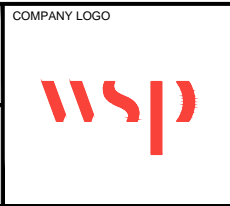
**Notes:**

1. Property line based on S.R.Q 2007 survey.
2. Air image taken from Google Earth.
3. Northern property boundaries are approximate.



CLIENT: The City of Temiskaming Shores

WSP Canada Inc.  
33 Mackenzie Street, Suite 100  
Sudbury, Ontario, P3C 4Y1



DWN BY: KJ  
CHKD BY: DS  
DATUM: NAD 83  
PROJECTION: ZONE 17  
SCALE: as shown

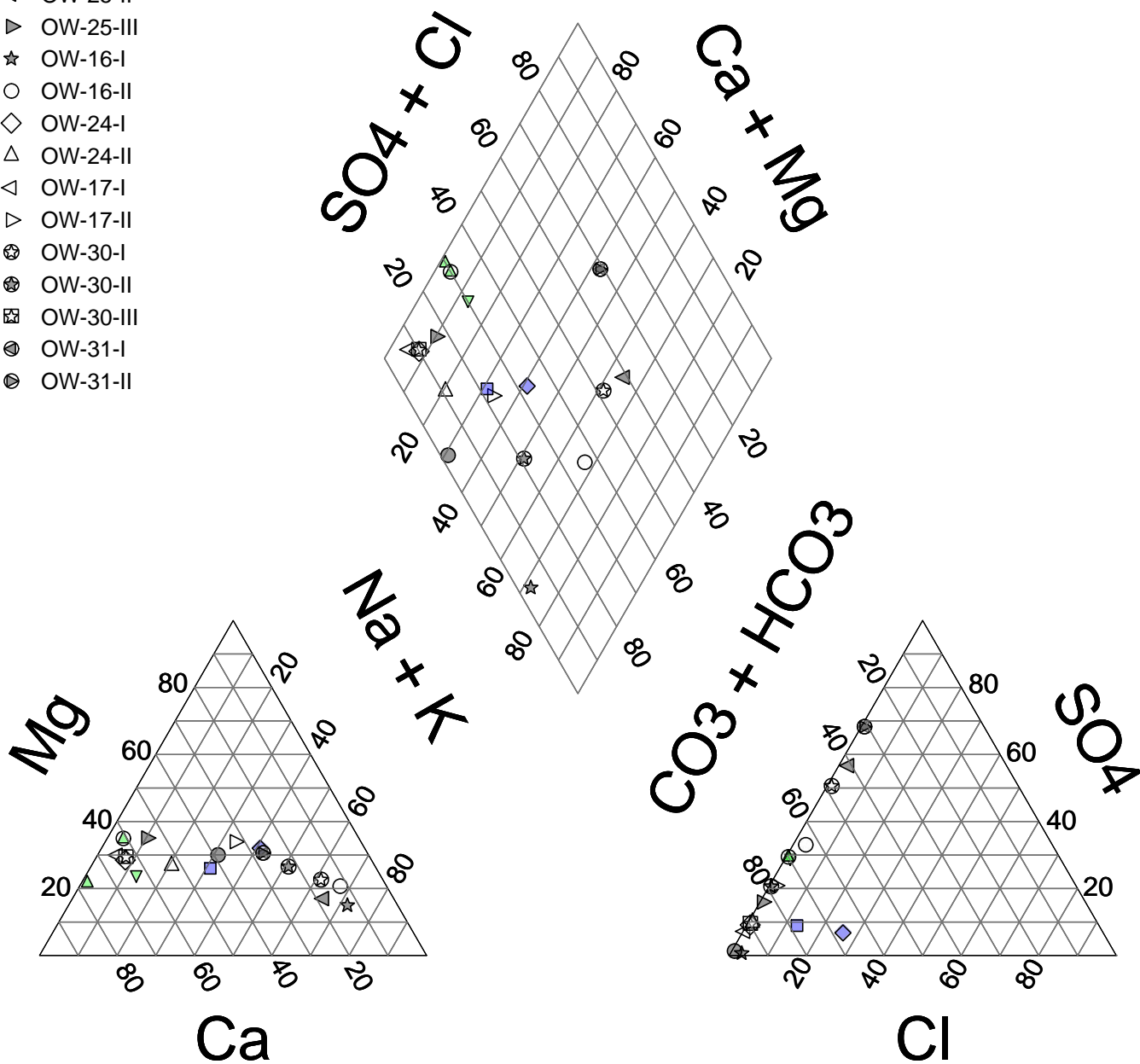
PROJECT: 2023 Annual Groundwater & Surface Water Monitoring Report  
New Liskeard Waste Disposal Site, New Liskeard, Ontario

TITLE: Inferred Deep Groundwater Contour Plan  
October 2023

DATE: April 2024  
PROJECT NO.: TY131010.1000  
REV. NO.: 1  
FIGURE No.: 6F

**Legend :**

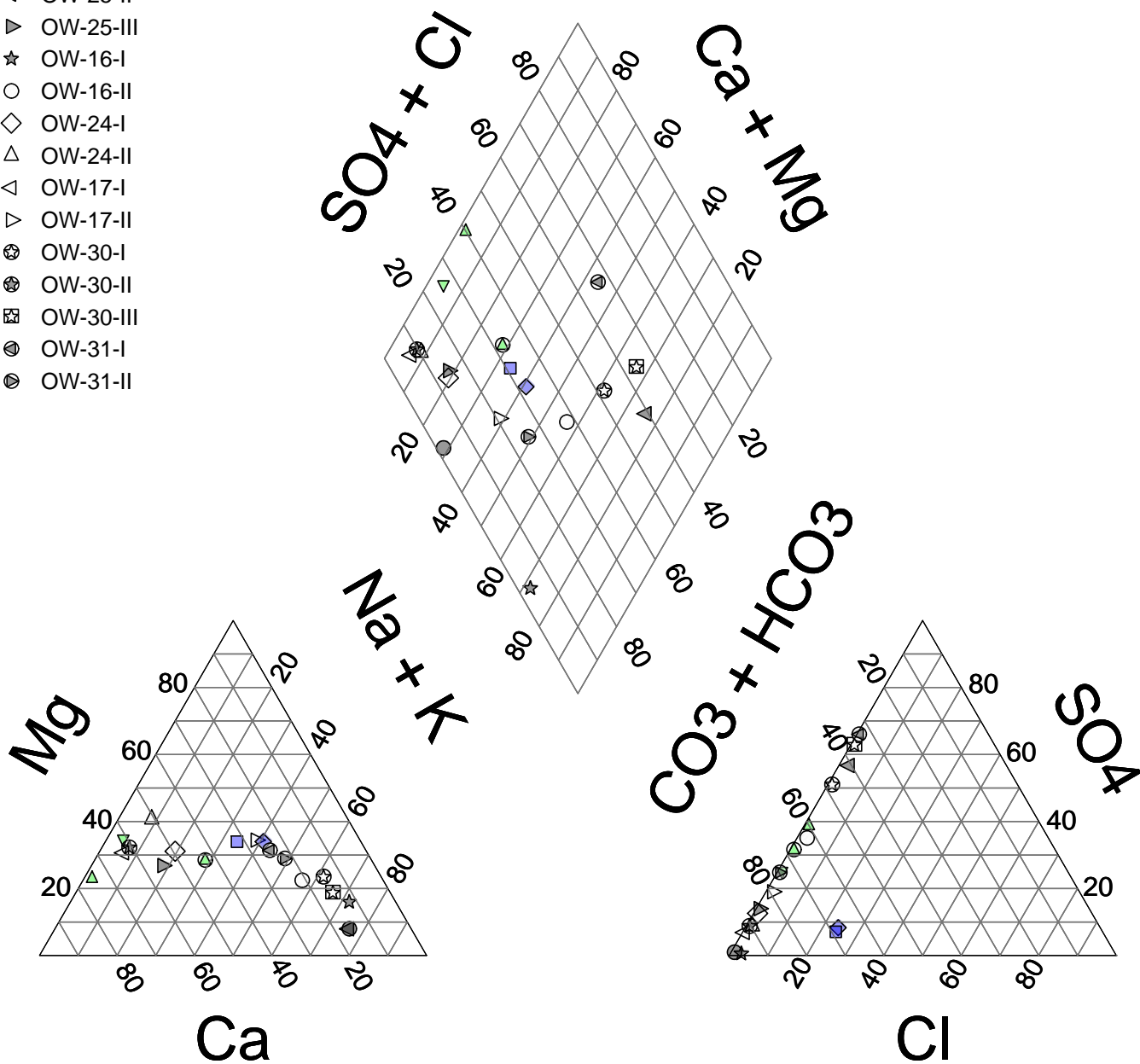
- ◆ OW-1R-I
- OW-1R-III
- ▼ OW-10-I
- ▲ OW-10-II
- ⊗ OW-10-III
- OW-25-I
- ▲ OW-25-II
- ▶ OW-25-III
- ★ OW-16-I
- OW-16-II
- ◇ OW-24-I
- △ OW-24-II
- ▽ OW-17-I
- ▽ OW-17-II
- ⊗ OW-30-I
- ⊗ OW-30-II
- ⊗ OW-30-III
- ⊗ OW-31-I
- ⊗ OW-31-II



<p>WSP Canada Inc. 33 Mackenzie Street, Suite 100 Sudbury, Ontario, P3C 4Y1</p>			<p>The City of Temiskaming Shores</p>
<p>PROJECT 2023 Annual Groundwater &amp; Surface Water Monitoring Report New Liskeard Waste Disposal Site, New Liskeard, Ontario</p>	<p>DWN BY:  KKJ</p>	<p>CHK'D BY:  DS</p>	<p>DATE: April 2024</p> <p>PROJECT NO: TY131010.1000</p>
<p>TITLE Groundwater Tri-Linear Piper Plot - June 2023</p>	<p>REV. NO.: 1</p>	<p>SCALE: not applicable</p>	<p>FIGURE NO: 7A</p>

**Legend :**

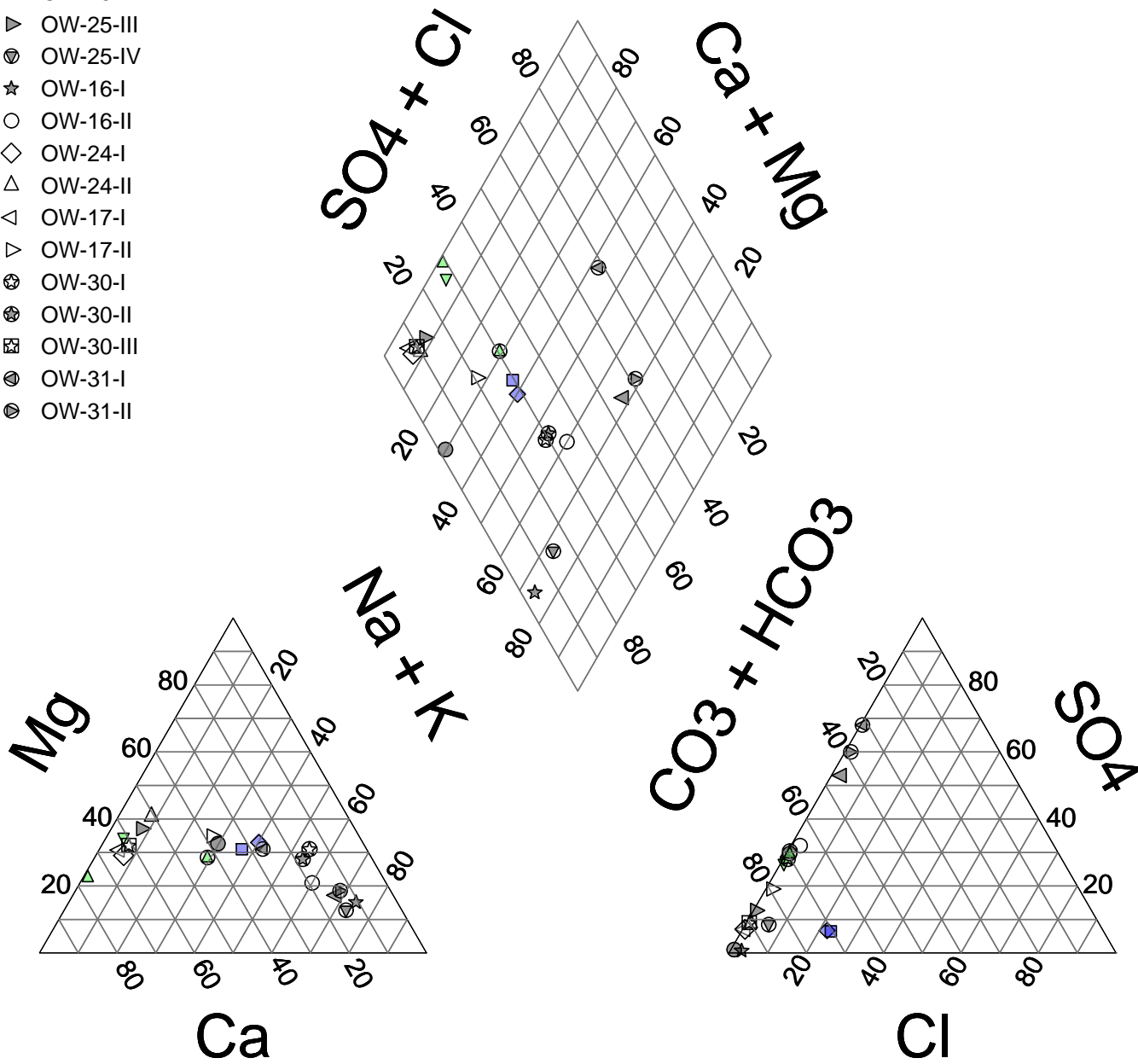
- ◆ OW-1R-I
- OW-1R-III
- ▼ OW-10-I
- ▲ OW-10-II
- ⊗ OW-10-III
- OW-25-I
- ▲ OW-25-II
- ▶ OW-25-III
- ☆ OW-16-I
- OW-16-II
- ◇ OW-24-I
- △ OW-24-II
- ▽ OW-17-I
- ▽ OW-17-II
- ⊗ OW-30-I
- ⊗ OW-30-II
- ⊗ OW-30-III
- ⊗ OW-31-I
- ⊗ OW-31-II



<p>WSP Canada Inc. 33 Mackenzie Street, Suite 100 Sudbury, Ontario, P3C 4Y1</p>			<p>The City of Temiskaming Shores</p>
<p>PROJECT 2023 Annual Groundwater &amp; Surface Water Monitoring Report New Liskeard Waste Disposal Site, New Liskeard, Ontario</p>	<p>DWN BY:  KKJ</p>	<p>CHK'D BY:  DS</p>	<p>DATE: April 2024</p> <p>PROJECT NO: TY131010.1000</p>
<p>TITLE Groundwater Tri-Linear Piper Plot - August 2023</p>	<p>REV. NO.: 1</p>	<p>SCALE: not applicable</p>	<p>FIGURE NO: 7B</p>

**Legend :**

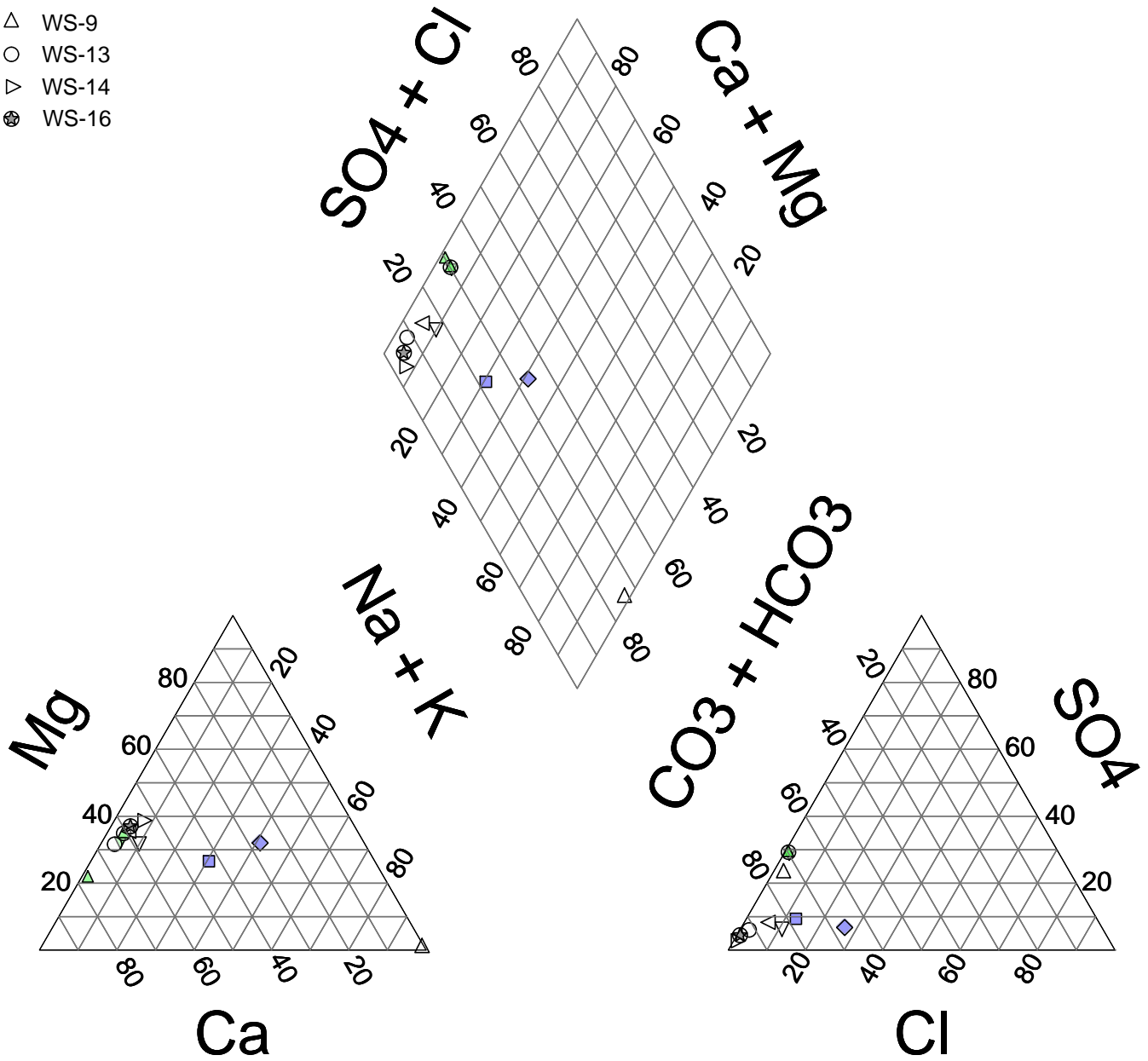
- ◆ OW-1R-I
- OW-1R-III
- ▼ OW-10-I
- ▲ OW-10-II
- ⊗ OW-10-III
- OW-25-I
- ▲ OW-25-II
- ▼ OW-25-III
- ⊗ OW-25-IV
- ☆ OW-16-I
- OW-16-II
- ◇ OW-24-I
- △ OW-24-II
- ▽ OW-17-I
- ▽ OW-17-II
- ⊗ OW-30-I
- ⊗ OW-30-II
- ⊗ OW-30-III
- ⊗ OW-31-I
- ⊗ OW-31-II



<p>WSP Canada Inc. 33 Mackenzie Street, Suite 100 Sudbury, Ontario, P3C 4Y1</p>			<p>The City of Temiskaming Shores</p>
<p>PROJECT 2023 Annual Groundwater &amp; Surface Water Monitoring Report New Liskeard Waste Disposal Site, New Liskeard, Ontario</p>	<p>DWN BY:  KKJ</p>	<p>CHK'D BY:  DS</p>	<p>DATE: April 2024</p> <p>PROJECT NO: TY131010.1000</p>
<p>TITLE Groundwater Tri-Linear Piper Plot - October 2023</p>	<p>REV. NO.: 1</p>	<p>SCALE: not applicable</p>	<p>FIGURE NO: 7C</p>

**Legend :**

- ◆ OW-1R-I
- OW-1R-III
- ▼ OW-10-I
- ▲ OW-10-II
- ⊗ OW-10-III
- ▽ WS-7
- △ WS-8
- △ WS-9
- WS-13
- ▽ WS-14
- ⊗ WS-16



<p>WSP Canada Inc. 33 Mackenzie Street, Suite 100 Sudbury, Ontario, P3C 4Y1</p>			<p>The City of Temiskaming Shores</p>
<p>PROJECT 2023 Annual Groundwater &amp; Surface Water Monitoring Report New Liskeard Waste Disposal Site, New Liskeard, Ontario</p>	<p>DWN BY:  KKJ</p>	<p>CHK'D BY:  DS</p>	<p>DATE: April 2024</p>
<p>TITLE Residential Groundwater Tri-Linear Piper Plot - June 2023</p>	<p>REV. NO.: 1</p>	<p>SCALE: not applicable</p>	<p>PROJECT NO: TY131010.1000</p> <p>FIGURE NO: 7D</p>



# Appendix A

Environmental Compliance  
Approval No. A-500-1115044194  
and MECP Correspondence

---

**ENVIRONMENTAL COMPLIANCE APPROVAL**

NUMBER A-500-1115044194

Version: 1.0

Issue Date: December 2, 2021

*Pursuant to section 20.3 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 and subject to all other applicable Acts or regulations this Environmental Compliance Approval is issued to:*

THE CORPORATION OF THE CITY OF  
TEMISKAMING SHORES.

325 FARR DRIVE  
HAILEYBURY ONTARIO  
P0J1K0

*For the following site:*

325 Farr Drive , Temsikaming, TEMISKAMING SHORES,  
ONTARIO, CANADA, P0J 1K0

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s) A571505, issued on May 9, 2000.

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

for the use and operation of 7.7 hectares (ha) within a total site area of 32 hectares for disposal of domestic, commercial and industrial solid non-hazardous waste.

## **DEFINITIONS**

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

1. "Adverse Effect" has the same meaning as defined in the EPA;
2. "Approval" means this entire Environmental Compliance Approval and any Schedules attached to it;
3. "Director" means a person appointed by the Minister pursuant to section 5 of the EPA for the purposes of Part II.1 of the EPA;
4. "District Manager" means the District Manager of the appropriate local district office of the Ministry, where the Site is geographically located;
5. "EPA" means the Environmental Protection Act, R.S.O. 1990, c.E.19;
6. "Ministry" means the ministry of the government of Ontario responsible for the EPA and OWRA and includes all officials, employees or other persons acting on its behalf;
7. "OWRA" means the Ontario Water Resources Act, R.S.O. 1990, c. O.40;

8. "Schedules" means the following schedules attached to this Approval and forming part of this Approval namely:
  - Schedule "1" - Supporting Documentation
9. "Supporting Documentation" means the documents listed in Schedule "1" of this Approval;
10. "Contaminant Attenuation Zone" or "CAZ" means a three-dimensional zone that,
  - a. is located on land adjacent to a landfilling site,
  - b. is in the subsurface or extends into the subsurface, and
  - c. is used or is intended to be used for the attenuation of contaminants from the landfilling site to levels that will not have an unacceptable impact beyond the boundary of the zone;
11. "NMA" means the Nutrient Management Act, 2002, S.O. 2002, c. 4;
12. "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;
13. "Owner" means any person that is responsible for the establishment or operation of the Site being approved by this *Approval*, and includes *Owner's* Legal Name and its successors and assigns;
14. "PA" means the Pesticides Act, R.S.O. (1990), c. P.11;
15. "Provincial Officer" means any person designated in writing by the Minister as a provincial officer pursuant to Section 5 of the OWRA, Section 5 of the EPA, Section 17 of the PA, Section 4 of the NMA, or Section 8 of the SDWA;
16. "Reg. 347" means R.R.O. 1990, Reg. 347: (General - Waste Management), made under the EPA;
17. "Reg. 903" means R.R.O. 1990, Reg. 903: (Wells), made under the OWRA;
18. "Regional Director" means the Regional Director of the local Regional Office of the Ministry in which the Site is located;
19. "SDWA" means the Safe Drinking Water Act, 2002, S.O. 2002, c. 32;
20. "Site" means the entire waste disposal site, including the buffer lands, and contaminant attenuation zone at Lot West 1/2 of Lot 5, Concession 2, Temiskaming Shores City, District of Temiskaming;
21. "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 Approval.

## **TERMS AND CONDITIONS**

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

## **A. GENERAL**

### **1. Compliance**

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

### **2. In Accordance**

1. Except as otherwise provided by this Approval, the Site shall be designed, developed, built, operated and maintained in accordance with the documentation listed in the attached Schedule 1.

### **3. Interpretation**

1. Where there is a conflict between a provision of any document listed in Schedule 1 in this Approval, and the conditions of this Approval, the conditions in this Approval shall take precedence.
2. Where there is a conflict between the application and a provision in any document listed in Schedule 1, 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.
3. Where there is a conflict between any two documents listed in Schedule 1, the document bearing the most recent date shall take precedence.
4. The conditions of this Approval are severable. If any condition of this Approval, or the application of any condition of this Approval to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this Approval shall not be affected thereby.

### **4. Other Legal Obligations**

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

### **5. Adverse Effect**

1. 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.
2. Despite an Owner, operator or any other person fulfilling any obligations imposed by this Approval, the person remains responsible for any contravention of any other condition of

this Approval or any applicable statute, regulation, or other legal requirement resulting from any act or omission that caused the adverse effect to the natural environment or impairment of water quality.

## **6. Change of Owner**

1. 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.
2. 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.
3. In the event of any change in ownership of the Site, other than change to a successor municipality, the Owner shall notify the successor of and provide the successor with a copy of this Approval, and the Owner shall provide a copy of the notification to the District Manager and the Director.

## **7. Registration on Title**

1. Prior to dealing with the property in any way, the Owner shall provide a copy of this Approval and any amendments, to any person who will acquire an interest in the property as a result of the dealing.
2. Within 180 calendar days from the date of issuance of this Approval, the Owner shall submit to the Director a completed Certificate of Requirement which shall include:
  - a. a plan of survey prepared, signed and sealed by an Ontario Land Surveyor, which shows the area of the Site where waste has been or is to be deposited at the Site;
  - b. proof of ownership of the Site;
  - 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 provided in the Certificate of Requirement;
  - d. the legal abstract of the property; and
  - e. any supporting documents including a registerable description of the Site.
3. Within fifteen (15) calendar days of receiving a Certificate of Requirement 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 and the District Manager, written verification that the Certificate of Requirement has been registered on title.

## **8. Inspections by the Ministry**

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

## **9. Information and Record Retention**

1. Except as authorized in writing by the Director, all records required by this Approval shall be retained at the Site for a minimum of two (2) years from their date of creation.
  - a. The Owner shall retain all documentation listed in Schedule 1 for as long as this Approval is valid.
  - b. The Owner shall retain employee training records as long as the employee is working at the Site.
  - c. The Owner shall make all of the above documents available for inspection upon request of Ministry staff.
2. The receipt of any information by the Ministry or the failure of the Ministry to prosecute any person or to require any person to take any action under this Approval or under any statute, regulation or other legal requirement, in relation to the information, shall not be construed as:
  - a. an approval, waiver, or justification by the Ministry of any act or omission of any person that contravenes any term or condition of this Approval or any statute, regulation or other legal requirement; or
  - b. acceptance by the Ministry of the information's completeness or accuracy.
3. The Owner shall ensure that a copy of this Approval, in its entirety and including all its Notices of Amendment, and documentation listed in Schedule 1, are retained at the Site at all times.
4. Any information related to this Approval and contained in Ministry files may be made available to the public in accordance with the provisions of the Freedom of Information and Protection of Privacy Act, RSO 1990, CF-31.

## **10. Registration on Title Requirement - Contaminant Attenuation Zone (CAZ)**

1. Within four (4) years from the date of this Approval, the Owner shall complete acquiring the ground water easement to the proposed contaminant attenuation zone to the north /north east, and between CAZ eastern boundary and Highway 65.
2. The Owner must continue to own the property rights to the Contaminant Attenuation Zone for all of the contaminating life span of the Site.

3. The ownership of the property rights must include the right to:
  - a. discharge contaminants from the operations at the Site into the Contaminant Attenuation Zone;
  - b. enter into the Contaminant Attenuation Zone and onto the surface above the Contaminant Attenuation Zone for purposes of testing, monitoring, intercepting contaminants and carrying out remedial work;
  - c. install, operate and maintain works, for the purposes mentioned in clause (b), in the Contaminant Attenuation Zone, including on the surface above the Contaminant Attenuation Zone; and
  - d. prevent the owner(s) of the land(s) in which the Contaminant Attenuation Zone is located from paving, erecting a structure or making any use of land(s) above or in the vicinity of the contaminant attenuation zone that would interfere with the functioning of the Contaminant Attenuation Zone or with the exercise of any of the rights mentioned in this subsection.
4. The Owner shall notify the Director in writing within thirty (30) days after any change in his, her or its ownership of the property rights in the Contaminant Attenuation Zone.
5. The Owner shall ensure that the written easement agreement, specified in Condition 10(3) includes an agreement of the property owner(s) of the land(s) required for the Contaminant Attenuation Zone, to register a Certificate of Requirement on title to the land (s) to be used as the Contaminant Attenuation Zone.
6. Within thirty (30) calendar days from the date of establishing a Contaminant Attenuation Zone (overburden and/or bedrock aquifers) in either fee simple or by way of a groundwater easement, the Owner shall submit to the Director a completed Certificate of Requirement which shall include:
  - a. If rights are obtained in fee simple, the Owner shall provide:
    - i. documentation evidencing ownership of the CAZ obtained in compliance with O. Reg. 232/98, as amended;
    - ii. a completed Certificate of Requirement and supporting documents containing a registerable description of the CAZ; and
    - iii. a letter signed by a member of the Law Society of Upper Canada; or other qualified legal practitioner acceptable to the Director, verifying the legal description of the CAZ.
  - b. Within fifteen (15) calendar days of receiving a Certificate of Requirement signed or authorized by the Director, the Owner shall:
    - i. register the Certificate of Requirement in the appropriate Land Registry Office on the title to the property; and
    - ii. submit to the Director and the District Manager, written verification that the Certificate of Requirement has been registered on title.
  - c. If rights are obtained by way of a groundwater easement, the Applicant shall:
    - i. provide a copy of the easement;
    - ii. provide a plan of survey signed and sealed by an Ontario Land Surveyor for the CAZ;
    - iii. submit proof of registration on title of the groundwater easement to the Director;

- d. The Owner shall not amend or remove or consent to the removal of the easement or CAZ from title without the prior written consent of the Director.

## **B. SITE OPERATIONS**

### **1. Operations**

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

### **2. Signs**

1. The Owner shall install and maintain a sign at the entrance to the Site. The sign shall be visible and readable from the main road leading to the Site. The following information shall be included on the sign:
  - a. the name of the Site and Owner;
  - b. the number of the Approval;
  - c. the name of the Operator;
  - d. the normal hours of operation;
  - e. the allowable 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. Vermin, Vectors, Dust, Litter, Odour, Noise and Traffic**

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

### **4. Burning**

1. Burning of waste at the Site is prohibited.

### **5. Site Security**

1. No waste shall be received, landfilled or removed from the Site unless a site supervisor or an attendant is present and supervises the operations during operating hours. The Site shall be closed when a site attendant is not present to supervise landfilling operations.
2. 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. The Owner shall ensure that:
  - a. access to the Site is restricted by fencing; and
  - b. fencing and lockable gate are kept in good repair.



4. All wastes and recyclable materials (scrape metals, glass and plastic) stored in temporary bin shall be managed and disposed of in accordance with the Act and Reg. 347.
5. The Owner shall ensure that:
  - a. all bins and waste storage areas are clearly labelled;
  - b. all lids or doors on bins shall be kept closed during non-operating hours and during high wind events; and
  - c. if necessary to prevent litter, waste storage areas shall be covered during high winds events.
6. The Owner shall transfer recyclable materials from the Site once the storage bins are full.
7. The Owner shall maintain a log book which records the following information:
  - a. date of record;
  - b. quantities (m<sup>3</sup>) and destination of each type of waste, including recyclable material, shipped from the transfer station; and
  - c. complaints received, if any, including the nature of the complaint, time of complaint and action(s) taken to remediate the problem.

#### **6. Hours of Operations**

1. The normal operating hours of the Site shall be as follows:
  - a. The maximum waste disposal operating hours of the landfill are Monday - Saturday 7:00 a.m. - 7:00 p.m.;
  - b. The Site shall be closed on Sundays and statutory holidays;
2. On-site equipment used for daily site preparation and closing activities may be operated one (1) hour before and one (1) hour after the hours of operation approved by this *Approval*.
3. With the prior written approval from the District Manager, the time periods may be extended to accommodate seasonal or unusual quantities of waste.

#### **7. Nuisances**

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

### **C. EMPLOYEE TRAINING**

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

### **D. COMPLAINT RESPONSE PROCEDURE**

1. 1. If at any time the Owner receives complaints regarding the operation of the Site, the Owner shall respond to these complaints according to the following procedure:
  - a. The Owner shall record and number each complaint, either electronically or in a log book, and shall include the following information: the nature of the complaint, the name, address and the telephone number of the complainant if the complainant will provide this information and the time and date of the complaint;

- b. The Owner, upon notification of the complaint, shall initiate appropriate steps to determine possible causes of the complaint, proceed to take the necessary actions to eliminate the cause of the complaint and forward a formal reply to the complainant; and
- c. The Owner shall complete and retain on-site a report written within one (1) week of the complaint date, listing the actions taken to resolve the complaint and any recommendations for remedial measures, and managerial or operational changes to reasonably avoid the recurrence of similar incidents.

## **E. EMERGENCY RESPONSE**

1.
  1. All equipment and materials required to handle the emergency situations shall be:
  2. All wastes resulting from an emergency situation shall be managed and disposed of in accordance with Reg. 347.
  3. 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.
  4. All Spills as defined in the EPA shall be immediately reported to the **Ministry's Spills Action Centre at 1-800-268-6060** and shall be recorded in the log book as to the nature of the emergency situation, and the action taken for clean-up, correction and prevention of future occurrences.
    - 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).

## **F. INSPECTIONS, RECORD KEEPING AND REPORTING**

### **1. Daily Log Book**

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

### **2. Daily Inspections and Log Book**

1. An inspection of the entire Site and all equipment on the Site shall be conducted each day the Site is in operation to ensure that: the Site is secure; that the operation of the Site is not causing any nuisances; that the operation of the Site is not causing any adverse effects on the environment and that the Site is being operated in compliance with this Approval. Any deficiencies discovered as a result of the inspection shall be remedied immediately, including temporarily ceasing operations at the Site if needed.
2. A record of the inspections shall be kept in a daily log book that includes:
  1. the name and signature of person that conducted the inspection;
  2. the date and time of the inspection;
  3. the list of any deficiencies discovered;
  4. the recommendations for remedial action; and
  5. the date, time and description of actions taken.
3. 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.

### **3. Annual Report**

1. 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 July 31st of the year following the period being reported upon.
2. The Annual Report shall include but not be limited to the following information:
  - a. the results and an interpretive analysis of the results of all leachate, groundwater surface water and landfill gas monitoring, including an assessment of the need to amend the monitoring programs;
  - b. an assessment of the operation and performance of all engineered facilities, the need to amend the design or operation of the Site, and the adequacy of and need to implement the contingency plans;
  - c. site plans showing the existing contours of the Site; areas of landfilling operation during the reporting period; areas of intended operation during the next reporting period; areas of excavation during the reporting period; the progress of final cover, vegetative cover, and any intermediate cover application; facilities existing, added or removed during the reporting period; and site preparations and facilities planned for installation during the next reporting period;
  - d. calculations of the volume of waste, weekly and intermediate cover, and final cover deposited or placed at the Site during the reporting period and a calculation of the total volume of Site capacity used during the reporting period;
  - e. a calculation of the remaining capacity of the Site and an estimate of the remaining Site life;
  - f. a summary of the weekly, maximum daily and total annual quantity (tonnes) of waste received at the Site;
  - g. a summary of any complaints received and the responses made;
  - h. a discussion of any operational problems encountered at the Site and corrective action taken;

- i. any changes to the Design and Operations Report and the Closure Plan that have been approved by the Director since the last Annual Report;
- j. a report on the status of all monitoring wells and a statement as to compliance with Ontario Regulation 903; and
- k. any other information with respect to the Site which the District Manager may require from time to time.

## **G. LANDFILL DESIGN AND DEVELOPMENT**

### **1. Approved Waste Types**

1. Only municipal waste as defined under Reg. 347 being solid non-hazardous shall be accepted at the Site for landfilling and a drop-off recyclable materials (scrape metals, glass and plastic) for temporary storage in bins for off-site disposal.
2. The Owner shall develop and implement a program to inspect waste to ensure that the waste received at the Site is of a type approved for acceptance under this Approval.
3. The Owner shall ensure that all loads of waste are properly inspected by Trained personnel prior to acceptance at the Site and that the waste vehicles are directed to the appropriate areas for disposal or transfer of the waste.
4. The Owner shall notify the District Manager, in writing, of load rejections at the Site within one (1) business day from their occurrence.

### **2. Capacity**

1. The calculated theoretical maximum volumetric capacity of the Site, consisting of the waste, daily cover and intermediate cover, but excluding the final cover is **366,845** cubic metres. The total capacity of the site including historical waste, capacity expansion, daily cover and intermediate cover is 874,000 cubic meter.
2. Within 2 years from the date of issuance of the Approval, the waste deposited outside the waste footprint area shown on updated Figure 6 of the Design and Operations Plan, enclosed as Item 21 in Schedule "1", shall be excavated and deposited within the approved waste footprint area.

### **3. Service Area**

1. Only waste that is generated within the geographical boundaries of the Haileybury, Dymond and New Liskeard and Town of Cobalt, and two First Nation Communities (Timiskaming First Nation and Kebaowk First Nation) shall be accepted at the Site.

### **4. Cover**

1. Alternative materials to soil may be used as weekly and interim cover material, based on an application with supporting information and applicable fee for a trial use or permanent use, submitted by the Owner to the Director, copied to the District Manager and as approved by the Director via an amendment to this Approval. The alternative material shall be non-hazardous according to Reg. 347 and will be expected to perform at least as well as soil in relation to the following functions:
  - a. Control of blowing litter, odours, dust, landfill gas, gulls, vectors, vermin and fires;
  - b. Provision for an aesthetic condition of the landfill during the active life of the Site;
  - c. Provision for vehicle access to the active tipping face; and

- d. Compatibility with the design of the Site for groundwater protection, leachate management and landfill gas management.
2. Cover material shall be applied as follows:
    - a. Weekly Cover - Weather permitting, deposited waste shall be covered every week in a manner acceptable to the District Manager so that no waste is exposed to the atmosphere;
    - 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.
  3. Where existing cover material has eroded such that waste is exposed, the cover material shall be promptly replaced.

#### **5. Solar Panels in CAZ**

1. The Owner shall ensure that:
  - a. the proposed solar panel installations within the CAZ do not interfere or affect ongoing Site groundwater and surface water monitoring programs, or the functioning of the CAZ;
  - b. access is maintained to all existing Site CAZ monitoring wells;
  - c. the proposed solar panels do not prevent or impede any future monitoring well installations that may be required within the CAZ.

#### **6. Storm Water and Erosion Control**

1. Prior to the acceptance of waste at this Site, the storm water control structures (diversion ditches, soil berms and seepage pond) shall be constructed as per Design and Operations report, enclosed as Item 11 of Schedule "1".

### **H. LANDFILL MONITORING**

#### **1. Landfill Gas**

1. The Owner shall ensure that any buildings or structures at the Site contain adequate ventilation systems to relieve any possible landfill gas accumulation to prevent methane concentration reaching the levels within its explosive range. Routine monitoring for explosive methane gas levels shall be conducted in all buildings or structures at the Site, especially enclosed structures which at times are occupied by people.
2. Within 2 year of the issuance of this Approval, the Owner shall construct at least two (2) dedicated landfill gas monitors at locations as shown on Figure 3 of the Proposed Surface and Groundwater Monitoring Program dated November 24, 2020 and the landfill gas monitoring shall occur concurrently with the groundwater monitoring plan outlined in Item 12 of Schedule "1".
3. The Owner shall ensure that all on-Site enclosed buildings are equipped with appropriate dedicated gas monitoring devices.

## **2. Leachate Monitoring**

1. Within 1 year of closure of Cell 2, the Owner shall construct one (1) dedicated leachate monitoring well within Cell 2 at location acceptable to the District Manager.
2. The leachate level and sampling and chemical testing shall occur concurrently with the groundwater monitoring plan outlined in Item 12 of Schedule "1".

## **3. Surface Water and Groundwater**

1. The Owner shall monitor surface water and ground water in accordance with the monitoring program outlined in "Surface and Groundwater Monitoring Program, New Liskeard Waste Disposal Site, dated November 24, 2020, and enclosed as Item 12 in Schedule "1".

## **4. Groundwater Wells and Monitors**

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

## **5. Trigger Mechanisms and Contingency Plans**

1. The Trigger mechanism shall be implemented as noted below:
  - a. Trigger mechanisms shall be in accordance with Trigger Mechanisms Contingency Plan provided in "Surface and Groundwater Monitoring Program, New Liskeard Waste Disposal Site, dated November 24, 2020, and enclosed as Item 12 in Schedule "A".
  - b. Contingency plan in the event of a confirmed exceedance of a site-specific trigger level relating to leachate mounding or groundwater or surface water impacts due to leachate shall be in accordance with Item 12 of Schedule "1".
  - c. In addition to the trigger parameters listed in Table 4 of the "Surface and Groundwater Monitoring Program, New Liskeard Waste Disposal Site, dated November 24, 2020, fluoride shall be deemed a trigger parameter for which a trigger concentration shall be established. Moreover, the trigger concentration for groundwater parameters is set at 80% of the Reasonable Use Concentration (RUC).
2. In the event of a confirmed exceedance of a site-specific trigger level relating to leachate mounding or groundwater or surface water impacts due to leachate, 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.

3. If monitoring results, investigative activities and/or trigger mechanisms indicate the need to implement contingency measures, the Owner shall ensure that the following steps are taken:
  - a. The Owner shall notify the District Manager, in writing of the need to implement contingency measures, no later than 30 days after confirmation of the exceedances;
  - b. Detailed plans, specifications and descriptions for the design, operation and maintenance of the contingency measures shall be prepared and submitted by the Owner to the Director for approval; and
  - c. The contingency measures shall be implemented by the Owner upon approval by the Director.
4. The Owner shall ensure that any proposed changes to the site-specific trigger levels for leachate impacts to the surface water or groundwater, are approved in advance by the Director via an amendment to this Approval.

## **6. Changes to the Monitoring Plan**

1. The Owner may request to make changes to the monitoring program to the District Manager in accordance with the recommendations of the annual report. The Owner shall make clear reference to the proposed changes in a separate letter that shall accompany the annual report.
2. Within sixty (60) days of receiving the written correspondence from the District Manager confirming that the District Manager is in agreement with the proposed changes to the environmental monitoring program, the Owner shall forward a letter identifying the proposed changes and a copy of the correspondences from the District Manager and all other correspondences and responses related to the changes to the monitoring program, to the Director requesting the Approval be amended to approve the proposed changes to the environmental monitoring plan prior to implementation.
3. In the event any other changes to the environmental monitoring program are proposed outside of the recommendation of the annual report, the Owner shall follow current Ministry procedures for seeking approval for amending the Approval.

## **7. Compliance**

1. The Site shall be operated in such a way as to ensure compliance with the following:
  - a. Reasonable Use Guideline B-7 for the protection of 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.

## **I. CLOSURE PLAN**

### **1. 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 but not be limited to the following information:

- a. a plan showing Site appearance after closure;
- b. a description of the proposed end use of the Site;
- c. a description of the procedures for closure of the Site, including:
  - i. advance notification of the public of the landfill closure;
  - ii. posting of a sign at the Site entrance indicating the landfill is closed and identifying any alternative waste disposal arrangements;
  - iii. completion, inspection and maintenance of the final cover and landscaping;
  - iv. Site security;
  - v. removal of unnecessary landfill-related structures, buildings and facilities;
  - vi. final construction of any control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas; and
  - vii. a schedule indicating the time-period for implementing sub-conditions (i) to (vi) above;
- d. descriptions of the procedures for post-closure care of the Site, including:
  - i. operation, inspection and maintenance of the control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;
  - ii. record keeping and reporting; and
  - iii. complaint contact and response procedures;
- e. an assessment of the adequacy of and need to implement the contingency plans for leachate and methane gas; and
- f. an updated estimate of the contaminating life span of the Site, based on the results of the monitoring programs to date.

## **REASONS**

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

1. *The reason for Conditions A1(1&2), A3 (1 to 4), A4(1), A5(1&2), A8(1) and A9(1-3) is to clarify the legal rights and responsibilities of the Owner and Operator under this Approval.*
2. *The reasons for Condition A2(1), B5(3), and G6(1) are to ensure that the Site is designed, operated, monitored and maintained in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.*
3. *The reasons for Condition A6(1) 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 A6(2) are to restrict potential transfer or encumbrance of the Site without the approval of the Director and to ensure that any transfer of encumbrance can be made only on the basis that it will not endanger compliance with this Approval.*



5. *The reason for Condition A6(3) is to ensure that the successor is aware of its legal responsibilities.*
6. *The reasons for Conditions A7(1-3) and A10 (1-6) are that the Part II.1 Director is an individual with authority pursuant to Section 197 of the Environmental Protection Act to require registration on title and provide any person with an interest in property before dealing with the property in any way to give a copy of the Approval to any person who will acquire an interest in the property as a result of the dealing.*
7. *The reason for Condition A8(1) is to ensure that appropriate Ministry staff has ready access to the Site for inspection of facilities, equipment, practices and operations required by the conditions in this Approval. This Condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the Act, the OWRA, the PA, the NMA and the SDWA.*
8. *The reason for Condition A9(1), A9(3) and B5(7) is to ensure that accurate waste records and approval documents are maintained to ensure compliance with the conditions in this Approval, the EPA and its regulations.*
9. *Condition A9(4) has been included to clarify what information may be subject to the Freedom of Information Act.*
10. *The reasons for Conditions B1(1), B3(1), B5(5&6), B7(1) and F2(1) 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.*
11. *The reason for Conditions B2(1) is to ensure that users of the Site are fully aware of important information and restrictions related to Site operations and access under this Approval.*
12. *The reasons for Condition B4(1) are open burning of municipal waste is unacceptable because of concerns with air emissions, smoke and other nuisance effects, and the potential fire hazard and to make sure burning of brush and wood are carried out in accordance with Ministry guidelines.*
13. *The reason for Condition B5(4) is to ensure that waste is transported to and from the Site in accordance with Reg. 347.*
14. *The reasons for Condition B5(1&2) 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.*
15. *The reasons for Condition B6(1-3) are to specify the hours of operation for the landfill site and a mechanism for amendment of the hours of operation, as required.*
16. *The reason for Condition C1(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.*
17. *The reason for Condition D1(1) is to ensure that any complaints regarding landfill operations at this Site are responded to in a timely and efficient manner.*

18. *Conditions E1(1-5) 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.*
19. *The reason for Conditions F1(1&2) is to ensure that accurate waste records are maintained to ensure compliance with the conditions in this Approval (such as fill rate, site capacity, record keeping, annual reporting, and financial assurance requirements), the EPA and its regulations.*
20. *The reason for Conditions F2(2&3) is to ensure that detailed records of Site inspections are recorded and maintained for inspection and information purposes.*
21. *The reasons for Conditions F3(1&2) 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.*
22. *The reason for Conditions G1(1-4) and G2(1&2) 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.*
23. *The reasons for Conditions G3(1) are to specify the approved areas from which waste may be accepted at the Site, based on the Owner's application and supporting documentation.*
24. *The reasons for Condition G4(1-3) are to ensure that 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.*
25. *Condition G5(1) is included to ensure that the proposed installations do not impact ongoing environmental protection programs at the Site.*
26. *The reasons for Condition H1(1-3) 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.*
27. *Conditions F2(1&2), H2(1&2), H3(1) and H7(1) are included to specify the leachate, groundwater and surface water monitoring requirements for monitoring leachate, groundwater and surface water quality and 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.*
28. *Conditions H4(1-3) are included to ensure the integrity of the groundwater monitoring network so that accurate monitoring results are achieved and the natural environment is protected.*
29. *Conditions H5(1-4) 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.*
30. *The reasons for Conditions H6(1-3) are included to streamline the approval of the changes to the monitoring plan.*

31. The reasons for Condition II(1) 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.

## APPEAL PROVISIONS

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In accordance with Section 139 of the *Environmental Protection Act*, you may by written notice served upon me and the Ontario Land 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 ("the Notice") shall state:

- I. 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;
- II. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

- I. The name of the appellant;
- II. The address of the appellant;
- III. The environmental compliance approval number;
- IV. The date of the environmental compliance approval;
- V. The name of the Director, and;
- VI. 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:

Registrar* Ontario Land Tribunal 655 Bay Street, Suite 1500 Toronto, Ontario M5G 1E5 OLT.Registrar@ontario.ca	and	The Director appointed for the purposes of Part II.1 of the <i>Environmental Protection Act</i> Ministry of the Environment, Conservation and Parks 135 St. Clair Avenue West, 1st Floor Toronto, Ontario M4V 1P5
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**\* Further information on the Ontario Land Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349 or 1 (866) 448-2248, or [www.olt.gov.on.ca](http://www.olt.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 3rd day of December, 2021



Mohsen Keyvani

Director

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

c: Maria Valcarcel, Wood PLC  
Steve Burnett

The following schedules are a part of this environmental compliance approval:

# SCHEDULE 1

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## SCHEDULE "1"

1. *The updated Application for a Certificate of Approval for a waste disposal site dated April 12, 2000.*
2. *Letters from Sutcliffe Rody Quesnel Inc. to the MOE dated February 4, 2000, March 14, 2000, and April 12, 2000.*
3. *Site Plan Approved Area (Sheet A) and Site Plan Final Contours (Sheet B) prepared by Sutcliffe Rody Quesnel Inc., and dated February 2000.*
4. *Application for a Provisional Certificate of Approval for a Waste Disposal Site dated November 19, 2004, signed by Dan Harvey, Director of Public Works, City of Temiskaming Shores, including all supporting documentation.*
5. *Application for a Provisional Certificate of Approval for a Waste Disposal Site dated November 14, 2005 and signed by Dave Treen, Manager of Environmental Services, City of Temiskaming Shores, including the attached drawing entitled "New Liskeard Landfill Site Figure 1 "showing the attenuation zone.*
6. *Application for a Certificate of Approval, Waste Disposal Site, dated November 1, 2011 and signed by Christopher Oslund, City Manager, City of Temiskaming Shores,*
7. *Letter dated March 15, 2012, from Jeff Roy, Program Manager, Canadian Solar Solutions Inc., to Lynda Mulcahy, P.Eng, MOE, RE: New Liskeard Landfill Contaminant Attenuation Zone, with attached letter report dated March 7, 2012, by Anthony Story, Story Environmental Inc.*
8. *e-mail from David Treen, City of Temiskaming Shores, to Mark Feenstra, Canadian Solar Solutions Inc., dated October 2, 2012, 10:02am, copied to Lynda Mulcahy, MOE, RE: New Liskeard LF waste amendment*
9. *Letter dated November 19, 2013, from G. Douglas Walsh, CET, Director of Public Works, The City of Temiskaming Shores, to Dickson Odame-Osafo, MOE Waste Unit, Senior Waste Engineer, Re: Application for Approval of WDS Closure Plan-ECA A571, Notice No. 3 for the New Liskeard Landfill Site.*
10. *Environmental Compliance Approval Application dated January 26, 2021 and signed by Steve Burnett, including the attached supporting documentation.*
11. *Design & Operations Plan and Closure Plan, Wood Environment & Infrastructures Solutions, February 12, 2020.*
12. *Surface and Groundwater Monitoring Program, Wood Environment & Infrastructure Solutions, November 24, 2020.*
13. *Appendix A: ECA Pre-submission Review Email, dated December 1, 2020, enclosed with Environmental Compliance Approval Application dated January 26, 2021.*
14. *Appendix B: Site Plan and Scaled Area Location Plan, Figures 1 to 6, Wood Environment & Infrastructure Solutions, September 2020.*
15. *Appendix C: Location Plans, Figures 1 to 3, Wood Environment & Infrastructure Solutions, September 2020.*
16. *Appendix D: Proof of Compliance with EAA – Notice of Approval, dated April 01, 2019, enclosed with Environmental Compliance Approval Application dated January 26, 2021.*
17. *Appendix E: Municipal Zoning Letter, dated January 20, 2021.*

18. *Appendix F: Zoning Map (Figure 5.21), February 2018, enclosed with Environmental Compliance Approval Application dated January 26, 2021.*
19. *Appendix I: New Waste Management Capacity Environmental Study Report, Technical Support Document: Hydrogeology, Amec Foster Wheeler Environment & Infrastructure, August 2016, provided with Environmental Compliance Approval Application dated January 26, 2021.*
20. *Appendix J. ECA: Open House Summary of First Nations Letters. AMEC Environment & Infrastructure, February 2013. enclosed with Environmental Compliance Approval Application dated January 26, 2021.*
21. *Email from Brain Grant to Abdul Quayum, P. Eng., dated November 26, 2021, including enclosed updated Figure 6 - Proposed Top of Cap Contours for Landfill Expansion.*



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PROVISIO. - CERTIFICATE OF APPROVAL  
FOR A WASTE DISPOSAL/PROCESSING SITE  
NO. A571505  
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*Under the Environmental Protection Act and the regulations and subject to the limitations thereof, this Provisional Certificate of Approval is issued to:*

The Corporation of the Town of New Liskeard  
P.O. Box 730, 90 Whitewood Avenue  
New Liskeard, Ontario  
POJ 1P0

*for the use and operation of a 2.02 hectare landfilling area within a 32 hectare total site area.*

*all in accordance with the following plans and specifications:*

as listed in Schedule "A"

*Located:* West ½ of Lot 5, Concession 2  
Corporation of the Town of New Liskeard

*which includes the use of the site only for the Processing and Disposal of the following categories of waste (Note: Use of the site or additional categories of wastes requires a new application and amendments to the Provisional Certificate of Approval) domestic, commercial and non-hazardous solid industrial waste*

*and subject to the following conditions:*

For the purpose of this Provisional Certificate of Approval:

- (a) "Certificate" means this Provisional Certificate of Approval including its schedules, if any, issued in accordance with the Environmental Protection Act;
- (b) "Director" means a Director of the Environmental Assessment and Approvals Branch of the Ministry;
- (c) "Regional Director" means the Director, Thunder Bay Regional Office of the Northern Region of the Ministry;
- (d) "District Manager" means the District Manager of the Timmins District Office of the Northern Region of the Ministry;
- (d) "Ministry" means the Ontario Ministry of the Environment, unless specific reference is made to another Ministry;
- (e) "Town" means the Corporation of the Town of New Liskeard;
- (g) "Provincial Officer" means a person who is designated by the Ministry of Environment as a Provincial Officer for the purposes of the Environmental Protection Act, the Ontario Water Resources Act, the Pesticides Act, and their respective regulations;



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- (h) "Site" means the facility described in the application for this Provisional Certificate of Approval and in the supporting documentation referred to herein;
- (i) "ODWO" means the Ontario Drinking Water Objectives; and
- (j) "RUP" means the Ministry's Reasonable Use Policy (Policy 15-08).

#### GENERAL

- (1) Except as otherwise provided by these conditions, the Site shall be designed, developed, used, maintained and operated, and all facilities, equipment and fixtures shall be built and installed, in accordance with the Application for a Certificate Approval for a Waste Disposal Site dated April 12, 2000 and supporting documentation, and plans and specifications listed in Schedule "A".
- (2) The requirements specified in this Provisional Certificate of Approval are the requirements under the Environmental Protection Act, R.S.O. 1990. The issuance of this Provisional Certificate of Approval in no way abrogates the Town's legal obligations to take all reasonable steps to avoid violating other applicable provisions of this legislation and other legislation and regulations.
- (3) The requirements of this Provisional Certificate of Approval are severable. If any requirement of this Provisional Certificate of Approval, or the application of any requirement of this Provisional Certificate of Approval to any circumstance, is held invalid, the application of such requirement to other circumstances and the remainder of this Provisional Certificate of Approval shall not be affected in any way.
- (4) The Town shall ensure compliance with all the terms and conditions of this Provisional Certificate of Approval. Any non-compliance constitutes a violation of the Environmental Protection Act, R.S.O. 1990 and is grounds for enforcement.
- (5)
  - (a) The Town shall, forthwith upon request of the Director, District Manager, or Provincial Officer (as defined in the Act), furnish any information requested by such persons with respect to compliance with this Provisional Certificate of Approval, including but not limited to, any records required to be kept under this Provisional Certificate of Approval; and
  - (b) In the event the Town provides the Ministry with information, records, documentation or notification in accordance with this Provisional Certificate of Approval (for the purposes of this condition referred to as "Information"),
    - (i) the receipt of Information by the Ministry;
    - (ii) the acceptance by the Ministry of the Information's completeness or accuracy; or
    - (iii) the failure of the Ministry to prosecute the Town, or to require the Town to take any action, under this Provisional Certificate of Approval or any statute or regulation in relation to the Information





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shall not be construed as an approval, excuse or justification by the Ministry of any act or omission of the Town relating to the Information, amounting to non-compliance with this Provisional Certificate of Approval or any statute or regulation.

- (6) The Town shall allow Ministry personnel, or a Ministry authorized representative(s), upon presentation of credentials, to:
- (a) carry out any and all inspections authorized by Section 156, 157 or 158 of the Environmental Protection Act, R.S.O. 1990, Section 15, 16 or 17 of the Ontario Water Resources Act, R.S.O. 1990, or Section 19 or 20 of the Pesticides Act, R.S.O. 1990, as amended from time to time, of any place to which this Provisional Certificate of Approval relates; and, without restricting the generality of the foregoing, to:
    - (b) (i) enter upon the premises where the records required by the conditions of this Provisional Certificate of Approval are kept;
    - (ii) have access to and copy, at reasonable times, any records required by the conditions of this Provisional Certificate of Approval;
    - (iii) inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations required by the conditions of this Provisional Certificate of Approval; and
    - (iv) sample and monitor at reasonable times for the purposes of assuring compliance with the conditions of this Provisional Certificate of Approval.
- (7) (a) Where there is a conflict between a provision of any document referred to in Schedule "A", and the conditions of this Provisional Certificate of Approval, the conditions in this Provisional Certificate of Approval shall take precedence; and
- (b) Where there is a conflict between documents listed in Schedule "A", the document bearing the most recent date shall prevail.
- (8) The Town shall ensure that all communications/correspondence made pursuant to this Provisional Certificate of Approval includes reference to the Provisional Certificate of Approval No. A 571505.
- (9) The Town shall notify the Director in writing of any of the following changes within thirty (30) days of the change occurring:
- (a) change of Town or Owner of the Site or both;
  - (b) change of address or address of the new Town;
  - (c) change of partners where the Operator or Owner is or at any time becomes a partnership, and a copy of the most recent declaration filed under the Business Names Act, 1991 shall be included in the notification to the Director;



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- (d) any change of name of the corporation where the Operator or Owner is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" (form 1 or 2 of O. Reg. 182, Chapter C-39, R.R.O. 1990 as amended from time to time), filed under the Corporations Information Act shall be included in the notification to the Director; and
- (e) change in directors or officers of the corporation where the Operator or Owner is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" as referred to in 9(d), supra.
- (10) In the event of any change in ownership of the Site, the Town shall notify, in writing, the succeeding owner of the existence of this Provisional Certificate of Approval, and a copy of such notice shall be forwarded to the Director.
- (11) Any information relating to this Provisional Certificate of Approval and contained in Ministry files may be made available to the public in accordance with the provisions of the Freedom of Information and Protection of Privacy Act, R.S.O. 1990, C. F-31.
- (12) All records and monitoring data required by the conditions of this Provisional Certificate of Approval must be kept on the Town's premises for a minimum period of two (2) years from the date of their creation.

OPERATIONAL

- (13) This Certificate revokes all previously issued Certificates for this Site.
- (14) The Town shall ensure that the Site is operated by trained personnel in a safe and secure manner, and that the wastes are properly handled, so as not to pose any threat to the general public, Site personnel or the environment, and that access to the Site is limited to the Town and his staff.
- (15) Within ninety (90) days of the issuance of this Certificate, the Town shall mark the Site boundaries, as identified in the site plan included with the application and supporting documents, with permanent markers, that shall be erected so as to be visible throughout the year for the life of the Site.
- (16) The Town shall ensure that no burning of waste shall take place at the Site.
- (17) All waste received at the Site under the authority of this Certificate shall be deposited within a 2.02 hectare landfilling area shown on Sheets A and B, provided with the Application for the Certificate.
- (18) The Site shall be closed when final contours shown on Sheet B and reduced by 0.9m for final cover, have been reached.
- (19) Liquid industrial waste or hazardous waste as defined in Ont. Reg. 347 shall not be received or deposited at the Site.

OPERATOR TRAINING  
SITE BOUNDARIES

RESTRICTIONS



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slow  
Litter

(20) The Town shall operate a litter maintenance program, which will include the collection and proper disposal of any wind blown or vector borne litter, from off-site deposition locations and from those areas of the Site that are not being actively landfilled.

- (21) (a) The Town shall:
- i) Within 60 days of the date of this Certificate, submit to the Director, for the Director's signature, two copies of a completed Certificate of Prohibition containing a registrable description of the Property, in accordance with Forms 4 & 5 of O. Reg. 14/92; and
  - ii) Within 10 calendar days of receiving the Certificates of Prohibition signed by the Director, register the Certificate of Prohibition in the appropriate Land Registry Office on title to the Property and submit to the Director the duplicate registered copy immediately following registration; and
- (b) Pursuant to Section 197 of the Environmental Protection Act, neither the Owner nor any person having an interest in the Property shall deal with the Property in any way without first giving a copy of this Certificate to each person acquiring an interest in the Property as a result of the dealing.

(22) Within 18 (eighteen) months of the issuance of this Certificate, the Town shall submit for the Director's approval a hydrogeological report. This report shall include but not limited to the following issues:

Report

- (a) groundwater regime evaluation (hydraulic gradients, direction of groundwater flow, groundwater flow velocity);
- (b) the extent of the existing groundwater contaminant plume;
- (c) monitoring requirements; and
- (d) contaminant attenuation zone requirements.

(23) Within two years of the issuance of this Certificate, the Town shall submit for the Director's approval an Operation and Maintenance Plan. This Plan shall include but not be limited to the following issues:

Plan

- (a) the Site capacity approved in accordance with the Ministry's protocol;
- (b) total in situ waste volume;
- (c) the remaining life of the Site;
- (d) new final contours reflecting the capacity defined in (a);
- (e) the final cover installation in the Fill Beyond Approved Limit (FBAL) areas and its schedule;
- (f) Site operations including daily and final cover;
- (g) the groundwater monitoring program; and
- (h) the closure plan.

(24) The Site shall be operated, maintained and monitored in accordance with the approved Operation & Maintenance Plan required by Condition 23.



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- (25) Two years before the Site is expected to stop receiving waste, the Town shall submit for the Director's approval an updated Closure Plan. This Plan shall include, but not be limited to the following issues:
- (a) the choice of final cover material;
  - (b) changes to the final contour plan that may be previously identified in the annual reports, or recommended in the Closure Plan;
  - (c) the sequence and schedule for final cover installation;
  - (d) post-closure and end-use plans which reflect an after-use of conservation and passive recreation;
  - (e) schedules for Site inspections;
  - (f) plans and schedules for post-closure groundwater and surface water monitoring programs; and
  - (g) plans and schedules for the routine monitoring and maintenance of the final cover.
- (26) The Town shall prepare and submit an annual report to the Regional Director by June 1st of the year following the calendar year covered by the report which shall include as a minimum, the following:
- (a) a summary of total annual quantities of waste received at the Site;
  - (b) a drawing(s) of the Site indicating all groundwater monitoring locations;
  - (c) tables outlining monitor locations, analytical parameters sampled, and frequency of sampling;
  - (d) an analysis and interpretation of groundwater monitoring data; a review of the adequacy of the monitoring program; conclusions of the monitoring data; and recommendations for any changes in monitoring program that may be necessary;
  - (e) an assessment of groundwater quality in relation to the RUP and ODWO;
  - (f) an assessment of the efficiency of the Contaminant Attenuation Zone established;
  - (g) an update of changes in operations, equipment, or procedures made or produced at the Site, and any operating difficulties encountered;
  - (h) drawings showing areas of fill, buffer areas, current Site contours, maximum final Site contours, any recommended changes of the final contours of the Site, percentage of available space utilized, and an estimate of the remaining disposal capacity and Site life;
  - (i) a statement as to compliance with all Conditions and with the inspection and reporting requirements of the Conditions;
  - (j) summary of any complaints made regarding Site operation and the Town's response and action taken; and
  - (k) recommendations respecting any proposed changes in the operation of the Site.

## COMPLAINT PROCEDURES

- (27) If at any time, the Town receives complaints regarding the operation of the Site, the Town shall respond to these complaints according to the following procedures:
- (a) The Town shall record each complaint on a formal complaint form entered in a sequentially numbered log book. The information recorded shall include the nature of the complaint, the name, address and the telephone number of the complainant and the time and date of the complaint;

complaints



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

SCHEDULE "A"

This Schedule "A" forms part of this Provisional Certificate of Approval:

1. The updated Application for a Certificate of Approval for a Waste Disposal Site dated April 12, 2000.
2. Letters from Sutcliffe Rody Quesnel Inc. to the MOE dated February 4, 2000, March 14, 2000 and April 12, 2000.
3. Site Plan Approved Area (Sheet A) and Site Plan Final Contours (Sheet B) prepared by Sutcliffe Rody Quesnel Inc. and dated February 2000.

*The reasons for the imposition of these Conditions are as follows:*

- (1) The reason for Condition (1) is to ensure that the Site is operated in accordance with the application and supporting documentation submitted by the Town, and not in a manner which the Director has not been asked to consider.
- (2) The reason for Conditions (2), (3), (4), (5), (7), (8), (9), (10), (11) and (12) is to clarify the legal rights and responsibilities of the Town.
- (3) The reason for Condition (6) is to ensure that the appropriate Ministry staff have ready access to information and the operations of the Site which are approved under this Provisional Certificate of Approval. Condition (6) is supplementary to the powers of entry afforded a Provincial Officer pursuant to the Environmental Protection Act, the Ontario Water Resources Act, and the Pesticides Act, as amended.
- (4) The reason for Condition (13) is to ensure that this Certificate revokes all previously issued Certificates for this Site.
- (5) The reason for Conditions (14) and (20) is to ensure that the Site is operated in an environmentally safe manner.



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- (6) The reason for Condition (15) is to allow a viable on-site inspection to realize the limits of the Site during any season.
- (7) The reason for Condition (16) is to reduce potential damage and environmental effects due to fire.
- (8) The reason for Conditions (17), (18), (19) and (24) is to ensure that this Site is operated in accordance with the application and submitted documentation listed in Schedule A.
- (9) The reason for Condition (21) requiring registration of the Provisional Certificate of Approval is that Section 46 of the Environmental Protection Act, R.S.O. 1990, prohibits any use being made of the lands after they cease to be used for waste disposal purposes within a period of twenty-five years from the year in which such land ceased to be used for waste disposal, unless the approval of the Minister for the proposed use has been given. The purpose of this prohibition is to protect future users of the Site and the environment from any hazards which might occur as a result of waste being disposed of on the Site. This prohibition and potential hazard should be drawn to the attention of future owners and users of the Site by the Provisional Certificate of Approval being registered on title.
- (10) Condition (22) is to ensure that the Town shall conduct and submit for the Director's approval a hydrogeological report.
- (11) The reason for Condition (23) is to ensure that the Town shall develop and submit for the Director's approval an Operation and Maintenance Plan.
- (12) The reason for Condition (25) is to ensure that two years before the Site is closed, the Town shall submit for the Director's approval an updated Closure Plan.
- (13) The reason for Condition (26) is to ensure that the Town shall prepare and submit an annual report to the Regional Director by June 1<sup>st</sup> of the year following the calendar year covered by the report.
- (14) The reason for Condition (27) is to ensure that the complaints are responded to in a systematic manner to protect the health and safety of the public and the environment.

*You may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board. Section 142 of the Environmental Protection Act, R.S.O. 1990 c. E-19, as amended, 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.



Ministry of the Environment  
Ministère de l'Environnement

PROVISION. CERTIFICATE OF APPROVAL  
FOR A WASTE DISPOSAL/PROCESSING SITE  
NO. A571505  
Page 9 of 9

*In addition to these legal requirements, 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 Appeal Board,  
2300 Yonge St., 12<sup>th</sup> Floor,  
P.O. Box 2382  
Toronto, Ontario.  
M4P 1E4

AND

The Director,  
Section 39, Environmental Protection Act,  
Ministry of the Environment,  
250 Davisville Avenue, 3rd Floor,  
Toronto, Ontario.  
M4S 1H2

\*Further information on the Environmental Appeal Board's requirements for an appeal can be obtained directly from the Board by: Tel: (416) 314-4600, Fax: (416) 314-4506 or e-mail: [www.ert.gov.on.ca](http://www.ert.gov.on.ca).

*DATED AT TORONTO this 9th day of May, 2000.*

A. Domiński, P. Eng.,  
Director,  
Section 39,  
Environmental Protection Act

EZ/nb

c.: District Manager, Timmins District Office

Location: N.L. LANDFILL  
C of A #: A571505 Issue Date: APR 17/07  
Revokes/Repeals: NOTICE #2



Ministry of the Environment  
Ministère de l'Environnement

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL  
WASTE DISPOSAL SITE  
NUMBER A571505

Notice No. 2  
Issue Date: April 17, 2007

The Corporation of the City of Temiskaming Shores  
PO Box 2050  
Haileybury, Ontario  
POJ 1K0

APR 26 2007

To: Dave Treen.  
April 30, 2007.  
CWT

Site Location: New Liskeard Landfill  
West 1/2 of Lot 5, Concession 2, Dymond Twp  
Temiskaming Shores City, District of Temiskaming

You are hereby notified that I have amended Provisional Certificate of Approval No. A571505 issued on May 9, 2000 and amended April 27, 2005 for a waste disposal site (landfill), as follows:

- I. This Certificate is hereby amended to recognize the addition of a contaminant attenuation zone.
- II. The following Item is hereby added to Schedule "A":
  4. Application for a Provisional Certificate of Approval for a Waste Disposal Site dated November 14, 2005 and signed by Dave Treen, Manager of Environmental Services, City of Temiskaming Shores, including the attached drawing entitled "New Liskeard Landfill Site Figure 1" showing the attenuation zone.

The reason for this amendment to the Certificate of Approval is as follows:

1. To recognize the addition of the contaminant attenuation zone as required by Provincial Officer's Order No. 7026-6GQLJY.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A571505 dated May 9, 2000, as amended.

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

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



*The Notice should also include:*

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

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

*This Notice must be served upon:*

The Secretary\*  
Environmental Review Tribunal  
2300 Yonge St., Suite 1700  
P.O. Box 2382  
Toronto, Ontario  
M4P 1E4

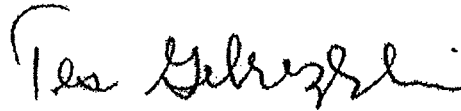
AND

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](http://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 17th day of April, 2007



---

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

AN/

c: District Manager, MOE North Bay  
H. James Hawken, Sutcliffe Rody Quesnel Inc.



RECEIVED  
NOV - 2 2012

Ministry of the Environment  
Ministère de l'Environnement

**AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL**

NUMBER A571505

Notice No. 3

Issue Date: October 24, 2012

The Corporation of the City of Temiskaming Shores  
325 Farr Dr  
Temiskaming Shores, Ontario  
POJ 1K0

Site Location: New Liskeard Landfill  
Lot West 1/2 of Lot 5, Concession 2  
Temiskaming Shores City, District of Timiskaming

*You are hereby notified that I have amended Approval No. A571505 issued on May 9, 2000 and amended on April 27, 2005 and April 17, 2007 for a waste disposal site (landfill), as follows:*

This Notice of amendment authorizes installation of solar panels on the contaminant attenuation zone for the Site, and requires updated information for the Site.

The following definitions are added:

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

"CAZ" means the contaminant attenuation zone for the Site;

The following conditions are added to the Approval:

**Closure Plan**

(28) Within ninety (90) days of the date of issue of this Approval, the Owner shall submit a closure plan for the Site to the Director and copied to the District Manger, including:

- i. an as-constructed drawing of the Site, showing waste final contours, final slopes and final cap details;
- ii. total volume of waste placed at the Site;
- iii. information on post-closure Site layout and use.

**Certificate of Requirement - Contaminant Attenuation Zone**

CC: Dave Trean (Nov 2/12) for follow-up

- (29) The Owner shall:
- (a) Within sixty (60) days of the date of the issuance of this Approval, submit to the Director for review, two copies of a completed Certificate of Requirement with a registerable description of the contaminant attenuation zone; 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 CAZ and submit to the Director the duplicate registered copy immediately following registration.

#### **Solar Panels in CAZ**

- (30) The Owner shall ensure that:
- i. the proposed solar panel installations within the CAZ do not interfere or affect ongoing Site groundwater and surfacewater monitoring programs, or the functioning of the CAZ;
  - ii. access is maintained to all existing Site CAZ monitoring wells;
  - iii. the proposed solar panels do not prevent or impede any future monitoring well installations that may be required within the CAZ.

The following items are added to Schedule "A"

5. Application for a Certificate of Approval, Waste Disposal Site, dated November 1, 2011 and signed by Christopher Oslund, City Manager, City of Temiskaming Shores,
6. Letter dated March 15, 2012, from Jeff Roy, Program Manager, Canadian Solar Solutions Inc., to Lynda Mulcahy, P.Eng, MOE, RE: New Liskeard Landfill Contaminant Attenuation Zone, with attached letter report dated March 7, 2012, by Anthony Story, Story Environmental Inc.
7. e-mail from David Treen, City of Temiskaming Shores, to Mark Feenstra, Canadian Solar Solutions Inc., dated October 2, 2012, 10:02am, copied to Lynda Mulcahy, MOE, RE: New Liskeard LF waste amendment

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

Condition 28 is included to ensure the Director has information on the post-closure Site condition.

Condition 29 is included to ensure that any persons with an interest in the lands used for contaminant attenuation are aware of this use.

Condition 30 is included to ensure that the proposed installations do not impact ongoing environmental protection programs at the Site

**This Notice shall constitute part of the approval issued under Approval No. A571505 dated May 9, 2000**

*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

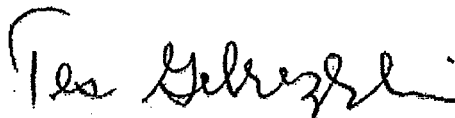
AND

The Director appointed for the purposes of  
Part II.1 of the Environmental Protection Act  
Ministry of the Environment  
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) 212-6349, Fax: (416) 314-4506 or [www.ert.gov.on.ca](http://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 24th day of October, 2012



---

Tesfaye Gebrezghi, P.Eng.  
Director  
appointed for the purposes of Part II.1 of the  
*Environmental Protection Act*

LM/

c: District Manager, MOE North Bay  
Jeff Roy, Canadian Solar

## AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER A571505

Notice No. 4

Issue Date: December 11, 2013

The Corporation of the City of Temiskaming Shores  
Post Office Box, No. 2050  
Haileybury, Ontario  
P0J 1K0

Site Location: New Liskeard Landfill  
Lot West 1/2 of Lot 5, Concession 2  
Temiskaming Shores City, District of Timiskaming

*You are hereby notified that I have amended Approval No. A571505 issued on May 09, 2000 and amended as subsequently for the use and operation of a Waste Disposal Site (Landfill) of a 2.02 hectare landfilling area within a total area of 32 hectare , as follows:*

Pursuant to the request in a letter dated November 19, 2013, for withdrawal of the submitted closure plan as required by Condition 28 in Notice No.3 dated October 24, 2012, Condition 28 is hereby revoked and replaced by this new condition as follows:

You are hereby notified that this Approval is issued to you subject to the Condition 28 that is hereby revoked and replaced as follows:

28. (1) The *Owner/operator* shall install a minimum of 300 mm thick Interim Cover soil over the waste, pending approval for the proposed vertical expansion of the *Site* . The Interim Cover soil shall be a low permeability cover soil that shall be placed and vegetated as required .
- (2) In the event the *Owner* does not receive *EAA* and *EPA* approval for the proposed vertical expansion of the *Site* or the *Owner* withdrawals from the vertical expansion option/process, then within ninety (90) of that decision the *Owner* shall submit a closure plan for the *Site* to the *Director* and copied to the *District Manger* , including:
- i. an as-constructed drawing of the *Site* , showing waste final contours, final slopes and final cap details;
  - ii. total volume of waste placed at the *Site* ;
  - iii. information on post-closure *Site* layout and use.

## **SCHEDULE "A":**

The following documentation is hereby added to Schedule "A" and forms part of the ECA No. A571505:

8. Letter dated November 19, 2013, from G. Douglas Walsh, CET, Director of Public Works, The City of Temiskaming Shores, to Dickson Odame-Osafo, MOE Waste Unit, Senior Engineer. Re: Application for Approval of WDS Closure Plan-ECA A571505, Notice No. 3 for the New Liskeard Landfill Site.

The reason for this amendment to the Approval is as follows:

1. The reason for this amendment to the Condition 28 is to provide for the potential vertical expansion of the Site as proposed, and ensure that the inactive Landfill is controlled and maintained in such a manner to address potential nuisances, achieve public interest and avoid hazards to health and safety of any person.

**This Notice shall constitute part of the approval issued under Approval No. A571505 dated May 09, 2000**

*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

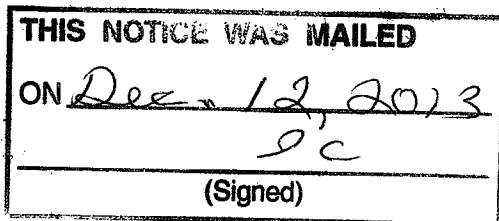
AND

The Director appointed for the purposes of  
Part II.1 of the Environmental Protection Act  
Ministry of the Environment  
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) 212-6349, Fax: (416) 314-3717 or [www.ert.gov.on.ca](http://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 11th day of December, 2013



Dale Gable, P.Eng.

Director

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

AC/

c: Area Manager, MOE North Bay

c: District Manager, MOE Sudbury

David B. Treen CET, The Corporation of the City of Temiskaming Shores ✓





April 11, 2023

Greg Ault, Timmins District Manager, Northern Region  
Drinking Water and Environmental Compliance Division  
Ministry of the Environment, Conservation and Parks  
191 Booth Road, Unit 16,  
North Bay, ON P1A 4K3

Dear Mr. Ault:

Subject: **Proposed Changes to the Monitoring Program  
2022 Annual Monitoring Report  
New Liskeard Waste Disposal Site  
New Liskeard, Ontario**

In accordance with Condition H.6 of the Environmental Compliance Approval No. A-500-1115044194, issued on December 2, 2021, The Corporation of the City of Temiskaming Shores (the "Owner") is requesting a change to New Liskeard Waste Disposal Site (the "Site") monitoring program.

The Site currently remains under a state of inactivity, and while construction activities have commenced during the 2022 monitoring period, the Site is not anticipated to accept waste until late fall 2023. Given the current status of the Site, it is proposed that the monitoring program be conducted in accordance with the former Compliance Approval No. A571505 for the 2023 monitoring period. It is recommended that the monitoring program be updated as per the Site's new ECA, with implementation for the 2024 monitoring period, once the Site becomes active.

It is important to note that the existing monitoring program currently exceeds the requirements of the C of A, with the implementation of landfill gas monitoring in 2015, as well as a surface water monitoring program in 2017.

Yours sincerely,

Dominique Gagnon, B.Sc.  
Environmental Scientist

Larry Rodricks, P.Eng.  
Senior Associate Engineer

Dirk Scheurlen, C. Tech  
Senior Technical Consultant

WSP E&I Canada Limited  
131 Filing Road  
Lively, ON P3Y 1L7

T: +1 705-682-2632  
F: +1 705-682-2260  
wsp.com

**"Effective September 21, 2022, Wood Environment & Infrastructure Solutions Canada Limited is now operating as WSP E&I Canada Limited. No other aspects of our legal entity, contractual terms or capabilities have changed in relation to this report submission."**

# Appendix B

## Borehole Logs



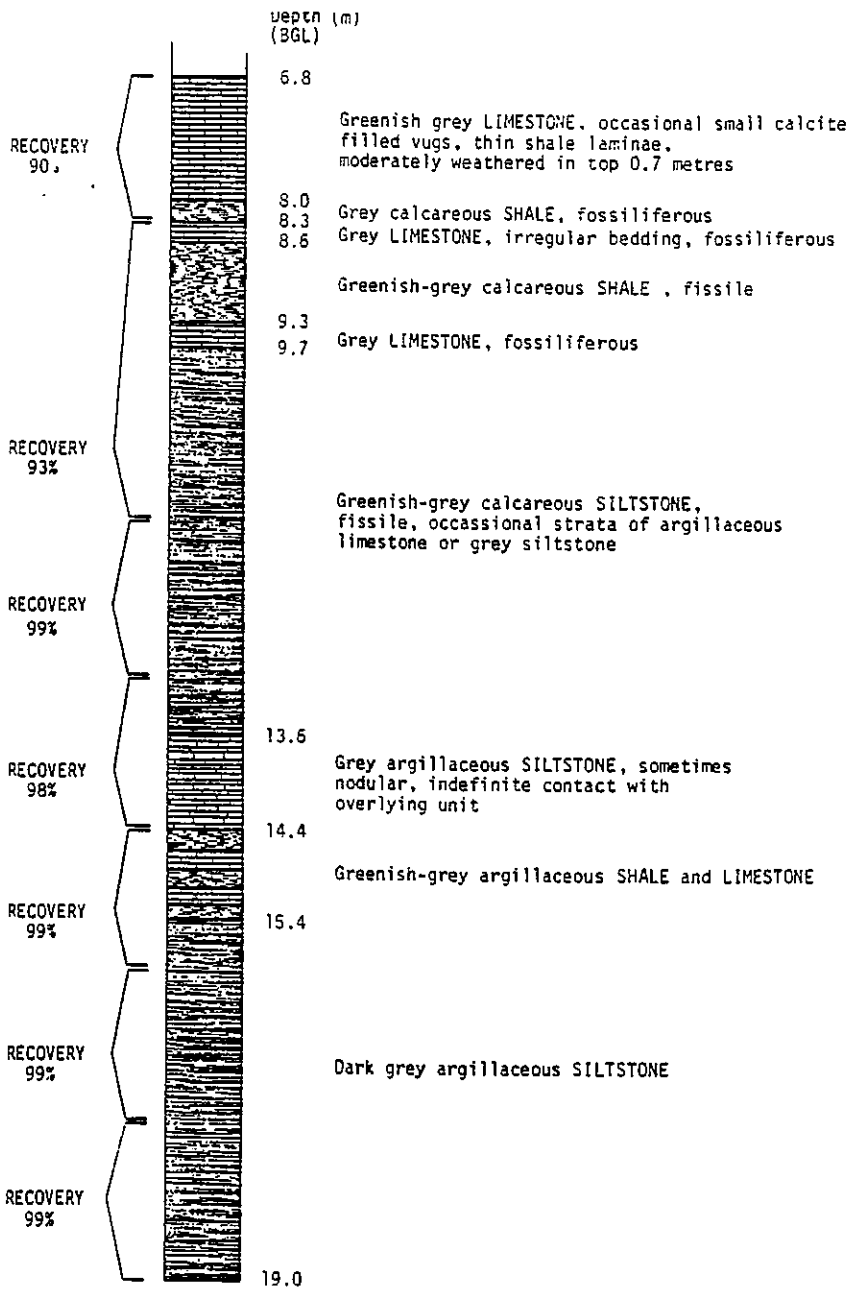


New Liskeard Landfill FILE NO. 147-802  
Hydrogeologic Impact Study, Phase II  
 GEOLOGIST/ENGINEER WDB / BWB DATE COMPLETED June 22-23, 1980

DEPTH metres feet	DESCRIPTION	SAMPLE "N"		WELL DETAIL
		no.	type	
0				A B C
10	TILL, glacial silty sand and gravel medium brown			
5	LIMESTONE BEDROCK grey, with interbeds of calcareous shale			
20	see next page for detailed bedrock core log			
30				
40				
50				
60				
20	End Hole			
70				

Water levels taken August 28/80

GS - GRAB SAMPLE |||| SS - SPLIT SPOON // ST - SHELBY TUBE "N" BLOWS PER FOOT WATER LEVEL ▽



ISST

Water levels taken August 28/80



**morrison beatty limited**  
 consulting engineers and hydrogeologists  
 290 The West Mall, Scarborough, Ontario M3C 1G6 (416-622-9374)

OW2

New Liskeard Landfill

FILE NO. 147-802

Hydrogeologic Impact Study, Phase II

GEOLOGIST/ENGINEER WDB / BWB

DATE COMPLETED

June 24/26, 1980

DEPTH metres feet	DESCRIPTION	SAMPLE no. type "N"	WELL DETAIL		
			A	B	C
0-10	TILL, glacial silty sand and gravel medium brown				
10-30	LIMESTONE BEDROCK grey, with interbeds of calcareous shale				
30-70	End Hole				

Water levels taken August 28/80

GS - GRAB SAMPLE |||| SS - SPLIT SPOON // ST - SHELBY TUBE "N" BLOWS PER FOOT WATER LEVEL ▽



**morrison beatty limited**  
 consulting engineers and hydrogeologists  
 290 The West Mall, Scarborough, Ontario M3C 1C5 (416-622-9374)

OW 4

New Liskeard Landfill

FILE NO. 147-802

Hydrogeologic Impact Study, Phase II

GEOLOGIST/ENGINEER WDB / BWB

DATE COMPLETED

June 24-25, 1980

DEPTH metres foot	DESCRIPTION	SAMPLE "N"			WELL DETAIL		
		no.	type	"N"			
0-10	TILL, glacial silty sand and gravel medium brown						
10-30	LIMESTONE BEDROCK grey, with interbeds of calcareous shale						
30-70	End Hole						

Water levels taken August 28/80

GS - GRAB SAMPLE    SS - SPLIT SPOON    ST - SHELBY TUBE    "N" BLOWS PER FOOT    WATER LEVEL ▽



**morrison beatty limited**  
 consulting engineers and hydrogeologists  
 290 The West Mall, Mississauga, Ontario M9C 1C6 (416-622-9374)

OW5

New Liskeard Landfill

FILE NO. 147-802

Hydrogeologic Impact Study, Phase II

GEOLOGIST/ENGINEER WDB / BWB

DATE COMPLETED

June 24-25, 1980

DEPTH in feet	DESCRIPTION	SAMPLE "N"			WELL DETAIL
		no.	type		
0					A B C
0-10	TILL, glacial silty sand and gravel medium brown				
10-40	LIMESTONE BEDROCK grey, with interbeds of calcareous shale				
40-70	End Hole				

Water levels taken August 28/80

GS-GRAB SAMPLE

SS-SPLIT SPOON

ST-SHELBY TUBE

"N" BLOWS PER FOOT

WATER LEVEL



**morrison beatty limited**  
 consulting engineers and hydrogeologists  
 290 The West Mall, Mississauga, Ontario M9C 1C6 (416-622-9374)

OW6

New Liskeard Landfill  
 Hydrogeologic Impact Study, Phase II  
 GEOLOGIST/ENGINEER WDB / BWR DATE COMPLETED June 24/26, 1980  
 FILE NO. 147-802

DEPTH metres foot		DESCRIPTION	SAMPLE no. type "N"			WELL DETAIL
10		TILL, glacial silty sand and gravel medium brown				
5		LIMESTONE BEDROCK grey, with interbeds of calcareous shale				
20		End Hole				
30						
40						
50						
60						
70						

Water levels taken August 28/80

GS - GRAB SAMPLE    SS - SPLIT SPOON    ST - SHELBY TUBE    "N" BLOWS PER FOOT    WATER LEVEL ∇





**morrison beatty limited**  
 consulting engineers and hydrogeologists  
 290 The West Mall, Mississauga, Ontario M5C 1C6 (416-622-9374)

OW 7

New Liskeard Landfill FILE NO. 147-802  
 Hydrogeologic Impact Study, Phase II  
 GEOLOGIST/ENGINEER WDB / BWB DATE COMPLETED June 24-26, 1980

DEPTH		DESCRIPTION	SAMPLE			WELL DETAIL
metres	feet		no.	type	"N"	
	10	TILL, glacial silty sand and gravel medium brown				
5						
	20	LIMESTONE BEDROCK grey, with interbeds of calcareous shale				
	30					
10						
	40	End Hole				
	50					
15						
	60					
	70					
	20					
	70					

Water levels taken August 28/80

GS - GRAB SAMPLE    SS - SPLIT SPOON    ST - SHELBY TUBE    "N" BLOWS PER FOOT    WATER LEVEL



**morrison beatty limited**  
 consulting engineers and hydrogeologists  
 290 The West Mall, Etobicoke, Ontario M9C 1G6 (416-622-9374)

OW 8

New Liskeard Landfill

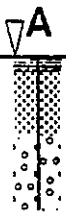

FILE NO. 147-802

Hydrogeologic Impact Study, Phase II

GEOLOGIST/ENGINEER WDB / BWB

DATE COMPLETED

June 24, 1980

DEPTH		DESCRIPTION	SAMPLE			WELL DETAIL
metres	feet		no.	type	"N"	
		TILL, glacial silty sand and gravel medium brown				
	10	LIMESTONE BEDROCK grey, with interbeds of calcareous shale				
	5	End Hole				
	20					
	30					
	40					
	50					
	60					
	70					

WL-100980

Water levels taken August 28/80

GS - GRAB SAMPLE    SS - SPLIT SPOON    ST - SHELBY TUBE    "N" BLOWS PER FOOT    WATER LEVEL ▽



**morrison beatty limited**  
 consulting engineers and hydrogeologists  
 290 The West Mall, Scarborough, Ontario M9C 1C6 (416-622-9374)

OW9

New Liskeard Landfill

FILE NO. 147-802

Hydrogeologic Impact Study, Phase II

GEOLOGIST/ENGINEER WDB / BWR

DATE COMPLETED

June 24, 1980

DEPTH metres feet		DESCRIPTION	SAMPLE no. type "N"			WELL DETAIL
		TILL, glacial silty sand and gravel medium brown				
	10	LIMESTONE BEDROCK grey, with interbeds of calcareous shale				
	5	End Hole				
	20					
	30					
	40					
	50					
	60					
	70					

Water levels taken August 28/80

GS - GRAB SAMPLE    SS - SPLIT SPOON    ST - SHELBY TUBE    "N" BLOWS PER FOOT    WATER LEVEL

WL-100980

# BOREHOLE NO. OW-1R

PROJECT NAME: NEW LISKEARD LANDFILL SITE

PROJECT NO.: 001148.00

CLIENT: SUTCLIFFE RODY QUESNEL INC.

DATE: SEPTEMBER 24-25, 2000

BOREHOLE TYPE: HQ / HW CORING

GEOLOGIST: BDT

GROUND ELEVATION: 253.07 mASL (I), 253.21 mASL (II), 253.16 mASL (III)

REVIEWER: \_\_\_\_\_

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS I II III			SAMPLE					CONE PENETRATION			WATER CONTENT %			REMARKS	
						TYPE	N <sup>o</sup> VALUE	% WATER	% RECOVERY	ROD (%)	"N" VALUE			WATER CONTENT %				
											10	20	30	10	20	30		
0																		
1.2	FILL/DISTURBED SOIL; MEDIUM BROWN FINE SANDY SILT, TRACE CLAY, TRACE GRAVEL, DAMP					SS1	47		17									WATER LEVEL DEPTH (mbgl) I - 0.82 II - 0.78 III - 0.75
2	SAND TILL; MEDIUM GREY SILTY FINE SAND TILL, SOME GRAVEL, OCCASIONAL COBBLES, DAMP					SS2	78		100									MONITOR NEST COMPLETED IN SEPARATE ADJACENT BOREHOLES
3.3						RC	78		46									INTER-FRACTURE SPACING (m):
4	LIMESTONE; GREY TO GREENISH GREY, CLASTIC. CLASTS ARE SUBROUNDED TO ROUNDED. MASSIVE TO THICK BEDDED. SEVERAL SHALEY PARTINGS, 3 CM THICK. SOFT TO MEDIUM SOFT. SLIGHT TO FRESH WEATHERING. HIGHLY BROKEN WHITE CALCITE NODULES UP TO 3 CM ACROSS, ROUNDED TO ELONGATED. SHARP CONTACT WITH NEXT UNIT.					RC			78	0								0.08
6						RC			100	63								0.20
8						RC			100	78								0.31
8						RC			99	83								0.31
8						RC			97	83								0.37
8						RC			95	40								0.18
8.5	SILTSTONE-SHALE; GREY, WITH THIN LIMESTONE INTERBEDS, APHANITIC, LAMINATED, SOFT, VERY BROKEN.					RC			100	96								0.45
10	LIMESTONE; GREENISH GREY, MASSIVE, CLASTIC. CLASTS ARE SUBROUNDED TO ROUNDED. MEDIUM SOFT TO SOFT. SLIGHT TO FRESH WEATHERING, BROKEN. WHITE CALCITE NODULES UP TO 1 CM ACROSS. ROUNDED TO ELONGATED.					RC			100	100								0.28
10.7						RC			100	94								
12	SILTSTONE-SHALE; MEDIUM GREY, MICRO LAMINATED TO LAMINATED. SOFT, SLIGHT TO FRESH WEATHERING. BROKEN TO VERY BROKEN.					RC			100	100								FRACTURE AT 12.68 m
14	LIMESTONE; GREENISH GREY, CLASTIC. CLASTS UP TO 1 CM ACROSS, ROUNDED TO ELONGATED. THICK BEDDED TO MASSIVE, MEDIUM SOFT. SLIGHT TO FRESH WEATHERING. BLOCKY TO MASSIVE FRACTURING. BLACK SILTSTONE PARTING.					RC			95	94								FRACTURE AT 13.71 m
14.2						RC			100	86								
16	LIMESTONE; GREY, MASSIVE WITH THIN BEDS OF SHALE AND CLASTIC LIMESTONE. MEDIUM SOFT TO SOFT, MASSIVE TO BLOCKY FRACTURING. FRESH WEATHERING, OCCASIONAL CALCITE NODULE, OCCASIONAL SHALEY PARTINGS.					RC			99	100								0.74
18						RC			99	100								
20	BOREHOLE TERMINATED AT 20.3 m																	FRACTURE AT 18.80 m

Revision 1/ May 2000

# BOREHOLE NO. OW-10

PROJECT NAME: NEW LISKEARD LANDFILL SITE

PROJECT NO.: 001148.00

CLIENT: SUTCLIFFE RODY QUESNEL INC.

DATE: SEPTEMBER 21, 2000

BOREHOLE TYPE: HQ / HW CORING

GEOLOGIST: BDT

GROUND ELEVATION: 250.76 mASL

REVIEWER: \_\_\_\_\_

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS		SAMPLE					CONE PENETRATION			WATER CONTENT %			REMARKS			
					TYPE	N VALUE	% WATER	% RECOVERY	ROD (%)	"N" VALUE			SHEAR STRENGTH				WATER CONTENT %		
										10	20	30	10	20	30		10	20	30
0			I	II															
1.2	SILT: GREY BROWN SILT, TRACE SAND TO FINE SANDY, TRACE TO SOME CLAY, TRACE GRAVEL, DAMP				SS1	9		45											
					SS2	>50		43											
					SS3			0											
2	SILT TILL: GREY BROWN, TRACE FINE SAND, TRACE CLAY, DAMP				RC			97	100										
2.4																			
4	BEDROCK: LIMESTONE WITH SHALE AND SILTSTONE INTERBEDS. SEE BOREHOLE OW-1R FOR DETAIL.				RC			75	93									0.36	
					RC			100	94									0.58	
					RC			85	49									0.23	
6	BOREHOLE TERMINATED AT 5.8 m																		
8																			
10																			
12																			
14																			
16																			
18																			
20																			

Revision 1/ May 2000

# BOREHOLE NO. OW-11

PROJECT NAME: NEW LISKEARD LANDFILL SITE

PROJECT NO.: 001148.00

CLIENT: SUTCLIFFE RODY QUESNEL INC.

DATE: SEPTEMBER 20, 2000

BOREHOLE TYPE: HQ / HW CORING

GEOLOGIST: BDT

GROUND ELEVATION: 242.12 mASL

REVIEWER: \_\_\_\_\_

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS		SAMPLE					CONE PENETRATION			WATER CONTENT %			REMARKS	
					TYPE	N° VALUE	% WATER	% RECOVERY	ROD (%)	"N" VALUE			WATER CONTENT %				
										10	20	30	10	20	30		
0			I	II													
1.3	SILT TILL: LIGHT BROWN SILT TILL, TRACE SAND TO FINE SANDY, TRACE TO SOME CLAY BOULDER 0.9 m-1.3 m, MOIST				SS1	5		50									WATER LEVEL DEPTH (mbgl) I - 0.89 II - 0.32  INTER-FRACTURE SPACING (m): 0.14  0.16  0.34  0.24
2	BEDROCK: LIMESTONE WITH SHALE AND SILTSTONE INTERBEDS. SEE BOREHOLE OW-1R FOR DETAIL.			RC			97	48									
4				RC			100	87									
5.8				RC			100	85									
6		BOREHOLE TERMINATED AT 5.8 m															
8																	
10																	
12																	
14																	
16																	
18																	
20																	

Revision 1/ May 2000

# BOREHOLE NO. OW-12

PROJECT NAME: NEW LISKEARD LANDFILL SITE  
 CLIENT: SUTCLIFFE RODY QUESNEL INC.  
 BOREHOLE TYPE: HQ / HW CORING  
 GROUND ELEVATION: 248.00 mASL (I), 248.15 mASL (II)

PROJECT NO.: 001148.00  
 DATE: SEPTEMBER 19, 2000  
 GEOLOGIST: BDT  
 REVIEWER: \_\_\_\_\_

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS		SAMPLE					CONE PENETRATION			WATER CONTENT %			REMARKS
					TYPE	N <sup>o</sup> VALUE	% WATER	% RECOVERY	ROD (%)	"N" VALUE			WATER CONTENT %			
										10	20	30	10	20	30	
0			I	II												
2	2.0	SILT; LIGHT BROWN GRADING TO DARK GREY SILT, TRACE TO SOME FINE SAND, TRACE TO SOME CLAY, WET, MOIST			SS1	4		33								WATER LEVEL DEPTH I - 0.28 II - 0.20  INTER-FRACTURE SPACING (m):
4		BEDROCK; LIMESTONE WITH SHALE AND SILTSTONE INTERBEDS. SEE BOREHOLE OW-1R FOR DETAIL.			SS2	6		43								0.10
					SS3	22		45								0.20
					SS4	>50		33								0.12
					RC			99	32							
					RC			100	100							
					RC			100	55							
6	5.5	BOREHOLE TERMINATED AT 5.5 m														MONITOR NEST COMPLETED IN SEPARATE ADJACENT BOREHOLES
8																
10																
12																
14																
16																
18																
20																

Revision 1/ May 2000

# BOREHOLE NO. OW-13

PROJECT NAME: NEW LISKEARD LANDFILL SITE  
 CLIENT: SUTCLIFFE RODY QUESNEL INC.  
 BOREHOLE TYPE: HQ / HW CORING  
 GROUND ELEVATION: 272.83 mASL (I), 272.77 mASL (II)

PROJECT NO.: 001148.00  
 DATE: SEPTEMBER 22-23, 2000  
 GEOLOGIST: BDT  
 REVIEWER: \_\_\_\_\_

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS		SAMPLE				CONE PENETRATION		WATER CONTENT %		REMARKS		
					TYPE	N <sup>o</sup> VALUE	% WATER	% RECOVERY	ROD (%)	"N" VALUE				10 20 30	
										10	20	30		W <sub>p</sub>	W <sub>L</sub>
0			I	II											
0.9	FILL: BROWN FINE SAND TO SANDY SILT, WITH GRAVEL				SS1	13		33						WATER LEVEL DEPTH (MBGL) I - 4.15 II - 1.63 INTER-FRACTURE SPACING (m): 0.10  0.13 FRACTURES BROWN STAINED  0.22 SOME FRACTURES BROWN STAINED  0.27 NO STAINED FRACTURES  0.25 BROWN STAINED FRACTURE AT 6.8 m  0.19 NO STAINED FRACTURES  0.16 NO STAINED FRACTURES	
2	BEDROCK: GREENISH GREY NODULAR LIMESTONE, MASSIVE BEDDED NODULES UP TO 10 CM, SEPARATED BY SHALEY STRINGERS. VERY FINE GRAINED CRYSTALLINE, MEDIUM HARD, BROKEN TO BLOCKY, WHITE CARBONATE CLASTS OR FRAGMENTS THAT ARE ROUNDED TO ELONGATED, SOME SHELL FOSSILS. SLIGHT WEATHERING FROM 0.9 M TO 6.7 M. FRESH WEATHERING FROM 7.6 M TO 10.8 M.			SS2	>50		13								
				RC				98	47						
				RC				100	57						
				RC				100	85						
				RC				100	100						
				RC				100	98						
				RC				100	67						
				RC				91	93						
10.8															
12	BOREHOLE TERMINATED AT 10.8 m (I) AND 4.4 m (II)												MONITOR NEST COMPLETED IN SEPARATE ADJACENT BOREHOLES		
14															
16															
18															
20															

Revision 1 / May 2000



# BOREHOLE NO. OW-14

PROJECT NAME: NEW LISKEARD LANDFILL SITE

PROJECT NO.: 001148.00

CLIENT: SUTCLIFFE RODY QUESNEL INC.

DATE: SEPTEMBER 26-27, 2000

BOREHOLE TYPE: HQ / HW CORING

GEOLOGIST: BDT

GROUND ELEVATION: 257.93 mASL

REVIEWER: \_\_\_\_\_

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS		SAMPLE					CONE PENETRATION			WATER CONTENT %			REMARKS
					TYPE	N <sup>o</sup> VALUE	% WATER	% RECOVERY	ROD (%)	"N" VALUE			WATER CONTENT %			
										10	20	30	10	20	30	
0			I	II												
2	FILL: GREY SILTY FINE SAND FILL WITH BOULDERS				SS1	10		39								WATER LEVEL DEPTH (mbgl) I - 1.91 II - 1.16 INTER-FRACTURE SPACING (m):
4					SS2	6		0								DRILLER REPORTS LOSS OF CIRCULATION 2.9-4.0 mbgl
4.3					SS3	20		0								
6	SANDY SILT TILL: GREY FINE SANDY SILT TILL, SOME GRAVEL TO FINE TO COARSE GRAVELY, OCCASIONAL COBBLE				RC			0								0.10
6	BEDROCK: LIMESTONE WITH SHALE AND SILTSTONE INTERBEDS. SEE BOREHOLE OW-1R FOR DETAIL.				RC			97	50							0.05
8					RC			100	8							
9.5					RC			85	85							FRACTURE ZONE 8.1-8.5 mbgl
10	BOREHOLE TERMINATED AT 9.5 m (I) AND 5.5 m (II)															MONITOR NEST COMPLETED IN SEPARATE ADJACENT BOREHOLES
12																
14																
16																
18																
20																

Revision 1/ May 2000

# BOREHOLE NO. OW-15

PROJECT NAME: NEW LISKEARD LANDFILL SITE

PROJECT NO.: 001148.02

CLIENT: TOWN OF NEW LISKEARD / SUTCLIFFE RODY QUESNEL INC.

DATE: OCTOBER 16, 2002

BOREHOLE TYPE: 108 mm I.D. HOLLOW STEM AUGER

SUPERVISOR: WDN

GROUND ELEVATION: 253.7 mASL

REVIEWER: BDT

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS I II		SAMPLE				CONE PENETRATION		WATER CONTENT %			REMARKS		
					TYPE	N° VALUE	% WATER	% RECOVERY	ROD (%)	"N" VALUE			WATER CONTENT %			
										10	20	30	SHEAR STRENGTH			
0																
0.15	TOPSOIL				1SS	5	16.5	67						MONITORS ARE INSTALLED WITHIN SEPARATE BOREHOLES.		
2	CLAYEY SILT: MOTTLED YELLOWISH-ORANGE BEIGE AND LIGHT GREY CLAYEY SILT, APL-WTPL, FIRM TO HARD, OCCASIONAL MEDIUM TO FINE GRAVEL.				2SS	24	14.3	42								
2.3					3SS		14.5	36								
4	CLAYEY SILT TO SILTY CLAY: LIGHT GREY CALCAREOUS CLAYEY SILT TO SILTY CLAY, MOIST TO DRY, MDTPL, HARD, OCCASIONAL LIMESTONE BOULDERS, WEATHERED.				4SS		-	75								
4					5SS		-	25								
6					6SS		-	100								
6					7SS		-	69								
8					8SS		-	100								
8					9SS		-	100								
9.4					10SS		-	100								
10	BOREHOLE TERMINATED AT 9.4 m IN HARD CLAYEY SILT TO SILTY CLAY.															
12																
14																
16																
18																
20																

PROJECT NAME: NEW LISKEARD LANDFILL SITE

PROJECT NO.: 001148.02

CLIENT: TOWN OF NEW LISKEARD / SUTCLIFFE RODY QUESNEL INC.

DATE: OCTOBER 19, 2002

BOREHOLE TYPE: 108 mm I.D. HOLLOW STEM AUGER

SUPERVISOR: WDN

GROUND ELEVATION: 238.0 mASL

REVIEWER: BDT

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	SAMPLE					CONE PENETRATION			WATER CONTENT %			REMARKS	
			MONITOR DETAILS I II III	TYPE	N <sup>o</sup> VALUE	% WATER	% RECOVERY	ROD (%)	"N" VALUE			10 20 30			
									SHEAR STRENGTH			W <sub>p</sub> W <sub>L</sub>			
0															
0.15	TOPSOIL													MONITORS ARE INSTALLED WITHIN SEPARATE BOREHOLES.  - SPOON SAMPLER BOUNCING	
2	SILTY FINE TO MEDIUM SAND TO FINE SANDY SILT; LIGHT BROWN TO MOTTLED, SILTY FINE TO MEDIUM SAND TO FINE SANDY SILT, TRACE COBBLES, MOIST, DENSE TO VERY DENSE.			1SS	30	5.3	25								
				2SS		5.9	61								
2.3	SILT TILL; BROWNISH-GREY BECOMING DARK GREY BELOW 3.0 m, SILT TILL, TRACE TO SOME SAND, TRACE TO SOME CLAY, OCCASIONAL FINE TO MEDIUM GRAVEL AND COBBLES THROUGHOUT, APL TO DTPL, VERY STIFF TO HARD.			3SS		7.6	50								
4				4SS	39	8.4	92								
				5SS	44	9.6	100								
				6SS	29	9.7	100								
				7SS	36	8.6	58								
				8SS	141	8.4	67								
				9SS	37	8.8	100								
				10SS	36	8.9	96								
				11SS	85	8.2	71								
				12SS	60	8.4	100								
				13SS	105	10.3	67								
				14SS		8.9	100								
				15SS	177	8.2	72								
19.5	SILTY MEDIUM TO FINE SAND TO MEDIUM TO FINE SANDY SILT; GREY SILTY MEDIUM TO FINE SAND TO MEDIUM TO FINE SANDY SILT, SATURATED, OCCASIONAL MEDIUM TO FINE GRAVEL, DENSE TO VERY DENSE.														
20															

PROJECT NAME: NEW LISKEARD LANDFILL SITE

PROJECT NO.: 001148.02

CLIENT: TOWN OF NEW LISKEARD / SUTCLIFFE RODY QUESNEL INC.

DATE: OCTOBER 19, 2002

BOREHOLE TYPE: 108 mm I.D. HOLLOW STEM AUGER

SUPERVISOR: WDN

GROUND ELEVATION: 238.0 mASL

REVIEWER: BDT

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE					CONE PENETRATION			WATER CONTENT %			REMARKS
				TYPE	N <sup>o</sup> VALUE	% WATER	% RECOVERY	ROD (%)	N <sup>o</sup> VALUE			SHEAR STRENGTH			
									10	20	30	10	20	30	
20			I												
22	SILTY MEDIUM TO FINE SAND TO MEDIUM TO FINE SANDY SILT CONTINUED			16SS	43	10.7	100			43					
	- BOULDER AT 22.9 - 23.1 m			17SS		12.2	100			125: FOR 127: mm					
23.3				18SS						300: FOR 5 mm:					
24	IGNEOUS BEDROCK: BLACK WITH GREY TO WHITE SPECKLING, PHANERITIC, GRANODIORITE TO GABBRO, HARD, SLIGHTLY WEATHERED.			19RC			80	100		125: FOR 25 mm:					
24.8				20SS			0	100							
				21RC			100	92							
26	BOREHOLE TERMINATED AT 24.8 m IN MAFIC IGNEOUS BEDROCK.														
28															
30															
32															
34															
36															
38															
40															

# BOREHOLE NO. OW-17

PROJECT NAME: NEW LISKEARD LANDFILL SITE

PROJECT NO.: 001148.02

CLIENT: TOWN OF NEW LISKEARD / SUTCLIFFE RODY QUESNEL INC.

DATE: OCTOBER 20, 2002

BOREHOLE TYPE: 108 mm I.D. HOLLOW STEM AUGER

SUPERVISOR: WDN

GROUND ELEVATION: 229.3 mASL

REVIEWER: BDT

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS				SAMPLE				CONE PENETRATION			WATER CONTENT %			REMARKS	
			I	II	III	TYPE	N <sub>v</sub> VALUE	% WATER	% RECOVERY	ROD (%)	"N" VALUE			WATER CONTENT %				
											10	20	30	10	20	30		
										SHEAR STRENGTH			W <sub>p</sub> W <sub>L</sub>					
0																		
0.15	TOPSOIL																	MONITORS ARE INSTALLED WITHIN SEPARATE BOREHOLES.
1.5	SILTY CLAY TO CLAYEY SILT; MOTTLED GREY BROWN SILTY CLAY TO CLAYEY SILT, TRACE FINE SAND, APL TO WTPL. STIFF.				1SS	12	34.0	100										
2	FINE SAND, TRACE TO SOME SILT; BROWN FINE SAND, TRACE SILT, INTERBEDDED CLAYEY SILT, WET, DENSE.				2SS	11	21.3	75										
3.0					3SS	39	15.4	88										
4	SANDY SILT TO SILT TILL; BROWN BECOMES GREY BELOW 3.4 m SANDY SILT TILL, TRACE TO SOME CLAY, TRACE MEDIUM TO FINE GRAVEL, OCCASIONAL COBBLES, APL TO DTPL, VERY STIFF TO HARD.				4SS	29	7.8	75										
6	- CLAYEY				5SS	47	6.5	71										
8					6SS	21	8.4	79										
8.8					7SS		5.6	100										
10	SILTY FINE SAND; GREY SILTY FINE SAND, TRACE COARSE SAND, TRACE MEDIUM TO FINE GRAVEL FRAGMENTS, SATURATED, VERY DENSE.				8SS	81	13.7	100										
12	BOREHOLE TERMINATED ON ASSUMED MAFIC IGNEOUS BEDROCK.				9SS	132	14.2	100										
11.9					10SS		-	2										
14																		
16																		
18																		
20																		

# BOREHOLE NO. OW-18

PROJECT NAME: NEW LISKEARD LANDFILL SITE

PROJECT NO.: 001148.02

CLIENT: TOWN OF NEW LISKEARD / SUTCLIFFE RODY QUESNEL INC.

DATE: OCTOBER 21, 2002

BOREHOLE TYPE: 108 mm I.D. HOLLOW STEM AUGER

SUPERVISOR: WDN

GROUND ELEVATION: 278.8 mASL

REVIEWER: BDT

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE					CONE PENETRATION	WATER CONTENT %	REMARKS				
				TYPE	"N" VALUE	% WATER	% RECOVERY	RQD (%)				"N" VALUE			WATER CONTENT %
									10	20		30	10	20	30
0			I												
0.6	COVER SOIL FILL; BLACK TO MEDIUM BROWN SILT, SOME SAND, TRACE GRAVEL. STIFF.		/ / / / /	1SS	10	13.8	42								
1.5	CLAYEY SILT FILL; BLACK TO BROWN TO GREY CLAYEY SILT, SOME SAND, WET, VERY STIFF.		/ / / / /	2SS	28	20.7	0								
2	REFUSE; HOUSEHOLD REFUSE CONSISTING OF PLASTIC BAGS, PAPER, WOOD DEBRIS, PIECES OF METAL AND GLASS AT DEPTH. MOIST TO DRY, STRONG ODOUR.		. . . . .	3SS	54	-	20.8								
4			. . . . .												
6			. . . . .												
8			. . . . .												
10			. . . . .												
12			. . . . .												
14			. . . . .	4SS		-	100				50 FOR 150 mm				
15.2			. . . . .	5SS		-	100				50 FOR 100 mm				
16	SANDY CLAYEY SILT; LIGHT BROWN, DARK STAINED TO 15.4 m SANDY CLAYEY SILT, WET, ODOUROUS, HARD.		/ / / / /	6SS	34	8.1	50								
16.1	BOREHOLE TERMINATED AT 16.1 m DUE TO REFUSAL ON ASSUMED LIMESTONE BEDROCK.		/ / / / /												
18			. . . . .												
20			. . . . .												

# BOREHOLE NO. OW-19

PROJECT NAME: NEW LISKEARD LANDFILL SITE

PROJECT NO.: 001148.02

CLIENT: TOWN OF NEW LISKEARD / SUTCLIFFE RODY QUESNEL INC.

DATE: OCTOBER 22, 2002

BOREHOLE TYPE: 108 mm I.D. HOLLOW STEM AUGER

SUPERVISOR: WDN

GROUND ELEVATION: 258.7 mASL

REVIEWER: BDT

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS I II		SAMPLE					CONE PENETRATION		WATER CONTENT %			REMARKS	
					TYPE	N <sup>o</sup> VALUE	% WATER	% RECOVERY	ROD (%)	"N" VALUE			SHEAR STRENGTH			
										10	20	30	10	20		30
0																
2	MEDIUM TO FINE SAND FILL: BROWN, ORANGY-BROWN AND BLACK MEDIUM TO FINE SAND, TRACE SILT, OCCASIONAL PIECES OF SLAG, MOIST TO DRY, LOOSE.				1SS	8	3.7	50							MONITORS ARE INSTALLED WITHIN SEPARATE BOREHOLES.  - COBBLE AT 3.0 m	
2.7	- TRACE FINE GRAVEL, SOME SILT, GLASS, SLIGHTLY ODDUROUS.				2SS	10	5.2	42								
3.6	FINE SANDY SILT; LIGHT BROWN FINE SANDY SILT, MOIST, VERY DENSE, SOME ROCK FRAGMENTS.				3SS	17	10.8	42								
4	CLAYEY SILT TO SILT, SOME CLAY; MOTTLED GREENISH-GREY THEN MEDIUM BROWN CLAYEY SILT, GRADING TO SILT SOME CLAY WITH DEPTH, TRACE SAND, FINE GRAVEL, APL, FIRM TO STIFF.				4SS	99	12.2	79								
5.5					5SS	-	-	0								
6	SANDY SILT TILL; BROWN SANDY SILT, TRACE TO SOME CLAY TILL, OCCASIONAL MEDIUM TO FINE GRAVEL, APL, VERY STIFF.				6SS	7	23.3	83								
6.1	BOREHOLE TERMINATED AT 6.1 m IN SANDY SILT TILL.				7SS	18	24.0	71								
8					8SS	22	12.6	83								
10																
12																
14																
16																
18																
20																

PROJECT NAME: NEW LISKEARD LANDFILL SITE  
 CLIENT: CITY OF TEMISKAMING SHORES  
 BOREHOLE TYPE: HOLLOW STEM AUGERS 203 mm (8") O.D.  
 GROUND ELEVATION: 258.52 mASL

PROJECT NO.: 001148.04  
 DATE: NOVEMBER 11, 2004  
 SUPERVISOR: DJW  
 REVIEWER: BDT

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS		SAMPLE					CONE PENETRATION			WATER CONTENT %			REMARKS	
					TYPE	N <sub>v</sub> VALUE	% WATER	% RECOVERY	ROD (%)	"N" VALUE			SHEAR STRENGTH				
										10	20	30	W <sub>p</sub>	W <sub>L</sub>			
0																	
0.2	TOPSOIL, CLAYEY SILT;																STATIC WATER LEVELS AT I = 0.82 mBGL II = 0.91 mBGL ON DECEMBER 7, 2004
2	CLAYEY SILT; LIGHT BROWN TO LIGHT GREY BROWN WITH MOTTLED BROWN CLAYEY SILT, NONE TO TRACE FINE GRAVEL, NONE TO TRACE SAND, DTPL TO APL, FIRM TO STIFF.  - GREYISH BROWN AT 3.0 m.			SS1	8		79										
					SS2	15		100									
					SS3	7		100									
					SS4	10		50									
					SS5	50+		37									
					SS6	37		83									
					SS7	48		42									
					SS8	25		100									
					SS9	27		100									
3.7	SAND; MEDIUM BROWN FINE TO MEDIUM SAND, TRACE TO SOME SILT, TRACE FINE GRAVEL, MOIST, VERY DENSE.																
4.5	SILT TILL; GREY SILT TILL, SOME FINE SAND, TRACE TO SOME CLAY, TRACE TO SOME FINE TO MEDIUM GRAVEL, MOIST, COMPACT TO VERY DENSE.  - WET AT 7.6 m.																
9.1	BOREHOLE TERMINATED AT 9.1 m AT AUGER REFUSAL (PROBABLE BEDROCK).																
10																	
12																	
14																	
16																	
18																	
20																	

Revision 27 Aug 2003



# RECORD OF MONITORING WELL No. **OW-21** Co-Ord. **17T 0597146 E, 5262516 N**



Project Number: **TY131010.6000**

Drilling Location: **East of Solar Farm Gate**

Logged by: **JS**

Project Client: **City of Temiskaming Shores**

Drilling Method: **200 mm Hollow Stem Augers**

Compiled by: **MAT**

Project Name: **Monitoring Well Installation Project - New Liskeard Landfill Site**

Drilling Machine: **Track Mounted Drill**

Reviewed by: **TIM**

Project Location: **New Liskeard, Ontario**

Date Started: **9 Sep 14** Date Completed: **9 Sep 14**


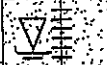
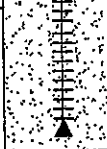
Revision No.: **0, 21/11/14**

Lithology Profile	SOIL SAMPLING					FIELD TESTING				INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing	Soil Vapour Reading		
<p><b>Local Ground Surface Elevation:</b></p> <p>light brown CLAYEY SILT trace gravel mottled, soft</p>								★ Rinse pH Values 2 4 6 8 10 12 Soil Vapour Reading Δ parts per million (ppm) 100 200 300 400 ▲ Lower Explosive Limit * Passing 75 μm (%) ○ Moisture Content (%)		1 riser pipe in bentonite 1 riser pipe in sand 1 slotted pipe in sand	
<p>0.4</p> <p>brown SILT trace sand, gravel and clay loose to very dense</p>	AU				1						
<p>4.2</p> <p>END OF BOREHOLE DUE TO REFUSAL ON PROBABLE BEDROCK OR BOULDERS</p>					2						
					3						
					4						

# BOREHOLE NO. OW-22

PROJECT NAME: NEW LISKEARD LANDFILL SITE  
 CLIENT: CITY OF TEMISKAMING SHORES  
 BOREHOLE TYPE: HOLLOW STEM AUGERS 203 mm (8") O.D.  
 GROUND ELEVATION: 257.99 mASL

PROJECT NO.: 001148.04  
 DATE: NOVEMBER 11, 2004  
 SUPERVISOR: DJW  
 REVIEWER: BDT

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE					CONE PENETRATION		WATER CONTENT %			REMARKS	
				TYPE	N <sub>v</sub> VALUE	% WATER	% RECOVERY	ROD (%)	"N" VALUE			WATER CONTENT %			
									10	20	30	10	20		30
0															
	CLAYEY SILT FILL; LIGHT GREY BROWN GRADING TO LIGHT BROWN CLAYEY SILT TO CLAY AND SILT FILL, APL, SOFT TO FIRM.			SS1	5		13							STATIC WATER LEVEL AT 1.99 m BGL ON DECEMBER 7, 2004	
				SS2	5		33								
2	CLAYEY SILT AND BURIED TOPSOIL; CLAYEY SILT AND BURIED TOPSOIL, APL.			SS3	4		21								
2.1				SS4	18		21								
2.3	SANDY SILT TILL; LIGHT BROWN SANDY SILT TILL, TRACE TO SOME CLAY, TRACE FINE GRAVEL, DTPL TO APL, VERY STIFF TO HARD.			SS5	50+		4								
				SS6	37		38								
4	- CLAYEY SILT ZONE AT 3.0 m			SS7	66+		4								
4.3	BOREHOLE TERMINATED AT 4.3 m AT AUGER REFUSAL (PROBABLE BEDROCK).														
6															
8															
10															
12															
14															
16															
18															
20															

Revision 2/ Aug 2003

PROJECT NAME: NEW LISKEARD LANDFILL SITE  
 CLIENT: CITY OF TEMISKAMING SHORES  
 BOREHOLE TYPE: HOLLOW STEM AUGERS 203 mm (8") O.D.  
 GROUND ELEVATION: 202.33 mASL

PROJECT NO.: 001148.04  
 DATE: NOVEMBER 12-13, 2004  
 SUPERVISOR: DJW  
 REVIEWER: BDT

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS		SAMPLE				CONE PENETRATION		WATER CONTENT %		REMARKS	
					TYPE	N <sup>o</sup> VALUE	% WATER	% RECOVERY	RQD (%)	"N" VALUE		WATER CONTENT %		
										10	20	30		10
0			I	II										
0.6	TOPSOIL: DARK BROWN TOPSOIL WITH CLAYEY SILT AND ORGANIC SILT, BRANCHES, APL, STIFF.				SS1	10		29					STATIC WATER LEVEL AT I = 6.29 m BGL II = DRY ON DECEMBER 7, 2004	
1.4	CLAYEY SILT; MEDIUM BROWN CLAYEY SILT, TRACE FINE SAND, DTPL, STIFF.				SS2	14		79						
2	SANDY SILT TILL; LIGHT TO MEDIUM BROWN SANDY TO SOME SILT TILL, TRACE CLAY TO CLAYEY, TRACE FINE GRAVEL, DTPL, VERY STIFF TO HARD.  - COBBLES AT 3.1 m				SS3	19		25						
4					SS4	36		100						
						SS5	58		38			58		
						SS6	52		50			52		
						SS7	50+		4			50/25 mm		
6	- GREY TO DARK GREY BELOW 4.6 m.													
8					SS8	79		46			56/102 mm			
9.1					SS9	63		100			63			
10	CLAYEY SILT TILL; GREY CLAYEY SILT TILL, SOME FINE SAND, TRACE FINE GRAVEL, DTPL, HARD.													
12					SS10	53		58			53			
12.2					SS11	83+		38			83/292 mm			
14	SANDY SILT TO CLAYEY SILT TILL; MEDIUM GREY TO DARK GREY SANDY SILT TO CLAYEY SILT TILL, TRACE FINE TO MEDIUM GRAVEL, TRACE CLAY, DTPL TO APL, VERY STIFF TO HARD.													
16	- WET BELOW 15.2 m.				SS12	56		92			56			
18					SS13	37		96						
18.1					SS14	28		79						
18.1	BOREHOLE TERMINATED AT 18.1 m AT AUGER REFUSAL (PROBABLE BEDROCK).				SS15	-		-						

Revision 2/ Aug 2003



# RECORD OF MONITORING WELL No. OW-24-I Co-Ord. 17T 0597379 E, 5263237 N



Project Number: **TY131010.6000**

Drilling Location: **NE Corner of Solar Farm**

Logged by: **JS**

Lithology Plot	LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING				INSTRUMENTATION INSTALLATION	COMMENTS	
	DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing	Soil Vapour Reading			
	light brown / grey SILTY CLAY some sand, trace cobbles very stiff to stiff								Penetration Testing ○ SPT      ● DCPT MTO Vane*    Nilcon Vane* △ Intact      ◇ Intact ▲ Remould    ◆ Remould * Undrained Shear Strength (kPa) 20   40   60   80	★ Rinse pH Values 2   4   6   8   10   12 Soil Vapour Reading △ parts per million (ppm) 100   200   300   400 ▲ Lower Explosive Limit * Passing 75 µm (%) ○ Moisture Content (%) 20   40   60   80			1 riser pipe in bentonite 1 riser pipe in grout 1 riser pipe in sand 1 slotted pipe in sand
		grey / brown SANDY SILT some gravel, some to trace clay moist very dense	7.3										
			AU										

# RECORD OF MONITORING WELL No. OW-24-I Co-Ord. 17T 0597379 E, 5263237 N



Project Number: **TY131010.6000**

Drilling Location: **NE Corner of Solar Farm**

Logged by: **JS**

Lithology Plot	LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING				INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing	Soil Vapour Reading		
	grey / brown SANDY SILT some gravel, some to trace clay moist very dense					13						1 riser pipe in bentonite 1 riser pipe in grout 1 riser pipe in sand 1 slotted pipe in sand
	grey SAND trace silt and gravel moist to wet, fine to medium, very dense					13.1						
	END OF BOREHOLE (no refusal)					18.3						

# RECORD OF MONITORING WELL No. OW-24-II Co-Ord. 17T 0597379 E, 5263237 N



Project Number: TY131010.6000 Drilling Location: NE Corner of Solar Farm Logged by: JS  
 Project Client: City of Temiskaming Shores Drilling Method: 200 mm Hollow Stem Augers Compiled by: MAT  
 Project Name: Monitoring Well Installation Project - New Liskeard Landfill Site Drilling Machine: Track Mounted Drill Reviewed by: TIM  
 Project Location: New Liskeard, Ontario Date Started: 4 Sep 14 Date Completed: 4 Sep 14 Revision No.: 0, 21/11/14

LITHOLOGY PROFILE	SOIL SAMPLING				FIELD TESTING				INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing		
Lithology Plot  Local Ground Surface Elevation: brown SILTY SAND some organics, roots moist, compact  light brown / grey SILTY CLAY some sand, trace cobbles very stiff to stiff								Penetration Testing ○ SPT ● DCPT MTO Vane* Nilcon Vane* △ Intact ◇ Intact ▲ Remould ◆ Remould * Undrained Shear Strength (kPa) 20 40 60 80	★ Rinse pH Values 2 4 6 8 10 12 Soil Vapour Reading △ parts per million (ppm) 100 200 300 400 ▲ Lower Explosive Limit * Passing 75 µm (%) ○ Moisture Content (%) 20 40 60 80	1 riser pipe in bentonite 1 riser pipe in sand 1 slotted pipe in sand
					0.8					STICK-UP HEIGHT: 0.93 m
						1				
						2				
						3				
						4				
						5				
						6				

# RECORD OF MONITORING WELL No. OW-24-II Co-Ord. 17T 0597379 E, 5263237 N



Project Number: **TY131010.6000**

Drilling Location: **NE Corner of Solar Farm**

Logged by: **JS**

LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING				INSTRUMENTATION INSTALLATION	COMMENTS	
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing				★ Rinse pH Values 2 4 6 8 10 12 Soil Vapour Reading Δ parts per million (ppm) 100 200 300 400 ▲ Lower Explosive Limit * Passing 75 μm (%) ○ Moisture Content (%)
		light brown / grey SILTY CLAY some sand, trace cobbles very stiff to stiff					7					
	grey / brown SANDY SILT some gravel, some to trace clay moist very dense					8						
	END OF BOREHOLE (no refusal)					9						



# BOREHOLE NO. OW 24-I

PROJECT NAME: 2007 MONITORING WELL NEST INSTALLATION

PROJECT NO.: 4-001148.08

CLIENT: CITY OF TEMISKAMING SHORES

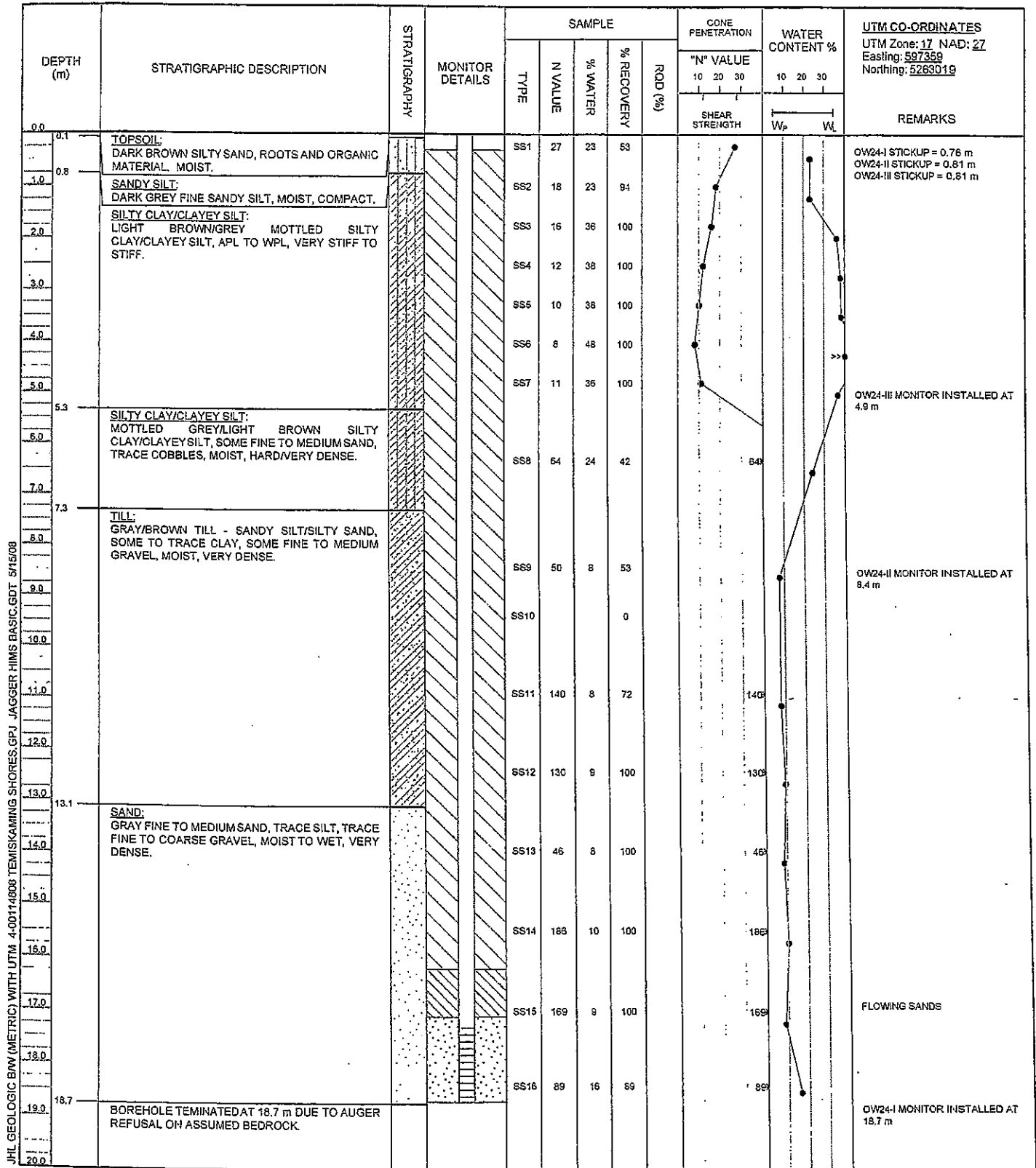
DATE COMPLETED: Oct 24, 2007

BOREHOLE TYPE: 110 mm HOLLOW STEM AUGER

SUPERVISOR: SLW

GROUND ELEVATION: 235.9 mASL

REVIEWER: AGH



JHL GEOLOGIC BAY (METRIC) WITH UTM 4-00114808 TEMISKAMING SHORES.GPJ JAGGER HIMS BASIC.GDT 5/15/08



# BOREHOLE NO. OW 25-I

PROJECT NAME: 2007 MONITORING WELL NEST INSTALLATION

PROJECT NO.: 4-001148.08

CLIENT: CITY OF TEMISKAMING SHORES

DATE COMPLETED: Oct 25, 2007

BOREHOLE TYPE: 110 mm HOLLOW STEM AUGER

SUPERVISOR: SLW

GROUND ELEVATION: 239.5 mASL

REVIEWER: AGH

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE					CONE PENETRATION		WATER CONTENT %		REMARKS	
				TYPE	N VALUE	% WATER	% RECOVERY	ROD (%)	"N" VALUE			WATER CONTENT %		
									10	20	30	10		20
								SHEAR STRENGTH		W <sub>p</sub> W <sub>L</sub>				
20.0	SILT; DARK GREY SILT, SOME FINE SAND, SOME CLAY, SOME TO TRACE FINE GRAVEL, OCCASIONAL COBBLE, MOIST, HARD.			SS18	82	11	100						OW25-I MONITOR INSTALLED AT 22.0 m	
21.0														
22.0														
23.0	BOREHOLE TERMINATED AT 23.3 m DUE TO AUGER REFUSAL ON ASSUMED BEDROCK.			SS19	99	14	100							
23.3														
24.0														
25.0														
26.0														
27.0														
28.0														
29.0														
30.0														
31.0														
32.0														
33.0														
34.0														
35.0														
36.0														
37.0														
38.0														
39.0														
40.0														

JHL GEOLOGIC BMV (METRIC) WITH UTM 4-00114808 TEMISKAMING SHORES.GPJ JAGGER HIMS BASIC.GDT 5/15/08

# RECORD OF MONITORING WELL No. OW-30-I Co-Ord. 17T 0597401 E, 5262836 N



Project Number: TY131010.6000 Drilling Location: East Side of Solar Farm Logged by: JS  
 Project Client: City of Temiskaming Shores Drilling Method: 200 mm Hollow Stem Augers Compiled by: MAT  
 Project Name: Monitoring Well Installation Project - New Liskeard Landfill Site Drilling Machine: Track Mounted Drill Reviewed by: TIM  
 Project Location: New Liskeard, Ontario Date Started: 6 Sep 14 Date Completed: 7 Sep 14 Revision No.: 0, 20/11/14

LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING				INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing	Soil Vapour Reading		
		dark grey SILTY SAND some gravel and cobbles, trace clay damp to wet, dense to very dense  Local Ground Surface Elevation:							Penetration Testing ○ SPT ● DCPT MTO Vane* Nilcon Vane* △ Intact ◇ Intact ▲ Remould ◆ Remould * Undrained Shear Strength (kPa) 20 40 60 80	★ Rinse pH Values 2 4 6 8 10 12 Soil Vapour Reading △ parts per million (ppm) 100 200 300 400 ▲ Lower Explosive Limit * Passing 75 µm (%) ○ Moisture Content (%) 20 40 60 80	1 riser pipe in bentonite 1 riser pipe in grout 1 riser pipe in sand 1 slotted pipe in sand
		AU				1					STICK-UP HEIGHT: 0.90 m
						2					
						3					
						4					
						5					
						6					

# RECORD OF MONITORING WELL No. OW-30-I Co-Ord. 17T 0597401 E, 5262836 N



Project Number: **TY131010.6000**

Drilling Location: **East Side of Solar Farm**

Logged by: **JS**

Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)		ELEVATION (m)		FIELD TESTING				INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value					Penetration Testing		Soil Vapour Reading			
										○ SPT      ● DCPT △ Intact    ◇ Intact ▲ Remould   ◆ Remould * Undrained Shear Strength (kPa)	★ Rinse pH Values 2 4 6 8 10 12 Soil Vapour Reading Δ parts per million (ppm) 100 200 300 400 ▲ Lower Explosive Limit * Passing 75 um (%) ○ Moisture Content (%)				
	dark grey SILTY SAND some gravel and cobbles, trace clay damp to wet, dense to very dense					7									
		SS	1	100	15					○					
						10									
		SS	2	100	21					○					
						12									
		SS	3	100	30					○					

# RECORD OF MONITORING WELL No. OW-30-I Co-Ord. 17T 0597401 E, 5262836 N



Project Number: **TY131010.6000**

Drilling Location: **East Side of Solar Farm**

Logged by: **JS**

Lithology Plot	LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)		ELEVATION (m)		FIELD TESTING				INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value			Penetration Testing	MTO Vane*	Nilcon Vane*	Soil Vapour Reading	Moisture Content (%)	Lower Explosive Limit	Passing 75 um (%)		
dark grey SILTY SAND some gravel and cobbles, trace clay damp to wet, dense to very dense						13									1 riser pipe in bentonite 1 riser pipe in grout 1 riser pipe in sand 1 slotted pipe in sand	
	SS	4	38	100+	14											
						15										
	SS	5	100	65	16											
						17										
	SS	6	100	64	18											
						19										
	SS	7	100	78	20											

# RECORD OF MONITORING WELL No. OW-30-I Co-Ord. 17T 0597401 E, 5262836 N



Project Number: **TY131010.6000**

Drilling Location: **East Side of Solar Farm**

Logged by: **JS**

LITHOLOGY PROFILE	SOIL SAMPLING				FIELD TESTING		INSTRUMENTATION INSTALLATION	COMMENTS	
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)			ELEVATION (m)
dark grey SILTY SAND some gravel and cobbles, trace clay damp to wet, dense to very dense	SS	8	100	50+	20		Penetration Testing ○ SPT ● DCPT MTO Vane* Nilcon Vane* △ Intact ◇ Intact ▲ Remould ◆ Remould * Undrained Shear Strength (kPa) 20 40 60 80	★ Rinse pH Values 2 4 6 8 10 12 Soil Vapour Reading △ parts per million (ppm) 100 200 300 400 ▲ Lower Explosive Limit * Passing 75 µm (%) ○ Moisture Content (%) 20 40 60 80	1 riser pipe in bentonite 1 riser pipe in grout 1 riser pipe in sand 1 slotted pipe in sand
END OF BOREHOLE DUE TO REFUSAL ON PROBABLE BEDROCK OR BOULDERS									

# RECORD OF MONITORING WELL No. OW-30-II Co-Ord. 17T 0597401 E, 5262836 N



Project Number: TY131010.6000 Drilling Location: East Side of Solar Farm Logged by: JS  
 Project Client: City of Temiskaming Shores Drilling Method: 200 mm Hollow Stem Augers Compiled by: MAT  
 Project Name: Monitoring Well Installation Project - New Liskeard Landfill Site Drilling Machine: Track Mounted Drill Reviewed by: TIM  
 Project Location: New Liskeard, Ontario Date Started: 5 Sep 14 Date Completed: 8 Sep 14 Revision No.: 0, 20/11/14

Lithology Profile	SOIL SAMPLING				FIELD TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)		
Lithology Plot Local Ground Surface Elevation: light brown to dark grey SILTY SAND some gravel damp, dense	AU	1						1 riser pipe in bentonite 1 riser pipe in grout 1 riser pipe in sand 1 slotted pipe in sand  STICK-UP HEIGHT: 0.93 m
	SS	2	72	21	1			
	SS	3	75	18	2			
	SS	4	89	53	3			
	SS	5	79	38	4			
	SS	6	100	38	5			
	SS	7	100	26	6			

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# RECORD OF MONITORING WELL No. OW-30-II Co-Ord. 17T 0597401 E, 5262836 N



Project Number: **TY131010.6000**

Drilling Location: **East Side of Solar Farm**

Logged by: **JS**

LITHOLOGY PROFILE	SOIL SAMPLING				FIELD TESTING		INSTRUMENTATION INSTALLATION	COMMENTS	
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)			ELEVATION (m)
Lithology Plot light brown to dark grey SILTY SAND some gravel damp, dense	SS	8	100	19				* Rinse pH Values 2 4 6 8 10 12 Soil Vapour Reading Δ parts per million (ppm) 100 200 300 400 ▲ Lower Explosive Limit * Passing 75 um (%) ○ Moisture Content (%)	1 riser pipe in bentonite 1 riser pipe in grout 1 riser pipe in sand 1 slotted pipe in sand
END OF BOREHOLE (no refusal)									

# RECORD OF MONITORING WELL No. **OW-10-III** Co-Ord. **0596682 E, 5263278 N**

Project Number: **TY910491.8000** Drilling Location: **North Side of Landfill** Logged by: **ARM**  
 Project Client: **City of Temiskaming Shores** Drilling Method: **200 mm Hollow Stem Augers** Compiled by: **MAT**  
 Project Name: **2017 Supplemental Hydrogeological Program** Drilling Machine: **Track Mounted Drill** Reviewed by: **BRG**  
 Project Location: **New Liskeard Landfill, City of Temiskaming Shores, Ontario** Date Started: **07 Jun 17** Date Completed: **09 Jun 17** Revision No.: **1, 23/02/18**

Lithology Plot	LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ● DCPT MTO Vane* Nilcon Vane* △ Intact ◇ Intact ▲ Remould ◆ Remould * Undrained Shear Strength (kPa) 20 40 60 80		
	<b>Local Ground Surface Elevation:</b> START OF CORING									
	BEDROCK	2.1								
	TCR = 78% SCR = 75% RQD = 50%		RC	1	80					
	TCR = 81% SCR = 83% RQD = 33%	4.0	RC	2	80					
	TCR = 86% SCR = 50% RQD = 26%	4.7	RC	3	86					
	TCR = 98% SCR = 100% RQD = 100%	5.9	RC	4	99					
	TCR = 98% SCR = 100% RQD = 100%	7.4	RC	5	98					
	TCR = 98% SCR = 100% RQD = 100%	9.0	RC	6	99					
		10.5								



∇ No freestanding groundwater measured in open borehole on completion.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present. Also, borehole information should be read in conjunction with the environmental report for which it was commissioned and the accompanying 'Explanation of Borehole Log'.

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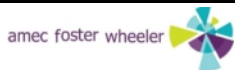
# RECORD OF MONITORING WELL No. **OW-10-III** Co-Ord. **0596682 E, 5263278 N**

Project Number: **TY910491.8000**

Drilling Location: **North Side of Landfill**

Logged by: **ARM**

Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING				INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value			Penetration Testing		Soil Vapour Reading			
							○ SPT      ● DCPT △ Intact    ◇ Intact ▲ Remould   ◆ Remould * Undrained Shear Strength (kPa)	★ Rinse pH Values 2 4 6 8 10 12 Soil Vapour Reading Δ parts per million (ppm) 100 200 300 400 ▲ Lower Explosive Limit * Passing 75 µm (%) ○ Moisture Content (%)					
BEDROCK	TCR = 92% SCR = 66% RQD = 72% TCR = 92% SCR = 66% RQD = 72%	RC	7	92		11.8							
	TCR = 100% SCR = 95% RQD = 97%	RC	8	100		12							
	TCR = 100% SCR = 100% RQD = 92%	RC	9	100		13.4							
	TCR = 100% SCR = 93% RQD = 88%	RC	10	100		15.0							
	TCR = 100% SCR = 100% RQD = 100%	RC	11	100		16.5							
	END OF CORING					18.1							



Borehole details as presented, do not constitute a thorough understanding of all potential conditions present. Also, borehole information should be read in conjunction with the environmental report for which it was commissioned and the accompanying 'Explanation of Borehole Log'.

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# RECORD OF MONITORING WELL No. OW-25-IV Co-Ord. 0597369 E, 5262983 N

Project Number: TY910491.8000 Drilling Location: Eastern Fence Line Logged by: ARM  
 Project Client: City of Temiskaming Shores Drilling Method: 200 mm Hollow Stem Augers Compiled by: MAT  
 Project Name: 2017 Supplemental Hydrogeological Program Drilling Machine: Track Mounted Drill Reviewed by: BRG  
 Project Location: New Liskeard Landfill, City of Temiskaming Shores, Ontario Date Started: 12 Jun 17 Date Completed: 13 Jun 17 Revision No.: 1, 23/02/18

Lithology Profile	SOIL SAMPLING				FIELD TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)		
brown SILT & SAND some gravel moist	SS	1	30	14			1 riser pipe in bentonite 1 riser pipe in grout 1 riser pipe in sand 1 slotted pipe in sand	
	SS	2	75	16	1			
	SS	3	80	52	2			
					3			
					4			
					5			
					6			
					7			
					8			
					9			
					10			
					11			


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No freestanding groundwater measured in open borehole on completion.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present. Also, borehole information should be read in conjunction with the environmental report for which it was commissioned and the accompanying 'Explanation of Borehole Log'.

Scale: 1 : 60  
 Page: 1 of 3

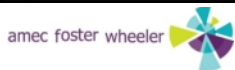
# RECORD OF MONITORING WELL No. OW-25-IV Co-Ord. 0597369 E, 5262983 N

Project Number: **TY910491.8000**

Drilling Location: **Eastern Fence Line**

Logged by: **ARM**

Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)		ELEVATION (m)		FIELD TESTING				INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value					Penetration Testing		Soil Vapour Reading			
										○ SPT      ● DCPT ▲ Intact    ◇ Intact ▲ Remould   ◆ Remould * Undrained Shear Strength (kPa)	★ Rinse pH Values 2 4 6 8 10 12 Soil Vapour Reading Δ parts per million (ppm) 100 200 300 400 ▲ Lower Explosive Limit * Passing 75 um (%) ○ Moisture Content (%)				
	brown SILT & SAND some gravel moist					12									1 riser pipe in bentonite 1 riser pipe in grout 1 riser pipe in sand 1 slotted pipe in sand
						13									
						14									
						15									
						16									
						17									
						18									
						19									
						20									
						21									
						22									
						23									



Borehole details as presented, do not constitute a thorough understanding of all potential conditions present. Also, borehole information should be read in conjunction with the environmental report for which it was commissioned and the accompanying 'Explanation of Borehole Log'.

Scale: 1 : 60

Page: 2 of 3

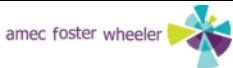
# RECORD OF MONITORING WELL No. OW-25-IV Co-Ord. 0597369 E, 5262983 N

Project Number: **TY910491.8000**

Drilling Location: **Eastern Fence Line**

Logged by: **ARM**

Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)		ELEVATION (m)		FIELD TESTING				INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value			Penetration Testing	Soil Vapour Reading	Soil Vapour Reading	Soil Vapour Reading	Soil Vapour Reading			
	brown SILT & SAND some gravel moist					24									
	START OF CORING BEDROCK TCR = 85% SCR = 87% RQD = 64%	RC	4	85		27.4									
	TCR = 100% SCR = 70% RQD = 63%	RC	5	100		28.8									
	END OF CORING					30.3									



Borehole details as presented, do not constitute a thorough understanding of all potential conditions present. Also, borehole information should be read in conjunction with the environmental report for which it was commissioned and the accompanying 'Explanation of Borehole Log'.

Scale: 1 : 60

Page: 3 of 3

# RECORD OF MONITORING WELL No. **OW-30-III** Co-Ord. **0597401 E, 5262825 N**

Project Number: **TY910491.8000** Drilling Location: **Eastern Fence Line** Logged by: **ARM**  
 Project Client: **City of Temiskaming Shores** Drilling Method: **200 mm Hollow Stem Augers** Compiled by: **MAT**  
 Project Name: **2017 Supplemental Hydrogeological Program** Drilling Machine: **Track Mounted Drill** Reviewed by: **BRG**  
 Project Location: **New Liskeard Landfill, City of Temiskaming Shores, Ontario** Date Started: **15 May 17** Date Completed: **17 May 17** Revision No.: **1, 23/02/18**

Lithology Profile	SOIL SAMPLING				FIELD TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)		
brown SILTY SAND trace clay and gravel moist to wet	SS	1	67	3			1 riser pipe in bentonite 1 riser pipe in grout 1 riser pipe in sand 1 slotted pipe in sand	
	SS	2	51	22	1			
brown SAND some silt, trace gravel moist to wet	SS	3	59	54				
					2			
					3			
					4			
					5			
					6			
					7			
					8			
					9			
					10			
					11			



∇ No freestanding groundwater measured in open borehole on completion.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present. Also, borehole information should be read in conjunction with the environmental report for which it was commissioned and the accompanying 'Explanation of Borehole Log'.

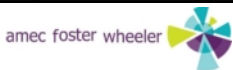
# RECORD OF MONITORING WELL No. OW-30-III Co-Ord. 0597401 E, 5262825 N

Project Number: **TY910491.8000**

Drilling Location: **Eastern Fence Line**

Logged by: **ARM**

Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)		ELEVATION (m)		FIELD TESTING				INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value					Penetration Testing		Soil Vapour Reading			
										○ SPT      ● DCPT △ Intact    ◇ Intact ▲ Remould   ◆ Remould * Undrained Shear Strength (kPa)	★ Rinse pH Values 2 4 6 8 10 12 Soil Vapour Reading Δ parts per million (ppm) 100 200 300 400 ▲ Lower Explosive Limit * Passing 75 µm (%) ○ Moisture Content (%)				
brown SAND some silt, trace gravel moist to wet						12									
						13									
						14									
						15									
						16									
						17									
						18									
						19									
						20									
START CORING	20.0					20									
brown SAND & CLAY some gravel, trace silt compressed, moist						21									
		RC				22									
						23									
brown SANDSTONE oxidation, wet	22.3					23									
		RC		100											



Borehole details as presented, do not constitute a thorough understanding of all potential conditions present. Also, borehole information should be read in conjunction with the environmental report for which it was commissioned and the accompanying 'Explanation of Borehole Log'.

Scale: 1 : 60

Page: 2 of 3



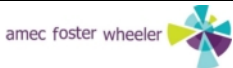
# RECORD OF MONITORING WELL No. OW-30-III Co-Ord. 0597401 E, 5262825 N

Project Number: **TY910491.8000**

Drilling Location: **Eastern Fence Line**

Logged by: **ARM**

Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)		ELEVATION (m)		FIELD TESTING				INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value			Penetration Testing	Soil Vapour Reading	Soil Vapour Reading	Soil Vapour Reading	Soil Vapour Reading			
	brown SANDSTONE oxidation, wet TCR = 100% SCR = 83% RQD = 0% TCR = 32% SCR = 76% RQD = 7%	RC	32			23.9	24								
	TCR = 84% SCR = 48% RQD = 24%	RC	84			25.4	26								
	TCR = 100% SCR = 85% RQD = 70%	RC	100			26.6	27								
	TCR = 92% SCR = 95% RQD = 96%	RC	92			27.3	28								
	TCR = 100% SCR = 97% RQD = 95%	RC	100			28.8	29								
	END OF CORING					30.4	30								



Borehole details as presented, do not constitute a thorough understanding of all potential conditions present. Also, borehole information should be read in conjunction with the environmental report for which it was commissioned and the accompanying 'Explanation of Borehole Log'.

Scale: 1 : 60

Page: 3 of 3

# RECORD OF MONITORING WELL No. **OW-31-I**

Project Number: **TY910491.8000** Drilling Location: **Eastern Fence Line** Logged by: **ARM**  
 Project Client: **City of Temiskaming Shores** Drilling Method: **200 mm Hollow Stem Augers** Compiled by: **MAT**  
 Project Name: **2017 Supplemental Hydrogeological Program** Drilling Machine: **Track Mounted Drill** Reviewed by: **BRG**  
 Project Location: **New Liskeard Landfill, City of Temiskaming Shores, Ontario** Date Started: **18 May 17** Date Completed: **18 May 17** Revision No.: **1, 23/02/18**


LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING				INSTRUMENTATION INSTALLATION	COMMENTS	
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing	Soil Vapour Reading			
	<p><b>Local Ground Surface Elevation:</b> 150 mm ORGANICS over</p> <p>grey SILT trace clay moist</p> <p>brown SAND &amp; GRAVEL trace silt and clay increasing silt and clay content with depth wet</p>					0.4		Penetration Testing ○ SPT ● DCPT MTO Vane* Nilcon Vane* △ Intact ◇ Intact ▲ Remould ◆ Remould * Undrained Shear Strength (kPa) 20 40 60 80	★ Rinse pH Values 2 4 6 8 10 12 Soil Vapour Reading △ parts per million (ppm) 100 200 300 400 ▲ Lower Explosive Limit * Passing 75 um (%) ○ Moisture Content (%) 20 40 60 80		1 riser pipe in bentonite 1 riser pipe in grout 1 riser pipe in sand 1 slotted pipe in sand	
		AU				1						
						2						
						3						
						4						
						5						
						6						
						7						
	END OF BOREHOLE (no refusal)					7.6						

# RECORD OF MONITORING WELL No. OW-31-II Co-Ord. 0597398 E, 5262893 N

Project Number: TY910491.8000 Drilling Location: Eastern Fence Line Logged by: ARM  
 Project Client: City of Temiskaming Shores Drilling Method: 200 mm Hollow Stem Augers Compiled by: MAT  
 Project Name: 2017 Supplemental Hydrogeological Program Drilling Machine: Track Mounted Drill Reviewed by: BRG  
 Project Location: New Liskeard Landfill, City of Temiskaming Shores, Ontario Date Started: 18 May 17 Date Completed: 18 May 17 Revision No.: 1, 23/02/18

Lithology Profile	SOIL SAMPLING				FIELD TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)		
Lithology Plot Local Ground Surface Elevation: 150 mm ORGANICS over grey SILT trace clay moist brown SAND & GRAVEL trace silt and clay increasing silt and clay content with depth wet								1 riser pipe in bentonite 1 riser pipe in grout 1 riser pipe in sand 1 slotted pipe in sand
	SS	1	100	24	0.4			
	SS	2	5	67	1			
	SS	3	33	40	2			
	SS	4	100	48	3			
	SS	5	16	41	4			
	SS	6	100	44	5			
	SS	7	100	40	6			
	SS	8	59	40	7			
	SS	9	100	27	8			
	SS	10	100	38	9			
					10			
					10.7			
					11			


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 No freestanding groundwater measured in open borehole on completion.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present. Also, borehole information should be read in conjunction with the environmental report for which it was commissioned and the accompanying 'Explanation of Borehole Log'.

Scale: 1 : 60  
 Page: 1 of 2

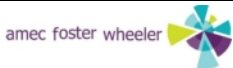
# RECORD OF MONITORING WELL No. OW-31-II Co-Ord. 0597398 E, 5262893 N

Project Number: **TY910491.8000**

Drilling Location: **Eastern Fence Line**

Logged by: **ARM**

LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)		ELEVATION (m)		FIELD TESTING				INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing		Soil Vapour Reading		Moisture Content (%)		INSTRUMENTATION INSTALLATION	COMMENTS
								○ SPT      ● DCPT MTO Vane*    Nilcon Vane* △ Intact      ◇ Intact ▲ Remould    ◆ Remould * Undrained Shear Strength (kPa) 20   40   60   80		★ Rinse pH Values 2   4   6   8   10   12 Soil Vapour Reading △ parts per million (ppm) 100   200   300   400		▲ Lower Explosive Limit * Passing 75 µm (%) ○ Moisture Content (%) 20   40   60   80		INSTRUMENTATION INSTALLATION	1 riser pipe in bentonite 1 riser pipe in grout 1 riser pipe in sand 1 slotted pipe in sand
brown SILTY SAND some gravel moist	SS	11	75	30	12								X		
	SS	12	59	40	13			○							
	SS	13	72	51	14			○							
	SS	14	42	78	15			○							
brown SAND & GRAVEL moist	15.3	SS	14	42	78										
END OF BOREHOLE DUE TO REFUSAL ON POSSIBLE COBBLE / BOULDERS OR BEDROCK	15.9														



Borehole details as presented, do not constitute a thorough understanding of all potential conditions present. Also, borehole information should be read in conjunction with the environmental report for which it was commissioned and the accompanying 'Explanation of Borehole Log'.

Scale: 1 : 60

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# Appendix C

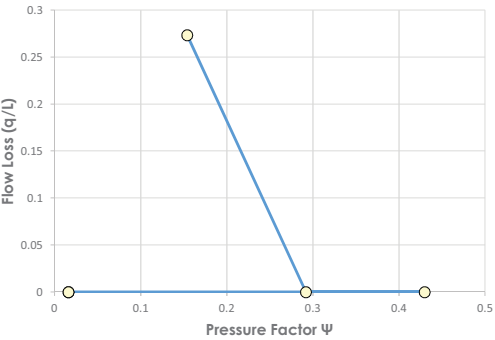
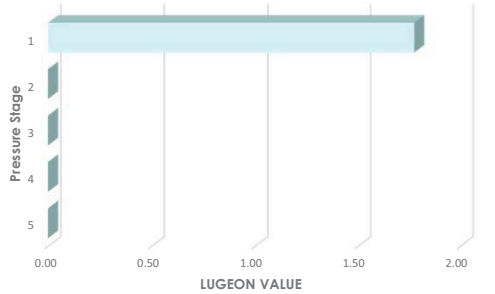
## Hydraulic Conductivities





**PROJECT NO.:** TY91049.8000  
**CLIENT:** City of Temiskaming Shores  
**LOCATION:** New Liskeard  
**BOREHOLE ID:** OW10-III  
**TEST DATE:** 08-Jun-17  
**TEST NO.:** 1  
**TOP OF TEST INTERVAL:** 59 FEET  
**BOTTOM OF TEST INTERVAL:** 59.4 FEET  
**INTERVAL LENGTH:** 0.1 METRES  
**GAUGE HEIGHT:** 0.75 m above ground  
**WATER LEVEL:** 0.90 m below ground  
**BOREHOLE DIP:** 90 degrees  
**DIP WATER LEVEL:** 0.90 m below ground  
**BOREHOLE RADIUS:** 0.048 METRES

	GUAGE PRESSURE (PSI)	GUAGE PRESSURE (KPA)	EFFECTIVE TEST ZONE PRESSURE (KPA)	GUAGE PRESSURE (PSI)	GUAGE PRESSURE (KPA)	EFFECTIVE TEST ZONE PRESSURE (KPA)	GUAGE PRESSURE (PSI)	GUAGE PRESSURE (KPA)	EFFECTIVE TEST ZONE PRESSURE (KPA)	GUAGE PRESSURE (PSI)	GUAGE PRESSURE (KPA)	EFFECTIVE TEST ZONE PRESSURE (KPA)	GUAGE PRESSURE (PSI)	GUAGE PRESSURE (KPA)	EFFECTIVE TEST ZONE PRESSURE (KPA)
	20	137.90	154.08	40	275.79	291.98	60	413.69	429.87	0	0.00	16.19	0	0.00	16.19
Time	Flowmeter	Flowmeter	Take	Flowmeter	Flowmeter	Take	Flowmeter	Flowmeter	Take	Flowmeter	Flowmeter	Take	Flowmeter	Flowmeter	Take
(min)	(m <sup>3</sup> )	(litres)	(litres)	(m <sup>3</sup> )	(litres)	(litres)	(m <sup>3</sup> )	(litres)	(litres)	(m <sup>3</sup> )	(litres)	(litres)	(m <sup>3</sup> )	(litres)	(litres)
0	36.039	36039		36.04	36040		36.04	36040		0			0		
1	36.039	36039	0	36.04	36040	0	36.04	36040	0	0			0		
5	36.039	36039	0	36.04	36040	0	36.04	36040	0	0			0		
10	36.039	36039	0	36.04	36040	0	36.04	36040	0	0			0		
30	36.04	36040	1	36.04	36040	0	36.04	36040	0	0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		



AVERAGE FLOW (litres / min)	0.03	AVERAGE FLOW (litres / min)	0.00	AVERAGE FLOW (litres / min)	0.00	AVERAGE FLOW (litres / min)		AVERAGE FLOW (litres / min)	
LUGEON VALUE	1.77	LUGEON VALUE	0.00	LUGEON VALUE	0.00	LUGEON VALUE	INCOMPLETE DATA	LUGEON VALUE	INCOMPLETE DATA
HYDRAULIC CONDUCTIVITY K (m/s)	4.30E-08	HYDRAULIC CONDUCTIVITY K (m/s)	0.00E+00	HYDRAULIC CONDUCTIVITY K (m/s)	0.00E+00	HYDRAULIC CONDUCTIVITY K (m/s)	INCOMPLETE DATA	HYDRAULIC CONDUCTIVITY K (m/s)	INCOMPLETE DATA

INTERPRETED K:	1.43E-08 (m/s)
INTERPRETED FLOW:	NO FLOW
TEST BY:	EHS
REVIEWED BY:	BG

Interpretation References:  
 Houslsby, A. (1976). Routine Interpretation of the Lugeon Water-Test. Q. J. Eng. Geol. Vol. 9, pp. 303-313.  
 Quiñones-Rozo, Camilo (2010):Lugeon test interpretation, revisited. In: Collaborative Management of Integrated Watersheds, US Society of Dams, 30th Annual Conference, S. 405-414.

PROJECT NO.: TY91049.8000 TOP OF TEST INTERVAL: 27 FEET

CLIENT: City of Temiskaming Shores BOTTOM OF TEST INTERVAL: 47 FEET INTERVAL LENGTH: 6.1 METRES

LOCATION: New Liskeard GAUGE HEIGHT: 0.75 m above ground

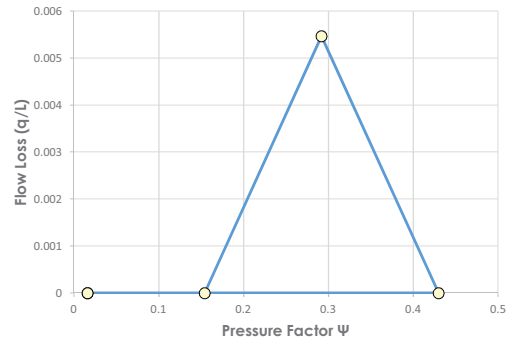
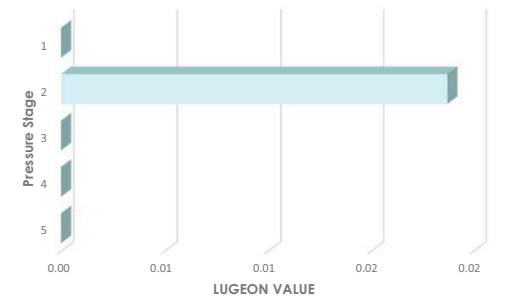
BOREHOLE ID: OW10-III WATER LEVEL: 0.90 m below ground

TEST DATE: 08-Jun-17 BOREHOLE DIP: 90 degrees DIP WATER LEVEL: 0.90 m below ground

TEST NO.: 1 BOREHOLE RADIUS: 0.048 METRES



	GUAGE PRESSURE (PSI)	GUAGE PRESSURE (KPA)	EFFECTIVE TEST ZONE PRESSURE (KPA)	GUAGE PRESSURE (PSI)	GUAGE PRESSURE (KPA)	EFFECTIVE TEST ZONE PRESSURE (KPA)	GUAGE PRESSURE (PSI)	GUAGE PRESSURE (KPA)	EFFECTIVE TEST ZONE PRESSURE (KPA)	GUAGE PRESSURE (PSI)	GUAGE PRESSURE (KPA)	EFFECTIVE TEST ZONE PRESSURE (KPA)	GUAGE PRESSURE (PSI)	GUAGE PRESSURE (KPA)	EFFECTIVE TEST ZONE PRESSURE (KPA)
	20	137.90	154.08	40	275.79	291.98	60	413.69	429.87	0	0.00	16.19	0	0.00	16.19
Time	Flowmeter	Flowmeter	Take	Flowmeter	Flowmeter	Take	Flowmeter	Flowmeter	Take	Flowmeter	Flowmeter	Take	Flowmeter	Flowmeter	Take
(min)	(m <sup>3</sup> )	(litres)	(litres)	(m <sup>3</sup> )	(litres)	(litres)	(m <sup>3</sup> )	(litres)	(litres)	(m <sup>3</sup> )	(litres)	(litres)	(m <sup>3</sup> )	(litres)	(litres)
0	36.04	36040		36.04	36040		36.041	36041		0			0		
1	36.04	36040	0	36.04	36040	0	36.041	36041	0	0			0		
5	36.04	36040	0	36.04	36040	0	36.041	36041	0	0			0		
10	36.04	36040	0	36.04	36040	0	36.041	36041	0	0			0		
30	36.04	36040	0	36.041	36041	1	36.041	36041	0	0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
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0	0			0			0			0			0		
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0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		



AVERAGE FLOW (litres / min)	0.00	AVERAGE FLOW (litres / min)	0.03	AVERAGE FLOW (litres / min)	0.00	AVERAGE FLOW (litres / min)		AVERAGE FLOW (litres / min)	
LUGEN VALUE	0.00	LUGEN VALUE	0.02	LUGEN VALUE	0.00	LUGEN VALUE	INCOMPLETE DATA	LUGEN VALUE	INCOMPLETE DATA
HYDRAULIC CONDUCTIVITY K (m/s)	0.00E+00	HYDRAULIC CONDUCTIVITY K (m/s)	2.36E-09	HYDRAULIC CONDUCTIVITY K (m/s)	0.00E+00	HYDRAULIC CONDUCTIVITY K (m/s)	INCOMPLETE DATA	HYDRAULIC CONDUCTIVITY K (m/s)	INCOMPLETE DATA

INTERPRETED K:	7.87E-10 (m/s)
INTERPRETED FLOW:	NO FLOW
TEST BY:	EHS
REVIEWED BY:	BG

Interpretation References:  
 Houslsby, A. (1976). Routine Interpretation of the Lugeon Water-Test. Q. J. Eng. Geol. Vol. 9, pp. 303-313.  
 Quiñones-Rozo, Camilo (2010):Lugeon test interpretation, revisited. In: Collaborative Management of Integrated Watersheds, US Society of Dams, 30th Annual Conference, S. 405-414.

PROJECT NO.: TY91049.8000 TOP OF TEST INTERVAL: 10 FEET

CLIENT: City of Temiskaming Shores BOTTOM OF TEST INTERVAL: 27 FEET INTERVAL LENGTH: 5.2 METRES

LOCATION: New Liskeard GAUGE HEIGHT: 0.75 m above ground

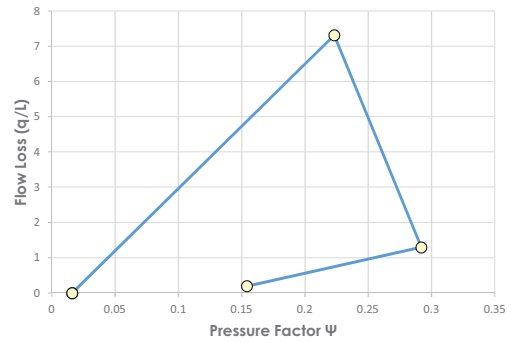
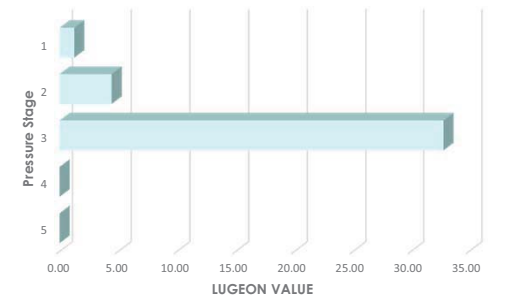
BOREHOLE ID: OW10-III WATER LEVEL: 0.90 m below ground

TEST DATE: 08-Jun-17 BOREHOLE DIP: 90 degrees DIP WATER LEVEL: 0.90 m below ground

TEST NO.: 1 BOREHOLE RADIUS: 0.048 METRES



	GAUGE PRESSURE (PSI)	GAUGE PRESSURE (KPA)	EFFECTIVE TEST ZONE PRESSURE (KPA)	GAUGE PRESSURE (PSI)	GAUGE PRESSURE (KPA)	EFFECTIVE TEST ZONE PRESSURE (KPA)	GAUGE PRESSURE (PSI)	GAUGE PRESSURE (KPA)	EFFECTIVE TEST ZONE PRESSURE (KPA)	GAUGE PRESSURE (PSI)	GAUGE PRESSURE (KPA)	EFFECTIVE TEST ZONE PRESSURE (KPA)	GAUGE PRESSURE (PSI)	GAUGE PRESSURE (KPA)	EFFECTIVE TEST ZONE PRESSURE (KPA)
	20	137.90	154.08	40	275.79	291.98	30	206.84	223.03	0	0.00	16.19	0	0.00	16.19
Time	Flowmeter	Flowmeter	Take	Flowmeter	Flowmeter	Take	Flowmeter	Flowmeter	Take	Flowmeter	Flowmeter	Take	Flowmeter	Flowmeter	Take
(min)	(m <sup>3</sup> )	(litres)	(litres)	(m <sup>3</sup> )	(litres)	(litres)	(m <sup>3</sup> )	(litres)	(litres)	(m <sup>3</sup> )	(litres)	(litres)	(m <sup>3</sup> )	(litres)	(litres)
0	36.041	36041		36.053	36053		36.254	36254		0			0		
1	36.042	36042	1	36.055	36055	2	36.274	36274	20	0			0		
5	36.047	36047	5	36.09	36090	35	36.429	36429	155	0			0		
10	36.051	36051	4	36.184	36184	94	36.633	36633	204	0			0		
30	0			36.254	36254	70				0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		
0	0			0			0			0			0		



AVERAGE FLOW (litres / min)	1.00	AVERAGE FLOW (litres / min)	6.70	AVERAGE FLOW (litres / min)	37.90	AVERAGE FLOW (litres / min)		AVERAGE FLOW (litres / min)	
LUGEON VALUE	1.25	LUGEON VALUE	4.43	LUGEON VALUE	32.80	LUGEON VALUE	INCOMPLETE DATA	LUGEON VALUE	INCOMPLETE DATA
HYDRAULIC CONDUCTIVITY K (m/s)	1.53E-07	HYDRAULIC CONDUCTIVITY K (m/s)	5.40E-07	HYDRAULIC CONDUCTIVITY K (m/s)	4.00E-06	HYDRAULIC CONDUCTIVITY K (m/s)	INCOMPLETE DATA	HYDRAULIC CONDUCTIVITY K (m/s)	INCOMPLETE DATA

INTERPRETED K:	1.56E-06 (m/s)
INTERPRETED FLOW:	NO FLOW
TEST BY:	EHS
REVIEWED BY:	BG

Interpretation References:  
 Houslyby, A. (1976). Routine Interpretation of the Lugeon Water-Test. Q. J. Eng. Geol. Vol. 9, pp. 303-313.  
 Quiñones-Rozo, Camilo (2010):Lugeon test interpretation, revisited. In: Collaborative Management of Integrated Watersheds, US Society of Dams, 30th Annual Conference, S. 405-414.



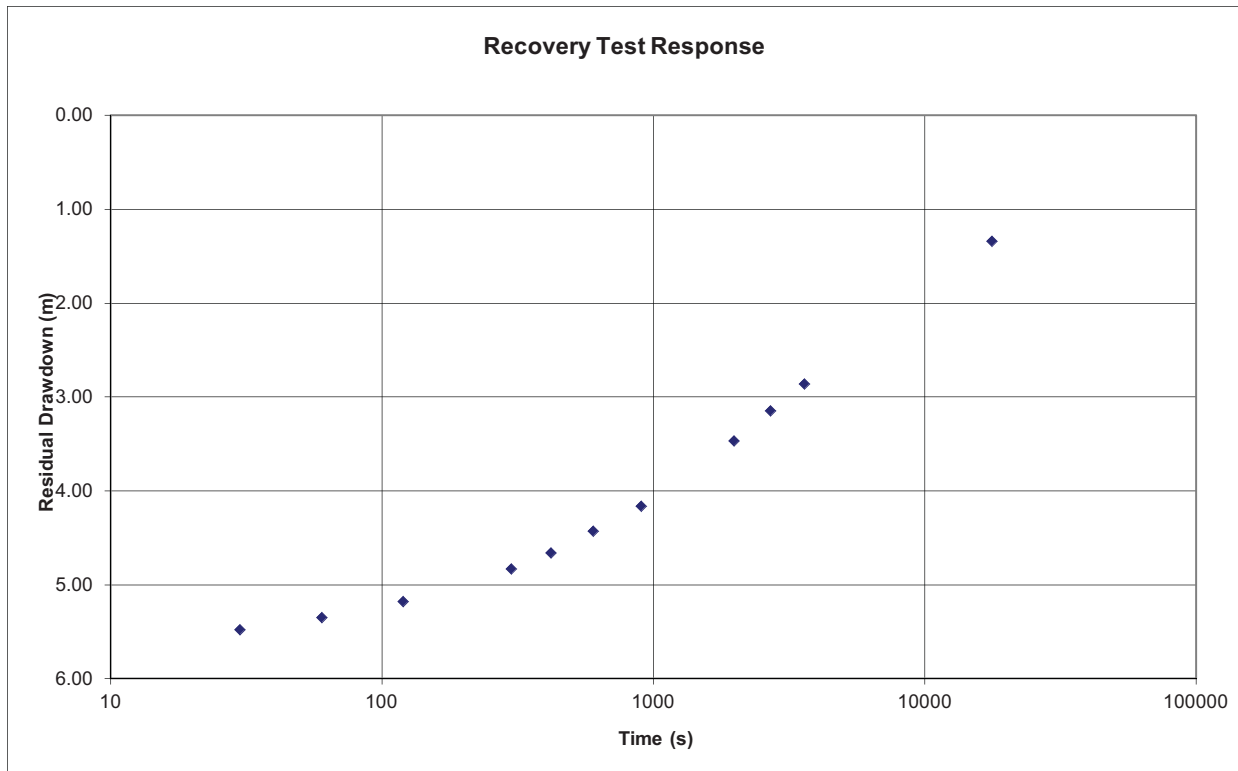
## Hydraulic Conductivity Calculations - Hvorslev

JOB #: TY910491.8000

WELL OW-25-IV

STATIC LEVEL (m top) 5.7300  
 BOREHOLE DIAMETER (m) 0.2000  
 RISER DIAMETER (m) 0.0510  
 FILTER PACK LENGTH (m) 3.5000

Time (seconds)	Water Level (m)	Drawdown (m)	Hydraulic Conductivity (m/s)
min			
0	0.00	5.73	
30	0.25	5.48	4.911E-07
60	0.38	5.35	2.643E-07
120	0.55	5.18	1.777E-07
300	0.90	4.83	1.284E-07
420	1.07	4.66	9.861E-08
600	1.30	4.43	9.287E-08
900	1.57	4.16	6.923E-08
1980	2.26	3.47	5.546E-08
2700	2.58	3.15	4.438E-08
3600	2.87	2.86	3.544E-08
17700	4.39	1.34	1.776E-08
Geometric Mean of Hydraulic Conductivity (m/s):			8.94E-08



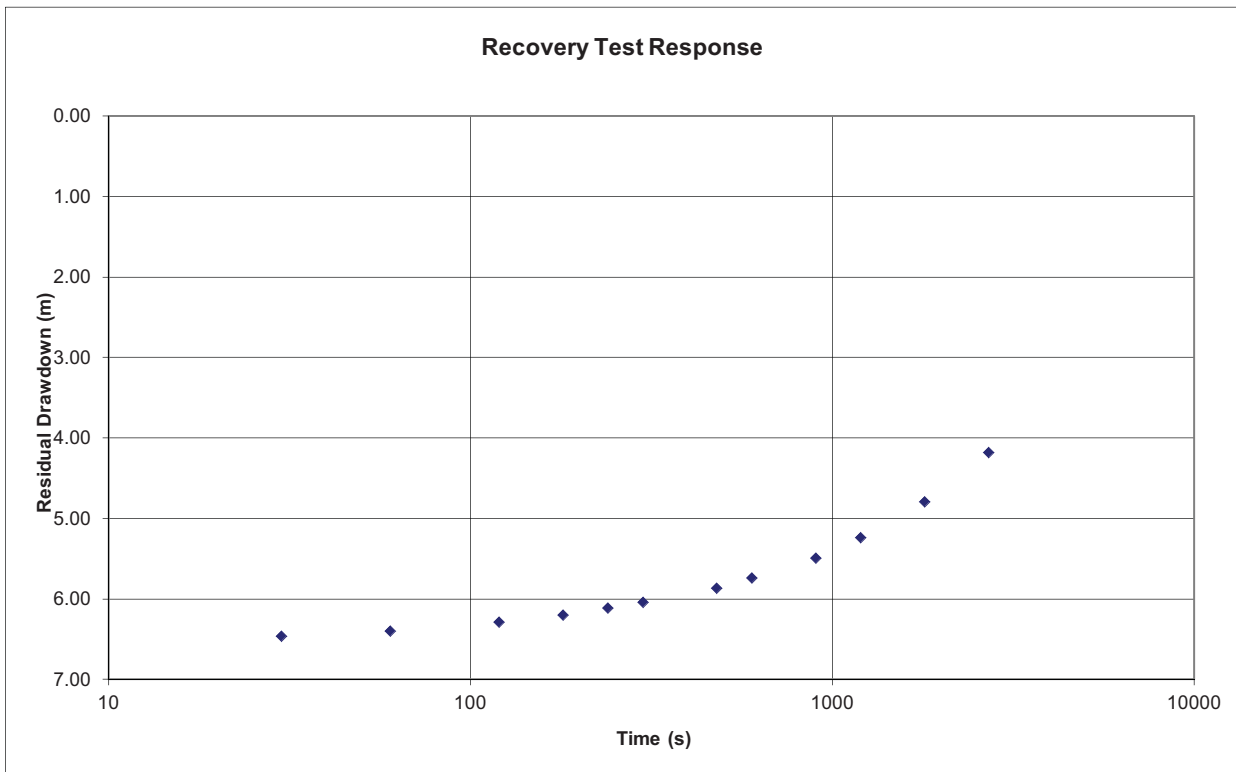
## Hydraulic Conductivity Calculations - Hvorslev

JOB #: TY910491.8000

WELL OW-30-III

STATIC LEVEL (m top) 6.6500  
 BOREHOLE DIAMETER (m) 0.2000  
 RISER DIAMETER (m) 0.0510  
 FILTER PACK LENGTH (m) 3.5000

Time (seconds)	Water Level (m)	Drawdown (m)	Hydraulic Conductivity (m/s)
min			
0	0.00	6.65	
30	0.19	6.46	3.191E-07
60	0.25	6.40	1.027E-07
120	0.36	6.29	9.543E-08
180	0.45	6.20	7.933E-08
240	0.54	6.11	8.049E-08
300	0.61	6.04	6.343E-08
480	0.78	5.87	5.238E-08
600	0.91	5.74	6.164E-08
900	1.16	5.49	4.902E-08
1200	1.41	5.24	5.131E-08
1800	1.86	4.79	4.942E-08
2700	2.47	4.18	4.999E-08
3600	3.15	3.50	6.515E-08
Geometric Mean of Hydraulic Conductivity (m/s):			7.29E-08



# Appendix D

## Summary of Groundwater Elevations





Summary of Groundwater Elevations

Monitor No.	UTM Coordinates		Current Measuring Point Elevation (masl) <sup>(1)</sup>	Elevation of Water (masl) <sup>(1)</sup>																													
	Eastings	Northing		Jun-14	Jul-14	Sep-14	May-15	Jul-15	Sep-15	May-16	Jul-16	Sep-16	May-17	Jul-17	Sep-17	May-18	Jul-18	Oct-18	May-19	Jul-19	Sep-19	Jun-20	Aug-20	Oct-20	Jun-21	Aug-21	Oct-21	May-22	Aug-22	Oct-22	Jun-23	Aug-23	Oct-23
OW-1R-I	596848	5262959	254.17	251.84	251.22	251.72	251.60	250.82	250.95	251.90	251.20	250.61	251.84	251.53	251.59	251.98	251.38	251.53	252.53	251.39	251.51	251.77	251.75	252.02	251.36	251.87	251.65	252.34	251.46	251.58	251.45	251.47	252.43
OW-1R-II	596848	5262959	254.06	251.67	251.02	251.62	251.41	250.87	251.01	251.55	250.97	250.72	251.59	251.49	251.56	251.89	251.22	251.50	252.34	251.36	251.48	251.77	251.74	251.93	251.35	251.77	251.67	251.56	251.36	251.56	251.31	251.41	252.33
OW-1R-III	596848	5262959	254.19	252.97	252.16	252.74	252.76	252.15	252.47	252.85	252.99	251.96	252.75	252.36	252.41	252.77	252.25	252.38	252.82	252.29	252.37	252.68	252.59	252.75	252.25	252.73	252.64	252.46	252.05	252.55	252.39	252.11	252.92
OW-2B	596919	5263040	247.26	ND	246.31																												
OW-2C	596919	5263040	247.14	ND	245.11																												
OW-3A	596974	5263111	244.55	243.28	242.41																												
OW-3B	596974	5263111	244.50	243.55	242.67																												
OW-4A	596978	5262870	251.20	250.14	249.23																												
OW-4C	596978	5262870	251.31	249.52	249.85																												
OW-5A	596879	5262883	253.48	250.32	250.09																												
OW-6A	596973	5262769	254.32	253.15	252.93																												
OW-6B	596973	5262769	254.35	252.34	252.28																												
OW-7A	596895	5262781	255.83	252.45	252.22																												
OW-7B	596895	5262781	256.01	252.51	252.26																												
OW-7C	596895	5262781	255.90	248.30	248.13																												
OW-8A	597088	5262770	249.47	248.15	248.03																												
OW-8B	597088	5262770	249.54																														
OW-9A	597071	5262876	247.25	245.45	245.45																												
OW-9B	597071	5262876	247.33	245.14	245.36																												
OW-10-I	596724	5263229	251.67	249.76	248.82	249.78	249.68	248.85	249.28	249.79	247.85	248.52	249.64	249.15	249.43	249.57	248.63	249.61	249.83	248.83	249.37	249.69	249.58	249.91	249.07	249.79	249.70	249.63	248.53	249.69	249.43	249.43	249.84
OW-10-II	596724	5263229	251.69	249.76	248.92	250.14	250.16	248.92	249.71	250.27	248.86	248.50	250.25	249.56	249.91	250.22	248.63	249.97	250.45	248.84	249.65	250.12	249.85	250.39	249.32	250.04	249.94	250.08	248.48	250.2	249.73	249.59	250.33
OW-10-III	596724	5263229	ND																														
OW-11-I	597001	5263159	242.93	241.18	240.33	241.03	241.13	240.47	239.91	240.93	240.54	238.90	240.61	240.86	240.88	240.90	240.29	240.71	240.51	240.48	240.62	240.94	240.69	240.65	240.83	240.91	241.00	240.81	241.00	240.91	240.78	240.93	
OW-11-II	597001	5263159	242.82	241.37	240.82	241.27	241.34	240.80	240.73	241.34	240.26	240.34	241.31	240.76	240.94	241.30	240.44	240.85	241.20	240.51	240.79	241.07	240.85	241.07	240.77	240.98	240.72	240.98	240.4	240.83	240.92	240.66	241.09
OW-12-I	597007	5262919	248.92	246.73	246.69	246.86	247.10	246.74	246.97	247.07	246.40	246.48	247.03	246.83	246.92	247.03	246.79	247.05	247.14	246.65	247.05	247.10	247.03	247.18	246.94	247.13	247.12	246.08	246.52	247.12	247.13	247.16	247.32
OW-12-II	597007	5262919	248.95	246.86	246.69	246.91	247.22	246.79	247.11	247.17	246.46	246.55	247.15	246.85	246.98	247.11	246.91	247.02	247.16	246.59	247.07	247.17	246.99	247.17	246.92	247.15	247.01	246.97	246.55	246.96	247.42	246.02	247.21
OW-13-I	596602	5262921	273.70	264.94	264.02	264.71	264.77	264.12	264.27	265.64	264.13	263.78	265.02	264.26	264.24	265.31	263.94	264.03	266.28	264.12	263.85	264.37	264.37	264.80	264.14	267.05	264.45	264.69	263.86	264.54	264.74	264.30	265.97
OW-13-II	596602	5262921	273.85	268.66	268.59	268.64	268.67	268.60	268.47	268.66	268.57	268.52	268.62	268.59	268.61	268.72	268.53	268.47	268.70	268.59	268.53	268.64	268.63	268.67	268.39	268.64	268.60	268.64	268.4	268.6	268.69	268.57	268.68
OW-14-I	596877	5262674	258.81	253.95	253.76	254.03	254.02	253.74	253.41	254.05	253.77	253.78	254.05	253.95	253.99	254.06	253.76	253.00	254.15	253.77	254.02	254.10	254.17	254.21	253.72	ND	254.21	254.08	253.85	254.14	254.08	254.15	254.30
OW-14-II	596877	5262674	258.72	255.09	254.88	254.99	254.97	254.84	254.50	255.12	254.86	254.83	255.03	254.88	254.88	255.04	254.86	254.89	255.32	254.82	254.88	254.97	254.92	255.13	254.64	ND	254.96	255.02	255.05	254.89	254.99	254.91	255.04
OW-15-I	597059	5262605	254.32																														
OW-15-II	597059	5262605	254.40																														
OW-16-I	597372	5263132	238.59	235.16	234.66	234.94	235.22	234.91	234.29	235.29	234.69	234.14	234.91	234.81	236.06	234.94	234.57	234.07	235.34	235.00	234.49	235.12	235.13	235.03	235.42	235.40	234.98	235.42	231.73	234.98	235.38	234.75	234.75
OW-16-II	597372	5263132	238.73	235.67	232.74	233.95	235.56	232.22	231.77	236.25	234.14	234.69	236.08	233.75	234.44	235.49	232.38	233.30	236.23	233.63	232.67	236.28	234.07	232.29	236.18	234.53	232.15	235.47	232.1	233.38	236.08	232.54	233.26
OW-16-III	597372	5263132	238.94	236.74	236.27	236.81	237.07	236.82	237.35	235.64	235.98	237.38	236.59	236.93	237.23	235.58	237.29	237.64	235.03	237.94	238.04	237.38	238.03	237.35	237.99	237.70							
OW-17-I	597359	5263362	230.08	229.60	229.23	229.34	229.54	229.35	228.93	229.67	229.21	228.68	229.39	229.24	229.14	229.44	229.00	228.58	229.71	227.78	228.78	229.46	229.32	229.29	229.34	229.56	229.24	229.62	228.91	229.01	229.36	228.88	229.30
OW-17-II	597359	5263362	229.88	228.51	226.16	227.31	228.64	227.54	226.38	228.67	226.29	226.48	228.21	227.59	226.96	228.42	227.09	226.50	228.78	229.04	226.44	228.21	227.63	227.02	228.13	227.66	226.73	228.67	226.69	226.02	227.81	226.58	226.49
OW-17-III	597359	5263362	230.04	228.54	227.32	227.11	228.64	226.54	226.26	228.86	227.76	226.26	228.71	226.89	226.26	228.64	226.26	228.81	226.28	227.94	226.89	226.30	227.48	227.									

# Appendix E

## 2023 Laboratory Analytical Reports





## FINAL REPORT

CA15703-JUN23 R1

TY131010.2023.1000.1142.5730-00, New Liskeard SW

Prepared for

**WSP Environment & Infrastructure Canada Limited**

## First Page

### CLIENT DETAILS

Client WSP Environment & Infrastructure Canada Limited

Address 131 Fielding Road  
Lively, ON  
P3Y 1L7, Canada

Contact Dominique Gagnon

Telephone 705-665-0159

Facsimile

Email Dominique.Gagnon@wsp.com; meg.russell@wsp.com

Project TY131010.2023.1000.1142.5730-00, New Liskeard SW

Order Number

Samples Surface Water (6)

### LABORATORY DETAILS

Project Specialist Maarit Wolfe, Hon.B.Sc

Laboratory SGS Canada Inc.

Address 185 Concession St., Lakefield ON, K0L 2H0

Telephone 705-652-2000

Facsimile 705-652-6365

Email Maarit.Wolfe@sgs.com

SGS Reference CA15703-JUN23

Received 06/21/2023

Approved 06/28/2023

Report Number CA15703-JUN23 R1

Date Reported 06/28/2023

### COMMENTS

Temperature of Sample upon Receipt: 4

Cooling Agent Present: Yes

Custody Seal Present: Yes

Chain of Custody Number: n/a

### SIGNATORIES

Maarit Wolfe, Hon.B.Sc



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Annexes.....	13





# FINAL REPORT

CA15703-JUN23 R1

**Client:** WSP Environment & Infrastructure Canada Limited

**Project:** TY131010.2023.1000.1142.5730-00, New Liskeard SW

**Project Manager:** Dominique Gagnon

**Samplers:** Aedan Lemon

MATRIX: WATER

Sample Number	6	7	8	9	10	11
Sample Name	SW-1	SW-2	SW-4	SW-5	SW-6	SW DUP
Sample Matrix	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sample Date	19/06/2023	19/06/2023	19/06/2023	19/06/2023	19/06/2023	19/06/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	
<b>General Chemistry</b>									
Biochemical Oxygen Demand (BOD5)	mg/L	2	< 4 †	< 4 †	< 4 †	< 4 †	< 4 †	< 4 †	
Total Suspended Solids	mg/L	2	22	2	23	46	42	39	
Alkalinity	mg/L as CaCO3	2	64	341	323	26	26	25	
Conductivity	uS/cm	2	153	780	3580	75	72	77	
Total Dissolved Solids	mg/L	30	123	431	2050	66	77	83	
Chemical Oxygen Demand	mg/L	8	20	14	26	19	23	38	
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05	0.18	0.25	< 0.05	0.14	0.25	0.14	
Ammonia+Ammonium (N)	as N mg/L	0.04	0.06	0.05	0.08	< 0.04	< 0.04	0.04	

### Metals and Inorganics

Sulphate	mg/L	2	6	< 2	15	7	6	6
Nitrite (as N)	as N mg/L	0.03	< 0.03	< 0.03	< 0.3 †	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06	< 0.06	< 0.06	< 0.06	0.17	0.18	0.17
Nitrate + Nitrite (as N)	as N mg/L	0.06	< 0.06	< 0.06	< 0.3 †	0.17	0.18	0.17
Arsenic (total)	mg/L	0.0002	0.0011	0.0009	0.0012	0.0013	0.0011	0.0012
Barium (total)	mg/L	0.00008	0.0148	0.0204	0.0857	0.0287	0.0201	0.0228
Boron (total)	mg/L	0.002	0.010	0.018	0.019	0.007	0.006	0.006
Cadmium (total)	mg/L	0.000003	0.000008	< 0.000003	0.000010	0.000035	0.000035	0.000037
Chromium (total)	mg/L	0.00008	0.00208	0.00044	0.00126	0.00633	0.00343	0.00426
Copper (total)	mg/L	0.0002	0.0020	0.0012	0.0021	0.0070	0.0041	0.0048
Iron (total)	mg/L	0.007	0.828	0.158	0.845	2.66	1.45	1.80
Lead (total)	mg/L	0.00009	0.00038	< 0.00009	0.00019	0.00238	0.00076	0.00172
Phosphorus (total)	mg/L	0.003	0.030	0.027	0.067	0.061	0.047	0.050



# FINAL REPORT

CA15703-JUN23 R1

**Client:** WSP Environment & Infrastructure Canada Limited

**Project:** TY131010.2023.1000.1142.5730-00, New Liskeard SW

**Project Manager:** Dominique Gagnon

**Samplers:** Aedan Lemon

MATRIX: WATER

Sample Number	6	7	8	9	10	11
<b>Sample Name</b>	SW-1	SW-2	SW-4	SW-5	SW-6	SW DUP
<b>Sample Matrix</b>	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
<b>Sample Date</b>	19/06/2023	19/06/2023	19/06/2023	19/06/2023	19/06/2023	19/06/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	
<b>Metals and Inorganics (continued)</b>									
Zinc (total)	mg/L	0.002	0.003	0.004	0.003	0.012	0.008	0.008	
<b>Other (ORP)</b>									
pH	No unit	0.05	7.96	8.20	8.10	7.56	7.58	7.67	
Chloride	mg/L	1	7	36	1400	6	3	5	
Mercury (dissolved)	mg/L	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	
<b>Phenols</b>									
4AAP-Phenolics	mg/L	0.001	< 0.001	< 0.001	0.003	< 0.001	< 0.001	< 0.001	

## QC SUMMARY

### Alkalinity

Method: SM 2320 | Internal ref.: ME-CA-1ENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0538-JUN23	mg/L as CaCO3	2	< 2	0	20	100	80	120	NA		

### Ammonia by SFA

Method: SM 4500 | Internal ref.: ME-CA-1ENVISFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0221-JUN23	mg/L	0.04	<0.04	ND	10	106	90	110	97	75	125
Ammonia+Ammonium (N)	SKA0246-JUN23	mg/L	0.04	<0.04	1	10	99	90	110	97	75	125

## QC SUMMARY

### Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO5099-JUN23	mg/L	1	<1	ND	20	103	80	120	119	75	125
Sulphate	DIO5099-JUN23	mg/L	2	<2	ND	20	112	80	120	120	75	125

### Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-IENVIIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nitrate + Nitrite (as N)	DIO0681-JUN23	mg/L	0.06	<0.06	NA		NA			NA		
Nitrite (as N)	DIO0681-JUN23	mg/L	0.03	<0.03	ND	20	98	90	110	100	75	125
Nitrate (as N)	DIO0681-JUN23	mg/L	0.06	<0.06	1	20	97	90	110	97	75	125
Nitrite (as N)	DIO0706-JUN23	mg/L	0.03	<0.03	8	20	100	90	110	103	75	125

## QC SUMMARY

### Biochemical Oxygen Demand

Method: SM 5210 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0047-JUN23	mg/L	2	< 2	22	30	110	70	130	NV	70	130

### Chemical Oxygen Demand

Method: HACH 8000 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chemical Oxygen Demand	EWL0530-JUN23	mg/L	8	<8	4	20	106	80	120	105	75	125
Chemical Oxygen Demand	EWL0559-JUN23	mg/L	8	<8	12	20	110	80	120	104	75	125
Chemical Oxygen Demand	EWL0568-JUN23	mg/L	8	<8	ND	20	104	80	120	94	75	125



# FINAL REPORT

CA15703-JUN23 R1

## QC SUMMARY

### Conductivity

Method: SM 2510 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0538-JUN23	uS/cm	2	< 2	0	20	100	90	110	NA		

### Mercury by CVAAS

Method: EPA 7471A/SM 3112B | Internal ref.: ME-CA-IENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (dissolved)	EHG0045-JUN23	mg/L	0.00001	< 0.00001	ND	20	93	80	120	88	70	130

## QC SUMMARY

### Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Arsenic (total)	EMS0213-JUN23	mg/L	0.0002	<0.0002	4	20	101	90	110	110	70	130
Barium (total)	EMS0213-JUN23	mg/L	0.00008	<0.00008	2	20	94	90	110	126	70	130
Boron (total)	EMS0213-JUN23	mg/L	0.002	<0.002	6	20	99	90	110	92	70	130
Cadmium (total)	EMS0213-JUN23	mg/L	0.000003	<0.000003	15	20	100	90	110	107	70	130
Chromium (total)	EMS0213-JUN23	mg/L	0.00008	<0.00008	4	20	102	90	110	116	70	130
Copper (total)	EMS0213-JUN23	mg/L	0.0002	<0.0002	4	20	103	90	110	111	70	130
Iron (total)	EMS0213-JUN23	mg/L	0.007	<0.007	3	20	104	90	110	125	70	130
Lead (total)	EMS0213-JUN23	mg/L	0.00009	<0.00009	8	20	100	90	110	96	70	130
Phosphorus (total)	EMS0213-JUN23	mg/L	0.003	<0.003	ND	20	99	90	110	NV	70	130
Zinc (total)	EMS0213-JUN23	mg/L	0.002	<0.002	3	20	98	90	110	107	70	130

### pH

Method: SM 4500 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0538-JUN23	No unit	0.05	NA	0		99			NA		



# FINAL REPORT

CA15703-JUN23 R1

## QC SUMMARY

### Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-IENVISFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0237-JUN23	mg/L	0.001	<0.001	ND	10	100	80	120	92	75	125

### Solids Analysis

Method: SM 2540C | Internal ref.: ME-CA-IENVIEWL-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Dissolved Solids	EWL0515-JUN23	mg/L	30	<30	0	20	101	80	120	NA		
Total Dissolved Solids	EWL0517-JUN23	mg/L	30	<30	0	20	102	80	120	NA		

### Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-IENVIEWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0560-JUN23	mg/L	2	< 2	0	10	98	90	110	NA		



## QC SUMMARY

### Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-IENVISFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen (N)	SKA0238-JUN23	mg/L	0.05	<0.05	ND	10	102	90	110	100	75	125
Total Kjeldahl Nitrogen (N)	SKA0253-JUN23	mg/L	0.05	<0.05	ND	10	101	90	110	103	75	125

**Method Blank:** a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

**Duplicate:** Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

**LCS/Spike Blank:** Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

**Matrix Spike:** A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

**Reference Material:** a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

**RL:** Reporting limit

**RPD:** Relative percent difference

**AC:** Acceptance criteria

**Multielement Scan Qualifier:** as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

**Duplicate Qualifier:** for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

**Matrix Spike Qualifier:** for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

## LEGEND

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### FOOTNOTES

**NSS** Insufficient sample for analysis.  
**RL** Reporting Limit.  
   ↑ Reporting limit raised.  
   ↓ Reporting limit lowered.  
**NA** The sample was not analysed for this analyte  
**ND** Non Detect

Results relate only to the sample tested.

Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.

"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

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This report supersedes all previous versions.

-- End of Analytical Report --



### Request for Laboratory Services and CHAIN OF CUSTODY (General)

SGS Environmental Services - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Toll Free: 877-747-7658 Fax: 705-652-6365 Web: www.ca.sgs.com {4}

SGS Environmental Services - London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361 Web: www.ca.sgs.com {4}

#### Laboratory Information Section

Received Date (mm/dd/yyyy): JUN 21 2023

LAB LIMS #: CA15703-jun23

Received Time (After Hours Only):

Temperature Upon Receipt (°C): 41.3, 6

#### Billing & Reporting Information

Invoice/Receipt to {3}:  
 Company: WSP *E&S Canada Limited*  
 Attention: Dominique Gagnon  
 Address: 131 Fielding Rd  
 Lively, Ontario  
 P3Y 1L7  
 Email: dominique.gagnon@wsp.com

Quote #: 2021 1248  
 Attached Parameter List: 1246  YES  NO  
 Turnaround Time  
 Is \*Rush Turnaround Time Required?  YES  NO  
 Specify:  
 \* Rush TA Requests Require Lab Approval

Project Name/Number: TY131010 - NEW LISKEARD SW

P.O. #:

Client Lab #:

#### Client Information/Report To:

Company Name: WSP  
 Contact Name:  
 Address:  
 Copy to:

Phone Number: 705-682-2632  
 Fax Number:  
 E-mail:

#### Sample Information

Sample Identifier	Date Sampled (mm/dd/yy)	Time Sampled	# of Bottles	Analysis Requested (please enter the analysis required below and check off which analysis applies to each sample)								
				Comprehensive SW-Column 3								
SW-1	6/19/23	5:59pm	9	X								
SW-2	6/19/23	6:22pm	9	X								
<del>SW-3</del>				<del>X</del>								
SW-4	6/19/23	6:40pm	9	X								
SW-5	6/19/23	7:24pm	9	X								
SW-6	6/19/23	7:07pm	9	X								
SW DUP	6/19/23		9	X								

Sampled By {1}: (Name) *Aedan Vernon* (Signature) *Aedan Vernon* Date: 06.19.23 (mm/dd/yy)  
 Relinquished by {2}: (Name) *Aedan Vernon* (Signature) *Aedan Vernon* Date: 06.20.23 (mm/dd/yy)

Note: {1} Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. {4} Completion of work may require the subcontracting of samples between the London and Lakefield laboratories.

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## FINAL REPORT

CA15726-JUN23 R

TY131010.2023.1000.1142.5730-00 NEW LISKEARD Supply Well

Prepared for

**WSP E & I Canada Ltd**

**First Page**

**CLIENT DETAILS**

**LABORATORY DETAILS**

Client	WSP E & I Canada Ltd	Project Specialist	Maarit Wolfe, Hon.B.Sc
Address	131 Fielding Road Lively, ON P3Y 1L7, Canada	Laboratory	SGS Canada Inc.
Contact	Dominique Gagnon	Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-665-0159	Telephone	705-652-2000
Facsimile		Facsimile	705-652-6365
Email	Dominique.Gagnon@wsp.com; meg.russell@wsp.com	Email	Maarit.Wolfe@sgs.com
Project	TY131010.2023.1000.1142.5730-00 NEW LISKEARD Supply V	SGS Reference	CA15726-JUN23
Order Number		Received	06/22/2023
Samples	Ground Water (7)	Approved	06/29/2023
		Report Number	CA15726-JUN23 R
		Date Reported	06/29/2023

**COMMENTS**

Temperature of Sample upon Receipt: 13 degrees C  
 Cooling Agent Present: Yes  
 Custody Seal Present: Yes  
  
 Chain of Custody Number: n/a

**SIGNATORIES**

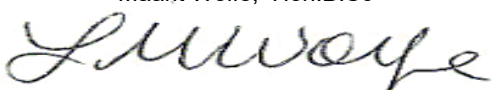
Maarit Wolfe, Hon.B.Sc  


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# FINAL REPORT

CA15726-JUN23 R

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 NEW LISKEARD Supply Well

**Project Manager:** Dominique Gagnon

**Samplers:** Aedon Lemon

MATRIX: WATER

Sample Number	7	8	9	10	11	12	13
<b>Sample Name</b>	WS-7	WS-8	WS-9	WS-13	WS-14	WS-16	NL Res Dup
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	19/06/2023	20/06/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result
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## General Chemistry

Alkalinity	mg/L as CaCO3	2	361	314	285	301	322	342	378
Conductivity	uS/cm	2	768	679	731	582	605	648	775
Total Dissolved Solids	mg/L	30	463	406	426	334	357	389	446
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05	0.16	0.15	0.05	0.13	0.32	0.19	0.22
Ammonia+Ammonium (N)	as N mg/L	0.04	< 0.04	0.14	0.04	0.04	0.26	0.14	0.07
Organic Nitrogen	mg/L	0.05	0.13	< 0.05	< 0.05	0.09	0.06	0.05	0.15
Dissolved Organic Carbon	mg/L	1	1	2	1	3	1	1	2
Total Reactive Phosphorous (o-phosphate as P)	mg/L	0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03

## Metals and Inorganics

Fluoride	mg/L	0.06	0.14	0.23	0.96	< 0.06	0.43	0.25	0.11
Sulphate	mg/L	2	28	30	84	19	11	15	28
Nitrite (as N)	as N mg/L	0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06	< 0.06	< 0.06	< 0.06	0.07	< 0.06	< 0.06	< 0.06
Hardness (dissolved)	mg/L as CaCO3	0.05	391	354	2.11	314	317	347	387
Aluminum (dissolved)	mg/L	0.001	0.016	0.002	< 0.001	0.002	< 0.001	< 0.001	0.004
Arsenic (dissolved)	mg/L	0.0002	< 0.0002	0.0012	0.0011	< 0.0002	0.0029	0.0035	< 0.0002
Barium (dissolved)	mg/L	0.00008	0.06948	0.05782	0.00049	0.01806	0.07729	0.08941	0.06912
Beryllium (dissolved)	mg/L	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth (dissolved)	mg/L	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron (dissolved)	mg/L	0.002	0.009	0.011	0.299	0.025	0.070	0.026	0.007
Calcium (dissolved)	mg/L	0.01	100	87.8	0.42	84.1	73.8	84.7	99.8



# FINAL REPORT

CA15726-JUN23 R

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 NEW LISKEARD Supply Well

**Project Manager:** Dominique Gagnon

**Samplers:** Aedon Lemon

MATRIX: WATER

Sample Number	7	8	9	10	11	12	13
<b>Sample Name</b>	WS-7	WS-8	WS-9	WS-13	WS-14	WS-16	NL Res Dup
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	19/06/2023	20/06/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result
<b>Metals and Inorganics (continued)</b>									
Cadmium (dissolved)	mg/L	0.000003	< 0.000003	< 0.000003	0.000003	0.000014	0.000003	< 0.000003	< 0.000003
Cobalt (dissolved)	mg/L	0.000004	0.000071	0.000028	0.000027	0.000026	0.000136	0.000170	0.000063
Chromium (dissolved)	mg/L	0.00008	< 0.00008	< 0.00008	< 0.00008	0.00022	0.00009	< 0.00008	0.00009
Copper (dissolved)	mg/L	0.0002	0.0031	0.0007	0.0043	0.0045	0.0007	0.0022	0.0007
Iron (dissolved)	mg/L	0.007	2.15	1.18	0.046	< 0.007	1.22	1.48	1.98
Potassium (dissolved)	mg/L	0.009	2.07	2.37	0.207	1.14	3.30	2.32	2.08
Lead (dissolved)	mg/L	0.00009	0.00013	< 0.00009	0.00046	0.00040	< 0.00009	0.00024	< 0.00009
Magnesium (dissolved)	mg/L	0.001	34.1	32.6	0.258	25.3	32.1	32.9	33.5
Manganese (dissolved)	mg/L	0.00001	0.03080	0.02731	0.00057	0.00004	0.01188	0.01607	0.03057
Molybdenum (dissolved)	mg/L	0.00004	0.00067	0.00098	0.00370	0.00022	0.00222	0.00173	0.00067
Nickel (dissolved)	mg/L	0.0001	0.0022	0.0002	0.0006	0.0007	0.0003	0.0003	0.0008
Phosphorus (dissolved)	mg/L	0.003	0.014	0.010	< 0.003	< 0.003	< 0.003	< 0.003	0.012
Selenium (dissolved)	mg/L	0.00004	< 0.00004	< 0.00004	< 0.00004	0.00016	< 0.00004	< 0.00004	< 0.00004
Sodium (dissolved)	mg/L	0.01	17.4	8.64	162	5.11	9.56	6.65	17.0
Silicon (dissolved)	mg/L	0.02	7.30	9.14	5.94	4.52	4.70	5.28	7.13
Silver (dissolved)	mg/L	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Strontium (dissolved)	mg/L	0.00008	0.180	0.218	0.02785	0.135	1.48	0.519	0.174
Sulfur (dissolved)	mg/L	3	8	9	30	6	3	5	8
Thallium (dissolved)	mg/L	0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.000011	< 0.000005
Tin (dissolved)	mg/L	0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006
Titanium (dissolved)	mg/L	0.00007	< 0.00007	0.00041	< 0.00007	0.00010	< 0.00007	< 0.00007	< 0.00007
Uranium (dissolved)	mg/L	0.000002	0.000062	0.000248	0.000225	0.000579	0.000815	0.001306	0.000065





# FINAL REPORT

CA15726-JUN23 R

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 NEW LISKEARD Supply Well

**Project Manager:** Dominique Gagnon

**Samplers:** Aedon Lemon

MATRIX: WATER

Sample Number	7	8	9	10	11	12	13
<b>Sample Name</b>	WS-7	WS-8	WS-9	WS-13	WS-14	WS-16	NL Res Dup
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	19/06/2023	20/06/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result
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**Metals and Inorganics (continued)**

Vanadium (dissolved)	mg/L	0.00001	0.00003	0.00004	0.00003	0.00030	< 0.00001	0.00001	0.00002
Zinc (dissolved)	mg/L	0.002	0.004	< 0.002	0.005	< 0.002	0.008	0.163	0.002

**Other (ORP)**

pH	No unit	0.05	8.04	8.07	8.12	7.96	8.07	7.98	8.04
Chloride	mg/L	1	31	24	10	6	< 1	2	31



# FINAL REPORT

CA15726-JUN23 R

## QC SUMMARY

### Alkalinity

Method: SM 2320 | Internal ref.: ME-CA-1ENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0538-JUN23	mg/L as CaCO3	2	< 2	0	20	100	80	120	NA		

### Ammonia by SFA

Method: SM 4500 | Internal ref.: ME-CA-1ENVISFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0231-JUN23	mg/L	0.04	<0.04	0	10	104	90	110	111	75	125

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO5103-JUN23	mg/L	1	<1	1	20	102	80	120	94	75	125
Sulphate	DIO5103-JUN23	mg/L	2	<2	ND	20	112	80	120	108	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-IENVIIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nitrite (as N)	DIO0686-JUN23	mg/L	0.03	<0.03	ND	20	100	90	110	105	75	125
Nitrate (as N)	DIO0686-JUN23	mg/L	0.06	<0.06	ND	20	101	90	110	101	75	125



# FINAL REPORT

CA15726-JUN23 R

## QC SUMMARY

### Carbon by SFA

Method: SM 5310 | Internal ref.: ME-CA-ENVI/SFA-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Dissolved Organic Carbon	SKA0249-JUN23	mg/L	1	<1	ND	20	101	90	110	94	75	125
Dissolved Organic Carbon	SKA0267-JUN23	mg/L	1	<1	1	20	99	90	110	101	75	125

### Conductivity

Method: SM 2510 | Internal ref.: ME-CA-ENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0538-JUN23	uS/cm	2	< 2	0	20	100	90	110	NA		

### Fluoride by Specific Ion Electrode

Method: SM 4500 | Internal ref.: ME-CA-ENVIEWL-LAK-AN-014

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Fluoride	EWL0708-JUN23	mg/L	0.06	<0.06	ND	10	96	90	110	87	75	125

## QC SUMMARY

### Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (dissolved)	EMS0218-JUN23	mg/L	0.00005	<0.00005	ND	20	99	90	110	104	70	130
Aluminum (dissolved)	EMS0218-JUN23	mg/L	0.001	<0.001	0	20	99	90	110	124	70	130
Arsenic (dissolved)	EMS0218-JUN23	mg/L	0.0002	<0.0002	11	20	104	90	110	106	70	130
Barium (dissolved)	EMS0218-JUN23	mg/L	0.00008	<0.00008	2	20	99	90	110	105	70	130
Beryllium (dissolved)	EMS0218-JUN23	mg/L	0.000007	<0.000007	ND	20	93	90	110	90	70	130
Boron (dissolved)	EMS0218-JUN23	mg/L	0.002	<0.002	0	20	91	90	110	94	70	130
Bismuth (dissolved)	EMS0218-JUN23	mg/L	0.00001	<0.00001	2	20	97	90	110	97	70	130
Calcium (dissolved)	EMS0218-JUN23	mg/L	0.01	<0.01	1	20	102	90	110	106	70	130
Cadmium (dissolved)	EMS0218-JUN23	mg/L	0.000003	<0.000003	18	20	101	90	110	101	70	130
Cobalt (dissolved)	EMS0218-JUN23	mg/L	0.000004	<0.000004	10	20	97	90	110	96	70	130
Chromium (dissolved)	EMS0218-JUN23	mg/L	0.00008	<0.00008	2	20	95	90	110	115	70	130
Copper (dissolved)	EMS0218-JUN23	mg/L	0.0002	<0.0002	4	20	97	90	110	103	70	130
Iron (dissolved)	EMS0218-JUN23	mg/L	0.007	<0.007	15	20	102	90	110	75	70	130
Potassium (dissolved)	EMS0218-JUN23	mg/L	0.009	<0.009	1	20	109	90	110	104	70	130
Magnesium (dissolved)	EMS0218-JUN23	mg/L	0.001	<0.001	2	20	100	90	110	104	70	130
Manganese (dissolved)	EMS0218-JUN23	mg/L	0.00001	<0.00001	0	20	102	90	110	105	70	130
Molybdenum (dissolved)	EMS0218-JUN23	mg/L	0.00004	<0.00004	7	20	98	90	110	110	70	130
Sodium (dissolved)	EMS0218-JUN23	mg/L	0.01	<0.01	1	20	96	90	110	103	70	130
Nickel (dissolved)	EMS0218-JUN23	mg/L	0.0001	<0.0001	1	20	100	90	110	98	70	130
Lead (dissolved)	EMS0218-JUN23	mg/L	0.00009	<0.00009	3	20	102	90	110	95	70	130

## QC SUMMARY

### Metals in aqueous samples - ICP-MS (continued)

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (dissolved)	EMS0218-JUN23	mg/L	0.003	<0.003	9	20	98	90	110	NV	70	130
Selenium (dissolved)	EMS0218-JUN23	mg/L	0.00004	<0.00004	14	20	107	90	110	92	70	130
Sulfur (dissolved)	EMS0218-JUN23	mg/L	3	<1	0	20	103	90	110	NV	70	130
Silicon (dissolved)	EMS0218-JUN23	mg/L	0.02	<0.02	1	20	95	90	110	NV	70	130
Tin (dissolved)	EMS0218-JUN23	mg/L	0.00006	<0.00006	1	20	101	90	110	NV	70	130
Strontium (dissolved)	EMS0218-JUN23	mg/L	0.00008	<0.00008	1	20	104	90	110	101	70	130
Titanium (dissolved)	EMS0218-JUN23	mg/L	0.00007	<0.00005	6	20	107	90	110	NV	70	130
Thallium (dissolved)	EMS0218-JUN23	mg/L	0.000005	<0.000005	ND	20	96	90	110	96	70	130
Uranium (dissolved)	EMS0218-JUN23	mg/L	0.000002	<0.000002	0	20	97	90	110	104	70	130
Vanadium (dissolved)	EMS0218-JUN23	mg/L	0.00001	<0.00001	2	20	96	90	110	103	70	130
Zinc (dissolved)	EMS0218-JUN23	mg/L	0.002	<0.002	1	20	93	90	110	124	70	130

### pH

Method: SM 4500 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0538-JUN23	No unit	0.05	NA	0		99			NA		



# FINAL REPORT

CA15726-JUN23 R

## QC SUMMARY

### Reactive Phosphorus by SFA

Method: SM 4500-P F | Internal ref.: ME-CA-IENVISFA-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Reactive Phosphorous (o-phosphate as P)	SKA0247-JUN23	mg/L	0.03	<0.03	3	10	101	90	110	96	75	125

### Solids Analysis

Method: SM 2540C | Internal ref.: ME-CA-IENVIEWL-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Dissolved Solids	EWL0544-JUN23	mg/L	30	<30	0	20	90	80	120	NA		

QC SUMMARY

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-IENVISFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen (N)	SKA0238-JUN23	mg/L	0.05	<0.05	ND	10	102	90	110	100	75	125
Total Kjeldahl Nitrogen (N)	SKA0253-JUN23	mg/L	0.05	<0.05	ND	10	101	90	110	103	75	125

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

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

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

**Multielement Scan Qualifier:** as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

**Duplicate Qualifier:** for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

**Matrix Spike Qualifier:** for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.



## LEGEND

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### FOOTNOTES

- NSS** Insufficient sample for analysis.
- RL** Reporting Limit.
  - ↑ Reporting limit raised.
  - ↓ Reporting limit lowered.
- NA** The sample was not analysed for this analyte
- ND** Non Detect

Results relate only to the sample tested.

Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.

"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

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This report supersedes all previous versions.

-- End of Analytical Report --



### Request for Laboratory Services and CHAIN OF CUSTODY (General)

SGS Environmental Services - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Toll Free: 877-747-7658 Fax: 705-652-6365 Web: www.ca.sgs.com {4}

SGS Environmental Services - London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361 Web: www.ca.sgs.com {4}

#### Laboratory Information Section

Received Date (mm/dd/yyyy): JUN 22 2023 *km* LAB LIMS #: CA15726 - Jun 23  
 Received Time (After Hours Only): \_\_\_\_\_ Temperature Upon Receipt (°C): 13 x 3

#### Billing & Reporting Information

Invoice/Receipt to {3}:	Company:	WSP		Quote #:	2021 1246		
	Attention:	Dominique Gagnon		Attached Parameter List:	<input type="checkbox"/> YES <input type="checkbox"/> NO		
	Address:	131 Fielding Rd		Turnaround Time			
		Lively, Ontario		Is *Rush Turnaround Time Required? <input type="checkbox"/> YES <input type="checkbox"/> NO			
	P3Y 1L7		Specify: _____				
	Email: dominique.gagnon@wsp.com		* Rush TA Requests Require Lab Approval				
Project Name/Number:	TY131010 - NEW LISKEARD Supply Well	P.O. #:					

#### Client Information/Report To:

Company Name:	WSP	Phone Number:	705-682-2632
Contact Name:		Fax Number:	
Address:		E-mail:	
Copy to:			

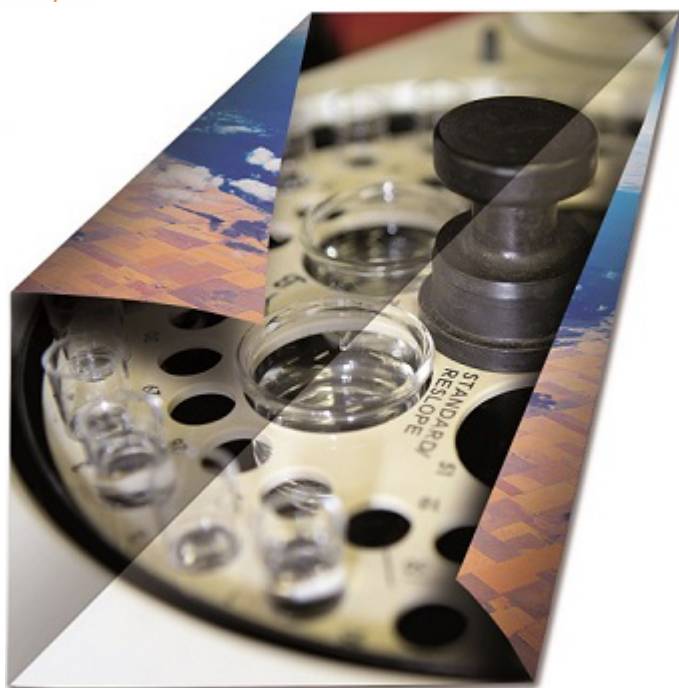
#### Sample Information

Sample Identifier	Date Sampled (mm/dd/yy)	Time Sampled # of bottles	# of Bottles Time Sample	Analysis Requested (please enter the analysis required below and check off which analysis applies to each sample)															
				New Liskeard Supply Wells Package															
WS-7	06/20/23	5	15:35	X															
WS-8	06/20/23	5	15:17	X															
WS-9	06/20/23	5	16:09	X															
WS-13	06/20/23	5	16:23	X															
WS-14	06/20/23	5	15:55	X															
<del>WS-15</del>				X															
WS-16	06/19/23	5	15:30	X															
NL Res Dup	06/20/23	5		X															

Sampled By {1}:	(Name) <i>Aggelon Lemon</i>	(Signature) <i>Aggelon Lemon</i>	Date:	<u>06/20/23</u>	(mm/dd/yy)
Relinquished by {2}:	(Name) <i>Aggelon Lemon</i>	(Signature) <i>Aggelon Lemon</i>	Date:	<u>06/21/23</u>	(mm/dd/yy)

Note: {1} Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. {4} Completion of work may require the subcontracting of samples between the London and Lakefield laboratories. This document is issued by the Company under its General Conditions of Service accessible at [http://www.sgs.com/terms\\_and\\_conditions.htm](http://www.sgs.com/terms_and_conditions.htm). (Printed copies are available upon request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

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km PP  
9:45



## FINAL REPORT

CA15728-JUN23 R1

TY131010.2023.1000.1142.5730-00 - New Liskeard LF GW

Prepared for

**WSP E & I Canada Ltd**

**First Page**

**CLIENT DETAILS**

**LABORATORY DETAILS**

Client	WSP E & I Canada Ltd	Project Specialist	Maarit Wolfe, Hon.B.Sc
Address	131 Fielding Road Lively, ON P3Y 1L7, Canada	Laboratory	SGS Canada Inc.
Contact	Dominique Gagnon	Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-665-0159	Telephone	705-652-2000
Facsimile		Facsimile	705-652-6365
Email	Dominique.Gagnon@wsp.com; meg.russell@wsp.com	Email	Maarit.Wolfe@sgs.com
Project	TY131010.2023.1000.1142.5730-00 - New Liskeard LF GW	SGS Reference	CA15728-JUN23
Order Number		Received	06/22/2023
Samples	Ground Water (30)	Approved	06/29/2023
		Report Number	CA15728-JUN23 R1
		Date Reported	06/29/2023

**COMMENTS**

Temperature of Sample upon Receipt: 12 degrees C  
 Cooling Agent Present: Yes  
 Custody Seal Present: Yes  
  
 Chain of Custody Number: n/a  
  
 TK RL raised fur tag 28 due to sample matrix

**SIGNATORIES**

Maarit Wolfe, Hon.B.Sc



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# FINAL REPORT

CA15728-JUN23 R1

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 - New Liskeard LF GW

**Project Manager:** Dominique Gagnon

**Samplers:** NA

MATRIX: WATER

Sample Number	7	8	9	10	11	12	13	14
<b>Sample Name</b>	OW-1R-I	OW-1-R-III	OW-10-I	OW-10-II	OW-11-I	OW-11-II	OW-12-I	OW-12-II
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	21/06/2023	21/06/2023	20/06/2023	20/06/2023	21/06/2023	21/06/2023	21/06/2023	21/06/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result	Result
<b>General Chemistry</b>										
Alkalinity	mg/L as CaCO3	2	975	797	275	274	252	429	328	531
Conductivity	uS/cm	2	2500	1850	698	678	582	1110	856	1240
Total Dissolved Solids	mg/L	30	1480	1130	466	489	280	700	594	757
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05	31.2	18.9	0.63	0.09	0.06	0.79	0.35	1.22
Ammonia+Ammonium (N)	as N mg/L	0.04	30.7	18.1	0.05	< 0.04	0.06	< 0.04	< 0.04	< 0.04
Organic Nitrogen	mg/L	0.05	0.46	0.86	0.58	0.06	< 0.05	0.77	0.39	1.20
Total Reactive Phosphorous (o-phosphate as P)	mg/L	0.03	0.04	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Dissolved Organic Carbon	mg/L	1	22	18	3	2	1	7	2	8

**Metals and Inorganics**

Sulphate	mg/L	2	98	91	110	110	42	130	78	81
Nitrite (as N)	as N mg/L	0.03	< 0.31	0.11	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06	0.30	0.40	< 0.06	0.06	< 0.06	< 0.06	< 0.06	< 0.06
Fluoride	mg/L	0.06	0.13	0.08	0.32	0.07	0.37	0.19	0.38	< 0.06
Hardness (dissolved)	mg/L as CaCO3	0.05	832	712	415	407	326	561	460	613
Aluminum (dissolved)	mg/L	0.001	0.009	0.002	0.002	0.003	< 0.001	0.001	< 0.001	0.001
Arsenic (dissolved)	mg/L	0.0002	0.0014	0.0004	< 0.0002	< 0.0002	< 0.0002	0.0002	< 0.0002	0.0002
Barium (dissolved)	mg/L	0.00008	0.103	0.120	0.0312	0.0174	0.0339	0.0296	0.0590	0.0366
Beryllium (dissolved)	mg/L	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth (dissolved)	mg/L	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron (dissolved)	mg/L	0.002	1.47	1.10	0.178	0.021	0.276	0.483	0.371	0.260
Calcium (dissolved)	mg/L	0.01	155	176	110	127	81.1	149	115	181



# FINAL REPORT

CA15728-JUN23 R1

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 - New Liskeard LF GW

**Project Manager:** Dominique Gagnon

**Samplers:** NA

MATRIX: WATER

Sample Number	7	8	9	10	11	12	13	14
<b>Sample Name</b>	OW-1R-I	OW-1-R-III	OW-10-I	OW-10-II	OW-11-I	OW-11-II	OW-12-I	OW-12-II
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	21/06/2023	21/06/2023	20/06/2023	20/06/2023	21/06/2023	21/06/2023	21/06/2023	21/06/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result	Result
<b>Metals and Inorganics (continued)</b>										
Cadmium (dissolved)	mg/L	0.000003	0.000013	0.000034	< 0.000003	< 0.000003	0.000007	< 0.000003	< 0.000003	< 0.000003
Chromium (dissolved)	mg/L	0.00008	0.00090	0.00057	0.00012	0.00014	0.00014	0.00025	0.00015	0.00031
Cobalt (dissolved)	mg/L	0.000004	0.0104	0.00484	0.000026	0.000043	0.000061	0.000191	0.000019	0.000247
Copper (dissolved)	mg/L	0.0002	0.0017	0.0088	0.0012	0.0015	0.0017	0.0015	0.0011	0.0016
Iron (dissolved)	mg/L	0.007	0.862	0.013	0.203	< 0.007	< 0.007	0.020	< 0.007	0.040
Potassium (dissolved)	mg/L	0.009	127	79.4	5.67	1.09	7.36	6.72	9.36	3.20
Magnesium (dissolved)	mg/L	0.001	108	66.1	33.9	22.0	29.9	46.1	41.9	39.4
Manganese (dissolved)	mg/L	0.00001	0.972	0.905	0.0359	0.00159	0.00221	0.0163	0.00043	0.0437
Molybdenum (dissolved)	mg/L	0.00004	0.00094	0.00077	0.00006	0.00016	0.00027	0.00093	0.00063	0.00020
Sodium (dissolved)	mg/L	0.01	181	95.8	4.67	1.96	16.2	47.9	19.4	66.6
Nickel (dissolved)	mg/L	0.0001	0.0578	0.0274	0.0002	0.0007	0.0017	0.0064	0.0031	0.0090
Phosphorus (dissolved)	mg/L	0.003	0.058	0.006	0.105	< 0.003	< 0.003	0.003	< 0.003	0.006
Lead (dissolved)	mg/L	0.00009	0.00023	0.00030	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Selenium (dissolved)	mg/L	0.00004	0.00032	0.00038	< 0.00004	0.00010	< 0.00004	0.00011	< 0.00004	0.00007
Silicon (dissolved)	mg/L	0.02	8.57	7.42	3.43	2.42	3.40	5.05	5.08	4.18
Silver (dissolved)	mg/L	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Strontium (dissolved)	mg/L	0.00008	1.09	0.873	1.23	0.178	2.18	0.300	2.33	0.467
Sulfur (dissolved)	mg/L	3	38	32	40	41	27	45	32	29
Thallium (dissolved)	mg/L	0.000005	0.000323	0.000233	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin (dissolved)	mg/L	0.00006	0.00030	0.00012	< 0.00006	< 0.00006	< 0.00006	< 0.00006	0.00006	0.00006
Titanium (dissolved)	mg/L	0.00007	0.00047	0.00016	0.00011	0.00009	< 0.00007	< 0.00007	< 0.00007	< 0.00007
Uranium (dissolved)	mg/L	0.000002	0.00188	0.00139	0.000023	0.000242	0.000318	0.000901	0.000476	0.000597



# FINAL REPORT

CA15728-JUN23 R1

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 - New Liskeard LF GW

**Project Manager:** Dominique Gagnon

**Samplers:** NA

MATRIX: WATER

Sample Number	7	8	9	10	11	12	13	14
<b>Sample Name</b>	OW-1R-I	OW-1-R-III	OW-10-I	OW-10-II	OW-11-I	OW-11-II	OW-12-I	OW-12-II
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	21/06/2023	21/06/2023	20/06/2023	20/06/2023	21/06/2023	21/06/2023	21/06/2023	21/06/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result	Result
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**Metals and Inorganics (continued)**

Vanadium (dissolved)	mg/L	0.00001	0.00040	0.00041	< 0.00001	0.00005	0.00006	0.00009	0.00008	0.00006
Zinc (dissolved)	mg/L	0.002	0.006	0.047	< 0.002	0.002	0.036	0.002	0.002	< 0.002

**Other (ORP)**

pH	No unit	0.05	7.84	7.85	8.13	8.09	8.11	7.97	8.14	8.02
Chloride	mg/L	1	280	99	4	1	16	52	49	59

MATRIX: WATER

Sample Number	15	16	17	18	19	20	21	22
<b>Sample Name</b>	OW-13-I	OW-16-I	OW-16-II	OW-17-1	OW-17-II	OW-17-III	OW-23-I	OW-23-II
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	21/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result	Result
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**General Chemistry**

Alkalinity	mg/L as CaCO3	2	376	307	166	236	280	356	209	219
Conductivity	uS/cm	2	822	549	496	462	632	643	406	615
Total Dissolved Solids	mg/L	30	540	400	286	297	426	397	286	383
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05	1.66	1.56	< 0.05	0.09	< 0.05	< 0.05	10.7	< 0.05
Ammonia+Ammonium (N)	as N mg/L	0.04	0.14	1.31	< 0.04	0.07	< 0.04	< 0.04	9.62	< 0.04
Organic Nitrogen	mg/L	0.05	1.52	0.25	< 0.05	< 0.05	< 0.05	< 0.05	1.07	< 0.05
Total Reactive Phosphorous (o-phosphate as P)	mg/L	0.03	0.27	0.17	< 0.03	< 0.03	0.03	< 0.03	0.38	< 0.03
Dissolved Organic Carbon	mg/L	1	8	10	2	3	1	3	< 1	3





# FINAL REPORT

CA15728-JUN23 R1

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 - New Liskeard LF GW

**Project Manager:** Dominique Gagnon

**Samplers:** NA

MATRIX: WATER

Sample Number	15	16	17	18	19	20	21	22
<b>Sample Name</b>	OW-13-I	OW-16-I	OW-16-II	OW-17-1	OW-17-II	OW-17-III	OW-23-I	OW-23-II
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	21/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result	Result
<b>Metals and Inorganics</b>										
Sulphate	mg/L	2	96	< 2	82	18	72	5	4	90
Nitrite (as N)	as N mg/L	0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.22	< 0.03
Nitrate (as N)	as N mg/L	0.06	< 0.06	< 0.06	0.09	< 0.06	0.07	< 0.06	< 0.06	0.13
Fluoride	mg/L	0.06	0.24	1.59	1.00	0.35	1.28	0.07	0.23	1.24
Hardness (dissolved)	mg/L as CaCO3	0.05	506	91.0	119	263	266	377	137	147
Aluminum (dissolved)	mg/L	0.001	0.002	0.005	0.010	< 0.001	0.068	0.006	0.009	0.002
Arsenic (dissolved)	mg/L	0.0002	0.0009	0.0004	0.0011	0.0003	0.0007	0.0013	0.0005	0.0006
Barium (dissolved)	mg/L	0.00008	0.0371	0.0421	0.0301	0.0305	0.0469	0.0174	0.0285	0.0324
Beryllium (dissolved)	mg/L	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth (dissolved)	mg/L	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron (dissolved)	mg/L	0.002	0.125	0.400	0.198	0.037	0.134	0.002	0.128	0.300
Calcium (dissolved)	mg/L	0.01	133	17.2	24.7	72.0	51.9	103	32.6	27.3
Cadmium (dissolved)	mg/L	0.000003	0.000007	< 0.000003	0.000015	< 0.000003	0.000009	< 0.000003	0.000071	0.000017
Chromium (dissolved)	mg/L	0.00008	0.00017	0.00048	0.00036	0.00012	0.00056	0.00015	0.00021	0.00040
Cobalt (dissolved)	mg/L	0.000004	0.000803	0.000124	0.000017	0.000147	0.000091	0.00161	0.000114	0.000022
Copper (dissolved)	mg/L	0.0002	0.0047	0.0009	0.0024	0.0009	0.0009	0.0005	0.0009	0.0015
Iron (dissolved)	mg/L	0.007	0.221	0.122	< 0.007	0.327	0.107	2.12	0.261	< 0.007
Potassium (dissolved)	mg/L	0.009	12.2	4.75	7.59	3.46	4.73	0.568	2.80	4.52
Magnesium (dissolved)	mg/L	0.001	42.4	11.7	13.9	20.1	33.2	29.2	13.6	19.2
Manganese (dissolved)	mg/L	0.00001	0.0378	0.0177	0.00111	0.0371	0.00385	0.873	0.0295	0.00123
Molybdenum (dissolved)	mg/L	0.00004	0.00255	0.00942	0.0249	0.00234	0.0114	0.00049	0.00479	0.0420
Sodium (dissolved)	mg/L	0.01	3.08	104	69.9	4.12	58.8	6.32	27.6	86.2



# FINAL REPORT

CA15728-JUN23 R1

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 - New Liskeard LF GW

**Project Manager:** Dominique Gagnon

**Samplers:** NA

MATRIX: WATER

Sample Number	15	16	17	18	19	20	21	22
<b>Sample Name</b>	OW-13-I	OW-16-I	OW-16-II	OW-17-1	OW-17-II	OW-17-III	OW-23-I	OW-23-II
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	21/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result	Result
<b>Metals and Inorganics (continued)</b>										
Nickel (dissolved)	mg/L	0.0001	0.0039	0.0004	0.0005	0.0004	0.0009	0.0035	0.0004	0.0006
Phosphorus (dissolved)	mg/L	0.003	3.39	0.075	0.006	0.023	0.006	< 0.003	1.36	< 0.003
Lead (dissolved)	mg/L	0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Selenium (dissolved)	mg/L	0.00004	0.00009	0.00005	0.00025	< 0.00004	0.00008	0.00007	0.00029	0.00020
Silicon (dissolved)	mg/L	0.02	5.45	8.26	3.44	9.32	4.60	8.07	4.53	3.25
Silver (dissolved)	mg/L	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Strontium (dissolved)	mg/L	0.00008	0.685	0.577	0.510	0.494	3.26	0.149	0.216	0.878
Sulfur (dissolved)	mg/L	3	38	< 3	31	6	24	< 3	3	32
Thallium (dissolved)	mg/L	0.000005	0.000008	< 0.000005	0.000006	< 0.000005	0.000005	< 0.000005	< 0.000005	< 0.000005
Tin (dissolved)	mg/L	0.00006	0.00009	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	0.00010	< 0.00006
Titanium (dissolved)	mg/L	0.00007	0.00042	0.00088	0.00007	0.00014	0.00288	0.00030	0.00065	< 0.00007
Uranium (dissolved)	mg/L	0.000002	0.000800	0.000044	0.00275	0.000042	0.00381	0.000420	0.000095	0.00169
Vanadium (dissolved)	mg/L	0.00001	0.00094	0.00119	0.00158	0.00012	0.00064	0.00023	0.00023	0.00026
Zinc (dissolved)	mg/L	0.002	0.007	< 0.002	< 0.002	< 0.002	< 0.002	0.010	< 0.002	< 0.002



# FINAL REPORT

CA15728-JUN23 R1

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 - New Liskeard LF GW

**Project Manager:** Dominique Gagnon

**Samplers:** NA

MATRIX: WATER

Sample Number	15	16	17	18	19	20	21	22
<b>Sample Name</b>	OW-13-I	OW-16-I	OW-16-II	OW-17-1	OW-17-II	OW-17-III	OW-23-I	OW-23-II
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	21/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result	Result
<b>Other (ORP)</b>										
pH	No unit	0.05	8.13	8.22	8.24	8.17	8.24	8.09	7.90	8.28
Chloride	mg/L	1	2	7	5	< 1	4	< 1	3	13

MATRIX: WATER

Sample Number	23	24	25	26	27	28	29	30
<b>Sample Name</b>	OW-24-I	OW-24-II	OW-25-I	OW-25-II	OW-25-III	OW-30-I	OW-30-II	OW-30-III
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result	Result
<b>General Chemistry</b>										
Alkalinity	mg/L as CaCO3	2	233	348	232	150	348	180	224	182
Conductivity	uS/cm	2	470	676	426	703	717	696	514	371
Total Dissolved Solids	mg/L	30	309	474	263	466	471	491	317	229
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05	0.06	< 0.05	0.48	0.20	< 0.05	< 0.25 †	0.44	0.19
Ammonia+Ammonium (N)	as N mg/L	0.04	0.11	< 0.04	0.33	< 0.04	0.04	< 0.04	< 0.04	0.06
Organic Nitrogen	mg/L	0.05	< 0.05	< 0.05	0.15	0.19	< 0.05	< 0.05	0.42	0.13
Total Reactive Phosphorous (o-phosphate as P)	mg/L	0.03	0.06	0.06	0.07	< 0.03	0.06	0.10	0.08	< 0.03
Dissolved Organic Carbon	mg/L	1	2	2	4	1	2	2	2	3

**Metals and Inorganics**

Sulphate	mg/L	2	24	37	3	200	65	180	55	19
Nitrite (as N)	as N mg/L	0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06	< 0.06	0.13	< 0.06	0.12	< 0.06	0.06	0.09	< 0.06
Fluoride	mg/L	0.06	0.35	0.79	0.66	1.10	1.06	1.49	0.53	0.22



# FINAL REPORT

CA15728-JUN23 R1

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 - New Liskeard LF GW

**Project Manager:** Dominique Gagnon

**Samplers:** NA

MATRIX: WATER

Sample Number	23	24	25	26	27	28	29	30
<b>Sample Name</b>	OW-24-I	OW-24-II	OW-25-I	OW-25-II	OW-25-III	OW-30-I	OW-30-II	OW-30-III
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result	Result
<b>Metals and Inorganics (continued)</b>										
Hardness (dissolved)	mg/L as CaCO3	0.05	248	379	173	126	427	146	169	200
Aluminum (dissolved)	mg/L	0.001	0.002	0.001	< 0.001	0.004	0.001	0.004	0.005	< 0.001
Arsenic (dissolved)	mg/L	0.0002	0.0003	< 0.0002	0.0002	0.0017	0.0009	0.0005	0.0006	< 0.0002
Barium (dissolved)	mg/L	0.00008	0.0280	0.0489	0.0395	0.0250	0.0597	0.0290	0.0312	0.0710
Beryllium (dissolved)	mg/L	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	0.000014
Bismuth (dissolved)	mg/L	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron (dissolved)	mg/L	0.002	0.037	0.037	0.140	0.179	0.022	0.451	0.089	0.025
Calcium (dissolved)	mg/L	0.01	68.7	88.1	39.5	26.0	104	24.9	37.0	54.3
Cadmium (dissolved)	mg/L	0.000003	< 0.000003	0.000003	< 0.000003	0.000017	< 0.000003	0.000015	0.000012	< 0.000003
Chromium (dissolved)	mg/L	0.00008	0.00017	0.00009	0.00013	0.00036	0.00009	0.00015	0.00017	0.00014
Cobalt (dissolved)	mg/L	0.000004	0.000089	0.000153	0.000018	0.000020	0.00480	0.000021	0.000045	0.000024
Copper (dissolved)	mg/L	0.0002	0.0007	0.0007	0.0005	0.0010	0.0007	0.0009	0.0017	0.0004
Iron (dissolved)	mg/L	0.007	0.198	< 0.007	0.206	< 0.007	0.073	< 0.007	0.008	1.55
Potassium (dissolved)	mg/L	0.009	2.53	5.19	3.99	7.72	4.21	7.22	5.24	3.20
Magnesium (dissolved)	mg/L	0.001	18.5	38.6	18.1	14.9	40.6	20.2	18.5	15.5
Manganese (dissolved)	mg/L	0.00001	0.0318	0.0313	0.0113	0.00092	0.113	0.00179	0.00560	0.0634
Molybdenum (dissolved)	mg/L	0.00004	0.00222	0.00683	0.00311	0.0374	0.00535	0.0396	0.0103	0.00064
Sodium (dissolved)	mg/L	0.01	8.07	15.7	31.9	103	15.3	107	50.6	4.72
Nickel (dissolved)	mg/L	0.0001	0.0005	0.0015	0.0001	0.0005	0.0026	0.0006	0.0007	0.0001
Phosphorus (dissolved)	mg/L	0.003	0.003	< 0.003	0.035	0.007	< 0.003	0.010	0.008	0.055
Lead (dissolved)	mg/L	0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Selenium (dissolved)	mg/L	0.00004	< 0.00004	< 0.00004	< 0.00004	0.00051	0.00008	< 0.00004	0.00008	< 0.00004



# FINAL REPORT

CA15728-JUN23 R1

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 - New Liskeard LF GW

**Project Manager:** Dominique Gagnon

**Samplers:** NA

MATRIX: WATER

Sample Number	23	24	25	26	27	28	29	30
<b>Sample Name</b>	OW-24-I	OW-24-II	OW-25-I	OW-25-II	OW-25-III	OW-30-I	OW-30-II	OW-30-III
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result	Result
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**Metals and Inorganics (continued)**

Silicon (dissolved)	mg/L	0.02	6.90	5.79	7.79	3.12	6.52	2.80	3.88	6.38
Silver (dissolved)	mg/L	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Strontium (dissolved)	mg/L	0.00008	0.360	1.23	0.825	0.572	2.04	0.997	0.462	0.971
Sulfur (dissolved)	mg/L	3	7	11	< 3	68	23	68	16	6
Thallium (dissolved)	mg/L	0.000005	< 0.000005	0.000011	< 0.000005	< 0.000005	0.000011	0.000009	0.000008	< 0.000005
Tin (dissolved)	mg/L	0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	0.00009	< 0.00006	< 0.00006
Titanium (dissolved)	mg/L	0.00007	0.00015	0.00009	< 0.00007	0.00010	< 0.00007	0.00022	0.00012	< 0.00007
Uranium (dissolved)	mg/L	0.000002	0.000359	0.00161	0.000039	0.00439	0.00394	0.000665	0.00165	0.000053
Vanadium (dissolved)	mg/L	0.00001	0.00030	0.00027	0.00006	0.00179	0.00039	0.00030	0.00045	0.00011
Zinc (dissolved)	mg/L	0.002	< 0.002	0.003	< 0.002	0.003	< 0.002	< 0.002	< 0.002	< 0.002

**Other (ORP)**

pH	No unit	0.05	8.09	8.10	8.22	8.19	7.99	8.35	8.17	7.90
Chloride	mg/L	1	< 1	3	< 1	6	< 1	3	1	< 1



# FINAL REPORT

CA15728-JUN23 R1

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 - New Liskeard LF GW

**Project Manager:** Dominique Gagnon

**Samplers:** NA

MATRIX: WATER

Sample Number	31	32	33	34	35	36
<b>Sample Name</b>	OW-10-III	OW-31-I	OW-31-II	NL GW Dup-1	NL GW Dup-2	NL GW Dup-3
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	21/06/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result
<b>General Chemistry</b>								
Alkalinity	mg/L as CaCO3	2	201	134	130	236	182	805
Conductivity	uS/cm	2	530	783	629	465	371	1890
Total Dissolved Solids	mg/L	30	340	534	414	280	220	1090
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05	0.05	0.42	0.20	< 0.05	0.12	19.4
Ammonia+Ammonium (N)	as N mg/L	0.04	0.06	< 0.04	< 0.04	0.07	0.07	18.6
Organic Nitrogen	mg/L	0.05	< 0.05	0.39	0.19	< 0.05	0.05	0.83
Total Reactive Phosphorous (o-phosphate as P)	mg/L	0.03	< 0.03	< 0.03	0.10	< 0.03	0.04	< 0.03
Dissolved Organic Carbon	mg/L	1	< 1	1	3	3	3	18

## Metals and Inorganics

Sulphate	mg/L	2	81	280	200	26	18	89
Nitrite (as N)	as N mg/L	0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.10
Nitrate (as N)	as N mg/L	0.06	< 0.06	0.44	< 0.06	< 0.06	< 0.06	0.39
Fluoride	mg/L	0.06	0.54	0.71	1.19	0.36	0.23	< 0.06
Hardness (dissolved)	mg/L as CaCO3	0.05	216	240	138	245	203	692
Aluminum (dissolved)	mg/L	0.001	0.002	0.033	0.335	0.001	< 0.001	0.003
Arsenic (dissolved)	mg/L	0.0002	< 0.0002	0.0003	0.0006	0.0003	< 0.0002	0.0004
Barium (dissolved)	mg/L	0.00008	0.0214	0.0318	0.0446	0.0295	0.0691	0.122
Beryllium (dissolved)	mg/L	0.000007	< 0.000007	< 0.000007	0.000012	< 0.000007	0.000015	< 0.000007
Bismuth (dissolved)	mg/L	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron (dissolved)	mg/L	0.002	0.208	0.167	0.181	0.038	0.027	0.919
Calcium (dissolved)	mg/L	0.01	54.5	45.2	28.8	68.1	55.6	170



# FINAL REPORT

CA15728-JUN23 R1

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 - New Liskeard LF GW

**Project Manager:** Dominique Gagnon

**Samplers:** NA

MATRIX: WATER

Sample Number	31	32	33	34	35	36
<b>Sample Name</b>	OW-10-III	OW-31-I	OW-31-II	NL GW Dup-1	NL GW Dup-2	NL GW Dup-3
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	21/06/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result
<b>Metals and Inorganics (continued)</b>								
Cadmium (dissolved)	mg/L	0.000003	< 0.000003	0.000006	0.000006	< 0.000003	< 0.000003	0.000037
Chromium (dissolved)	mg/L	0.00008	0.00017	0.00038	0.00195	0.00012	0.00017	0.00056
Cobalt (dissolved)	mg/L	0.000004	0.000263	0.000054	0.000426	0.000098	0.000026	0.00523
Copper (dissolved)	mg/L	0.0002	0.0009	0.0018	0.0034	0.0005	< 0.0002	0.0090
Iron (dissolved)	mg/L	0.007	0.021	0.044	0.705	0.195	1.56	0.012
Potassium (dissolved)	mg/L	0.009	6.03	9.26	5.75	2.52	3.20	78.6
Magnesium (dissolved)	mg/L	0.001	19.3	31.0	16.1	18.2	15.6	64.7
Manganese (dissolved)	mg/L	0.00001	0.0217	0.00203	0.0367	0.0339	0.0652	0.975
Molybdenum (dissolved)	mg/L	0.00004	0.00027	0.0149	0.0167	0.00235	0.00050	0.00087
Sodium (dissolved)	mg/L	0.01	36.7	76.4	93.2	8.14	4.85	95.9
Nickel (dissolved)	mg/L	0.0001	0.0003	0.0013	0.0029	0.0005	0.0001	0.0286
Phosphorus (dissolved)	mg/L	0.003	< 0.003	< 0.003	0.031	< 0.003	0.057	0.006
Lead (dissolved)	mg/L	0.00009	< 0.00009	< 0.00009	0.00035	< 0.00009	< 0.00009	0.00031
Selenium (dissolved)	mg/L	0.00004	< 0.00004	0.00034	< 0.00004	< 0.00004	< 0.00004	0.00033
Silicon (dissolved)	mg/L	0.02	3.17	3.08	3.50	7.01	5.99	6.60
Silver (dissolved)	mg/L	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Strontium (dissolved)	mg/L	0.00008	1.98	1.07	0.760	0.368	0.983	0.914
Sulfur (dissolved)	mg/L	3	28	96	68	7	6	31
Thallium (dissolved)	mg/L	0.000005	< 0.000005	0.000024	< 0.000005	< 0.000005	< 0.000005	0.000255
Tin (dissolved)	mg/L	0.00006	< 0.00006	0.00009	0.00019	< 0.00006	< 0.00006	0.00014
Titanium (dissolved)	mg/L	0.00007	< 0.00007	0.00160	0.0162	0.00010	0.00008	0.00019
Uranium (dissolved)	mg/L	0.000002	0.000044	0.00243	0.000929	0.000373	0.000051	0.00139



# FINAL REPORT

CA15728-JUN23 R1

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 - New Liskeard LF GW

**Project Manager:** Dominique Gagnon

**Samplers:** NA

MATRIX: WATER

Sample Number	31	32	33	34	35	36
<b>Sample Name</b>	OW-10-III	OW-31-I	OW-31-II	NL GW Dup-1	NL GW Dup-2	NL GW Dup-3
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	21/06/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result
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**Metals and Inorganics (continued)**

Vanadium (dissolved)	mg/L	0.00001	0.00013	0.00093	0.00155	0.00040	0.00013	0.00040
Zinc (dissolved)	mg/L	0.002	0.002	< 0.002	0.004	< 0.002	< 0.002	0.043

**Other (ORP)**

pH	No unit	0.05	8.14	8.10	8.14	8.02	7.96	7.78
Chloride	mg/L	1	< 1	2	2	< 1	< 1	130





# FINAL REPORT

CA15728-JUN23 R1

## QC SUMMARY

### Alkalinity

Method: SM 2320 | Internal ref.: ME-CA-1ENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0584-JUN23	mg/L as CaCO3	2	< 2	1	20	102	80	120	NA		

### Ammonia by SFA

Method: SM 4500 | Internal ref.: ME-CA-1ENVISFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0244-JUN23	mg/L	0.04	<0.04	0	10	99	90	110	94	75	125
Ammonia+Ammonium (N)	SKA0265-JUN23	mg/L	0.04	<0.04	ND	10	100	90	110	95	75	125

## QC SUMMARY

### Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO5106-JUN23	mg/L	1	<1	ND	20	104	80	120	111	75	125
Sulphate	DIO5106-JUN23	mg/L	2	<2	1	20	111	80	120	114	75	125
Chloride	DIO5108-JUN23	mg/L	1	<1	1	20	101	80	120	98	75	125
Sulphate	DIO5108-JUN23	mg/L	2	<2	5	20	110	80	120	90	75	125

### Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-IENVIIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nitrite (as N)	DIO0661-JUN23	mg/L	0.03	<0.03	ND	20	97	90	110	104	75	125
Nitrate (as N)	DIO0661-JUN23	mg/L	0.06	<0.06	0	20	97	90	110	NV	75	125
Nitrite (as N)	DIO0721-JUN23	mg/L	0.03	<0.03	ND	20	100	90	110	105	75	125
Nitrate (as N)	DIO0721-JUN23	mg/L	0.06	<0.06	3	20	97	90	110	99	75	125
Nitrite (as N)	DIO0723-JUN23	mg/L	0.03	<0.03	ND	20	99	90	110	100	75	125
Nitrate (as N)	DIO0723-JUN23	mg/L	0.06	<0.06	ND	20	98	90	110	99	75	125
Nitrite (as N)	DIO0773-JUN23	mg/L	0.03	<0.03	4	20	100	90	110	106	75	125



# FINAL REPORT

CA15728-JUN23 R1

## QC SUMMARY

### Carbon by SFA

Method: SM 5310 | Internal ref.: ME-CA-|ENV|SFA-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Dissolved Organic Carbon	SKA0249-JUN23	mg/L	1	<1	ND	20	101	90	110	94	75	125
Dissolved Organic Carbon	SKA0267-JUN23	mg/L	1	<1	1	20	99	90	110	101	75	125

### Conductivity

Method: SM 2510 | Internal ref.: ME-CA-|ENV|EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0584-JUN23	uS/cm	2	< 2	0	20	99	90	110	NA		

### Fluoride by Specific Ion Electrode

Method: SM 4500 | Internal ref.: ME-CA-|ENV|EWL-LAK-AN-014

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Fluoride	EWL0613-JUN23	mg/L	0.06	<0.06	ND	10	98	90	110	93	75	125

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (dissolved)	EMS0225-JUN23	mg/L	0.00005	<0.00005	ND	20	102	90	110	92	70	130
Aluminum (dissolved)	EMS0225-JUN23	mg/L	0.001	<0.001	3	20	100	90	110	113	70	130
Arsenic (dissolved)	EMS0225-JUN23	mg/L	0.0002	<0.0002	3	20	104	90	110	117	70	130
Barium (dissolved)	EMS0225-JUN23	mg/L	0.00008	<0.00008	2	20	100	90	110	99	70	130
Beryllium (dissolved)	EMS0225-JUN23	mg/L	0.000007	<0.000007	4	20	104	90	110	100	70	130
Boron (dissolved)	EMS0225-JUN23	mg/L	0.002	<0.002	5	20	99	90	110	93	70	130
Bismuth (dissolved)	EMS0225-JUN23	mg/L	0.00001	<0.00001	ND	20	97	90	110	90	70	130
Calcium (dissolved)	EMS0225-JUN23	mg/L	0.01	<0.01	1	20	103	90	110	106	70	130
Cadmium (dissolved)	EMS0225-JUN23	mg/L	0.000003	<0.000003	18	20	105	90	110	98	70	130
Cobalt (dissolved)	EMS0225-JUN23	mg/L	0.000004	<0.000004	2	20	101	90	110	107	70	130
Chromium (dissolved)	EMS0225-JUN23	mg/L	0.00008	<0.00008	0	20	105	90	110	101	70	130
Copper (dissolved)	EMS0225-JUN23	mg/L	0.0002	<0.0002	2	20	104	90	110	96	70	130
Iron (dissolved)	EMS0225-JUN23	mg/L	0.007	<0.007	2	20	107	90	110	125	70	130
Potassium (dissolved)	EMS0225-JUN23	mg/L	0.009	<0.009	1	20	110	90	110	118	70	130
Magnesium (dissolved)	EMS0225-JUN23	mg/L	0.001	<0.001	2	20	102	90	110	104	70	130
Manganese (dissolved)	EMS0225-JUN23	mg/L	0.00001	<0.00001	0	20	105	90	110	102	70	130
Molybdenum (dissolved)	EMS0225-JUN23	mg/L	0.00004	<0.00004	1	20	101	90	110	110	70	130
Sodium (dissolved)	EMS0225-JUN23	mg/L	0.01	<0.01	2	20	105	90	110	116	70	130
Nickel (dissolved)	EMS0225-JUN23	mg/L	0.0001	<0.0001	0	20	105	90	110	100	70	130
Lead (dissolved)	EMS0225-JUN23	mg/L	0.00009	<0.00009	4	20	105	90	110	96	70	130

## QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (dissolved)	EMS0225-JUN23	mg/L	0.003	<0.003	ND	20	105	90	110	NV	70	130
Selenium (dissolved)	EMS0225-JUN23	mg/L	0.00004	<0.00004	7	20	104	90	110	109	70	130
Sulfur (dissolved)	EMS0225-JUN23	mg/L	3	<1	0	20	110	90	110	NV	70	130
Silicon (dissolved)	EMS0225-JUN23	mg/L	0.02	<0.02	2	20	102	90	110	NV	70	130
Tin (dissolved)	EMS0225-JUN23	mg/L	0.00006	<0.00006	ND	20	97	90	110	NV	70	130
Strontium (dissolved)	EMS0225-JUN23	mg/L	0.00008	<0.00008	0	20	102	90	110	99	70	130
Titanium (dissolved)	EMS0225-JUN23	mg/L	0.00007	<0.00005	5	20	101	90	110	NV	70	130
Thallium (dissolved)	EMS0225-JUN23	mg/L	0.000005	<0.000005	13	20	100	90	110	98	70	130
Uranium (dissolved)	EMS0225-JUN23	mg/L	0.000002	<0.000002	4	20	103	90	110	116	70	130
Vanadium (dissolved)	EMS0225-JUN23	mg/L	0.00001	<0.00001	1	20	104	90	110	100	70	130
Zinc (dissolved)	EMS0225-JUN23	mg/L	0.002	<0.002	7	20	96	90	110	125	70	130
Boron (dissolved)	EMS0285-JUN23	mg/L	0.002	<0.002	0	20	98	90	110	102	70	130

## QC SUMMARY

### pH

Method: SM 4500 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0584-JUN23	No unit	0.05	NA	0		99			NA		

### Reactive Phosphorus by SFA

Method: SM 4500-P F | Internal ref.: ME-CA-IENVISFA-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Reactive Phosphorous (o-phosphate as P)	SKA0247-JUN23	mg/L	0.03	<0.03	3	10	101	90	110	96	75	125
Total Reactive Phosphorous (o-phosphate as P)	SKA0258-JUN23	mg/L	0.03	<0.03	ND	10	99	90	110	90	75	125



# FINAL REPORT

CA15728-JUN23 R1

## QC SUMMARY

### Solids Analysis

Method: SM 2540C | Internal ref.: ME-CA-IENVIEWL-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Dissolved Solids	EWL0552-JUN23	mg/L	30	<30	1	20	99	80	120	NA		
Total Dissolved Solids	EWL0561-JUN23	mg/L	30	<30	5	20	98	80	120	NA		

### Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-IENVISFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen (N)	SKA0253-JUN23	mg/L	0.05	<0.05	ND	10	101	90	110	103	75	125
Total Kjeldahl Nitrogen (N)	SKA0283-JUN23	mg/L	0.05	<0.05	ND	10	102	90	110	105	75	125
Total Kjeldahl Nitrogen (N)	SKA0294-JUN23	mg/L	0.05	<0.05	2	10	102	90	110	102	75	125

## QC SUMMARY

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**Method Blank:** a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

**Duplicate:** Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

**LCS/Spike Blank:** Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

**Matrix Spike:** A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

**Reference Material:** a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

**RL:** Reporting limit

**RPD:** Relative percent difference

**AC:** Acceptance criteria

**Multielement Scan Qualifier:** as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

**Duplicate Qualifier:** for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

**Matrix Spike Qualifier:** for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.



## LEGEND

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### FOOTNOTES

- NSS** Insufficient sample for analysis.
- RL** Reporting Limit.
  - ↑ Reporting limit raised.
  - ↓ Reporting limit lowered.
- NA** The sample was not analysed for this analyte
- ND** Non Detect

Results relate only to the sample tested.

Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.

"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

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This report supersedes all previous versions.

-- End of Analytical Report --

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**Request for Laboratory Services and CHAIN OF CUSTODY (General)**

SGS Environmental Services - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Toll Free: 877-747-7658 Fax: 705-652-6365 Web: www.ca.sgs.com {4}

SGS Environmental Services - London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361 Web: www.ca.sgs.com {4}

**Laboratory Information Section**

Received Date (mm/dd/yyyy): JUN 17 2023 JUN 22 2023 VMM LAB LIMS #: CA15728 - Jun 23  
 Received Time (After Hours Only): \_\_\_\_\_ Temperature Upon Receipt (°C): 12x3

**Billing & Reporting Information**

Invoice/Receipt to (3):	Company:	WSP	Quote #:	2021 1426
	Attention:	Dominique Gagnon	Attached Parameter List:	<input type="checkbox"/> YES <input type="checkbox"/> NO
	Address:	131 Fielding Rd Lively, Ontario P3Y 1L7	Turnaround Time	
	Email:	dominique.gagnon@wsp.com	Is *Rush Turnaround Time Required?	<input type="checkbox"/> YES <input type="checkbox"/> NO
Project Name/Number:	TY131010 New Liskeard LF GW	P.O. #:		Specify: _____ * Rush TA Requests Require Lab Approval

**Client Information/Report To:**

Company Name:	WSP	Phone Number:	705-682-2632
Contact Name:		Fax Number:	
Address:		E-mail:	
Copy to:			

**Sample Information**

Sample Identifier	Date Sampled (mm/dd/yy)	Time Sampled	# of Bottles	Analysis Requested (please enter the analysis required below and check off which analysis applies to each sample)					
				Field Filtered	SW as per quote	GW as per quote			
OW-1R-I	06/21/23	9:56	5			X			
OW-1R-III	06/21/23	9:53	5			X			
OW-10-I	06/20/23	9:05	5			X			
OW-10-II	06/20/23	9:00	5			X			
OW-11-I	06/21/23	11:25	5			X			
OW-11-II	06/21/23	11:28	5			X			
OW-12-I	06/21/23	11:46	5			X			
OW-12-II	06/21/23	11:40	5			X			
<del>OW-13-I</del> OW-13-1	06/21/23	10:30	5			X			
OW-16-I	06/20/23	11:25	5			X			
OW-16-II	06/20/23	11:12	5			X			
<del>OW-16-III</del>	DRY					X			
OW-17-I	06/20/23	18:13	5			X			
OW-17-II	06/20/23	17:55	5			X			
OW-17-III	06/20/23	18:05	5			X			
<del>OW-23-I</del> OW-23-1	06/20/23	17:10	5			X			

Sampled By (1): (Name) <u>CLEMENT CHEONG</u>	(Signature) <u>[Signature]</u>	Date: <u>06/21/23</u>	(mm/dd/yy)
Relinquished by (2): (Name) <u>CLEMENT CHEONG</u>	(Signature) <u>[Signature]</u>	Date: <u>06/21/23</u>	(mm/dd/yy)

Note: (1) Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. (2) Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). (3) Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. (4) Completion of work may require the subcontracting of samples between the London and Lakefield laboratories.

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VMM 334170466315  
9.45 " 6356  
PP " 6349



**Request for Laboratory Services and CHAIN OF CUSTODY (General)**

SGS Environmental Services - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Toll Free: 877-747-7658 Fax: 705-652-6365 Web: www.ca.sgs.com {4}

SGS Environmental Services - London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361 Web: www.ca.sgs.com {4}

**Laboratory Information Section**

Received Date (mm/dd/yyyy):   /  /   LAB LIMS #: \_\_\_\_\_  
 Received Time (After Hours Only): \_\_\_\_\_ Temperature Upon Receipt (°C): \_\_\_\_\_

**Billing & Reporting Information**

Invoice/Receipt to {3}:	Company:	WSP	Quote #:	2021 1426
	Attention:	Dominique Gagnon	Attached Parameter List:	<input type="checkbox"/> YES <input type="checkbox"/> NO
	Address:	131 Fielding Rd Lively, Ontario P3Y 1L7	<b>Turnaround Time</b>	
	Email:	dominique.gagnon@wsp.com	Is *Rush Turnaround Time Required?	<input type="checkbox"/> YES <input type="checkbox"/> NO
Project Name/Number:	TY131010 New Liskeard LF GW	P.O. #:	Specify: _____ * Rush TA Requests Require Lab Approval	

**Client Information/Report To:**

Company Name:	WSP	Phone Number:	705-682-2632
Contact Name:		Fax Number:	
Address:		E-mail:	
Copy to:			

**Sample Information**

Sample Identifier	Date Sampled (mm/dd/yy)	Time Sampled	# of Bottles	Analysis Requested (please enter the analysis required below and check off which analysis applies to each sample)			
				Field Filtered	SW as per quote	GW as per quote	
OW-23-II	06/20/23	11:05	5			X	
OW-24-I	06/20/23	11:10	5			X	
OW-24-II	06/20/23	11:15	5			X	
<del>OW-24-III</del>	<del>06/20/23</del>	<del>11:05</del>				X	
OW-25-I	06/20/23	12:45	5			X	
OW-25-II	06/20/23	12:50	5			X	
OW-25-III	06/20/23	12:55	5			X	
OW-30-I	06/20/23	12:27	5			X	
OW-30-II	06/20/23	12:10	5			X	
OW-30-III	06/20/23	13:15	5			X	
OW-10-III	06/20/23	9:10	5			X	
<del>OW-25-IV</del>						X	
OW-31-I	06/20/23	11:04	5			X	
OW-31-II	06/20/23	11:10	5			X	
NL GW Dup-1	06/20/23		5			X	
NL GW Dup-2	06/20/23		5			X	

Sampled By {1}: (Name)	(Signature)	Date: _____	(mm/dd/yy)
Relinquished by {2}: (Name)	(Signature)	Date: _____	(mm/dd/yy)

**Note:** {1} Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. {4} Completion of work may require the subcontracting of samples between the London and Lakefield laboratories.

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**Request for Laboratory Services and CHAIN OF CUSTODY (General)**

SGS Environmental Services - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Toll Free: 877-747-7658 Fax: 705-652-6365 Web: www.ca.sgs.com {4}  
 SGS Environmental Services - London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361 Web: www.ca.sgs.com {4}

**Laboratory Information Section**

Received Date (mm/dd/yyyy): JUN 22 2023 *Kmm* LAB LIMS #: CA15729-JA23  
 Received Time (After Hours Only): \_\_\_\_\_ Temperature Upon Receipt (°C): 12.3

**Billing & Reporting Information**

Invoice/Receipt to {3}:	Company:	WSP	Quote #:	2021 1426
	Attention:	Dominique Gagnon	Attached Parameter List:	<input type="checkbox"/> YES <input type="checkbox"/> NO
	Address:	131 Fielding Rd Lively, Ontario P3Y 1L7	Turnaround Time	
	Email:	dominique.gagnon@wsp.com	Is *Rush Turnaround Time Required?	<input type="checkbox"/> YES <input type="checkbox"/> NO
Project Name/Number:	TY131010 New Liskeard LF GW	P.O. #:	Specify: _____ * Rush TA Requests Require Lab Approval	

**Client Information/Report To:**

Company Name:	WSP	Phone Number:	705-682-2632
Contact Name:		Fax Number:	
Address:		E-mail:	
Copy to:			

**Sample Information**

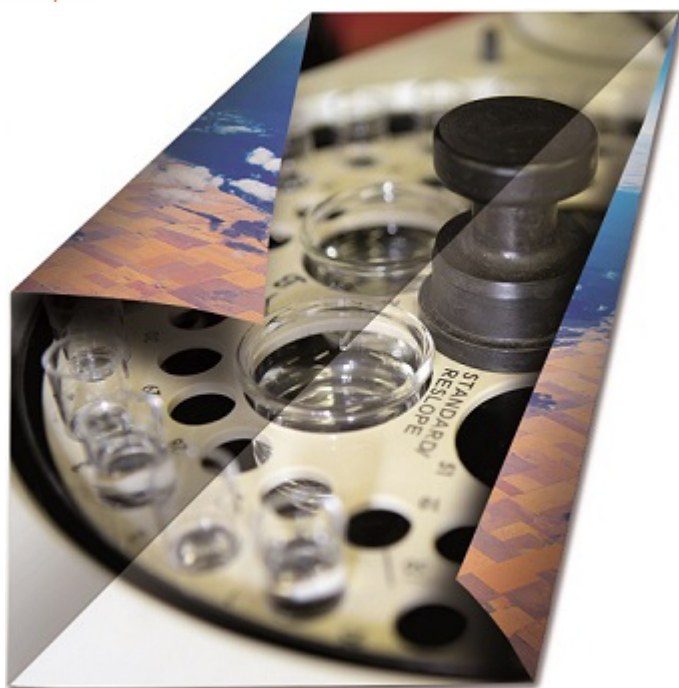
Sample Identifier	Date Sampled (mm/dd/yy)	Time Sampled	# of Bottles	Analysis Requested (please enter the analysis required below and check off which analysis applies to each sample)								
				Field Filtered	SW as per quote	GW as per quote						
NL GW Dup-3			5			X						

Sampled By {1}: (Name)	(Signature)	Date: ____/____/____	(mm/dd/yy)
Relinquished by {2}: (Name)	(Signature)	Date: ____/____/____	(mm/dd/yy)

**Note:** {1} Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. {4} Completion of work may require the subcontracting of samples between the London and Lakefield laboratories.

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*Kmm*  
*9:45*



## FINAL REPORT

CA19657-AUG23 R1

PO#C025701288, TY131010.2023.1000.1142.5730-00-New  
Liskeard SW

Prepared for

**WSP E & I Canada Ltd**

## First Page

### CLIENT DETAILS

Client WSP E & I Canada Ltd

Address 131 Fielding Road, Lively  
Canada, P3Y 1L7  
Phone: 705-665-0159. Fax:

Contact Dominique Gagnon  
Telephone 705-665-0159  
Facsimile  
Email Dominique.Gagnon@wsp.com; meg.russell@wsp.com  
Project PO#C025701288, TY131010.2023.1000.1142.5730-00-New Li  
Order Number  
Samples Surface Water (7)

### LABORATORY DETAILS

Project Specialist Brad Moore Hon. B.Sc  
Laboratory SGS Canada Inc.  
Address 185 Concession St., Lakefield ON, K0L 2H0

Telephone 705-652-2143  
Facsimile 705-652-6365  
Email brad.moore@sgs.com  
SGS Reference CA19657-AUG23  
Received 08/31/2023  
Approved 09/13/2023  
Report Number CA19657-AUG23 R1  
Date Reported 09/13/2023


### COMMENTS

Temperature of Sample upon Receipt: 9  
Cooling Agent Present: UNKNOWN  
Custody Seal Present: UNKNOWN

Chain of Custody Number:NA

### SIGNATORIES

Brad Moore Hon. B.Sc



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# FINAL REPORT

CA19657-AUG23 R1

**Client:** WSP E & I Canada Ltd

**Project:** PO#C025701288, TY131010.2023.1000.1142.5730-00-New Liskearc

**Project Manager:** Dominique Gagnon

**Samplers:** Aedon Lemon

MATRIX: WATER

L1 = PWQQ\_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Sample Number	7	8	9	10	11	12	13
Sample Name	SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW DUP
Sample Matrix	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sample Date	30/08/2023	30/08/2023	30/08/2023	30/08/2023	30/08/2023	30/08/2023	30/08/2023

Parameter	Units	RL	L1	Result	Result	Result	Result	Result	Result	Result
<b>General Chemistry</b>										
Biochemical Oxygen Demand (BOD5)	mg/L	2		< 4 †	< 4 †	< 4 †	< 4 †	< 4 †	< 4 †	< 4 †
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05		0.22	0.52	0.55	< 0.05	0.28	0.32	0.26
Total Suspended Solids	mg/L	2		27	12	441	20	9	11	25
Alkalinity	mg/L as CaCO3	2		89	292	298	263	66	62	87
Conductivity	uS/cm	2		198	551	552	2300	193	170	216
Total Dissolved Solids	mg/L	30		137	383	340	1120	149	120	34
Chemical Oxygen Demand	mg/L	8		24	37	40	47	30	26	25
Ammonia+Ammonium (N)	as N mg/L	0.04		0.04	0.04	0.04	0.04	0.05	< 0.04	0.04
<b>Metals and Inorganics</b>										
Sulphate	mg/L	2		5	< 2	< 2	26	9	9	5
Nitrite (as N)	as N mg/L	0.003		< 0.003	< 0.003	< 0.003	< 0.03 †	< 0.003	< 0.003	< 0.003
Nitrate (as N)	as N mg/L	0.006		0.011	< 0.006	< 0.006	< 0.006	0.066	0.067	0.119
Arsenic (total)	mg/L	0.0002	0.005	0.0010	0.0005	0.0008	0.0010	0.0011	0.0011	0.0009
Barium (total)	mg/L	0.00008		0.0180	0.0200	0.0277	0.0554	0.0181	0.0174	0.0182
Boron (total)	mg/L	0.002	0.2	0.008	0.020	0.015	0.019	0.012	0.011	0.008
Cadmium (total)	mg/L	0.000003	0.0001	0.000011	0.000017	0.000026	0.000028	0.000014	0.000010	0.000009
Chromium (total)	mg/L	0.00008	0.1	0.00193	0.00069	0.00145	0.00189	0.00124	0.00135	0.00231
Copper (total)	mg/L	0.0002	0.001	0.0018	0.0017	0.0028	0.0173	0.0032	0.0023	0.0018
Iron (total)	mg/L	0.007	0.3	0.827	0.249	0.537	1.23	0.495	0.551	0.896
Lead (total)	mg/L	0.00009	0.02 0.025	0.00046	0.00019	0.00048	0.00138	0.00043	0.00032	0.00046
Phosphorus (total)	mg/L	0.003	0.01	0.035	0.033	0.059	0.079	0.030	0.031	0.028





# FINAL REPORT

CA19657-AUG23 R1

**Client:** WSP E & I Canada Ltd

**Project:** PO#C025701288, TY131010.2023.1000.1142.5730-00-New Liskearc

**Project Manager:** Dominique Gagnon

**Samplers:** Aedon Lemon

MATRIX: WATER

Sample Number	7	8	9	10	11	12	13
<b>Sample Name</b>	SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW DUP
<b>Sample Matrix</b>	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
<b>Sample Date</b>	30/08/2023	30/08/2023	30/08/2023	30/08/2023	30/08/2023	30/08/2023	30/08/2023

L1 = PWQO\_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Parameter	Units	RL	L1	Result	Result	Result	Result	Result	Result	Result
<b>Metals and Inorganics (continued)</b>										
Zinc (total)	mg/L	0.002	0.02	0.003	0.003	0.006	0.008	0.003	0.003	0.004
<b>Other (ORP)</b>										
pH	No unit	0.05	8.6	8.03	8.41	8.35	8.23	8.04	7.99	8.02
Chloride	mg/L	1		9	7	19	600	17	13	9
Mercury (dissolved)	mg/L	0.00001	0.0002	0.00002	0.00002	0.00001	0.00002	0.00001	0.00001	0.00001
<b>Phenols</b>										
4AAP-Phenolics	mg/L	0.001	0.001	< 0.001	0.002	0.002	0.003	< 0.001	0.002	< 0.001

## EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	PWQO_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E L1
-----------	--------	-------	--------	--

### SW-1

Copper	SM 3030/EPA 200.8	mg/L	0.0018	0.001
Iron	SM 3030/EPA 200.8	mg/L	0.827	0.3
Phosphorus	SM 3030/EPA 200.8	mg/L	0.035	0.01

### SW-2

Copper	SM 3030/EPA 200.8	mg/L	0.0017	0.001
Phosphorus	SM 3030/EPA 200.8	mg/L	0.033	0.01
4AAP-Phenolics	SM 5530B-D	mg/L	0.002	0.001

### SW-3

Copper	SM 3030/EPA 200.8	mg/L	0.0028	0.001
Iron	SM 3030/EPA 200.8	mg/L	0.537	0.3
Phosphorus	SM 3030/EPA 200.8	mg/L	0.059	0.01
4AAP-Phenolics	SM 5530B-D	mg/L	0.002	0.001

### SW-4

Copper	SM 3030/EPA 200.8	mg/L	0.0173	0.001
Iron	SM 3030/EPA 200.8	mg/L	1.23	0.3
Phosphorus	SM 3030/EPA 200.8	mg/L	0.079	0.01
4AAP-Phenolics	SM 5530B-D	mg/L	0.003	0.001

### SW-5

Copper	SM 3030/EPA 200.8	mg/L	0.0032	0.001
Iron	SM 3030/EPA 200.8	mg/L	0.495	0.3
Phosphorus	SM 3030/EPA 200.8	mg/L	0.030	0.01

### SW-6

Copper	SM 3030/EPA 200.8	mg/L	0.0023	0.001
Iron	SM 3030/EPA 200.8	mg/L	0.551	0.3
Phosphorus	SM 3030/EPA 200.8	mg/L	0.031	0.01
4AAP-Phenolics	SM 5530B-D	mg/L	0.002	0.001

### SW DUP

Copper	SM 3030/EPA 200.8	mg/L	0.0018	0.001
Iron	SM 3030/EPA 200.8	mg/L	0.896	0.3
Phosphorus	SM 3030/EPA 200.8	mg/L	0.028	0.01

## QC SUMMARY

### Alkalinity

Method: SM 2320 | Internal ref.: ME-CA-1ENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0004-SEP23	mg/L as CaCO3	2	< 2	3	20	102	80	120	NA		

### Ammonia by SFA

Method: SM 4500 | Internal ref.: ME-CA-1ENVISFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0004-SEP23	mg/L	0.04	<0.04	ND	10	100	90	110	96	75	125

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO5015-SEP23	mg/L	1	<1	0	20	102	80	120	95	75	125
Sulphate	DIO5015-SEP23	mg/L	2	<2	2	20	98	80	120	99	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-IENVIIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nitrite (as N)	DIO0042-SEP23	mg/L	0.003	<0.003	ND	20	98	90	110	103	75	125
Nitrate (as N)	DIO0042-SEP23	mg/L	0.006	<0.006	ND	20	100	90	110	103	75	125
Nitrite (as N)	DIO0102-SEP23	mg/L	0.003	<0.003	1	20	98	90	110	102	75	125



# FINAL REPORT

CA19657-AUG23 R1

## QC SUMMARY

### Biochemical Oxygen Demand

Method: SM 5210 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0060-AUG23	mg/L	2	< 2	3	30	102	70	130	NV	70	130

### Chemical Oxygen Demand

Method: HACH 8000 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chemical Oxygen Demand	EWL0018-SEP23	mg/L	8	<8	0	20	116	80	120	109	75	125
Chemical Oxygen Demand	EWL0042-SEP23	mg/L	8	<8	0	20	102	80	120	98	75	125

### Conductivity

Method: SM 2510 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0004-SEP23	uS/cm	2	3	4	20	100	90	110	NA		

## QC SUMMARY

### Mercury by CVAAS

Method: EPA 7471A/SM 3112B | Internal ref.: ME-CA-IENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (dissolved)	EHG0002-SEP23	mg/L	0.00001	< 0.00001	0	20	95	80	120	95	70	130

### Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Arsenic (total)	EMS0007-SEP23	mg/L	0.0002	<0.0002	4	20	100	90	110	99	70	130
Barium (total)	EMS0007-SEP23	mg/L	0.00008	<0.00008	3	20	100	90	110	94	70	130
Boron (total)	EMS0007-SEP23	mg/L	0.002	<0.002	1	20	96	90	110	111	70	130
Cadmium (total)	EMS0007-SEP23	mg/L	0.000003	<0.000003	4	20	97	90	110	103	70	130
Chromium (total)	EMS0007-SEP23	mg/L	0.00008	<0.00008	1	20	94	90	110	91	70	130
Copper (total)	EMS0007-SEP23	mg/L	0.0002	<0.0002	3	20	95	90	110	95	70	130
Iron (total)	EMS0007-SEP23	mg/L	0.007	<0.007	0	20	94	90	110	125	70	130
Lead (total)	EMS0007-SEP23	mg/L	0.00009	<0.00009	ND	20	100	90	110	96	70	130
Phosphorus (total)	EMS0007-SEP23	mg/L	0.003	<0.003	ND	20	94	90	110	NV	70	130
Zinc (total)	EMS0007-SEP23	mg/L	0.002	<0.002	2	20	93	90	110	96	70	130



# FINAL REPORT

CA19657-AUG23 R1

## QC SUMMARY

### pH

Method: SM 4500 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0004-SEP23	No unit	0.05	NA	0		100			NA		

### Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-IENVISFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0017-SEP23	mg/L	0.001	<0.001	ND	10	102	80	120	85	75	125
4AAP-Phenolics	SKA0029-SEP23	mg/L	0.001	<0.001	ND	10	101	80	120	85	75	125



# FINAL REPORT

CA19657-AUG23 R1

## QC SUMMARY

### Solids Analysis

Method: SM 2540C | Internal ref.: ME-CA-IENVIEWL-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Dissolved Solids	EWL0668-AUG23	mg/L	30	<30	2	20	98	80	120	NA		
Total Dissolved Solids	EWL0669-AUG23	mg/L	30	<30	2	20	92	80	120	NA		

### Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-IENVIEWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0003-SEP23	mg/L	2	< 2	0	10	104	90	110	NA		

### Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-IENVISFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen (N)	SKA0022-SEP23	mg/L	0.05	<0.05	ND	10	104	90	110	101	75 125	



## QC SUMMARY

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**Method Blank:** a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

**Duplicate:** Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

**LCS/Spike Blank:** Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

**Matrix Spike:** A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

**Reference Material:** a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

**RL:** Reporting limit

**RPD:** Relative percent difference

**AC:** Acceptance criteria

**Multielement Scan Qualifier:** as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

**Duplicate Qualifier:** for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

**Matrix Spike Qualifier:** for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

**LEGEND****FOOTNOTES**

**NSS** Insufficient sample for analysis.  
**RL** Reporting Limit.  
    ↑ Reporting limit raised.  
    ↓ Reporting limit lowered.  
**NA** The sample was not analysed for this analyte  
**ND** Non Detect

Results relate only to the sample tested.

Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.

"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

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This report supersedes all previous versions.

-- End of Analytical Report --



Request for Laboratory Services and CHAIN OF CUSTODY (General)

SGS Environmental Services - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Toll Free: 877-747-7658 Fax: 705-652-6365 Web: www.ca.sgs.com {4}

SGS Environmental Services - London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361 Web: www.ca.sgs.com {4}

Laboratory Information Section

Received Date (mm/dd/yyyy): 08/30/23 LAB LIMS #: CIA PG57 - Aug 28
Received Time (After Hours Only): Temperature Upon Receipt (°C): 9.3

Billing & Reporting Information

Company: WSP E & I Quote #: 2021 1246
Attention: Dominique Gagnon Attached Parameter List: YES NO
Address: 131 Fielding Rd Turnaround Time
Lively, Ontario P3Y 1L7
Email: APInvoice.Canada@woodplc.com, meg.russell@wsp.com, dominique.gagnon@wsp.com
Is \*Rush Turnaround Time Required? YES NO
Specify:
Project Name/Number: TY131010.2023.1000.1142.5730-00 - New Liskeard SW P.O. #: C023701288 \*Rush TA Requests Require Lab Approval

Client Information/Report To:

Company Name: WSP E & I Phone Number: 705-682-2632
Contact Name: Dominique Gagnon, Meg Russell Fax Number:
Address: E-mail:
Copy to: meg.russell@wsp.com, dominique.gagnon@wsp.com

Sample Information

Table with columns: Sample Identifier, Date Sampled, Time Sampled, # of Bottles, Analysis Requested (Comprehensive SW-Column 3, PH, Temp). Rows include SW-1 to SW-6 and SW DUP with handwritten data.

Sampled By (1): (Name) Ardon Lemon (Signature) [Signature] Date: 08/30/23 (mm/dd/yy)
Relinquished by (2): (Name) Ardon Lemon (Signature) [Signature] Date: 08/30/23 (mm/dd/yy)

Note: {1} Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. {4} Completion of work may require the subcontracting of samples between the London and Lakefield laboratories.

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## FINAL REPORT

CA19658-AUG23 R1

PO#C025701288, TY131010.2023.1000.1142.5730-00- New  
Liskeard GW

Prepared for

**WSP E & I Canada Ltd**

**First Page**

**CLIENT DETAILS**

**LABORATORY DETAILS**

Client	WSP E & I Canada Ltd	Project Specialist	Brad Moore Hon. B.Sc
Address	131 Fielding Road, Lively Canada, P3Y 1L7 Phone: 705-665-0159. Fax:	Laboratory	SGS Canada Inc.
Contact	Dominique Gagnon	Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-665-0159	Telephone	705-652-2143
Facsimile		Facsimile	705-652-6365
Email	Dominique.Gagnon@wsp.com; meg.russell@wsp.com	Email	brad.moore@sgs.com
Project	PO#C025701288, TY131010.2023.1000.1142.5730-00- New Li	SGS Reference	CA19658-AUG23
Order Number		Received	08/31/2023
Samples	Ground Water (28)	Approved	09/14/2023
		Report Number	CA19658-AUG23 R1
		Date Reported	09/14/2023

**COMMENTS**

Temperature of Sample upon Receipt: 8  
 Cooling Agent Present: UNKNOWN  
 Custody Seal Present: UNKNOWN

Chain of Custody Number:NA

NO2 RL raised for sample #7 due to sample matrix

**SIGNATORIES**

Brad Moore Hon. B.Sc




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# FINAL REPORT

CA19658-AUG23 R1

Client: WSP E & I Canada Ltd

Project: PO#C025701288, TY131010.2023.1000.1142.5730-00- New Lishear

Project Manager: Dominique Gagnon

Samplers: NA

MATRIX: WATER

Sample Number	7	8	9	10	11	12	13	14
Sample Name	OW-1R-I	OW-1-R-III	OW-10-I	OW-10-II	OW-11-I	OW-11-II	OW-12-I	OW-12-II
Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Sample Date	29/08/2023	29/08/2023	29/08/2023	28/08/2023	29/08/2023	29/08/2023	29/08/2023	29/08/2023

L1 = ODWS\_AO\_OG / WATER / - - Table 4 - Drinking Water - Reg O.169\_03

L2 = ODWS\_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169\_03

Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
<b>General Chemistry</b>												
Alkalinity	mg/L as CaCO3	2	500		928	1020	282	257	246	472	357	558
Conductivity	uS/cm	2			2300	2520	678	755	577	1100	919	1290
Total Dissolved Solids	mg/L	30	500		1540	1430	431	563	340	731	671	703
Dissolved Organic Carbon	mg/L	1.0	5		29.0	28.3	1.2	2.7	< 1.0	7.2	3.0	8.9
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			35.2	34.9	0.16	0.17	0.07	0.63	0.30	1.11
Ammonia+Ammonium (N)	as N mg/L	0.04			33.3	32.3	0.10	0.05	< 0.04	< 0.04	< 0.04	0.04
Organic Nitrogen	mg/L	0.05	0.15		1.97	2.53	0.06	0.12	0.06	0.61	0.29	1.07
Total Reactive Phosphorous (o-phosphate as P)	mg/L	0.03			< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03

### Metals and Inorganics

Fluoride	mg/L	0.06		1.5	0.15	0.11	0.33	< 0.06	0.33	0.22	0.37	0.08
Sulphate	mg/L	2	500		110	99	91	160	54	96	84	83
Nitrite (as N)	as N mg/L	0.03		1	< 0.3†	0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06		10	< 0.06	< 0.06	< 0.06	< 0.06	0.13	< 0.06	< 0.06	< 0.06
Hardness (dissolved)	mg/L as CaCO3	0.05	100		851	832	369	426	296	552	467	589
Aluminum (dissolved)	mg/L	0.001			0.003	0.003	< 0.001	0.001	< 0.001	0.041	0.007	0.001
Arsenic (dissolved)	mg/L	0.0002		0.01	0.0010	0.0008	< 0.0002	0.0003	< 0.0002	0.0002	< 0.0002	0.0003
Barium (dissolved)	mg/L	0.00008		1	0.124	0.158	0.0315	0.0206	0.0349	0.0365	0.0689	0.0450
Boron (dissolved)	mg/L	0.002		5	1.87	1.49	0.204	0.024	0.277	0.415	0.396	0.310
Beryllium (dissolved)	mg/L	0.000007			< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth (dissolved)	mg/L	0.00001			< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Calcium (dissolved)	mg/L	0.01			147	166	94.8	130	70.8	143	112	164



# FINAL REPORT

CA19658-AUG23 R1

**Client:** WSP E & I Canada Ltd

**Project:** PO#C025701288, TY131010.2023.1000.1142.5730-00- New Lishear

**Project Manager:** Dominique Gagnon

**Samplers:** NA

MATRIX: WATER

L1 = ODWS\_AO\_OG / WATER / - - Table 4 - Drinking Water - Reg O.169\_03

L2 = ODWS\_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169\_03

Sample Number	7	8	9	10	11	12	13	14
<b>Sample Name</b>	OW-1R-I	OW-1R-III	OW-10-I	OW-10-II	OW-11-I	OW-11-II	OW-12-I	OW-12-II
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	29/08/2023	29/08/2023	29/08/2023	28/08/2023	29/08/2023	29/08/2023	29/08/2023	29/08/2023

Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
<b>Metals and Inorganics (continued)</b>												
Cadmium (dissolved)	mg/L	0.000003		0.005	0.000004	0.000083	< 0.000003	< 0.000003	0.000010	0.000006	0.000011	< 0.000003
Chromium (dissolved)	mg/L	0.00008		0.05	0.00083	0.00102	0.00025	0.00056	0.00025	0.00035	0.00020	0.00028
Cobalt (dissolved)	mg/L	0.000004			0.00966	0.0107	0.000018	0.000068	0.000026	0.000199	0.000060	0.000243
Copper (dissolved)	mg/L	0.0002	1		0.0020	0.0044	0.0008	0.0008	0.0011	0.0012	0.0017	0.0006
Iron (dissolved)	mg/L	0.007	0.3		0.329	0.177	0.274	0.066	< 0.007	0.063	0.033	0.354
Potassium (dissolved)	mg/L	0.009			124	112	5.32	1.19	6.92	7.31	9.64	3.84
Magnesium (dissolved)	mg/L	0.001			118	101	32.2	24.8	29.0	47.6	45.5	43.6
Manganese (dissolved)	mg/L	0.00001	0.05		0.877	1.74	0.0201	0.00931	0.00034	0.0143	0.00127	0.0477
Sodium (dissolved)	mg/L	0.01	200	20	187	147	4.82	1.86	13.6	36.8	19.1	64.5
Lead (dissolved)	mg/L	0.00009		0.01	0.00020	0.00108	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Molybdenum (dissolved)	mg/L	0.00004			0.00095	0.00098	0.00007	0.00024	0.00022	0.00070	0.00045	0.00014
Nickel (dissolved)	mg/L	0.0001			0.0569	0.0505	0.0002	0.0008	0.0011	0.0045	0.0037	0.0080
Phosphorus (dissolved)	mg/L	0.003			0.017	0.012	0.012	< 0.003	< 0.003	< 0.003	< 0.003	0.009
Selenium (dissolved)	mg/L	0.00004		0.05	0.00037	0.00043	< 0.00004	0.00009	< 0.00004	0.00008	0.00007	0.00008
Silicon (dissolved)	mg/L	0.02			7.73	7.58	3.65	2.43	3.42	5.39	5.40	4.62
Silver (dissolved)	mg/L	0.00005			< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Strontium (dissolved)	mg/L	0.00008			1.67	1.04	1.23	0.214	2.24	0.339	2.57	0.558
Sulfur (dissolved)	mg/L	3			40	36	32	56	25	32	34	28
Thallium (dissolved)	mg/L	0.000005			0.000132	0.000600	< 0.000005	< 0.000005	< 0.000005	0.000005	< 0.000005	< 0.000005
Tin (dissolved)	mg/L	0.00006			0.00063	0.00040	0.00009	0.00038	0.00011	0.00011	0.00012	0.00018
Titanium (dissolved)	mg/L	0.00007			0.00021	0.00027	0.00068	0.00008	< 0.00007	0.00202	0.00034	0.00011
Uranium (dissolved)	mg/L	0.000002		0.02	0.00187	0.00183	0.000017	0.000256	0.000280	0.000811	0.000408	0.000445





# FINAL REPORT

CA19658-AUG23 R1

**Client:** WSP E & I Canada Ltd

**Project:** PO#C025701288, TY131010.2023.1000.1142.5730-00- New Lishear

**Project Manager:** Dominique Gagnon

**Samplers:** NA

**MATRIX: WATER**

Sample Number	7	8	9	10	11	12	13	14
<b>Sample Name</b>	OW-1R-I	OW-1-R-III	OW-10-I	OW-10-II	OW-11-I	OW-11-II	OW-12-I	OW-12-II
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	29/08/2023	29/08/2023	29/08/2023	28/08/2023	29/08/2023	29/08/2023	29/08/2023	29/08/2023

L1 = ODWS\_AO\_OG / WATER / - - Table 4 - Drinking Water - Reg O.169\_03

L2 = ODWS\_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169\_03

Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
<b>Metals and Inorganics (continued)</b>												
Vanadium (dissolved)	mg/L	0.00001			0.00034	0.00053	0.00004	0.00011	0.00009	0.00023	0.00012	0.00010
Zinc (dissolved)	mg/L	0.002	5		0.002	0.005	0.002	< 0.002	0.009	0.005	0.004	< 0.002

**Other (ORP)**

pH	No unit	0.05	8.5		8.14	7.77	7.95	8.17	8.60	8.25	7.93	7.83
Chloride	mg/L	1	250		240	250	2	2	12	45	49	66

**MATRIX: WATER**

Sample Number	15	16	17	18	19	20	21	22
<b>Sample Name</b>	OW-13-I	OW-16-I	OW-16-II	OW-17-1	OW-17-II	OW-23-II	OW-24-I	OW-24-II
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	30/08/2023	29/08/2023	29/08/2023	30/08/2023	30/08/2023	30/08/2023	29/08/2023	29/08/2023

L1 = ODWS\_AO\_OG / WATER / - - Table 4 - Drinking Water - Reg O.169\_03

L2 = ODWS\_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169\_03

Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
<b>General Chemistry</b>												
Alkalinity	mg/L as CaCO3	2	500		383	389	165	240	303	217	234	345
Conductivity	uS/cm	2			840	556	501	466	649	596	456	612
Total Dissolved Solids	mg/L	30	500		526	461	317	266	414	380	309	434
Dissolved Organic Carbon	mg/L	1.0	5		4.3	9.8	4.6	2.7	1.5	1.8	9.6	1.2
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			2.92	1.74	< 0.05	0.17	< 0.05	0.13	0.11	0.07
Ammonia+Ammonium (N)	as N mg/L	0.04			2.43	1.37	< 0.04	0.05	< 0.04	< 0.04	0.16	< 0.04
Organic Nitrogen	mg/L	0.05	0.15		0.49	0.37	< 0.05	0.12	< 0.05	0.13	< 0.05	0.06
Total Reactive Phosphorous (o-phosphate as P)	mg/L	0.03			0.05	0.28	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03



# FINAL REPORT

CA19658-AUG23 R1

Client: WSP E & I Canada Ltd

Project: PO#C025701288, TY131010.2023.1000.1142.5730-00- New Liskear

Project Manager: Dominique Gagnon

Samplers: NA

MATRIX: WATER

L1 = ODWS\_AO\_OG / WATER / - - Table 4 - Drinking Water - Reg O.169\_03

L2 = ODWS\_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169\_03

Sample Number	15	16	17	18	19	20	21	22
Sample Name	OW-13-I	OW-16-I	OW-16-II	OW-17-1	OW-17-II	OW-23-II	OW-24-I	OW-24-II
Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Sample Date	30/08/2023	29/08/2023	29/08/2023	30/08/2023	30/08/2023	30/08/2023	29/08/2023	29/08/2023

Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
<b>Metals and Inorganics</b>												
Fluoride	mg/L	0.06		1.5	0.27	1.55	1.02	0.36	1.27	1.32	0.57	0.73
Sulphate	mg/L	2	500		85	< 2	89	18	70	82	32	33
Nitrite (as N)	as N mg/L	0.03		1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06		10	0.24	< 0.06	0.15	< 0.06	0.06	0.10	< 0.06	0.06
Hardness (dissolved)	mg/L as CaCO3	0.05	100		468	86.7	110	244	228	131	213	372
Aluminum (dissolved)	mg/L	0.001			0.004	0.003	0.006	0.001	0.038	0.002	0.002	0.002
Arsenic (dissolved)	mg/L	0.0002		0.01	0.0008	0.0004	0.0012	0.0008	0.0006	0.0005	0.0005	< 0.0002
Barium (dissolved)	mg/L	0.00008		1	0.0378	0.0424	0.0310	0.0296	0.0455	0.0294	0.0375	0.0460
Boron (dissolved)	mg/L	0.002		5	0.096	0.411	0.194	0.032	0.122	0.336	0.075	0.036
Beryllium (dissolved)	mg/L	0.000007			< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth (dissolved)	mg/L	0.00001			< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Calcium (dissolved)	mg/L	0.01			120	14.8	21.5	65.2	40.4	21.4	52.7	83.2
Cadmium (dissolved)	mg/L	0.000003		0.005	0.000004	0.000009	0.000014	0.000004	0.000006	0.000018	< 0.000003	0.000005
Chromium (dissolved)	mg/L	0.00008		0.05	0.00053	0.00053	0.00052	0.00032	0.00055	0.00059	0.00029	0.00010
Cobalt (dissolved)	mg/L	0.000004			0.000350	0.000102	0.000012	0.000189	0.000058	0.000018	0.000117	0.000198
Copper (dissolved)	mg/L	0.0002	1		0.0010	0.0003	0.0017	0.0009	0.0014	0.0013	0.0004	0.0017
Iron (dissolved)	mg/L	0.007	0.3		0.555	0.224	< 0.007	0.437	0.058	< 0.007	0.112	0.014
Potassium (dissolved)	mg/L	0.009			6.74	4.36	7.48	3.30	4.40	4.03	3.02	4.82
Magnesium (dissolved)	mg/L	0.001			40.7	12.1	13.8	19.7	30.8	18.9	19.8	40.0
Manganese (dissolved)	mg/L	0.00001	0.05		0.0387	0.0188	0.00017	0.0414	0.00203	0.00029	0.0662	0.0335
Sodium (dissolved)	mg/L	0.01	200	20	2.48	99.5	62.5	3.74	62.0	80.7	21.4	13.6
Lead (dissolved)	mg/L	0.00009		0.01	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009



# FINAL REPORT

CA19658-AUG23 R1

**Client:** WSP E & I Canada Ltd

**Project:** PO#C025701288, TY131010.2023.1000.1142.5730-00- New Liskear

**Project Manager:** Dominique Gagnon

**Samplers:** NA

MATRIX: WATER

L1 = ODWS\_AO\_OG / WATER / - - Table 4 - Drinking Water - Reg O.169\_03

L2 = ODWS\_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169\_03

Sample Number	15	16	17	18	19	20	21	22
<b>Sample Name</b>	OW-13-I	OW-16-I	OW-16-II	OW-17-1	OW-17-II	OW-23-II	OW-24-I	OW-24-II
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	30/08/2023	29/08/2023	29/08/2023	30/08/2023	30/08/2023	30/08/2023	29/08/2023	29/08/2023

Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
<b>Metals and Inorganics (continued)</b>												
Molybdenum (dissolved)	mg/L	0.00004			0.00119	0.00907	0.0210	0.00198	0.00986	0.0353	0.00456	0.00583
Nickel (dissolved)	mg/L	0.0001			0.0012	0.0002	0.0004	0.0003	0.0008	0.0006	0.0005	0.0018
Phosphorus (dissolved)	mg/L	0.003			1.02	0.063	0.005	0.022	< 0.003	< 0.003	< 0.003	< 0.003
Selenium (dissolved)	mg/L	0.00004		0.05	0.00035	0.00009	0.00060	< 0.00004	0.00008	0.00017	< 0.00004	0.00005
Silicon (dissolved)	mg/L	0.02			5.32	8.06	3.45	9.21	4.60	3.30	6.86	5.95
Silver (dissolved)	mg/L	0.00005			< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Strontium (dissolved)	mg/L	0.00008			0.648	0.579	0.521	0.501	3.19	0.782	0.535	1.12
Sulfur (dissolved)	mg/L	3			34	< 3	31	6	24	29	9	11
Thallium (dissolved)	mg/L	0.000005			< 0.000005	< 0.000005	0.000005	< 0.000005	0.000005	< 0.000005	< 0.000005	0.000018
Tin (dissolved)	mg/L	0.00006			0.00013	0.00007	0.00015	0.00022	0.00010	0.00008	0.00012	0.00045
Titanium (dissolved)	mg/L	0.00007			0.00037	0.00083	0.00011	0.00007	0.00184	0.00012	0.00014	0.00015
Uranium (dissolved)	mg/L	0.000002		0.02	0.000622	0.000034	0.00248	0.000039	0.00374	0.00155	0.000503	0.00160
Vanadium (dissolved)	mg/L	0.00001			0.00090	0.00078	0.00141	0.00016	0.00059	0.00027	0.00066	0.00023
Zinc (dissolved)	mg/L	0.002	5		0.004	< 0.002	0.003	0.002	< 0.002	< 0.002	< 0.002	0.004



# FINAL REPORT

CA19658-AUG23 R1

**Client:** WSP E & I Canada Ltd

**Project:** PO#C025701288, TY131010.2023.1000.1142.5730-00- New Liskear

**Project Manager:** Dominique Gagnon

**Samplers:** NA

**MATRIX: WATER**

	Sample Number	15	16	17	18	19	20	21	22
	<b>Sample Name</b>	OW-13-I	OW-16-I	OW-16-II	OW-17-1	OW-17-II	OW-23-II	OW-24-I	OW-24-II
	<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
	<b>Sample Date</b>	30/08/2023	29/08/2023	29/08/2023	30/08/2023	30/08/2023	30/08/2023	29/08/2023	29/08/2023

L1 = ODWS\_AO\_OG / WATER / - - Table 4 - Drinking Water - Reg O.169\_03

L2 = ODWS\_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169\_03

Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
<b>Other (ORP)</b>												
pH	No unit	0.05	8.5		7.94	8.41	8.09	8.02	8.19	8.17	8.44	8.23
Chloride	mg/L	1	250		2	9	5	< 1	4	12	< 1	4

**MATRIX: WATER**

	Sample Number	23	24	25	26	27	28	29	30
	<b>Sample Name</b>	OW-25-I	OW-25-II	OW-30-I	OW-30-II	OW-30-III	OW-31-I	OW-31-II	NL GW Dup-1
	<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
	<b>Sample Date</b>	29/08/2023	29/08/2023	29/08/2023	29/08/2023	29/08/2023	29/08/2023	29/08/2023	29/08/2023

L1 = ODWS\_AO\_OG / WATER / - - Table 4 - Drinking Water - Reg O.169\_03

L2 = ODWS\_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169\_03

Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
<b>General Chemistry</b>												
Alkalinity	mg/L as CaCO3	2	500		231	151	206	184	118	148	263	217
Conductivity	uS/cm	2			421	703	701	366	612	799	638	557
Total Dissolved Solids	mg/L	30	500		232	477	491	217	429	529	409	320
Dissolved Organic Carbon	mg/L	1.0	5		2.7	1.4	1.5	2.4	2.1	1.3	1.9	1.4
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			0.69	< 0.05	< 0.05	0.20	0.13	< 0.05	0.10	0.14
Ammonia+Ammonium (N)	as N mg/L	0.04			0.39	< 0.04	< 0.04	0.06	< 0.04	< 0.04	< 0.04	0.11
Organic Nitrogen	mg/L	0.05	0.15		0.30	< 0.05	< 0.05	0.14	0.13	< 0.05	0.10	< 0.05
Total Reactive Phosphorous (o-phosphate as P)	mg/L	0.03			< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03

**Metals and Inorganics**

Fluoride	mg/L	0.06		1.5	0.67	1.18	1.54	0.24	1.22	0.76	0.34	0.69
Sulphate	mg/L	2	500		< 2	200	210	18	200	290	83	89
Nitrite (as N)	as N mg/L	0.03		1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03



# FINAL REPORT

CA19658-AUG23 R1

Client: WSP E & I Canada Ltd

Project: PO#C025701288, TY131010.2023.1000.1142.5730-00- New Lishear

Project Manager: Dominique Gagnon

Samplers: NA

MATRIX: WATER

Sample Number	23	24	25	26	27	28	29	30
Sample Name	OW-25-I	OW-25-II	OW-30-I	OW-30-II	OW-30-III	OW-31-I	OW-31-II	NL GW Dup-1
Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Sample Date	29/08/2023	29/08/2023	29/08/2023	29/08/2023	29/08/2023	29/08/2023	29/08/2023	29/08/2023

L1 = ODWS\_AO\_OG / WATER / - - Table 4 - Drinking Water - Reg O.169\_03

L2 = ODWS\_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169\_03

Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
<b>Metals and Inorganics (continued)</b>												
Nitrate (as N)	as N mg/L	0.06		10	< 0.06	0.14	< 0.06	< 0.06	< 0.06	0.40	< 0.06	< 0.06
Hardness (dissolved)	mg/L as CaCO3	0.05	100		168	119	135	192	105	227	151	363
Aluminum (dissolved)	mg/L	0.001			0.002	0.005	0.003	0.001	0.002	0.004	0.003	< 0.001
Arsenic (dissolved)	mg/L	0.0002		0.01	< 0.0002	0.0026	0.0004	< 0.0002	0.0007	0.0003	0.0006	< 0.0002
Barium (dissolved)	mg/L	0.00008		1	0.0384	0.0226	0.0307	0.0646	0.0392	0.0346	0.0306	0.0306
Boron (dissolved)	mg/L	0.002		5	0.125	0.189	0.430	0.031	0.195	0.189	0.138	0.202
Beryllium (dissolved)	mg/L	0.000007			< 0.000007	< 0.000007	< 0.000007	0.000009	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth (dissolved)	mg/L	0.00001			< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Calcium (dissolved)	mg/L	0.01			36.4	22.4	21.1	50.6	18.5	40.3	26.1	93.6
Cadmium (dissolved)	mg/L	0.000003		0.005	< 0.000003	0.000023	0.000027	< 0.000003	0.000008	0.000011	0.000009	< 0.000003
Chromium (dissolved)	mg/L	0.00008		0.05	0.00024	0.00047	0.00032	0.00040	0.00035	0.00033	0.00038	0.00028
Cobalt (dissolved)	mg/L	0.000004			0.000022	0.000014	0.000028	0.000053	0.000030	0.000022	0.000030	0.000017
Copper (dissolved)	mg/L	0.0002	1		0.0006	0.0013	0.0011	0.0007	0.0018	0.0023	0.0010	0.0002
Iron (dissolved)	mg/L	0.007	0.3		0.128	< 0.007	< 0.007	1.50	< 0.007	0.009	< 0.007	0.273
Potassium (dissolved)	mg/L	0.009			3.75	7.34	6.18	3.10	5.44	9.01	6.16	5.31
Magnesium (dissolved)	mg/L	0.001			18.6	15.2	20.1	16.0	14.3	30.7	20.8	31.4
Manganese (dissolved)	mg/L	0.00001	0.05		0.0120	0.00028	0.00341	0.0786	0.00490	0.00168	0.00196	0.0196
Sodium (dissolved)	mg/L	0.01	200	20	28.4	101	95.8	4.20	90.3	73.3	61.7	4.65
Lead (dissolved)	mg/L	0.00009		0.01	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Molybdenum (dissolved)	mg/L	0.00004			0.00185	0.0370	0.0346	0.00119	0.0146	0.0132	0.0134	0.00046
Nickel (dissolved)	mg/L	0.0001			< 0.0001	0.0005	0.0005	0.0002	0.0011	0.0011	0.0004	0.0001
Phosphorus (dissolved)	mg/L	0.003			0.034	0.008	0.006	0.053	< 0.003	< 0.003	0.007	0.011



# FINAL REPORT

CA19658-AUG23 R1

**Client:** WSP E & I Canada Ltd

**Project:** PO#C025701288, TY131010.2023.1000.1142.5730-00- New Liskear

**Project Manager:** Dominique Gagnon

**Samplers:** NA

MATRIX: WATER

	Sample Number	23	24	25	26	27	28	29	30
	<b>Sample Name</b>	OW-25-I	OW-25-II	OW-30-I	OW-30-II	OW-30-III	OW-31-I	OW-31-II	NL GW Dup-1
	<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
	<b>Sample Date</b>	29/08/2023	29/08/2023	29/08/2023	29/08/2023	29/08/2023	29/08/2023	29/08/2023	29/08/2023

L1 = ODWS\_AO\_OG / WATER / - - Table 4 - Drinking Water - Reg O.169\_03

L2 = ODWS\_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169\_03

Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
<b>Metals and Inorganics (continued)</b>												
Selenium (dissolved)	mg/L	0.00004		0.05	< 0.00004	0.00055	< 0.00004	< 0.00004	0.00004	0.00045	< 0.00004	< 0.00004
Silicon (dissolved)	mg/L	0.02			8.12	3.27	2.52	6.62	3.60	3.30	4.30	3.66
Silver (dissolved)	mg/L	0.00005			< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Strontium (dissolved)	mg/L	0.00008			0.788	0.556	1.02	0.881	0.689	1.03	0.544	1.24
Sulfur (dissolved)	mg/L	3			< 3	70	69	6	70	99	28	31
Thallium (dissolved)	mg/L	0.000005			< 0.000005	< 0.000005	0.000006	< 0.000005	0.000007	0.000022	0.000009	< 0.000005
Tin (dissolved)	mg/L	0.00006			0.00011	0.00012	0.00017	0.00007	0.00017	0.00012	0.00006	< 0.00006
Titanium (dissolved)	mg/L	0.00007			0.00013	0.00014	< 0.00007	0.00009	< 0.00007	0.00018	0.00012	0.00010
Uranium (dissolved)	mg/L	0.000002		0.02	0.000037	0.00498	0.000562	0.000053	0.000968	0.00218	0.00159	0.000019
Vanadium (dissolved)	mg/L	0.00001			0.00015	0.00211	0.00030	0.00021	0.00112	0.00085	0.00057	0.00004
Zinc (dissolved)	mg/L	0.002	5		< 0.002	0.002	< 0.002	0.002	< 0.002	0.003	< 0.002	< 0.002

**Other (ORP)**

pH	No unit	0.05	8.5		8.14	8.30	8.40	8.00	8.30	8.27	8.37	8.37
Chloride	mg/L	1	250		< 1	7	3	< 1	2	< 1	1	3



# FINAL REPORT

CA19658-AUG23 R1

**Client:** WSP E & I Canada Ltd

**Project:** PO#C025701288, TY131010.2023.1000.1142.5730-00- New Liskear

**Project Manager:** Dominique Gagnon

**Samplers:** NA

MATRIX: WATER

Sample Number	31	32	33	34
<b>Sample Name</b>	NL GW Dup-2	NL GW Dup-3	OW-25-III	OW-10-III
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	29/08/2023	30/08/2023	29/08/2023	28/08/2023

L1 = ODWS\_AO\_OG / WATER / - - Table 4 - Drinking Water - Reg O.169\_03

L2 = ODWS\_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169\_03

Parameter	Units	RL	L1	L2	Result	Result	Result	Result
<b>General Chemistry</b>								
Alkalinity	mg/L as CaCO3	2	500		187	248	402	197
Conductivity	uS/cm	2			363	446	754	537
Total Dissolved Solids	mg/L	30	500		237	306	480	309
Dissolved Organic Carbon	mg/L	1.0	5		2.5	2.2	1.2	< 1.0
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			0.08	0.08	0.10	0.07
Ammonia+Ammonium (N)	as N mg/L	0.04			0.06	0.05	< 0.04	< 0.04
Organic Nitrogen	mg/L	0.05	0.15		< 0.05	< 0.05	0.09	< 0.05
Total Reactive Phosphorous (o-phosphate as P)	mg/L	0.03			< 0.03	< 0.03	< 0.03	< 0.03

### Metals and Inorganics

Fluoride	mg/L	0.06		1.5	0.24	0.35	1.06	0.59
Sulphate	mg/L	2	500		18	21	64	87
Nitrite (as N)	as N mg/L	0.03		1	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06		10	< 0.06	< 0.06	< 0.06	< 0.06
Hardness (dissolved)	mg/L as CaCO3	0.05	100		192	244	405	205
Aluminum (dissolved)	mg/L	0.001			0.001	0.002	0.002	0.050
Arsenic (dissolved)	mg/L	0.0002		0.01	< 0.0002	0.0004	0.0023	< 0.0002
Barium (dissolved)	mg/L	0.00008		1	0.0636	0.0303	0.0744	0.0216
Boron (dissolved)	mg/L	0.002		5	0.025	0.027	0.021	0.221
Beryllium (dissolved)	mg/L	0.000007			0.000012	< 0.000007	< 0.000007	< 0.000007
Bismuth (dissolved)	mg/L	0.00001			< 0.00001	< 0.00001	< 0.00001	< 0.00001
Calcium (dissolved)	mg/L	0.01			50.8	65.5	96.6	49.3



# FINAL REPORT

CA19658-AUG23 R1

**Client:** WSP E & I Canada Ltd

**Project:** PO#C025701288, TY131010.2023.1000.1142.5730-00- New Liskear

**Project Manager:** Dominique Gagnon

**Samplers:** NA

MATRIX: WATER

Sample Number	31	32	33	34
<b>Sample Name</b>	NL GW Dup-2	NL GW Dup-3	OW-25-III	OW-10-III
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	29/08/2023	30/08/2023	29/08/2023	28/08/2023

L1 = ODWS\_AO\_OG / WATER / - - Table 4 - Drinking Water - Reg O.169\_03

L2 = ODWS\_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169\_03

Parameter	Units	RL	L1	L2	Result	Result	Result	Result
<b>Metals and Inorganics (continued)</b>								
Cadmium (dissolved)	mg/L	0.000003		0.005	< 0.000003	< 0.000003	< 0.000003	< 0.000003
Chromium (dissolved)	mg/L	0.00008		0.05	0.00018	0.00021	0.00026	0.00047
Cobalt (dissolved)	mg/L	0.000004			0.000050	0.000128	0.00374	0.000335
Copper (dissolved)	mg/L	0.0002	1		0.0003	0.0003	0.0004	0.0008
Iron (dissolved)	mg/L	0.007	0.3		1.52	0.657	1.22	0.076
Potassium (dissolved)	mg/L	0.009			3.11	3.46	3.74	5.88
Magnesium (dissolved)	mg/L	0.001			16.0	19.5	39.7	19.9
Manganese (dissolved)	mg/L	0.00001	0.05		0.0772	0.0397	0.0920	0.0291
Sodium (dissolved)	mg/L	0.01	200	20	4.13	3.65	13.9	34.3
Lead (dissolved)	mg/L	0.00009		0.01	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Molybdenum (dissolved)	mg/L	0.00004			0.00044	0.00145	0.00463	0.00019
Nickel (dissolved)	mg/L	0.0001			0.0002	0.0003	0.0022	0.0005
Phosphorus (dissolved)	mg/L	0.003			0.054	0.023	< 0.003	< 0.003
Selenium (dissolved)	mg/L	0.00004		0.05	0.00005	< 0.00004	0.00008	< 0.00004
Silicon (dissolved)	mg/L	0.02			6.61	9.32	7.82	3.22
Silver (dissolved)	mg/L	0.00005			< 0.00005	< 0.00005	< 0.00005	< 0.00005
Strontium (dissolved)	mg/L	0.00008			0.887	0.504	1.90	1.92
Sulfur (dissolved)	mg/L	3			6	6	18	29
Thallium (dissolved)	mg/L	0.000005			< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin (dissolved)	mg/L	0.00006			< 0.00006	0.00012	0.00009	0.00012
Titanium (dissolved)	mg/L	0.00007			0.00008	0.00014	0.00019	0.00185
Uranium (dissolved)	mg/L	0.000002		0.02	0.000051	0.000026	0.00456	0.000033





# FINAL REPORT

CA19658-AUG23 R1

**Client:** WSP E & I Canada Ltd

**Project:** PO#C025701288, TY131010.2023.1000.1142.5730-00- New Liskear

**Project Manager:** Dominique Gagnon

**Samplers:** NA

MATRIX: WATER

Sample Number	31	32	33	34
<b>Sample Name</b>	NL GW Dup-2	NL GW Dup-3	OW-25-III	OW-10-III
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	29/08/2023	30/08/2023	29/08/2023	28/08/2023

L1 = ODWS\_AO\_OG / WATER / - - Table 4 - Drinking Water - Reg O.169\_03

L2 = ODWS\_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169\_03

Parameter	Units	RL	L1	L2	Result	Result	Result	Result
<b>Metals and Inorganics (continued)</b>								
Vanadium (dissolved)	mg/L	0.00001			0.00016	0.00012	0.00033	0.00024
Zinc (dissolved)	mg/L	0.002	5		< 0.002	< 0.002	< 0.002	< 0.002
<b>Other (ORP)</b>								
pH	No unit	0.05	8.5		7.77	8.18	8.07	8.45
Chloride	mg/L	1	250		< 1	< 1	< 1	< 1

## EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG /	ODWS_MAC /
				WATER / - - Table 4	WATER / - - Table
				- Drinking Water -	1,2 and 3 -
				Reg O.169_03	Drinking Water -
					Reg O.169_03
				L1	L2

### OW-1R-I

Organic Nitrogen		mg/L	1.97	0.15	
Alkalinity	SM 2320	mg/L as CaCO3	928	500	
Total Dissolved Solids	SM 2540C	mg/L	1540	500	
Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	851	100	
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	0.329	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.877	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	187		20
Dissolved Organic Carbon	SM 5310B	mg/L	29.0	5	

### OW-1R-III

Organic Nitrogen		mg/L	2.53	0.15	
Alkalinity	SM 2320	mg/L as CaCO3	1020	500	
Total Dissolved Solids	SM 2540C	mg/L	1430	500	
Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	832	100	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	1.74	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	147		20
Dissolved Organic Carbon	SM 5310B	mg/L	28.3	5	

### OW-10-I

Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	369	100	
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### OW-10-II

Total Dissolved Solids	SM 2540C	mg/L	563	500	
Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	426	100	

### OW-11-I

Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	296	100	
pH	SM 4500	No unit	8.60	8.5	

### OW-11-II

Organic Nitrogen		mg/L	0.61	0.15	
Total Dissolved Solids	SM 2540C	mg/L	731	500	
Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	552	100	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	36.8		20
Dissolved Organic Carbon	SM 5310B	mg/L	7.2	5	

### OW-12-I

Organic Nitrogen		mg/L	0.29	0.15	
Total Dissolved Solids	SM 2540C	mg/L	671	500	
Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	467	100	

## EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03
				L1	L2

### OW-12-II

Organic Nitrogen		mg/L	1.07	0.15	
Alkalinity	SM 2320	mg/L as CaCO3	558	500	
Total Dissolved Solids	SM 2540C	mg/L	703	500	
Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	589	100	
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	0.354	0.3	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	64.5		20
Dissolved Organic Carbon	SM 5310B	mg/L	8.9	5	

### OW-13-I

Organic Nitrogen		mg/L	0.49	0.15	
Total Dissolved Solids	SM 2540C	mg/L	526	500	
Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	468	100	
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	0.555	0.3	

### OW-16-I

Organic Nitrogen		mg/L	0.37	0.15	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	99.5		20
Fluoride	SM 4500	mg/L	1.55		1.5
Dissolved Organic Carbon	SM 5310B	mg/L	9.8	5	

### OW-16-II

Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	110	100	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	62.5		20

### OW-17-1

Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	244	100	
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	0.437	0.3	

### OW-17-II

Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	228	100	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	62.0		20

### OW-23-II

Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	131	100	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	80.7		20

### OW-24-I

Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	213	100	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.0662	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	21.4		20
Dissolved Organic Carbon	SM 5310B	mg/L	9.6	5	

## EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG /	ODWS_MAC /
				WATER / - - Table 4	WATER / - - Table
				- Drinking Water -	1,2 and 3 -
				Reg O.169_03	Drinking Water -
					Reg O.169_03
				<b>L1</b>	<b>L2</b>

### OW-24-II

Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	372	100	
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### OW-25-I

Organic Nitrogen		mg/L	0.30	0.15	
Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	168	100	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	28.4		20

### OW-25-II

Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	119	100	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	101		20

### OW-30-I

Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	135	100	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	95.8		20
Fluoride	SM 4500	mg/L	1.54		1.5

### OW-30-II

Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	192	100	
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	1.50	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.0786	0.05	

### OW-30-III

Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	105	100	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	90.3		20

### OW-31-I

Total Dissolved Solids	SM 2540C	mg/L	529	500	
Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	227	100	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	73.3		20

### OW-31-II

Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	151	100	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	61.7		20

### NL GW Dup-1

Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	363	100	
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### NL GW Dup-2

Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	192	100	
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	1.52	0.3	

## EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG /	ODWS_MAC /
				WATER / - - Table 4	WATER / - - Table
				- Drinking Water -	1,2 and 3 -
				Reg O.169_03	Drinking Water -
					Reg O.169_03
				<b>L1</b>	<b>L2</b>

### NL GW Dup-2 (continued)

Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.0772	0.05
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### NL GW Dup-3

Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	244	100
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	0.657	0.3

### OW-25-III

Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	405	100
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	1.22	0.3
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.0920	0.05

### OW-10-III

Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	205	100
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	34.3	20

QC SUMMARY

Alkalinity

Method: SM 2320 | Internal ref.: ME-CA-1ENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0004-SEP23	mg/L as CaCO3	2	< 2	3	20	102	80	120	NA		
Alkalinity	EWL0015-SEP23	mg/L as CaCO3	2	< 2	0	20	104	80	120	NA		

Ammonia by SFA

Method: SM 4500 | Internal ref.: ME-CA-1ENVISFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0004-SEP23	mg/L	0.04	<0.04	ND	10	100	90	110	96	75	125
Ammonia+Ammonium (N)	SKA0026-SEP23	mg/L	0.04	<0.04	1	10	100	90	110	88	75	125

## QC SUMMARY

### Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO5013-SEP23	mg/L	1	<1	ND	20	102	80	120	107	75	125
Sulphate	DIO5013-SEP23	mg/L	2	<2	17	20	104	80	120	108	75	125

### Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-IENVIIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nitrite (as N)	DIO0017-SEP23	mg/L	0.03	<0.03	ND	20	98	90	110	104	75	125
Nitrate (as N)	DIO0017-SEP23	mg/L	0.06	<0.06	ND	20	100	90	110	104	75	125
Nitrite (as N)	DIO0019-SEP23	mg/L	0.03	<0.03	ND	20	98	90	110	104	75	125
Nitrate (as N)	DIO0019-SEP23	mg/L	0.06	<0.06	ND	20	99	90	110	101	75	125
Nitrite (as N)	DIO0061-SEP23	mg/L	0.03	<0.03	ND	20	97	90	110	106	75	125

QC SUMMARY

Carbon by Combustion/Oxidation

Method: SM 5310B | Internal ref.: ME-CA-IENVIEWL-LAK-AN-023

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Dissolved Organic Carbon	EWL0024-SEP23	mg/L	1.0	<1.0	ND	20	101	90	110	93	75	125
Dissolved Organic Carbon	EWL0033-SEP23	mg/L	1.0	<1.0	ND	20	100	90	110	98	75	125
Dissolved Organic Carbon	EWL0061-SEP23	mg/L	1.0	<1.0	0	20	101	90	110	105	75	125

Conductivity

Method: SM 2510 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0004-SEP23	uS/cm	2	3	4	20	100	90	110	NA		
Conductivity	EWL0015-SEP23	uS/cm	2	< 2	0	20	100	90	110	NA		





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## QC SUMMARY

Fluoride by Specific Ion Electrode

Method: SM 4500 | Internal ref.: ME-CA-1ENVIEWL-LAK-AN-014

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Fluoride	EWL0068-SEP23	mg/L	0.06	<0.06	ND	10	100	90	110	109	75	125
Fluoride	EWL0077-SEP23	mg/L	0.06	<0.06	0	10	100	90	110	97	75	125

## QC SUMMARY

### Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (dissolved)	EMS0261-AUG23	mg/L	0.00005	<0.00005	ND	20	99	90	110	79	70	130
Aluminum (dissolved)	EMS0261-AUG23	mg/L	0.001	<0.001	0	20	98	90	110	108	70	130
Arsenic (dissolved)	EMS0261-AUG23	mg/L	0.0002	<0.0002	1	20	100	90	110	73	70	130
Barium (dissolved)	EMS0261-AUG23	mg/L	0.00008	<0.00008	0	20	95	90	110	91	70	130
Beryllium (dissolved)	EMS0261-AUG23	mg/L	0.000007	<0.000007	ND	20	93	90	110	98	70	130
Boron (dissolved)	EMS0261-AUG23	mg/L	0.002	<0.002	0	20	96	90	110	97	70	130
Bismuth (dissolved)	EMS0261-AUG23	mg/L	0.00001	<0.00001	ND	20	93	90	110	95	70	130
Calcium (dissolved)	EMS0261-AUG23	mg/L	0.01	<0.01	1	20	99	90	110	91	70	130
Cadmium (dissolved)	EMS0261-AUG23	mg/L	0.000003	<0.000003	ND	20	101	90	110	96	70	130
Cobalt (dissolved)	EMS0261-AUG23	mg/L	0.000004	<0.000004	8	20	98	90	110	91	70	130
Chromium (dissolved)	EMS0261-AUG23	mg/L	0.00008	<0.00008	2	20	96	90	110	96	70	130
Copper (dissolved)	EMS0261-AUG23	mg/L	0.0002	<0.0002	10	20	100	90	110	103	70	130
Iron (dissolved)	EMS0261-AUG23	mg/L	0.007	<0.007	4	20	100	90	110	75	70	130
Potassium (dissolved)	EMS0261-AUG23	mg/L	0.009	<0.009	1	20	102	90	110	99	70	130
Magnesium (dissolved)	EMS0261-AUG23	mg/L	0.001	0.001	1	20	100	90	110	90	70	130
Manganese (dissolved)	EMS0261-AUG23	mg/L	0.00001	<0.00001	1	20	102	90	110	93	70	130
Molybdenum (dissolved)	EMS0261-AUG23	mg/L	0.00004	<0.00004	2	20	103	90	110	91	70	130
Sodium (dissolved)	EMS0261-AUG23	mg/L	0.01	<0.01	0	20	96	90	110	94	70	130
Nickel (dissolved)	EMS0261-AUG23	mg/L	0.0001	<0.0001	10	20	100	90	110	89	70	130
Lead (dissolved)	EMS0261-AUG23	mg/L	0.00009	<0.00009	ND	20	101	90	110	95	70	130

## QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (dissolved)	EMS0261-AUG23	mg/L	0.003	<0.003	ND	20	99	90	110	NV	70	130
Selenium (dissolved)	EMS0261-AUG23	mg/L	0.00004	<0.00004	NV	20	98	90	110	119	70	130
Sulfur (dissolved)	EMS0261-AUG23	mg/L	3	<1	ND	20	104	90	110	NV	70	130
Silicon (dissolved)	EMS0261-AUG23	mg/L	0.02	<0.02	3	20	99	90	110	NV	70	130
Tin (dissolved)	EMS0261-AUG23	mg/L	0.00006	<0.00006	3	20	100	90	110	NV	70	130
Strontium (dissolved)	EMS0261-AUG23	mg/L	0.00008	<0.00008	0	20	99	90	110	88	70	130
Titanium (dissolved)	EMS0261-AUG23	mg/L	0.00007	<0.00005	9	20	100	90	110	NV	70	130
Thallium (dissolved)	EMS0261-AUG23	mg/L	0.000005	<0.000005	0	20	99	90	110	99	70	130
Uranium (dissolved)	EMS0261-AUG23	mg/L	0.000002	<0.000002	1	20	96	90	110	95	70	130
Vanadium (dissolved)	EMS0261-AUG23	mg/L	0.00001	<0.00001	0	20	100	90	110	97	70	130
Zinc (dissolved)	EMS0261-AUG23	mg/L	0.002	<0.002	ND	20	99	90	110	93	70	130



# FINAL REPORT

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## QC SUMMARY

### pH

Method: SM 4500 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0004-SEP23	No unit	0.05	NA	0		100			NA		
pH	EWL0015-SEP23	No unit	0.05	NA	0		100			NA		

### Reactive Phosphorus by SFA

Method: SM 4500-P F | Internal ref.: ME-CA-IENVISFA-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Reactive Phosphorous (o-phosphate as P)	SKA0023-SEP23	mg/L	0.03	<0.03	3	10	97	90	110	107	75	125

## QC SUMMARY

### Solids Analysis

Method: SM 2540C | Internal ref.: ME-CA-IENVIEWL-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Dissolved Solids	EWL0005-SEP23	mg/L	30	<30	3	20	102	80	120	NA		
Total Dissolved Solids	EWL0031-SEP23	mg/L	30	<30	1	20	100	80	120	NA		
Total Dissolved Solids	EWL0045-SEP23	mg/L	30	<30	0	20	101	80	120	NA		

### Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-IENVISFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen (N)	SKA0022-SEP23	mg/L	0.05	<0.05	ND	10	104	90	110	101	75	125

## QC SUMMARY

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**Method Blank:** a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

**Duplicate:** Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

**LCS/Spike Blank:** Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

**Matrix Spike:** A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

**Reference Material:** a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

**RL:** Reporting limit

**RPD:** Relative percent difference

**AC:** Acceptance criteria

**Multielement Scan Qualifier:** as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

**Duplicate Qualifier:** for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

**Matrix Spike Qualifier:** for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

## LEGEND

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### FOOTNOTES

- NSS** Insufficient sample for analysis.
- RL** Reporting Limit.
  - ↑ Reporting limit raised.
  - ↓ Reporting limit lowered.
- NA** The sample was not analysed for this analyte
- ND** Non Detect

Results relate only to the sample tested.

Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.

"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

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This report supersedes all previous versions.

-- End of Analytical Report --



### Request for Laboratory Services and CHAIN OF CUSTODY (General)

SGS Environmental Services - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Toll Free: 877-747-7658 Fax: 705-652-6365 Web: www.ca.sgs.com (4)

SGS Environmental Services - London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361 Web: www.ca.sgs.com (4)

#### Laboratory Information Section

Received Date (mm/dd/yyyy): 08/31/23 LAB LIMS #: CA 19658 - Aug 23  
 Received Time (After Hours Only): 8:30 Temperature Upon Receipt (°C): 8x3

#### Billing & Reporting Information

Invoice/Receipt to (3):  
 Company: WSP E & I Quote #: 2021 1246  
 Attention: Dominique Gagnon Attached Parameter List:  YES  NO  
 131 Fielding Rd  
 Address: Lively, Ontario Turnaround Time  
 P3Y 1L7  
 Email: dominique.gagnon@wsp.com Is \*Rush Turnaround Time Required?  YES  NO  
 Specify:  
 \* Rush TA Requests Require Lab Approval

Client Information/Report To: Client Lab #:  
 Company Name: WSP E & I Phone Number: 705-682-2632  
 Contact Name: Fax Number:  
 Address: E-mail:  
 Copy to:

#### Sample Information

Sample Identifier	Date Sampled (mm/dd/yy)	Time Sampled	# of Bottles	Analysis Requested (please enter the analysis required below and check off which analysis applies to each sample)						
				Field Filtered	SW as per quote	GW as per quote	PH	TEMP		
OW-1R-I	08/29/23		5	Y		X	7.29	18.9		
OW-1-R-III	08/29/23		5	Y		X	7.01	13.4		
OW-10-I	08/29/23		5	Y		X	7.41	9.7		-
OW-10-II	08/29/23		5	Y		X	6.96	12.12		-
OW-11-I	08/29/23		5	Y		X	7.73	11.9		-
OW-11-II	08/29/23		5	Y		X	7.13	15.5		-
OW-12-I	08/29/23		5	Y		X	7.53	11.3		-
OW-12-II	08/29/23		5	Y		X	7.00	15.0		-
OW-13-I	08/30/23		5	Y		X	6.37	5.92		-
OW-16-I	08/29/23		5	Y		X	8.17	9.1		-
OW-16-II	08/29/23		5	Y		X	8.17	10.6		-
<del>OW-10-III</del>						X				
OW-17-1	08/30/23		5	Y		X	7.85	6.96		-
OW-17-II	08/30/23		5	Y		X	7.09	8.86		-
<del>OW-17-III</del>						X				
<del>OW-23-I</del>	08/30/23		5	Y		X				

Sampled By (1): (Name) (Signature) Date: \_\_\_/\_\_\_/\_\_\_ (mm/dd/yy)  
 Relinquished by (2): (Name) (Signature) Date: \_\_\_/\_\_\_/\_\_\_ (mm/dd/yy)

Note: {1} Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. {4} Completion of work may require the subcontracting of samples between the London and Lakefield laboratories.  
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#### Laboratory Information Section

Received Date (mm/dd/yyyy): \_\_\_/\_\_\_/\_\_\_

LAB LIMS #:

Received Time (After Hours Only): \_\_\_:\_\_\_:\_\_\_

Temperature Upon Receipt (°C):

#### Billing & Reporting Information

Invoice/Receipt to (3):	Company:	WSP E & I		Quote #:	2021 1246	
	Attention:	Dominique Gagnon		Attached Parameter List:	<input type="checkbox"/> YES <input type="checkbox"/> NO	
	Address:	131 Fielding Rd Lively, Ontario P3Y 1L7		Turnaround Time		
	Email:	dominique.gagnon@wsp.com		Is *Rush Turnaround Time Required?	<input type="checkbox"/> YES <input type="checkbox"/> NO	
Project Name/Number:	TY131010.2023.1000.1142.5730-00 (New Liskeard LF GW)	P.O. #:	C023701288		Specify: _____ * Rush TA Requests Require Lab Approval	

#### Client Information/Report To:

Client Lab #:

Company Name:	WSP E & I		Phone Number:	705-682-2632	
Contact Name:			Fax Number:		
Address:			E-mail:		
Copy to:					

#### Sample Information

Sample Identifier	Date Sampled (mm/dd/yy)	Time Sampled	# of Bottles	Analysis Requested (please enter the analysis required below and check off which analysis applies to each sample)							
				Field Filtered	GW as per quote	pH	TEMP	PM			
OW-23-II	08/30/23		5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	8.16	10.85				
OW-24-I	08/29/23		5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	7.67	8.7				-
OW-24-II	08/29/23		5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	7.71	9.7				-
<del>OW-24-III</del>					<input checked="" type="checkbox"/>						
OW-25-I	08/29/23		5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	7.70	9.1				-
OW-25-II	08/29/23		5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	7.84	10.3				-
<del>OW-25-III</del>					<input checked="" type="checkbox"/>						
OW-30-I	08/29/23		5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	7.93	8.9				-
OW-30-II	08/29/23		5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	7.96	9.8				-
OW-30-III	08/29/23		5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	7.27	10.3				-
<del>OW-10-III</del>					<input checked="" type="checkbox"/>						
<del>OW-25-IV</del>					<input checked="" type="checkbox"/>						
OW-31-I	08/29/23		5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	7.66	13.4				-
OW-31-II	08/29/23		5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	7.79	9.0				-
NL GW Dup-1	08/29/23		5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	7.22	12.12	6.98			-
NL GW Dup-2	08/29/23		5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	7.27	11.3				-

Sampled By (1):	(Name)	(Signature)	Date:	___/___/___	(mm/dd/yy)
Relinquished by (2):	(Name)	(Signature)	Date:	___/___/___	(mm/dd/yy)

Note: (1) Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. (2) Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). (3) Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. (4) Completion of work may require the subcontracting of samples between the London and Lakefield laboratories.

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### Request for Laboratory Services and CHAIN OF CUSTODY (General)

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SGS Environmental Services - London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361 Web: www.ca.sgs.com {4}

#### Laboratory Information Section

Received Date (mm/dd/yyyy): \_\_\_/\_\_\_/\_\_\_

LAB LIMS #:

Received Time (After Hours Only): \_\_\_:\_\_\_

Temperature Upon Receipt (°C):

#### Billing & Reporting Information

Invoice/Receipt to (3):	Company:	WSP E & I	Quote #:	2021 1246
	Attention:	Dominique Gagnon	Attached Parameter List:	<input type="checkbox"/> YES <input type="checkbox"/> NO
	Address:	131 Fielding Rd Lively, Ontario P3Y 1L7	Turnaround Time	
	Email:	APIInvoice.Canada@woodplc.com, meg.russell@wsp.com, dominique.gagnon@wsp.com	Is *Rush Turnaround Time Required?	<input type="checkbox"/> YES <input type="checkbox"/> NO
Project Name/Number:	TY131010.2023.1000.1142.5730-00 New Liskeard GW	P.O. #:	C023701288	Specify: * Rush TA Requests Require Lab Approval

#### Client Information/Report To:

Client Lab #:

Company Name:	WSP E & I	Phone Number:	705-682-2632
Contact Name:	Dominique Gagnon, Meg Russell	Fax Number:	
Address:		E-mail:	
Copy to:	meg.russell@wsp.com, dominique.gagnon@wsp.com		

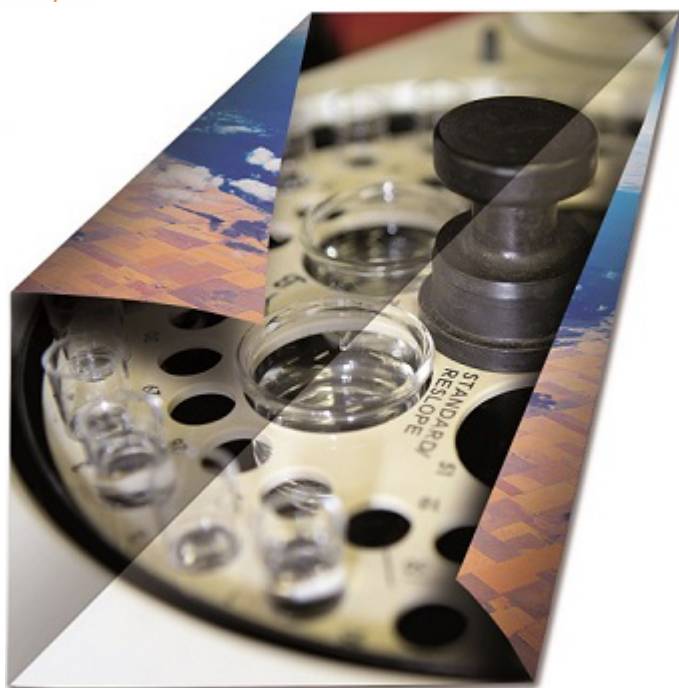
#### Sample Information

Sample Identifier	Date Sampled (mm/dd/yy)	Time Sampled	# of Bottles	Analysis Requested (please enter the analysis required below and check off which analysis applies to each sample)								
				Field Filtered	GW as per quote	pu	500p					
NL GW Dup-3	03/30/23		5	<input checked="" type="checkbox"/>	X	6.96	7.05					
06-25-iii	04/24/23		5	<input checked="" type="checkbox"/>	X	7.27	14.4					
06-10-iii	06/28/23		5	<input checked="" type="checkbox"/>	X	7.56	11.21					

Sampled By {1}: (Name)	(Signature)	Date: ___/___/___	(mm/dd/yy)
Relinquished by {2}: (Name)	(Signature)	Date: ___/___/___	(mm/dd/yy)

Note: {1} Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. {4} Completion of work may require the subcontracting of samples between the London and Lakefield laboratories.

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## FINAL REPORT

CA15277-OCT23 R1

TY131010.2023.1000.1142.5730-00, New Liskeard SW

Prepared for

**WSP E & I Canada Ltd**

## First Page

### CLIENT DETAILS

### LABORATORY DETAILS

Client	WSP E & I Canada Ltd	Project Specialist	Maarit Wolfe, Hon.B.Sc
Address	131 Fielding Road, Lively Canada, P3Y 1L7 Phone: 705-665-0159. Fax:	Laboratory	SGS Canada Inc.
Contact	Dominique Gagnon	Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-665-0159	Telephone	705-652-2000
Facsimile		Facsimile	705-652-6365
Email	Dominique.Gagnon@wsp.com; meg.russell@wsp.com	Email	Maarit.Wolfe@sgs.com
Project	TY131010.2023.1000.1142.5730-00, New Liskeard SW	SGS Reference	CA15277-OCT23
Order Number		Received	10/18/2023
Samples	Surface Water (7)	Approved	11/03/2023
		Report Number	CA15277-OCT23 R1
		Date Reported	11/03/2023

### COMMENTS

Temperature of Sample upon Receipt: 10 degrees C  
 Cooling Agent Present: Yes  
 Custody Seal Present: Yes

Chain of Custody Number: n/a

BOD spike low, accepted based on all other QC

### SIGNATORIES

Maarit Wolfe, Hon.B.Sc



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# FINAL REPORT

CA15277-OCT23 R1

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00, New Liskeard SW

**Project Manager:** Dominique Gagnon

**Samplers:** Mikayla Bechard

MATRIX: WATER

Sample Number	7	8	9	10	11	12	13
<b>Sample Name</b>	SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW Dup
<b>Sample Matrix</b>	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
<b>Sample Date</b>	17/10/2023	17/10/2023	17/10/2023	17/10/2023	17/10/2023	17/10/2023	17/10/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result	
<b>General Chemistry</b>										
Biochemical Oxygen Demand (BOD5)	mg/L	2	< 4 †	< 4 †	6	6	5	< 4 †	< 4 †	
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05	0.20	0.43	0.32	< 0.05	0.47	0.28	< 0.05	
Total Suspended Solids	mg/L	2	13	7	22	67	30	31	30	
Alkalinity	mg/L as CaCO3	2	71	324	330	339	128	130	342	
Conductivity	uS/cm	2	160	624	720	1830	288	290	1840	
Total Dissolved Solids	mg/L	30	111	340	400	923	217	< 30	900	
Chemical Oxygen Demand	mg/L	8	50	15	21	14	37	42	22	
Ammonia+Ammonium (N)	as N mg/L	0.04	< 0.04	< 0.04	< 0.04	< 0.04	0.04	0.04	< 0.04	

### Metals and Inorganics

Sulphate	mg/L	2	< 2	3	5	19	14	11	19
Nitrite (as N)	as N mg/L	0.003	< 0.003	< 0.003	0.004	<0.03 †	0.007	0.008	<0.03 †
Nitrate (as N)	as N mg/L	0.006	0.185	0.019	0.016	0.020	0.875	0.902	0.016
Arsenic (total)	mg/L	0.0002	0.0007	0.0005	0.0005	0.0005	0.0008	0.0007	0.0006
Barium (total)	mg/L	0.00008	0.0162	0.0178	0.0218	0.0540	0.0308	0.0307	0.0520
Boron (total)	mg/L	0.002	0.008	0.014	0.014	0.015	0.013	0.013	0.014
Cadmium (total)	mg/L	0.000003	0.000006	0.000008	0.000009	0.000022	0.000016	0.000014	0.000022
Chromium (total)	mg/L	0.00008	0.00185	0.00061	0.00068	0.00144	0.00411	0.00356	0.00200
Copper (total)	mg/L	0.0002	0.0024	0.0021	0.0026	0.0069	0.0041	0.0040	0.0047
Iron (total)	mg/L	0.007	0.756	0.242	0.261	0.920	1.60	1.55	1.02
Lead (total)	mg/L	0.00009	0.00040	0.00022	0.00024	0.00062	0.00075	0.00082	0.00050
Phosphorus (total)	mg/L	0.003	0.025	0.016	0.022	0.046	0.057	0.051	0.047
Zinc (total)	mg/L	0.002	0.006	0.007	0.004	0.007	0.006	0.008	0.006



# FINAL REPORT

CA15277-OCT23 R1

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00, New Liskeard SW

**Project Manager:** Dominique Gagnon

**Samplers:** Mikayla Bechard

MATRIX: WATER

Sample Number	7	8	9	10	11	12	13
<b>Sample Name</b>	SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW Dup
<b>Sample Matrix</b>	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
<b>Sample Date</b>	17/10/2023	17/10/2023	17/10/2023	17/10/2023	17/10/2023	17/10/2023	17/10/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result
-----------	-------	----	--------	--------	--------	--------	--------	--------	--------

**Other (ORP)**

pH	No unit	0.05	7.74	8.20	8.10	8.08	7.86	7.92	8.07
Chloride	mg/L	1	7	18	43	410	12	11	420
Mercury (dissolved)	mg/L	0.00001	< 0.00001	< 0.00001	< 0.00001	0.00006	< 0.00001	< 0.00001	< 0.00001

**Phenols**

4AAP-Phenolics	mg/L	0.001	0.002	0.002	0.001	0.003	0.002	0.001	0.004
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# FINAL REPORT

CA15277-OCT23 R1

## QC SUMMARY

### Alkalinity

Method: SM 2320 | Internal ref.: ME-CA-1ENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0501-OCT23	mg/L as CaCO3	2	< 2	0	20	104	80	120	NA		

### Ammonia by SFA

Method: SM 4500 | Internal ref.: ME-CA-1ENVISFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0182-OCT23	mg/L	0.04	<0.04	ND	10	100	90	110	98	75	125



QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO5003-NOV23	mg/L	1	<1	ND	20	103	80	120	104	75	125
Sulphate	DIO5003-NOV23	mg/L	2	<2	ND	20	103	80	120	107	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-IENVIIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nitrite (as N)	DIO0614-OCT23	mg/L	0.003	<0.003	6	20	98	90	110	99	75	125
Nitrate (as N)	DIO0614-OCT23	mg/L	0.006	<0.006	0	20	100	90	110	82	75	125
Nitrite (as N)	DIO0675-OCT23	mg/L	0.003	<0.003	16	20	99	90	110	102	75	125

## QC SUMMARY

### Biochemical Oxygen Demand

Method: SM 5210 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0038-OCT23	mg/L	2	< 2	14	30	103	70	130	69	70	130

### Chemical Oxygen Demand

Method: HACH 8000 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chemical Oxygen Demand	EWL0474-OCT23	mg/L	8	<8	0	20	114	80	120	108	75	125
Chemical Oxygen Demand	EWL0475-OCT23	mg/L	8	<8	7	20	98	80	120	106	75	125

### Conductivity

Method: SM 2510 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0501-OCT23	uS/cm	2	< 2	0	20	96	90	110	NA		



# FINAL REPORT

CA15277-OCT23 R1

## QC SUMMARY

### Mercury by CVAAS

Method: EPA 7471A/SM 3112B | Internal ref.: ME-CA-IENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (dissolved)	EHG0044-OCT23	mg/L	0.00001	< 0.00001	ND	20	91	80	120	87	70	130

### Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Arsenic (total)	EMS0192-OCT23	mg/L	0.0002	<0.0002	1	20	98	90	110	105	70	130
Barium (total)	EMS0192-OCT23	mg/L	0.00008	<0.00008	2	20	94	90	110	94	70	130
Boron (total)	EMS0192-OCT23	mg/L	0.002	<0.002	6	20	93	90	110	93	70	130
Cadmium (total)	EMS0192-OCT23	mg/L	0.000003	<0.000003	3	20	98	90	110	99	70	130
Chromium (total)	EMS0192-OCT23	mg/L	0.00008	<0.00008	11	20	96	90	110	105	70	130
Copper (total)	EMS0192-OCT23	mg/L	0.0002	<0.0002	1	20	98	90	110	99	70	130
Iron (total)	EMS0192-OCT23	mg/L	0.007	<0.007	6	20	93	90	110	125	70	130
Lead (total)	EMS0192-OCT23	mg/L	0.00009	<0.00009	3	20	94	90	110	91	70	130
Phosphorus (total)	EMS0192-OCT23	mg/L	0.003	<0.003	ND	20	92	90	110	NV	70	130
Zinc (total)	EMS0192-OCT23	mg/L	0.002	<0.002	5	20	99	90	110	104	70	130



# FINAL REPORT

CA15277-OCT23 R1

## QC SUMMARY

### pH

Method: SM 4500 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0501-OCT23	No unit	0.05	NA	0		100			NA		

### Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-IENVISFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0175-OCT23	mg/L	0.001	0.001	0	10	99	80	120	89	75 125	

### Solids Analysis

Method: SM 2540C | Internal ref.: ME-CA-IENVIEWL-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Dissolved Solids	EWL0577-OCT23	mg/L	30	<30	3	20	97	80	120	NA		
Total Dissolved Solids	EWL0620-OCT23	mg/L	30	<30	0	20	105	80	120	NA		



# FINAL REPORT

CA15277-OCT23 R1

## QC SUMMARY

### Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-IENVIEWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0531-OCT23	mg/L	2	< 2	1	10	96	90	110	NA		
Total Suspended Solids	EWL0534-OCT23	mg/L	2	< 2	0	10	94	90	110	NA		
Total Suspended Solids	EWL0564-OCT23	mg/L	2	< 2	1	10	94	90	110	NA		

### Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-IENVISFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen (N)	SKA0180-OCT23	mg/L	0.05	<0.05	ND	10	101	90	110	108	75	125
Total Kjeldahl Nitrogen (N)	SKA0200-OCT23	mg/L	0.05	<0.05	5	10	99	90	110	104	75	125
Total Kjeldahl Nitrogen (N)	SKA0214-OCT23	mg/L	0.05	<0.05	ND	10	103	90	110	93	75	125

## QC SUMMARY

---

**Method Blank:** a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

**Duplicate:** Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

**LCS/Spike Blank:** Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

**Matrix Spike:** A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

**Reference Material:** a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

**RL:** Reporting limit

**RPD:** Relative percent difference

**AC:** Acceptance criteria

**Multielement Scan Qualifier:** as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

**Duplicate Qualifier:** for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

**Matrix Spike Qualifier:** for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

**LEGEND****FOOTNOTES**

**NSS** Insufficient sample for analysis.  
**RL** Reporting Limit.  
    ↑ Reporting limit raised.  
    ↓ Reporting limit lowered.  
**NA** The sample was not analysed for this analyte  
**ND** Non Detect

Results relate only to the sample tested.

Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.

"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

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This report supersedes all previous versions.

-- End of Analytical Report --



### Request for Laboratory Services and CHAIN OF CUSTODY (General)

SGS Environmental Services - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Toll Free: 877-747-7658 Fax: 705-652-6365 Web: www.ca.sgs.com {4}

SGS Environmental Services - London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361 Web: www.ca.sgs.com {4}

#### Laboratory Information Section

Received Date (mm/dd/yyyy): 10/18/2023 LAB LIMS #: CA 15277-6923

Received Time (After Hours Only): \_\_\_\_\_ Temperature Upon Receipt (°C): 10, 10, 11

#### Billing & Reporting Information

Invoice/Receipt to {3}:	Company:	WSP E & I		Quote #:	2021 1246	
	Attention:	Dominique Gagnon		Attached Parameter List:	<input type="checkbox"/> YES <input type="checkbox"/> NO	
	Address:	131 Fielding Rd Lively, Ontario P3Y 1L7		Turnaround Time	Is *Rush Turnaround Time Required? <input type="checkbox"/> YES <input type="checkbox"/> NO	
	Email:	APInvoice.Canada@wsp.com, meg.russell@wsp.com, dominique.gagnon@wsp.com		Specify:	_____	
Project Name/Number:	TY131010.2023.1000.1142.5730-00 - New Liskeard SW	P.O. #:	C023701288		* Rush TA Requests Require Lab Approval	

#### Client Information/Report To:

Company Name:	WSP E & I	Phone Number:	705-682-2632
Contact Name:	Dominique Gagnon, Meg Russell	Fax Number:	
Address:		E-mail:	
Copy to:	meg.russell@wsp.com, dominique.gagnon@wsp.com		

#### Sample Information

Sample Identifier	Date Sampled (mm/dd/yy)	Time Sampled	# of Bottles	Analysis Requested (please enter the analysis required below and check off which analysis applies to each sample)										
				Comprehensive SW-Column 3										
SW-1	PH = 8.42, Temp = 8.26	10/17/23	10:45	9	X									
SW-2	PH = 7.81, Temp = 6.64	10/17/23	9:20	9	X									
SW-3	PH = 7.75, Temp = 6.63	10/17/23	9:05	9	X									
SW-4	PH = 6.64, Temp = 7.46	10/17/23	8:30	9	X									
SW-5	PH = 7.63, Temp = 9.66	10/17/23	8:00	9	X									
SW-6	PH = 8.07, Temp = 11.04	10/17/23	7:35	9	X									
SW DUP	PH = 6.64, Temp = 7.46	10/17/23	8:30	9	X									

Sampled By {1}:	(Name) <u>Mikayla Bechara</u>	(Signature) <u>[Signature]</u>	Date:	<u>10/17/23</u>	(mm/dd/yy)
Relinquished by {2}:	(Name) <u>Mikayla Bechara</u>	(Signature) <u>[Signature]</u>	Date:	<u>10/17/23</u>	(mm/dd/yy)

Note: {1} Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. {4} Completion of work may require the subcontracting of samples between the London and Lakefield laboratories. This document is issued by the Company under its General Conditions of Service accessible at [http://www.sgs.com/terms\\_and\\_conditions.htm](http://www.sgs.com/terms_and_conditions.htm). (Printed copies are available upon request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.





## FINAL REPORT

CA15351-OCT23 R1

TY131010.2023.1000.1142.5730-00 New Liskeard LF GW

Prepared for

**WSP E & I Canada Ltd**

**First Page**

CLIENT DETAILS		LABORATORY DETAILS	
Client	WSP E & I Canada Ltd	Project Specialist	Brad Moore Hon. B.Sc
Address	131 Fielding Road Lively, ON P3Y 1L7, Canada	Laboratory	SGS Canada Inc.
Contact	Megan Russell	Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-665-0159	Telephone	705-652-2143
Facsimile		Facsimile	705-652-6365
Email	Dominique.Gagnon@wsp.com; meg.russell@wsp.com	Email	brad.moore@sgs.com
Project	TY131010.2023.1000.1142.5730-00 New Liskeard LF GW	SGS Reference	CA15351-OCT23
Order Number		Received	10/20/2023
Samples	Ground Water (29)	Approved	10/30/2023
		Report Number	CA15351-OCT23 R1
		Date Reported	10/30/2023

**COMMENTS**

Temperature of Sample upon Receipt: 9 degrees C  
Cooling Agent Present: Yes  
Custody Seal Present: Yes

Chain of Custody Number: n/a

raised RL for NO2 due to SM

**SIGNATORIES**

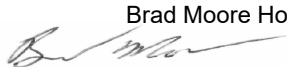
Brad Moore Hon. B.Sc  


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# FINAL REPORT

CA15351-OCT23 R1

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 New Liskeard LF GW

**Project Manager:** Megan Russell

**Samplers:** Mikayla Bechard

MATRIX: WATER

Sample Number	7	8	9	10	11	12	13	14
<b>Sample Name</b>	OW-1R-I	OW-1-R-III	OW-10-I	OW-10-II	OW-11-I	OW-11-II	OW-12-I	OW-12-II
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	17/10/2023	17/10/2023	16/10/2023	16/10/2023	18/10/2023	18/10/2023	18/10/2023	18/10/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result	Result
<b>General Chemistry</b>										
Alkalinity	mg/L as CaCO3	2	1090	1030	285	288	259	450	354	568
Conductivity	uS/cm	2	2620	2480	701	724	587	1060	909	1310
Total Dissolved Solids	mg/L	30	1510	1510	440	503	323	649	554	757
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05	34.3	31.7	0.43	0.38	< 0.05	0.84	0.20	0.84
Ammonia+Ammonium (N)	as N mg/L	0.04	32.4	29.3	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
Organic Nitrogen	mg/L	0.05	1.90	2.43	0.40	0.36	< 0.05	0.83	0.18	0.83
Total Reactive Phosphorous (o-phosphate as P)	mg/L	0.03	0.06	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Dissolved Organic Carbon	mg/L	1	23	20	1	2	< 1	3	3	8

### Metals and Inorganics

Sulphate	mg/L	2	100	94	100	110	43	110	85	67
Nitrite (as N)	as N mg/L	0.03	< 0.03	0.08	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06	< 0.06	0.88	< 0.06	< 0.06	0.28	< 0.06	0.07	< 0.06
Fluoride	mg/L	0.06	0.18	0.14	0.39	0.07	0.36	0.12	0.36	0.06
Hardness (dissolved)	mg/L as CaCO3	0.05	905	896	430	444	327	569	484	658
Aluminum (dissolved)	mg/L	0.001	0.004	0.005	< 0.001	0.001	< 0.001	0.310	< 0.001	0.020
Arsenic (dissolved)	mg/L	0.0002	0.0007	0.0004	< 0.0002	< 0.0002	< 0.0002	0.0002	< 0.0002	0.0002
Barium (dissolved)	mg/L	0.00008	0.135	0.168	0.0331	0.0190	0.0345	0.0293	0.0621	0.0427
Beryllium (dissolved)	mg/L	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	0.000060	< 0.000007	< 0.000007
Bismuth (dissolved)	mg/L	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron (dissolved)	mg/L	0.002	2.12	1.74	0.259	0.030	0.353	0.404	0.457	0.343
Calcium (dissolved)	mg/L	0.01	164	182	110	138	79.6	147	120	186



# FINAL REPORT

CA15351-OCT23 R1

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 New Liskeard LF GW

**Project Manager:** Megan Russell

**Samplers:** Mikayla Bechard

MATRIX: WATER

Sample Number	7	8	9	10	11	12	13	14
<b>Sample Name</b>	OW-1R-I	OW-1-R-III	OW-10-I	OW-10-II	OW-11-I	OW-11-II	OW-12-I	OW-12-II
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	17/10/2023	17/10/2023	16/10/2023	16/10/2023	18/10/2023	18/10/2023	18/10/2023	18/10/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result	Result
<b>Metals and Inorganics (continued)</b>										
Cadmium (dissolved)	mg/L	0.000003	0.000010	0.000034	< 0.000003	< 0.000003	0.000004	0.000010	0.000007	< 0.000003
Chromium (dissolved)	mg/L	0.00008	0.00131	0.00065	< 0.00008	< 0.00008	< 0.00008	0.00057	0.00009	0.00024
Cobalt (dissolved)	mg/L	0.000004	0.00941	0.0103	0.000012	0.000105	0.000026	0.000534	0.000015	0.000284
Copper (dissolved)	mg/L	0.0002	0.0038	0.0151	0.0012	0.0014	0.0011	0.0024	0.0012	0.0012
Iron (dissolved)	mg/L	0.007	0.156	0.035	0.217	0.073	< 0.007	0.470	< 0.007	0.421
Potassium (dissolved)	mg/L	0.009	131	117	6.07	1.03	7.52	4.17	9.71	4.00
Magnesium (dissolved)	mg/L	0.001	120	107	37.8	24.3	31.0	48.9	44.6	47.0
Manganese (dissolved)	mg/L	0.00001	0.935	1.87	0.0205	0.0179	0.00211	0.0820	0.00040	0.0629
Molybdenum (dissolved)	mg/L	0.00004	0.00106	0.00107	0.00006	0.00017	0.00034	0.00022	0.00044	0.00017
Sodium (dissolved)	mg/L	0.01	192	169	4.98	2.32	13.9	39.2	22.3	70.2
Nickel (dissolved)	mg/L	0.0001	0.0571	0.0531	0.0002	0.0007	0.0010	0.0044	0.0035	0.0087
Phosphorus (dissolved)	mg/L	0.003	0.010	0.006	< 0.003	< 0.003	< 0.003	0.043	< 0.003	< 0.003
Lead (dissolved)	mg/L	0.00009	0.00028	0.00101	< 0.00009	< 0.00009	< 0.00009	0.00089	< 0.00009	< 0.00009
Selenium (dissolved)	mg/L	0.00004	0.00022	0.00031	< 0.00004	0.00005	< 0.00004	0.00008	< 0.00004	0.00008
Silicon (dissolved)	mg/L	0.02	7.47	7.17	3.43	2.32	3.59	4.78	5.32	4.13
Silver (dissolved)	mg/L	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Strontium (dissolved)	mg/L	0.00008	1.84	1.14	1.41	0.219	2.27	0.320	2.43	0.620
Sulfur (dissolved)	mg/L	3	42	36	41	44	17	42	29	25
Thallium (dissolved)	mg/L	0.000005	0.000246	0.000553	< 0.000005	< 0.000005	< 0.000005	0.000006	0.000005	< 0.000005
Tin (dissolved)	mg/L	0.00006	0.00035	0.00027	< 0.00006	< 0.00006	0.00006	< 0.00006	< 0.00006	< 0.00006
Titanium (dissolved)	mg/L	0.00007	0.00016	0.00021	< 0.00007	< 0.00007	< 0.00007	0.00491	< 0.00007	0.00061
Uranium (dissolved)	mg/L	0.000002	0.00198	0.00182	0.000015	0.000247	0.000145	0.000816	0.000253	0.000461



# FINAL REPORT

CA15351-OCT23 R1

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 New Liskeard LF GW

**Project Manager:** Megan Russell

**Samplers:** Mikayla Bechard

MATRIX: WATER

Sample Number	7	8	9	10	11	12	13	14
<b>Sample Name</b>	OW-1R-I	OW-1-R-III	OW-10-I	OW-10-II	OW-11-I	OW-11-II	OW-12-I	OW-12-II
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	17/10/2023	17/10/2023	16/10/2023	16/10/2023	18/10/2023	18/10/2023	18/10/2023	18/10/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result	Result
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**Metals and Inorganics (continued)**

Vanadium (dissolved)	mg/L	0.00001	0.00025	0.00078	< 0.00001	0.00006	0.00003	0.00046	0.00006	0.00004
Zinc (dissolved)	mg/L	0.002	0.003	0.004	< 0.002	< 0.002	< 0.002	0.003	< 0.002	< 0.002

**Other (ORP)**

pH	No unit	0.05	7.84	7.89	8.11	8.00	8.05	7.98	8.10	7.95
Chloride	mg/L	1	240	250	2	2	12	37	49	58

MATRIX: WATER

Sample Number	15	16	17	18	19	20	21	22
<b>Sample Name</b>	OW-13-I	OW-16-I	OW-16-II	OW-17-1	OW-17-II	OW-23-II	OW-24-I	OW-24-II
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	18/10/2023	18/10/2023	18/10/2023	17/10/2023	17/10/2023	17/10/2023	18/10/2023	18/10/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result	Result
-----------	-------	----	--------	--------	--------	--------	--------	--------	--------	--------

**General Chemistry**

Alkalinity	mg/L as CaCO3	2	394	325	169	239	281	221	258	358
Conductivity	uS/cm	2	819	567	497	455	629	580	505	668
Total Dissolved Solids	mg/L	30	520	393	306	274	397	349	323	380
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05	0.62	2.34	0.22	0.26	0.19	0.40	< 0.05	0.11
Ammonia+Ammonium (N)	as N mg/L	0.04	0.41	1.74	< 0.04	0.06	< 0.04	< 0.04	0.04	< 0.04
Organic Nitrogen	mg/L	0.05	0.21	0.60	0.20	0.20	0.18	0.38	< 0.05	0.09
Total Reactive Phosphorous (o-phosphate as P)	mg/L	0.03	< 0.03	0.23	< 0.03	< 0.03	0.07	< 0.03	0.11	0.04
Dissolved Organic Carbon	mg/L	1	2	7	1	2	2	2	2	2



# FINAL REPORT

CA15351-OCT23 R1

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 New Liskeard LF GW

**Project Manager:** Megan Russell

**Samplers:** Mikayla Bechard

MATRIX: WATER

Sample Number	15	16	17	18	19	20	21	22
<b>Sample Name</b>	OW-13-I	OW-16-I	OW-16-II	OW-17-1	OW-17-II	OW-23-II	OW-24-I	OW-24-II
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	18/10/2023	18/10/2023	18/10/2023	17/10/2023	17/10/2023	17/10/2023	18/10/2023	18/10/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result	Result
<b>Metals and Inorganics</b>										
Sulphate	mg/L	2	77	< 2	81	17	66	79	23	34
Nitrite (as N)	as N mg/L	0.03	0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06	0.24	< 0.06	0.11	< 0.06	< 0.06	0.10	0.09	0.13
Fluoride	mg/L	0.06	0.24	1.56	1.03	0.33	1.24	1.28	0.30	0.65
Hardness (dissolved)	mg/L as CaCO3	0.05	505	90.1	111	276	404	129	326	418
Aluminum (dissolved)	mg/L	0.001	0.001	0.016	0.006	0.002	0.675	0.008	0.378	0.022
Arsenic (dissolved)	mg/L	0.0002	< 0.0002	0.0003	0.0010	0.0002	0.0010	0.0005	0.0003	0.0002
Barium (dissolved)	mg/L	0.00008	0.0397	0.0363	0.0300	0.0315	0.0565	0.0279	0.0303	0.0529
Beryllium (dissolved)	mg/L	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	0.000063	< 0.000007	0.000029	< 0.000007
Bismuth (dissolved)	mg/L	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron (dissolved)	mg/L	0.002	0.122	0.468	0.199	0.030	0.142	0.384	0.036	0.046
Calcium (dissolved)	mg/L	0.01	131	14.6	21.1	74.5	83.9	20.0	89.0	92.5
Cadmium (dissolved)	mg/L	0.000003	< 0.000003	0.000003	0.000007	< 0.000003	0.000027	0.000018	0.000009	0.000005
Chromium (dissolved)	mg/L	0.00008	0.00010	0.00057	0.00020	0.00136	0.00423	0.00031	0.00211	0.00019
Cobalt (dissolved)	mg/L	0.000004	0.00104	0.000112	0.000015	0.000107	0.00146	0.000060	0.000574	0.000133
Copper (dissolved)	mg/L	0.0002	0.0010	0.0011	0.0043	0.0013	0.0049	0.0016	0.0042	0.0029
Iron (dissolved)	mg/L	0.007	< 0.007	0.069	0.008	0.642	1.62	0.007	1.07	0.035
Potassium (dissolved)	mg/L	0.009	6.23	4.82	7.90	3.58	4.98	4.08	2.18	5.70
Magnesium (dissolved)	mg/L	0.001	43.5	13.0	14.1	21.9	47.2	19.1	25.2	45.5
Manganese (dissolved)	mg/L	0.00001	0.0375	0.0153	0.00025	0.0348	0.0766	0.00461	0.0495	0.0289
Molybdenum (dissolved)	mg/L	0.00004	0.00059	0.00673	0.0220	0.00152	0.00936	0.0346	0.00148	0.00575
Sodium (dissolved)	mg/L	0.01	3.03	113	69.2	4.36	64.4	88.5	8.69	15.7



# FINAL REPORT

CA15351-OCT23 R1

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 New Liskeard LF GW

**Project Manager:** Megan Russell

**Samplers:** Mikayla Bechard

MATRIX: WATER

Sample Number	15	16	17	18	19	20	21	22
<b>Sample Name</b>	OW-13-I	OW-16-I	OW-16-II	OW-17-1	OW-17-II	OW-23-II	OW-24-I	OW-24-II
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	18/10/2023	18/10/2023	18/10/2023	17/10/2023	17/10/2023	17/10/2023	18/10/2023	18/10/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result	Result
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**Metals and Inorganics (continued)**

Nickel (dissolved)	mg/L	0.0001	0.0013	0.0005	0.0007	0.0004	0.0041	0.0008	0.0022	0.0012
Phosphorus (dissolved)	mg/L	0.003	< 0.003	0.120	< 0.003	0.021	0.108	< 0.003	0.051	< 0.003
Lead (dissolved)	mg/L	0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	0.00179	< 0.00009	0.00082	0.00009
Selenium (dissolved)	mg/L	0.00004	< 0.00004	0.00005	0.00028	< 0.00004	0.00009	0.00012	0.00006	0.00006
Silicon (dissolved)	mg/L	0.02	5.24	7.35	3.10	8.60	5.15	2.96	7.15	5.65
Silver (dissolved)	mg/L	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Strontium (dissolved)	mg/L	0.00008	0.683	0.653	0.567	0.564	3.56	0.827	0.352	1.58
Sulfur (dissolved)	mg/L	3	27	< 3	30	6	24	28	7	12
Thallium (dissolved)	mg/L	0.000005	0.000031	< 0.000005	0.000006	< 0.000005	0.000017	< 0.000005	0.000007	0.000006
Tin (dissolved)	mg/L	0.00006	< 0.00006	0.00014	< 0.00006	0.00006	0.00007	0.00009	0.00007	0.00008
Titanium (dissolved)	mg/L	0.00007	0.00010	0.00128	0.00010	0.00010	0.0202	0.00008	0.0186	0.00101
Uranium (dissolved)	mg/L	0.000002	0.000379	0.000028	0.00251	0.000028	0.00384	0.00161	0.000497	0.00142
Vanadium (dissolved)	mg/L	0.00001	0.00014	0.00083	0.00145	0.00013	0.00281	0.00034	0.00177	0.00039
Zinc (dissolved)	mg/L	0.002	< 0.002	< 0.002	0.004	< 0.002	0.006	0.002	0.004	0.002





# FINAL REPORT

CA15351-OCT23 R1

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 New Liskeard LF GW

**Project Manager:** Megan Russell

**Samplers:** Mikayla Bechard

MATRIX: WATER

Sample Number	15	16	17	18	19	20	21	22
<b>Sample Name</b>	OW-13-I	OW-16-I	OW-16-II	OW-17-1	OW-17-II	OW-23-II	OW-24-I	OW-24-II
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	18/10/2023	18/10/2023	18/10/2023	17/10/2023	17/10/2023	17/10/2023	18/10/2023	18/10/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result	Result
<b>Other (ORP)</b>										
pH	No unit	0.05	8.00	8.23	8.17	8.15	8.21	8.35	8.09	8.06
Chloride	mg/L	1	2	9	5	< 1	4	12	< 1	3

MATRIX: WATER

Sample Number	23	24	25	26	27	28	29	30
<b>Sample Name</b>	OW-25-I	OW-25-II	OW-25-III	OW-30-I	OW-30-II	OW-30-III	OW-10-III	OW-25-IV
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	18/10/2023	18/10/2023	18/10/2023	18/10/2023	18/10/2023	18/10/2023	16/10/2023	18/10/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result	Result
<b>General Chemistry</b>										
Alkalinity	mg/L as CaCO3	2	233	155	347	232	226	185	204	181
Conductivity	uS/cm	2	424	703	668	722	576	370	533	389
Total Dissolved Solids	mg/L	30	246	420	391	477	400	217	343	220
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05	0.40	0.10	0.14	0.24	0.26	0.14	0.20	0.24
Ammonia+Ammonium (N)	as N mg/L	0.04	0.35	< 0.04	< 0.04	0.05	< 0.04	< 0.04	< 0.04	0.04
Organic Nitrogen	mg/L	0.05	0.05	0.09	0.13	0.19	0.25	0.11	0.18	0.20
Total Reactive Phosphorous (o-phosphate as P)	mg/L	0.03	0.06	< 0.03	< 0.03	0.05	0.10	< 0.03	< 0.03	< 0.03
Dissolved Organic Carbon	mg/L	1	3	1	2	2	2	2	1	2

**Metals and Inorganics**

Sulphate	mg/L	2	< 2	180	49	140	96	17	84	17
Nitrite (as N)	as N mg/L	0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06	< 0.06	0.16	< 0.06	0.11	< 0.06	< 0.06	< 0.06	< 0.06
Fluoride	mg/L	0.06	0.65	1.19	0.95	1.26	0.79	0.22	0.57	1.84



# FINAL REPORT

CA15351-OCT23 R1

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 New Liskeard LF GW

**Project Manager:** Megan Russell

**Samplers:** Mikayla Bechard

MATRIX: WATER

Sample Number	23	24	25	26	27	28	29	30
<b>Sample Name</b>	OW-25-I	OW-25-II	OW-25-III	OW-30-I	OW-30-II	OW-30-III	OW-10-III	OW-25-IV
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	18/10/2023	18/10/2023	18/10/2023	18/10/2023	18/10/2023	18/10/2023	16/10/2023	18/10/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result	Result
<b>Metals and Inorganics (continued)</b>										
Hardness (dissolved)	mg/L as CaCO3	0.05	185	122	631	195	150	211	228	62.7
Aluminum (dissolved)	mg/L	0.001	0.001	0.005	1.05	0.004	0.009	0.002	0.002	0.003
Arsenic (dissolved)	mg/L	0.0002	< 0.0002	0.0020	0.0014	0.0004	0.0007	< 0.0002	< 0.0002	0.0002
Barium (dissolved)	mg/L	0.00008	0.0381	0.0231	0.0804	0.0452	0.0252	0.0521	0.0210	0.0138
Beryllium (dissolved)	mg/L	0.000007	< 0.000007	< 0.000007	0.000077	< 0.000007	< 0.000007	0.000018	< 0.000007	< 0.000007
Bismuth (dissolved)	mg/L	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.00001	< 0.00001	< 0.00001	< 0.00001
Boron (dissolved)	mg/L	0.002	0.138	0.208	0.037	0.431	0.175	0.026	0.265	0.339
Calcium (dissolved)	mg/L	0.01	39.8	22.2	151	26.0	23.8	55.7	54.8	13.3
Cadmium (dissolved)	mg/L	0.000003	< 0.000003	0.000013	0.000045	0.000008	0.000004	0.000003	< 0.000003	0.000013
Chromium (dissolved)	mg/L	0.00008	0.00013	0.00024	0.00535	0.00133	0.00025	0.00012	< 0.00008	0.00009
Cobalt (dissolved)	mg/L	0.000004	0.000014	0.000016	0.00742	0.000093	0.000016	0.000027	0.000181	0.000048
Copper (dissolved)	mg/L	0.0002	0.0021	0.0034	0.0091	0.0013	0.0043	0.0010	0.0008	0.0016
Iron (dissolved)	mg/L	0.007	0.190	< 0.007	2.50	< 0.007	0.009	0.864	< 0.007	0.078
Potassium (dissolved)	mg/L	0.009	4.13	7.96	5.86	9.47	6.95	3.28	6.24	2.95
Magnesium (dissolved)	mg/L	0.001	20.8	16.1	61.5	31.5	22.0	17.6	22.2	7.15
Manganese (dissolved)	mg/L	0.00001	0.0116	0.00027	0.238	0.00639	0.00134	0.0691	0.0274	0.00950
Molybdenum (dissolved)	mg/L	0.00004	0.00201	0.0375	0.00470	0.0328	0.0170	0.00047	0.00047	0.0389
Sodium (dissolved)	mg/L	0.01	33.0	112	18.5	97.4	75.3	4.77	39.3	76.3
Nickel (dissolved)	mg/L	0.0001	0.0004	0.0008	0.0080	0.0014	0.0007	0.0002	0.0005	0.0003
Phosphorus (dissolved)	mg/L	0.003	0.030	< 0.003	0.121	< 0.003	0.004	0.006	< 0.003	< 0.003
Lead (dissolved)	mg/L	0.00009	< 0.00009	< 0.00009	0.00261	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Selenium (dissolved)	mg/L	0.00004	< 0.00004	0.00041	0.00006	0.00014	0.00005	< 0.00004	< 0.00004	< 0.00004



# FINAL REPORT

CA15351-OCT23 R1

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 New Liskeard LF GW

**Project Manager:** Megan Russell

**Samplers:** Mikayla Bechard

MATRIX: WATER

Sample Number	23	24	25	26	27	28	29	30
<b>Sample Name</b>	OW-25-I	OW-25-II	OW-25-III	OW-30-I	OW-30-II	OW-30-III	OW-10-III	OW-25-IV
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	18/10/2023	18/10/2023	18/10/2023	18/10/2023	18/10/2023	18/10/2023	16/10/2023	18/10/2023

Parameter	Units	RL	Result	Result	Result	Result	Result	Result	Result	Result
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**Metals and Inorganics (continued)**

Silicon (dissolved)	mg/L	0.02	7.55	3.01	7.38	2.60	4.01	5.95	2.84	4.11
Silver (dissolved)	mg/L	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Strontium (dissolved)	mg/L	0.00008	0.876	0.590	2.87	1.40	0.580	0.886	2.10	0.498
Sulfur (dissolved)	mg/L	3	< 3	71	27	56	37	5	30	6
Thallium (dissolved)	mg/L	0.000005	< 0.000005	< 0.000005	0.000027	0.000011	0.000005	< 0.000005	< 0.000005	< 0.000005
Tin (dissolved)	mg/L	0.00006	< 0.00006	0.00007	< 0.00006	0.00014	0.00014	< 0.00006	< 0.00006	0.00015
Titanium (dissolved)	mg/L	0.00007	0.00009	0.00008	0.03209	0.00009	0.00076	0.00009	< 0.00007	0.00008
Uranium (dissolved)	mg/L	0.000002	0.000040	0.00490	0.00461	0.000527	0.00120	0.000038	0.000035	0.000129
Vanadium (dissolved)	mg/L	0.00001	0.00007	0.00204	0.00346	0.00028	0.00042	0.00010	0.00013	0.00005
Zinc (dissolved)	mg/L	0.002	0.002	0.003	0.010	< 0.002	0.004	< 0.002	< 0.002	< 0.002

**Other (ORP)**

pH	No unit	0.05	8.22	8.12	8.13	8.29	8.26	7.95	8.21	8.27
Chloride	mg/L	1	< 1	7	< 1	3	1	< 1	< 1	9



# FINAL REPORT

CA15351-OCT23 R1

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 New Liskeard LF GW

**Project Manager:** Megan Russell

**Samplers:** Mikayla Bechard

MATRIX: WATER

Sample Number	31	32	33	34	35
<b>Sample Name</b>	OW-31-I	OW-31-II	NL GW Dup-1	NL GW Dup-2	NL GW Dup-3
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	18/10/2023	18/10/2023	16/10/2023	18/10/2023	18/10/2023

Parameter	Units	RL	Result	Result	Result	Result	Result
<b>General Chemistry</b>							
Alkalinity	mg/L as CaCO <sub>3</sub>	2	135	121	288	185	258
Conductivity	uS/cm	2	805	648	726	369	427
Total Dissolved Solids	mg/L	30	534	429	480	214	269
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05	0.13	0.13	0.21	< 0.05	0.40
Ammonia+Ammonium (N)	as N mg/L	0.04	< 0.04	< 0.04	< 0.04	0.04	0.35
Organic Nitrogen	mg/L	0.05	0.14	0.11	0.19	< 0.05	0.05
Total Reactive Phosphorous (o-phosphate as P)	mg/L	0.03	0.05	0.06	0.05	< 0.03	0.08
Dissolved Organic Carbon	mg/L	1	1	2	2	2	2

### Metals and Inorganics

Sulphate	mg/L	2	280	180	110	18	< 2
Nitrite (as N)	as N mg/L	0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06	0.40	< 0.06	< 0.06	< 0.06	< 0.06
Fluoride	mg/L	0.06	0.74	1.19	0.06	0.22	0.65
Hardness (dissolved)	mg/L as CaCO <sub>3</sub>	0.05	259	108	442	211	188
Aluminum (dissolved)	mg/L	0.001	0.180	0.011	0.001	0.004	0.001
Arsenic (dissolved)	mg/L	0.0002	0.0003	0.0006	< 0.0002	< 0.0002	0.0002
Barium (dissolved)	mg/L	0.00008	0.0382	0.0373	0.0194	0.0541	0.0384
Beryllium (dissolved)	mg/L	0.000007	< 0.000007	< 0.000007	< 0.000007	0.000010	< 0.000007
Bismuth (dissolved)	mg/L	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron (dissolved)	mg/L	0.002	0.202	0.215	0.028	0.028	0.137
Calcium (dissolved)	mg/L	0.01	48.3	18.2	137	55.7	40.6



# FINAL REPORT

CA15351-OCT23 R1

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 New Liskeard LF GW

**Project Manager:** Megan Russell

**Samplers:** Mikayla Bechard

MATRIX: WATER

Sample Number	31	32	33	34	35
<b>Sample Name</b>	OW-31-I	OW-31-II	NL GW Dup-1	NL GW Dup-2	NL GW Dup-3
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	18/10/2023	18/10/2023	16/10/2023	18/10/2023	18/10/2023

Parameter	Units	RL	Result	Result	Result	Result	Result
<b>Metals and Inorganics (continued)</b>							
Cadmium (dissolved)	mg/L	0.000003	0.000007	0.000004	< 0.000003	< 0.000003	< 0.000003
Chromium (dissolved)	mg/L	0.00008	0.00122	0.00012	< 0.00008	0.00011	0.00012
Cobalt (dissolved)	mg/L	0.000004	0.000555	0.000056	0.000115	0.000024	0.000012
Copper (dissolved)	mg/L	0.0002	0.0050	0.0028	0.0039	0.0019	0.0014
Iron (dissolved)	mg/L	0.007	0.340	0.012	0.075	0.860	0.190
Potassium (dissolved)	mg/L	0.009	9.83	5.77	1.02	3.28	4.07
Magnesium (dissolved)	mg/L	0.001	33.7	15.3	24.4	17.5	21.1
Manganese (dissolved)	mg/L	0.00001	0.0197	0.00869	0.0187	0.0711	0.0113
Molybdenum (dissolved)	mg/L	0.00004	0.0134	0.0151	0.00024	0.00047	0.00212
Sodium (dissolved)	mg/L	0.01	79.6	103	2.26	4.64	32.8
Nickel (dissolved)	mg/L	0.0001	0.0028	0.0014	0.0010	0.0003	0.0002
Phosphorus (dissolved)	mg/L	0.003	0.012	< 0.003	< 0.003	0.005	0.029
Lead (dissolved)	mg/L	0.00009	0.00028	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Selenium (dissolved)	mg/L	0.00004	0.00041	0.00004	0.00005	< 0.00004	< 0.00004
Silicon (dissolved)	mg/L	0.02	3.21	3.24	2.27	5.92	7.28
Silver (dissolved)	mg/L	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Strontium (dissolved)	mg/L	0.00008	1.17	0.746	0.218	0.868	0.882
Sulfur (dissolved)	mg/L	3	102	72	44	5	< 3
Thallium (dissolved)	mg/L	0.000005	0.000026	0.000008	< 0.000005	< 0.000005	< 0.000005
Tin (dissolved)	mg/L	0.00006	0.00013	0.00009	< 0.00006	0.00012	< 0.00006
Titanium (dissolved)	mg/L	0.00007	0.00905	0.00045	0.00007	< 0.00007	0.00007
Uranium (dissolved)	mg/L	0.000002	0.00217	0.00110	0.000248	0.000039	0.000046



# FINAL REPORT

CA15351-OCT23 R1

**Client:** WSP E & I Canada Ltd

**Project:** TY131010.2023.1000.1142.5730-00 New Liskeard LF GW

**Project Manager:** Megan Russell

**Samplers:** Mikayla Bechard

MATRIX: WATER

Sample Number	31	32	33	34	35
<b>Sample Name</b>	OW-31-I	OW-31-II	NL GW Dup-1	NL GW Dup-2	NL GW Dup-3
<b>Sample Matrix</b>	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
<b>Sample Date</b>	18/10/2023	18/10/2023	16/10/2023	18/10/2023	18/10/2023

Parameter	Units	RL	Result	Result	Result	Result	Result
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**Metals and Inorganics (continued)**

Vanadium (dissolved)	mg/L	0.00001	0.00151	0.00101	0.00006	0.00011	0.00008
Zinc (dissolved)	mg/L	0.002	0.005	< 0.002	0.003	0.002	< 0.002

**Other (ORP)**

pH	No unit	0.05	7.99	8.03	8.04	7.89	8.13
Chloride	mg/L	1	< 1	3	3	< 1	1



# FINAL REPORT

CA15351-OCT23 R1

## QC SUMMARY

### Alkalinity

Method: SM 2320 | Internal ref.: ME-CA-1ENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0551-OCT23	mg/L as CaCO3	2	< 2	0	20	102	80	120	NA		

### Ammonia by SFA

Method: SM 4500 | Internal ref.: ME-CA-1ENVISFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0225-OCT23	mg/L	0.04	<0.04	ND	10	100	90	110	99	75	125
Ammonia+Ammonium (N)	SKA0240-OCT23	mg/L	0.04	<0.04	0	10	100	90	110	96	75	125

## QC SUMMARY

### Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO5081-OCT23	mg/L	1	<1	1	20	101	80	120	102	75	125
Sulphate	DIO5081-OCT23	mg/L	2	<2	ND	20	104	80	120	105	75	125
Sulphate	DIO5083-OCT23	mg/L	2	<2	ND	20	107	80	120	103	75	125

### Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-IENVIIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nitrite (as N)	DIO0659-OCT23	mg/L	0.03	<0.03	ND	20	99	90	110	104	75	125
Nitrate (as N)	DIO0659-OCT23	mg/L	0.06	<0.06	ND	20	99	90	110	102	75	125
Nitrite (as N)	DIO0661-OCT23	mg/L	0.03	<0.03	ND	20	100	90	110	105	75	125
Nitrate (as N)	DIO0661-OCT23	mg/L	0.06	<0.06	ND	20	100	90	110	104	75	125
Nitrite (as N)	DIO0662-OCT23	mg/L	0.03	<0.03	ND	20	100	90	110	103	75	125
Nitrate (as N)	DIO0662-OCT23	mg/L	0.06	<0.06	ND	20	100	90	110	102	75	125





# FINAL REPORT

CA15351-OCT23 R1

## QC SUMMARY

### Carbon by SFA

Method: SM 5310 | Internal ref.: ME-CA-ENVI/SFA-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Dissolved Organic Carbon	SKA0216-OCT23	mg/L	1	<1	ND	20	100	90	110	99	75	125
Dissolved Organic Carbon	SKA0227-OCT23	mg/L	1	<1	1	20	100	90	110	92	75	125

### Conductivity

Method: SM 2510 | Internal ref.: ME-CA-ENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0551-OCT23	uS/cm	2	< 2	0	20	100	90	110	NA		

### Fluoride by Specific Ion Electrode

Method: SM 4500 | Internal ref.: ME-CA-ENVIEWL-LAK-AN-014

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Fluoride	EWL0651-OCT23	mg/L	0.06	<0.06	0	10	103	90	110	91	75	125

## QC SUMMARY

### Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (dissolved)	EMS0217-OCT23	mg/L	0.00005	<0.00005	ND	20	97	90	110	91	70	130
Aluminum (dissolved)	EMS0217-OCT23	mg/L	0.001	<0.001	ND	20	91	90	110	129	70	130
Arsenic (dissolved)	EMS0217-OCT23	mg/L	0.0002	<0.0002	ND	20	94	90	110	96	70	130
Barium (dissolved)	EMS0217-OCT23	mg/L	0.00008	<0.00008	2	20	92	90	110	97	70	130
Beryllium (dissolved)	EMS0217-OCT23	mg/L	0.000007	<0.000007	ND	20	90	90	110	101	70	130
Boron (dissolved)	EMS0217-OCT23	mg/L	0.002	<0.002	ND	20	98	90	110	93	70	130
Bismuth (dissolved)	EMS0217-OCT23	mg/L	0.00001	<0.00001	ND	20	96	90	110	84	70	130
Calcium (dissolved)	EMS0217-OCT23	mg/L	0.01	<0.01	0	20	96	90	110	98	70	130
Cadmium (dissolved)	EMS0217-OCT23	mg/L	0.000003	<0.000003	ND	20	97	90	110	94	70	130
Cobalt (dissolved)	EMS0217-OCT23	mg/L	0.000004	<0.000004	ND	20	95	90	110	94	70	130
Chromium (dissolved)	EMS0217-OCT23	mg/L	0.00008	<0.00008	ND	20	93	90	110	101	70	130
Copper (dissolved)	EMS0217-OCT23	mg/L	0.0002	<0.0002	ND	20	98	90	110	101	70	130
Iron (dissolved)	EMS0217-OCT23	mg/L	0.007	<0.007	ND	20	92	90	110	100	70	130
Potassium (dissolved)	EMS0217-OCT23	mg/L	0.009	<0.009	2	20	107	90	110	96	70	130
Magnesium (dissolved)	EMS0217-OCT23	mg/L	0.001	<0.001	3	20	103	90	110	103	70	130
Manganese (dissolved)	EMS0217-OCT23	mg/L	0.00001	<0.00001	ND	20	93	90	110	105	70	130
Molybdenum (dissolved)	EMS0217-OCT23	mg/L	0.00004	<0.00004	ND	20	102	90	110	94	70	130
Sodium (dissolved)	EMS0217-OCT23	mg/L	0.01	<0.01	1	20	105	90	110	87	70	130
Nickel (dissolved)	EMS0217-OCT23	mg/L	0.0001	<0.0001	ND	20	95	90	110	97	70	130
Lead (dissolved)	EMS0217-OCT23	mg/L	0.00009	<0.00009	ND	20	94	90	110	98	70	130

## QC SUMMARY

### Metals in aqueous samples - ICP-MS (continued)

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (dissolved)	EMS0217-OCT23	mg/L	0.003	<0.003	ND	20	92	90	110	NV	70	130
Selenium (dissolved)	EMS0217-OCT23	mg/L	0.00004	<0.00004	ND	20	94	90	110	89	70	130
Sulfur (dissolved)	EMS0217-OCT23	mg/L	3	<1	ND	20	107	90	110	NV	70	130
Silicon (dissolved)	EMS0217-OCT23	mg/L	0.02	<0.02	ND	20	93	90	110	NV	70	130
Tin (dissolved)	EMS0217-OCT23	mg/L	0.00006	<0.00006	ND	20	98	90	110	NV	70	130
Strontium (dissolved)	EMS0217-OCT23	mg/L	0.00008	<0.00008	3	20	99	90	110	94	70	130
Titanium (dissolved)	EMS0217-OCT23	mg/L	0.00007	<0.00005	ND	20	100	90	110	NV	70	130
Thallium (dissolved)	EMS0217-OCT23	mg/L	0.000005	<0.000005	ND	20	94	90	110	96	70	130
Uranium (dissolved)	EMS0217-OCT23	mg/L	0.000002	<0.000002	ND	20	95	90	110	103	70	130
Vanadium (dissolved)	EMS0217-OCT23	mg/L	0.00001	<0.00001	ND	20	92	90	110	97	70	130
Zinc (dissolved)	EMS0217-OCT23	mg/L	0.002	<0.002	ND	20	96	90	110	108	70	130

### pH

Method: SM 4500 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0551-OCT23	No unit	0.05	NA	0		101			NA		



# FINAL REPORT

CA15351-OCT23 R1

## QC SUMMARY

### Reactive Phosphorus by SFA

Method: SM 4500-P F | Internal ref.: ME-CA-IENVISFA-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Reactive Phosphorous (o-phosphate as P)	SKA0194-OCT23	mg/L	0.03	<0.03	0	10	96	90	110	86	75	125

### Solids Analysis

Method: SM 2540C | Internal ref.: ME-CA-IENVIEWL-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Dissolved Solids	EWL0529-OCT23	mg/L	30	<30	13	20	87	80	120	NA		
Total Dissolved Solids	EWL0546-OCT23	mg/L	30	<30	1	20	105	80	120	NA		
Total Dissolved Solids	EWL0548-OCT23	mg/L	30	<30	ND	20	101	80	120	NA		
Total Dissolved Solids	EWL0579-OCT23	mg/L	30	<30	6	20	100	80	120	NA		

## QC SUMMARY

### Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-IENVISFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen (N)	SKA0202-OCT23	mg/L	0.05	<0.05	1	10	103	90	110	100	75	125
Total Kjeldahl Nitrogen (N)	SKA0228-OCT23	mg/L	0.05	<0.05	3	10	100	90	110	113	75	125
Total Kjeldahl Nitrogen (N)	SKA0243-OCT23	mg/L	0.05	<0.05	1	10	97	90	110	87	75	125

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

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

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

**Multielement Scan Qualifier:** as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

**Duplicate Qualifier:** for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

**Matrix Spike Qualifier:** for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

## LEGEND

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### FOOTNOTES

- NSS** Insufficient sample for analysis.
- RL** Reporting Limit.
  - ↑ Reporting limit raised.
  - ↓ Reporting limit lowered.
- NA** The sample was not analysed for this analyte
- ND** Non Detect

Results relate only to the sample tested.

Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.

"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

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This report supersedes all previous versions.

-- End of Analytical Report --



### Request for Laboratory Services and CHAIN OF CUSTODY (General)

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SGS Environmental Services - London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361 Web: www.ca.sgs.com {4}

#### Laboratory Information Section

Received Date (mm/dd/yyyy): OCT 20 2023 LAB LIMS #: OCT15351  
Received Time (After Hours Only): \_\_\_\_\_ Temperature Upon Receipt (°C): 9x3

#### Billing & Reporting Information

Invoice/Receipt to (3):	Company:	WSP E&I Canada Limited	Quote #:	2021 1246
	Attention:	Megan Russell	Attached Parameter List:	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
	Address:	131 Fielding Road Lively, ON, P3Y 1L7	Turnaround Time	
	Email:	APInvoice.Canada@wsp.com, meg.russell@wsp.com, dominique.gagnon@wsp.com	Is *Rush Turnaround Time Required?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
Project Name/Number:	New Liskeard GW TY131010.2023.1000.1142.5730-00	P.O. #:	C025701288	Specify: * Rush TA Requests Require Lab Approval

#### Client Information/Report To:

Company Name:	WSP E&I Canada Limited	Phone Number:	705-682-2632
Contact Name:	Megan Russell	Fax Number:	705-682-2260
Address:	131 Fielding Road, Lively, ON, P3Y 1L7	E-mail:	meg.russell@wsp.com
Copy to:	meg.russell@wsp.com; dominique.gagnon@wsp.com		

#### Sample Information

Sample Identifier	Date Sampled (mm/dd/yy)	Time Sampled	# of Bottles	Analysis Requested (please enter the analysis required below and check off which analysis applies to each sample)						
				Field filtered	NL GW param. As per Quote 2021 1246					
OW-1R-I	10/17/23	16:40	5	X	X					
OW-1-R-III	10/17/23	16:30	5	X	X					
OW-10-I	10/16/23	13:10	5	X	X					
OW-10-II	10/16/23	12:55	5	X	X					
OW-11-I	10/18/23	8:15	5	X	X					
OW-11-II	10/18/23	8:25	5	X	X					
OW-12-I	10/18/23	7:45	5	X	X					
OW-12-II	10/18/23	7:55	5	X	X					
OW-13-I	10/18/23	13:40	5	X	X					
OW-16-I	10/18/23	11:30	5	X	X					
OW-16-II	10/18/23	11:45	5	X	X					
OW-16-III	-	-	-	-	-					
OW-17-1	10/17/23	18:40	5	X	X					
OW-17-II	10/17/23	18:45	5	X	X					
OW-17-III	<del>10/17/23</del>	-	-	-	-					
	10/17/23									

Sampled By (1): (Name)	Mikayla Bechard	(Signature)	<i>Mikayla Bechard</i>	Date:	10/19/23	(mm/dd/yy)
Relinquished by (2): (Name)	Mikayla Bechard	(Signature)	<i>Mikayla Bechard</i>	Date:	10/19/23	(mm/dd/yy)

{1} Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. {4} Completion of work may require the subcontracting of samples between the London and Lakefield laboratories.

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" " 068



### Request for Laboratory Services and CHAIN OF CUSTODY (General)

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SGS Environmental Services - London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361 Web: www.ca.sgs.com (4)

#### Laboratory Information Section

Received Date (mm/dd/yyyy): \_\_\_/\_\_\_/\_\_\_

LAB LIMS #:

Received Time (After Hours Only): \_\_\_:\_\_\_

Temperature Upon Receipt (°C):

#### Billing & Reporting Information

Invoice/Receipt to (3):	Company:	WSP E&I Canada Limited		Quote #:	2021 1246	
	Attention:	Megan Russell		Attached Parameter List:	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
	Address:	131 Fielding Road Lively, ON, P3Y 1L7		<b>Turnaround Time</b>		
	Email:	APIInvoice.Canada@wsp.com, meg.russell@wsp.com, dominique.gagnon@wsp.com		Is *Rush Turnaround Time Required?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
Project Name/Number:	New Liskeard GW TY131010.2023.1000.1142.5730-00	P.O. #:	C025701288	Specify:	* Rush TA Requests Require Lab Approval	

#### Client Information/Report To:

Client Lab #:

Company Name:	WSP E&I Canada Limited	Phone Number:	705-682-2632
Contact Name:	Megan Russell	Fax Number:	705-682-2260
Address:	131 Fielding Road, Lively, ON, P3Y 1L7	E-mail:	meg.russell@wsp.com
Copy to:	meg.russell@wsp.com; dominique.gagnon@wsp.com		

#### Sample Information

Sample Identifier	Date Sampled (mm/dd/yy)	Time Sampled	# of Bottles	Analysis Requested (please enter the analysis required below and check off which analysis applies to each sample)										
				Field filtered	NL GW param. As per Quote 2021 1246									
OW-23-I	—	—	—											
OW-23-II	10/17/23	10:00	5	X	X									
OW-24-I	10/18/23	13:00	5	X	X									
OW-24-II	10/18/23	13:10	5	X	X									
OW-24-III	—	—	—											
OW-25-I	10/18/23	16:40	5	X	X									
OW-25-II	10/18/23	17:00	5	X	X									
OW-25-III	10/18/23	17:20	5	X	X									
OW-30-I	10/18/23	14:50	5	X	X									
OW-30-II	10/18/23	15:00	5	X	X									
OW-30-III	10/18/23	9:25	5	X	X									
OW-11 OW-10-III	10/16/23	13:00	5	X	X									
OW-21 OW-25-IV	10/1/23	17:45	5	X	X									
OW-31-I	10/18/23	9:50	5	X	X									
OW-31-II	10/18/23	10:05	5	X	X									

Sampled By {1}: (Name)	Mikayla Bechard	(Signature)	<i>Mikayla Bechard</i>	Date:	10/19/23	(mm/dd/yy)
Relinquished by {2}: (Name)	Mikayla Bechard	(Signature)	<i>Mikayla Bechard</i>	Date:	10/19/23	(mm/dd/yy)

{1} Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. {4} Completion of work may require the subcontracting of samples between the London and Lakefield laboratories.

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#### Laboratory Information Section

Received Date (mm/dd/yyyy):	___ / ___ / ___	LAB LIMS #:	
Received Time (After Hours Only):	___ : ___	Temperature Upon Receipt (°C):	

#### Billing & Reporting Information

Invoice/Receipt to (3):	Company:	WSP E&I Canada Limited		Quote #:	2021 1246	
	Attention:	Megan Russell		Attached Parameter List:	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
	Address:	131 Fielding Road Lively, ON, P3Y 1L7		<b>Turnaround Time</b>		
	Email:	APIInvoice.Canada@wsp.com, meg.russell@wsp.com, dominique.gagnon@wsp.com		Is "Rush Turnaround Time Required?"	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
Project Name/Number:	New Liskeard GW TY131010.2023.1000.1142.5730-00	P.O. #:	C025701288	Specify:	* Rush TA Requests Require Lab Approval	

#### Client Information/Report To:

Company Name:	WSP E&I Canada Limited	Phone Number:	705-682-2632
Contact Name:	Megan Russell	Fax Number:	705-682-2260
Address:	131 Fielding Road, Lively, ON, P3Y 1L7	E-mail:	meg.russell@wsp.com
Copy to:	meg.russell@wsp.com; dominique.gagnon@wsp.com		

#### Sample Information

Sample Identifier	Date Sampled (mm/dd/yy)	Time Sampled	# of Bottles	Analysis Requested (please enter the analysis required below and check off which analysis applies to each sample)							
				Field filtered	NL GW param. As per Quote 2021 1246						
NL GW Dup-1	10/16/23	12:55	5	X	X						
NL GW Dup-2	10/18/23	9:25	5	X	X						
NL GW Dup-3	10/18/23	16:40	5	X	X						

Sampled By (1): (Name)	M. Kayla Bechard	(Signature)	<i>[Signature]</i>	Date:	10/19/23	(mm/dd/yy)
Relinquished by (2): (Name)	Mikayla Bechard	(Signature)	<i>[Signature]</i>	Date:	10/19/23	(mm/dd/yy)

{1} Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. {4} Completion of work may require the subcontracting of samples between the London and Lakefield laboratories.

# Appendix F

## Summary of Groundwater Geochemical Analyses



Groundwater Geochemical Results OW-10-I

Parameters	Units	ODWS <sup>(1)</sup>	2014			2015			2016			2017			2018		
			June	July	Sep	May	July	Sep	May	July	Sep	May	July	Sep	May	July	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	259	253	259	253	267	256	253	266	271	262	248	305	309	276	263
Chloride	mg/L	250 AO <sup>(3)</sup>	3.26	3.27	3.38	3.25	2.59	3.05	2.38	2.87	3.17	2.64	3.95	3.53	3.28	2.89	2.54
Dissolved Organic Carbon	mg/L	5 AO	2.4	1.6	1.4	1.3	3.0	2.4	2.2	1.5	1.3	1.2	1.8	1.6	1.3	2.1	1.7
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	<0.10	<0.25	0.26	0.18	<0.25	<0.25	<0.25	<0.10	<0.25	<0.25	0.32	0.26	0.17	0.31	0.18
Sulphate	mg/L	500 AO	186	192	166	137	200	153	147	124	119	162	108	92.1	113	93.1	123
Hardness	mg/L	80-100 OG	<b>440</b>	<b>455</b>	<b>400</b>	<b>361</b>	<b>465</b>	<b>412</b>	<b>370</b>	<b>363</b>	<b>351</b>	<b>377</b>	<b>344</b>	<b>353</b>	<b>379</b>	<b>364</b>	<b>393</b>
Nitrate	mg/L	10 MAC	<0.10	<0.25	<0.10	<0.10	<0.25	<0.25	<0.25	<0.10	<0.25	<0.25	<0.05	<0.10	<0.05	<0.05	<0.10
Nitrite	mg/L	1 MAC	<0.10	<0.25	<0.10	<0.10	<0.25	<0.25	<0.25	<0.10	<0.25	<0.25	<0.05	<0.10	<0.05	<0.05	<0.10
Organic Nitrogen	mg/L	0.15 OG	<b>0.39</b>	<0.10	0.13	<0.10	<b>0.29</b>	<b>0.18</b>	<b>0.23</b>	0.11	0.12	<0.10	<0.10	<0.10	<0.10	0.11	<b>0.16</b>
Orthophosphate	mg/L		<0.20	<0.05	<0.20	<0.20	<0.50	<0.50	<0.50	<0.20	<0.50	<0.50	<0.10	<0.20	<0.10	<0.10	<0.20
pH	pH Units	6.5-8.5 OG	8.16	8.05	7.82	8.15	7.74	7.65	7.96	7.58	8.12	7.93	7.84	8.21	7.65	8.07	7.51
Electrical Conductivity	µS/cm		802	821	809	741	868	779	655	742	739	728	650	706	713	709	733
Total Ammonia	mg/L		0.06	0.07	0.03	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	0.06
Total Dissolved Solids	mg/L	500 AO	<b>512</b>	<b>568</b>	<b>500</b>	434	<b>548</b>	464	414	446	414	440	408	408	442	406	440
Total Kjeldahl Nitrogen (TKN)	mg/L		0.45	<0.10	0.16	<0.10	0.29	0.2	0.23	0.11	0.12	<0.10	<0.10	0.12	<0.10	0.11	0.22
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	0.007	<0.004	<0.004	<0.004	<0.004	<0.004	0.015	0.012	0.005	0.005	<0.004	0.005	<0.004	<0.004	0.004
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.027	0.028	0.027	0.027	0.020	0.035	0.019	0.030	0.033	0.032	0.034	0.034	0.032	0.029	0.038
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	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	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.143	0.11	0.161	0.139	0.020	0.120	0.021	0.154	0.182	0.160	0.193	0.232	0.197	0.255	0.225
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		117	122	105	93.4	143	110	115	95.4	93.4	97.6	85.2	90.2	96.7	93.3	101
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.005	<0.003	<0.003
Iron	mg/L	0.3 AO	0.104	0.134	0.177	0.129	0.049	<b>0.778</b>	<0.010	0.075	0.073	0.141	0.159	0.169	0.10	0.149	0.177
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Magnesium	mg/L		36.0	36.5	33.4	31.1	26.1	33.3	20.2	30.4	28.6	32.3	31.8	31.0	33.4	31.9	34.1
Manganese	mg/L	0.05 AO	0.021	0.021	0.02	0.024	0.020	0.044	0.002	0.014	0.012	0.022	0.031	0.020	0.021	0.020	0.022
Molybdenum	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	<0.002	<0.002	<0.002
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		4.21	4.17	4.35	4.01	1.37	4.48	1.07	4.45	4.46	4.19	5.42	5.32	4.46	4.77	5.31
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		2.74	2.76	2.96	3.24	1.96	3.04	1.88	2.83	3.13	3.27	3.54	3.45	2.74	3.52	3.57
Silver	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	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	3.4	3.25	3.63	4.15	2.10	3.87	2.51	4.76	4.76	4.16	5.85	5.09	4.06	4.84	4.83
Strontium	mg/L		0.92	0.868	0.91	0.878	0.20	1.08	0.147	0.93	0.987	1.04	1.26	1.24	1.12	1.15	1.22
Sulphur	mg/L		55.6	64.4	60.5	49.2	68.0	59.6	39.0	40.4	37.6	52.1	35.2	28.7	38.5	30.4	43.0
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	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	<0.002	<0.002	<0.002
Titanium	mg/L		<0.002	<0.002	<0.002	0.002	0.003	0.004	<0.002	<0.002	0.002	0.003	<0.002	<0.002	0.002	<0.002	0.002
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	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	<0.002	<0.002	<0.002
Zinc	mg/L	5 AO	0.006	0.005	<0.005	0.006	0.005	0.005	0.006	0.008	0.007	<0.005	0.006	<0.005	0.009	<0.005	<0.005

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-10-I

Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	261	264	273	289	297	317	288	296	298	291	288	287	275	282	285
Chloride	mg/L	250 AO <sup>(3)</sup>	2.46	2.93	2.65	2.66	2.93	2.53	2.56	2.84	2.92	2.0	2.0	2.0	4	2	2
Dissolved Organic Carbon	mg/L	5 AO	1.7	1.8	1.0	1.6	1.3	1.4	1.4	1.8	1.9	1.4	2.0	2.0	3.0	1.2	1.0
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.21	0.23	0.17	0.25	<0.05	<0.05	0.20	0.23	0.20	0.31	0.35	0.34	0.32	0.33	0.39
Sulphate	mg/L	500 AO	152	110	96.7	92.8	88.9	105	88.8	82.4	78.8	120	75	110	110	91	100
Hardness	mg/L	80-100 OG	<b>401</b>	<b>367</b>	<b>352</b>	<b>365</b>	<b>324</b>	<b>351</b>	<b>313</b>	<b>344</b>	<b>340</b>	<b>436</b>	<b>386</b>	<b>386</b>	<b>415</b>	<b>369</b>	<b>430</b>
Nitrate	mg/L	10 MAC	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.05	<0.05	<0.05	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Nitrite	mg/L	1 MAC	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.05	<0.05	<0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Organic Nitrogen	mg/L	0.15 OG	<0.10	0.12	<0.10	<b>0.3</b>	0.13	0.15	<b>0.22</b>	<0.10	<b>0.16</b>	< 0.5	< 0.5	0.06	<b>0.58</b>	0.06	<b>0.40</b>
Orthophosphate	mg/L		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10						< 0.03
pH	pH Units	6.5-8.5 OG	7.53	7.65	7.44	7.47	7.74	7.60	7.78	7.82	7.76	8.13	8.21	8.04	8.13	7.95	8.11
Electrical Conductivity	µS/cm		730	749	762	763	609	630	662	670	668	687	673	729	698	678	701
Total Ammonia	mg/L		<0.02	0.04	<0.02	<0.02	0.02	<0.02	<0.02	0.05	<0.02	0.06	< 0.04	< 0.04	0.05	0.1	< 0.04
Total Dissolved Solids	mg/L	500 AO	476	406	420	400	398	438	372	410	420	440	351	480	466	431	440
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.10	0.16	<0.10	0.3	0.15	0.15	0.22	<0.10	0.16	< 0.5	< 0.05	0.08	0.63	0.16	0.43
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.003
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	<0.004	0.007	0.027	0.024	0.039	0.011	0.024	<0.004	0.003	0.028	< 0.001	0.002	< 0.001	< 0.001
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Barium	mg/L	1 MAC	0.034	0.031	0.033	0.033	0.028	0.029	0.028	0.030	0.033	0.0391	0.0344	0.0343	0.0312	0.0315	0.0331
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.162	0.256	0.283	0.227	0.320	0.251	0.228	0.276	0.350	0.285	0.231	0.339	0.178	0.204	0.259
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000005	< 0.000003	0.000007	< 0.000003	< 0.000003	< 0.000003
Calcium	mg/L		104	93.7	92.1	93.6	82.6	90.9	78.9	86	85.4	122	104	101	110	94.8	110
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.00031	0.00015	0.00012	0.00012	0.00025	< 0.00008
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000023	0.000017	0.000016	0.000026	0.000018	0.000012
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.004	<0.003	0.0013	0.0007	< 0.0002	0.0012	0.0008	0.0012
Iron	mg/L	0.3 AO	0.097	<0.010	0.087	0.181	0.236	0.201	0.166	0.212	<0.010	0.185	0.180	0.214	0.203	0.274	0.217
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Magnesium	mg/L		34.2	32.2	29.7	31.8	28.7	30.1	28.2	31.4	30.8	32	30.4	32.7	33.9	32.2	37.8
Manganese	mg/L	0.05 AO	0.021	0.021	0.020	0.018	0.019	0.018	0.011	0.019	0.019	0.0215	0.0206	0.0209	0.0359	0.0201	0.0205
Molybdenum	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00008	0.00008	0.00009	0.00006	0.00007	0.00006
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0002	< 0.0001	0.0001	0.0002	0.0002	0.0002
Potassium	mg/L		4.95	4.80	4.96	4.86	4.40	4.78	4.47	5.10	5.05	6.11	5.26	5.46	5.67	5.32	6.07
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	< 0.00004	< 0.00004	0.00006	< 0.00004	< 0.00004	< 0.00004
Silicon	mg/L		3.81	2.38	3.31	3.38	3.47	3.26	2.68	3.89	3.95	4.26	4.96	4.34	3.43	3.65	3.43
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	200 AO	4.04	4.76	4.93	4.86	4.78	4.68	4.71	5.43	5.17	4.54	5.45	4.25	4.67	4.82	4.98
Strontium	mg/L		1.17	1.16	1.15	1.16	1.2	1.17	0.998	1.31	1.32	1.31	1.15	1.25	1.23	1.23	1.41
Sulphur	mg/L		50.5	35.6	31.4	30.0	25.7	36.5	27.8	27.6	24.5	51	24	39	40	32	41
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00008	0.00009	< 0.00006	< 0.00006	0.00009	< 0.00006
Titanium	mg/L		0.003	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	0.00018	< 0.00005	< 0.00005	0.00011	0.00068	< 0.00007
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000022	0.000015	0.00002	0.000023	0.000017	0.000015
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00005	< 0.00001	0.00002	< 0.00001	0.00004	< 0.00001
Zinc	mg/L	5 AO	<0.005	<0.005	<0.005	<0.005	<0.005	0.018	<0.005	<0.005	<0.005	0.002	0.003	< 0.002	< 0.002	0.002	< 0.002

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-10-II

Parameters	Units	ODWS <sup>(1)</sup>	2014			2015			2016			2017			2018		
			June	July	Sep	May	July	Sep	May	July	Sep	May	July	Sep	May	July	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	249	258	269	247	262	261	253	256	270	247	255	271	279	268	240
Chloride	mg/L	250 AO <sup>(3)</sup>	2.06	2.37	2.43	2.14	2.78	2.73	2.38	2.38	2.65	2.14	1.67	2.05	2.15	2.21	1.84
Dissolved Organic Carbon	mg/L	5 AO	2.1	1.7	2.2	2.0	3.0	2.3	2.2	2.9	3.5	1.9	2.4	2.9	2.6	3.2	2.9
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	<0.05	<0.25	<0.10	<0.10	<0.25	<0.25	<0.25	<0.10	<0.25	<0.25	<0.05	<0.10	<0.05	0.09	<0.10
Sulphate	mg/L	500 AO	142	218	162	126	135	200	147	191	177	150	199	184	135	187	177
Hardness	mg/L	80-100 OG	<b>393</b>	<b>499</b>	<b>409</b>	<b>363</b>	<b>384</b>	<b>485</b>	<b>370</b>	<b>436</b>	<b>447</b>	<b>362</b>	<b>414</b>	<b>441</b>	<b>376</b>	<b>450</b>	<b>447</b>
Nitrate	mg/L	10 MAC	<0.05	<0.25	<0.10	<0.10	<0.25	<0.25	<0.25	<0.10	<0.25	<0.25	<0.05	<0.10	<0.05	0.06	<0.10
Nitrite	mg/L	1 MAC	<0.05	<0.25	<0.10	<0.10	<0.25	<0.25	<0.25	<0.10	<0.25	<0.25	<0.05	<0.10	<0.05	<0.05	<0.10
Organic Nitrogen	mg/L	0.15 OG	<b>0.48</b>	<0.10	<0.10	0.12	<b>0.16</b>	0.10	<b>0.23</b>	<b>0.70</b>	<b>0.32</b>	<0.10	<0.10	<b>0.29</b>	<0.10	0.13	<b>0.23</b>
Orthophosphate	mg/L		<0.10	<0.50	<0.20	<0.20	<0.50	<0.50	<0.50	<0.20	<0.50	<0.50	<0.10	<0.20	<0.10	<0.10	<0.20
pH	pH Units	6.5-8.5 OG	8.16	8.00	7.73	8.10	8.03	7.93	7.96	7.81	8.20	8.14	8.18	8.05	7.78	7.94	7.76
Electrical Conductivity	µS/cm		716	863	814	715	744	871	655	836	853	684	799	818	694	815	791
Total Ammonia	mg/L		0.04	0.07	0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	<0.02	0.04
Total Dissolved Solids	mg/L	500 AO	436	<b>602</b>	<b>508</b>	426	426	<b>546</b>	414	<b>504</b>	<b>530</b>	418	<b>512</b>	<b>522</b>	450	<b>504</b>	<b>596</b>
Total Kjeldahl Nitrogen (TKN)	mg/L		0.52	<0.10	0.16	0.12	0.16	0.10	0.23	0.70	0.32	<0.10	<0.10	0.33	<0.10	0.13	0.27
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	<0.004	<0.004	<0.004	<0.004	0.007	0.015	0.010	0.010	0.005	0.026	0.005	<0.004	<0.004	0.004
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.017	0.020	0.019	0.014	0.029	0.022	0.019	0.021	0.028	0.017	0.019	0.021	0.016	0.021	0.025
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.023	0.033	0.029	0.016	0.141	0.026	0.021	0.025	0.037	0.019	0.03	0.031	0.018	0.054	0.030
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		122	154	126	113	100	150	115	135	138	112	127	135	117	139	138
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.010	<0.010	<0.010	<0.010	0.112	<0.010	<0.010	<0.010	<b>0.501</b>	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Magnesium	mg/L		21.5	27.9	22.9	19.7	32.5	26.8	20.2	24.1	24.9	19.9	23.5	25.3	20.4	25.1	24.8
Manganese	mg/L	0.05 AO	<0.002	<0.002	<0.002	<0.002	0.021	<0.002	0.002	0.010	<b>0.149</b>	<0.002	0.005	0.008	<0.002	<0.002	<0.002
Molybdenum	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	<0.002	<0.002	<0.002
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	0.006	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		0.96	1.71	1.18	1.04	4.35	1.78	1.07	1.17	1.75	0.87	1.02	1.4	0.85	1.36	1.22
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		1.97	2.03	2.04	2.13	2.82	2.33	1.88	2.12	2.24	2.11	2.3	2.29	1.79	2.30	2.57
Silver	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	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	2.4	2.18	2.25	2.21	4.30	2.27	2.51	2.20	2.25	2.17	1.99	2.22	1.99	2.14	2.25
Strontium	mg/L		0.167	0.212	0.181	0.138	0.943	0.209	0.147	0.193	0.219	0.159	0.19	0.201	0.145	0.208	0.205
Sulphur	mg/L		41.7	73.0	60	44.8	43.9	71.3	39.0	59.8	58.7	49.0	62.5	60.6	44.9	55.1	63.6
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	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	<0.002	<0.002	<0.002
Titanium	mg/L		<0.002	<0.002	<0.002	0.002	0.002	0.004	<0.002	0.002	0.004	0.003	0.004	<0.002	0.003	0.002	0.003
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	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	<0.002	<0.002	<0.002
Zinc	mg/L	5 AO	0.018	0.006	0.005	<0.005	<0.005	<0.005	0.006	0.011	0.005	<0.005	0.009	0.006	<0.005	0.006	<0.005

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-10-II

Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	242	233	240	244	267	308	262	301	293	280	DRY	257	274	257	288
Chloride	mg/L	250 AO <sup>(3)</sup>	1.69	2.64	1.64	1.56	1.64	1.44	1.54	1.37	1.55	< 1	< 1	1	2	2	
Dissolved Organic Carbon	mg/L	5 AO	2.7	2.8	2.1	2.0	2.5	3.8	2.8	4.1	4.0	2.7	5.0	2.0	2.7	2.0	
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	<0.10	<0.25	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.06	0.07	0.07	< 0.06	0.07	
Sulphate	mg/L	500 AO	120	187	231	135	154	110	132	109	143	95	78	110	160	110	
Hardness	mg/L	80-100 OG	<b>348</b>	<b>428</b>	<b>453</b>	<b>384</b>	<b>365</b>	<b>362</b>	<b>333</b>	<b>382</b>	<b>422</b>	<b>422</b>	<b>328</b>	<b>407</b>	<b>426</b>	<b>444</b>	
Nitrate	mg/L	10 MAC	<0.10	<0.25	<0.25	<0.10	<0.10	<0.10	<0.05	<0.05	<0.05	< 0.06	< 0.06	0.06	< 0.06	< 0.06	
Nitrite	mg/L	1 MAC	<0.10	<0.25	<0.25	<0.10	<0.10	<0.10	<0.05	<0.05	<0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	
Organic Nitrogen	mg/L	0.15 OG	0.14	<b>0.17</b>	<0.10	<b>0.18</b>	<b>0.18</b>	<b>0.17</b>	<b>0.17</b>	<b>0.24</b>	<b>0.39</b>	< <b>0.5</b>	0.07	0.06	0.12	<b>0.36</b>	
Orthophosphate	mg/L		<0.20	<0.50	<0.50	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10					< 0.03	
pH	pH Units	6.5-8.5 OG	7.83	7.57	7.57	7.65	7.82	7.62	7.69	7.73	7.69	8.16	8.08	8.09	8.17	8.00	
Electrical Conductivity	µS/cm		640	819	907	750	642	614	692	714	772	638	601	678	755	724	
Total Ammonia	mg/L		<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05	0.07	< 0.04	0.05	< 0.04	
Total Dissolved Solids	mg/L	500 AO	380	<b>508</b>	<b>558</b>	444	478	450	422	486	<b>550</b>	409	377	489	<b>563</b>	<b>503</b>	
Total Kjeldahl Nitrogen (TKN)	mg/L		0.14	0.19	<0.10	0.18	0.18	0.17	0.17	0.24	0.39	< 0.5	0.14	0.09	0.17	0.38	
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.03	< 0.03	< 0.03	< 0.03	< 0.003	
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	0.007	0.007	0.020	0.014	0.040	<b>0.112</b>	0.019	0.014	0.015	0.005	0.003	0.001	0.001	
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	< 0.0002	< 0.0002	< 0.0002	0.0003	< 0.0002	
Barium	mg/L	1 MAC	0.016	0.019	0.024	0.022	0.017	0.015	0.013	0.019	0.022	0.0197	0.0172	0.0174	0.0206	0.019	
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.012	0.045	0.054	0.030	0.074	0.033	0.025	0.051	0.064	0.050	0.048	0.021	0.024	0.03	
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000003	< 0.000003	< 0.000003	< 0.000003	< 0.000003	
Calcium	mg/L		109	132	140	119	113	113	102	118	130	138	102	127	130	138	
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.00029	0.00029	0.00014	0.00056	< 0.00008	
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000038	0.000054	0.000043	0.000068	0.000105	
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0013	0.0004	0.0015	0.0008	0.0014	
Iron	mg/L	0.3 AO	<0.010	<0.010	<0.010	<0.010	<0.010	0.152	0.016	0.013	<0.010	0.013	< 0.007	< 0.007	0.066	0.073	
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	
Magnesium	mg/L		18.5	24.0	25.0	21.0	20.2	19.4	19.1	21.3	23.7	18.8	17.7	22.0	24.8	24.3	
Manganese	mg/L	0.05 AO	<0.002	0.003	0.004	<0.002	0.006	<b>0.061</b>	<0.002	0.003	0.002	0.00059	0.00104	0.00159	0.00931	0.0179	
Molybdenum	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00016	0.00017	0.00016	0.00024	0.00017	
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0006	0.0006	0.0007	0.0008	0.0007	
Potassium	mg/L		0.88	1.19	1.18	0.88	0.93	0.92	1.01	1.15	1.09	1.14	0.96	1.09	1.19	1.03	
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.00009	0.00009	0.0001	0.00009	0.00005	
Silicon	mg/L		2.51	0.94	2.17	2.08	2.39	2.1	1.87	3.08	2.67	2.78	2.68	2.42	2.43	2.32	
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	
Sodium	mg/L	200 AO	2.06	2.14	2.17	2.04	1.79	2.01	1.82	2.15	1.99	1.94	1.86	1.96	1.86	2.32	
Strontium	mg/L		0.151	0.198	0.214	0.158	0.179	0.159	0.128	0.185	0.213	0.156	0.154	0.178	0.214	0.219	
Sulphur	mg/L		40.6	61.1	69.5	42.0	41.9	42.7	41.3	35.3	42.7	43	26	41	56	44	
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	
Tin	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00006	< 0.00006	< 0.00006	0.00038	< 0.00006	
Titanium	mg/L		0.002	0.002	0.003	0.003	<0.002	<0.002	0.01	0.002	<0.002	0.00051	0.00019	0.00009	0.00008	< 0.00007	
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000188	0.000211	0.000242	0.000256	0.000247	
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00012	0.00007	0.00005	0.00011	0.00006	
Zinc	mg/L	5 AO	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	< 0.002	0.006	0.002	< 0.002	< 0.002	

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-10-III

Parameters	Units	ODWS <sup>(1)</sup>	2017				2018				2019			2020			2021			2022			2023		
			Sept	May	July	Oct	May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct				
<b>General Chemistry</b>																									
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	231	228	196	183	200	195	196	207	212	237	210	205	202	213	197	211	201	197	204				
Chloride	mg/L	250 AO <sup>(3)</sup>	8.69	1.08	1.10	0.90	0.98	0.89	0.78	0.94	0.96	0.86	1.04	0.91	1.01	< 1	< 1	< 1	< 1	< 1	< 1				
Dissolved Organic Carbon	mg/L	5 AO	<b>8.6</b>	0.9	2.1	2.0	1.7	1.3	0.5	1.7	1.3	1.8	1.3	1.7	1.5	1.1	1.0	2.0	< 1	< 1	1				
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.42	0.75	0.54	0.47	0.48	0.48	0.29	0.54	0.57	0.52	0.51	0.44	0.56	0.58	0.58	0.54	0.54	0.59	0.57				
Sulphate	mg/L	500 AO	177	82.1	80.2	81.8	88.3	83.7	83.4	80.5	81.9	81.8	82.2	83.8	83.9	83	84	81	81	87	84				
Hardness	mg/L	80-100 OG	<b>267</b>	<b>208</b>	<b>200</b>	<b>201</b>	<b>208</b>	<b>197</b>	<b>190</b>	<b>207</b>	<b>180</b>	<b>186</b>	<b>192</b>	<b>190</b>	<b>219</b>	<b>227</b>	<b>195</b>	<b>209</b>	<b>216</b>	<b>205</b>	<b>228</b>				
Nitrate	mg/L	10 MAC	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.06	< 0.06	0.06	< 0.06	< 0.06	< 0.06				
Nitrite	mg/L	1 MAC	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03				
Organic Nitrogen	mg/L	0.15 OG	<b>0.26</b>	0.10	<0.10	<b>0.16</b>	<b>0.21</b>	0.14	<0.10	<b>0.23</b>	<0.10	<b>0.18</b>	<b>0.35</b>	<0.10	0.14	<b>&lt; 0.5</b>	<b>&lt; 0.5</b>	0.06	< 0.05	< 0.05	<b>0.18</b>				
Orthophosphate	mg/L		<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10				< 0.05	< 0.05	< 0.03				
pH	pH Units	6.5-8.5 OG	8.22	8.00	8.08	7.94	7.82	7.93	7.78	7.86	7.98	7.62	7.84	8.04	7.98	8.22	8.21	8.14	8.14	8.45	8.21				
Electrical Conductivity	µS/cm		813	546	538	528	528	577	602	596	478	461	532	534	536	531	538	534	530	537	533				
Total Ammonia	mg/L		0.07	0.05	0.04	0.08	0.04	0.08	0.05	<0.02	0.03	0.03	0.03	0.04	<0.02	0.06	0.15	< 0.04	0.06	< 0.04	< 0.04				
Total Dissolved Solids	mg/L	500 AO	432	294	302	310	276	286	296	302	298	294	310	328	296	300	340	294	340	309	343				
Total Kjeldahl Nitrogen (TKN)	mg/L		0.33	0.15	<0.10	0.24	0.25	0.22	<0.10	0.23	<0.10	0.21	0.38	<0.10	0.14	< 0.5	0.28	0.08	0.05	0.07	0.20				
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.050	<0.050	<0.050	0.138	<0.050	0.159	0.06	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03				
<b>Metals</b>																									
Aluminum	mg/L	0.1 OG	0.009	0.007	0.005	0.011	<0.004	0.006	0.013	0.019	0.016	0.033	0.041	0.019	<b>0.680</b>	0.004	0.009	0.004	0.002	0.050	0.002				
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	< 0.0002	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002				
Barium	mg/L	1 MAC	0.046	0.026	0.024	0.029	0.038	0.021	0.023	0.026	0.019	0.018	0.017	0.019	0.031	0.0273	0.0255	0.0213	0.0214	0.0216	0.0210				
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007				
Bismuth	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	<0.002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001				
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.24	0.262	0.251	0.277	0.249	0.060	0.242	0.259	0.330	0.249	0.194	0.262	0.249	0.364	0.257	0.243	0.208	0.221	0.265				
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	< 0.000003	< 0.000003	0.000008	< 0.000003	< 0.000003	< 0.000003				
Calcium	mg/L		63.9	48.8	47.2	47.7	50.0	46.6	45.0	49.0	42.3	44.3	44.3	44.1	53.4	58.6	46.2	51.2	54.5	49.3	54.8				
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.004	<0.003	0.007	0.00021	0.00014	0.00022	0.00017	0.00047	< 0.00008				
Cobalt	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	0.002	0.00022	0.00031	0.000244	0.000263	0.000335	0.000181				
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.006	0.0016	0.0003	< 0.0002	0.0009	0.0008	0.0008				
Iron	mg/L	0.3 AO	0.04	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.022	0.017	0.033	0.043	0.021	<b>1.61</b>	0.016	0.033	< 0.007	0.021	0.076	< 0.007				
Lead	mg/L	0.01 MAC	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009				
Magnesium	mg/L		26.2	20.8	20.0	19.8	20.1	19.5	18.9	20.6	18.0	18.2	19.8	19.4	20.7	19.7	19.3	19.8	19.3	19.9	22.2				
Manganese	mg/L	0.05 AO	<b>0.137</b>	0.036	0.026	0.041	0.048	0.027	0.029	0.026	0.020	0.023	0.015	0.023	<b>0.111</b>	0.0218	0.0316	0.0213	0.0217	0.0291	0.0274				
Molybdenum	mg/L		0.074	<0.002	<0.002	<0.002	0.008	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00039	0.00081	0.00051	0.00027	0.00019	0.00047				
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.01	<0.003	<0.003	<0.003	<0.003	<0.003	0.0003	0.0005	0.0004	0.0003	0.0005	0.0005				
Potassium	mg/L		7.73	5.82	5.36	6.33	6.95	5.45	5.66	6.16	4.94	5.16	5.51	5.37	5.63	6.92	5.51	5.79	6.03	5.88	6.24				
Selenium	mg/L		<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	< 0.00004	< 0.00004	0.00011	< 0.00004	< 0.00004	< 0.00004				
Silicon	mg/L		4.35	2.79	3.08	2.71	3.57	2.17	2.94	2.03	2.96	2.93	1.98	2.93	3.43	3.99	2.86	3.23	3.17	3.22	2.84				
Silver	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	<0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005				
Sodium	mg/L	200 AO	47.5	36.4	34.0	36.2	36.1	35.2	35.8	36.1	32.2	33.9	34.8	34.4	34.6	35.9	34.7	35.0	36.7	34.3	39.3				
Strontium	mg/L		2.25	1.65	1.74	1.84	1.69	1.76	1.80	1.8	1.81	1.74	1.22	1.79	1.84	1.97	1.72	1.82	1.98	1.92	2.1				
Sulphur	mg/L		57	27.3	25.3	30.5	27.2	27.9	27.0	26.0	24.2	35.5	26.4	27.8	24.7	38	28	28	28	29	30				
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005				
Tin	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	<0.002	0.00008	0.00009	0.00007	< 0.00006	0.00012	< 0.00006				
Titanium	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	0.009	0.00009	0.00025	0.00019	< 0.00007	0.00185	< 0.00007				
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000047	0.000058	0.000048	0.000044	0.000033	0.000035				
Vanadium	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	0.003	0.00051	0.00039	0.00008	0.00013	0.00024	0.00013				
Zinc	mg/L	5 AO	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.013	0.002	< 0.002	0.006	0.002	< 0.002	< 0.002				

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-13-I

Parameters	Units	ODWS <sup>(1)</sup>	2014			2015			2016			2017			2018		
			June	July	Sep	May	July	Sep	May	July	Sep	May	July	Sep	May	July	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	363	364	363	328	374	360	393	386	Insufficient	387	323	379	365	363	330
Chloride	mg/L	250 AO <sup>(3)</sup>	3.49	3.49	3.69	3.35	3.28	3.29	3.67	4.34	volume	2.72	2.52	3.36	2.85	2.85	2.83
Dissolved Organic Carbon	mg/L	5 AO	3.3	1.5	1.3	1.9	2.0	1.5	1.4	3.2	to sample	1.1	1.9	2.0	1.7	2.4	2.0
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	<0.10	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25		<0.25	<0.25	<0.10	<0.25	0.27	<0.25
Sulphate	mg/L	500 AO	101	113	102	96.9	104	107	125	108		115	102	111	107	98.6	107
Hardness	mg/L	80-100 OG	<b>474</b>	<b>487</b>	<b>445</b>	<b>396</b>	<b>470</b>	<b>440</b>	<b>480</b>	<b>456</b>		<b>452</b>	<b>445</b>	<b>508</b>	<b>414</b>	<b>454</b>	<b>459</b>
Nitrate	mg/L	10 MAC	<0.10	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25		<0.25	<0.25	0.13	<0.25	0.13	0.26
Nitrite	mg/L	1 MAC	<0.10	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25		<0.25	<0.25	<0.10	<0.25	<0.05	<0.25
Organic Nitrogen	mg/L	0.15 OG	<b>0.68</b>	<0.10	0.13	<b>0.39</b>	<b>0.39</b>	0.14	0.15	<b>0.72</b>		<0.10	<0.10	<b>0.52</b>	<b>0.31</b>	<b>0.20</b>	<0.10
Orthophosphate	mg/L		<0.20	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50		<0.50	<0.50	<0.20	<0.50	<0.10	<0.50
pH	pH Units	6.5-8.5 OG	8.02	8.05	7.80	7.99	8.05	7.93	7.97	7.92		8.17	8.06	8.02	7.87	7.92	7.79
Electrical Conductivity	µS/cm		814	880	878	805	885	859	833	902		845	748	880	772	853	822
Total Ammonia	mg/L		0.06	0.42	0.03	<0.02	<0.02	<0.02	<0.02	0.06		<0.02	<0.02	0.06	<0.02	<0.02	0.04
Total Dissolved Solids	mg/L	500 AO	<b>508</b>	<b>558</b>	<b>510</b>	488	498	498	494	<b>538</b>		498	<b>514</b>	486	472	436	<b>582</b>
Total Kjeldahl Nitrogen (TKN)	mg/L		0.74	0.47	0.16	0.39	0.39	0.14	0.15	0.78		<0.10	<0.10	0.58	0.31	0.20	0.10
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	0.005	<0.004	<0.004	0.004	<0.004	<0.004	0.009	<0.004		0.008	0.004	0.006	0.007	<0.004	<0.004
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.04	0.038	0.035	0.039	0.039	0.040	0.041	0.040		0.043	0.039	0.039	0.037	0.037	0.044
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	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	<0.002	<0.002
Boron	mg/L	5 IMAC <sup>(5)</sup>	0.114	0.099	0.114	0.107	0.108	0.104	0.135	0.103		0.114	0.111	0.13	0.123	0.119	0.116
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		121	126	115	96.1	121	111	124	119		116	113	132	101	118	119
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.016		<0.003	<0.003	<0.003	0.071	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.010	<0.010	<0.010	<0.010	0.197	<0.010	0.139	<0.010		<0.010	0.014	0.053	<0.010	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	0.004	<0.001	<0.001
Magnesium	mg/L		41.7	41.9	38.4	38.0	40.7	39.6	41.3	38.5		39.5	39.5	43.4	39.2	38.8	39.3
Manganese	mg/L	0.05 AO	0.003	<0.002	<0.002	<0.002	0.012	<0.002	0.018	0.002		0.005	0.003	0.009	0.009	<0.002	<0.002
Molybdenum	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	<0.002	<0.002
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	0.003	0.006	<0.003	<0.003		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		5.96	6.09	5.63	5.49	5.70	5.77	5.98	6.25		5.65	5.5	6.08	5.34	5.74	5.77
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004		<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		5.43	4.53	4.57	5.08	4.54	4.85	4.76	4.45		5.11	5.01	4.69	3.64	5.52	5.27
Silver	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	<0.002	<0.002
Sodium	mg/L	200 AO	2.74	2.58	2.53	2.66	2.58	2.49	2.62	2.77		2.36	2.39	3.03	2.51	2.55	2.69
Strontium	mg/L		0.657	0.625	0.526	0.574	0.657	0.6	0.633	0.609		0.627	0.652	0.64	0.575	0.638	0.638
Sulphur	mg/L		29.7	38.0	33.5	34.7	35.1	37.4	32.5	33.2		35.2	35.0	33.2	33.0	32.7	38.5
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	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	<0.002	<0.002
Titanium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	0.003	<0.002	0.003		0.002	0.002	<0.002	0.002	<0.002	0.002
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	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	<0.002	<0.002
Zinc	mg/L	5 AO	0.008	0.007	0.006	0.007	0.007	<0.005	0.011	0.008		<0.005	0.007	<0.005	0.086	<0.005	0.007

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.



Groundwater Geochemical Results OW-13-I

Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	386	332	345	379	376	407	Insufficient	256	368	115	356	376	376	383	394
Chloride	mg/L	250 AO <sup>(3)</sup>	3.06	3.24	2.30	2.42	2.36	2.05	volume	2.07	2.63	1	< 1	1	2	2	2
Dissolved Organic Carbon	mg/L	5 AO	1.6	2.0	1.6	1.7	2.1	2.8	to sample	3.0	1.8	3.1	2.0	2.0	8.0	4.3	2.0
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	<0.25	<0.25	<0.25	<0.05	<0.05	<0.05		0.22	<0.05	0.18	0.24	0.21	0.24	0.27	0.24
Sulphate	mg/L	500 AO	93.6	92.7	111	113	96.6	90.6		99	99.2	99	100	90	96	85	77
Hardness	mg/L	80-100 OG	<b>432</b>	<b>452</b>	<b>447</b>	<b>471</b>	<b>421</b>	<b>425</b>		<b>434</b>	<b>437</b>	<b>532</b>	<b>459</b>	<b>495</b>	<b>506</b>	<b>468</b>	<b>505</b>
Nitrate	mg/L	10 MAC	<0.25	0.38	<0.25	<0.25	0.10	0.12		0.21	<0.05	0.06	0.17	< 0.06	< 0.06	0.24	0.24
Nitrite	mg/L	1 MAC	<0.25	<0.25	<0.25	<0.25	<0.10	<0.10		<0.05	0.19	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.03
Organic Nitrogen	mg/L	0.15 OG	<0.10	<b>0.30</b>	<b>0.16</b>	<b>0.16</b>	0.13	<b>0.16</b>		<b>0.25</b>	0.12	<b>&lt; 0.5</b>	<b>&lt; 0.5</b>	< 0.05	<b>1.52</b>	<b>0.49</b>	<b>0.21</b>
Orthophosphate	mg/L		<0.50	<0.50	<0.50	<0.50	<0.20	<0.20		<0.10	<0.10						< 0.03
pH	pH Units	6.5-8.5 OG	7.76	7.82	7.72	7.84	7.89	7.87		8.01	7.76	8.21	8.13	8.04	8.13	7.94	8.00
Electrical Conductivity	µS/cm		814	852	919	954	725	720		596	821	20	818	837	822	840	819
Total Ammonia	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		0.1	<0.02	0.05	< 0.04	0.04	0.14	2.43	0.41
Total Dissolved Solids	mg/L	500 AO	392	436	<b>512</b>	<b>534</b>	492	360		<b>536</b>	<b>518</b>	457	480	500	<b>540</b>	<b>526</b>	<b>520</b>
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.10	0.30	0.16	0.16	0.13	0.16		0.35	0.12	< 0.5	0.05	0.05	1.66	2.92	0.62
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.050	<0.050	<0.050		<0.050	<0.050	< 0.03	< 0.03	< 0.03	0.27	0.05	< 0.003
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	0.006	0.007	0.021	0.015	0.049		0.012	<0.004	0.004	< 0.001	0.003	0.002	0.004	0.001
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		<0.003	<0.003	< 0.0002	< 0.0002	< 0.0002	0.0009	0.0008	< 0.0002
Barium	mg/L	1 MAC	0.040	0.035	0.038	0.046	0.034	0.033		0.036	0.04	0.0445	0.0398	0.0472	0.0371	0.0378	0.0397
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.118	0.126	0.122	0.131	0.181	0.110		0.13	0.132	0.183	0.136	0.100	0.125	0.096	0.122
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	0.000007	0.000011	0.000004	0.000007	0.000004	< 0.000003
Calcium	mg/L		110	116	117	121	108	111		110	112	146	120	129	133	120	131
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		<0.003	<0.003	0.00022	0.00023	0.00022	0.00017	0.00053	0.00010
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	0.000194	0.000045	0.000031	0.000803	0.00035	0.00104
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	0.004	<0.003	<0.003		0.005	<0.003	0.0005	0.0008	0.0006	0.0047	0.001	0.001
Iron	mg/L	0.3 AO	<0.010	<0.010	<0.010	0.022	<0.010	<0.010		0.028	<0.010	0.012	< 0.007	0.009	0.221	<b>0.555</b>	< 0.007
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Magnesium	mg/L		38.2	39.5	37.7	41.1	36.8	35.8		38.6	38.1	40.6	38.8	42.3	42.4	40.7	43.5
Manganese	mg/L	0.05 AO	0.007	0.002	<0.002	0.012	<0.002	<0.002		0.003	<0.002	0.0149	0.00183	0.00196	0.0378	0.0387	0.0375
Molybdenum	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	0.00148	0.00078	0.0008	0.00255	0.00119	0.00059
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		<0.003	<0.003	0.0009	0.0008	0.0009	0.0039	0.0012	0.0013
Potassium	mg/L		5.47	5.75	5.81	5.41	5.01	4.9		5.57	5.31	7.03	5.62	6.14	12.2	6.74	6.23
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004		<0.004	<0.004	< 0.00004	< 0.00004	0.00007	0.00009	0.00035	< 0.00004
Silicon	mg/L		5.41	3.84	4.61	5.28	5.34	4.49		5.08	5.23	6.58	5.72	5.56	5.45	5.32	5.24
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	200 AO	2.50	2.52	2.50	2.29	2.15	2.22		2.38	2.17	2.59	2.30	2.36	3.08	2.48	3.03
Strontium	mg/L		0.614	0.645	0.631	0.645	0.625	0.55		0.661	0.655	0.724	0.601	0.676	0.685	0.648	0.683
Sulphur	mg/L		34.6	33.2	36.4	35	29.8	32.1		33.5	29.4	44	36	38	38	34	27
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006		<0.006	<0.006	0.000017	0.000021	0.000009	0.000008	< 0.000005	0.000031
Tin	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	< 0.00006	0.00011	0.00009	0.00009	0.00013	< 0.00006
Titanium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	0.00013	0.00006	0.00018	0.00042	0.00037	0.0001
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	0.000518	0.000606	0.000526	0.0008	0.000622	0.000379
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	0.00015	0.00012	0.0001	0.00094	0.0009	0.00014
Zinc	mg/L	5 AO	<0.005	0.007	0.007	<0.005	<0.005	<0.005		0.008	<0.005	< 0.002	0.003	0.008	0.007	0.004	< 0.002

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-1R-I

Parameters	Units	ODWS <sup>(1)</sup>	2014			2015			2016			2017			2018		
			June	July	Sep	May	July	Sep	May	July	Sep	May	July	Sep	May	July	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	908	951	917	951	912	670	899	986	948	899	965	956	1060	917	876
Chloride	mg/L	250 AO <sup>(3)</sup>	245	261	228	274	268	173	254	247	250	245	248	253	259	222	210
Dissolved Organic Carbon	mg/L	5 AO	19.1	22.0	21.1	23.2	19.6	14.3	21.5	21.5	10.4	17.8	27.5	23.5	23.5	24.8	23.8
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	<0.5	<1.0	<0.25	<0.5	<1.0	<0.5	<0.5	<1.0	<1.0	<0.5	<0.5	<0.5	<0.25	<0.5	<1.0
Sulphate	mg/L	500 AO	244	257	240	207	206	162	177	192	194	169	145	165	154	139	135
Hardness	mg/L	80-100 OG	972	910	774	885	980	676	806	933	857	859	876	825	886	809	834
Nitrate	mg/L	10 MAC	<0.5	<1.0	1.0	<0.5	<1.0	0.6	1.3	<1.0	<1.0	1.2	<0.5	<0.5	0.36	<0.5	<1.0
Nitrite	mg/L	1 MAC	<0.5	<1.0	<0.25	<0.5	<1.0	<0.5	<0.5	<1.0	<1.0	<0.5	<0.5	<0.5	<0.25	<0.5	<1.0
Organic Nitrogen	mg/L	0.15 OG	0.9	1.6	1.5	2.3	5.2	2.59	2.0	<0.10	3.0	3.1	<0.10	3.3	0.4	0.4	1.2
Orthophosphate	mg/L		<1.0	<2.0	<0.50	<1.0	<2.0	<1.0	<1.0	<2.0	<2.0	<1.0	<1.0	<1.0	<0.50	<1.0	<2.0
pH	pH Units	6.5-8.5 OG	7.82	7.67	7.3	7.6	7.97	7.98	7.81	7.72	7.66	7.99	8.01	7.84	7.9	7.85	7.72
Electrical Conductivity	µS/cm		2620	2780	2730	2850	2730	2040	2280	2810	2730	2420	2610	2520	2550	2510	2470
Total Ammonia	mg/L		13	15.5	13	12	12	6.39	14.7	13.4	12.7	15.9	16.6	12.4	15.2	16.4	16.0
Total Dissolved Solids	mg/L	500 AO	1510	1660	1600	1630	1450	1180	1340	1580	1520	1400	1550	1400	1500	1380	1570
Total Kjeldahl Nitrogen (TKN)	mg/L		13.9	17.1	14.5	14.3	17.2	8.98	16.7	13.4	15.7	19	16.6	15.7	15.6	16.8	17.2
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	<0.004	<0.004	<0.004	0.004	0.006	0.014	0.011	0.015	0.005	0.008	0.008	<0.004	<0.004	<0.004
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.072	0.07	0.062	0.079	0.070	0.067	0.057	0.073	0.079	0.079	0.079	0.082	0.074	0.080	0.082
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	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	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC <sup>(5)</sup>	1.26	1.79	1.55	1.67	1.53	1.21	1.62	1.57	1.97	1.43	1.70	1.63	1.50	1.46	1.82
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		188	178	146	163	188	132	148	179	162	161	161	164	165	151	156
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	0.008	0.006	<0.003	0.005	0.003	0.007	0.011	0.01	<0.003	0.012	0.005	0.014
Cobalt	mg/L		0.005	0.007	0.004	0.005	0.005	0.003	0.007	0.005	0.007	0.004	0.006	0.005	0.006	0.006	0.005
Copper	mg/L	1 AO	0.004	0.004	<0.003	0.003	0.005	0.003	0.004	<0.003	<0.003	0.005	0.009	0.004	0.009	0.011	0.009
Iron	mg/L	0.3 AO	<0.010	0.021	0.125	0.157	<0.010	<0.010	0.084	0.080	0.172	<0.010	<0.010	0.012	<0.010	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Magnesium	mg/L		122	113.0	99.4	116	124	84	106	118	110	111	115	101	115	105	108
Manganese	mg/L	0.05 AO	0.686	0.728	0.569	0.788	0.64	0.429	0.736	0.644	0.712	0.51	0.632	0.533	0.581	0.60	0.504
Molybdenum	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	<0.002	<0.002	<0.002
Nickel	mg/L		0.033	0.043	0.027	0.043	0.036	0.03	0.039	0.036	0.045	0.033	0.048	0.037	0.043	0.045	0.045
Potassium	mg/L		89.8	89.6	80.2	78.9	89.6	56.8	83.4	87.6	100	77.3	91	81.9	80.3	88.2	97.0
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.010	0.01	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		7.14	7.68	6.07	8.14	6.01	6.19	6.44	6.15	7.70	8.1	8.94	7.57	5.42	7.92	8.33
Silver	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	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	187	179	168	187	186	127	173	196	190	160	176	158	170	166	178
Strontium	mg/L		2.05	2.13	1.57	2.25	2.12	2.69	1.07	2.80	1.80	2.31	1.95	1.83	1.41	1.65	1.57
Sulphur	mg/L		75.6	87.1	76.4	88.9	66.8	60.4	46.6	60.5	57.6	55.5	52.9	46.1	50.3	46.1	50.4
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	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	<0.002	<0.002	<0.002
Titanium	mg/L		0.002	0.002	<0.002	0.004	0.003	0.004	0.003	<0.002	0.004	0.003	0.003	<0.002	0.003	<0.002	0.002
Uranium	mg/L	0.02 MAC	0.002	0.003	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	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	<0.002	<0.002	<0.002
Zinc	mg/L	5 AO	0.007	0.007	<0.005	0.006	0.007	0.006	0.007	0.006	0.007	<0.005	0.012	0.005	0.005	<0.005	<0.005

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-1R-I

Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	956	929	988	1000	979	1060	1080	1030	1010	1100	1050	1040	975	928	1090
Chloride	mg/L	250 AO <sup>(3)</sup>	192	178	209	221	278	208	218	202	193	210	180	230	280	240	240
Dissolved Organic Carbon	mg/L	5 AO	21.7	21.9	20.5	23.7	23.8	26.2	28.5	31.4	26.1	25.1	24.0	24.0	22.0	29.0	23.0
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	<1.0	<1.0	<1.0	<0.13	<0.07	<0.07	<0.05	<0.05	<0.05	0.14	0.17	0.16	0.13	0.15	0.18
Sulphate	mg/L	500 AO	153	159	172	156	179	133	122	123	111	95	92	110	98	110	100
Hardness	mg/L	80-100 OG	848	841	869	872	789	800	158	819	796	860	719	777	832	851	905
Nitrate	mg/L	10 MAC	<1.0	<1.0	<1.0	<1.0	<0.5	<0.5	<0.14	<0.14	<0.14	0.64	< 0.06	0.46	0.30	< 0.06	< 0.06
Nitrite	mg/L	1 MAC	<1.0	<1.0	<1.0	<1.0	<0.5	<0.5	<0.11	<0.11	3.2	0.06	0.07	0.12	< 0.3	< 0.3	< 0.03
Organic Nitrogen	mg/L	0.15 OG	4.5	3.2	3.7	3.8	1.6	2.1	1.6	0.8	4.3	1.6	1.7	9.6	0.46	1.97	1.90
Orthophosphate	mg/L		<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<0.26	<0.26	<0.26						0.06
pH	pH Units	6.5-8.5 OG	7.72	7.18	7.57	7.72	7.63	7.73	7.44	7.44	7.34	7.95	7.76	7.87	7.84	8.14	7.84
Electrical Conductivity	µS/cm		2450	2760	2910	2910	2250	2190	2670	2520	2430	2450	2610	2530	2500	2300	2620
Total Ammonia	mg/L		12.6	23.3	16.5	15.9	16.9	18.2	22.8	20.6	17.3	29.8	29.8	28.4	30.7	33.3	32.4
Total Dissolved Solids	mg/L	500 AO	1300	1400	1450	1510	1510	1420	1520	1470	1440	1400	1460	1260	1480	1540	1510
Total Kjeldahl Nitrogen (TKN)	mg/L		17.1	26.5	20.2	19.7	18.5	20.3	24.4	21.4	21.6	31.5	31.5	38	31.2	35.2	34.3
Total Phosphorus	mg/L		<0.05	0.06	<0.05	<0.050	<0.050	<0.050	0.076	<0.050	<0.050	0.21	< 0.03	0.12	0.04	< 0.03	0.01
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	0.010	0.011	0.015	0.005	0.020	0.027	0.041	0.020	0.011	0.068	0.123	0.132	0.009	0.003	0.004
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	0.004	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	0.0005	0.0005	0.0011	0.0014	0.001	0.0007
Barium	mg/L	1 MAC	0.083	0.111	0.097	0.10	0.076	0.081	0.12	0.080	0.097	0.114	0.113	0.113	0.103	0.124	0.135
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	<0.001	<0.001	0.000017	0.000017	0.000023	< 0.000007	< 0.000007	< 0.000007
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00001	< 0.00001	0.00001	< 0.00001	< 0.00001	< 0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	1.76	1.51	1.93	1.85	2.65	1.99	2.93	2.12	1.9	2.71	2.12	2.03	1.47	1.87	2.12
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00001	0.000009	0.000012	0.000013	0.000004	0.00001
Calcium	mg/L		163	157	165	158	146	152	27.9	145	144	174	122	144	155	147	164
Chromium	mg/L	0.05 MAC	0.012	0.004	0.004	<0.003	<0.003	<0.003	<0.003	<0.003	0.004	0.00124	0.00103	0.0012	0.0009	0.00083	0.00131
Cobalt	mg/L		0.006	0.011	0.010	0.008	0.006	0.006	0.008	0.004	0.007	0.0103	0.0102	0.00989	0.0104	0.00966	0.00941
Copper	mg/L	1 AO	0.009	0.005	<0.003	<0.003	<0.003	<0.003	0.015	0.010	<0.003	0.0103	0.0053	0.0037	0.0017	0.002	0.0038
Iron	mg/L	0.3 AO	<0.010	<b>0.350</b>	0.093	<b>0.453</b>	<b>0.306</b>	0.112	0.188	0.041	0.032	0.235	0.271	<b>2.71</b>	<b>0.862</b>	<b>0.329</b>	0.156
Lead	mg/L	0.01 MAC	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00034	0.00052	0.00071	0.00023	0.0002	0.00028
Magnesium	mg/L		107	109	111	116	103	102	21.4	111	106	103	101	101	108	118	120
Manganese	mg/L	0.05 AO	<b>0.729</b>	<b>1.51</b>	<b>0.813</b>	<b>0.700</b>	<b>0.598</b>	<b>0.559</b>	<b>0.774</b>	<b>0.581</b>	<b>0.547</b>	<b>1.13</b>	<b>0.874</b>	<b>0.798</b>	<b>0.972</b>	<b>0.877</b>	<b>0.935</b>
Molybdenum	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00083	0.00104	0.00101	0.00094	0.00095	0.00106
Nickel	mg/L		0.044	0.053	0.052	0.046	0.045	0.046	0.058	0.045	0.051	0.0557	0.0559	0.0525	0.0578	0.0569	0.0571
Potassium	mg/L		93.2	112	109	102	84.4	82	18.5	95.3	94	141	127	108	127	124	131
Selenium	mg/L	0.05 MAC	<0.004	0.011	0.013	0.006	0.006	<0.004	<0.004	<0.004	0.009	0.0003	0.00028	0.00027	0.00032	0.00037	0.00022
Silicon	mg/L		8.42	7.61	7.64	7.78	8.96	7.06	7.92	7.25	8.09	9.63	9.52	10.1	8.57	7.73	7.47
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	200 AO	165	173	188	182	160	163	35.6	177	169	169	164	155	181	187	192
Strontium	mg/L		1.23	0.927	1.36	1.4	1.58	1.73	1.58	1.53	1.86	1.12	1.07	1.65	1.09	1.67	1.84
Sulphur	mg/L		54.3	52.9	60.8	51.2	43.0	46.5	8.37	43.0	36	47	36	38	38	40	42
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.000314	0.000306	0.000181	0.000323	0.000132	0.000246
Tin	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00032	0.00027	0.00036	0.0003	0.00063	0.00035
Titanium	mg/L		0.003	<0.002	0.002	<0.002	0.002	<0.002	0.010	<0.002	<0.002	0.00161	0.00333	0.00401	0.00047	0.00021	0.00016
Uranium	mg/L	0.02 MAC	0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0015	0.00202	0.00187	0.00188	0.00187	0.00198
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00043	0.00037	0.00045	0.0004	0.00034	0.00025
Zinc	mg/L	5 AO	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.002	< 0.002	0.006	0.006	0.002	0.003

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

**Groundwater Geochemical Results OW-1R-III**

Parameters	Units	ODWS <sup>(1)</sup>	2014			2015			2016			2017			2018		
			June	July	Sep	May	July	Sep	May	July	Sep	May	July	Sep	May	July	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	820	977	882	764	976	978	876	1010	1010	898	959	1040	873	919	922
Chloride	mg/L	250 AO <sup>(3)</sup>	163	261	215	164	271	277	176	235	311	158	218	220	135	202	208
Dissolved Organic Carbon	mg/L	5 AO	15.7	24.8	20.4	16.2	23.7	28.8	17.5	27.8	29.9	16.5	24.6	30.7	19.1	25.0	25.6
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	<0.5	<1.0	<0.25	<0.25	<1.0	<0.25	<0.25	<1.0	<1.0	<0.5	<0.5	<1.0	<0.25	<0.5	<1.0
Sulphate	mg/L	500 AO	235	230	207	131	177	171	202	180	196	127	118	114	97.7	112	113
Hardness	mg/L	80-100 OG	870	898	731	683	927	821	779	894	915	741	802	840	630	773	843
Nitrate	mg/L	10 MAC	0.95	<1.0	1.17	9.87	3.70	7.18	0.66	<1.0	2.4	5.1	<0.5	<1.0	6.48	1.2	3.7
Nitrite	mg/L	1 MAC	<0.5	<1.0	<0.25	<0.25	<1.0	<0.25	<0.25	<1.0	<1.0	1.5	<0.5	<1.0	<0.25	<0.5	<1.0
Organic Nitrogen	mg/L	0.15 OG	1.3	0.2	3.7	1.7	2.9	2.5	1.9	0.3	1.4	0.7	1.3	3.5	1.0	<0.10	0.4
Orthophosphate	mg/L		<1.0	<2.0	<0.50	<0.50	<2.0	<0.50	<0.50	<2.0	<2.0	<1.0	<1.0	<2.0	<0.50	<1.0	<2.0
pH	pH Units	6.5-8.5 OG	7.91	7.72	7.37	7.81	7.87	7.94	7.82	7.63	7.69	8.01	7.99	7.77	7.81	7.90	7.69
Electrical Conductivity	µS/cm		2270	2880	2570	2210	2840	2920	2080	2840	3130	2080	2480	2680	1980	2490	2580
Total Ammonia	mg/L		11.8	17.6	10.3	11.5	14.7	21.1	9.8	17.2	23.4	13.5	16.2	20.3	17.7	22.6	25.3
Total Dissolved Solids	mg/L	500 AO	1370	1650	1530	1160	1540	1610	1230	1600	1700	1170	1410	1390	1120	1370	1620
Total Kjeldahl Nitrogen (TKN)	mg/L		13.1	17.8	14	13.2	17.6	23.6	11.7	17.5	24.8	14.2	17.5	23.8	18.7	22.0	25.7
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	0.004	0.004	0.014	<0.004	<0.004	0.027	0.035	0.025	0.016	0.015	0.012	0.015	0.118	0.018
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.079	0.103	0.087	0.095	0.099	0.125	0.097	0.121	0.107	0.092	0.104	0.118	0.093	0.122	0.133
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC <sup>(5)</sup>	1.08	1.73	1.37	1.31	1.44	1.52	1.37	1.60	2.21	1.22	1.55	1.56	1.39	1.56	1.94
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		188	175	152	131	190	149	169	180	170	154	153	165	121	145	156
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	0.005	0.007	0.004	0.005	<0.003	0.006	0.007	0.008	<0.003	0.008	0.005	0.008
Cobalt	mg/L		0.006	0.009	0.005	0.005	0.007	0.005	0.006	0.007	0.010	0.006	0.01	0.012	0.007	0.010	0.012
Copper	mg/L	1 AO	0.01	0.012	0.01	0.012	0.01	0.012	0.011	0.009	0.010	0.011	0.006	0.005	0.017	0.020	0.016
Iron	mg/L	0.3 AO	<0.010	0.043	<0.010	<0.010	<0.010	<0.010	<0.010	0.013	0.096	<0.010	0.187	0.172	<0.010	0.05	<0.010
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	0.003	<0.001
Magnesium	mg/L		97.2	112.0	85.4	86.4	110	109	86.6	108	119	86.5	102	104	79.7	99.7	110
Manganese	mg/L	0.05 AO	1.04	1.22	0.85	0.764	1.09	0.81	0.898	1.08	1.28	0.815	1.28	1.39	0.875	1.23	1.45
Molybdenum	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	<0.002	<0.002	<0.002
Nickel	mg/L		0.03	0.049	0.026	0.033	0.044	0.04	0.032	0.040	0.059	0.035	0.053	0.043	0.042	0.057	0.068
Potassium	mg/L		81.2	101	72.4	78.1	94.9	107	72.3	110	127	77.5	95.2	98.9	72.2	102	112
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		6.58	7.55	5.92	6.43	5.57	6.59	5.84	6.13	8.47	6.57	7.95	6.54	4.24	7.91	6.96
Silver	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	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	150	199	152	155	177	204	142	202	222	147	162	173	127	155	182
Strontium	mg/L		0.985	1.03	0.845	0.802	1.06	1.05	0.876	0.889	1.00	0.846	0.889	0.971	0.623	0.866	1.02
Sulphur	mg/L		70.1	81.0	70.4	50	56.1	56.1	53.9	57.2	63.8	41.8	42.3	36.5	33.1	38.7	43.0
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	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	<0.002	<0.002	<0.002
Titanium	mg/L		0.002	<0.002	<0.002	0.003	0.003	0.005	0.003	<0.002	0.004	0.003	0.003	<0.002	0.002	0.002	0.002
Uranium	mg/L	0.02 MAC	0.002	0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	0.002	<0.002
Vanadium	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	<0.002	<0.002	<0.002
Zinc	mg/L	5 AO	<0.005	<0.005	0.006	0.008	0.006	0.006	0.025	0.014	0.008	0.006	0.010	0.011	0.011	0.022	0.014

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
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 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-1R-III

Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	<b>858</b>	<b>956</b>	<b>922</b>	<b>985</b>	<b>898</b>	<b>1060</b>	<b>799</b>	<b>1110</b>	<b>1010</b>	<b>906</b>	<b>975</b>	<b>983</b>	<b>797</b>	<b>1020</b>	<b>1030</b>
Chloride	mg/L	250 AO <sup>(3)</sup>	105	195	191	159	180	154	85.5	180	191	160	200	240	99	250	250
Dissolved Organic Carbon	mg/L	5 AO	<b>10.4</b>	<b>19.1</b>	<b>18.0</b>	<b>21.9</b>	<b>17.9</b>	<b>22.8</b>	<b>14.9</b>	<b>29.8</b>	<b>26.6</b>	<b>20.8</b>	<b>21.0</b>	<b>22.0</b>	<b>18.0</b>	<b>28.3</b>	<b>20.0</b>
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	<0.5	<1.0	<1.0	<0.13	<0.07	<0.07	<0.05	<0.05	<0.05	0.08	0.09	0.14	0.08	0.11	0.14
Sulphate	mg/L	500 AO	126	147	213	115	118	92	74.3	92.6	103	94	98	90	91	99	94
Hardness	mg/L	80-100 OG	<b>686</b>	<b>864</b>	<b>887</b>	<b>720</b>	<b>622</b>	<b>740</b>	<b>107</b>	<b>747</b>	<b>729</b>	<b>768</b>	<b>842</b>	<b>788</b>	<b>712</b>	<b>832</b>	<b>896</b>
Nitrate	mg/L	10 MAC	<0.5	<1.0	1.9	<1.0	<0.5	<0.5	3.55	<0.14	<0.14	1.34	1.64	7.67	0.40	< 0.06	0.88
Nitrite	mg/L	1 MAC	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5	0.72	<0.11	<b>3.19</b>	<b>1.13</b>	0.32	0.09	0.11	0.05	0.08
Organic Nitrogen	mg/L	0.15 OG	<b>3.6</b>	0.10	<b>0.7</b>	<b>3.2</b>	<b>1.20</b>	<b>2.2</b>	<b>3.7</b>	<b>37.7</b>	<b>3.8</b>	<b>1.4</b>	<b>&lt; 0.5</b>	<b>6.02</b>	<b>0.86</b>	<b>2.53</b>	<b>2.43</b>
Orthophosphate	mg/L		<1.0	<2.0	<2.0	<2.0	<1.0	<1.0	<0.13	<0.26	1.3						< 0.03
pH	pH Units	6.5-8.5 OG	7.62	7.19	7.47	7.65	7.69	7.69	7.50	7.40	7.37	7.97	7.85	7.89	7.85	7.77	7.89
Electrical Conductivity	µS/cm		2000	2740	2810	2610	1890	2040	1800	2550	2350	1980	2420	2510	1850	2520	2480
Total Ammonia	mg/L		13.8	19.5	15.9	25.3	14.2	18.9	15.5	0.02	23.6	23.2	18.8	26.1	18.1	32.3	29.3
Total Dissolved Solids	mg/L	500 AO	<b>1150</b>	<b>1390</b>	<b>1500</b>	<b>1290</b>	<b>1290</b>	<b>1290</b>	<b>990</b>	<b>1400</b>	<b>1370</b>	<b>1140</b>	<b>1320</b>	<b>1470</b>	<b>1130</b>	<b>1430</b>	<b>1510</b>
Total Kjeldahl Nitrogen (TKN)	mg/L		17.4	19.6	16.6	28.5	15.4	21.1	19.2	37.7	27.4	24.6	18.9	32.2	18.9	34.9	31.7
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.006
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	0.006	0.009	0.018	0.020	0.024	0.032	0.009	0.004	0.013	0.005	0.003	0.002	0.003	0.005
Arsenic	mg/L	0.01 MAC	<0.003	0.004	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	0.0004	0.0004	0.0004	0.0004	0.0008	0.0004
Barium	mg/L	1 MAC	0.111	0.088	0.171	0.116	0.104	0.114	0.125	0.113	0.115	0.141	0.162	0.138	0.120	0.158	0.168
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.000007	< 0.000007	0.000008	< 0.000007	< 0.000007	< 0.000007
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	1.23	1.92	1.63	1.58	1.70	1.37	1.72	2.08	1.9	1.93	1.61	1.51	1.10	1.49	1.74
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000013	0.000029	0.00002	0.000034	0.000083	0.000034
Calcium	mg/L		137	163	187	130	136	164	22.2	131	135	172	188	160	176	166	182
Chromium	mg/L	0.05 MAC	0.012	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.005	0.00085	0.00067	0.00075	0.00057	0.00102	0.00065
Cobalt	mg/L		0.007	0.007	0.011	0.010	0.007	0.009	0.006	0.012	0.012	0.00933	0.0088	0.0113	0.00484	0.0107	0.0103
Copper	mg/L	1 AO	0.012	0.003	0.016	0.016	0.007	0.005	0.013	0.010	0.005	0.011	0.0146	0.0105	0.0088	0.0044	0.0151
Iron	mg/L	0.3 AO	<0.010	0.104	<0.010	<0.010	0.068	0.122	0.011	0.142	0.075	0.017	0.043	0.031	0.013	0.177	0.035
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.00042	0.00055	0.00056	0.00030	0.00108	0.00101
Magnesium	mg/L		83.4	111	102	96	68.7	80.2	12.5	102	95.1	82.2	90.9	94.6	66.1	101	107
Manganese	mg/L	0.05 AO	<b>0.984</b>	<b>0.725</b>	<b>1.67</b>	<b>1.43</b>	<b>1.02</b>	<b>1.34</b>	<b>1.11</b>	<b>1.45</b>	<b>1.16</b>	<b>1.54</b>	<b>1.41</b>	<b>1.58</b>	<b>0.905</b>	<b>1.74</b>	<b>1.87</b>
Molybdenum	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	0.00076	0.00093	0.00109	0.00077	0.00098	0.00107
Nickel	mg/L		0.041	0.049	0.051	0.062	0.035	0.041	0.035	0.067	0.06	0.0444	0.0436	0.0544	0.0274	0.0505	0.0531
Potassium	mg/L		82.2	101	99.5	109	68.3	75.2	14.5	121	107	108	98.9	101	79.4	112	117
Selenium	mg/L	0.05 MAC	<0.004	0.013	0.013	0.005	<0.004	<0.004	<0.004	<0.004	0.008	0.00027	0.00043	0.0003	0.00038	0.00043	0.00031
Silicon	mg/L		7.36	7.91	6.63	7.15	7.38	6.41	5.76	8.18	8.49	8.84	8.58	8.57	7.42	7.58	7.17
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	200 AO	134	180	150	156	111	136	19.1	174	157	106	120	145	95.8	147	169
Strontium	mg/L		0.748	1.20	1.05	0.848	0.87	0.9	0.706	0.85	0.905	0.872	1.04	0.983	0.873	1.04	1.14
Sulphur	mg/L		45.5	53.0	76.6	36.3	27.6	33.1	5.05	34.1	29.5	44	33	29	32	36	36
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.000384	0.000476	0.000461	0.000233	0.0006	0.000553
Tin	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00017	0.00026	0.00032	0.00012	0.0004	0.00027
Titanium	mg/L		0.002	<0.002	0.003	<0.002	<0.002	<0.002	0.011	<0.002	<0.002	0.00061	0.00026	0.00015	0.00016	0.00027	0.00021
Uranium	mg/L	0.02 MAC	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00103	0.00186	0.00167	0.00139	0.00183	0.00182
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00061	0.00068	0.00049	0.00041	0.00053	0.00078
Zinc	mg/L	5 AO	<0.005	0.005	0.007	<0.005	0.010	0.008	0.012	<0.005	<0.005	0.006	0.003	0.006	0.047	0.005	0.004

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-11-I

Parameters	Units	ODWS <sup>(1)</sup>	2014			2015			2016			2017			2018		
			June	July	Sep	May	July	Sep	May	July	Sep	May	July	Sep	May	July	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	231	235	245	225	228	236	240	250	227	234	243	243	250	228	229
Chloride	mg/L	250 AO <sup>(3)</sup>	7.22	9.65	9.1	8.67	9.88	6.56	7.65	11.6	7.76	4.67	9.71	9.53	9.53	11.6	9.21
Dissolved Organic Carbon	mg/L	5 AO	1.1	2.0	0.7	0.7	1.4	1.1	0.9	1.5	0.8	0.6	1.2	2.1	2.4	1.9	1.2
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.2	<0.10	0.36	0.33	<0.10	<0.25	<0.10	<0.10	<0.25	<0.25	0.28	0.31	0.47	0.37	0.21
Sulphate	mg/L	500 AO	81.2	58.7	55.7	72.3	71.5	70.3	95.4	68.6	94.3	104	62.5	68.1	74	62.8	48.6
Hardness	mg/L	80-100 OG	<b>279</b>	<b>287</b>	<b>265</b>	<b>265</b>	<b>286</b>	<b>281</b>	<b>282</b>	<b>273</b>	<b>270</b>	<b>273</b>	<b>262</b>	<b>271</b>	<b>252</b>	<b>269</b>	<b>278</b>
Nitrate	mg/L	10 MAC	0.25	0.11	0.25	0.53	0.54	<0.25	0.34	0.19	0.35	0.28	0.14	0.2	0.32	0.22	0.22
Nitrite	mg/L	1 MAC	<0.05	<0.10	<0.05	<0.10	<0.10	<0.25	<0.10	<0.10	<0.25	<0.25	<0.05	<0.05	<0.05	<0.05	<0.10
Organic Nitrogen	mg/L	0.15 OG	<b>0.48</b>	<b>0.29</b>	0.11	<b>0.17</b>	<b>0.59</b>	<b>0.22</b>	<b>0.29</b>	<b>0.84</b>	0.13	<0.10	<0.10		<b>0.61</b>	<b>0.34</b>	<0.10
Orthophosphate	mg/L		<0.10	<0.20	<0.10	<0.20	<0.20	<0.50	<0.20	<0.20	<0.50	<0.50	<0.10	<0.10	<0.10	<0.10	<0.20
pH	pH Units	6.5-8.5 OG	8.23	8.21	7.95	8.34	8.15	8.07	8.02	8.10	8.32	8.33	8.24	7.71	7.85	8.03	7.93
Electrical Conductivity	µS/cm		594	584	607	599	590	601	590	631	653	615	582	606	601	589	563
Total Ammonia	mg/L		0.04	0.08	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02	0.04
Total Dissolved Solids	mg/L	500 AO	320	332	318	-	334	324	336	320	354	342	318		350	318	378
Total Kjeldahl Nitrogen (TKN)	mg/L		0.52	0.37	0.14	0.17	0.59	0.22	0.29	0.84	0.13	<0.10	<0.10		0.61	0.34	<0.10
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	<0.004	<0.004	0.043	<0.004	0.008	0.012	0.058	0.009	0.013	<0.004	0.007	0.005	<0.004	0.005
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.032	0.032	0.031	0.030	0.030	0.035	0.029	0.034	0.039	0.037	0.032	0.038	0.033	0.034	0.038
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.264	0.241	0.279	0.257	0.231	0.296	0.343	0.253	0.306	0.301	0.258	0.324	0.322	0.282	0.309
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		65.8	67.8	62.4	62.7	68.4	67.7	66.9	65.6	64.6	63.7	61.8	64.6	59.5	63.8	66.9
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.004	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.006	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.010	<0.010	<0.010	0.043	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	0.041	<0.010	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Magnesium	mg/L		27.8	28.5	26.4	26.3	27.9	27.2	28.0	26.6	26.5	27.7	26.2	26.7	25.0	26.7	26.9
Manganese	mg/L	0.05 AO	<0.002	<0.002	<0.002	0.008	0.005	0.009	0.026	0.005	0.004	<0.002	0.045	<b>0.196</b>	0.003	0.008	<0.002
Molybdenum	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	<0.002	<0.002	<0.002
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	0.004	<0.003	<0.003	<0.003	<0.003	<0.003	0.006	<0.003	<0.003	<0.003
Potassium	mg/L		6.5	6.6	6.31	6.1	7.09	6.96	6.29	6.52	7.38	6.45	6.21	6.61	5.91	6.11	6.59
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		2.83	3.02	3.17	2.68	2.81	3.45	3.09	3.65	3.07	3.06	3.4	3.13	2.79	3.29	3.3
Silver	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	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	15.6	14.1	13.1	15.3	17.8	16.0	16.1	14.3	16.7	15.9	13.6	14.0	14.8	13.9	11.4
Strontium	mg/L		2.07	1.88	1.75	1.81	1.82	2.01	1.72	1.84	2.29	2.18	1.94	2.1	1.9	2.12	1.92
Sulphur	mg/L		23.9	18.8	19	25.7	24.6	56.9	26.5	19.7	29.8	35.2	19.7	21.7	28.4	20.4	14.2
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	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	<0.002	<0.002	<0.002
Titanium	mg/L		<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	0.002	0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	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	<0.002	<0.002	<0.002
Zinc	mg/L	5 AO	0.008	<0.005	0.005	0.007	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	0.007	0.006	<0.005	<0.005	<0.005

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-11-I

Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	234	228	234	239	255	280	245	386	261	258	255	246	252	246	259
Chloride	mg/L	250 AO <sup>(3)</sup>	9.69	10.6	7.61	9.79	10.4	8.26	9.42	11.6	9.76	16	13	12	16	12	12
Dissolved Organic Carbon	mg/L	5 AO	0.9	1.5	1.1	3.2	3.6	2.2	2.9	2.5	2.4	< 1.0	2.0	2.0	1	< 1	< 1
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.33	0.31	0.23	0.28	0.36	0.28	0.29	0.27	0.31	0.36	0.34	0.43	0.37	0.33	0.36
Sulphate	mg/L	500 AO	53.8	57.4	59.3	59.2	48.0	49.5	65	60.6	37.6	54	59	50	42	54	43
Hardness	mg/L	80-100 OG	<b>265</b>	<b>293</b>	<b>270</b>	<b>280</b>	<b>258</b>	<b>262</b>	<b>252</b>	<b>276</b>	<b>272</b>	<b>313</b>	<b>278</b>	<b>295</b>	<b>326</b>	<b>296</b>	<b>327</b>
Nitrate	mg/L	10 MAC	0.18	0.27	0.19	0.18	0.11	0.07	0.13	0.15	<0.05	0.12	0.11	0.12	< 0.06	0.13	0.28
Nitrite	mg/L	1 MAC	<0.05	<0.10	<0.10	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Organic Nitrogen	mg/L	0.15 OG	<0.10	<b>0.43</b>	<b>0.16</b>	<b>0.65</b>	<b>0.30</b>	0.12	<0.10	<b>0.20</b>	0.10	<b>&lt; 0.5</b>	<b>&lt; 0.5</b>	0.05	< 0.05	0.06	< 0.05
Orthophosphate	mg/L		<0.10	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10						< 0.03
pH	pH Units	6.5-8.5 OG	7.86	7.97	7.73	7.80	7.94	7.70	7.81	7.78	7.88	8.26	8.14	8.09	8.11	<b>8.60</b>	8.05
Electrical Conductivity	µS/cm		543	626	637	636	511	507	580	829	576	564	597	569	582	577	587
Total Ammonia	mg/L		<0.02	0.04	<0.02	<0.02	0.10	<0.02	0.03	<0.02	<0.02	0.04	0.05	0.06	0.06	< 0.04	< 0.04
Total Dissolved Solids	mg/L	500 AO	304	304	318	332	316	324	344	360	318	340	306	320	280	340	323
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.10	0.47	0.16	0.65	0.40	0.12	<0.10	0.20	0.1	< 0.5	0.07	0.11	0.06	0.07	< 0.05
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.050	<0.050	0.055	0.079	<0.050	<0.050	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.003
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	0.006	0.008	<0.004	0.014	0.023	0.011	0.020	<0.004	0.002	0.001	0.002	< 0.001	< 0.001	< 0.001
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Barium	mg/L	1 MAC	0.032	0.034	0.034	0.036	0.030	0.030	0.041	0.034	0.036	0.0353	0.0376	0.0347	0.0339	0.0349	0.0345
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.255	0.280	0.310	0.326	0.386	0.360	0.284	0.315	0.376	0.354	0.348	0.306	0.276	0.277	0.353
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.000003	< 0.000003	0.000007	0.000007	0.00001	0.000004
Calcium	mg/L		63.4	69.5	65.1	66.2	60.5	62.8	58.7	64.5	64.4	80.6	65.1	72.7	81.1	70.8	79.6
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0002	0.00019	0.00026	0.00014	0.00025	< 0.00008
Cobalt	mg/L		<0.001	<0.001	0.002	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	0.000025	0.000163	0.000254	0.000061	0.000026	0.000026
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0004	0.0003	0.0002	0.0017	0.0011	0.0011
Iron	mg/L	0.3 AO	<0.010	<0.010	<0.010	<0.010	0.064	0.017	0.011	0.052	<0.010	0.008	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Magnesium	mg/L		26.0	29.0	26.2	27.9	26.0	25.5	25.6	27.8	27	27.2	28	27.6	29.9	29	31
Manganese	mg/L	0.05 AO	0.002	<0.002	0.035	0.007	0.042	0.007	0.006	0.004	0.003	0.00058	0.00483	0.00575	0.00221	0.00034	0.00211
Molybdenum	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00042	0.00023	0.00031	0.00027	0.00022	0.00034
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0007	0.0013	0.001	0.0017	0.0011	0.0010
Potassium	mg/L		5.92	6.58	6.58	6.52	5.91	6.2	5.78	6.31	6.49	6.98	6.52	6.86	7.36	6.92	7.52
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	< 0.00004	< 0.00004	0.00007	< 0.00004	< 0.00004	< 0.00004
Silicon	mg/L		3.48	2.01	3.06	2.93	3.36	3.47	3.14	3.56	4.24	4.43	3.52	3.92	3.4	3.42	3.59
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	200 AO	12.6	13.9	12.9	14.5	12.2	12.1	13.6	12.4	11.2	11.2	13.6	12.9	16.2	13.6	13.9
Strontium	mg/L		1.93	2.15	1.98	2.167	2.27	1.96	1.73	2.11	1.99	2.03	2.01	2.12	2.18	2.24	2.27
Sulphur	mg/L		23.3	22.2	21.5	25.3	18.0	19.3	24	19.2	13.6	22	24	21	27	25	17
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00006	0.00008	0.00008	< 0.00006	0.00011	0.00006
Titanium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00008	< 0.00005	0.00022	< 0.00007	< 0.00007	< 0.00007
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0002	0.00032	0.000304	0.000318	0.00028	0.000145
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00013	0.00006	0.0001	0.00006	0.00009	0.00003
Zinc	mg/L	5 AO	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.013	<0.005	< 0.002	0.006	0.004	0.036	0.009	< 0.002

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by bold entries.

Groundwater Geochemical Results OW-11-II



Parameters	Units	ODWS <sup>(1)</sup>	2014			2015			2016			2017			2018		
			June	July	Sep	May	July	Sep	May	July	Sep	May	July	Sep	May	July	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	395	470	436	411	485	412	422		434	433	435	<b>507</b>	418	480	460
Chloride	mg/L	250 AO <sup>(3)</sup>	20.1	22.3	21.0	29.9	28.6	29.6	23.9		27.0	24.1	25.9	26.9	23.8	22.8	22.3
Dissolved Organic Carbon	mg/L	5 AO	5.0	4.5	4.8	<b>7.2</b>	<b>5.6</b>	<b>5.3</b>	<b>5.1</b>		<b>5.9</b>	<b>5.1</b>	<b>6.8</b>	<b>6.4</b>	<b>5.9</b>	<b>6.9</b>	5.0
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	<0.10	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25		<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Sulphate	mg/L	500 AO	51.2	44.9	42.1	58.8	41.2	79.2	81.9		78.9	<0.50	58.9	55.4	58.5	55.2	65.4
Hardness	mg/L	80-100 OG	<b>395</b>	<b>454</b>	<b>409</b>	<b>417</b>	<b>486</b>	<b>457</b>	<b>424</b>		<b>449</b>	<b>409</b>	<b>454</b>	<b>477</b>	<b>395</b>	<b>493</b>	<b>505</b>
Nitrate	mg/L	10 MAC	0.12	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25		<0.25	<0.25	<0.25	<0.25	0.27	<0.25	<0.25
Nitrite	mg/L	1 MAC	<0.10	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25		<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Organic Nitrogen	mg/L	0.15 OG	<b>0.87</b>	<b>0.71</b>	<b>0.59</b>	<b>1.1</b>	<b>1.5</b>	<b>0.53</b>	<b>2.32</b>		<b>0.58</b>	<b>0.44</b>	<b>0.51</b>	<b>1.04</b>	<b>2.0</b>	<b>1.06</b>	<b>0.31</b>
Orthophosphate	mg/L		<0.20	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50		<0.50	67.2	<0.50	<0.50	<0.50	<0.50	<0.50
pH	pH Units	6.5-8.5 OG	8.13	8.00	7.76	8.16	8.11	8.05	8.06		8.22	8.3	8.29	8.11	8.02	8.06	8.03
Electrical Conductivity	µS/cm		857	986	961	950	1060	987	891		1040	900	936	1080	841	1040	1040
Total Ammonia	mg/L		0.14	0.12	0.06	<0.02	0.06	<0.02	<0.02		<0.02	<0.02	0.11	0.07	<0.02	0.26	0.17
Total Dissolved Solids	mg/L	500 AO	<b>506</b>	<b>528</b>	<b>516</b>	<b>534</b>	<b>552</b>	<b>532</b>	<b>504</b>		<b>568</b>	<b>512</b>	<b>570</b>	<b>574</b>	470	<b>582</b>	<b>676</b>
Total Kjeldahl Nitrogen (TKN)	mg/L		1.01	0.83	0.65	1.1	1.56	0.53	2.32		0.58	0.44	0.62	1.11	2.0	1.32	0.48
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	0.004	<0.004	<0.004	<0.004	0.019	<0.004	0.008	0.011	0.011	0.006	<0.004	0.008	0.004	0.006	0.006
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.021	0.022	0.024	0.023	0.027	0.023	0.024	0.034	0.039	0.023	0.03	0.031	0.020	0.036	0.036
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	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	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.365	0.361	0.346	0.295	0.317	0.326	0.400	0.352	0.431	0.334	0.449	0.469	0.314	0.472	0.468
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		96.6	117	103	104	124	119	104		116	101	115	123	99	127	130
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	0.027	<0.003	<0.003	0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.005	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.010	0.193	0.068	<0.010	0.195	<0.010	0.055	<0.010	<0.010	<0.010	<b>0.475</b>	<b>0.492</b>	<0.010	<b>0.316</b>	0.207
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Magnesium	mg/L		37.4	39.3	36.8	38.1	42.9	38.8	39.8		38.7	38.1	40.5	41.3	36.0	42.6	43.8
Manganese	mg/L	0.05 AO	<b>0.162</b>	<b>0.124</b>	0.028	0.046	0.042	0.005	<b>0.124</b>	<0.002	0.045	0.006	<b>0.122</b>	<b>0.239</b>	0.022	<b>0.265</b>	<b>0.098</b>
Molybdenum	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	<0.002	<0.002	<0.002
Nickel	mg/L		<0.003	<0.003	<0.003	0.004	0.005	0.007	<0.003	0.005	0.004	0.003	0.005	<0.003	<0.003	0.003	0.004
Potassium	mg/L		5.99	4.96	4.43	6.11	5.79	4.76	5.59		5.85	5.89	7.79	6.29	4.54	6.47	7.06
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	0.004	<0.004	0.007	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		4.24	4.26	3.76	4.42	4.40	4.12	4.05	3.99	4.52	3.94	4.95	4.71	2.82	5.52	5.30
Silver	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	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	32.4	41.1	36.4	34.1	38.1	39.2	28.6		36.8	32.2	37.8	36.8	26.9	35.3	38.6
Strontium	mg/L		0.199	0.204	0.231	0.192	0.226	0.193	0.204	0.267	0.352	0.211	0.266	0.254	0.182	0.279	0.277
Sulphur	mg/L		14.8	15.6	15.8	21.4	13.0	26.6	21.5	22.0	24.2	28.3	20.1	18.7	19.1	20.1	24.6
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	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	<0.002	<0.002	<0.002
Titanium	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	<0.002	<0.002	<0.002
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.014	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc	mg/L	5 AO	0.008	0.007	<0.005	0.006	0.006	<0.005	0.005	0.006	<0.005	<0.005	0.030	<0.005	<0.005	<0.005	0.011

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.



Groundwater Geochemical Results OW-11-II

Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	373	465	<b>504</b>	431	<b>515</b>	<b>514</b>	498	478	<b>587</b>	375	490	467	429	472	450
Chloride	mg/L	250 AO <sup>(3)</sup>	18.9	21.8	19.2	26.5	25.8	23.0	19.2	20.5	17.2	32	22	22	52	45	37
Dissolved Organic Carbon	mg/L	5 AO	<b>7.0</b>	5.0	5.0	<b>8.5</b>	<b>6.6</b>	<b>5.2</b>	<b>6.8</b>	<b>7.8</b>	<b>6.6</b>	<b>5.2</b>	5.0	4.0	<b>7.0</b>	<b>7.2</b>	3.0
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	<0.25	<0.25	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.25	0.20	0.16	0.19	0.22	0.12
Sulphate	mg/L	500 AO	72.2	58.7	60.7	74.1	44.0	35.8	41.2	31.5	32	69	49	52	130	96	110
Hardness	mg/L	80-100 OG	<b>387</b>	<b>507</b>	<b>491</b>	<b>451</b>	<b>650</b>	<b>460</b>	<b>534</b>	<b>476</b>	<b>551</b>	<b>454</b>	<b>465</b>	<b>427</b>	<b>561</b>	<b>552</b>	<b>569</b>
Nitrate	mg/L	10 MAC	<0.25	0.56	<0.25	<0.25	<0.25	<0.25	<0.05	<0.05	<0.05	1.8	0.22	< 0.06	< 0.06	< 0.06	< 0.06
Nitrite	mg/L	1 MAC	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.05	<0.05	0.48	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Organic Nitrogen	mg/L	0.15 OG	<b>0.61</b>	<b>0.86</b>	<b>0.55</b>	<b>0.63</b>	<b>0.62</b>	<b>0.53</b>	<b>0.72</b>	<b>0.47</b>	<b>0.42</b>	< <b>0.5</b>	<b>0.50</b>	<b>0.39</b>	<b>0.77</b>	<b>0.61</b>	<b>0.83</b>
Orthophosphate	mg/L		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.10	<0.10	<0.10						< 0.03
pH	pH Units	6.5-8.5 OG	7.85	7.74	7.85	7.95	7.96	7.78	7.83	7.84	7.72	8.18	8.17	8.17	7.97	8.25	7.98
Electrical Conductivity	µS/cm		815	1110	1180	1080	911	842	979	930	1120	813	993	950	1110	1100	1060
Total Ammonia	mg/L		<0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
Total Dissolved Solids	mg/L	500 AO	494	<b>564</b>	<b>596</b>	<b>578</b>	<b>588</b>	<b>546</b>	<b>572</b>	<b>572</b>	<b>624</b>	494	<b>560</b>	<b>569</b>	<b>700</b>	<b>731</b>	<b>649</b>
Total Kjeldahl Nitrogen (TKN)	mg/L		0.61	0.90	0.55	0.63	0.62	0.53	0.72	0.47	0.42	< 0.5	0.54	0.41	0.79	0.63	0.84
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.050	<0.050	<0.050	0.07	<0.050	<0.050	0.08	< 0.03	< 0.03	< 0.03	< 0.03	0.043
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	<0.004	0.007	0.013	0.015	0.029	0.068	0.013	0.015	0.024	0.002	0.001	0.001	0.041	<b>0.31</b>
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	< 0.0002	< 0.0002	< 0.0002	0.0002	0.0002	0.0002
Barium	mg/L	1 MAC	0.021	0.027	0.034	0.029	0.029	0.025	0.027	0.029	0.034	0.0218	0.0341	0.0252	0.0296	0.0365	0.0293
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	0.00006
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.357	0.423	0.453	0.447	0.660	0.524	0.426	0.630	0.510	0.428	0.441	0.313	0.483	0.415	0.404
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000004	0.00001	0.000003	< 0.000003	0.000006	0.00001
Calcium	mg/L		98.8	131	129	115	168	119	136	121	140	123	121	110	149	143	147
Chromium	mg/L	0.05 MAC	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.00027	0.00017	0.00028	0.00025	0.00035	0.00057
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000126	0.000102	0.000183	0.000191	0.000199	0.000534
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.004	0.0016	0.0015	0.0005	0.0015	0.0012	0.0024
Iron	mg/L	0.3 AO	<0.010	<0.010	<0.010	<0.010	0.101	0.057	0.022	0.097	<0.010	0.019	0.008	0.021	0.020	0.063	<b>0.470</b>
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	0.00089
Magnesium	mg/L		34.1	43.8	41.0	39.8	56.0	39.6	47.1	42.3	48.9	35.4	39.8	37	46.1	47.6	48.9
Manganese	mg/L	0.05 AO	0.026	0.030	0.019	0.006	0.036	0.039	0.033	0.044	0.011	0.00242	0.00153	0.0172	0.0163	0.0143	<b>0.082</b>
Molybdenum	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00074	0.00072	0.00064	0.00093	0.0007	0.00022
Nickel	mg/L		<0.003	0.004	0.004	0.004	0.004	0.003	0.003	<0.003	<0.003	0.0029	0.003	0.0022	0.0064	0.0045	0.0044
Potassium	mg/L		4.71	8.07	6.56	6.63	11.1	5.23	6.69	6.07	4.93	4.81	5.82	4.57	6.72	7.31	4.17
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.00008	0.0001	0.00011	0.00011	0.00008	0.00008
Silicon	mg/L		4.60	5.17	4.58	3.65	5.82	4.64	4.04	5.38	5.80	4.64	5.39	4.95	5.05	5.39	4.78
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	200 AO	25.5	36.0	34.6	32.3	48.1	29.2	34.6	28.6	31.5	23.8	29.4	26.7	47.9	36.8	39.2
Strontium	mg/L		0.187	0.279	0.296	0.252	0.297	0.252	0.248	0.262	0.314	0.201	0.248	0.241	0.300	0.339	0.32
Sulphur	mg/L		23.6	21.6	19.5	25.3	19.9	16.3	15.2	13	11.4	29	15	16	45	32	42
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.000005	0.000006
Tin	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00006	0.00026	0.00008	< 0.00006	0.00011	< 0.00006
Titanium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00094	0.00011	< 0.00005	< 0.00007	0.00202	0.00491
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00058	0.000969	0.000787	0.000901	0.000811	0.000816
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00012	0.00024	0.00014	0.00009	0.00023	0.00046
Zinc	mg/L	5 AO	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.003	0.003	0.003	0.002	0.005	0.003

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-12-I

Parameters	Units	ODWS <sup>(1)</sup>	2014			2015			2016			2017			2018		
			June	July	Sep	May	July	Sep	May	July	Sep	May	July	Sep	May	July	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	262	272	279	265	<b>814</b>	265	284	279	259	289	266	317	292	266	261
Chloride	mg/L	250 AO <sup>(3)</sup>	50.6	37.3	39.7	48.4	38.4	32.0	50.1	36.7	32.4	39.1	37.1	41.5	35.0	37.4	31.6
Dissolved Organic Carbon	mg/L	5 AO	1.8	2.7	2.0	1.7	2.6	1.9	2.0	1.9	2.0	1.7	2.7	2.6	2.2	3.5	2.3
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.17	<0.25	0.44	0.41	<0.50	<0.25	<0.25	0.31	<0.25	<0.25	0.38	0.26	0.37	0.47	0.35
Sulphate	mg/L	500 AO	84	67.8	70.9	78.5	73.9	68.9	98.5	79.7	67.1	97.2	72.6	82.5	65.6	69.8	60.9
Hardness	mg/L	80-100 OG	<b>365</b>	<b>355</b>	<b>355</b>	<b>348</b>	<b>367</b>	<b>341</b>	<b>358</b>	<b>340</b>	<b>318</b>	<b>361</b>	<b>331</b>	<b>375</b>	<b>325</b>	<b>349</b>	<b>377</b>
Nitrate	mg/L	10 MAC	0.14	<0.25	0.11	<0.10	<0.50	<0.25	<0.25	<0.10	<0.25	<0.25	0.09	<0.10	<0.05	0.08	<0.10
Nitrite	mg/L	1 MAC	<0.10	<0.25	<0.10	<0.10	<0.50	<0.25	<0.25	<0.10	<0.25	<0.25	<0.05	<0.10	<0.05	<0.05	<0.10
Organic Nitrogen	mg/L	0.15 OG	<b>0.52</b>	<b>0.26</b>	<b>0.45</b>	<b>0.30</b>	<b>0.47</b>	<b>0.28</b>	0.12	<b>0.26</b>	<b>0.32</b>	0.12	0.14	<b>0.35</b>	<b>0.37</b>	<b>0.68</b>	<b>0.27</b>
Orthophosphate	mg/L		<0.20	<0.50	<0.20	<0.20	<1.00	<0.50	<0.50	<0.20	<0.50	<0.50	<0.10	<0.20	<0.10	<0.10	<0.20
pH	pH Units	6.5-8.5 OG	8.2	8.23	8.06	8.23	7.98	7.96	8.06	8.12	8.28	8.22	8.13	8.03	7.85	7.91	7.80
Electrical Conductivity	µS/cm		784	771	817	797	287	738	766	784	751	792	728	859	692	743	720
Total Ammonia	mg/L		0.05	0.07	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.04
Total Dissolved Solids	mg/L	500 AO	468	482	472	462	440	416	446	412	382	400	458	484	426	424	442
Total Kjeldahl Nitrogen (TKN)	mg/L		0.57	0.33	0.48	0.30	0.47	0.28	0.12	0.26	0.32	0.12	0.14	0.35	0.37	0.68	0.31
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.007	0.045	0.007	0.008	0.006	0.005	0.007	<0.004	0.012
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.057	0.053	0.053	0.052	0.055	0.056	0.062	0.056	0.060	0.057	0.056	0.07	0.059	0.053	0.070
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	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	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.332	0.351	0.407	0.309	0.360	0.390	0.422	0.391	0.439	0.366	0.359	0.452	0.407	0.376	0.486
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		86.5	83.3	83.7	81.0	86.4	81.3	83.0	80.6	75.6	84.8	78.0	90.0	76.5	82.5	89.9
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003
Iron	mg/L	0.3 AO	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Magnesium	mg/L		36.1	35.6	35.5	35.3	36.7	33.6	36.7	33.6	31.4	36.3	33.2	36.6	32.6	34.8	37.1
Manganese	mg/L	0.05 AO	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	0.004	<0.002	<0.002	<0.002	<0.002	<0.002
Molybdenum	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	<0.002	<0.002	<0.002
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	0.003	0.005	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	0.003	0.004
Potassium	mg/L		8.19	8.75	8.7	8.0	9.28	8.59	8.00	8.59	8.90	8.12	7.95	8.23	7.02	7.89	8.87
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		3.8	3.81	3.97	3.75	3.93	4.18	3.97	4.36	4.26	4.11	4.35	4.58	3.11	4.55	5.15
Silver	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	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	17.2	15.7	16.5	17.2	17.5	15.4	16.7	16.1	14.8	15.9	14.9	15.2	12.9	14.4	16.4
Strontium	mg/L		1.91	1.98	1.91	1.71	1.99	1.96	1.99	1.89	2.14	2.11	1.95	2.15	1.95	2.14	2.27
Sulphur	mg/L		24.9	24.0	27.3	28.6	25.2	23.5	26.6	22.4	22.6	28.9	22.6	26.1	29.7	23.2	27.4
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	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	<0.002	<0.002	<0.002
Titanium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	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	<0.002	<0.002	<0.002
Zinc	mg/L	5 AO	0.006	0.006	0.006	0.005	0.006	<0.005	0.005	<0.005	0.005	<0.005	0.007	<0.005	<0.005	0.006	0.005

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-12-I

Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	286	264	300	310	308	340	319	351	328	307	302	305	328	357	354
Chloride	mg/L	250 AO <sup>(3)</sup>	38.8	38.3	40.8	41.9	41.2	40.5	43.4	44.4	39	48	40	46	49	49	49
Dissolved Organic Carbon	mg/L	5 AO	2.6	3.1	2.3	2.9	2.5	2.9	3.3	3.1	3.2	3.2	2	3	2	3	3
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.33	<0.25	<0.25	<0.05	0.28	0.28	<0.05	<0.05	<0.05	0.45	0.43	0.5	0.38	0.37	0.36
Sulphate	mg/L	500 AO	74.6	77.3	90.2	85.4	79.0	78.9	79.7	90.6	71.5	84	80	84	78	84	85
Hardness	mg/L	80-100 OG	<b>361</b>	<b>395</b>	<b>418</b>	<b>409</b>	<b>372</b>	<b>367</b>	<b>364</b>	<b>429</b>	<b>417</b>	<b>458</b>	<b>381</b>	<b>432</b>	<b>460</b>	<b>467</b>	<b>484</b>
Nitrate	mg/L	10 MAC	<0.10	<0.25	<0.25	<0.25	<0.10	<0.10	<0.05	<0.05	<0.05	0.15	0.08	0.06	< 0.06	< 0.06	0.07
Nitrite	mg/L	1 MAC	<0.10	<0.25	<0.25	<0.25	<0.10	<0.10	<0.05	<0.05	<0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Organic Nitrogen	mg/L	0.15 OG	<b>0.30</b>	<b>0.41</b>	<b>0.31</b>	<b>0.32</b>	<b>0.24</b>	<b>0.36</b>	<b>0.48</b>	<b>0.31</b>	<b>0.28</b>	<b>&lt; 0.5</b>	<b>&lt; 0.5</b>	<b>0.25</b>	<b>0.39</b>	<b>0.29</b>	<b>0.18</b>
Orthophosphate	mg/L		<0.20	<0.50	<0.50	<0.50	<0.20	<0.20	<0.10	<0.10	<0.10						< 0.03
pH	pH Units	6.5-8.5 OG	7.80	7.92	7.68	7.71	8.00	7.91	7.93	8.00	7.79	8.22	8.13	8.11	8.14	7.93	8.10
Electrical Conductivity	µS/cm		752	831	935	934	709	723	843	912	835	783	806	821	856	919	909
Total Ammonia	mg/L		<0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	< 0.04	< 0.04	0.06	< 0.04	< 0.04	< 0.04
Total Dissolved Solids	mg/L	500 AO	448	474	488	<b>510</b>	<b>502</b>	500	<b>550</b>	<b>570</b>	<b>540</b>	457	460	<b>503</b>	<b>594</b>	<b>671</b>	<b>554</b>
Total Kjeldahl Nitrogen (TKN)	mg/L		0.30	0.45	0.31	0.32	0.24	0.36	0.48	0.31	0.28	< 0.5	0.12	0.31	0.35	0.30	0.20
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.050	<0.050	<0.050	0.14	<0.050	<0.050	0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.003
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	0.009	0.007	0.013	0.012	0.018	0.017	0.008	0.004	0.001	0.002	0.004	< 0.001	0.007	< 0.001
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Barium	mg/L	1 MAC	0.057	0.055	0.068	0.065	0.053	0.050	0.065	0.065	0.065	0.0634	0.0635	0.0666	0.0590	0.0689	0.0621
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron	mg/L	5 IMAC <sup>(5)</sup>	0.383	0.390	0.480	0.425	0.525	0.466	0.500	0.452	0.550	0.557	0.433	0.473	0.371	0.396	0.457
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.000003	0.000005	0.000004	< 0.000003	0.000011	0.000007
Calcium	mg/L		86.2	91.3	102	97.5	87.6	89.4	86.1	102	99.5	120	91.3	105	115	112	120
Chromium	mg/L	0.05 MAC	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.00056	0.00023	0.00018	0.00015	0.0002	0.00009
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000046	0.00003	0.000025	0.000019	0.00006	0.000015
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.006	<0.003	<0.003	0.0018	0.0015	0.0006	0.0011	0.0017	0.0012
Iron	mg/L	0.3 AO	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	0.038	<0.010	0.265	< 0.007	0.012	< 0.007	0.033	< 0.007
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Magnesium	mg/L		35.5	40.5	39.7	40.3	37.1	34.9	36.2	42.3	40.9	38.4	37.2	41.6	41.9	45.5	44.6
Manganese	mg/L	0.05 AO	<0.002	0.006	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	0.00327	0.00076	0.0009	0.00043	0.00127	0.0004
Molybdenum	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0008	0.00057	0.00075	0.00063	0.00045	0.00044
Nickel	mg/L		<0.003	0.004	0.004	0.003	0.003	0.003	0.005	<0.003	<0.003	0.003	0.0027	0.0033	0.0031	0.0037	0.0035
Potassium	mg/L		7.82	8.77	9.14	8.03	7.76	7.99	7.64	8.5	8.76	10	8.61	9.28	9.36	9.64	9.71
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.00005	0.00008	0.00011	< 0.00004	0.00007	< 0.00004
Silicon	mg/L		4.51	3.64	4.80	4.42	5.29	4.47	5.78	5.18	5.98	5.86	5.56	5.65	5.08	5.4	5.32
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	200 AO	15.1	17.2	17.8	16.3	15.4	15.9	15.9	18.6	18	16.1	15.9	17.2	19.4	19.1	22.3
Strontium	mg/L		2.12	2.26	2.31	2.311	2.31	1.95	2.2	2.29	2.46	2.35	2.08	2.35	2.33	2.57	2.43
Sulphur	mg/L		30.8	30.1	31.3	29.1	25.9	27.3	24.6	30.4	26.7	39	29	30	32	34	29
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.000005
Tin	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0001	0.00029	0.00012	0.00006	0.00012	< 0.00006
Titanium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0001	0.00009	0.00023	< 0.00007	0.00034	< 0.00007
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000333	0.000412	0.000392	0.000476	0.000408	0.000253
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00014	0.00007	0.00007	0.00008	0.00012	0.00006
Zinc	mg/L	5 AO	<0.005	0.009	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	0.005	0.002	0.006	0.004	0.002	0.004	< 0.002

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-12-II

Parameters	Units	ODWS <sup>(1)</sup>	2014			2015			2016			2017			2018		
			June	July	Sep	May	July	Sep	May	July	Sep	May	July	Sep	May	July	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	515	524	530	477	541	535	498	532	519	503	451	533	540	509	489
Chloride	mg/L	250 AO <sup>(3)</sup>	46.5	50.0	45.2	49.1	49.8	49.2	58.2	47.6	52.7	49.5	46.2	49.2	63.2	56.7	54.1
Dissolved Organic Carbon	mg/L	5 AO	7.2	8.5	8.2	7.9	8.6	9.1	7.0	9.5	9.5	6.7	9.1	9.2	9.7	8.7	8.2
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Sulphate	mg/L	500 AO	111	135	122	118	134	127	139	135	130	123	125	132	127	126	126
Hardness	mg/L	80-100 OG	569	580	525	466	600	518	517	528	562	510	530	533	548	572	595
Nitrate	mg/L	10 MAC	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Nitrite	mg/L	1 MAC	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Organic Nitrogen	mg/L	0.15 OG	1.76	1.61	1.78	1.29	1.66	1.71	1.3	2.0	1.69	1.08	1.23	1.55	1.04	1.41	1.24
Orthophosphate	mg/L		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
pH	pH Units	6.5-8.5 OG	8.02	8.10	7.52	7.90	7.98	7.95	8.03	7.92	8.05	8.18	8.16	8.02	7.95	7.91	7.83
Electrical Conductivity	µS/cm		1260	1320	1330	1250	1360	1340	1170	1290	1370	1200	1150	1320	1240	1310	1280
Total Ammonia	mg/L		0.07	0.07	0.05	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	0.03
Total Dissolved Solids	mg/L	500 AO	734	810	766	722	758	766	702	744	780	694	734	716	744	760	916
Total Kjeldahl Nitrogen (TKN)	mg/L		1.83	1.68	1.83	1.29	1.69	1.71	1.3	2.0	1.69	1.08	1.23	1.55	1.06	1.41	1.27
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.010	<b>0.475</b>	0.006	0.006	0.004	0.007	0.004	<0.004	0.005
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.044	0.048	0.04	0.039	0.044	0.049	0.038	0.052	0.052	0.037	0.044	0.045	0.037	0.044	0.049
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	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	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.124	0.193	0.196	0.138	0.181	0.240	0.147	0.220	0.249	0.139	0.225	0.276	0.139	0.269	0.272
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		171	174	156	133	180	151	155	159	170	152	156	160	164	171	178
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	0.004	<0.003	<0.003	0.005	<0.003	<0.003	0.004	<0.003	<0.003	0.005	<0.003	<0.003
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.006	<0.003	<0.003
Iron	mg/L	0.3 AO	0.092	<b>0.308</b>	0.171	0.131	<b>0.387</b>	0.042	0.260	<b>0.826</b>	0.179	0.293	<b>0.432</b>	0.222	<b>1.57</b>	0.141	0.168
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Magnesium	mg/L		34.6	35.3	32.8	32.6	36.5	34.3	31.6	31.9	33.3	31.6	34.0	32.4	33.6	35.2	36.6
Manganese	mg/L	0.05 AO	0.044	0.035	0.033	0.046	0.041	0.034	0.047	<b>0.068</b>	<b>0.054</b>	0.050	0.047	<b>0.055</b>	<b>0.081</b>	<b>0.077</b>	<b>0.074</b>
Molybdenum	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	<0.002	<0.002	<0.002
Nickel	mg/L		0.006	0.006	0.003	0.008	0.01	0.014	0.006	0.009	0.009	0.007	0.009	0.006	0.009	0.008	0.009
Potassium	mg/L		3.31	4.32	3.88	2.92	3.85	4.62	2.83	4.13	4.27	2.54	3.35	3.64	2.50	3.43	3.84
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		3.66	4.09	3.71	4.16	3.70	4.53	3.42	5.66	4.54	4.02	4.47	4.27	2.68	4.95	4.81
Silver	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	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	80.5	77.6	74.6	73.3	73.9	73.7	66.8	68.9	71.4	62.6	63.5	60	60.4	63.9	68.5
Strontium	mg/L		0.626	0.604	0.517	0.468	0.505	0.539	0.467	0.495	0.586	0.458	0.517	0.547	0.434	0.52	0.515
Sulphur	mg/L		35.8	46.1	42.2	41.5	40.9	42.8	38.1	38.7	44.8	41.0	42.0	42.1	42.6	42.1	45.3
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	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	<0.002	<0.002	<0.002
Titanium	mg/L		<0.002	<0.002	<0.002	0.002	0.002	0.003	0.002	0.011	0.002	0.002	0.002	<0.002	0.003	<0.002	0.002
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	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	<0.002	<0.002	<0.002
Zinc	mg/L	5 AO	0.006	<0.005	<0.005	<0.005	0.007	<0.005	0.008	0.008	<0.005	<0.005	0.007	<0.005	0.009	0.007	0.006

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-12-II

Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	498	496	<b>510</b>	500	<b>529</b>	<b>550</b>	<b>529</b>	<b>547</b>	<b>536</b>	471	<b>530</b>	<b>538</b>	<b>531</b>	<b>558</b>	<b>568</b>
Chloride	mg/L	250 AO <sup>(3)</sup>	51.4	53.1	49.5	51.6	53.6	47.3	50.7	51.7	52.7	66	53	57	59	66	58
Dissolved Organic Carbon	mg/L	5 AO	<b>8.3</b>	<b>6.3</b>	<b>7.2</b>	<b>7.5</b>	<b>8.5</b>	<b>8.2</b>	<b>7.4</b>	<b>8.3</b>	<b>9.0</b>	<b>8.1</b>	<b>7.0</b>	<b>7.0</b>	<b>8.0</b>	<b>8.9</b>	<b>8.0</b>
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	<0.25	<0.25	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	0.06	0.07	< 0.06	0.08	0.06
Sulphate	mg/L	500 AO	99.2	119	112	105	108	103	78.8	80.8	83.7	78	73	77	81	83	67
Hardness	mg/L	80-100 OG	<b>539</b>	<b>566</b>	<b>547</b>	<b>523</b>	<b>768</b>	<b>498</b>	<b>470</b>	<b>538</b>	<b>531</b>	<b>629</b>	<b>518</b>	<b>547</b>	<b>613</b>	<b>589</b>	<b>658</b>
Nitrate	mg/L	10 MAC	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.05	<0.05	<0.05	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Nitrite	mg/L	1 MAC	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.05	<0.05	<0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Organic Nitrogen	mg/L	0.15 OG	<b>0.95</b>	<b>1.21</b>	<b>1.14</b>	<b>1.05</b>	<b>1.26</b>	<b>1.2</b>	<b>1.07</b>	<b>1.11</b>	<b>1.35</b>	<b>0.50</b>	<b>0.80</b>	<b>0.95</b>	<b>1.20</b>	<b>1.07</b>	<b>0.83</b>
Orthophosphate	mg/L		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.10	<0.10	<0.10						< 0.03
pH	pH Units	6.5-8.5 OG	7.79	7.41	7.64	7.78	7.81	7.71	7.68	7.65	7.53	8.00	8.02	8.00	8.02	7.83	7.95
Electrical Conductivity	µS/cm		1180	1360	1410	1320	1090	1060	1200	1220	1230	1060	1220	1220	1240	1290	1310
Total Ammonia	mg/L		<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.06	<0.02	0.05	0.06	0.07	< 0.04	0.04	< 0.04
Total Dissolved Solids	mg/L	500 AO	<b>706</b>	<b>692</b>	<b>748</b>	<b>716</b>	<b>686</b>	<b>714</b>	<b>702</b>	<b>706</b>	<b>752</b>	<b>671</b>	<b>697</b>	<b>620</b>	<b>757</b>	<b>703</b>	<b>757</b>
Total Kjeldahl Nitrogen (TKN)	mg/L		0.95	1.23	1.14	1.05	1.26	1.2	1.07	1.17	1.35	0.6	0.9	1.02	1.22	1.11	0.84
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.13	< 0.03	< 0.03	< 0.03	< 0.03	< 0.003
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	0.004	0.006	0.005	0.024	0.021	0.034	0.021	<0.004	0.001	0.071	0.024	0.001	0.001	0.020
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	< 0.0002	0.0003	0.0002	0.0002	0.0003	0.0002
Barium	mg/L	1 MAC	0.035	0.043	0.044	0.042	0.036	0.035	0.038	0.037	0.043	0.038	0.0424	0.0426	0.0366	0.0450	0.0427
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.160	0.267	0.297	0.220	0.382	0.292	0.247	0.322	0.344	0.268	0.361	0.290	0.260	0.310	0.343
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000003	0.000006	0.000005	< 0.000003	< 0.000003	< 0.000003
Calcium	mg/L		162	168	164	153	226	147	136	156	152	194	151	156	181	164	186
Chromium	mg/L	0.05 MAC	0.006	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.00042	0.00035	0.00039	0.00031	0.00028	0.00024
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000367	0.000381	0.000305	0.000247	0.000243	0.000284
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	0.006	<0.003	<0.003	0.009	<0.003	<0.003	0.0007	0.0017	< 0.0002	0.0016	0.0006	0.0012
Iron	mg/L	0.3 AO	0.059	0.179	0.119	<b>0.301</b>	0.257	0.208	0.026	0.232	0.052	0.291	0.200	0.208	0.040	<b>0.354</b>	<b>0.421</b>
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.00009	0.00016	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Magnesium	mg/L		32.6	35.5	33.3	34.3	49.4	31.9	31.7	36.1	36.9	35.1	34.1	38.4	39.4	43.6	47.0
Manganese	mg/L	0.05 AO	0.045	<b>0.062</b>	<b>0.058</b>	0.048	<b>0.060</b>	<b>0.052</b>	0.032	<b>0.073</b>	0.048	<b>0.0841</b>	<b>0.0777</b>	<b>0.0600</b>	0.0437	0.0477	<b>0.0629</b>
Molybdenum	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00017	0.00022	0.00026	0.0002	0.00014	0.00017
Nickel	mg/L		0.008	0.008	0.009	0.007	0.008	0.007	0.009	0.006	0.007	0.0072	0.0083	0.0078	0.009	0.008	0.0087
Potassium	mg/L		2.67	3.74	3.47	2.68	4.4	3.16	2.85	3.52	3.33	2.93	3.28	3.31	3.20	3.84	4.00
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	0.005	<0.004	<0.004	<0.004	<0.004	<0.004	0.00009	0.00005	0.00013	0.00007	0.00008	0.00008
Silicon	mg/L		4.65	3.03	4.20	3.99	4.75	4.08	4.66	4.23	4.59	4.43	5.01	4.68	4.18	4.62	4.13
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	200 AO	61.7	64.9	63.9	57.8	86.0	57.2	53.9	59.8	58.0	53.7	59.5	55.8	66.6	64.5	70.2
Strontium	mg/L		0.444	0.494	0.516	0.468	0.474	0.487	0.456	0.473	0.531	0.496	0.440	0.520	0.467	0.558	0.620
Sulphur	mg/L		37.3	39.1	37.4	33.8	49.9	35.4	26.3	29.1	27.3	34.0	26.0	27.0	29	28	25
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00006	< 0.00006	0.00007	0.00006	0.00018	< 0.00006
Titanium	mg/L		<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	0.00007	0.00231	0.00108	< 0.00007	0.00011	0.00061
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000397	0.00059	0.000465	0.000597	0.000445	0.000461
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00011	0.00018	0.00011	0.00006	0.0001	0.00004
Zinc	mg/L	5 AO	<0.005	0.006	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.003	0.005	0.007	< 0.002	< 0.002	< 0.002

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-30-I

Parameters	Units	ODWS <sup>(1)</sup>	2014	2015			2016			2017			2018		
			Sep	May	July	Sept	May	July	Sept	May	July	Sept	May	July	Oct
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	118	137	124	123	190	163	145	143	145	152	146	125	126
Chloride	mg/L	250 AO <sup>(3)</sup>	41.3	24.4	18.7	17.4	15.0	11.4	10.8	8.89	8.38	7.66	6.93	5.53	4.74
Dissolved Organic Carbon	mg/L	5 AO	<b>8.0</b>	2.7	2.9	2.0	2.1	2.3	1.7	1.3	1.9	3.0	2.3	3.2	2.1
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	1.08	<b>1.53</b>	1.31	1.42	0.45	1.34	<b>1.62</b>	1.45	<b>2.04</b>	<b>1.85</b>	<b>2.7</b>	<b>1.9</b>	<b>1.69</b>
Sulphate	mg/L	500 AO	339	225	245	222	203	183	163	175	170	193	177	200	186
Hardness	mg/L	80-100 OG	<b>264</b>	<b>145</b>	<b>146</b>	<b>132</b>	<b>141</b>	<b>115</b>	<b>88.2</b>	<b>102</b>	90.5	<b>128</b>	92.6	<b>109</b>	<b>109</b>
Nitrate	mg/L	10 MAC	<0.25	<0.25	<0.25	0.41	<0.25	0.20	<0.25	<0.25	0.11	0.14	0.07	0.10	<0.10
Nitrite	mg/L	1 MAC	<0.25	<0.25	<0.25	<0.25	<0.25	<0.10	<0.25	<0.25	<0.05	<0.10	<0.05	<0.05	<0.10
Organic Nitrogen	mg/L	0.15 OG	<b>0.65</b>	<b>0.39</b>	<b>0.65</b>	<b>0.61</b>	<b>0.16</b>	<b>0.40</b>	<b>0.17</b>	0.14	<0.10	0.13	<0.10	<0.10	<0.10
Orthophosphate	mg/L		<0.50	<0.50	<0.50	<0.50	<0.50	<0.20	<0.50	<0.50	<0.10	<0.20	<0.10	<0.10	<0.20
pH	pH Units	6.5-8.5 OG	8.22	8.34	8.04	7.98	8.12	8.14	8.41	8.16	8.04	8.07	7.75	7.95	7.84
Electrical Conductivity	µS/cm		1070	869	812	810	737	734	713	670	667	750	656	685	673
Total Ammonia	mg/L		1.13	0.29	0.25	0.1	0.10	0.12	0.06	<0.02	0.09	0.02	0.09	<0.02	0.08
Total Dissolved Solids	mg/L	500 AO	<b>652</b>	480	490	452	428	410	386	372	388	410	360	402	418
Total Kjeldahl Nitrogen (TKN)	mg/L		1.78	0.68	0.90	0.71	0.26	0.52	0.23	0.14	<0.10	0.15	0.17	<0.10	0.10
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
<b>Metals</b>															
Aluminum	mg/L	0.1 OG	0.006	<b>0.129</b>	0.010	0.017	0.010	0.016	0.015	0.005	0.008	0.012	0.010	0.009	0.016
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.063	0.039	0.032	0.025	0.023	0.023	0.027	0.019	0.019	0.021	0.019	0.023	0.028
Beryllium	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
Bismuth	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	<0.002
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.371	0.390	0.375	0.439	0.407	0.420	0.435	0.38	0.440	0.449	0.448	0.454	0.493
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		49.8	26.3	24.3	21.9	25.4	20.0	13.7	16.3	13.8	29.3	15.0	17.6	17.4
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	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
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.063	<0.003	<0.003
Iron	mg/L	0.3 AO	0.126	0.178	0.030	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	<0.010	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.004	<0.001	<0.001
Magnesium	mg/L		33.9	19.2	20.8	18.7	18.8	15.9	13.1	14.8	13.6	13.3	13.4	15.9	15.9
Manganese	mg/L	0.05 AO	0.030	0.021	0.013	0.009	0.013	0.006	0.006	0.003	0.003	0.006	0.005	0.003	0.011
Molybdenum	mg/L		0.044	0.069	0.069	0.058	0.035	0.034	0.035	0.042	0.04	0.039	0.042	0.048	0.046
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		28.2	12.9	11.8	10.5	8.16	8.46	7.20	7.13	6.25	5.48	5.71	6.18	6.18
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		2.9	2.95	2.08	2.58	2.66	3.10	2.74	2.5	2.72	2.67	2.27	2.51	2.35
Silver	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	<0.002
Sodium	mg/L	200 AO	95.7	116	112	117	116	107	104	102	95.1	88.8	89.5	93.3	99.0
Strontium	mg/L		1.07	0.673	0.827	0.78	0.659	0.649	0.695	0.711	0.658	0.625	0.587	0.782	0.76
Sulphur	mg/L		125	84.0	85.4	83.1	56.3	53.1	52.7	60.5	55	53.9	55.4	59.1	65.1
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	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	<0.002
Titanium	mg/L		0.002	0.010	0.004	0.005	0.003	0.004	0.002	0.002	0.003	<0.002	0.003	0.002	0.003
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	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	<0.002
Zinc	mg/L	5 AO	<0.005	0.009	<0.005	0.009	0.005	<0.005	0.005	<0.005	0.006	<0.005	0.083	<0.005	<0.005

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by bold entries.

Groundwater Geochemical Results OW-30-I

Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	141	127	129	144	150	161	174	169	158	171	158	152	180	206	232
Chloride	mg/L	250 AO <sup>(3)</sup>	4.28	3.92	3.14	3.82	3.76	3.13	3.29	3.7	3.36	4.0	3.0	4.0	3	3	3
Dissolved Organic Carbon	mg/L	5 AO	2.3	1.9	1.0	2.7	3.0	2.2	1.8	1.8	2.1	2.0	2.0	1.0	2.0	1.5	2.0
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	<b>1.57</b>	<b>1.74</b>	<b>1.56</b>	<b>1.72</b>	<b>1.69</b>	<b>1.73</b>	1.40	<b>1.61</b>	<b>1.67</b>	<b>1.54</b>	1.47	<b>1.69</b>	1.49	<b>1.54</b>	1.26
Sulphate	mg/L	500 AO	196	205	197	193	192	195	167	175	173	210	190	200	180	210	140
Hardness	mg/L	80-100 OG	<b>110</b>	<b>111</b>	<b>112</b>	<b>113</b>	<b>104</b>	<b>102</b>	<b>105</b>	<b>113</b>	<b>135</b>	<b>137</b>	<b>122</b>	<b>125</b>	<b>146</b>	<b>135</b>	<b>195</b>
Nitrate	mg/L	10 MAC	<0.10	<0.10	<0.10	<0.10	0.11	<0.05	0.10	<0.05	<0.05	0.08	< 0.06	0.06	0.06	< 0.06	0.11
Nitrite	mg/L	1 MAC	<0.10	<0.10	<0.10	<0.10	<0.10	<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Organic Nitrogen	mg/L	0.15 OG	<0.10	<0.10	0.15	<b>0.23</b>	0.10	0.14	<b>0.16</b>	<0.10	<b>0.17</b>	<b>&lt; 0.5</b>	<b>&lt; 0.5</b>	0.08	< 0.05	< 0.05	<b>0.19</b>
Orthophosphate	mg/L		<0.20	<0.20	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10						0.05
pH	pH Units	6.5-8.5 OG	7.66	8.10	7.57	7.63	7.82	7.25	7.96	8.13	8.09	8.26	8.16	8.20	8.35	8.40	8.29
Electrical Conductivity	µS/cm		680	741	764	776	608	586	678	679	664	702	698	684	696	701	722
Total Ammonia	mg/L		<0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05	0.07	< 0.04	< 0.04	< 0.04	0.05
Total Dissolved Solids	mg/L	500 AO	416	424	388	406	414	424	402	408	388	426	451	411	491	491	477
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.10	0.12	0.15	0.23	0.10	0.14	0.16	<0.10	0.17	< 0.5	< 0.05	0.07	< 0.25	< 0.05	0.24
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	0.084	<0.050	<0.050	0.074	<0.050	0.053	0.13	< 0.03	< 0.03	0.1	< 0.03	< 0.003
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	0.010	0.008	0.010	0.018	0.019	0.070	0.058	<b>0.456</b>	0.005	<b>0.131</b>	0.037	0.004	0.003	0.004
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0005	0.0005	0.0005	0.0005	0.0004	0.0004
Barium	mg/L	1 MAC	0.025	0.024	0.026	0.027	0.023	0.022	0.021	0.026	0.033	0.0374	0.0322	0.0321	0.0290	0.0307	0.0452
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.000007	< 0.000007	0.000026	< 0.000007	< 0.000007	< 0.000007
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.498	0.471	0.427	0.474	0.577	0.466	0.374	0.494	0.455	0.690	0.456	0.454	0.451	0.430	0.431
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000023	0.000014	0.000015	0.000015	0.000027	0.000008
Calcium	mg/L		17.4	17.1	17.6	17.2	15.6	15.6	15.7	16.8	23.1	24.1	19.8	20.5	24.9	21.1	26.0
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0002	0.00084	0.00034	0.00015	0.00032	0.00133
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000024	0.000158	0.000041	0.000021	0.000028	0.000093
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.010	<0.003	0.003	0.0008	0.0009	0.0003	0.0009	0.0011	0.0013
Iron	mg/L	0.3 AO	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.064	0.091	<b>0.774</b>	< 0.007	0.268	0.061	< 0.007	< 0.007	< 0.007
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.00009	0.00017	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Magnesium	mg/L		16.1	16.5	16.5	17.1	15.7	15.4	15.9	17.2	18.7	18.8	17.7	18.0	20.2	20.1	31.5
Manganese	mg/L	0.05 AO	0.004	0.006	0.007	0.002	<0.002	0.005	0.004	0.004	0.032	0.00351	0.00957	0.00458	0.00179	0.00341	0.00639
Molybdenum	mg/L		0.044	0.043	0.042	0.043	0.040	0.035	0.025	0.038	0.036	0.0437	0.0436	0.0398	0.0396	0.0346	0.0328
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	0.0004	0.0009	0.0005	0.0006	0.0005	0.0014
Potassium	mg/L		5.91	5.99	6.14	6.8	5.42	5.28	5.82	5.98	6.05	7.76	5.61	5.95	7.22	6.18	9.47
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	< 0.00004	< 0.00004	0.00011	< 0.00004	< 0.00004	0.00014
Silicon	mg/L		2.86	1.16	2.29	1.8	2.29	2.05	2.33	2.36	2.76	3.07	2.30	2.57	2.80	2.52	2.60
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	200 AO	97.1	99.2	100	105	91.0	94.3	90.5	98.7	97.7	100	95.3	94.3	107	95.8	97.4
Strontium	mg/L		0.803	0.823	0.850	0.822	0.842	0.784	0.577	0.816	0.847	1.00	0.837	0.899	0.997	1.02	1.40
Sulphur	mg/L		65.2	65.0	64.6	64.1	58.0	62.3	53.5	56.3	53.7	85.0	63.0	63.0	68	69	56
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	< 0.000005	0.00001	0.000005	0.000009	0.000006	0.000011
Tin	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0001	0.00016	0.00013	0.00009	0.00017	0.00014
Titanium	mg/L		0.004	0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.018	0.00011	0.00535	0.00192	0.00022	< 0.00007	0.00009
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000554	0.000689	0.00056	0.000665	0.000562	0.000527
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00028	0.00053	0.00029	0.0003	0.0003	0.00028
Zinc	mg/L	5 AO	<0.005	<0.005	0.011	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	< 0.002	0.003	0.003	< 0.002	< 0.002	< 0.002

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-30-II

Parameters	Units	ODWS <sup>(1)</sup>	2014	2015			2016			2017			2018		
			Sep	May	July	Sept	May	July	Sept	May	July	Sept	May	July	Oct
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	224	192	168	174	246	219	207	255	260	241	248	247	219
Chloride	mg/L	250 AO <sup>(3)</sup>	28.7	8.8	8.84	7.55	4.53	4.81	5.24	3.75	3.29	3.65	3.48	2.62	2.58
Dissolved Organic Carbon	mg/L	5 AO	<b>6.1</b>	2.5	3.1	2.2	2.4	2.4	2.0	1.8	2.9	3.5	2.5	<b>5.1</b>	3.0
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	1.03	0.53	0.61	0.61	0.21	0.53	<0.25	<0.25	0.66	0.64	0.75	0.68	0.56
Sulphate	mg/L	500 AO	277	138	165	165	81.8	120	130	64.5	69.1	82.4	90.8	78.9	96.2
Hardness	mg/L	80-100 OG	<b>54.8</b>	93.6	<b>102</b>	<b>107</b>	<b>146</b>	<b>121</b>	<b>124</b>	<b>141</b>	<b>129</b>	<b>123</b>	<b>130</b>	<b>160</b>	<b>150</b>
Nitrate	mg/L	10 MAC	<0.25	0.37	<0.25	<0.25	0.20	<0.10	<0.25	<0.25	0.06	<0.10	0.19	0.14	<0.10
Nitrite	mg/L	1 MAC	<0.25	<0.05	<0.25	<0.25	<0.10	<0.10	<0.25	<0.25	<0.05	<0.10	<0.05	<0.05	<0.10
Organic Nitrogen	mg/L	0.15 OG	<b>0.82</b>	<b>0.38</b>	<b>0.54</b>	<b>0.39</b>	<b>0.25</b>	<b>0.29</b>	<b>0.23</b>	<0.10	<0.10	<b>0.39</b>	<b>0.20</b>	<0.10	0.13
Orthophosphate	mg/L		<0.50	<0.10	<0.50	<0.50	<0.20	<0.20	<0.50	<0.50	<0.10	<0.20	<0.10	<0.10	<0.20
pH	pH Units	6.5-8.5 OG	8.49	8.44	8.06	8.00	8.14	8.15	8.39	8.44	8.33	8.25	8.10	8.15	8.03
Electrical Conductivity	µS/cm		1080	718	685	726	578	683	710	596	616	643	620	637	641
Total Ammonia	mg/L		0.33	0.18	0.22	0.10	0.03	0.04	0.03	<0.02	0.06	0.04	<0.02	<0.02	0.07
Total Dissolved Solids	mg/L	500 AO	<b>1300</b>	410	466	434	344	388	398	326	340	346	340	350	400
Total Kjeldahl Nitrogen (TKN)	mg/L		1.15	0.56	0.76	0.49	0.28	0.33	0.26	<0.10	<0.10	0.43	0.20	<0.10	0.20
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
<b>Metals</b>															
Aluminum	mg/L	0.1 OG	<b>0.21</b>	0.006	0.007	0.008	0.029	0.014	0.022	<0.004	0.007	0.009	0.007	<0.004	0.007
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.015	0.022	0.023	0.026	0.028	0.028	0.032	0.032	0.029	0.031	0.029	0.035	0.037
Beryllium	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
Bismuth	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	<0.002
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.172	0.145	0.162	0.196	0.115	0.170	0.199	0.111	0.151	0.178	0.160	0.165	0.209
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		12.4	17.7	17.3	18.3	28.8	19.4	20.2	27.2	21.1	20.2	23.2	28.3	23.6
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	0.004	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.004
Cobalt	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
Copper	mg/L	1 AO	<0.003	<0.003	0.043	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	0.124	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Magnesium	mg/L		5.79	12.0	14.2	15.0	18.0	17.7	17.9	17.8	18.5	17.5	17.5	21.6	22.2
Manganese	mg/L	0.05 AO	0.013	0.029	0.027	0.026	<b>0.072</b>	0.031	0.023	0.004	0.015	<b>0.066</b>	0.016	0.003	0.017
Molybdenum	mg/L		0.094	0.046	0.061	0.052	0.017	0.035	0.039	0.021	0.023	0.028	0.027	0.022	0.028
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		6.17	5.3	6.29	7.19	4.32	6.95	7.11	4.65	5.58	5.49	5.15	5.92	6.92
Selenium	mg/L		<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		3.28	3.13	2.69	3.40	3.27	4.21	4.04	3.6	4.07	4.12	2.63	4.19	3.74
Silver	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	<0.002
Sodium	mg/L	200 AO	197	120	112	116	81.9	97.8	97.9	76.6	78.9	74.3	74	74.2	82.4
Strontium	mg/L		0.128	0.208	0.325	0.35	0.251	0.369	0.454	0.356	0.418	0.413	0.354	0.45	0.522
Sulphur	mg/L		100	51.2	54.9	60.1	20.9	34.7	39.2	22.1	22.6	26.8	29.9	24.5	33.7
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	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	<0.002
Titanium	mg/L		0.008	0.002	0.003	0.003	<0.002	0.003	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Uranium	mg/L	0.02 MAC	0.005	0.003	0.005	0.004	0.003	0.003	0.002	0.002	0.002	<0.002	0.002	0.002	0.003
Vanadium	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	<0.002
Zinc	mg/L	5 AO	<0.005	<0.005	0.036	0.005	<0.005	<0.005	0.019	<0.005	0.006	<0.005	<0.005	<0.005	<0.005

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by bold entries.



Groundwater Geochemical Results OW-30-II

Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	244	228	212	216	221	244	252	226	206	220	207	205	224	184	226
Chloride	mg/L	250 AO <sup>(3)</sup>	1.42	2.36	2.20	2.40	2.40	2.15	1.14	2.47	1.94	2.0	< 1	1.0	1	< 1	1
Dissolved Organic Carbon	mg/L	5 AO	2.9	4.3	1.6	2.4	2.1	2.8	3.2	3.7	3.8	1.8	2.0	2.0	2.0	2.4	2.0
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.29	0.57	0.51	0.70	0.68	0.72	0.27	0.63	0.65	0.70	0.75	0.76	0.53	0.24	0.79
Sulphate	mg/L	500 AO	28.3	64.2	91.0	93.4	93.4	111.0	33.5	85.1	114	96	98	100	55	18	96
Hardness	mg/L	80-100 OG	<b>182</b>	<b>153</b>	<b>136</b>	<b>135</b>	<b>130</b>	<b>131</b>	<b>244</b>	<b>138</b>	<b>146</b>	<b>156</b>	<b>143</b>	<b>152</b>	<b>169</b>	<b>192</b>	<b>150</b>
Nitrate	mg/L	10 MAC	<0.05	<0.10	<0.10	<0.10	<0.05	<0.05	0.06	<0.05	<0.05	< 0.06	< 0.06	< 0.06	0.09	< 0.06	< 0.06
Nitrite	mg/L	1 MAC	<0.05	<0.10	<0.10	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Organic Nitrogen	mg/L	0.15 OG	<0.10	<0.10	0.15	<b>0.24</b>	<b>0.16</b>	<b>0.16</b>	<b>0.29</b>	0.14	<b>0.18</b>	<b>&lt; 0.5</b>	<b>&lt; 0.5</b>	0.09	<b>0.42</b>	0.14	<b>0.25</b>
Orthophosphate	mg/L		<0.10	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10						0.1
pH	pH Units	6.5-8.5 OG	7.95	7.92	7.90	8.00	8.10	7.59	7.88	8.12	8.10	8.20	8.27	8.18	8.17	8.00	8.26
Electrical Conductivity	µS/cm		483	615	676	660	525	529	517	583	613	579	577	602	514	366	576
Total Ammonia	mg/L		<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	0.09	<0.02	< 0.04	< 0.04	< 0.04	< 0.04	0.06	< 0.04
Total Dissolved Solids	mg/L	500 AO	284	308	346	332	338	374	284	368	364	360	334	360	317	217	400
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.10	0.10	0.15	0.24	0.16	0.16	0.29	0.23	0.18	< 0.5	0.08	0.09	0.44	0.20	0.26
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.14	< 0.03	< 0.03	0.08	< 0.03	0.004
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	0.005	0.009	0.024	0.025	0.027	0.040	0.092	0.045	0.027	0.048	0.033	0.005	0.001	0.009
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0006	0.0006	0.0007	0.0006	< 0.0002	0.0007
Barium	mg/L	1 MAC	0.034	0.031	0.031	0.025	0.027	0.027	0.020	0.029	0.026	0.0313	0.0329	0.0331	0.0312	0.0646	0.0252
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.000007	< 0.000007	0.000021	< 0.000007	0.000009	< 0.000007
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.062	0.146	0.172	0.159	0.224	0.188	0.034	0.174	0.198	0.258	0.204	0.192	0.089	0.031	0.175
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000017	0.000005	0.000013	0.000012	< 0.000003	0.000004
Calcium	mg/L		40.2	28.4	22.0	22	21.3	21.1	59.8	23.2	23.1	29.2	24.3	25.8	37	50.6	23.8
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.005	<0.003	<0.003	0.00029	0.00035	0.00046	0.00017	0.0004	0.00025
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000031	0.000073	0.000033	0.000045	0.000053	0.000016
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	0.0021	0.0008	0.0006	0.0017	0.0007	0.0043
Iron	mg/L	0.3 AO	<0.010	<0.010	<0.010	0.010	0.011	<0.010	0.038	0.125	<0.010	0.016	0.067	0.079	0.008	<b>1.50</b>	0.009
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Magnesium	mg/L		19.9	19.9	19.7	19.4	18.7	18.9	23.1	19.5	21.4	20.1	20.1	21.2	18.5	16	22
Manganese	mg/L	0.05 AO	0.009	0.015	0.017	0.010	0.004	0.007	0.004	0.015	0.021	0.00147	0.00577	0.00222	0.0056	<b>0.0786</b>	0.00134
Molybdenum	mg/L		0.007	0.018	0.023	0.021	0.021	0.024	0.003	0.019	0.023	0.0182	0.0177	0.0198	0.0103	0.00119	0.017
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0005	0.0006	0.0005	0.0007	0.0002	0.0007
Potassium	mg/L		3.64	5.26	6.26	6.23	5.25	5.86	2.71	5.76	6.61	7.29	5.97	6.54	5.24	3.1	6.95
Selenium	mg/L		<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.00004	0.00004	0.00009	0.00008	< 0.00004	0.00005
Silicon	mg/L		3.93	2.76	3.94	3.29	3.87	3.70	2.37	4.43	4.03	5.22	4.54	4.68	3.88	6.62	4.01
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	200 AO	38.0	64.3	77.3	71.0	66.8	76.0	33.9	72.9	75.2	68.8	65.0	68.7	50.6	4.20	75.3
Strontium	mg/L		0.36	0.43	0.476	0.405	0.465	0.472	0.146	0.434	0.507	0.521	0.469	0.538	0.462	0.881	0.58
Sulphur	mg/L		8.74	21.5	29.5	23.1	27.4	33.7	9.16	28.3	35.1	44	31	38	16	6	37
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.000007	0.000007	0.000011	0.000008	< 0.000005	0.000005
Tin	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00006	0.00012	0.00007	< 0.00006	0.00007	0.00014
Titanium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.003	<0.002	0.00041	0.00177	0.00108	0.00012	0.00009	0.00076
Uranium	mg/L	0.02 MAC	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00122	0.00151	0.00161	0.00165	0.000053	0.0012
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00049	0.00044	0.0005	0.00045	0.00021	0.00042
Zinc	mg/L	5 AO	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.002	0.002	< 0.002	< 0.002	0.002	0.004

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-30-III



Parameters	Units	ODWS <sup>(1)</sup>	2017		2018			2019			2020			2021			2022			2023		
			Sept	May	July	Oct	May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct	
<b>General Chemistry</b>																						
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	284	275	251	178	213	202	197	206	212	225	217	211	198	196	187	185	182	118	185	
Chloride	mg/L	250 AO <sup>(3)</sup>	22.6	9.01	10.7	0.68	0.78	0.93	0.69	0.75	0.74	0.65	0.87	0.76	0.50	< 1	< 1	< 1	< 1	2	< 1	
Dissolved Organic Carbon	mg/L	5 AO	<b>22.6</b>	<b>8.0</b>	<b>12.7</b>	2.7	4.2	3.6	2.2	3.0	2.9	3.8	4.0	2.9	3.2	2.7	2.0	3.0	3.0	2.1	2.0	
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.79	0.55	0.46	0.17	0.23	0.25	0.21	0.26	0.20	0.18	0.24	0.20	0.18	0.23	0.28	0.22	0.22	1.22	0.22	
Sulphate	mg/L	500 AO	339	123	142	18.6	21.1	21.5	21.2	20.3	20.6	20.3	17.8	21.4	20.1	23	18	20	19	200	17	
Hardness	mg/L	80-100 OG	<b>306</b>	<b>212</b>	<b>234</b>	<b>178</b>	<b>189</b>	<b>205</b>	<b>188</b>	<b>198</b>	<b>176</b>	<b>185</b>	<b>177</b>	<b>197</b>	<b>186</b>	<b>221</b>	<b>189</b>	<b>189</b>	<b>200</b>	<b>105</b>	<b>211</b>	
Nitrate	mg/L	10 MAC	<0.25	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	
Nitrite	mg/L	1 MAC	<0.25	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	
Organic Nitrogen	mg/L	0.15 OG	0.15	<0.10	0.13	0.14	<0.10	0.10	<0.10	<b>0.20</b>	<b>0.16</b>	<b>0.16</b>	<b>0.19</b>	<0.10	<b>0.18</b>	<b>&lt; 0.5</b>	<b>&lt; 0.5</b>	0.07	0.13	0.13	0.11	
Orthophosphate	mg/L		<0.50	<0.10	<0.50	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10						< 0.03	
pH	pH Units	6.5-8.5 OG	8.22	8.00	8.02	7.73	7.80	7.77	7.69	7.84	7.88	7.36	7.77	7.88	7.78	7.99	8.05	7.94	7.90	8.30	7.95	
Electrical Conductivity	µS/cm		1280	723	784	390	420	458	474	466	375	357	423	420	410	373	386	378	371	612	370	
Total Ammonia	mg/L		0.07	0.03	0.12	0.10	0.05	0.08	0.03	<0.02	0.04	0.04	0.05	0.06	<0.02	0.04	< 0.04	0.06	0.06	< 0.04	< 0.04	
Total Dissolved Solids	mg/L	500 AO	<b>732</b>	402	440	230	222	204	224	228	234	224	236	240	212	200	251	209	229	429	217	
Total Kjeldahl Nitrogen (TKN)	mg/L		0.22	<0.10	0.25	0.24	<0.10	0.18	<0.10	0.20	0.20	0.20	0.24	<0.10	0.18	< 0.5	0.09	0.13	0.19	0.13	0.14	
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.050	<0.050	0.05	<0.050	<0.050	<0.050	0.03	< 0.03	0.03	< 0.03	< 0.03	0.006	
<b>Metals</b>																						
Aluminum	mg/L	0.1 OG	0.009	0.007	0.006	0.008	<0.004	0.005	0.007	0.008	0.013	0.015	0.052	0.012	0.008	<b>0.143</b>	0.002	0.002	< 0.001	0.002	0.002	
Arsenic	mg/L	0.01 MAC	<0.003	0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0007	< 0.0002	
Barium	mg/L	1 MAC	0.107	0.062	0.036	0.059	0.103	0.042	0.052	0.059	0.044	0.037	0.058	0.061	0.145	0.116	0.104	0.0935	0.0710	0.0392	0.0521	
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000035	< 0.000007	0.000017	0.000014	< 0.000007	0.000018	
Bismuth	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	<0.002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.152	0.123	0.067	0.041	0.054	0.071	0.068	0.058	0.10	0.058	0.051	0.063	0.055	0.064	0.052	0.042	0.025	0.195	0.026	
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000005	< 0.000003	0.000006	< 0.000003	0.000008	0.000003	
Calcium	mg/L		75.9	52.5	57.3	46.9	48.5	52.2	48.1	50.4	44.3	47.6	43.8	49.3	48.8	62.1	50.5	50.3	54.3	18.5	55.7	
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.00059	0.00016	0.00025	0.00014	0.00035	0.00012	
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000139	0.000078	0.000054	0.000024	0.00003	0.000027	
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	0.0031	< 0.0002	0.0003	0.0004	0.0018	0.0010	
Iron	mg/L	0.3 AO	<b>0.607</b>	<b>1.17</b>	<b>0.432</b>	<b>1.31</b>	<b>1.12</b>	0.037	<b>0.658</b>	<b>0.63</b>	<b>0.79</b>	<b>0.546</b>	<b>1.80</b>	<b>0.491</b>	<b>0.918</b>	<b>1.64</b>	0.106	<b>1.07</b>	<b>1.55</b>	< 0.007	<b>0.864</b>	
Lead	mg/L	0.01 MAC	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00028	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	
Magnesium	mg/L		28.3	19.6	22.1	14.8	16.6	18.1	16.5	17.4	15.9	16.1	16.5	17.9	15.5	16	15.3	15.5	15.5	14.3	17.6	
Manganese	mg/L	0.05 AO	<b>0.829</b>	<b>0.545</b>	<b>0.090</b>	<b>0.096</b>	<b>0.271</b>	<b>0.095</b>	<b>0.126</b>	<b>0.077</b>	<b>0.114</b>	<b>0.089</b>	<b>0.21</b>	<b>0.108</b>	<b>0.151</b>	<b>0.0898</b>	<b>0.0768</b>	<b>0.0743</b>	<b>0.0634</b>	0.0049	<b>0.0691</b>	
Molybdenum	mg/L		0.025	0.018	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00051	0.00082	0.00055	0.00064	0.0146	0.00047	
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0006	0.0003	< 0.0001	0.0001	0.0011	0.0002	
Potassium	mg/L		6.16	4.85	5.25	3.21	3.84	3.95	3.92	3.83	3.35	3.53	3.73	3.98	3.46	3.62	3.05	3.03	3.20	5.44	3.28	
Selenium	mg/L		<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.009	<0.004	<0.004	<0.004	<0.004	<0.004	< 0.00004	< 0.00004	0.00012	< 0.00004	0.00004	< 0.00004	
Silicon	mg/L		5.77	4.41	6.32	5.03	6.35	5.51	5.95	4.96	6.57	5.79	5.27	6.31	5.88	8.29	7.19	6.91	6.38	3.60	5.95	
Silver	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	<0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	
Sodium	mg/L	200 AO	136	62.2	72.6	12.8	14.1	10.7	10.7	11.1	9.6	8.45	11.4	9.09	8.97	5.00	5.19	4.60	4.72	90.3	4.77	
Strontium	mg/L		3.82	2.81	1.25	1.22	1.47	1.17	1.21	1.19	1.15	1.08	1.13	1.2	1.68	1.31	1.12	1.07	0.971	0.689	0.886	
Sulphur	mg/L		102	60.9	44.9	7.53	7.71	8.20	7.30	6.71	6.01	9.40	6.31	7.85	6.20	11	6	6	6	70	5	
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.000007	< 0.000005	
Tin	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	<0.002	< 0.00006	0.00008	0.00011	< 0.00006	0.00017	< 0.00006	
Titanium	mg/L		0.002	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.003	<0.002	0.00425	< 0.00005	0.00009	< 0.00007	< 0.00007	0.00009	
Uranium	mg/L	0.02 MAC	0.003	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000096	0.000172	0.000087	0.000053	0.000968	0.000038	
Vanadium	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	<0.002	0.00041	0.00007	0.00011	0.00011	0.00112	0.00010	
Zinc	mg/L	5 AO	0.012	0.006	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.003	< 0.002	0.005	< 0.002	< 0.002	< 0.002	

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (

Groundwater Geochemical Results OW-31-I

Parameters	Units	ODWS <sup>(1)</sup>	2017	2018			2019			2020			2021			2022			2023		
			Sept	May	July	Oct	May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	164	146	132	Insufficient	140	128	140	139		163	136	Insufficient	136	144	137	137	134	148	135
Chloride	mg/L	250 AO <sup>(3)</sup>	13.8	5.97	4.67	volume	2.75	2.85	2.08	1.98		1.65	1.62	volume	1.61	1	< 1	< 1	2	< 1	< 1
Dissolved Organic Carbon	mg/L	5 AO	2.1	1.3	3.3	to sample	1.5	2.8	1.0	1.5		1.7	1.8	to sample	3.0	1.4	2.0	2.0	1.0	1.3	1.0
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.73	0.82	0.40		0.58	0.75	<0.25	0.56		0.55	0.42		0.43	0.71	0.79	0.72	0.71	0.76	0.74
Sulphate	mg/L	500 AO	111	213	272		282	292	313	283		311	278		299	300	290	270	280	290	280
Hardness	mg/L	80-100 OG	154	177	227		240	245	256	254		247	214		240	258	242	234	240	227	259
Nitrate	mg/L	10 MAC	<0.10	0.37	0.62		0.64	0.58	0.82	0.69		0.70	0.52		0.51	0.56	0.49	0.42	0.44	0.40	0.40
Nitrite	mg/L	1 MAC	<0.10	<0.05	<0.25		<0.25	<0.25	<0.25	<0.25		<0.10	<0.05		<0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Organic Nitrogen	mg/L	0.15 OG	0.18	0.11	0.14		<0.10	1.28	0.11	0.17	0.16	0.11	0.39		<0.10	< 0.5	< 0.5	< 0.05	0.39	< 0.05	0.14
Orthophosphate	mg/L		<0.20	<0.10	<0.50		<0.50	<0.50	<0.50	<0.50		<0.20	<0.10		<0.10						0.05
pH	pH Units	6.5-8.5 OG	8.29	7.66	7.85		7.81	7.97	7.66	7.74		7.17	7.69		7.96	8.09	8.19	8.08	8.10	8.27	7.99
Electrical Conductivity	µS/cm		605	689	805		808	886	958	909		749	805		827	799	815	804	783	799	805
Total Ammonia	mg/L		0.17	0.07	<0.02		<0.02	0.09	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
Total Dissolved Solids	mg/L	500 AO	338	432	478		498	528	518	518		570	512		532	529	526	554	534	529	534
Total Kjeldahl Nitrogen (TKN)	mg/L		0.35	0.18	0.14		<0.10	1.37	0.11	0.17	0.16	0.11	0.39		<0.10	< 0.5	< 0.05	< 0.05	0.42	< 0.05	0.13
Total Phosphorus	mg/L		<0.05	<0.05	<0.05		<0.05	<0.05	<0.05	<0.050	<0.050	<0.050	0.078		<0.050	0.21	< 0.03	< 0.03	< 0.03	< 0.03	0.012
<b>Metals</b>																					
Aluminum	mg/L	0.1 OG	0.009	0.030	<0.004		0.230	0.008	0.008	0.022	0.020	0.015	0.057		0.111	0.333	0.378	0.093	0.033	0.004	0.180
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		<0.003	0.0004	0.0005	0.0005	0.0003	0.0003	0.0003
Barium	mg/L	1 MAC	0.045	0.038	0.052		0.043	0.042	0.051	0.037	0.036	0.037	0.032		0.039	0.0421	0.0413	0.0385	0.0318	0.0346	0.0382
Beryllium	mg/L		<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	0.000012	0.000014	0.00001	< 0.000007	< 0.000007	< 0.000007
Bismuth	mg/L		<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.202	0.192	0.190		0.220	0.212	0.220	0.210	0.277	0.215	0.187		0.228	0.320	0.224	0.225	0.167	0.189	0.202
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	0.000012	0.000008	0.000019	0.000006	0.000011	0.000007
Calcium	mg/L		24.5	29.4	38.0		40.4	41.7	44.1	42.1	38.7	43.6	35.4		41	50.2	43.1	43.1	45.2	40.3	48.3
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		<0.003	0.00152	0.00253	0.00071	0.00038	0.00033	0.00122
Cobalt	mg/L		<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	0.000553	0.000946	0.000177	0.000054	0.000022	0.000555
Copper	mg/L	1 AO	<0.003	<0.003	<0.003		0.007	<0.003	0.004	<0.003	<0.003	<0.003	0.006		0.003	0.0032	0.0028	0.0014	0.0018	0.0023	0.0050
Iron	mg/L	0.3 AO	0.062	<0.010	<0.010		0.337	<0.010	<0.010	<0.010	<0.010	0.019	<0.010	0.106	0.055	0.388	0.633	0.135	0.044	0.009	0.340
Lead	mg/L	0.01 MAC	<0.002	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	0.00033	0.00043	0.00009	< 0.00009	< 0.00009	0.00028
Magnesium	mg/L		22.5	25.1	32.1		33.8	34.1	35.4	36.2	31.6	33.6	30.6		33.4	32.3	32.7	30.6	31.0	30.7	33.7
Manganese	mg/L	0.05 AO	0.053	0.020	0.018		0.023	0.003	0.004	<0.002	0.003	<0.002	0.010		0.011	0.0175	0.0344	0.00542	0.00203	0.00168	0.0197
Molybdenum	mg/L		0.014	0.014	0.013		0.013	0.012	0.013	0.013	0.012	0.013	0.016		0.013	0.0136	0.014	0.0133	0.0149	0.0132	0.0134
Nickel	mg/L		<0.003	<0.003	0.003		0.003	<0.003	<0.003	0.004	<0.003	<0.003	<0.003		<0.003	0.0025	0.0037	0.0014	0.0013	0.0011	0.0028
Potassium	mg/L		6.45	7.24	8.57		8.73	8.89	9.93	9.63	8.17	8.91	7.97		9.08	10.6	8.66	8.84	9.26	9.01	9.83
Selenium	mg/L		<0.004	<0.004	<0.004		<0.004	<0.004	<0.004	0.057	<0.004	<0.004	<0.004		<0.004	0.00036	0.00044	0.00055	0.00034	0.00045	0.00041
Silicon	mg/L		4.35	2.55	3.35		3.80	2.29	3.32	2.24	3.08	3.06	3.01		3.04	4.75	3.33	3.76	3.08	3.30	3.21
Silver	mg/L		<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	200 AO	48.8	62.4	72.2		74.9	76.9	81.9	78.7	73.2	78.0	69.3		75.9	74.3	73.1	71.6	76.4	73.3	79.6
Strontium	mg/L		1.94	0.983	1.25		1.19	1.20	1.30	1.18	1.14	1.20	1.03		1.12	1.11	0.982	0.999	1.07	1.03	1.17
Sulphur	mg/L		35.1	66.6	82.0		93.2	95.1	101	95.3	89.7	101	89		90.4	119	96	95	96	99	102
Thallium	mg/L		<0.006	<0.006	<0.006		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006		<0.006	0.000033	0.000036	0.000029	0.000024	0.000022	0.000026
Tin	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	0.00008	0.00013	0.00009	0.00012	0.00013
Titanium	mg/L		<0.002	0.005	0.003		0.015	0.004	0.004	<0.002	<0.002	<0.002	0.012		0.008	0.015	0.0188	0.00506	0.0016	0.00018	0.00905
Uranium	mg/L	0.02 MAC	<0.002	0.002	0.004		0.004	0.002	0.003	0.003	0.002	0.002	0.002		0.002	0.00234	0.00275	0.00231	0.00243	0.00218	0.00217
Vanadium	mg/L		<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	0.00224	0.00222	0.00145	0.00093	0.00085	0.00151
Zinc	mg/L	5 AO	<0.005	<0.005	<0.005		0.008	<0.005	0.005	<0.005	<0.005	<0.005	<0.005		<0.005	0.003	0.004	0.003	< 0.002	0.003	0.005

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-31-II

Parameters	Units	ODWS <sup>(1)</sup>	2017				2018				2019			2020			2021			2022			2023		
			Sept	May	July	Oct	May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct				
<b>General Chemistry</b>																									
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	169	155	129	124	140	139	126	130	134	146	128	143	117	DRY	115	119	130	263	121				
Chloride	mg/L	250 AO <sup>(3)</sup>	18.8	9.62	6.80	4.58	3.47	3.36	2.60	2.52	2.76	2.33	2.14	3.01	1.95		1.0	2.0	2	1	3				
Dissolved Organic Carbon	mg/L	5 AO	<b>6.6</b>	<b>6.4</b>	<b>8.4</b>	<b>5.1</b>	4.4	4.2	2.7	<b>7.3</b>	3.3	3.7	2.6	4.8	4.2		2.0	2.0	3.0	1.9	2.0				
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	1.0	1.27	1.13	0.98	0.93	1.11	0.94	1.10	1.40	1.24	1.01	1.37	1.16		1.24	1.17	1.19	0.34	1.19				
Sulphate	mg/L	500 AO	166	232	241	218	206	223	211	193	199	199	193	190	196		190	210	200	83	180				
Hardness	mg/L	80-100 OG	<b>137</b>	<b>145</b>	<b>135</b>	<b>125</b>	<b>117</b>	<b>115</b>	<b>109</b>	<b>112</b>	99.9	99.5	<b>115</b>	91.5	<b>112</b>		<b>102</b>	<b>108</b>	<b>138</b>	<b>151</b>	<b>108</b>				
Nitrate	mg/L	10 MAC	<0.10	<0.05	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	<0.05	<0.05	0.07	<0.05	<0.05		< 0.06	< 0.06	< 0.06	< 0.06	< 0.06				
Nitrite	mg/L	1 MAC	<0.10	<0.05	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05		< 0.03	< 0.03	< 0.03	< 0.03	< 0.03				
Organic Nitrogen	mg/L	0.15 OG	<b>0.28</b>	0.12	<b>0.26</b>	<0.10	<0.10	0.14	<0.10	<b>0.22</b>	0.12	<b>0.18</b>	0.15	<b>0.28</b>	0.14		< <b>0.5</b>	0.08	<b>0.19</b>	0.10	0.11				
Orthophosphate	mg/L		<0.20	<0.10	<0.10	<0.20	<0.20	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10						0.06				
pH	pH Units	6.5-8.5 OG	8.21	7.80	7.99	7.72	7.88	8.04	7.72	7.82	7.87	7.22	7.73	8.16	8.04		8.24	8.04	8.14	8.37	8.03				
Electrical Conductivity	µS/cm		752	763	758	726	688	768	764	748	599	575	655	618	646		635	656	629	638	648				
Total Ammonia	mg/L		0.08	0.14	0.06	0.13	0.04	0.10	0.08	<0.02	0.05	0.02	<0.02	0.02	<0.02		0.05	0.04	< 0.04	< 0.04	< 0.04				
Total Dissolved Solids	mg/L	500 AO	392	444	468	456	422	412	408	402	396	418	402	424	388		429	414	414	409	429				
Total Kjeldahl Nitrogen (TKN)	mg/L		0.36	0.26	0.32	0.20	<0.10	0.24	0.12	0.22	0.17	0.20	0.15	0.3	0.14		< 0.05	0.12	0.20	0.10	0.13				
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		< 0.03	< 0.03	0.10	< 0.03	< 0.003				
<b>Metals</b>																									
Aluminum	mg/L	0.1 OG	0.008	0.011	0.007	0.010	0.008	0.016	0.009	0.019	0.013	0.029	0.078	0.041	0.027		0.011	0.018	<b>0.335</b>	0.003	0.011				
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		0.0004	0.0007	0.0006	0.0006	0.0006				
Barium	mg/L	1 MAC	0.077	0.064	0.059	0.059	0.047	0.044	0.046	0.043	0.035	0.033	0.037	0.036	0.04		0.0416	0.042	0.0446	0.0306	0.0373				
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		< 0.000007	0.000022	0.000012	< 0.000007	< 0.000007				
Bismuth	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	<0.002		< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001				
Boron	mg/L	5 IMAC <sup>(5)</sup>	0.213	0.213	0.229	0.231	0.241	0.224	0.222	0.233	0.282	0.216	0.245	0.23	0.215		0.243	0.217	0.181	0.138	0.215				
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		0.000003	0.000015	0.000006	0.000009	0.000004				
Calcium	mg/L		20.9	25.0	23.3	21.4	20.2	19.7	18.8	19.0	17.1	17.6	19.4	13.9	20.5		17.5	19.6	28.8	26.1	18.2				
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		0.00021	0.00019	0.00195	0.00038	0.00012				
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		0.00007	0.000052	0.000426	0.00003	0.000056				
Copper	mg/L	1 AO	<0.003	0.054	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.004	<0.003	<0.003		0.0004	0.0013	0.0034	0.001	0.0028				
Iron	mg/L	0.3 AO	<0.010	0.013	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	0.014	0.026	0.061	0.03	<0.010		0.02	0.032	<b>0.705</b>	< 0.007	0.012				
Lead	mg/L	0.01 MAC	<0.002	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		< 0.00009	< 0.00009	0.00035	< 0.00009	< 0.00009				
Magnesium	mg/L		20.5	20.1	18.7	17.3	16.2	16.0	15.1	15.7	13.9	13.5	16.1	13.8	14.8		14.1	14.2	16.1	20.8	15.3				
Manganese	mg/L	0.05 AO	<b>0.053</b>	<b>0.051</b>	0.045	0.045	0.023	0.028	0.023	0.013	0.019	0.008	0.007	0.011	0.034		0.0196	0.00854	0.0367	0.00196	0.00869				
Molybdenum	mg/L		0.014	0.017	0.016	0.016	0.016	0.015	0.016	0.015	0.015	0.014	0.016	0.016	0.016		0.0168	0.0166	0.0167	0.0134	0.0151				
Nickel	mg/L		0.004	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.006	<0.003	0.024	<0.003	<0.003	<0.003		0.0015	0.0013	0.0029	0.0004	0.0014				
Potassium	mg/L		5.43	6.11	5.66	5.74	5.50	5.46	5.63	6.40	4.9	4.82	5.66	5.21	5.44		5.13	5.4	5.75	6.16	5.77				
Selenium	mg/L		<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004		< 0.00004	0.00017	< 0.00004	< 0.00004	0.00004				
Silicon	mg/L		3.4	2.48	3.25	2.68	3.77	2.22	3.21	2.42	3.66	3.22	3.72	1.7	1.98		2.32	3.73	3.5	4.3	3.24				
Silver	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	<0.002		< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005				
Sodium	mg/L	200 AO	84	104	99.3	106	96.7	99.4	103	102	90.3	92.6	107	87.4	93.9		92.5	91.7	93.2	61.7	103				
Strontium	mg/L		1.99	1.03	1.07	0.984	0.833	0.825	0.82	0.72	0.75	0.659	0.774	0.746	0.762		0.686	0.679	0.760	0.544	0.746				
Sulphur	mg/L		52.6	72.2	71.1	74.5	70.2	69.1	68.4	65.9	61.4	65.3	61.8	59.8	74.4		67	70	68	28	72				
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006		< 0.000005	0.000011	< 0.000005	0.000009	0.000008				
Tin	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	<0.002		0.00014	0.00015	0.00019	0.00006	0.00009				
Titanium	mg/L		<0.002	0.004	0.003	0.003	0.005	0.002	0.003	<0.002	<0.002	<0.002	0.011	<0.002	<0.002		0.00057	0.00081	0.0162	0.00012	0.00045				
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		0.000779	0.00131	0.000929	0.00159	0.0011				
Vanadium	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	<0.002		0.00034	0.00108	0.00155	0.00057	0.00101				
Zinc	mg/L	5 AO	<0.005	0.080	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		< 0.002	0.004	0.004	< 0.002	< 0.002				

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by bold entries.

Groundwater Geochemical Results OW-25-I

Parameters	Units	ODWS <sup>(1)</sup>	2014			2015			2016			2017			2018		
			June	July	Sep	May	July	Sep	May	July	Sep	May	July	Sep	May	July	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	230	227	223	221	231	225	234	235	239	236	243	239	252	222	211
Chloride	mg/L	250 AO <sup>(3)</sup>	1.68	1.27	1.32	1.27	1.48	1.32	1.43	1.23	1.22	1.41	1.21	1.26	1.21	1.24	1.04
Dissolved Organic Carbon	mg/L	5 AO	2.5	2.5	2.4	2.7	3.2	2.8	2.7	3.1	2.4	2.5	3.0	3.0	2.7	2.3	2.6
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.54	0.55	0.59	0.60	0.46	0.60	0.16	0.58	0.53	0.51	0.56	0.52	0.52	0.59	0.53
Sulphate	mg/L	500 AO	5.3	0.89	1.38	0.90	6.11	1.24	2.53	1.42	0.77	2.62	1.88	0.82	2.25	2.33	0.90
Hardness	mg/L	80-100 OG	<b>164</b>	<b>181</b>	<b>165</b>	<b>163</b>	<b>177</b>	<b>166</b>	<b>161</b>	<b>159</b>	<b>160</b>	<b>153</b>	<b>157</b>	<b>166</b>	<b>167</b>	<b>166</b>	<b>168</b>
Nitrate	mg/L	10 MAC	0.16	<0.05	<0.10	<0.05	<0.10	<0.05	<0.10	<0.05	<0.05	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrite	mg/L	1 MAC	<0.05	<0.05	<0.10	<0.05	<0.10	<0.05	<0.10	<0.05	<0.05	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05
Organic Nitrogen	mg/L	0.15 OG	<b>0.44</b>	<0.10	<b>0.18</b>	<b>0.17</b>	<b>0.39</b>	<b>0.21</b>	<0.10	<b>0.21</b>	<b>0.16</b>	<b>0.17</b>	<0.10	<b>0.23</b>	<b>0.25</b>	<0.10	<b>0.19</b>
Orthophosphate	mg/L		<0.10	<0.10	<0.20	0.55	<0.20	<0.10	<0.20	<0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10
pH	pH Units	6.5-8.5 OG	8.32	8.19	8.06	8.39	8.15	8.13	8.08	8.17	8.33	8.23	8.34	8.18	7.92	7.96	7.8
Electrical Conductivity	µS/cm		433	432	444	432	454	438	414	444	449	422	427	449	429	432	418
Total Ammonia	mg/L		0.33	0.39	0.34	0.31	0.22	0.33	0.30	0.31	0.36	0.22	0.33	0.30	0.35	0.34	0.34
Total Dissolved Solids	mg/L	500 AO	240	246	228	220	240	230	224	228	224	220	232	220	222	224	286
Total Kjeldahl Nitrogen (TKN)	mg/L		0.77	0.46	0.52	0.48	0.61	0.54	0.39	0.52	0.52	0.39	0.38	0.53	0.60	0.37	0.53
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	<0.004	<0.004	<0.004	0.005	<0.004	0.007	<b>0.236</b>	0.016	<0.004	0.005	0.007	0.005	<0.004	0.012
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.04	0.036	0.034	0.040	0.041	0.040	0.040	0.043	0.042	0.041	0.04	0.045	0.043	0.040	0.041
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	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	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.136	0.131	0.123	0.113	0.127	0.130	0.141	0.127	0.127	0.118	0.131	0.142	0.128	0.132	0.139
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		34.5	39.8	34.9	34.8	39.0	35.7	33.4	33.8	35.2	32.0	32.5	36.6	36.0	35.7	36.7
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	0.102	0.17	0.163	0.157	0.151	0.137	0.141	0.283	0.137	0.081	0.162	0.142	<0.010	0.124	0.146
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Magnesium	mg/L		19.0	19.8	18.8	18.4	19.3	18.6	18.8	18.1	17.6	17.8	18.3	18.0	18.7	18.7	18.5
Manganese	mg/L	0.05 AO	0.007	0.011	0.011	0.009	0.024	0.012	0.012	0.015	0.011	0.011	0.014	0.011	0.011	0.010	0.014
Molybdenum	mg/L		0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	0.003	0.002	<0.002	0.002	<0.002	<0.002
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		3.94	4.32	4.01	3.92	3.87	4.01	3.81	3.85	3.84	3.67	3.46	3.45	3.69	3.51	3.61
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		7.56	7.43	7.37	6.94	6.35	7.43	7.25	8.53	7.45	7.69	7.99	7.45	5.48	8.92	6.56
Silver	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	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	33.1	29.3	29.2	29.1	27.5	29.4	32.5	30.0	27.9	29.5	27.5	24.8	28.8	27.6	27.3
Strontium	mg/L		0.745	0.744	0.657	0.654	0.730	0.722	0.732	0.728	0.77	0.764	0.751	0.737	0.714	0.709	0.802
Sulphur	mg/L		1.28	0.9	1.88	0.55	0.54	0.83	0.77	1.32	1.14	1.01	1.14	0.86	0.76	1.63	1.20
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	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	<0.002	<0.002	<0.002
Titanium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.010	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	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	<0.002	<0.002	<0.002
Zinc	mg/L	5 AO	0.005	<0.005	<0.005	0.006	<0.005	0.007	0.006	<0.005	<0.005	<0.005	0.009	<0.005	<0.005	<0.005	<0.005

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-25-I

Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	234	217	223	234	233	248	235	No sample obtained	232	245	223	230	232	231	233
Chloride	mg/L	250 AO <sup>(3)</sup>	1.11	1.44	1.13	1.57	1.34	1.30	1.26		1.06	2	< 1	< 1	< 1	< 1	< 1
Dissolved Organic Carbon	mg/L	5 AO	3.0	3.1	2.2	2.7	3.0	3.1	2.8		3.4	3.5	3.0	3.0	4.0	2.7	3.0
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.50	0.60	0.57	0.64	0.66	0.62	0.54		0.57	0.69	0.61	0.59	0.66	0.67	0.65
Sulphate	mg/L	500 AO	1.53	2.64	1.31	5.63	0.74	2.46	1.24		1.80	10	< 2	2	3	< 2	< 2
Hardness	mg/L	80-100 OG	<b>167</b>	<b>169</b>	<b>156</b>	<b>163</b>	<b>147</b>	<b>153</b>	<b>155</b>		<b>158</b>	<b>183</b>	<b>159</b>	<b>162</b>	<b>173</b>	<b>168</b>	<b>185</b>
Nitrate	mg/L	10 MAC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	0.27	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Nitrite	mg/L	1 MAC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Organic Nitrogen	mg/L	0.15 OG	<b>0.16</b>	<b>0.25</b>	<b>0.37</b>	<b>0.33</b>	0.15	<b>0.24</b>	<b>0.18</b>		<b>0.55</b>	< 0.5	< 0.5	< 0.05	0.15	<b>0.30</b>	0.05
Orthophosphate	mg/L		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		<0.10						0.06
pH	pH Units	6.5-8.5 OG	7.83	7.86	7.70	7.76	8.01	7.60	7.87		8.05	8.24	8.28	8.15	8.22	8.14	8.22
Electrical Conductivity	µS/cm		414	463	468	492	380	370	422		427	426	426	418	426	421	424
Total Ammonia	mg/L		0.16	0.29	0.36	0.14	0.32	0.27	0.29		<0.02	0.29	0.38	0.38	0.33	0.39	0.35
Total Dissolved Solids	mg/L	500 AO	226	220	232	248	230	230	220		222	246	246	234	263	232	246
Total Kjeldahl Nitrogen (TKN)	mg/L		0.32	0.54	0.73	0.47	0.47	0.51	0.47		0.55	< 0.5	0.41	0.42	0.48	0.69	0.40
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	0.086	<0.050	0.071	0.146		0.067	0.03	< 0.03	< 0.03	0.07	< 0.03	0.03
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	0.004	0.009	0.011	0.017	0.025	0.012		0.008	0.001	0.002	0.010	< 0.001	0.002	0.001
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		<0.003	0.0002	< 0.0002	< 0.0002	0.0002	< 0.0002	< 0.0002
Barium	mg/L	1 MAC	0.040	0.039	0.040	0.040	0.033	0.034	0.035		0.042	0.046	0.041	0.0394	0.0395	0.0384	0.0381
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.142	0.147	0.145	0.145	0.189	0.148	0.143		0.145	0.207	0.129	0.165	0.140	0.125	0.138
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	< 0.000003	< 0.000003	0.000008	< 0.000003	< 0.000003	< 0.000003
Calcium	mg/L		36.6	36.3	33.9	34.7	31.9	33.2	32.9		33.1	43	35.1	36.2	39.5	36.4	39.8
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		<0.003	0.00026	0.00015	0.00033	0.00013	0.00024	0.00013
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	0.000033	0.000034	0.000028	0.000018	0.000022	0.000014
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.007		<0.003	0.0005	0.0017	0.0002	0.0005	0.0006	0.0021
Iron	mg/L	0.3 AO	0.046	<0.010	0.069	0.113	0.112	0.177	0.179		0.106	0.160	0.158	0.167	0.206	0.128	0.190
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	< 0.00009	0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Magnesium	mg/L		18.4	19.1	17.3	18.5	16.3	17.0	17.7		18.4	18.4	17.3	17.3	18.1	18.6	20.8
Manganese	mg/L	0.05 AO	0.012	0.020	0.016	0.014	0.016	0.019	0.009		0.011	0.0122	0.0119	0.0126	0.0113	0.0120	0.0116
Molybdenum	mg/L		0.002	0.002	0.002	0.003	<0.002	0.003	<0.002		<0.002	0.00269	0.00096	0.00239	0.00311	0.00185	0.00201
Nickel	mg/L		<0.003	<0.003	<0.003	0.006	<0.003	<0.003	<0.003		<0.003	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	0.0004
Potassium	mg/L		3.79	3.72	3.60	3.14	3.07	3.34	3.28		3.50	4.34	3.42	3.46	3.99	3.75	4.13
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	0.005	<0.004	<0.004	<0.004		<0.004	< 0.00004	< 0.00004	0.0002	< 0.00004	< 0.00004	< 0.00004
Silicon	mg/L		7.57	6.93	7.38	7.72	8.16	7.11	6.21		8.20	9.98	8.72	8.48	7.79	8.12	7.55
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	200 AO	28.7	31.2	28.5	28.0	24.6	28.6	25.7		27.0	29.4	25.7	25.5	31.9	28.4	33.0
Strontium	mg/L		0.733	0.74	0.738	0.751	0.728	0.705	0.587		0.798	0.828	0.656	0.703	0.825	0.788	0.876
Sulphur	mg/L		1.57	1.83	1.31	1.61	0.74	2.47	1.31		1.23	5	< 1	< 1	< 3	< 3	< 3
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006		<0.006	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	< 0.00006	< 0.00006	0.0001	< 0.00006	0.00011	< 0.00006
Titanium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.01		<0.002	0.00012	0.00009	0.00043	< 0.00007	0.00013	0.00009
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	0.000038	0.000015	0.000043	0.000039	0.000037	0.00004
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	0.00014	0.00006	0.00009	0.00006	0.00015	0.00007
Zinc	mg/L	5 AO	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		0.011	< 0.002	< 0.002	0.003	< 0.002	< 0.002	0.002

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-25-II

Parameters	Units	ODWS <sup>(1)</sup>	2014			2015			2016			2017			2018		
			June	July	Sep	May	July	Sep	May	July	Sep	May	July	Sep	May	July	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	152	142	139	145	147	143	155	152	142	155	160	156	169	143	137
Chloride	mg/L	250 AO <sup>(3)</sup>	11.2	10.4	10.8	8.82	10.2	9.64	9.87	8.69	8.31	7.16	7.92	7.7	7.48	6.87	6.26
Dissolved Organic Carbon	mg/L	5 AO	1.4	1.1	1.3	1.5	<b>5.3</b>	1.5	1.5	1.6	1.2	1.0	1.7	1.7	1.9	1.8	2.2
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	1.00	0.43	0.96	1.16	0.65	1.11	0.29	0.9	1.0	0.62	1.09	0.96	1.30	0.61	0.90
Sulphate	mg/L	500 AO	232	230	212	218	237	223	257	236	210	213	214	199	211	212	196
Hardness	mg/L	80-100 OG	<b>141</b>	<b>149</b>	<b>135</b>	<b>141</b>	<b>145</b>	<b>142</b>	<b>137</b>	<b>129</b>	<b>124</b>	<b>128</b>	<b>125</b>	<b>119</b>	<b>125</b>	<b>128</b>	<b>124</b>
Nitrate	mg/L	10 MAC	0.25	<0.25	0.27	<0.25	<0.25	0.35	<0.25	0.19	<0.25	<0.25	0.13	0.14	0.16	<0.25	0.11
Nitrite	mg/L	1 MAC	<0.05	<0.25	<0.10	<0.25	<0.25	<0.25	<0.25	<0.10	<0.25	<0.25	<0.05	<0.10	<0.05	<0.25	<0.10
Organic Nitrogen	mg/L	0.15 OG	<b>0.38</b>	<0.10	<b>0.20</b>	<b>0.32</b>	<b>0.86</b>	<b>0.33</b>	<0.10	<b>0.25</b>	<0.10	<0.10	<0.10	<b>0.26</b>	<b>0.37</b>	<b>0.16</b>	<b>0.18</b>
Orthophosphate	mg/L		<0.10	<0.50	<0.20	<0.50	<0.50	<0.50	<0.50	<0.20	<0.50	<0.50	<0.10	<0.20	<0.10	<0.50	<0.20
pH	pH Units	6.5-8.5 OG	8.29	8.26	8.29	8.33	8.04	8.13	8.14	8.21	8.37	8.17	8.17	8.08	7.76	7.89	7.75
Electrical Conductivity	µS/cm		808	806	795	798	836	793	769	791	795	740	770	784	749	746	722
Total Ammonia	mg/L		0.06	0.05	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.10
Total Dissolved Solids	mg/L	500 AO	474	<b>514</b>	440	408	462	476	452	456	454	420	448	450	452	448	454
Total Kjeldahl Nitrogen (TKN)	mg/L		0.44	<0.10	0.23	0.32	0.86	0.33	<0.10	0.25	<0.10	<0.10	<0.10	0.26	0.37	0.16	0.28
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	0.009	0.008	0.005	0.024	<b>0.151</b>	0.006	0.026	<b>0.181</b>	0.011	0.016	0.009	0.011	<b>0.366</b>	0.005	0.013
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.019	0.02	0.021	0.024	0.023	0.025	0.027	0.023	0.027	0.023	0.023	0.024	0.024	0.023	0.025
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.010	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.18	0.192	0.195	0.204	0.176	0.198	0.226	0.196	0.198	0.193	0.218	0.219	0.134	0.186	0.214
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		26.6	28.1	25.4	26.3	27.1	27.1	25.2	24.2	23.8	23.8	23.1	22.4	23.5	23.7	23.3
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.052	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.010	<0.010	<0.010	<0.010	0.217	<0.010	<0.010	0.125	<0.010	<0.010	<0.010	<0.010	0.193	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.003	<0.001	<0.001
Magnesium	mg/L		18.2	19.2	17.5	18.2	18.7	18.1	17.9	16.6	15.8	16.7	16.4	15.2	16.1	16.6	16.0
Manganese	mg/L	0.05 AO	0.002	<0.002	<0.002	<0.002	0.010	<0.002	<0.002	0.005	<0.002	<0.002	<0.002	<0.002	0.016	<0.002	<0.002
Molybdenum	mg/L		0.066	0.079	0.072	0.067	0.068	0.063	0.058	0.059	0.06	0.061	0.061	0.063	0.031	0.049	0.053
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.013	<0.003	<0.003
Potassium	mg/L		8.08	8.55	8.37	8.37	8.11	8.5	8.12	8.65	8.10	7.99	7.27	6.67	6.87	6.87	7.46
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		2.89	3.11	3.17	3.24	2.79	3.2	3.06	3.65	3.06	3.2	3.36	3.6	2.42	3.22	2.75
Silver	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	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	116	117	116	115	110	115	122	118	110	108	103	97	95.7	98.9	104
Strontium	mg/L		0.552	0.595	0.521	0.55	0.595	0.559	0.540	0.538	0.566	0.571	0.562	0.537	0.348	0.507	0.531
Sulphur	mg/L		66.9	76.7	80.9	82	81.4	82	71.7	67.9	65.9	72.7	67.4	65.6	45.0	64.4	68.8
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	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	<0.002	<0.002	<0.002
Titanium	mg/L		0.002	<0.002	<0.002	0.005	0.011	0.004	0.004	0.011	0.003	0.003	0.005	<0.002	0.007	0.002	0.003
Uranium	mg/L	0.02 MAC	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.004	0.003	0.004	0.004
Vanadium	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	<0.002	<0.002	<0.002
Zinc	mg/L	5 AO	0.005	0.010	0.005	<0.005	0.005	<0.005	0.009	<0.005	<0.005	0.006	0.008	0.005	0.078	<0.005	<0.005

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-25-II

Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	158	141	144	154	157	178	157	158	151	158	148	154	150	151	155
Chloride	mg/L	250 AO <sup>(3)</sup>	5.93	6.54	5.80	5.90	7.33	6.26	5.57	6.08	5.75	7	6	7	6	7	7
Dissolved Organic Carbon	mg/L	5 AO	1.6	1.4	1.2	1.5	2.0	1.7	2.6	1.5	2.2	1.8	1.0	1.0	1	1.4	1
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.91	1.03	0.58	0.90	1.16	0.97	0.92	0.94	1.10	1.17	1.07	1.13	1.1	1.18	1.19
Sulphate	mg/L	500 AO	199	218	203	202	198	196	192	199	193	220	200	200	200	200	180
Hardness	mg/L	80-100 OG	<b>123</b>	<b>127</b>	<b>117</b>	<b>129</b>	<b>114</b>	<b>109</b>	<b>127</b>	<b>122</b>	<b>115</b>	<b>132</b>	<b>120</b>	<b>121</b>	<b>126</b>	<b>119</b>	<b>122</b>
Nitrate	mg/L	10 MAC	0.12	<0.10	<0.25	<0.25	<0.10	0.10	0.11	0.13	0.09	0.11	0.13	0.13	0.12	0.14	0.16
Nitrite	mg/L	1 MAC	<0.10	<0.10	<0.25	<0.25	<0.10	<0.10	<0.05	<0.05	<0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Organic Nitrogen	mg/L	0.15 OG	<0.10	<0.10	<0.10	<b>0.20</b>	0.11	0.14	<b>0.16</b>	<0.10	<b>0.17</b>	< 0.5	< 0.5	< 0.05	<b>0.19</b>	< 0.05	0.09
Orthophosphate	mg/L		<0.20	<0.20	<0.50	<0.50	<0.20	<0.20	<0.10	<0.10	<0.10						< 0.03
pH	pH Units	6.5-8.5 OG	7.97	8.03	7.64	7.69	7.89	7.30	7.82	8.05	8.05	8.08	8.25	8.18	8.19	8.3	8.12
Electrical Conductivity	µS/cm		716	795	810	803	645	626	713	727	705	694	704	721	703	703	703
Total Ammonia	mg/L		<0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
Total Dissolved Solids	mg/L	500 AO	440	416	420	430	418	452	416	432	412	420	443	449	466	477	420
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.10	0.12	<0.10	0.20	0.11	0.14	0.16	<0.10	0.17	< 0.5	< 0.05	0.06	0.20	< 0.05	0.10
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.050	<0.050	<0.050	0.136	<0.050	<0.050	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.003
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	0.008	0.006	0.007	0.027	0.017	0.031	0.064	<b>0.124</b>	0.017	0.013	0.006	0.019	0.004	0.005	0.005
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0015	0.0016	0.0017	0.0017	0.0026	0.0020
Barium	mg/L	1 MAC	0.025	0.024	0.027	0.026	0.022	0.021	0.025	0.027	0.023	0.0284	0.0276	0.0274	0.0250	0.0226	0.0231
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.220	0.220	0.197	0.211	0.263	0.211	0.212	0.208	0.208	0.315	0.220	0.229	0.179	0.189	0.208
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000021	0.000012	0.000014	0.000017	0.000023	0.000013
Calcium	mg/L		23.2	23.8	22.1	23.9	21.0	20.4	23.2	22.6	21.1	27.3	22.9	23.5	26.0	22.4	22.2
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.00046	0.00035	0.00046	0.00036	0.00047	0.00024
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00003	0.000029	0.000031	0.00002	0.000014	0.000016
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.013	<0.003	<0.003	0.0012	0.0007	0.001	0.0010	0.0013	0.0034
Iron	mg/L	0.3 AO	<0.010	<0.010	<0.010	0.02	0.021	0.017	0.022	0.196	<0.10	0.011	0.008	0.024	< 0.007	< 0.007	< 0.007
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Magnesium	mg/L		15.8	16.5	15.1	16.9	15.0	14.2	16.7	16.0	15.1	15.5	15.2	15.2	14.9	15.2	16.1
Manganese	mg/L	0.05 AO	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.005	0.011	<0.002	0.00101	0.00052	0.00125	0.00092	0.00028	0.00027
Molybdenum	mg/L		0.048	0.050	0.048	0.046	0.057	0.041	0.042	0.046	0.044	0.0326	0.0404	0.0404	0.0374	0.0370	0.0375
Nickel	mg/L		<0.003	<0.003	<0.003	0.013	<0.003	0.009	<0.003	<0.003	<0.003	0.0005	0.0005	0.0005	0.0005	0.0005	0.0008
Potassium	mg/L		7.04	7.26	7.54	8.06	6.56	6.64	7.35	7.01	7.23	8.81	7.06	7.34	7.72	7.34	7.96
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.00053	0.00055	0.00045	0.00051	0.00055	0.00041
Silicon	mg/L		3.68	2.10	3.14	2.96	3.50	3.0	3.14	3.28	2.7	4.19	3.08	3.49	3.12	3.27	3.01
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	200 AO	99.0	105	105	106.0	97.4	97.9	105	103	103	101	99.4	101	103	101	112
Strontium	mg/L		0.548	0.557	0.536	0.538	0.606	0.482	0.537	0.506	0.506	0.575	0.506	0.532	0.572	0.556	0.590
Sulphur	mg/L		67.7	69.1	66.3	66.2	62.4	62.5	63.7	64	59.4	85	67	67	68	70	71
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.000006	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00006	0.00007	0.00015	< 0.00006	0.00012	0.00007
Titanium	mg/L		0.004	0.003	0.003	<0.002	<0.002	0.002	0.008	0.003	<0.002	0.00034	0.00023	0.00082	0.0001	0.00014	0.00008
Uranium	mg/L	0.02 MAC	0.005	0.003	0.004	0.004	0.004	0.003	0.004	0.005	0.004	0.00359	0.00472	0.00438	0.00439	0.00498	0.0049
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	0.002	<0.002	0.002	0.002	<0.002	0.00196	0.00177	0.00217	0.00179	0.00211	0.00204
Zinc	mg/L	5 AO	<0.005	<0.005	0.009	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	< 0.002	< 0.002	0.004	0.003	0.002	0.003

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.



Groundwater Geochemical Results OW-25-III

Parameters	Units	ODWS <sup>(1)</sup>	2014			2015			2016			2017			2018		
			June	July	Sep	May	July	Sep	May	July	Sep	May	July	Sep	May	July	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	356	364	348	307	332	314	340	364	Insufficient	378	347	353	352	No data	298
Chloride	mg/L	250 AO <sup>(3)</sup>	1.79	1.63	2.02	1.36	1.03	1.33	1.26	1.28	volume	2.03	0.77	2.47	1.60	available	1.84
Dissolved Organic Carbon	mg/L	5 AO	1.0	1.0	1.1	1.0	1.5	1.2	1.3	1.3	to sample	1.1	1.4	1.9	1.5		1.7
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.54	0.51	1.24	1.14	0.66	0.81	<0.25	0.59		1.04	1.31	1.02	1.24		0.92
Sulphate	mg/L	500 AO	132	140	161	130	96.6	116	93.9	127		76.3	125	242	137		112
Hardness	mg/L	80-100 OG	<b>403</b>	<b>432</b>	<b>417</b>	<b>341</b>	<b>364</b>	<b>365</b>	<b>328</b>	<b>361</b>		<b>305</b>	<b>334</b>	<b>477</b>	<b>373</b>		<b>378</b>
Nitrate	mg/L	10 MAC	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25		<0.25	<0.25	<0.25	<0.05		<0.10
Nitrite	mg/L	1 MAC	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25		<0.25	<0.25	<0.25	<0.05		<0.10
Organic Nitrogen	mg/L	0.15 OG	<b>0.61</b>	<0.10	<b>0.19</b>	<0.10	<b>0.23</b>	<b>0.16</b>	0.15	<b>0.41</b>		<0.10	<0.10	<b>0.24</b>	<b>0.19</b>		<0.10
Orthophosphate	mg/L		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50		<0.50	<0.50	<0.50	<0.10		<0.20
pH	pH Units	6.5-8.5 OG	8.22	8.15	8.01	8.15	8.20	8.15	8.22	8.17		8.35	8.26	8.26	8.09		7.99
Electrical Conductivity	µS/cm		865	900	950	818	792	779	720	856		710	838	1070	812		777
Total Ammonia	mg/L		0.07	0.08	0.04	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02	<0.02	<0.02		0.09
Total Dissolved Solids	mg/L	500 AO	<b>536</b>	<b>550</b>	<b>532</b>	450	432	418	426	472		394	<b>516</b>	<b>662</b>	492		<b>532</b>
Total Kjeldahl Nitrogen (TKN)	mg/L		0.68	0.14	0.23	<0.10	0.23	0.16	0.15	0.41		<0.10	<0.10	0.24	0.19		<0.10
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.16	<0.05		<0.05	<0.05	<0.05	<0.05		<0.05
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	<0.004	0.024	0.005	<0.004	0.010	<b>2.58</b>	0.008		0.018	0.004	0.010	0.006		0.011
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		<0.003	<0.003	<0.003	<0.003		<0.003
Barium	mg/L	1 MAC	0.039	0.037	0.036	0.031	0.036	0.042	0.077	0.036		0.042	0.045	0.047	0.042		0.047
Beryllium	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
Bismuth	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		<0.002
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.035	0.049	0.056	0.050	0.027	0.033	0.027	0.050		0.021	0.023	0.071	0.019		0.030
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002		<0.002
Calcium	mg/L		87.4	90.8	86.8	65.3	83.3	81.8	74.3	74.3		71.5	78.2	100	82.6		88.0
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.007	0.006		<0.003	<0.003	<0.003	<0.003		0.003
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.004	<0.001		<0.001	<0.001	0.002	<0.001		0.001
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.005	<0.003		<0.003	<0.003	<0.003	0.070		<0.003
Iron	mg/L	0.3 AO	<0.010	<0.010	0.018	<0.010	<0.010	<0.010	<b>1.96</b>	<0.010		<0.010	0.028	0.012	<0.010		<0.010
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.006	<0.002		<0.002	<0.002	<0.002	0.004		<0.001
Magnesium	mg/L		44.9	49.9	48.7	43.2	38.0	39.1	34.5	42.5		30.8	33.8	55.1	40.6		38.5
Manganese	mg/L	0.05 AO	<0.002	0.005	0.003	0.005	<0.002	<0.002	<b>0.288</b>	0.022		0.039	0.015	0.032	<0.002		0.026
Molybdenum	mg/L		0.007	0.011	0.009	0.008	0.007	0.008	0.003	0.009		0.008	0.008	0.011	0.007		0.008
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	0.004	0.005	<0.003		<0.003	<0.003	<0.003	<0.003		<0.003
Potassium	mg/L		5.21	6.89	6.95	5.56	4.89	5.36	3.61	6.39		3.17	4.66	7.06	4.03		5.51
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004		<0.004	<0.004	<0.004	<0.004		<0.004
Silicon	mg/L		4.96	4.69	4.86	4.42	4.89	6.29	7.20	5.31		5.18	6.37	4.96	3.79		5.11
Silver	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		<0.002
Sodium	mg/L	200 AO	34.8	36.1	36.5	34.8	29.7	32.4	36.3	33.2		32.2	31.0	31.5	25.1		25.3
Strontium	mg/L		2.22	2.77	3.06	2.54	1.76	1.57	1.41	2.69		1.97	1.56	3.9	1.56		1.88
Sulphur	mg/L		37.5	46.8	60.1	47.1	28.2	31.8	21.5	35.4		45.8	28.2	81.3	30.3		41.3
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006		<0.006	<0.006	<0.006	<0.006		<0.006
Tin	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		<0.002
Titanium	mg/L		<0.002	<0.002	<0.002	0.002	<0.002	0.002	0.027	0.002		0.002	0.002	0.002	<0.002		<0.002
Uranium	mg/L	0.02 MAC	0.005	0.004	0.004	0.003	0.004	0.005	0.004	0.004		0.005	0.005	0.006	0.006		0.004
Vanadium	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		<0.002
Zinc	mg/L	5 AO	<0.005	0.006	<0.005	<0.005	<0.005	0.012	0.013	0.006		<0.005	0.008	0.007	0.087		0.007

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-25-III

Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	383	348	294	364	397	411	349	379	353	342	361	311	348	402	347
Chloride	mg/L	250 AO <sup>(3)</sup>	2.06	2.54	3.01	2.83	2.78	2.28	1.97	2.1	1.2	1	< 1	< 1	< 1	< 1	< 1
Dissolved Organic Carbon	mg/L	5 AO	1.8	1.9	1.3	2.9	3.4	1.7	2.5	3.8	2.2	1	2	2	2.0	1.2	2.0
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.60	0.90	0.52	0.78	1.01	0.70	0.84	0.64	0.85	0.91	1.13	0.85	1.06	1.06	0.95
Sulphate	mg/L	500 AO	44.5	150	95.1	104	91.0	58.8	70.9	92.6	37.7	74	89	74	65	64	49
Hardness	mg/L	80-100 OG	<b>375</b>	<b>478</b>	<b>319</b>	<b>407</b>	<b>387</b>	<b>355</b>	<b>353</b>	<b>437</b>	<b>338</b>	<b>400</b>	<b>533</b>	<b>356</b>	<b>427</b>	<b>405</b>	<b>631</b>
Nitrate	mg/L	10 MAC	<0.10	<0.25	<0.25	<0.25	<0.10	<0.10	<0.05	<0.05	<0.05	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Nitrite	mg/L	1 MAC	<0.10	<0.25	<0.25	<0.25	<0.10	<0.10	<0.05	<0.05	<0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Organic Nitrogen	mg/L	0.15 OG	<0.10	<b>0.16</b>	<0.10	<b>0.22</b>	0.14	<b>0.17</b>	<b>0.21</b>	<0.10	0.15	<b>&lt; 0.5</b>	<b>&lt; 0.5</b>	<b>0.19</b>	< 0.05	0.09	0.13
Orthophosphate	mg/L		<0.20	<0.50	<0.50	<0.50	<0.20	<0.20	<0.10	<0.10	<0.10						< 0.03
pH	pH Units	6.5-8.5 OG	7.86	7.69	7.82	8.02	8.00	7.75	7.86	7.86	7.82	8.15	8.15	8.07	7.99	8.07	8.13
Electrical Conductivity	µS/cm		734	974	813	916	747	665	740	814	699	689	793	628	717	754	668
Total Ammonia	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	< 0.04	0.07	< 0.04	0.04	< 0.04	< 0.04
Total Dissolved Solids	mg/L	500 AO	398	<b>522</b>	410	476	486	454	414	468	384	431	491	369	471	480	391
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.10	0.16	<0.10	0.22	0.14	0.17	0.21	<0.10	0.15	< 0.5	< 0.05	0.18	< 0.05	0.10	0.14
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	0.10	<0.050	<0.050	<0.050	<0.050	<0.050	0.14	< 0.03	0.03	0.06	< 0.03	0.121
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	0.016	<0.004	0.008	0.019	0.016	0.019	<b>0.103</b>	<b>0.217</b>	0.021	0.038	<b>1.41</b>	0.018	0.001	0.002	<b>1.05</b>
Arsenic	mg/L	0.01 MAC	0.005	<0.003	<0.003	<0.003	0.004	<0.003	<0.003	<0.003	<0.003	0.0003	0.0017	0.0002	0.0009	0.0023	0.0014
Barium	mg/L	1 MAC	0.061	0.051	0.049	0.064	0.057	0.066	0.052	0.075	0.065	0.0763	0.0838	0.0854	0.0597	0.0744	0.0804
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.000007	0.000073	0.000022	< 0.000007	< 0.000007	0.000077
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.012	0.051	0.013	0.018	0.061	0.020	0.02	0.032	0.018	0.030	0.050	0.053	0.022	0.021	0.037
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00001	0.000025	0.000004	< 0.000003	< 0.000003	0.000045
Calcium	mg/L		91.5	104	80.3	95.8	90.5	88.4	79.7	100	82.5	104	126	86.3	104	96.6	151
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.00043	0.00675	0.00025	0.00009	0.00026	0.00535
Cobalt	mg/L		0.004	0.002	<0.001	0.008	0.005	0.001	0.004	0.005	0.002	0.00059	0.00721	0.000209	0.0048	0.00374	0.00742
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0015	0.0056	0.0006	0.0007	0.0004	0.0091
Iron	mg/L	0.3 AO	<b>2.57</b>	<0.010	<0.010	<b>2.5</b>	<b>2.3</b>	<b>0.324</b>	<b>0.736</b>	<b>1.35</b>	0.088	0.036	<b>2.88</b>	0.015	0.073	<b>1.22</b>	<b>2.50</b>
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.00009	0.00222	< 0.00009	< 0.00009	< 0.00009	0.00261
Magnesium	mg/L		35.6	52.9	28.8	40.8	39.2	32.7	37.4	45.5	32.1	33.8	52.9	34.1	40.6	39.7	61.5
Manganese	mg/L	0.05 AO	<b>0.296</b>	<b>0.060</b>	<0.002	<b>0.165</b>	<b>0.147</b>	<b>0.062</b>	<b>0.117</b>	<b>0.152</b>	<b>0.068</b>	0.00311	<b>0.208</b>	0.00244	<b>0.113</b>	<b>0.092</b>	<b>0.238</b>
Molybdenum	mg/L		0.006	0.009	0.008	0.007	0.008	0.005	0.005	0.006	0.005	0.00629	0.00539	0.00672	0.00535	0.00463	0.0047
Nickel	mg/L		<0.003	0.003	<0.003	0.004	<0.003	<0.003	<0.003	<0.003	<0.003	0.0016	0.0075	0.001	0.0026	0.0022	0.008
Potassium	mg/L		2.76	6.23	3.28	2.83	3.58	1.98	3.35	4.35	2.33	3.58	5	2.9	4.21	3.74	5.86
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	0.007	<0.004	0.015	<0.004	<0.004	0.0006	< 0.00004	0.00018	0.00008	0.00008	0.00006
Silicon	mg/L		8.13	4.34	5.67	6.05	7.95	6.97	5.34	6.78	7.56	6.14	9.41	7.2	6.52	7.82	7.38
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	200 AO	21.3	26.8	15.9	17.5	17.6	13.7	15.1	18	11.6	11.8	16.4	11.9	15.3	13.9	18.5
Strontium	mg/L		0.926	2.94	1.32	1.61	1.92	0.945	1.78	2.2	1.13	1.51	2.2	1.39	2.04	1.9	2.87
Sulphur	mg/L		11.2	51.6	24.3	25.8	25.0	17.2	26.9	30.1	11.5	31	27	18	23	18	27
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.000022	0.000037	0.000024	0.000011	< 0.000005	0.000027
Tin	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00006	< 0.00006	< 0.00006	< 0.00006	0.00009	< 0.00006
Titanium	mg/L		<0.002	0.002	<0.002	<0.002	<0.002	<0.002	0.007	0.011	<0.002	0.0012	0.0589	0.00081	< 0.00007	0.00019	0.03209
Uranium	mg/L	0.02 MAC	0.006	0.005	0.004	0.005	0.006	0.005	0.004	0.006	0.004	0.0042	0.0053	0.00534	0.00394	0.00456	0.00461
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00078	0.00435	0.00043	0.00039	0.00033	0.00346
Zinc	mg/L	5 AO	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.003	0.008	< 0.002	< 0.002	< 0.002	0.01

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-25-IV

Parameters	Units	ODWS <sup>(1)</sup>	2017	2018			2019			2020			2021			2022			2023		
			Sept	May	July	Oct	May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	229	206	179	174	189	184	179	183	190	209	195	189	188	201	182	177	DRY	DRY	181
Chloride	mg/L	250 AO <sup>(3)</sup>	10.4	12.0	8.94	8.00	7.89	8.03	6.96	7.20	8.09	7.28	7.81	7.41	7.03	14	8	10			9
Dissolved Organic Carbon	mg/L	5 AO	<b>6.0</b>	<b>5.4</b>	<b>7.5</b>	<b>5.7</b>	4.6	4.0	2.6	3.0	3.6	4.4	<b>5.2</b>	<b>5.8</b>	4.3	3.7	2	2			2
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.85	<b>1.52</b>	<b>1.82</b>	<b>1.70</b>	<b>1.72</b>	<b>2.01</b>	<b>1.72</b>	<b>1.81</b>	<b>2.06</b>	<b>1.80</b>	<b>1.77</b>	<b>1.67</b>	<b>1.85</b>	<b>1.78</b>	<b>1.79</b>	<b>1.83</b>			<b>1.84</b>
Sulphate	mg/L	500 AO	55.1	45.8	35.8	32.3	23.7	24.8	22.0	19.4	20.8	22.0	23.9	24.2	21.6	45	21	43			17
Hardness	mg/L	80-100 OG	<b>177</b>	92.4	<b>66.5</b>	<b>64.1</b>	<b>61.8</b>	<b>60.8</b>	<b>326</b>	<b>56.0</b>	<b>51.6</b>	<b>52.9</b>	<b>54.9</b>	<b>54.7</b>	<b>57.9</b>	<b>64.9</b>	<b>57.3</b>	<b>61.2</b>			62.7
Nitrate	mg/L	10 MAC	0.78	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.06	< 0.06	0.35			< 0.06
Nitrite	mg/L	1 MAC	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	< 0.03			< 0.03
Organic Nitrogen	mg/L	0.15 OG	<b>0.18</b>	<0.10	0.11	0.11	<0.10	<0.10	<0.10	<b>0.22</b>	0.12	<0.10	0.14	0.10	<b>0.18</b>	<b>&lt; 0.5</b>	<b>&lt; 0.5</b>	0.11			<b>0.20</b>
Orthophosphate	mg/L		<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10						< 0.03
pH	pH Units	6.5-8.5 OG	8.11	7.83	8.06	7.79	7.90	8.00	7.94	7.86	8.02	7.48	7.93	8.19	8.12	8.28	8.30	8.17			8.27
Electrical Conductivity	µS/cm		581	494	453	436	415	458	440	454	368	356	421	414	413	433	410	384			389
Total Ammonia	mg/L		0.06	0.06	0.05	0.10	0.03	0.04	0.05	<0.02	0.02	0.05	0.05	0.18	<0.02	0.09	0.09	0.09			0.04
Total Dissolved Solids	mg/L	500 AO	296	272	268	276	246	250	226	232	226	222	246	260	238	131	260	200			220
Total Kjeldahl Nitrogen (TKN)	mg/L		0.24	0.10	0.16	0.21	<0.10	0.13	0.13	0.22	0.14	0.13	0.19	0.28	0.18	< 0.5	0.14	0.20			0.24
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.39	< 0.03	< 0.03			< 0.003
<b>Metals</b>																					
Aluminum	mg/L	0.1 OG	0.010	0.009	0.016	0.015	<0.004	<0.004	0.012	0.009	0.028	0.017	<b>0.163</b>	0.048	<b>0.113</b>	0.006	0.032	<b>0.107</b>			0.003
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0004	0.0003	0.0003			0.0002
Barium	mg/L	1 MAC	0.040	0.027	0.022	0.021	0.016	0.015	0.015	0.012	0.011	0.012	0.020	0.017	0.018	0.0209	0.0205	0.0168			0.0138
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.000007	0.000012	0.00004			< 0.000007
Bismuth	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	<0.002	< 0.00001	< 0.00001	< 0.00001			< 0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.175	0.299	0.301	0.358	0.355	0.334	0.322	0.333	0.411	0.329	0.358	0.349	0.318	0.481	0.336	0.332			0.339
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000019	0.000007	0.000017			0.000013
Calcium	mg/L		41.4	20.8	14.6	14.0	13.6	13.3	69.1	12.1	10.9	11.2	11.7	11.9	12.6	14.9	12.3	13.5			13.3
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.00027	0.00022	0.00036			0.00009
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00004	0.000072	0.000154			0.000048
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.004	<0.003	<0.003	0.0018	0.0003	0.0008			0.0016
Iron	mg/L	0.3 AO	0.118	<0.010	<0.010	<0.010	<0.010	<0.010	0.037	0.037	0.091	0.119	0.254	0.083	<0.010	0.052	0.121	0.174			0.078
Lead	mg/L	0.01 MAC	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.00009	< 0.00009	0.00014			< 0.00009
Magnesium	mg/L		17.8	9.83	7.3	7.07	6.77	6.69	37.2	6.27	5.92	6.05	6.24	6.07	6.42	6.69	6.48	6.68			7.15
Manganese	mg/L	0.05 AO	0.042	0.012	0.026	0.018	0.013	0.023	0.019	0.016	0.020	0.020	0.023	0.023	0.021	0.0173	0.0148	0.0225			0.0095
Molybdenum	mg/L		0.021	0.036	0.036	0.042	0.041	0.037	0.041	0.046	0.042	0.039	0.041	0.043	0.039	0.0351	0.0364	0.0402			0.0389
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0002	0.0003	0.0005			0.0003
Potassium	mg/L		2.57	2.98	2.71	2.70	2.89	2.61	5.76	2.82	2.3	2.41	2.48	2.57	2.57	3.09	2.55	2.64			2.95
Selenium	mg/L		<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.013	<0.004	<0.004	<0.004	<0.004	<0.004	< 0.00004	< 0.00004	0.00005			< 0.00004
Silicon	mg/L		3.82	3.10	4.31	3.83	5.02	3.58	4.32	4.42	4.76	3.95	5.26	4.30	4.03	5.76	5.02	4.99			4.11
Silver	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	<0.002	< 0.00005	< 0.00005	< 0.00005			< 0.00005
Sodium	mg/L	200 AO	41.5	69.5	70.2	74.5	67.5	70.0	14.4	69.3	63.8	68.0	64.9	70.8	69.6	70.3	68.3	66.4			76.3
Strontium	mg/L		0.685	0.516	0.474	0.491	0.445	0.445	0.438	0.422	0.452	0.416	0.468	0.581	0.470	0.497	0.43	0.427			0.498
Sulphur	mg/L		17.2	15.3	11.6	11.8	8.55	8.39	7.56	5.7	6.25	7.54	7.75	8.40	6.96	13	7	6			6
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	< 0.000005	< 0.000005	< 0.000005			< 0.000005
Tin	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	<0.002	0.00008	0.00007	0.00016			0.00015
Titanium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.003	<0.002	0.003	0.011	<0.002	0.003	0.00013	0.0011	0.00414			0.00008
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000229	0.000251	0.000175			0.000129
Vanadium	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	<0.002	0.00018	0.00013	0.00044			0.00005
Zinc	mg/L	5 AO	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.002	< 0.002	0.003			< 0.002

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-16-I

Parameters	Units	ODWS <sup>(1)</sup>	2014			2015			2016			2017			2018		
			June	July	Sep	May	July	Sep	May	July	Sep	May	July	Sep	May	July	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	285	276	278	310	290	304	327	323	315	336	327	326	375	298	329
Chloride	mg/L	250 AO <sup>(3)</sup>	7.64	6.85	5.97	6.69	5.90	5.33	7.89	5.72	5.82	6.49	5.03	4.45	6.45	5.28	5.02
Dissolved Organic Carbon	mg/L	5 AO	<b>7.6</b>	<b>9.4</b>	<b>9.4</b>	<b>8.9</b>	<b>9.4</b>	<b>8.8</b>	<b>9.4</b>	<b>10.7</b>	<b>8.4</b>	<b>9.3</b>	<b>11.0</b>	<b>14.4</b>	<b>10.0</b>	<b>13.1</b>	<b>11.4</b>
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	<b>1.54</b>	<b>1.54</b>	<b>1.64</b>	<b>1.65</b>	<b>1.62</b>	<b>1.93</b>	0.41	<b>1.98</b>	<b>1.66</b>	1.22	<b>1.64</b>	<b>1.56</b>	1.47	<b>1.70</b>	1.50
Sulphate	mg/L	500 AO	4.26	4.0	2.4	3.55	2.70	1.82	5.2	1.60	2.64	4.09	1.82	1.64	3.06	2.36	2.43
Hardness	mg/L	80-100 OG	<b>79</b>	82	82.3	81.7	84.1	<b>102</b>	81.9	<b>78.8</b>	<b>77.9</b>	<b>77.0</b>	<b>76.6</b>	<b>78.7</b>	<b>187</b>	<b>77.8</b>	80.9
Nitrate	mg/L	10 MAC	0.05	<0.10	<0.05	<0.05	<0.10	<0.25	<0.25	<0.05	<0.25	<0.10	<0.05	<0.10	<0.05	<0.05	<0.10
Nitrite	mg/L	1 MAC	<0.05	<0.10	<0.05	<0.05	<0.10	<0.25	<0.25	<0.05	<0.25	<0.10	<0.05	<0.10	<0.05	<0.05	<0.10
Organic Nitrogen	mg/L	0.15 OG	<b>1.47</b>	<b>0.49</b>	<b>1.04</b>	<b>0.71</b>	<b>0.78</b>	<b>0.80</b>	<b>0.75</b>	<b>1.39</b>	<b>0.68</b>	<b>1.0</b>	<b>0.46</b>	<b>2.96</b>	<b>0.48</b>	<b>2.68</b>	<b>1.04</b>
Orthophosphate	mg/L		<0.10	<0.20	<0.10	<0.10	<0.20	<0.50	<0.50	<0.10	<0.50	<0.20	<0.10	<0.20	<0.10	<0.10	<0.20
pH	pH Units	6.5-8.5 OG	8.49	8.45	8.16	8.26	8.19	8.12	8.12	8.32	8.28	8.22	8.39	8.21	8.05	8.11	7.93
Electrical Conductivity	µS/cm		549	592	543	600	570	592	573	606	616	585	590	606	598	587	577
Total Ammonia	mg/L		1.1	1.16	1.56	1.15	1.34	0.83	0.92	0.75	1.10	0.91	1.33	1.0	1.36	0.54	0.91
Total Dissolved Solids	mg/L	500 AO	378	492	404	400	388	364	386	410	380	400	392	368	444	362	346
Total Kjeldahl Nitrogen (TKN)	mg/L		2.57	1.65	2.6	1.86	2.12	1.63	1.67	2.14	1.78	1.91	1.79	3.96	1.84	3.22	1.95
Total Phosphorus	mg/L		0.07	0.07	<0.05	<0.05	0.05	<0.05	0.08	0.07	0.06	<0.05	0.05	0.07	0.06	<0.05	0.08
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	0.011	0.01	0.004	0.007	0.009	0.006	0.016	<b>0.334</b>	0.014	0.016	0.005	0.034	0.014	0.007	0.015
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.031	0.031	0.033	0.037	0.034	0.037	0.033	0.041	0.037	0.034	0.031	0.058	0.040	0.049	0.037
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	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	<0.002	<0.002	<0.002
Boron	mg/L	5 IMAC <sup>(5)</sup>	0.428	0.445	0.44	0.413	0.434	0.418	0.494	0.460	0.443	0.444	0.408	0.488	0.485	0.454	0.484
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		13.1	13.1	14	13.6	13.9	18.1	13.5	13.1	12.9	12.7	12.2	12.9	30.5	12.7	13.1
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	0.204	0.281	0.226	0.157	0.149	0.090	0.235	<b>0.554</b>	0.245	0.212	0.202	0.081	0.179	0.044	<b>0.404</b>
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Magnesium	mg/L		11.2	11.9	11.5	11.6	12.0	13.7	11.7	11.2	11.1	11.0	11.2	11.3	26.8	11.2	11.7
Manganese	mg/L	0.05 AO	0.018	0.015	0.017	0.021	0.022	0.018	0.017	0.030	0.017	0.017	0.016	0.013	0.015	0.016	0.017
Molybdenum	mg/L		0.016	0.013	0.009	0.013	0.01	0.008	0.014	0.010	0.011	0.013	0.009	0.009	0.012	0.011	0.008
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		4.41	4.77	4.42	4.44	4.52	5.94	4.74	4.90	4.62	4.53	4.2	4.09	7.14	4.08	4.55
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		7.62	6.86	6.86	7.41	6.25	6.96	7.26	8.92	7.47	7.56	7.67	7.27	5.19	8.43	7.60
Silver	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	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	108	109	106	108	106	109	117	112	108	107	99.3	90.7	62.3	97.8	103
Strontium	mg/L		0.53	0.497	0.499	0.491	0.553	0.507	0.514	0.539	0.578	0.55	0.55	0.546	0.445	0.551	0.50
Sulphur	mg/L		1.8	2.0	2.79	1.8	1.33	1.39	1.88	0.82	1.59	1.82	1.03	1.36	1.03	1.48	1.62
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	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	<0.002	<0.002	<0.002
Titanium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.014	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	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	<0.002	<0.002	<0.002
Zinc	mg/L	5 AO	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	0.009	<0.005	<0.005	0.005	<0.005	<0.005	<0.005

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-16-I

Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	338	317	308	332	440	351	331	318	333	355	331	338	307	389	325
Chloride	mg/L	250 AO <sup>(3)</sup>	4.97	5.06	4.12	4.81	5.44	4.91	5.8	5.07	8.01	8	8	9	7	9	9
Dissolved Organic Carbon	mg/L	5 AO	<b>12.1</b>	<b>11.3</b>	<b>8.0</b>	<b>12.6</b>	<b>9.3</b>	<b>11.1</b>	<b>10.2</b>	<b>10.0</b>	<b>9.7</b>	<b>9.2</b>	<b>8</b>	<b>8</b>	<b>10</b>	<b>9.8</b>	<b>7.0</b>
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	1.49	<b>1.65</b>	1.38	<b>1.67</b>	<b>1.99</b>	<b>1.73</b>	<b>1.67</b>	1.29	<b>1.55</b>	<b>1.59</b>	<b>1.59</b>	<b>1.59</b>	<b>1.59</b>	<b>1.55</b>	<b>1.56</b>
Sulphate	mg/L	500 AO	2.60	1.51	1.07	3.31	3.03	1.27	2.76	1.96	3.9	3	< 2	< 2	< 2	< 2	< 2
Hardness	mg/L	80-100 OG	82.8	80.7	81.3	86.4	<b>77.9</b>	83.6	<b>70.7</b>	92.5	<b>126</b>	92.4	84	85.7	91.0	86.7	90.1
Nitrate	mg/L	10 MAC	<0.05	0.11	<0.10	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Nitrite	mg/L	1 MAC	<0.05	<0.10	<0.10	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Organic Nitrogen	mg/L	0.15 OG	<b>1.31</b>	<b>1.13</b>	<b>1.04</b>	<b>1.75</b>	<b>0.83</b>	<b>0.89</b>	<b>1.1</b>	<b>0.8</b>	<b>1.08</b>	< <b>0.5</b>	< <b>0.5</b>	<b>0.48</b>	<b>0.25</b>	<b>0.37</b>	<b>0.60</b>
Orthophosphate	mg/L		<0.10	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10						0.23
pH	pH Units	6.5-8.5 OG	7.89	7.93	7.81	7.88	8.14	7.88	8.09	8.20	8.07	8.28	8.25	8.35	8.22	8.41	8.23
Electrical Conductivity	µS/cm		568	627	649	656	518	504	572	562	581	567	586	576	549	556	567
Total Ammonia	mg/L		0.46	0.65	0.70	0.34	0.81	0.78	1.13	1.35	0.77	1.22	1.39	1.39	1.31	1.37	1.74
Total Dissolved Solids	mg/L	500 AO	426	372	362	384	364	384	366	394	438	374	383	360	400	461	393
Total Kjeldahl Nitrogen (TKN)	mg/L		1.77	1.78	1.74	2.09	1.64	1.67	2.23	2.15	1.85	1.7	1.82	1.87	1.56	1.74	2.34
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.050	<0.050	0.127	0.071	0.114	0.198	0.11	0.04	0.12	0.17	0.28	0.12
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	0.006	0.009	0.009	0.016	0.018	0.029	0.034	0.062	<b>0.757</b>	0.011	<b>0.164</b>	0.004	0.005	0.003	0.016
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0002	0.0003	0.0002	0.0004	0.0004	0.0003
Barium	mg/L	1 MAC	0.051	0.031	0.033	0.051	0.033	0.030	0.043	0.035	0.043	0.0442	0.0430	0.0345	0.0421	0.0424	0.0363
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.000007	0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.492	0.487	0.476	0.539	0.586	0.483	0.614	0.484	0.510	0.715	0.492	0.466	0.400	0.411	0.468
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000003	0.000008	0.000007	< 0.000003	0.000009	0.000003
Calcium	mg/L		13.7	13.2	13.6	14.0	12.9	14.5	11.5	16.6	24.6	17.6	14.4	14.8	17.2	14.8	14.6
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.004	0.00067	0.00107	0.00058	0.00048	0.00053	0.00057
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00013	0.000263	0.000107	0.000124	0.000102	0.000112
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	0.0028	0.0007	< 0.0002	0.0009	0.0003	0.0011
Iron	mg/L	0.3 AO	<0.010	<0.010	0.190	0.112	<b>0.417</b>	<b>0.417</b>	0.232	<b>0.422</b>	<b>1.60</b>	0.207	<b>0.497</b>	<b>0.314</b>	0.122	0.224	0.069
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.00009	0.00014	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Magnesium	mg/L		11.8	11.6	11.5	12.5	11.1	11.5	10.2	12.4	15.8	11.8	11.7	11.8	11.7	12.1	13.0
Manganese	mg/L	0.05 AO	0.014	0.016	0.016	0.015	0.019	0.019	0.018	0.025	<b>0.064</b>	0.0199	0.0243	0.0167	0.0177	0.0188	0.0153
Molybdenum	mg/L		0.008	0.007	0.008	0.007	0.008	0.006	0.01	0.008	0.008	0.00808	0.00888	0.00816	0.00942	0.00907	0.00673
Nickel	mg/L		<0.003	<0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0002	0.0006	0.0002	0.0004	0.0002	0.0005
Potassium	mg/L		4.49	4.05	4.21	5.55	3.77	3.98	3.89	4.32	4.47	5.27	4.08	4.11	4.75	4.36	4.82
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.004	< 0.00004	0.00008	0.00019	0.00005	0.00009	0.00005
Silicon	mg/L		7.91	7.16	7.43	8.11	8.8	7.36	9.85	8.4	9.45	10.3	9.47	8.78	8.26	8.06	7.35
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	200 AO	98.9	99.2	103	104	94.3	96.7	93.2	93.6	102	100	99.4	101	104	99.5	113
Strontium	mg/L		0.545	0.590	0.581	0.549	0.583	0.558	0.55	0.609	0.588	0.623	0.531	0.585	0.577	0.579	0.653
Sulphur	mg/L		1.06	1.27	1.37	1.02	1.51	3.63	1.5	2.85	2.06	5	< 1	1	< 3	< 3	< 3
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00018	0.00017	0.0001	< 0.00006	0.00007	0.00014
Titanium	mg/L		<0.002	<0.002	<0.002	0.005	<0.002	0.003	<0.002	0.005	0.028	0.00111	0.00854	0.00088	0.00088	0.00083	0.00128
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000014	0.000025	0.000012	0.000044	0.000034	0.000028
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00078	0.00113	0.00053	0.00119	0.00078	0.00083
Zinc	mg/L	5 AO	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.008	<0.005	<0.005	< 0.002	0.004	0.008	< 0.002	< 0.002	< 0.002

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-16-II

Parameters	Units	ODWS <sup>(1)</sup>	2014			2015			2016			2017			2018		
			June	July	Sep	May	July	Sep	May	July	Sep	May	July	Sep	May	July	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	173	169	169	167	171	165	176	172	184	176	178	171	185	159	154
Chloride	mg/L	250 AO <sup>(3)</sup>	5.24	5.51	6.14	4.74	4.81	5.40	5.26	5.23	5.18	4.03	4.58	4.4	4.37	4.06	3.99
Dissolved Organic Carbon	mg/L	5 AO	1.6	1.1	1.3	1.4	2.4	1.7	1.4	1.8	1.1	1.4	1.7	1.9	1.5	1.9	1.9
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.77	<0.25	0.9	0.86	0.78	1.07	0.52	0.94	0.74	0.64	0.86	0.87	0.74	0.93	0.91
Sulphate	mg/L	500 AO	119	114	108	108	117	118	114	112	101	95.5	94.8	91.7	95.0	94.8	92.2
Hardness	mg/L	80-100 OG	<b>139</b>	<b>143</b>	<b>129</b>	<b>129</b>	<b>138</b>	<b>139</b>	<b>133</b>	<b>129</b>	<b>120</b>	<b>115</b>	<b>114</b>	<b>108</b>	<b>114</b>	<b>114</b>	<b>117</b>
Nitrate	mg/L	10 MAC	0.06	<0.25	<0.10	0.06	0.15	0.28	<0.10	0.15	<0.25	<0.10	0.10	0.06	0.09	0.10	0.12
Nitrite	mg/L	1 MAC	<0.05	<0.25	<0.10	<0.05	<0.10	<0.05	<0.10	<0.05	<0.25	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05
Organic Nitrogen	mg/L	0.15 OG	<b>0.30</b>	<0.10	<b>0.19</b>	<b>0.23</b>	<b>0.38</b>	<0.10	<0.10	<b>0.17</b>	<0.10	<0.10	<0.10	<b>0.20</b>	<b>0.18</b>	<0.10	<0.10
Orthophosphate	mg/L		<0.10	<0.50	<0.20	<0.10	<0.20	<0.10	<0.20	<0.10	<0.50	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10
pH	pH Units	6.5-8.5 OG	8.35	8.22	8.21	8.3	8.06	7.94	7.99	8.09	8.33	8.07	8.10	8.09	7.75	7.88	7.71
Electrical Conductivity	µS/cm		588	592	588	576	603	596	547	577	581	530	542	548	534	527	524
Total Ammonia	mg/L		0.09	0.04	0.02	<0.02	0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.06	0.04	0.06
Total Dissolved Solids	mg/L	500 AO	332	340	332	308	332	326	320	298	312	288	302	282	284	302	344
Total Kjeldahl Nitrogen (TKN)	mg/L		0.39	<0.10	0.21	0.23	0.4	<0.10	<0.10	0.17	<0.10	<0.10	<0.10	0.20	0.24	<0.10	<0.10
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	0.017	0.005	0.005	0.008	0.024	0.006	0.012	<b>0.112</b>	0.013	0.010	0.007	0.010	0.009	0.007	0.009
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.026	0.026	0.026	0.026	0.026	0.030	0.030	0.032	0.035	0.031	0.030	0.031	0.031	0.029	0.034
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	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	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.173	0.184	0.192	0.163	0.178	0.211	0.208	0.208	0.209	0.186	0.183	0.238	0.212	0.194	0.222
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		26.9	27.8	25.0	24.8	27.1	26.8	25.4	25.2	23.8	22.0	21.7	21.1	21.9	22.1	22.6
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	0.015	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.005	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.031	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Magnesium	mg/L		17.5	17.9	16.1	16.2	17.2	17.4	16.9	16.1	14.8	14.7	14.5	13.4	14.4	14.4	14.7
Manganese	mg/L	0.05 AO	<0.002	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Molybdenum	mg/L		0.031	0.034	0.031	0.028	0.027	0.028	0.030	0.029	0.030	0.029	0.030	0.029	0.026	0.024	0.025
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		7.88	8.12	8.08	7.58	7.80	8.34	7.61	8.27	8.12	7.35	7.2	6.62	6.40	6.72	7.47
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		3.03	3.1	3.17	3.04	2.53	3.39	2.90	3.70	3.24	3.03	3.33	3.31	2.65	3.55	3.30
Silver	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	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	71.3	71.2	71.3	69.7	68.5	70.0	73.0	69.2	69.6	66.7	62.9	59.7	60.3	61.9	66.3
Strontium	mg/L		0.565	0.55	0.517	0.495	0.593	0.602	0.541	0.536	0.578	0.528	0.522	0.508	0.475	0.487	0.504
Sulphur	mg/L		35.4	39.8	41	40	40.2	42.3	35.0	32.4	31.7	32.5	31.4	29.6	30.7	29.3	32.6
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	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	<0.002	<0.002	<0.002
Titanium	mg/L		<0.002	<0.002	<0.002	<0.002	0.002	0.003	<0.002	0.008	<0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002
Uranium	mg/L	0.02 MAC	0.003	0.003	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Vanadium	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	<0.002	<0.002	<0.002
Zinc	mg/L	5 AO	0.005	<0.005	<0.005	0.008	0.007	<0.005	<0.005	<0.005	<0.005	0.005	0.006	<0.005	0.007	<0.005	<0.005

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-16-II



Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	171	157	168	174	179	189	174	172	168	176	164	170	166	165	169
Chloride	mg/L	250 AO <sup>(3)</sup>	4.18	3.66	3.99	4.09	4.42	4.17	4.1	3.88	4.01	5	4	5	5	5	5
Dissolved Organic Carbon	mg/L	5 AO	1.6	1.3	1.4	3.6	2.3	1.5	1.5	3.0	2.5	1.2	1.0	1.0	2.0	4.6	1.0
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.80	0.90	0.91	0.97	1.06	0.88	0.92	0.90	0.96	0.98	0.97	0.97	1.00	1.02	1.03
Sulphate	mg/L	500 AO	89.5	90.3	88.4	82.1	82.0	86.0	84.9	83.7	90.6	90	88	82	82	89	81
Hardness	mg/L	80-100 OG	<b>137</b>	<b>107</b>	<b>110</b>	<b>108</b>	94	<b>104</b>	95.2	<b>104</b>	<b>110</b>	<b>124</b>	<b>102</b>	<b>103</b>	<b>119</b>	<b>110</b>	<b>111</b>
Nitrate	mg/L	10 MAC	0.11	0.05	0.30	0.10	0.07	0.15	0.09	0.10	0.11	0.12	0.22	0.08	0.09	0.15	0.11
Nitrite	mg/L	1 MAC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Organic Nitrogen	mg/L	0.15 OG	<0.10	<0.10	0.10	<b>0.29</b>	0.13	0.14	0.14	<b>0.23</b>	<b>4.38</b>	<0.5	<0.5	0.05	<0.05	<0.05	<b>0.20</b>
Orthophosphate	mg/L		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10						<0.03
pH	pH Units	6.5-8.5 OG	7.75	8.02	7.59	7.68	7.89	7.32	7.83	8.04	8.06	8.31	8.27	8.13	8.24	8.09	8.17
Electrical Conductivity	µS/cm		506	546	578	564	441	446	500	502	514	511	510	499	496	501	497
Total Ammonia	mg/L		<0.02	0.04	0.06	0.25	<0.02	<0.02	<0.02	0.1	<0.02	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Total Dissolved Solids	mg/L	500 AO	288	272	308	292	274	292	284	306	288	320	300	309	286	317	306
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.10	0.13	0.16	0.54	0.13	0.14	0.14	0.33	4.38	<0.5	0.1	0.05	<0.05	<0.05	0.22
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	0.065	<0.050	<0.050	<0.050	0.066	<0.050	0.04	<0.03	<0.03	<0.03	<0.03	<0.003
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	0.008	0.014	0.012	0.025	0.017	0.027	0.010	0.022	0.012	0.011	0.009	0.008	0.010	0.006	0.006
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	0.004	<0.003	<0.003	<0.003	<0.003	<0.003	0.001	0.0011	0.001	0.0011	0.0012	0.001
Barium	mg/L	1 MAC	0.032	0.028	0.033	0.032	0.024	0.027	0.032	0.027	0.033	0.0361	0.0322	0.0314	0.0301	0.0310	0.0300
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.000007	<0.000007	<0.000007	<0.000007	<0.000007	<0.000007
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.217	0.215	0.216	0.233	0.275	0.222	0.251	0.197	0.238	0.318	0.235	0.217	0.198	0.194	0.199
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000008	0.000007	0.000006	0.000015	0.000014	0.000007
Calcium	mg/L		26.4	20.5	21.3	20.1	17.7	20.0	18	19.7	21.0	26.1	19.7	20.5	24.7	21.5	21.1
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.00042	0.00041	0.00044	0.00036	0.00052	0.0002
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000042	0.000025	0.000022	0.000017	0.000012	0.000015
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.004	<0.003	<0.003	0.002	0.0057	0.0004	0.0024	0.0017	0.0043
Iron	mg/L	0.3 AO	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.053	<0.010	0.015	0.009	0.010	<0.007	<0.007	0.008
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009
Magnesium	mg/L		17.2	13.5	13.8	14.1	12.1	13.1	12.2	13.4	14	14.3	12.9	12.6	13.9	13.8	14.1
Manganese	mg/L	0.05 AO	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	0.006	<0.002	0.00029	0.00031	0.00037	0.00111	0.00017	0.00025
Molybdenum	mg/L		0.027	0.026	0.027	0.026	0.026	0.024	0.022	0.023	0.024	0.0217	0.0228	0.0226	0.0249	0.0210	0.0220
Nickel	mg/L		<0.003	<0.003	<0.003	0.005	<0.003	<0.003	<0.003	<0.003	<0.003	0.0004	0.0005	0.0003	0.0005	0.0004	0.0007
Potassium	mg/L		8.03	6.69	7.57	7.75	6.07	6.82	6.13	6.77	7.24	8.42	6.88	6.86	7.59	7.48	7.90
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.005	0.00025	0.0004	0.00049	0.00025	0.0006	0.00028
Silicon	mg/L		3.65	2.23	3.22	3.0	3.36	3.21	2.6	3.08	3.43	4.14	3.19	3.66	3.44	3.45	3.10
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Sodium	mg/L	200 AO	73.0	63.3	65.1	65.8	58.0	62.1	58.8	63.2	65.3	63.9	61.1	59.1	69.9	62.5	69.2
Strontium	mg/L		0.507	0.482	0.514	0.477	0.474	0.489	0.519	0.467	0.526	0.54	0.445	0.466	0.510	0.521	0.567
Sulphur	mg/L		30.8	29.3	28.7	27.3	24.3	27.8	26.2	27.9	28.7	41	29	27	31	31	30
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.000005	0.000006	<0.000005	0.000006	0.000005	0.000006
Tin	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.00006	0.00034	0.00007	<0.00006	0.00015	<0.00006
Titanium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.009	0.003	<0.002	0.00022	0.00028	0.00025	0.00007	0.00011	0.0001
Uranium	mg/L	0.02 MAC	0.003	0.002	0.003	0.003	0.002	0.002	0.003	0.002	0.003	0.00226	0.00271	0.00267	0.00275	0.00248	0.00251
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.004	<0.002	<0.002	0.00145	0.0015	0.00147	0.00158	0.00141	0.00145
Zinc	mg/L	5 AO	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	0.008	0.004	<0.002	0.003	0.004

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-16-III

Parameters	Units	ODWS <sup>(1)</sup>	2014			2015			2016			2017			2018		
			June	July	Sep	May	July	Sep	May	July	Sep	May	July	Sep	May	July	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	344	406	454	423	452	321	301	357	354	291	298	352	373	348	279
Chloride	mg/L	250 AO <sup>(3)</sup>	2.31	2.33	3.14	3.35	3.98	5.45	4.60	3.97	2.93	3.80	3.74	4.32	3.31	3.06	2.93
Dissolved Organic Carbon	mg/L	5 AO	2.6	2.2	2.6	1.6	2.7	2.2	1.6	2.3	1.5	1.3	2.0	2.4	1.8	2.8	2.9
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.12	<0.25	0.31	0.34	<0.25	0.25	0.32	<0.25	<0.25	0.20	0.28	0.26	<0.05	0.45	0.17
Sulphate	mg/L	500 AO	5.92	7.34	4.24	7.59	4.54	29.9	21.7	34.0	72.7	24.8	14.3	17.5	22.4	25.8	26.3
Hardness	mg/L	80-100 OG	<b>312</b>	<b>405</b>	<b>400</b>	<b>364</b>	<b>424</b>	<b>345</b>	<b>293</b>	<b>348</b>	<b>387</b>	<b>270</b>	<b>302</b>	<b>309</b>	<b>346</b>	<b>355</b>	<b>316</b>
Nitrate	mg/L	10 MAC	<0.05	<0.25	<0.25	<0.10	<0.25	0.31	0.32	<0.25	<0.25	<0.10	<0.05	<0.10	<0.05	<0.05	<0.10
Nitrite	mg/L	1 MAC	<0.05	<0.25	<0.25	<0.10	<0.25	<0.05	<0.10	<0.25	<0.25	<0.10	<0.05	<0.10	<0.05	<0.05	<0.10
Organic Nitrogen	mg/L	0.15 OG	<b>0.46</b>	<0.10	<b>0.47</b>	<b>0.23</b>	<b>0.63</b>	<b>0.60</b>	<b>0.69</b>	0.15	<b>0.17</b>	0.10	<0.10	<b>0.61</b>	0.12	<b>0.16</b>	<b>0.33</b>
Orthophosphate	mg/L		<0.10	<0.50	<0.50	<0.20	<0.50	<0.10	<0.20	<0.50	<0.50	<0.20	<0.10	<0.20	<0.10	<0.10	<0.20
pH	pH Units	6.5-8.5 OG	8.1	7.84	7.63	7.99	8.1	8.06	8.06	8.00	8.12	8.26	8.24	8.21	8.03	8.02	7.92
Electrical Conductivity	µS/cm		633	770	865	804	853	671	558	719	819	557	561	663	660	700	592
Total Ammonia	mg/L		0.09	0.15	0.15	0.41	0.68	0.1	0.16	0.34	0.28	0.02	0.12	0.19	0.03	0.10	0.02
Total Dissolved Solids	mg/L	500 AO	308	414	436	408	426	356	314	378	430	296	328	320	338	370	362
Total Kjeldahl Nitrogen (TKN)	mg/L		0.55	0.23	0.62	0.64	1.31	0.7	0.85	0.49	0.45	0.12	<0.10	0.80	0.15	0.26	0.35
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	0.12	0.14	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	<0.004	<0.004	<0.004	0.005	<0.004	0.022	<b>0.294</b>	0.014	0.013	<0.004	0.006	0.006	0.004	0.011
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.036	0.046	0.08	0.063	0.068	0.037	0.038	0.068	0.068	0.035	0.032	0.049	0.046	0.054	0.045
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	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	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.015	0.013	0.058	0.015	0.025	0.013	0.016	0.022	0.032	<0.010	0.014	0.043	0.017	0.039	0.021
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		83.9	108	91.1	87.7	105	94.5	78.7	90.6	100	73.3	82.6	82.4	92.8	87.5	87.5
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<b>1.7</b>	<b>2.72</b>	<b>1.24</b>	<b>0.684</b>	<b>0.804</b>	0.159	<b>0.455</b>	<b>0.733</b>	<b>2.85</b>	<b>0.828</b>	<b>0.657</b>	<b>0.584</b>	0.227	<b>1.33</b>	<b>0.39</b>
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Magnesium	mg/L		24.9	32.8	41.9	35.3	39.2	26.4	23.5	29.6	33.3	21.1	23.3	25.1	27.7	33.2	23.8
Manganese	mg/L	0.05 AO	<b>0.053</b>	<b>0.093</b>	<b>0.056</b>	0.049	<b>0.069</b>	0.025	<b>0.068</b>	<b>0.085</b>	<b>0.082</b>	<b>0.072</b>	<b>0.075</b>	<b>0.065</b>	0.048	<b>0.064</b>	<b>0.073</b>
Molybdenum	mg/L		<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.004	<0.002	<0.002	<0.002	<0.002	<0.002	0.002
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	0.004	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		2.22	4.08	7.54	7.43	9.65	2.77	2.43	5.51	6.06	1.77	2.08	3.29	1.99	4.58	2.49
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<b>0.065</b>	0.005	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		5.22	6.98	7.53	6.01	6.19	5.19	5.11	8.69	6.59	4.16	5.51	5.90	3.48	6.94	4.16
Silver	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	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	5.01	9.81	17.4	10.7	12.2	8.5	8.74	11.5	12.2	8.6	7.99	8.71	6.23	10.6	6.62
Strontium	mg/L		0.257	0.329	1.15	0.591	0.763	0.241	0.361	0.554	0.646	0.271	0.22	0.422	0.393	0.623	0.312
Sulphur	mg/L		<0.05	3.9	6.65	9.93	4.58	12.6	6.22	9.95	23.0	8.89	6.51	7.03	7.79	9.79	11.3
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	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	<0.002	<0.002	<0.002
Titanium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.011	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	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	<0.002	<0.002	<0.002
Zinc	mg/L	5 AO	0.005	<0.005	<0.005	<0.005	<0.005	0.006	0.008	<0.005	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	<0.005

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.



Groundwater Geochemical Results OW-16-III

Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	252	286	250	265	309	325	251	306	311	DAMAGED			DAMAGED		
Chloride	mg/L	250 AO <sup>(3)</sup>	2.09	2.95	1.90	2.64	2.76	1.98	2.35	2.03	1.60						
Dissolved Organic Carbon	mg/L	5 AO	3.0	3.1	3.2	2.2	2.1	2.3	2.3	4.0	2.6						
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.16	0.40	0.19	0.34	0.40	0.16	0.27	0.28	0.23						
Sulphate	mg/L	500 AO	13.0	16.5	21.4	25.2	17.1	14.4	19.8	15.5	11.7						
Hardness	mg/L	80-100 OG	<b>251</b>	<b>291</b>	<b>255</b>	<b>247</b>	<b>273</b>	<b>286</b>	<b>229</b>	<b>290</b>	<b>306</b>						
Nitrate	mg/L	10 MAC	0.29	0.13	0.05	0.09	<0.05	<0.05	<0.05	<0.05	0.05						
Nitrite	mg/L	1 MAC	<0.05	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05						
Organic Nitrogen	mg/L	0.15 OG	<b>0.22</b>	<b>0.46</b>	<b>0.16</b>	<b>0.32</b>	<b>0.30</b>	<b>0.24</b>	<b>0.41</b>	<b>0.30</b>	<b>0.22</b>						
Orthophosphate	mg/L		<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10						
pH	pH Units	6.5-8.5 OG	7.83	7.70	7.70	7.90	7.95	7.57	7.80	7.80	7.86						
Electrical Conductivity	µS/cm		474	630	570	587	511	493	496	561	587						
Total Ammonia	mg/L		0.14	0.33	0.16	0.04	0.12	0.03	0.07	0.13	<0.02						
Total Dissolved Solids	mg/L	500 AO	264	294	274	282	300	296	276	340	320						
Total Kjeldahl Nitrogen (TKN)	mg/L		0.36	0.79	0.32	0.36	0.42	0.27	0.48	0.43	0.22						
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050						
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	<0.004	0.007	0.026	0.016	0.078	0.068	<0.004	0.017						
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	0.004	<0.003	<0.003	<0.003	<0.003	<0.003						
Barium	mg/L	1 MAC	0.046	0.072	0.037	0.032	0.036	0.030	0.043	0.040	0.056						
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001						
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002						
Boron	mg/l	5 IMAC <sup>(5)</sup>	<0.010	0.038	0.023	0.053	0.071	0.022	0.019	0.021	0.031						
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002						
Calcium	mg/L		71.6	75.6	73.9	67.9	74.7	80.2	60.8	81	82.6						
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003						
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001						
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003						
Iron	mg/L	0.3 AO	<0.010	<b>0.827</b>	<0.010	0.228	<b>1.12</b>	<b>0.356</b>	<b>0.664</b>	<b>0.432</b>	<b>0.711</b>						
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001						
Magnesium	mg/L		17.6	24.8	17.0	18.8	21.1	20.8	18.7	21.3	24.2						
Manganese	mg/L	0.05 AO	<b>0.136</b>	<b>0.440</b>	0.047	0.045	<b>0.066</b>	<b>0.056</b>	<b>0.069</b>	<b>0.071</b>	<b>0.122</b>						
Molybdenum	mg/L		<0.002	0.003	<0.002	0.004	<0.002	<0.002	<0.002	<0.002	<0.002						
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003						
Potassium	mg/L		2.33	4.26	1.99	1.95	2.26	1.57	2.12	2.03	2.95						
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	0.005	<0.004	<0.004	<0.004	<0.004	0.004						
Silicon	mg/L		4.67	5.32	4.19	4.18	6.12	4.7	4.4	4.53	6.11						
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002						
Sodium	mg/L	200 AO	4.50	8.94	5.42	14.3	6.48	4.84	5.2	5.43	6.54						
Strontium	mg/L		0.226	0.457	0.196	0.215	0.34	0.243	0.343	0.264	0.435						
Sulphur	mg/L		5.99	6.45	6.91	9.18	6.21	6.82	7.22	6.45	5.53						
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006						
Tin	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002						
Titanium	mg/L		<0.002	<0.002	<0.002	0.006	<0.002	<0.002	0.01	<0.002	<0.002						
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002						
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002						
Zinc	mg/L	5 AO	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005						

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-24-I

Parameters	Units	ODWS <sup>(1)</sup>	2014			2015			2016			2017			2018		
			June	July	Sep	May	July	Sep	May	July	Sep	May	July	Sep	May	July	Oct
<b>General Chemistry</b>			DESTROYED	DESTROYED													
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>			176	213	241	235	247	239	232	253	222	244	248	218	208
Chloride	mg/L	250 AO <sup>(3)</sup>			12.5	1.63	2.73	2.11	1.54	1.77	1.73	1.73	1.26	2.31	1.87	0.77	1.18
Dissolved Organic Carbon	mg/L	5 AO			<b>6.6</b>	2.2	3.3	2.0	2.4	2.5	3.1	1.7	2.8	3.4	2.1	2.9	2.5
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>			0.36	0.37	0.28	0.33	0.25	0.30	0.36	0.30	0.31	0.38	0.19	0.31	0.36
Sulphate	mg/L	500 AO			82.1	16.9	21.2	20.8	23.4	19.8	17.5	18.1	17.9	17.6	20.9	19.8	18.9
Hardness	mg/L	80-100 OG			<b>225</b>	<b>206</b>	<b>227</b>	<b>234</b>	<b>239</b>	<b>223</b>	<b>211</b>	<b>229</b>	<b>214</b>	<b>217</b>	<b>226</b>	<b>224</b>	<b>220</b>
Nitrate	mg/L	10 MAC			<0.05	<0.05	<0.10	<0.05	<0.05	<0.05	<0.05	0.11	<0.05	<0.10	<0.05	<0.05	<0.05
Nitrite	mg/L	1 MAC			<0.05	<0.05	<0.10	<0.05	<0.05	<0.05	<0.05	<0.10	<0.05	<0.10	<0.05	<0.05	<0.05
Organic Nitrogen	mg/L	0.15 OG			<b>0.30</b>	<b>0.33</b>	<b>0.31</b>	<b>0.25</b>	<b>0.22</b>	<b>0.22</b>	<b>0.21</b>	0.13	0.12	<b>0.23</b>	<0.10	<0.10	<b>0.22</b>
Orthophosphate	mg/L				<0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.20	<0.10	<0.10	<0.10
pH	pH Units	6.5-8.5 OG			8.13	8.32	8.17	8.06	8.11	8.07	8.25	8.19	8.11	8.12	7.91	8.01	7.88
Electrical Conductivity	µS/cm				558	455	501	497	467	490	491	490	431	492	463	459	448
Total Ammonia	mg/L				0.29	0.04	0.09	0.03	0.03	0.07	0.16	<0.02	0.17	0.12	0.07	0.08	0.06
Total Dissolved Solids	mg/L	500 AO			314	226	242	256	264	256	250	266	256	244	248	252	252
Total Kjeldahl Nitrogen (TKN)	mg/L				0.59	0.37	0.40	0.28	0.25	0.29	0.37	0.13	0.29	0.35	0.12	<0.10	0.28
Total Phosphorus	mg/L				<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG			<0.004	<0.004	0.027	0.051	0.022	<b>0.207</b>	0.017	0.007	0.004	0.006	0.008	0.011	<0.004
Arsenic	mg/L	0.01 MAC			<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC			0.04	0.038	0.024	0.044	0.040	0.044	0.036	0.034	0.032	0.037	0.035	0.034	0.033
Beryllium	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
Bismuth	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	<0.002
Boron	mg/l	5 IMAC <sup>(5)</sup>			0.071	0.044	0.039	0.046	0.052	0.044	0.049	0.042	0.036	0.062	0.048	0.061	0.061
Cadmium	mg/L	0.005 MAC			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L				53	50.6	57.1	60.5	64.5	59.9	55.7	61.2	56.3	56.6	60.7	59.7	58.4
Chromium	mg/L	0.05 MAC			<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L				<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO			<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO			<b>0.772</b>	<b>1.03</b>	<b>0.802</b>	<b>1.56</b>	<b>0.887</b>	<b>0.890</b>	<b>1.06</b>	0.032	<b>0.327</b>	<b>0.381</b>	0.164	0.267	<b>0.710</b>
Lead	mg/L	0.01 MAC			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Magnesium	mg/L				22.5	19.3	20.6	20.1	18.9	17.8	17.5	18.4	17.9	18.4	18.0	18.3	18.1
Manganese	mg/L	0.05 AO			<b>0.054</b>	0.039	<b>0.061</b>	<b>0.062</b>	<b>0.082</b>	<b>0.078</b>	<b>0.053</b>	0.038	<b>0.071</b>	<b>0.063</b>	0.047	<b>0.051</b>	<b>0.051</b>
Molybdenum	mg/L				0.011	0.005	0.009	0.006	0.004	0.004	0.003	0.003	0.003	0.003	0.002	<0.002	0.003
Nickel	mg/L				<0.003	<0.003	<0.003	0.004	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L				6.44	4.79	4.01	4.29	2.86	3.10	3.22	2.58	2.94	3.14	2.49	2.70	2.89
Selenium	mg/L	0.05 MAC			<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L				5.64	6.88	5.39	7.02	6.59	7.60	6.57	6.38	7.37	6.86	4.83	8.57	6.09
Silver	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	<0.002
Sodium	mg/L	200 AO			17.1	9.55	16.7	13.4	9.07	11.6	11.8	11.7	9.05	13.1	7.61	7.18	9.32
Strontium	mg/L				0.448	0.396	0.321	0.403	0.395	0.398	0.479	0.323	0.414	0.448	0.356	0.447	0.489
Sulphur	mg/L				29.5	5.57	6.01	6.74	6.11	5.95	8.19	6.11	6.24	6.74	6.53	7.48	7.93
Thallium	mg/L				<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	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	<0.002
Titanium	mg/L				<0.002	<0.002	<0.002	0.003	<0.002	0.009	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Uranium	mg/L	0.02 MAC			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	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	<0.002
Zinc	mg/L	5 AO			0.005	<0.005	<0.005	<0.005	0.009	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-24-I

Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	227	207	217	234	253	347	265	363	318	254	228	256	233	234	258
Chloride	mg/L	250 AO <sup>(3)</sup>	1.22	3.57	1.34	1.34	1.25	1.84	1.26	2.96	1.29	3	< 1	< 1	< 1	< 1	< 1
Dissolved Organic Carbon	mg/L	5 AO	2.8	2.4	2.2	2.2	3.4	2.5	2.2	4.9	3.6	2.0	3.0	2.0	2.0	<b>9.6</b>	2.0
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.21	0.61	0.39	0.38	0.30	0.19	0.14	0.62	<0.05	0.30	0.37	0.35	0.35	0.57	0.30
Sulphate	mg/L	500 AO	19.6	16.7	20.1	21.1	21.4	23.7	21.3	25.2	20.6	30	24	28	24	32	23
Hardness	mg/L	80-100 OG	<b>225</b>	<b>197</b>	<b>210</b>	<b>228</b>	<b>215</b>	<b>287</b>	<b>230</b>	<b>364</b>	<b>310</b>	<b>293</b>	<b>198</b>	<b>252</b>	<b>248</b>	<b>213</b>	<b>326</b>
Nitrate	mg/L	10 MAC	<0.05	0.06	<0.05	0.11	0.08	0.26	0.15	<0.05	0.25	0.09	< 0.06	0.09	< 0.06	< 0.06	0.09
Nitrite	mg/L	1 MAC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Organic Nitrogen	mg/L	0.15 OG	<0.10	0.12	<b>0.23</b>	<b>0.30</b>	0.15	<b>0.24</b>	<b>0.35</b>	<b>0.43</b>	<b>0.30</b>	<b>&lt; 0.5</b>	<b>&lt; 0.5</b>	0.05	< 0.05	< 0.05	< 0.05
Orthophosphate	mg/L		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10						0.11
pH	pH Units	6.5-8.5 OG	7.82	7.86	7.75	7.86	7.89	7.73	7.74	8.03	7.67	8.09	8.16	8.06	8.09	8.44	8.09
Electrical Conductivity	µS/cm		437	473	505	524	436	541	509	684	615	483	469	513	470	456	505
Total Ammonia	mg/L		0.02	0.06	0.11	<0.02	0.04	0.02	<0.02	0.23	<0.02	0.07	0.1	0.08	0.11	0.16	0.04
Total Dissolved Solids	mg/L	500 AO	244	238	236	262	304	342	276	366	332	283	240	294	309	309	323
Total Kjeldahl Nitrogen (TKN)	mg/L		0.10	0.18	0.34	0.30	0.19	0.26	0.35	0.66	0.3	< 0.5	0.08	0.13	0.06	0.11	< 0.05
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	0.084	<0.050	<0.050	<0.050	0.074	<0.050	0.05	< 0.03	0.14	0.06	< 0.03	0.051
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	0.006	0.009	<0.004	0.013	0.023	0.033	<b>0.196</b>	0.007	<b>0.236</b>	0.019	<b>0.332</b>	0.002	0.002	<b>0.378</b>
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	0.004	<0.003	<0.003	<0.003	<0.003	<0.003	0.0003	0.0003	0.0015	0.0003	0.0005	0.0003
Barium	mg/L	1 MAC	0.031	0.028	0.033	0.034	0.025	0.034	0.022	0.063	0.033	0.0339	0.0316	0.0474	0.0280	0.0375	0.0303
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000016	< 0.000007	0.00001	< 0.000007	< 0.000007	0.000029
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.045	0.093	0.072	0.060	0.090	0.040	0.032	0.057	0.040	0.064	0.046	0.081	0.037	0.075	0.036
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000003	< 0.000003	0.000009	< 0.000003	< 0.000003	0.000009
Calcium	mg/L		63.2	49.9	56.1	60.2	58.1	79.9	63.4	73.8	86.1	86.1	49.3	65.4	68.7	52.7	89.0
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.00091	0.00022	0.00157	0.00017	0.00029	0.00211
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000279	0.000211	0.000545	0.000089	0.000117	0.000574
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	0.004	0.014	<0.003	<0.003	0.0026	0.0004	0.0012	0.0007	0.0004	0.0042
Iron	mg/L	0.3 AO	0.044	0.068	<b>0.386</b>	0.265	0.056	0.138	0.032	<b>0.309</b>	0.067	<b>0.340</b>	0.102	<b>0.733</b>	0.198	0.112	<b>1.07</b>
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00025	< 0.00009	0.00037	< 0.00009	< 0.00009	0.00082
Magnesium	mg/L		16.4	17.6	17.0	18.9	17	21.3	17.5	43.7	23.0	19	18.2	21.7	18.5	19.8	25.2
Manganese	mg/L	0.05 AO	<b>0.073</b>	0.022	<b>0.072</b>	0.049	0.036	0.027	0.023	<b>0.091</b>	0.032	0.028	<b>0.0523</b>	<b>0.0774</b>	0.0318	<b>0.0662</b>	0.0495
Molybdenum	mg/L		0.004	0.01	0.004	0.002	<0.002	0.002	<0.002	0.007	0.002	0.00235	0.00261	0.00403	0.00222	0.00456	0.00148
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.006	<0.003	<0.003	0.0013	0.0007	0.0018	0.0005	0.0005	0.0022
Potassium	mg/L		2.82	3.68	3.00	2.7	2.13	1.66	1.59	6.09	1.47	2.25	2.48	2.46	2.53	3.02	2.18
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.00005	< 0.00004	< 0.00004	< 0.00004	< 0.00004	0.00006
Silicon	mg/L		6.28	4.63	6.41	6.52	7.71	6.75	5.97	6.4	7.71	9.06	6.33	7.98	6.90	6.86	7.15
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	200 AO	6.83	18.5	9.71	9.25	7.17	12.7	7.11	14.4	9.84	7.00	7.48	14.7	8.07	21.4	8.69
Strontium	mg/L		0.271	0.323	0.423	0.418	0.369	0.275	0.134	1.37	0.241	0.225	0.341	0.431	0.360	0.535	0.352
Sulphur	mg/L		8.08	6.18	6.62	6.62	6.2	9.17	7.82	10	6.5	12	7.0	8.0	7	9	7
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.000011	< 0.000005	< 0.000005	< 0.000005	< 0.000005	0.000007
Tin	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00007	< 0.00006	< 0.00006	< 0.00006	0.00012	0.00007
Titanium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.009	0.01	<0.002	0.0112	0.00102	0.02031	0.00015	0.00014	0.0186
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000478	0.000456	0.00113	0.000359	0.000503	0.000497
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.001	0.00046	0.00191	0.0003	0.00066	0.00177
Zinc	mg/L	5 AO	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.003	< 0.002	0.002	< 0.002	< 0.002	0.004

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-24-II

Parameters	Units	ODWS <sup>(1)</sup>	2014		2015			2016			2017			2018		
			June	July	Sep	May	July	Sep	May	July	Sep	May	July	Sep	May	July
<b>General Chemistry</b>			DESTROYED	DESTROYED												
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>			204	263	282	292	300	307	306	328	302	349	351	324
Chloride	mg/L	250 AO <sup>(3)</sup>			36.2	15.0	12.6	7.4	6.67	5.32	4.70	3.56	3.74	4.07	4.12	3.33
Dissolved Organic Carbon	mg/L	5 AO			<b>31.7</b>	1.9	3.2	1.2	1.4	1.6	1.9	0.9	1.6	2.1	1.5	1.4
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>			0.34	0.92	0.79	0.74	0.67	0.66	0.70	0.57	0.73	0.64	0.65	0.58
Sulphate	mg/L	500 AO			74.1	10.4	18.7	14.2	11.6	10.8	13.2	14.5	14.8	16.8	17.3	20.8
Hardness	mg/L	80-100 OG			<b>275</b>	<b>231</b>	<b>266</b>	<b>277</b>	<b>261</b>	<b>271</b>	<b>277</b>	<b>281</b>	<b>287</b>	<b>316</b>	<b>301</b>	<b>330</b>
Nitrate	mg/L	10 MAC			<0.10	<0.05	0.13	<0.05	<0.10	<0.10	<0.05	<0.10	<0.05	<0.10	0.12	<0.10
Nitrite	mg/L	1 MAC			<0.10	<0.05	<0.10	<0.05	<0.10	<0.10	<0.05	<0.10	<0.05	<0.10	<0.05	<0.10
Organic Nitrogen	mg/L	0.15 OG			<b>0.19</b>	0.14	0.10	<b>0.16</b>	<0.10	<b>0.18</b>	0.13	0.10	<0.10	<b>0.40</b>	0.14	<b>0.26</b>
Orthophosphate	mg/L				<0.20	<0.10	<0.20	<0.10	<0.20	<0.20	<0.10	<0.20	<0.10	<0.20	<0.10	<0.20
pH	pH Units	6.5-8.5 OG			8.18	8.36	8.24	8.15	8.16	8.09	8.31	8.28	8.2	8.17	8.07	8.02
Electrical Conductivity	µS/cm				721	571	605	602	552	604	634	609	566	675	614	651
Total Ammonia	mg/L				0.13	<0.02	0.06	<0.02	<0.02	<0.02	<0.02	<0.02	0.16	0.02	0.06	0.07
Total Dissolved Solids	mg/L	500 AO			418	276	302	298	288	298	304	306	312	322	316	366
Total Kjeldahl Nitrogen (TKN)	mg/L				0.32	0.14	0.16	0.16	<0.10	0.18	0.13	0.10	<0.10	0.42	0.20	0.33
Total Phosphorus	mg/L				<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
<b>Metals</b>																
Aluminum	mg/L	0.1 OG			0.007	0.004	0.005	<0.004	<0.004	<b>0.337</b>	0.057	0.007	<0.004	0.006	0.009	0.009
Arsenic	mg/L	0.01 MAC			<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC			0.037	0.049	0.046	0.052	0.046	0.047	0.051	0.048	0.054	0.057	0.056	0.059
Beryllium	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
Bismuth	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 <sup>(5)</sup>			0.083	0.068	0.075	0.064	0.077	0.063	0.065	0.053	0.055	0.079	0.070	0.060
Cadmium	mg/L	0.005 MAC			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L				55.2	42.4	49.3	55.1	49.1	53.4	55.5	56.4	53.7	63.6	56.9	65.7
Chromium	mg/L	0.05 MAC			<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L				<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO			<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.013	<0.003	<0.003	0.013
Iron	mg/L	0.3 AO			0.019	<0.010	0.148	0.09	0.070	<b>0.319</b>	0.079	<0.010	0.073	0.045	<0.010	0.073
Lead	mg/L	0.01 MAC			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002
Magnesium	mg/L				33.2	30.3	34.7	33.9	33.7	33.4	33.6	34.0	37.1	38.1	38.7	40.3
Manganese	mg/L	0.05 AO			<b>0.093</b>	<b>0.083</b>	<b>0.126</b>	<b>0.107</b>	<b>0.067</b>	<b>0.110</b>	<b>0.109</b>	0.043	0.047	<b>0.126</b>	<b>0.112</b>	0.047
Molybdenum	mg/L				0.019	0.018	0.018	0.014	0.010	0.010	0.011	0.007	0.008	0.010	0.009	0.009
Nickel	mg/L				<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L				9.33	9.5	9.56	8.05	7.12	7.26	7.28	6.17	7.16	6.63	6.47	6.60
Selenium	mg/L	0.05 MAC			<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L				4.62	6.15	5.41	5.85	5.47	6.90	5.76	5.69	6.35	6.02	4.84	6.35
Silver	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
Sodium	mg/L	200 AO			28.6	21.9	21.4	17.2	17.5	16.5	15.6	15.8	15.1	14.1	15.4	15.1
Strontium	mg/L				0.617	0.616	0.754	0.735	0.735	0.777	0.877	0.807	1.06	1.07	1.11	1.06
Sulphur	mg/L				27.1	2.83	4.69	4.5	2.75	3.58	4.63	4.76	4.64	5.0	5.01	4.64
Thallium	mg/L				<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	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
Titanium	mg/L				<0.002	<0.002	<0.002	<0.002	<0.002	0.013	0.003	<0.002	<0.002	<0.002	<0.002	<0.002
Uranium	mg/L	0.02 MAC			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	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
Zinc	mg/L	5 AO			<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	0.024	0.005	<0.005	0.024

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-24-II

Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	347	320	340	349	362	396	350	289	357	363	350	358	348	345	358
Chloride	mg/L	250 AO <sup>(3)</sup>	3.25	3.45	3.08	3.21	3.43	3.02	3.12	1.23	2.64	4	2	3	3	4	3
Dissolved Organic Carbon	mg/L	5 AO	1.7	1.5	1.4	1.2	3.6	1.2	1.6	2.9	2.1	1.2	2.0	2.0	2.0	1.2	2.0
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.62	0.58	0.62	0.67	0.87	0.63	0.63	0.16	0.63	0.73	0.72	0.68	0.79	0.73	0.65
Sulphate	mg/L	500 AO	18.9	21.1	21.5	19.1	24.6	24.4	19.8	21.8	30.8	30	31	33	37	33	34
Hardness	mg/L	80-100 OG	<b>324</b>	<b>275</b>	<b>325</b>	<b>332</b>	<b>310</b>	<b>335</b>	<b>293</b>	<b>280</b>	<b>369</b>	<b>402</b>	<b>383</b>	<b>374</b>	<b>379</b>	<b>372</b>	<b>418</b>
Nitrate	mg/L	10 MAC	<0.10	0.12	0.12	0.18	<0.05	0.08	0.09	0.10	<0.05	0.10	< 0.06	0.09	0.13	0.06	0.13
Nitrite	mg/L	1 MAC	<0.10	<0.10	<0.10	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Organic Nitrogen	mg/L	0.15 OG	<0.10	0.12	<b>0.23</b>	<b>0.23</b>	<b>0.31</b>	<b>0.16</b>	<b>0.32</b>	<b>0.27</b>	<b>0.26</b>	< 0.5	< 0.5	< 0.05	< 0.05	0.06	0.09
Orthophosphate	mg/L		<0.20	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10						0.04
pH	pH Units	6.5-8.5 OG	7.99	7.84	7.90	8.05	8.00	7.88	8.01	7.84	7.97	8.07	8.14	8.13	8.10	8.23	8.06
Electrical Conductivity	µS/cm		631	733	746	731	597	602	657	547	698	654	690	689	676	612	668
Total Ammonia	mg/L		<0.02	0.03	0.07	<0.02	0.08	<0.02	0.03	<0.02	<0.02	0.09	0.06	< 0.04	< 0.04	< 0.04	< 0.04
Total Dissolved Solids	mg/L	500 AO	344	348	338	346	362	384	346	302	386	406	374	380	474	434	380
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.10	0.15	0.30	0.23	0.39	0.16	0.35	0.27	0.26	< 0.5	< 0.05	0.07	< 0.05	0.07	0.11
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.050	<0.050	<0.050	0.071	<0.050	0.078	< 0.03	< 0.03	< 0.03	0.06	< 0.03	< 0.003
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	<0.004	0.006	0.016	0.025	0.022	0.011	0.089	<b>0.417</b>	0.020	<b>0.902</b>	0.014	0.0010	0.0020	0.022
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	< 0.0002	0.0004	0.0003	< 0.0002	< 0.0002	0.0002
Barium	mg/L	1 MAC	0.053	0.026	0.053	0.050	0.052	0.040	0.042	0.027	0.060	0.063	0.0661	0.0568	0.0489	0.0460	0.0529
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.000007	0.000042	0.000024	< 0.000007	< 0.000007	< 0.000007
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00001	< 0.00001	0.00002	< 0.00001	< 0.00001	< 0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.060	0.056	0.060	0.058	0.108	0.042	0.052	0.036	0.054	0.076	0.055	0.075	0.037	0.036	0.046
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000007	0.000008	0.000009	0.000003	0.000005	0.000005
Calcium	mg/L		65.8	50.4	69.4	69.8	63.7	77.2	58.9	77.3	78.4	95.5	85.5	80.4	88.1	83.2	92.5
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.00026	0.00418	0.00022	0.00009	0.0001	0.00019
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000181	0.000927	0.000161	0.000153	0.000198	0.000133
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0008	0.0028	0.0005	0.0007	0.0017	0.0029
Iron	mg/L	0.3 AO	<0.010	<0.010	<0.010	0.018	0.150	<0.010	0.010	0.197	<b>0.503</b>	0.025	<b>1.50</b>	0.034	< 0.007	0.014	0.035
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.00009	0.00077	< 0.00009	< 0.00009	< 0.00009	0.00009
Magnesium	mg/L		38.9	36.2	36.9	38.4	36.6	34.5	35.4	21.1	42	39.8	41.3	42.1	38.6	40.0	45.5
Manganese	mg/L	0.05 AO	<b>0.075</b>	0.017	<b>0.122</b>	<b>0.072</b>	<b>0.096</b>	0.033	<b>0.075</b>	0.032	<b>0.097</b>	<b>0.0538</b>	<b>0.0910</b>	0.0429	0.0313	0.0335	0.0289
Molybdenum	mg/L		0.008	0.007	0.008	0.007	0.008	0.005	0.003	<0.002	0.006	0.00606	0.0056	0.0072	0.00683	0.00583	0.00575
Nickel	mg/L		<0.003	<0.003	<0.003	0.013	<0.003	<0.003	<0.003	<0.003	<0.003	0.0011	0.0036	0.0013	0.0015	0.0018	0.0012
Potassium	mg/L		6.10	4.57	5.68	5.34	5.09	4.11	5.18	1.62	5.34	6.36	5.35	5.48	5.19	4.82	5.7
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	0.005	<0.004	<0.004	<0.004	<0.004	<0.004	0.00004	< 0.00004	< 0.00004	< 0.00004	0.00005	0.00006
Silicon	mg/L		5.92	2.78	5.43	5.61	6.19	5.54	4.91	6.74	6.92	7.93	9.24	4.81	5.79	5.95	5.65
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	200 AO	16.2	14.3	14.3	14.6	13.3	12.3	15.3	7.46	13.1	15.9	14.9	14.3	15.7	13.6	15.7
Strontium	mg/L		1.21	1.03	1.17	0.988	1.25	0.877	0.898	0.177	1.37	1.37	1.23	1.36	1.23	1.12	1.58
Sulphur	mg/L		7.79	10.2	7.60	6.61	6.52	9.22	7.87	8.71	8.96	15	10	11	11	11	12
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.000008	0.000023	0.000014	0.000011	0.000018	0.000006
Tin	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00006	0.00013	0.00011	< 0.00006	0.00045	0.00008
Titanium	mg/L		<0.002	<0.002	<0.002	<0.002	0.002	<0.002	0.01	0.007	0.018	0.00094	0.0468	0.00079	0.00009	0.00015	0.00101
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00122	0.00154	0.00152	0.00161	0.0016	0.00142
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00044	0.00264	0.00037	0.00027	0.00023	0.00039
Zinc	mg/L	5 AO	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	< 0.002	0.008	0.005	0.003	0.004	0.002

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-24-III

Parameters	Units	ODWS <sup>(1)</sup>	2014			2015			2016			2017			2018		
			June	July	Sep	May	July	Sep	May	July	Sep	May	July	Sep	May	July	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	352	309	307	227	252	211	294	359	357	348	366	375	280	326	312
Chloride	mg/L	250 AO <sup>(3)</sup>	3.88	4.08	3.84	3.55	3.70	4.52	4.29	3.76	3.22	3.85	3.56	3.51	4.92	4.17	3.06
Dissolved Organic Carbon	mg/L	5 AO	1.5	2.7	2.0	1.9	2.6	3.7	2.7	2.2	4.6	1.8	2.2	2.7	2.1	3.0	2.0
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.07	<0.25	<0.10	<0.05	0.15	0.11	<0.10	<0.10	<0.05	<0.25	<0.05	<0.10	<0.05	<0.05	<0.10
Sulphate	mg/L	500 AO	15.5	20.8	13.0	14.1	9.61	21.6	19.9	11.0	7.89	18.4	11.9	12.9	14.4	12.7	15.2
Hardness	mg/L	80-100 OG	<b>335</b>	<b>335</b>	<b>303</b>	<b>224</b>	<b>300</b>	<b>249</b>	<b>297</b>	<b>357</b>	<b>335</b>	<b>333</b>	<b>352</b>	<b>352</b>	<b>257</b>	<b>339</b>	<b>346</b>
Nitrate	mg/L	10 MAC	0.59	0.49	0.78	1.20	1.37	0.22	1.09	2.45	1.85	2.33	2.10	1.59	0.56	0.94	0.90
Nitrite	mg/L	1 MAC	<0.05	<0.25	<0.10	<0.05	<0.10	<0.05	<0.10	<0.10	<0.05	<0.25	<0.05	<0.10	<0.05	<0.05	<0.10
Organic Nitrogen	mg/L	0.15 OG	<b>0.46</b>	<b>0.39</b>	<b>0.23</b>	<b>0.77</b>	<b>0.91</b>	<b>1.19</b>	<b>0.37</b>	<b>0.52</b>	<b>0.56</b>	<b>0.37</b>	<b>0.23</b>	<b>0.27</b>	<b>0.23</b>	<b>0.25</b>	<b>0.17</b>
Orthophosphate	mg/L		<0.10	<0.50	<0.20	<0.10	<0.20	<0.10	<0.20	<0.20	<0.10	<0.50	<0.10	<0.20	<0.10	<0.10	<0.20
pH	pH Units	6.5-8.5 OG	8.08	7.95	7.75	8.25	8.17	7.97	7.94	7.91	8.03	8.16	8.32	8.08	7.78	7.94	7.81
Electrical Conductivity	µS/cm		655	628	637	470	519	469	554	701	710	668	666	726	518	657	646
Total Ammonia	mg/L		0.07	0.09	0.6	0.45	0.37	0.1	0.03	0.04	0.14	0.07	1.14	0.11	0.15	0.31	0.04
Total Dissolved Solids	mg/L	500 AO	352	372	352	252	316	260	312	358	362	330	386	356	270	364	392
Total Kjeldahl Nitrogen (TKN)	mg/L		0.53	0.48	0.83	1.22	1.28	1.29	0.40	0.56	0.70	0.44	1.37	0.38	0.38	0.56	0.21
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.21	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	<0.004	<0.004	<0.004	0.004	<0.004	<b>0.403</b>	<b>0.240</b>	0.007	0.008	0.006	0.005	0.007	<0.004	0.007
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.032	0.03	0.03	0.019	0.023	0.023	0.036	0.028	0.029	0.029	0.025	0.025	0.027	0.042	0.034
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	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	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.01	0.012	0.021	0.011	0.011	0.018	0.010	<0.010	0.013	0.012	0.012	0.026	0.018	0.020	0.015
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		91.0	93.9	86.0	66.9	85.5	74.9	85.4	100	94.1	92.8	95.6	97.1	73.1	94.3	95.4
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	0.009	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	0.001	0.001	0.001	<0.001
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.014	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.010	<0.010	0.018	0.156	<0.010	<0.010	<b>0.334</b>	0.142	<0.010	<0.010	0.075	0.012	<b>0.72</b>	<b>2.73</b>	<0.010
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Magnesium	mg/L		26.2	24.4	21.4	13.9	21.0	15.1	20.4	26.0	24.2	24.5	27.5	26.5	18.2	25.1	26.1
Manganese	mg/L	0.05 AO	<0.002	0.002	<b>0.161</b>	<b>0.364</b>	0.037	<b>0.091</b>	0.026	0.050	0.019	0.005	0.030	0.010	<b>0.280</b>	<b>0.423</b>	0.008
Molybdenum	mg/L		<0.002	<0.002	0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		0.8	1.23	1.6	1.77	1.15	5.78	1.21	1.11	1.13	1.17	1.0	0.95	2.40	2.13	1.39
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		6.68	6.8	6.45	3.8	4.58	3.86	5.51	8.25	7.48	6.23	8.21	8.22	3.89	7.91	6.34
Silver	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	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	13.4	9.64	8.99	6.67	6.54	7.82	6.91	6.27	6.23	7.03	6.07	6.17	6.00	5.88	7.50
Strontium	mg/L		0.139	0.15	0.345	0.129	0.137	0.119	0.158	0.146	0.163	0.153	0.155	0.158	0.116	0.142	0.157
Sulphur	mg/L		4.56	8.3	6.65	6.26	2.75	7.32	6.99	3.10	4.0	6.23	4.43	4.62	4.55	6.18	7.53
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	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	<0.002	<0.002	<0.002
Titanium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.011	0.008	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	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	<0.002	<0.002	<0.002
Zinc	mg/L	5 AO	0.006	0.007	<0.005	<0.005	0.006	<0.005	0.012	<0.005	<0.005	0.006	0.027	<0.005	0.009	<0.005	0.011

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-24-III

Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	276	361	339	334	351	373	341	340	337	269	324	309	Damaged	Damaged	Damaged
Chloride	mg/L	250 AO <sup>(3)</sup>	2.91	4.28	3.16	2.86	3.47	1.86	2.39	2.42	1.63	6	3	2			
Dissolved Organic Carbon	mg/L	5 AO	2.4	<b>7.2</b>	4.9	1.5	1.4	2.8	1.7	2.4	3.5	2.5	2.0	2.0			
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	<0.05	<0.10	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.06	0.10	0.08			
Sulphate	mg/L	500 AO	14.3	12.5	16.0	20.8	17.2	14.8	16.4	15.7	13.3	14	17	15			
Hardness	mg/L	80-100 OG	<b>280</b>	<b>358</b>	<b>345</b>	<b>352</b>	<b>321</b>	<b>316</b>	<b>313</b>	<b>343</b>	<b>330</b>	<b>292</b>	<b>331</b>	<b>316</b>			
Nitrate	mg/L	10 MAC	0.38	<0.10	0.79	1.22	1.08	0.77	0.98	1.12	0.88	0.67	1.25	0.83			
Nitrite	mg/L	1 MAC	<0.05	<0.10	0.14	<0.10	<0.05	<0.05	<0.05	<0.05	0.06	< 0.03	< 0.03	< 0.03			
Organic Nitrogen	mg/L	0.15 OG	<b>0.26</b>	<b>1.05</b>	<b>1.07</b>	<b>0.66</b>	<b>0.27</b>	<b>0.27</b>	<b>0.69</b>	<b>0.31</b>	<b>0.27</b>	< <b>0.5</b>	< <b>0.5</b>	< 0.05			
Orthophosphate	mg/L		<0.10	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10						
pH	pH Units	6.5-8.5 OG	7.69	7.46	7.67	7.79	7.84	7.58	7.68	7.61	7.69	8.07	8.08	7.99			
Electrical Conductivity	µS/cm		521	784	748	718	585	554	635	648	636	502	642	592			
Total Ammonia	mg/L		<0.02	4.10	0.32	0.18	0.08	0.04	<0.02	0.03	<0.02	< 0.04	0.04	< 0.04			
Total Dissolved Solids	mg/L	500 AO	280	330	356	352	364	360	342	356	354	317	363	309			
Total Kjeldahl Nitrogen (TKN)	mg/L		0.26	5.15	1.39	0.84	0.35	0.31	0.69	0.34	0.27	< 0.5	0.10	< 0.05			
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	< 0.03	< 0.03	0.08			
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	0.011	<0.004	0.011	0.028	0.022	0.020	0.077	<b>0.113</b>	0.092	0.017	<b>0.284</b>	<b>0.118</b>			
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	0.006	<0.003	<0.003	<0.003	<0.003	<0.003	< 0.0002	< 0.0002	< 0.0002			
Barium	mg/L	1 MAC	0.026	0.030	0.028	0.023	0.019	0.027	0.022	0.027	0.028	0.0334	0.0276	0.0262			
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.000007	0.00001	0.00002			
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00001	< 0.00001	< 0.00001			
Boron	mg/l	5 IMAC <sup>(5)</sup>	<0.010	0.014	0.016	0.012	0.053	0.017	<0.010	0.012	0.016	0.031	0.018	0.029			
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000008	0.00001	0.000012			
Calcium	mg/L		77.7	98.4	95.7	97.6	87.3	90.4	86.7	93.3	92.3	84.7	90.8	87.0			
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.00053	0.00215	0.00136			
Cobalt	mg/L		<0.001	0.001	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000061	0.00469	0.000357			
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.009	<0.003	<0.003	0.0018	0.0014	0.0011			
Iron	mg/L	0.3 AO	<0.010	<0.010	<b>0.444</b>	0.064	0.032	0.012	0.115	0.091	<0.010	0.021	<b>0.355</b>	0.137			
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.00009	0.00028	0.00011			
Magnesium	mg/L		20.8	27.2	25.8	26.2	25.0	21.9	23.5	26.6	24.2	19.4	25.3	24.0			
Manganese	mg/L	0.05 AO	0.005	<b>0.268</b>	<b>0.216</b>	0.010	0.002	<0.002	0.007	0.004	0.004	0.00128	0.00903	0.00301			
Molybdenum	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00061	0.0003	0.00056			
Nickel	mg/L		<0.003	<0.003	<0.003	0.007	<0.003	<0.003	<0.003	<0.003	<0.003	0.0005	0.0013	0.0007			
Potassium	mg/L		0.91	2.61	1.18	0.9	0.84	1.14	1.44	1.15	1.25	0.903	0.776	0.952			
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.00017	0.00018	0.00029			
Silicon	mg/L		5.73	8.32	7.97	8.04	8.32	6.62	5.59	8.32	7.6	7.16	9.55	7.77			
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00005	< 0.00005	< 0.00005			
Sodium	mg/L	200 AO	5.86	6.48	6.27	5.73	5.54	6.0	5.46	6.3	6.0	6.46	6.06	6.75			
Strontium	mg/L		0.110	0.139	0.142	0.131	0.145	0.153	0.100	0.148	0.158	0.107	0.128	0.139			
Sulphur	mg/L		6.69	7.23	5.29	5.56	4.88	6.59	6.31	7.06	4.47	9	5	5			
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	< 0.000005	0.000008	< 0.000005			
Tin	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00006	< 0.00006	< 0.00006			
Titanium	mg/L		<0.002	<0.002	<0.002	0.004	<0.002	<0.002	<0.002	0.003	0.003	0.00068	0.0127	0.00543			
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000437	0.000558	0.000622			
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00069	0.00151	0.00103			
Zinc	mg/L	5 AO	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	0.003	0.004	0.006			

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-17-I

Parameters	Units	ODWS <sup>(1)</sup>	2014			2015			2016			2017			2018		
			June	July	Sep	May	July	Sep	May	July	Sep	May	July	Sep	May	July	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	235	245	231	219	235	228	253	242	230	239	222	241	259	230	220
Chloride	mg/L	250 AO <sup>(3)</sup>	0.69	0.78	0.83	0.85	0.82	0.69	0.82	0.72	0.73	0.97	0.28	0.90	0.88	0.76	0.62
Dissolved Organic Carbon	mg/L	5 AO	2.4	2.2	2.1	2.3	2.5	2.1	2.2	2.5	2.3	1.9	2.7	2.9	2.3	2.8	2.8
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.17	0.19	0.36	0.35	0.19	0.34	<0.10	0.23	0.34	0.25	0.24	0.24	0.12	0.27	0.25
Sulphate	mg/L	500 AO	16.2	15.9	15.5	14.8	16.5	16.5	20.0	16.8	15.5	15.5	14.6	15.4	16.4	16.0	15.4
Hardness	mg/L	80-100 OG	<b>235</b>	<b>249</b>	<b>231</b>	<b>227</b>	<b>246</b>	<b>235</b>	<b>239</b>	<b>235</b>	<b>233</b>	<b>221</b>	<b>226</b>	<b>232</b>	<b>239</b>	<b>242</b>	<b>240</b>
Nitrate	mg/L	10 MAC	<0.05	<0.10	0.06	<0.10	<0.10	<0.05	<0.10	<0.05	<0.05	0.14	0.05	0.13	<0.05	<0.05	<0.05
Nitrite	mg/L	1 MAC	<0.05	<0.10	<0.05	<0.10	<0.10	<0.05	<0.10	<0.05	<0.05	<0.10	0.14	<0.05	<0.05	<0.05	<0.05
Organic Nitrogen	mg/L	0.15 OG	<b>0.39</b>	<0.10	<b>0.16</b>	<0.10	<0.10	<0.10	<0.10	0.15	0.15	<0.10	<0.10	<b>0.23</b>	0.12	0.11	<b>0.22</b>
Orthophosphate	mg/L		<0.10	<0.20	<0.10	<0.20	<0.20	<0.10	<0.20	<0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10
pH	pH Units	6.5-8.5 OG	8.26	8.14	7.96	8.27	8.18	8.03	8.09	7.97	8.24	8.27	8.13	8.30	7.88	7.95	7.85
Electrical Conductivity	µS/cm		459	474	483	454	486	471	456	497	490	449	420	483	467	470	455
Total Ammonia	mg/L		0.09	0.09	0.07	<0.02	0.07	<0.02	<0.02	0.04	0.04	0.03	0.03	<0.02	0.02	0.03	<0.02
Total Dissolved Solids	mg/L	500 AO	258	280	254	250	254	244	262	264	258	244	250	256	258	230	278
Total Kjeldahl Nitrogen (TKN)	mg/L		0.48	<0.10	0.23	<0.10	<0.10	<0.10	<0.10	0.19	0.19	<0.10	<0.10	0.23	0.14	0.14	0.22
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	<0.004	0.009	<0.004	<0.004	<0.004	0.014	0.015	0.005	0.006	0.005	0.008	0.006	<0.004	0.009
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.029	0.028	0.03	0.028	0.027	0.031	0.034	0.030	0.034	0.040	0.033	0.034	0.034	0.032	0.036
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	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	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.028	0.031	0.032	0.029	0.028	0.031	0.035	0.030	0.036	0.030	0.030	0.049	0.034	0.039	0.037
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		63.0	66.2	61.1	61.1	65.5	62.9	63.1	63.4	62.9	58.0	59.9	62.4	63.4	65.1	64.3
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.004	<0.003	0.014	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	0.129	<b>0.415</b>	<b>0.352</b>	<b>0.453</b>	<b>0.371</b>	0.123	0.115	0.152	0.280	0.249	<b>0.33</b>	<b>0.302</b>	0.112	<b>0.370</b>	0.084
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Magnesium	mg/L		18.9	20.3	19.0	18.1	19.9	19.0	19.7	18.6	18.5	18.5	18.5	18.6	19.6	19.2	19.4
Manganese	mg/L	0.05 AO	0.023	0.024	0.038	0.024	0.024	0.015	0.012	0.015	0.040	0.023	0.019	0.015	0.029	0.037	0.036
Molybdenum	mg/L		<0.002	0.002	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		3.19	3.44	3.39	3.06	3.29	3.26	3.40	3.36	3.61	3.34	3.05	3.0	3.18	3.05	3.35
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		8.49	8.25	8.02	8.04	6.63	8.43	8.56	7.54	8.44	8.02	8.98	8.49	6.37	10.1	7.56
Silver	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	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	4.61	5.21	4.64	4.49	4.91	4.84	4.58	4.56	4.34	4.10	3.82	3.95	3.74	3.81	4.07
Strontium	mg/L		0.455	0.472	0.438	0.404	0.499	0.484	0.483	0.451	0.508	0.485	0.479	0.479	0.441	0.474	0.528
Sulphur	mg/L		4.41	5.9	5.85	5.86	5.31	5.65	5.27	5.34	5.71	5.38	5.49	5.03	5.48	6.47	7.00
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	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	<0.002	<0.002	<0.002
Titanium	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	<0.002	<0.002	<0.002
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	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	<0.002	<0.002	<0.002
Zinc	mg/L	5 AO	0.006	<0.005	0.006	<0.005	<0.005	<0.005	0.023	0.007	0.020	<0.005	0.027	<0.005	<0.005	<0.005	0.006

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.



Groundwater Geochemical Results OW-17-I

Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	236	224	224	240	237	254	240	240	236	244	229	232	236	240	239
Chloride	mg/L	250 AO <sup>(3)</sup>	0.76	0.78	0.70	0.70	0.77	0.70	0.54	0.68	0.16	< 1	< 1	< 1	< 1	< 1	< 1
Dissolved Organic Carbon	mg/L	5 AO	2.9	3.1	1.9	2.8	2.7	2.9	3.2	3.2	3.2	2.2	2.0	2.0	3.0	2.7	2.0
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.25	0.26	0.23	0.30	0.24	0.23	0.26	0.24	0.22	0.32	0.33	0.31	0.35	0.36	0.33
Sulphate	mg/L	500 AO	15.6	16.2	16.3	16.0	16.5	16.6	16.1	16.3	16.3	20	18	18	18	18	17
Hardness	mg/L	80-100 OG	<b>235</b>	<b>246</b>	<b>227</b>	<b>237</b>	<b>214</b>	<b>217</b>	<b>211</b>	<b>246</b>	<b>231</b>	<b>269</b>	<b>227</b>	<b>242</b>	<b>263</b>	<b>244</b>	<b>276</b>
Nitrate	mg/L	10 MAC	0.05	<0.05	<0.05	<0.05	0.13	0.05	<0.05	<0.05	<0.05	0.10	0.43	0.17	< 0.06	< 0.06	< 0.06
Nitrite	mg/L	1 MAC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Organic Nitrogen	mg/L	0.15 OG	<0.10	0.11	<0.10	<b>0.30</b>	<b>0.21</b>	<b>0.21</b>	<b>0.19</b>	0.10	<b>0.17</b>	< 0.5	< 0.5	< 0.05	< 0.05	0.12	<b>0.20</b>
Orthophosphate	mg/L		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10						< 0.03
pH	pH Units	6.5-8.5 OG	7.84	7.81	7.72	7.82	7.97	7.59	7.92	7.99	7.97	8.19	8.23	8.18	8.17	8.02	8.15
Electrical Conductivity	µS/cm		448	503	503	510	404	394	466	463	465	453	465	458	462	466	455
Total Ammonia	mg/L		0.02	0.03	<0.02	<0.02	0.02	<0.02	0.04	0.09	<0.02	0.07	0.09	0.11	0.07	0.05	0.06
Total Dissolved Solids	mg/L	500 AO	230	246	244	268	242	252	260	286	266	297	254	254	297	266	274
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.10	0.14	<0.10	0.3	0.23	0.21	0.23	0.19	0.17	< 0.5	0.25	0.11	0.09	0.17	0.26
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	0.091	<0.050	0.051	0.068	<0.050	<0.050	0.04	< 0.03	< 0.03	< 0.03	< 0.03	0.021
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	0.004	0.006	0.024	0.013	0.025	0.012	<0.004	0.005	0.006	0.002	0.068	< 0.001	0.001	0.002
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	0.004	0.004	<b>0.012</b>	<0.003	0.004	<0.003	0.0004	0.0006	0.0004	0.0003	0.0008	0.0002
Barium	mg/L	1 MAC	0.032	0.029	0.032	0.037	0.027	0.027	0.037	0.03	0.033	0.0373	0.0337	0.0335	0.0305	0.0296	0.0315
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.029	0.040	0.037	0.042	0.079	0.036	0.034	0.037	0.037	0.063	0.058	0.049	0.037	0.032	0.030
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.000003	0.000004	< 0.000003	< 0.000003	0.000004	< 0.000003
Calcium	mg/L		63.8	66.1	61.0	62.9	56.7	57.9	56.3	64.9	62.0	76.1	60.7	64.4	72.0	65.2	74.5
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.00023	0.00014	0.00051	0.00012	0.00032	0.00136
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000106	0.000111	0.00023	0.000147	0.000189	0.000107
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0018	< 0.0002	0.0004	0.0009	0.0009	0.0013
Iron	mg/L	0.3 AO	<b>0.314</b>	<0.010	0.252	<b>0.326</b>	0.21	0.133	0.016	0.273	0.237	<b>0.414</b>	<b>0.361</b>	<b>0.567</b>	<b>0.327</b>	<b>0.437</b>	<b>0.642</b>
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Magnesium	mg/L		18.3	19.7	18.2	19.3	17.5	17.6	17.1	20.4	18.6	19.3	18.4	19.8	20.1	19.7	21.9
Manganese	mg/L	0.05 AO	0.028	0.011	0.020	0.027	0.016	0.019	0.047	0.025	0.034	0.0406	0.0397	<b>0.0522</b>	0.0371	0.0414	0.0348
Molybdenum	mg/L		<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	0.00197	0.00181	0.00192	0.00234	0.00198	0.00152
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0002	0.0003	0.0004	0.0004	0.0003	0.0004
Potassium	mg/L		3.16	3.23	3.15	3.01	2.8	2.82	2.99	3.05	2.99	3.68	3.34	3.09	3.46	3.30	3.58
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	0.005	<0.004	<0.004	<0.004	<0.004	<0.004	< 0.00004	< 0.00004	0.00009	< 0.00004	< 0.00004	< 0.00004
Silicon	mg/L		8.71	8.11	8.48	8.19	9.53	7.82	8.31	8.62	9.13	11.4	9.64	9.64	9.32	9.21	8.60
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	200 AO	3.83	3.98	3.96	3.75	3.42	3.71	3.54	3.71	3.53	3.84	3.73	3.64	4.12	3.74	4.36
Strontium	mg/L		0.453	0.477	0.461	0.461	0.475	0.438	0.455	0.489	0.49	0.501	0.429	0.477	0.494	0.501	0.564
Sulphur	mg/L		6.66	6.68	5.63	5.37	4.98	6.63	6.12	7.2	6.09	10	5	5	6	6	6
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00008	0.00008	0.0002	< 0.00006	0.00022	0.00006
Titanium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.01	<0.002	<0.002	0.00017	0.00009	0.00385	0.00014	0.00007	0.0001
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000023	0.000025	0.00004	0.000042	0.000039	0.000028
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00016	0.00018	0.00038	0.00012	0.00016	0.00013
Zinc	mg/L	5 AO	<0.005	<0.005	<0.005	<0.005	<0.005	0.027	<0.005	<0.005	0.014	0.003	< 0.002	0.005	< 0.002	0.002	< 0.002

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-17-II

Parameters	Units	ODWS <sup>(1)</sup>	2014			2015			2016			2017			2018		
			June	July	Sep	May	July	Sep	May	July	Sep	May	July	Sep	May	July	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	277	284	279	274	298	211	284	292	272	319	299	288	291	274	256
Chloride	mg/L	250 AO <sup>(3)</sup>	2.26	2.58	2.58	2.44	2.68	9.80	2.67	2.76	2.72	2.29	2.33	3.09	2.50	2.86	2.59
Dissolved Organic Carbon	mg/L	5 AO	2.0	3.0	1.5	1.5	1.9	1.8	1.5	1.5	1.4	1.5	1.8	2.1	2.8	3.3	2.3
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	1.0	0.56	0.99	1.22	1.19	1.44	0.15	1.19	1.34	0.97	1.18	1.04	1.07	1.24	1.01
Sulphate	mg/L	500 AO	73	69.9	68.8	68.8	70.7	83.7	83.9	71.1	64.9	61.7	59.3	60.1	69.8	66.5	64.8
Hardness	mg/L	80-100 OG	<b>234</b>	<b>241</b>	<b>211</b>	<b>226</b>	<b>222</b>	<b>134</b>	<b>224</b>	<b>216</b>	<b>213</b>	<b>218</b>	<b>206</b>	<b>207</b>	<b>225</b>	<b>218</b>	<b>223</b>
Nitrate	mg/L	10 MAC	<0.05	<0.25	<0.10	<0.10	<0.10	0.14	<0.10	0.11	0.08	0.06	0.10	<0.10	0.06	0.08	<0.10
Nitrite	mg/L	1 MAC	<0.05	<0.25	<0.10	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05	<0.05	<0.05	<0.10	<0.05	<0.05	<0.10
Organic Nitrogen	mg/L	0.15 OG	<b>0.24</b>	0.13	0.15	<0.10	<0.10	0.12	<0.10	0.15	<0.10	<0.10	<0.10	<b>0.21</b>	<0.10	<b>0.21</b>	0.12
Orthophosphate	mg/L		<0.10	<0.50	<0.20	<0.20	<0.20	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	<0.20
pH	pH Units	6.5-8.5 OG	8.36	8.27	8.15	8.37	8.25	8.13	8.16	8.00	8.37	8.34	8.46	8.27	8.11	8.08	7.94
Electrical Conductivity	µS/cm		649	674	676	673	706	628	628	697	677	608	637	660	632	651	621
Total Ammonia	mg/L		0.03	0.07	0.03	<0.02	0.08	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
Total Dissolved Solids	mg/L	500 AO	354	390	358	348	368	336	346	368	352	320	348	322	332	346	366
Total Kjeldahl Nitrogen (TKN)	mg/L		0.27	0.2	0.18	<0.10	<0.10	0.12	<0.10	0.15	<0.10	<0.10	<0.10	0.21	<0.10	0.21	0.17
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	0.005	<0.004	<0.004	0.004	<0.004	<0.004	0.014	0.025	0.016	0.007	0.005	0.020	0.008	0.005	0.006
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.041	0.035	0.041	0.045	0.040	0.026	0.048	0.042	0.048	0.046	0.042	0.048	0.045	0.045	0.051
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	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	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.137	0.135	0.132	0.128	0.117	0.338	0.154	0.121	0.149	0.138	0.118	0.161	0.139	0.140	0.155
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		38.7	40.9	34.8	38.4	36.8	21.6	36.3	36.2	35.8	35.3	33.2	34.4	36.9	35.9	36.7
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.016	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.017	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Magnesium	mg/L		33.4	33.7	30.1	31.7	31.7	19.5	32.3	30.5	29.9	31.6	29.8	29.5	32.3	31.1	31.9
Manganese	mg/L	0.05 AO	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Molybdenum	mg/L		0.014	0.019	0.014	0.014	0.014	0.033	0.014	0.013	0.013	0.012	0.012	0.012	0.012	0.011	0.012
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		4.62	5.01	4.48	4.78	4.39	4.20	4.41	4.74	4.59	4.36	4.06	3.95	3.96	4.14	4.43
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		3.72	4.23	3.75	4.02	3.16	3.04	3.79	3.83	4.02	3.91	4.28	4.05	2.86	4.62	3.61
Silver	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	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	54.5	61.3	56.9	55.3	66.8	86.8	52.4	60.3	53.7	46.8	54.0	47.0	44.1	53.0	52.2
Strontium	mg/L		3.1	3.2	3.07	2.80	2.99	0.725	3.13	3.01	3.20	3.10	3.16	3.09	2.65	3.02	3.10
Sulphur	mg/L		21.6	24.6	25.5	25.5	22.5	32.3	23.0	22.2	20.5	21.2	19.3	19.3	22.3	20.9	23.5
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	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	<0.002	<0.002	<0.002
Titanium	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	<0.002	<0.002	<0.002
Uranium	mg/L	0.02 MAC	0.003	0.004	0.003	0.003	0.004	<0.002	0.004	0.004	0.004	0.003	0.004	0.004	0.004	0.004	0.004
Vanadium	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	<0.002	<0.002	<0.002
Zinc	mg/L	5 AO	0.008	<0.005	0.006	0.005	<0.005	0.005	0.006	<0.005	<0.005	<0.005	0.025	0.006	<0.005	<0.005	<0.005

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by bold entries.

Groundwater Geochemical Results OW-17-II

Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	282	272	269	274	293	308	274	284	281	291	300	284	280	303	281
Chloride	mg/L	250 AO <sup>(3)</sup>	3.02	3.12	2.60	3.03	3.27	3.08	3.11	3.01	3.14	4	3	6	4	4	4
Dissolved Organic Carbon	mg/L	5 AO	2.2	2.3	1.3	2.7	1.7	1.7	1.6	1.9	2.3	1.4	2	2	1.0	1.5	2.0
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	1.10	1.16	1.08	1.12	1.36	1.26	1.03	1.06	1.15	1.25	1.19	1.15	1.28	1.27	1.24
Sulphate	mg/L	500 AO	69.9	66.8	66.4	66.8	66.0	64.4	65.9	65.8	63.9	71	67	65	72	70	66
Hardness	mg/L	80-100 OG	<b>223</b>	<b>220</b>	<b>215</b>	<b>236</b>	<b>199</b>	<b>202</b>	<b>200</b>	<b>227</b>	<b>212</b>	<b>259</b>	<b>219</b>	<b>228</b>	<b>266</b>	<b>228</b>	<b>404</b>
Nitrate	mg/L	10 MAC	<0.10	0.13	<0.10	<0.10	0.08	0.06	<0.05	<0.05	<0.05	0.06	0.29	0.16	0.07	0.06	< 0.06
Nitrite	mg/L	1 MAC	<0.10	<0.10	<0.10	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Organic Nitrogen	mg/L	0.15 OG	<0.10	0.12	<0.10	<b>0.18</b>	0.10	<b>0.16</b>	<0.10	<0.10	0.11	<b>&lt; 0.5</b>	<b>&lt; 0.5</b>	< 0.05	< 0.05	< 0.05	<b>0.18</b>
Orthophosphate	mg/L		<0.20	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10						0.07
pH	pH Units	6.5-8.5 OG	7.93	7.96	7.85	7.91	8.09	7.75	8.05	8.14	8.09	8.29	8.35	8.24	8.24	8.19	8.21
Electrical Conductivity	µS/cm		620	700	701	684	565	551	617	624	634	619	690	628	632	649	629
Total Ammonia	mg/L		<0.02	0.03	<0.02	<0.02	0.02	<0.02	<0.02	0.03	<0.02	< 0.04	0.05	0.05	< 0.04	< 0.04	< 0.04
Total Dissolved Solids	mg/L	500 AO	320	362	336	346	340	350	344	396	348	377	403	357	426	414	397
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.10	0.15	<0.10	0.18	0.12	0.16	<0.10	<0.10	0.11	< 0.5	< 0.05	0.07	< 0.05	< 0.05	0.19
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.04	< 0.03	< 0.03	0.03	< 0.03	0.108
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	0.005	0.008	0.035	0.021	0.013	0.044	0.058	0.076	0.022	0.061	0.010	0.068	0.038	<b>0.675</b>
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0005	0.0007	0.0007	0.0007	0.0006	0.001
Barium	mg/L	1 MAC	0.047	0.044	0.049	0.052	0.039	0.040	0.043	0.044	0.049	0.0566	0.0506	0.0492	0.0469	0.0455	0.0565
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	0.000063
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.152	0.144	0.152	0.169	0.201	0.147	0.145	0.141	0.153	0.211	0.146	0.161	0.134	0.122	0.142
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000006	0.00001	0.000005	0.000009	0.000006	0.000027
Calcium	mg/L		37.3	36.2	36.2	38.8	32.5	33.7	32.6	36.6	34.6	50.5	35.2	42.4	51.9	40.4	83.9
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.00035	0.0005	0.00026	0.00056	0.00055	0.00423
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000038	0.000099	0.000033	0.000091	0.000058	0.00146
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.011	<0.003	0.003	0.0008	0.0019	0.0005	0.0009	0.0014	0.0049
Iron	mg/L	0.3 AO	<0.010	<0.010	<0.010	0.060	0.042	0.026	0.114	0.059	<0.010	0.026	0.111	0.023	0.107	0.058	<b>1.62</b>
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.00009	0.00012	< 0.00009	< 0.00009	< 0.00009	0.00179
Magnesium	mg/L		31.5	31.4	30.3	33.9	28.7	28.7	28.9	32.9	30.6	32.2	31.8	29.6	33.2	30.8	47.2
Manganese	mg/L	0.05 AO	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	0.004	0.00091	0.0038	0.0005	0.00385	0.00203	<b>0.0766</b>
Molybdenum	mg/L		0.013	0.011	0.012	0.012	0.011	0.012	0.007	0.011	0.011	0.0102	0.0116	0.0114	0.0114	0.00986	0.00936
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0007	0.0009	0.0007	0.0009	0.0008	0.0041
Potassium	mg/L		4.17	4.21	4.31	4.74	3.68	3.89	3.85	4.09	4.16	5.23	4.47	4.26	4.73	4.40	4.98
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	0.006	<0.004	<0.004	<0.004	<0.004	<0.004	0.00007	0.00006	0.0002	0.00008	0.00008	0.00009
Silicon	mg/L		4.84	3.03	4.10	4.22	4.27	4.26	3.71	4.05	4.74	5.51	4.99	4.76	4.60	4.60	5.15
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	200 AO	47.9	56.6	53.6	47.7	49.8	50.8	44.3	52.1	54.6	49.9	72.8	60.5	58.8	62.0	64.4
Strontium	mg/L		3.22	3.13	3.19	3.345	3.36	3.09	3.3	3.08	3.26	3.49	3.03	3.02	3.26	3.19	3.56
Sulphur	mg/L		23.9	22.2	22.2	21.4	19.3	21.6	20.6	23.3	19.4	32	23	22	24	24	24
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	< 0.000005	0.000007	0.000007	0.000005	0.000005	0.000017
Tin	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00006	0.0001	0.00007	< 0.00006	0.0001	0.00007
Titanium	mg/L		<0.002	<0.002	<0.002	0.005	<0.002	<0.002	<0.002	<0.002	0.004	0.00097	0.00282	0.00042	0.00288	0.00184	0.0202
Uranium	mg/L	0.02 MAC	0.005	0.003	0.004	0.004	0.003	0.003	0.003	0.003	0.004	0.00302	0.00424	0.00384	0.00381	0.00374	0.00384
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00052	0.00066	0.00049	0.00064	0.00059	0.00281
Zinc	mg/L	5 AO	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	< 0.002	0.003	0.006	< 0.002	< 0.002	0.006

Notes:  
(1) MECP Ontario Drinking Water Standards.  
(2) Operational Guideline (OG) within ODWS.  
(3) Aesthetic Objective (AO) within ODWS.  
(4) Maximum Acceptable Concentration (MAC) within ODWS.  
(5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
(6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-17-III

Parameters	Units	ODWS <sup>(1)</sup>	2014			2015			2016			2017			2018		
			June	July	Sep	May	July	Sep	May	July	Sep	May	July	Sep	May	July	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	183	Insufficient Water to Sample	387	175	319	DRY	143	340	DRY	134	349	DRY	187	DRY	DRY
Chloride	mg/L	250 AO <sup>(3)</sup>	1.56		2.2	1.41	2.66		1.42	2.58		1.0	1.23		1.54		
Dissolved Organic Carbon	mg/L	5 AO	2.3		2.7	2.2	3.0		2.8	4.7		2.7	2.5		2.7		
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	<0.05		<0.10	<0.05	<0.20		<0.05	<0.10		<0.05	<0.05		<0.05		
Sulphate	mg/L	500 AO	3.51		6.81	2.82	3.81		5.68	4.20		4.75	7.46		3.97		
Hardness	mg/L	80-100 OG	<b>163</b>		<b>356</b>	<b>172</b>	<b>340</b>		<b>126</b>	<b>332</b>		<b>117</b>	<b>338</b>		<b>167</b>		
Nitrate	mg/L	10 MAC	<0.05		<0.10	<0.05	<0.20		<0.05	<0.10		<0.05	<0.05		<0.05		
Nitrite	mg/L	1 MAC	<0.05		<0.10	<0.05	<0.20		<0.05	<0.10		<0.05	<0.05		<0.05		
Organic Nitrogen	mg/L	0.15 OG	<b>0.65</b>		<b>0.62</b>	<0.10	<b>0.39</b>		<b>0.42</b>	<b>1.39</b>		<0.10	<0.10		<0.10		
Orthophosphate	mg/L		<0.10		<0.20	<0.10	<0.40		<0.10	<0.20		<0.10	<0.10		<0.10		
pH	pH Units	6.5-8.5 OG	8		7.64	7.88	8.13		7.75	8.02		7.99	8.28		7.61		
Electrical Conductivity	µS/cm		354		709	354	605		263	656		250	614		332		
Total Ammonia	mg/L		0.08		0.04	<0.02	<0.02		<0.02	0.07		<0.02	<0.02		<0.02		
Total Dissolved Solids	mg/L	500 AO	196		368	178	320		148			134	350		172		
Total Kjeldahl Nitrogen (TKN)	mg/L		0.73		0.66	<0.10	0.39		0.42	1.46		<0.10	<0.10		<0.10		
Total Phosphorus	mg/L		<0.05		<0.05	<0.05	<0.05		<0.05	<0.05		<0.05	<0.05		<0.05		
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	0.011		0.008	0.012	0.010		0.019	0.014		0.012	0.007		0.007		
Arsenic	mg/L	0.01 MAC	<0.003		<0.003	<0.003	<0.003		<0.003	<0.003		<0.003	<0.003		<0.003		
Barium	mg/L	1 MAC	0.014		0.024	0.015	0.015		0.016	0.053		0.012	0.020		0.013		
Beryllium	mg/L		<0.001		<0.001	<0.001	<0.001		<0.001	<0.001		<0.001	<0.001		<0.001		
Bismuth	mg/L		<0.002		<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002		<0.002		
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.011		<0.010	<0.010	0.014		<0.010	<0.010		<0.010	<0.010		<0.010		
Cadmium	mg/L	0.005 MAC	<0.002		<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002		<0.002		
Calcium	mg/L		44.0		97.4	46.2	91.4		33.6	89.4		30.8	89.4		45.0		
Chromium	mg/L	0.05 MAC	<0.003		<0.003	<0.003	0.003		<0.003	<0.003		<0.003	<0.003		<0.003		
Cobalt	mg/L		<0.001		<0.001	<0.001	<0.001		<0.001	<0.001		<0.001	0.002		<0.001		
Copper	mg/L	1 AO	<0.003		<0.003	<0.003	<0.003		<0.003	<0.003		<0.003	<0.003		<0.003		
Iron	mg/L	0.3 AO	<0.010		0.011	<0.010	<0.010		<0.010	<0.010		<0.010	<b>1.83</b>		<0.010		
Lead	mg/L	0.01 MAC	<0.002		<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002		<0.001		
Magnesium	mg/L		12.8		27.3	13.7	27.2		10.2	26.4		9.64	27.9		13.3		
Manganese	mg/L	0.05 AO	0.012		0.004	0.009	0.024		0.026	<b>0.254</b>		0.008	<b>0.912</b>		0.030		
Molybdenum	mg/L		<0.002		<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002		<0.002		
Nickel	mg/L		<0.003		<0.003	<0.003	<0.003		<0.003	0.007		<0.003	<0.003		<0.003		
Potassium	mg/L		1.05		0.94	0.83	0.66		0.81	1.07		0.85	0.43		0.80		
Selenium	mg/L	0.05 MAC	<0.004		<0.004	<0.004	<0.004		<0.004	<0.004		<0.004	<0.004		<0.004		
Silicon	mg/L		5.86		6.48	5.6	5.36		4.85	6.19		4.8	7.28		4.11		
Silver	mg/L		<0.002		<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002		<0.002		
Sodium	mg/L	200 AO	4.57		5.29	3.85	5.85		4.64	7.67		2.95	5.02		3.0		
Strontium	mg/L		0.079		0.14	0.084	0.122		0.067	0.222		0.063	0.139		0.077		
Sulphur	mg/L		0.81		2.69	1.19	0.97		1.54	1.64		1.83	3.31		1.43		
Thallium	mg/L		<0.006		<0.006	<0.006	<0.006		<0.006	<0.006		<0.006	<0.006		<0.006		
Tin	mg/L		<0.002		<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002		<0.002		
Titanium	mg/L		<0.002		<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002		<0.002		
Uranium	mg/L	0.02 MAC	<0.002		<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002		<0.002		
Vanadium	mg/L		<0.002		<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002		<0.002		
Zinc	mg/L	5 AO	0.006		0.008	0.007	0.005		<0.005	0.006		<0.005	0.006		<0.005		

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-17-III

Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	126	DRY	DRY	318	413	DRY	242	417	DRY	155	DRY	DRY	DRY	DRY	DRY
Chloride	mg/L	250 AO <sup>(3)</sup>	0.94			1.25	1.28		1.61	1.66		< 1					
Dissolved Organic Carbon	mg/L	5 AO	3.4			2.2	3.0		2.2	4.4		2.3					
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	<0.05			<0.05	<0.05		<0.05	<0.05		< 0.06					
Sulphate	mg/L	500 AO	3.36			8.43	6.98		3.36	2.7		9					
Hardness	mg/L	80-100 OG	<b>123</b>			<b>322</b>	<b>366</b>		<b>201</b>	<b>408</b>		<b>156</b>					
Nitrate	mg/L	10 MAC	<0.05			<0.10	<0.10		<0.05	<0.05		< 0.06					
Nitrite	mg/L	1 MAC	<0.05			<0.10	<0.10		<0.05	<0.05		< 0.03					
Organic Nitrogen	mg/L	0.15 OG	<0.10			<b>0.17</b>	<b>0.24</b>		<b>0.42</b>	<b>0.27</b>		<b>&lt; 0.5</b>					
Orthophosphate	mg/L		<0.10			<0.20	<0.20		<0.10	<0.10							
pH	pH Units	6.5-8.5 OG	7.44			7.85	7.89		7.47	7.76		7.99					
Electrical Conductivity	µS/cm		236			642	653		438	729		282					
Total Ammonia	mg/L		<0.02			<0.02	<0.02		<0.02	<0.02		< 0.04					
Total Dissolved Solids	mg/L	500 AO	132			308	390		252	418		183					
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.10			0.17	0.24		0.42	0.27		< 0.5					
Total Phosphorus	mg/L		<0.05			<0.050	<0.050		<0.050	<0.050		< 0.03					
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	0.006			0.019	0.014		0.011	0.067		0.082					
Arsenic	mg/L	0.01 MAC	<0.003			0.005	<0.003		<0.003	<0.003		< 0.0002					
Barium	mg/L	1 MAC	0.011			0.020	0.017		0.014	0.022		0.0106					
Beryllium	mg/L		<0.001			<0.001	<0.001		<0.001	<0.001		0.000007					
Bismuth	mg/L		<0.002			<0.002	<0.002		<0.002	<0.002		< 0.00001					
Boron	mg/l	5 IMAC <sup>(5)</sup>	<0.010			<0.010	0.053		<0.010	<0.010		0.016					
Cadmium	mg/L	0.005 MAC	<0.002			<0.002	<0.002		<0.002	<0.002		0.000005					
Calcium	mg/L		33.3			86.1	99.2		52.8	110		43.5					
Chromium	mg/L	0.05 MAC	<0.003			<0.003	<0.003		<0.003	<0.003		0.00048					
Cobalt	mg/L		<0.001			<0.001	0.001		<0.001	0.001		0.000071					
Copper	mg/L	1 AO	<0.003			0.004	0.003		<0.003	<0.003		0.0009					
Iron	mg/L	0.3 AO	<0.010			<0.010	<b>0.789</b>		<b>0.614</b>	<b>1.08</b>		0.08					
Lead	mg/L	0.01 MAC	<0.001			<0.001	<0.001		<0.001	<0.001		< 0.00009					
Magnesium	mg/L		9.79			26.1	28.7		16.9	32.4		11.5					
Manganese	mg/L	0.05 AO	0.013			0.002	<b>0.354</b>		<b>0.422</b>	<b>0.513</b>		0.00359					
Molybdenum	mg/L		<0.002			<0.002	<0.002		<0.002	<0.002		0.00037					
Nickel	mg/L		<0.003			<0.003	<0.003		0.009	0.007		0.0006					
Potassium	mg/L		1.02			0.30	0.45		<0.50	0.58		0.72					
Selenium	mg/L	0.05 MAC	<0.004			0.004	<0.004		<0.004	<0.004		0.00007					
Silicon	mg/L		5.43			6.8	9.08		8.14	8.91		7.1					
Silver	mg/L		<0.002			<0.002	<0.002		<0.002	<0.002		< 0.00005					
Sodium	mg/L	200 AO	3.2			5.3	5.37		4.5	5.65		3.18					
Strontium	mg/L		0.062			0.125	0.163		0.086	0.168		0.0694					
Sulphur	mg/L		1.96			2.82	2.62		2.23	3.84		5					
Thallium	mg/L		<0.006			<0.006	<0.006		<0.006	<0.006		< 0.000005					
Tin	mg/L		<0.002			<0.002	<0.002		<0.002	<0.002		< 0.00006					
Titanium	mg/L		<0.002			<0.002	<0.002		0.01	<0.002		0.00231					
Uranium	mg/L	0.02 MAC	<0.002			<0.002	<0.002		<0.002	<0.002		0.00012					
Vanadium	mg/L		<0.002			<0.002	<0.002		<0.002	<0.002		0.0003					
Zinc	mg/L	5 AO	<0.005			<0.005	<0.005		<0.005	0.012		< 0.002					

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-23-I

Parameters	Units	ODWS <sup>(1)</sup>	2014			2015			2016			2017			2018		
			June	July	Sep	May	July	Sep	May	July	Sep	May	July	Sep	May	July	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	221	214	220	228	219	220	229	226	223	228	239	239	244	220	205
Chloride	mg/L	250 AO <sup>(3)</sup>	1.89	1.96	2.04	1.34	2.03	1.85	2.19	1.94	1.89	1.63	1.55	1.75	1.77	1.55	1.79
Dissolved Organic Carbon	mg/L	5 AO	2.7	2.1	2.4	2.7	3.1	2.7	2.5	2.4	2.3	2.4	3.0	3.4	2.2	3.6	3.3
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	1.17	1.38	1.25	0.89	1.41	1.26	1.25	1.27	1.31	1.02	1.2	1.19	1.06	1.08	1.35
Sulphate	mg/L	500 AO	5.16	4.3	4.76	5.40	5.24	6.50	5.90	4.82	4.22	4.15	4.31	4.36	4.96	4.79	6.74
Hardness	mg/L	80-100 OG	96	97	99.1	<b>153</b>	99.5	<b>139</b>	<b>114</b>	<b>105</b>	90.4	97.5	<b>101</b>	<b>125</b>	<b>121</b>	<b>130</b>	93.3
Nitrate	mg/L	10 MAC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.27	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrite	mg/L	1 MAC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Organic Nitrogen	mg/L	0.15 OG	<b>0.62</b>	<b>0.33</b>	<b>0.51</b>	<b>0.26</b>	<b>0.20</b>	<b>1.04</b>	<b>0.24</b>	<0.10	0.15	0.13	<0.10	<b>0.24</b>	<0.10	0.10	<b>0.30</b>
Orthophosphate	mg/L		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10
pH	pH Units	6.5-8.5 OG	8.43	8.11	8.32	8.39	8.17	8.2	8.23	8.05	8.45	8.39	8.28	8.25	8.04	8.04	7.92
Electrical Conductivity	µS/cm		422	428	439	457	441	443	423	448	440	417	434	454	434	436	410
Total Ammonia	mg/L		0.62	0.65	0.5	0.5	0.63	0.46	0.45	0.68	0.61	0.55	0.72	0.64	0.61	0.54	0.44
Total Dissolved Solids	mg/L	500 AO	226	240	216	218	226	236	228	240	220	218	230	224	210	234	252
Total Kjeldahl Nitrogen (TKN)	mg/L		1.24	0.98	1.01	0.76	0.83	1.5	0.69	0.74	0.76	0.68	0.71	0.88	0.66	0.64	0.74
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	0.006	<0.004	<0.004	<0.004	0.005	<0.004	0.011	0.013	0.017	0.011	0.004	0.006	0.007	<0.004	0.012
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.025	0.023	0.027	0.029	0.022	0.031	0.028	0.027	0.027	0.027	0.027	0.046	0.041	0.033	0.028
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	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	<0.002	<0.002	<0.002
Boron	mg/L	5 IMAC <sup>(5)</sup>	0.316	0.325	0.307	0.272	0.298	0.310	0.347	0.269	0.310	0.304	0.258	0.262	0.294	0.292	0.349
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		14.5	14.1	14.8	26.9	15.1	24.3	17.4	16.7	13.6	14.8	15.4	20.9	20.1	21.9	14.1
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.010	0.057	0.048	0.028	0.014	<0.010	0.046	0.063	0.063	0.034	0.058	0.029	<0.010	0.012	0.012
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Magnesium	mg/L		14.5	14.9	15.1	20.9	15.0	18.9	17.2	15.3	13.7	14.7	15.1	17.6	17.3	18.2	14.1
Manganese	mg/L	0.05 AO	0.009	0.009	0.008	0.009	0.008	0.008	0.010	0.009	0.008	0.009	0.009	0.008	0.007	0.011	0.010
Molybdenum	mg/L		0.009	0.01	0.009	0.009	0.013	0.009	0.009	0.009	0.010	0.010	0.009	0.006	0.008	0.008	0.010
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		2.99	3.16	3.2	3.50	3.0	4.16	3.29	3.31	3.06	3.17	3.09	3.17	3.26	3.19	2.97
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		4.63	4.54	4.5	4.59	3.66	4.38	4.64	4.85	4.55	4.55	5.19	5.41	3.6	5.85	3.82
Silver	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	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	60.0	63.0	59.1	35.0	57.2	50.1	57.0	58.9	60.5	57.5	49.9	42.1	43.6	42.5	58.2
Strontium	mg/L		0.442	0.453	0.432	0.433	0.535	0.438	0.479	0.536	0.495	0.483	0.54	0.721	0.537	0.596	0.465
Sulphur	mg/L		1.71	2.2	4.01	2.25	5.29	2.23	1.91	2.05	2.90	1.91	2.07	1.64	1.45	2.09	2.88
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	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	<0.002	<0.002	<0.002
Titanium	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	<0.002	<0.002	<0.002
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	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	0.002	<0.002	<0.002
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	0.006	<0.005	<0.005	<0.005	<0.005

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.  
 (7) ND indicates no data obtained.

Groundwater Geochemical Results OW-23-I

Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	227	221	212	233	226	255	233	230	235	238	217	Partial Sample	Destroyed	Destroyed	Destroyed
Chloride	mg/L	250 AO <sup>(3)</sup>	1.58	2.02	1.63	1.71	2.27	1.92	1.56	1.57	1.08	2	1				
Dissolved Organic Carbon	mg/L	5 AO	3.1	<b>5.7</b>	2.3	2.5	3.9	3.7	3.4	2.6	3.6	2.3	3.0				
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	1.30	1.49	1.28	1.26	<b>1.76</b>	1.40	1.04	1.11	0.86	1.2	1.33				
Sulphate	mg/L	500 AO	4.92	5.11	5.53	5.10	4.9	4.87	4.80	5.9	5.12	7	5				
Hardness	mg/L	80-100 OG	<b>101</b>	89.8	<b>117</b>	<b>117</b>	<b>110</b>	85.7	<b>144</b>	<b>127</b>	<b>148</b>	92.4	99.8	88.5			
Nitrate	mg/L	10 MAC	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.29	<0.05	0.24	0.2				
Nitrite	mg/L	1 MAC	<0.05	0.09	<0.05	<0.05	<0.05	<0.05	0.06	0.09	<0.05	0.06	< 0.03				
Organic Nitrogen	mg/L	0.15 OG	<b>0.44</b>	<b>0.24</b>	<b>0.22</b>	<b>0.36</b>	<b>0.20</b>	<b>0.40</b>	<b>0.38</b>	<b>0.56</b>	<b>0.33</b>	< <b>0.5</b>	< <b>0.5</b>				
Orthophosphate	mg/L		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10						
pH	pH Units	6.5-8.5 OG	8.00	8.07	8.01	7.81	8.00	7.70	8.02	8.17	8.13	8.27	8.39				
Electrical Conductivity	µS/cm		409	451	472	475	512	364	426	423	446	428	426				
Total Ammonia	mg/L		0.27	0.47	0.49	0.49	<0.02	0.45	0.59	0.30	0.45	0.60	0.65				
Total Dissolved Solids	mg/L	500 AO	214	228	218	238	324	224	226	244	242	254	249				
Total Kjeldahl Nitrogen (TKN)	mg/L		0.71	0.71	0.71	0.85	0.20	0.85	0.97	0.86	0.78	< 0.5	0.76				
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.25	< 0.03				
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	0.006	<0.004	0.027	0.015	0.016	0.044	0.009	0.005	0.037	0.007	0.072			
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0005	< 0.0002	0.0003			
Barium	mg/L	1 MAC	0.030	0.022	0.033	0.041	0.026	0.021	0.032	0.032	0.0400	0.0356	0.0275	0.0244			
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.000007	< 0.000007	0.000023			
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00001	< 0.00001	< 0.00001			
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.355	0.351	0.303	0.350	0.463	0.350	0.213	0.296	0.253	0.519	0.349	0.340			
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00001	0.000003	0.000007			
Calcium	mg/L		15.5	13.2	19.3	18.3	16.7	12.7	24.5	20.1	25.3	14.9	15.2	13.3			
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.00026	0.00016	0.00081			
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000042	0.000038	0.000084			
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	< 0.0002	0.0003	0.0005			
Iron	mg/L	0.3 AO	<0.010	<0.010	<0.010	0.054	<0.010	0.058	0.058	0.059	<0.010	0.041	0.089	0.115			
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.00009	< 0.00009	< 0.00009			
Magnesium	mg/L		15.1	13.8	16.6	17.4	16.5	13.1	20	18.7	20.5	13.4	15	13.5			
Manganese	mg/L	0.05 AO	0.011	0.009	0.010	0.010	<0.002	0.008	0.007	0.013	0.009	0.011	0.0102	0.0126			
Molybdenum	mg/L		0.010	0.010	0.009	0.008	0.031	0.010	0.004	0.008	0.006	0.00967	0.00991	0.012			
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0001	0.0001	0.0002			
Potassium	mg/L		3.07	2.83	3.11	3.46	3.29	2.63	3.51	3.1	3.41	3.54	2.98	2.9			
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	< 0.00004	< 0.00004	0.00006			
Silicon	mg/L		4.99	3.76	5.05	5.27	3.13	4.42	4.04	5.05	5.98	6.04	5.77	4.44			
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00005	< 0.00005	< 0.00005			
Sodium	mg/L	200 AO	54.2	58.4	47.9	50.7	73.5	55.4	38.1	46.2	36.4	60.9	55.5	60.6			
Strontium	mg/L		0.474	0.442	0.609	0.576	0.712	0.416	0.496	0.595	0.769	0.454	0.472	0.405			
Sulphur	mg/L		2.19	2.44	2.34	2.27	22.6	5.14	2.72	2.57	1.95	6	2	2			
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	< 0.000005	< 0.000005	< 0.000005			
Tin	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00006	0.00007	0.00016			
Titanium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.01	0.003	<0.002	0.00143	0.00042	0.00326			
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000064	0.000031	0.000086			
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00133	0.00009	0.00026			
Zinc	mg/L	5 AO	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	< 0.002	< 0.002	0.004			

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by bold entries.  
 (7) ND indicates no data obtained.

Groundwater Geochemical Results OW-23-II

Parameters	Units	ODWS <sup>(1)</sup>	2014			2015			2016			2017			2018		
			June	July	Sep	May	July	Sep	May	July	Sep	May	July	Sep	May	July	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	224	218	214	220	221	277	224	222	212	231	232	224	240	209	201
Chloride	mg/L	250 AO <sup>(3)</sup>	10.6	10.3	9.99	11.2	10.2	2.78	11.0	9.55	9.37	9.25	8.44	7.71	8.92	8.24	7.09
Dissolved Organic Carbon	mg/L	5 AO	1.8	1.4	1.6	1.6	2.3	1.4	1.7	2.0	1.5	1.4	2.0	2.0	2.1	2.5	2.3
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	0.96	0.69	1.05	1.02	1.13	1.38	1.05	1.13	1.05	0.98	1.20	1.14	1.13	1.26	1.06
Sulphate	mg/L	500 AO	120	113	102	104	97.2	71.2	101	91.1	80	83.6	78.0	72.8	88.2	81.0	74.8
Hardness	mg/L	80-100 OG	<b>160</b>	<b>158</b>	<b>145</b>	<b>143</b>	<b>142</b>	<b>229</b>	<b>142</b>	<b>131</b>	<b>122</b>	<b>125</b>	<b>119</b>	<b>116</b>	<b>132</b>	<b>125</b>	<b>123</b>
Nitrate	mg/L	10 MAC	0.10	<0.25	<0.10	0.08	0.17	<0.25	<0.10	<0.10	0.18	<0.05	0.06	0.14	<0.05	0.13	0.11
Nitrite	mg/L	1 MAC	<0.05	<0.25	<0.10	<0.05	<0.10	<0.25	<0.10	<0.10	<0.05	<0.05	<0.05	<0.10	<0.05	<0.05	<0.10
Organic Nitrogen	mg/L	0.15 OG	<b>0.47</b>	<0.10	0.15	0.10	<b>0.21</b>	<b>0.20</b>	<0.10	<b>0.27</b>	0.12	<0.10	<0.10	<b>0.20</b>	<0.10	<0.10	0.10
Orthophosphate	mg/L		<0.10	<0.50	<0.20	<0.10	<0.20	<0.50	<0.20	<0.20	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	<0.20
pH	pH Units	6.5-8.5 OG	8.36	8.24	8.23	8.41	8.2	8.19	8.16	8.08	8.40	8.34	8.35	8.31	7.98	8.04	7.92
Electrical Conductivity	µS/cm		694	688	678	675	666	672	632	656	635	608	606	604	625	602	573
Total Ammonia	mg/L		0.06	0.07	0.03	<0.02	<0.02	<0.02	<0.02	0.040	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
Total Dissolved Solids	mg/L	500 AO	364	400	358	362	352	342	352	360	338	334	320	314	344	338	374
Total Kjeldahl Nitrogen (TKN)	mg/L		0.53	<0.10	0.18	0.10	0.21	0.20	<0.10	0.31	0.12	<0.10	<0.10	0.20	<0.10	<0.10	0.15
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	<0.004	<0.004	0.009	0.018	<0.004	0.005	0.022	0.021	0.008	0.018	0.008	0.008	0.011	0.010
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.027	0.025	0.024	0.024	0.023	0.047	0.029	0.025	0.029	0.032	0.026	0.028	0.032	0.032	0.032
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	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	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.327	0.346	0.360	0.285	0.309	0.142	0.387	0.291	0.333	0.351	0.315	0.388	0.380	0.371	0.397
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		26.2	25.7	23.1	23.0	22.5	38.2	22.6	21.1	19.7	19.4	18.7	18.3	20.9	19.8	19.4
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	0.009	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.017	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.015	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.001	<0.001	<0.001
Magnesium	mg/L		22.9	22.9	21.3	20.7	20.9	32.4	20.8	18.9	17.8	18.6	17.6	17.0	19.5	18.3	18.1
Manganese	mg/L	0.05 AO	0.003	0.003	0.007	0.007	0.003	<0.002	0.011	0.021	<0.002	0.004	0.004	0.002	0.002	<0.002	<0.002
Molybdenum	mg/L		0.034	0.042	0.036	0.038	0.035	0.013	0.040	0.035	0.035	0.036	0.037	0.033	0.037	0.034	0.033
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		4.59	4.52	4.37	4.36	4.15	4.86	4.16	4.31	4.04	3.96	3.76	3.48	3.68	3.83	3.86
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		2.97	3.06	2.95	2.86	2.41	3.99	2.99	2.96	2.94	3.22	3.21	3.20	2.43	3.73	2.87
Silver	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	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	92.4	92.7	90.7	91.1	86.0	61.5	93.1	86.3	85.8	85.0	78.9	74.0	77.3	77.8	80.8
Strontium	mg/L		0.817	0.831	0.744	0.674	0.75	3.15	0.758	0.698	0.788	0.793	0.702	0.688	0.705	0.749	0.812
Sulphur	mg/L		35.4	38.3	38.1	38.6	31.6	24.6	32.1	28.5	25.4	29.4	26.2	23.5	30.7	25.2	26.6
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	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	<0.002	<0.002	<0.002
Titanium	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	0.002	<0.002	<0.002
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002
Vanadium	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	<0.002	<0.002	<0.002
Zinc	mg/L	5 AO	0.007	<0.005	<0.005	<0.005	<0.005	0.009	<0.005	0.010	0.005	<0.005	0.026	0.006	<0.005	<0.005	<0.005

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.



Groundwater Geochemical Results OW-23-II

Parameters	Units	ODWS <sup>(1)</sup>	2019			2020			2021			2022			2023		
			May	July	Sept	June	Aug	Oct	June	Aug	Oct	May	Aug	Oct	June	Aug	Oct
<b>General Chemistry</b>																	
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	223	205	206	217	240	245	226	224	210	233	215	220	219	217	221
Chloride	mg/L	250 AO <sup>(3)</sup>	8.44	8.40	7.75	8.78	8.2	6.89	8.78	8.03	8.4	12	10	10	13	12	12
Dissolved Organic Carbon	mg/L	5 AO	2.1	2.0	1.4	3.5	2.6	2.7	2.2	3.3	2.3	3.2	2.0	2.0	3.0	1.8	2.0
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>	1.17	1.24	1.12	1.26	1.41	1.21	1.08	1.11	1.28	1.35	1.25	1.21	1.24	1.32	1.28
Sulphate	mg/L	500 AO	86.9	81.0	75.5	76.9	76.4	75.9	89.5	78.6	76.1	86	90	79	90	82	79
Hardness	mg/L	80-100 OG	<b>128</b>	<b>125</b>	<b>115</b>	<b>122</b>	80.2	<b>111</b>	<b>115</b>	<b>127</b>	<b>120</b>	<b>141</b>	<b>137</b>	<b>137</b>	<b>147</b>	<b>131</b>	<b>129</b>
Nitrate	mg/L	10 MAC	0.06	<0.10	<0.10	<0.10	0.22	0.05	0.08	0.11	0.07	0.10	0.22	0.11	0.13	0.10	0.10
Nitrite	mg/L	1 MAC	<0.05	<0.10	<0.10	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Organic Nitrogen	mg/L	0.15 OG	<0.10	0.13	<0.10	<b>0.26</b>	<b>0.25</b>	<b>0.23</b>	<0.10	<0.10	<b>0.18</b>	< <b>0.5</b>	< <b>0.5</b>	0.14	< 0.05	0.13	<b>0.38</b>
Orthophosphate	mg/L		<0.10	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10						< 0.03
pH	pH Units	6.5-8.5 OG	7.95	8.04	7.80	7.88	8.14	7.65	8.01	8.15	7.91	8.33	8.30	8.25	8.28	8.17	8.35
Electrical Conductivity	µS/cm		593	639	644	644	371	500	612	589	574	601	613	597	615	596	580
Total Ammonia	mg/L		<0.02	0.05	<0.02	<0.02	0.57	<0.02	<0.02	<0.02	<0.02	< 0.04	0.04	< 0.04	< 0.04	< 0.04	< 0.04
Total Dissolved Solids	mg/L	500 AO	304	328	322	318	240	308	350	340	344	366	357	366	383	380	349
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.10	0.18	<0.10	0.26	0.82	0.23	<0.10	<0.10	0.18	< 0.5	< 0.05	0.15	< 0.05	0.13	0.40
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.050	<0.050	0.065	<0.050	<0.050	<0.050	0.07	< 0.03	< 0.03	< 0.03	< 0.03	< 0.003
<b>Metals</b>																	
Aluminum	mg/L	0.1 OG	<0.004	0.007	0.008	0.019	0.018	0.025	0.067	0.021	0.049	0.025	0.003	0.004	0.002	0.002	0.008
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0006	0.0005	0.0006	0.0006	0.0005	0.0005
Barium	mg/L	1 MAC	0.032	0.028	0.028	0.033	0.020	0.027	0.027	0.029	0.030	0.0395	0.0344	0.0324	0.0324	0.0294	0.0279
Beryllium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00001	< 0.00001	0.00002	< 0.00001	< 0.00001	< 0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.400	0.384	0.376	0.436	0.465	0.399	0.378	0.412	0.404	0.562	0.402	0.375	0.300	0.336	0.384
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000016	0.000012	0.000011	0.000017	0.000018	0.000018
Calcium	mg/L		20.6	19.8	18.7	18.6	11.5	17.4	18.1	19.5	18.3	25.5	24.1	23.2	27.3	21.4	20.0
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.00041	0.00031	0.00046	0.0004	0.00059	0.00031
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000071	0.000028	0.000048	0.000022	0.000018	0.00006
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0034	0.0006	0.0008	0.0015	0.0013	0.0016
Iron	mg/L	0.3 AO	<0.010	<0.010	<0.010	<0.010	0.042	0.019	0.016	0.031	<0.010	0.037	< 0.007	< 0.007	< 0.007	< 0.007	0.007
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Magnesium	mg/L		18.6	18.3	16.7	18.4	12.5	16.5	17	19.1	18	18.7	18.6	19.2	19.2	18.9	19.1
Manganese	mg/L	0.05 AO	<0.002	0.003	0.002	0.009	0.009	0.012	<0.002	<0.002	0.005	0.00354	0.00078	0.00148	0.00123	0.00029	0.00461
Molybdenum	mg/L		0.035	0.034	0.035	0.035	0.010	0.029	0.026	0.035	0.033	0.033	0.0323	0.0341	0.042	0.0353	0.0346
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0008	0.0006	0.0006	0.0006	0.0006	0.0008
Potassium	mg/L		3.78	3.78	3.73	4.33	2.51	3.43	3.51	3.62	3.74	4.87	3.86	3.97	4.52	4.03	4.08
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.00021	0.00024	0.00027	0.0002	0.00017	0.00012
Silicon	mg/L		3.81	2.23	3.03	1.94	4.8	3.13	2.3	3.18	3.49	4.48	3.78	3.46	3.25	3.30	2.96
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium	mg/L	200 AO	80.0	82.6	81.4	83.4	53.7	77.1	75.1	79.1	79.1	81.6	79.7	80.7	86.2	80.7	88.5
Strontium	mg/L		0.746	0.732	0.688	0.69	0.44	0.676	0.645	0.753	0.751	0.849	0.719	0.784	0.878	0.782	0.827
Sulphur	mg/L		29.3	26.7	25.2	24.7	2.31	25.3	28.1	33.8	22.9	40	29	29	32	29	28
Thallium	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Tin	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00007	< 0.00006	< 0.00006	< 0.00006	0.00008	0.00009
Titanium	mg/L		<0.002	<0.002	<0.002	0.004	<0.002	<0.002	0.01	<0.002	0.003	0.0007	0.00019	0.00011	< 0.00007	0.00012	0.00008
Uranium	mg/L	0.02 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00137	0.00161	0.00159	0.00169	0.00155	0.00161
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00068	0.00042	0.00043	0.00026	0.00027	0.00034
Zinc	mg/L	5 AO	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	<0.005	0.004	< 0.002	< 0.002	< 0.002	< 0.002	0.002

Notes:  
(1) MECP Ontario Drinking Water Standards.  
(2) Operational Guideline (OG) within ODWS.  
(3) Aesthetic Objective (AO) within ODWS.  
(4) Maximum Acceptable Concentration (MAC) within ODWS.  
(5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
(6) ODWS exceedances indicated by **bold** entries.

Summary of Residential Geochemical Results WS-7

Parameters	Units	ODWS <sup>(1)</sup>	2003	2004	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Res	
			Dec	June	Sept	Aug	June	July	June	June	July	June	June	June	May	June	May	May	May	May	May	June	June	May	June
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	308	304	315	307	305	304	324	341	328	295	320	316	306	309	326	329	330	329	No Sample	338	348	361	
Total Dissolved Solids	mg/L	500 AO <sup>(3)</sup>	392	428	396	362	364	406	898	462	394	377	406	384	364	354	368	354	352	354	Obtained	408	383	463	
Chloride	mg/L	250 AO	16.3	23.2	21.1	19.3	20.7	23.1	290	18	21	32	23	23.5	20.4	15.1	16.2	16.3	20.2	19.2		20.3	29.0	31.0	
Dissolved Organic Carbon	mg/L	5 AO	1.2	1.0	1.0	1.0	1.0	1.4	1.8	1.4	1.5	1.3	1.5	1.3	1.8	1.6	1.8	1.6	2.3	2.2		1.6	4.2	1.0	
Potassium	mg/L		<1	<1	3.0	1.76	1.75	0.4	0.21	0.27	2.0	2.0	2.0	1.73	1.82	1.77	1.69	1.78	1.75	1.67		1.88	1.92	2.07	
Sulphate	mg/L	500 AO	35.6	36.8	35.7	39.6	32.8	34.3	35	28	27	27	29	31	33.1	30.6	29.4	27.4	32.6	29.2		26.5	31.0	28.0	
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>						0.13			0.1	0.1	0.13	<0.10	<0.10	0.07	<0.05	<0.10	<0.05	<0.10		<0.05	0.13	0.14	
Hardness	mg/L	80 - 100 OG	50.5	6.9	342	310	327	<10	<1	<1	340	310	370	332	340	323	341	326	327	319		360	378	391	
Nitrate	mg/L	10 MAC	<0.2	<0.2	<0.2	<0.05	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	<0.05	<0.05	<0.10	<0.05	<0.10		<0.05	< 0.06	< 0.06	
Nitrite	mg/L	1 MAC	<0.2	<0.2	<0.2	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.10	<0.10	<0.05	<0.05	<0.10	<0.05	<0.10		<0.05	< 0.03	< 0.03	
Organic Nitrogen	mg/L	0.15 OG	0.06	0.02	0.06	0.11	0.28		0.18	0.18	0.18	0.075	0.30	<0.10	<0.10	<0.10	0.15	<0.10	0.16	<0.10		0.48	< 0.5	0.13	
Total Ammonia	mg/L		<0.03	<0.03	<0.03	<0.05	<0.05	<0.05	0.12	<0.05	<0.05	<0.05	<0.05	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	< 0.04	< 0.04	
Total Kjeldahl Nitrogen (TKN)	mg/L		0.09	0.05	0.09	0.16	0.33	<0.1	0.3	0.2	0.2	0.1	0.3	<0.10	<0.10	<0.10	0.15	<0.10	0.16	<0.10		0.48	< 0.05	0.16	
Orthophosphate	mg/L		<0.3	<0.3	<0.3	<0.1			0.04	0.02	<0.01	<0.01	<0.01	<0.20	<0.20	<0.10	<0.10	<0.20	<0.10	<0.20		<0.10		< 0.03	
pH	pH Units	6.5 - 8.5 OG												8.43	8.17	7.94	7.75	8.03	7.91	7.94		7.81	8.30	8.04	
Conductivity	µS/cm													716	638	671	663	667	624	691		711	689	768	
<b>Metals</b>																									
Aluminum	mg/L	0.1 OG	0.16	<0.05	0.16	<0.004	<0.004	<0.004	<0.005	<0.005	<0.005	<0.005	<0.005	0.014	<0.004	<0.004	<0.004	<0.004	0.009	0.004		0.014	< 0.001	0.016	
Arsenic	mg/L	0.01 MAC							<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		<0.003	< 0.0002	< 0.0002	
Barium	mg/L	1 MAC	<0.005	<0.005	0.057	0.048	0.041	<0.002	<0.005	<0.005	0.065	0.062	0.061	0.059	0.056	0.060	0.056	0.061	0.060	0.062		0.051	0.0675	0.06948	
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.001	<0.002	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	< 0.000007	< 0.000007	
Bismuth	mg/L		<0.2	<0.2	<0.2	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	< 0.00001	< 0.00001	
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.02	0.02	<0.01	<0.01	<0.01	0.01	0.019	<0.01	0.01	<0.01	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010		0.012	0.014	0.009	
Cadmium	mg/L	0.005 MAC	<0.005	<0.005	<0.005	<0.002	<0.002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	< 0.000003	< 0.000003	
Calcium	mg/L		19	2.63	87.2	80	84	<0.05	<0.2	<0.2	95	93	88	85.8	87.1	83.4	88.3	83.4	83.9	83.0		90.5	98.0	100.0	
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		<0.003	0.00018	< 0.00008	
Cobalt	mg/L		<0.005	<0.005	<0.005	<0.001	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	0.000028	0.000071	
Copper	mg/L	1 AO	0.006	<0.005	<0.005	<0.002	<0.003	0.03	0.002	0.003	0.2			<0.003	<0.003	0.005	<0.003	<0.003	<0.003	<0.003		<0.003	0.0079	0.0031	
Iron	mg/L	0.3 AO	0.08	0.02	1.6	1.03	1.86	0.04	<0.1	<0.1	2.0	5.9	4.6	2.0	1.48	2.12	1.77	1.97	1.49	<0.010		1.65	0.053	2.15	
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.001	0.089	<0.002	<0.001	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001		<0.001	0.00012	0.00013	
Magnesium	mg/L		0.76	0.08	30.2	26.8	28.5	<0.05	<0.05	<0.05	35	34	30	28.7	29.8	27.9	29.2	28.7	28.6	27.2		32.6	32.3	34.1	
Manganese	mg/L	0.05 AO	0.021	<0.005	0.061	0.023	0.026	<0.002	<0.002	<0.002	0.032	0.24	0.035	0.028	0.028	0.035	0.028	0.033	0.027	0.029		0.033	0.028	0.0308	
Molybdenum	mg/L		<0.02	<0.02	<0.02	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	0.001	0.00080	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	0.00076	0.00067	
Nickel	mg/L		<0.02	<0.02	<0.02	<0.003	<0.003	<0.003	<0.001	<0.001	<0.001	<0.001	0.0017	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		<0.003	0.0029	0.0022	
Phosphorus	mg/L													<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		0.062	< 0.003	0.014	
Selenium	mg/L	0.01 MAC							<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004		<0.004	< 0.00004	< 0.00004	
Silicon	mg/L													6.61	6.72	7.14	6.69	6.94	6.49	6.33		7.48	6.36	7.30	
Silver	mg/L		<0.005	<0.005	<0.005	<0.002	<0.002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	< 0.00005	< 0.00005	
Sodium	mg/L	200 AO	163	168	15.1	14.2	15.6	198	370	190	18	23	16	14.8	15.6	15.0	14.0	15.5	16.7	15.5		16.8	18.1	17.4	
Strontium	mg/L		0.013	0.002	0.146	0.131	0.125	<0.005	<0.001	<0.001	0.15	0.16	0.14	0.144	0.148	0.141	0.136	0.141	0.15	0.144		0.17	0.16	0.18	
Sulphur	mg/L													10.4	9.36	9.74	9.48	9.67	32.6	10.7		10.4	8.00	8.00	
Thallium	mg/L								<0.00005	<0.00005	<0.00005	0.00010	<0.00005	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006		<0.006	< 0.000005	< 0.000005	
Tin	mg/L		<0.05	<0.05	<0.05	<0.001	<0.002	<0.002		<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	0.00007	< 0.00006	
Titanium	mg/L		<0.005	<0.005	<0.005	<0.001	<0.002	<0.002		<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	< 0.00005	< 0.00007	
Uranium	mg/L	0.02 MAC							0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	0.000067	0.000062	
Vanadium	mg/L		<0.005	<0.005	<0.005	<0.001	<0.002																		

Summary of Residential Geochemical Results WS-8

Parameters	Units	ODWS <sup>(1)</sup>	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
			Dec	June	Nov	June	July	June	June	June	June	June	June	June	May	June	May	May	May	May	May	June	June
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	296	296	306	305	296	302	299	299	305	310	313	312	297	317	360	346	319	332	321	363	314
Total Dissolved Solids	mg/L	500 AO <sup>(3)</sup>	376	409	392	350	406	373	383	391	384	385	382	380	378	366	342	356	346	378	364	400	406
Chloride	mg/L	250 AO	22.9	35.9	23.5	26.4	22.7	26	29	28	26	22	21.5	23.1	28.7	27.3	27.2	20.9	16.0	16.2	16.2	24.0	24.0
Dissolved Organic Carbon	mg/L	5 AO	0.9	1.1	1.0	1.0	1.1	1.1	1.1	1.3	1.0	1.0	1.1	1.5	1.3	1.4	1.3	1.9	2.1	1.9	1.5	1.3	2
Potassium	mg/L		2.0	3.0	1.94	2.17	2.37	2.3	2.2	2.3	2.6	2.4	2.47	2.37	2.28	2.16	2.38	2.15	1.96	2.25	2.23	2.18	2.37
Sulphate	mg/L	500 AO	25.8	29.4	26.8	26.5	26.0	26.0	31.0	29.0	24.0	23.0	26.2	27.5	30.3	28.9	27.0	26.3	23.8	27.2	25.7	36.0	30.0
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>					0.26			0.2	0.2	0.25	<0.10	<0.10	0.16	0.27	<0.10	<0.05	0.14	0.17	<0.05	0.26	0.23
Hardness	mg/L	80 - 100 OG	<b>358</b>	<b>401</b>	<b>318</b>	<b>336</b>	<b>351</b>	<b>330</b>	<b>340</b>	<b>370</b>	<b>360</b>	<b>360</b>	<b>372</b>	<b>360</b>	<b>342</b>	<b>365</b>	<b>351</b>	<b>347</b>	<b>306</b>	<b>345</b>	<b>342</b>	<b>351</b>	<b>354</b>
Nitrate	mg/L	10 MAC	<0.2	<0.2	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	<0.05	<0.05	<0.10	<0.05	<0.10	<0.05	<0.05	<0.06	<0.06
Nitrite	mg/L	1 MAC	<0.2	<0.2	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.10	<0.10	<0.05	<0.05	<0.10	<0.05	<0.10	<0.05	<0.05	<0.03	<0.03
Organic Nitrogen	mg/L	0.15 OG	<0.01	0.12	0.10	<b>0.24</b>		<b>0.17</b>	<b>0.19</b>	<b>0.25</b>	<b>0.17</b>	<b>0.265</b>	<0.10	<0.10	<0.10	<b>0.17</b>	0.10	<0.10	<0.10	<b>0.29</b>	<b>0.30</b>	<b>&lt; 0.5</b>	< 0.05
Total Ammonia	mg/L		0.08	0.12	0.08	0.07	<0.05	0.23	0.11	0.05	0.13	0.085	0.08	0.10	0.06	0.08	0.06	0.07	0.09	<0.02	0.08	0.12	0.14
Total Kjeldahl Nitrogen (TKN)	mg/L		0.07	0.24	0.18	0.31	<0.1	0.4	0.3	0.3	0.3	0.35	0.16	0.13	0.10	0.25	0.16	0.16	<0.10	0.29	0.38	< 0.05	0.15
Orthophosphate	mg/L		<0.3	<0.3	<0.1			<0.01	<0.01	<0.01	<0.01	<0.01	<0.20	<0.20	<0.10	<0.10	<0.20	<0.10	<0.20	<0.10	<0.10		< 0.03
pH	pH Units	6.5 - 8.5 OG											8.41	8.25	7.88	7.92	7.88	7.87	7.85	7.71	7.93	8.15	8.07
Conductivity	µS/cm												691	675	692	678	675	635	654	758	657	653	679
<b>Metals</b>																							
Aluminum	mg/L	0.1 OG	0.05	0.06	0.027	<0.004	<0.004	<0.005	0.016	<0.005	<b>5.1</b>	<0.005	<0.004	<0.004	<0.004	0.010	0.004	0.099	<0.004	0.020	0.020	0.003	0.002
Arsenic	mg/L	0.01 MAC						<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0012	0.0012
Barium	mg/L	1 MAC	0.051	0.055	0.051	0.038	0.05	0.056	0.054	0.055	0.059	0.057	0.057	0.056	0.060	0.059	0.063	0.065	0.068	0.055	0.045	0.0578	0.05782
Beryllium	mg/L		<0.0005	<0.0005	<0.001	<0.002	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.000007	< 0.000007
Bismuth	mg/L		<0.2	<0.2	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00001	< 0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.02	0.02	0.051	0.01	0.02	0.015	0.02	0.014	0.02	0.029	0.012	0.014	0.014	0.012	0.012	0.014	0.015	0.020	0.019	0.013	0.011
Cadmium	mg/L	0.005 MAC	<0.005	<0.005	<0.002	<0.002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000003	< 0.000003
Calcium	mg/L		86.2	101	73.4	79.1	82.6	78	85	86	92	87	87.5	84.8	82.2	89.0	83.3	83.0	74.1	82.7	81.2	87.6	87.8
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.003	<0.003	<0.003	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.00015	< 0.00008
Cobalt	mg/L		<0.005	<0.005	<0.001	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000025	0.000028
Copper	mg/L	1 AO	<0.005	<0.005	<0.002	0.003	<0.002	0.002	0.006	0.003	0.003	0.003	<0.003	<0.003	<0.003	0.005	<0.003	<0.003	<0.003	<0.003	<0.003	0.0024	0.0007
Iron	mg/L	0.3 AO	<b>2.7</b>	<b>2.42</b>	<b>1.57</b>	<b>2.33</b>	<b>1.26</b>	<b>1.9</b>	<b>1.9</b>	<b>1.7</b>	<b>1.6</b>	<b>1.4</b>	<b>1.37</b>	<b>1.47</b>	<b>1.27</b>	<b>1.50</b>	<b>1.31</b>	<b>2.4</b>	<0.010	0.023	<b>1.40</b>	<b>1.14</b>	<b>1.18</b>
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.002	<0.002	<0.001	<0.0005	0.0005	0.0006	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	< 0.00009	< 0.00009
Magnesium	mg/L		34.6	36.1	32.8	33.7	35.1	33	35	36	40	37	37.2	36.1	33.3	34.7	34.8	34.0	29.4	33.6	33.8	32.1	32.6
Manganese	mg/L	0.05 AO	0.047	0.05	0.038	0.03	0.02	0.03	0.026	0.024	<b>0.056</b>	0.026	0.026	0.030	0.027	0.028	0.027	<b>0.052</b>	<b>0.057</b>	0.031	0.030	0.0282	0.02731
Molybdenum	mg/L		0.02	<0.02	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	0.001	0.0011	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00119	0.00098
Nickel	mg/L												<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0002	0.0002
Phosphorus	mg/L												<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.061	<0.050	0.021	0.01
Selenium	mg/L	0.01 MAC						<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<b>0.012</b>	<0.004	< 0.00004	< 0.00004
Silicon	mg/L												8.86	9.27	9.61	9.11	9.12	8.34	8.57	7.36	9.43	8.21	9.14
Silver	mg/L		<0.005	<0.005	<0.002	<0.002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00005	< 0.00005
Sodium	mg/L	200 AO	5.2	5.5	4.36	5.24	5.75	5.0	6.1	6.4	6.6	6.2	6.44	7.21	7.66	6.92	8.45	7.24	6.0	7.9	8.1	8.76	8.64
Strontium	mg/L		0.178	0.182	0.197	0.172	0.2	0.19	0.18	0.19	0.22	0.22	0.219	0.228	0.231	0.214	0.225	0.229	0.204	0.194	0.205	0.208	0.218
Sulphur	mg/L												7.7	7.80	9.94	9.09	9.74	26.3	9.39	9.55	9.77	8.00	9.00
Thallium	mg/L							<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	< 0.000005	< 0.000005	
Tin	mg/L		<0.05	<0.05	<0.001	<0.002	<0.002		<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.00006	< 0.00006	
Titanium	mg/L		<0.005	<0.005	<0.001	<0.002	<0.002		<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	0.00012	0.00041
Uranium	mg/L	0.02 MAC						0.0002	0.0002	0.0002	0.0002	0.00020	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000234	0.000248
Vanadium	mg/L		<0.005	<0.005	<0.001	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00004	0.00004
Zinc	mg/L	5 AO	0.072	0.179	0.066	0.009	0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.010	0.006	0.015	<0.005	0.009	<0.005	0.008	< 0.002

Notes:  
(1) MECP Ontario Drinking Water Standards.  
(2) Operational Guideline (OG) within ODWS.  
(3) Aesthetic Objective (AO) within ODWS.  
(4) Maximum Acceptable Concentration (MAC) within ODWS.  
(5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
(6) ODWS exceedances indicated by **bold** entries.



Summary of Residential Geochemical Results WS-9

Parameters	Units	ODWS <sup>(1)</sup>	2003	2004	2005	2006	2007	2008	2009	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
General Chemistry			Dec	June	June	Aug	July	June	June	May	June	May	May	May	May	May	June	June	May	June
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	272	272	270	269	259	271	274	271	275	No Sample	No Sample	292	307	291	No Sample	288	No Sample	285
Total Dissolved Solids	mg/L	500 AO <sup>(3)</sup>	394	423	366	398	394	412	413	386	424	Obtained	Obtained	416	348	422	Obtained	426	Obtained	426
Chloride	mg/L	250 AO	7.4	8.4	7.65	8.99	9.78	9.0	8.0	9.72	8.25			7.81	8.06	7.54		8.59		10
Dissolved Organic Carbon	mg/L	5 AO	0.9	0.6	0.9	1.2	1.1	1.2	1.1	1.2	1.5			1.3	1.9	1.8		1.3		1
Potassium	mg/L		4.0	4.0	4.0	3.71	4.31	3.9	4.0	3.86	1.09			0.18	0.18	0.14		<0.50		0.207
Sulphate	mg/L	500 AO	89.8	93.0	69.8	90.3	89.3	101	88.0	81.4	87.9			85.3	86.1	85.4		85.9		84
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>					0.94			0.68	0.68			0.61	1.29	0.76		0.9		0.96
Hardness	mg/L	80 - 100 OG	<b>309</b>	<b>336</b>	<b>270</b>	<b>282</b>	<b>300</b>	<b>290</b>	<b>320</b>	<b>297</b>	<b>31</b>			<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>		<b>&lt;0.5</b>		<b>2.11</b>
Nitrate	mg/L	10 MAC	<0.2	<0.2	<0.1	<0.05	<0.05	<0.1	<0.1	<0.10	<0.10			<0.10	<0.05	<0.10		<0.05		< 0.06
Nitrite	mg/L	1 MAC	<0.2	<0.2	<0.1	<0.05	<0.05	<0.01	<0.01	<0.10	<0.10			<0.10	<0.05	<0.10		<0.05		< 0.03
Organic Nitrogen	mg/L	0.15 OG	0.09	0.09	<b>0.17</b>	<0.38		<b>0.34</b>	0.09	<0.10	<0.10			<0.10	<0.10	<0.10		<b>0.38</b>		< 0.05
Total Ammonia	mg/L		0.19	0.21	0.23	0.18	0.11	0.36	0.21	0.23	0.04			<0.02	<0.02	<0.02		<0.02		0.04
Total Kjeldahl Nitrogen (TKN)	mg/L		0.28	0.3	0.4	<0.5	0.13	0.7	0.3	0.28	<0.10			<0.10	<0.10	<0.10		0.38		0.05
Orthophosphate	mg/L		<0.3	<0.3	<0.3			<0.01	<0.01	<0.20	<0.20			<0.20	<0.10	<0.20		<0.10		< 0.03
pH	pH Units	6.5 - 8.5 OG								8.41	8.36			7.96	7.91	7.96		8.03		8.12
Conductivity	µS/cm									697	735			729	717	741		723		731
<b>Metals</b>																				
Aluminum	mg/L	0.1 OG	<0.05	<0.05	<0.1	0.006	<0.004	<0.005	<0.005	0.010	<0.004			<0.004	0.004	0.005		0.019		< 0.001
Arsenic	mg/L	0.01 MAC						<0.001	<0.001	<0.003	<0.003			<0.003	<0.003	<0.003		<0.003		0.0011
Barium	mg/L	1 MAC	0.052	0.054	0.05	0.03	0.050	0.053	0.053	0.056	0.005			0.003	<0.002	<0.002		<0.002		0.00049
Beryllium	mg/L		<0.0005	<0.0005	<0.005	<0.002	<0.001	<0.0005	<0.0005	<0.001	<0.001			<0.001	<0.001	<0.001		<0.001		< 0.000007
Bismuth	mg/L		<0.2	<0.2	<0.2	<0.002	<0.002	<0.001	<0.001	<0.002	<0.002			<0.002	<0.002	<0.002		<0.002		< 0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.36	0.36		0.29	0.36	0.40	0.37	0.347	0.358			0.304	0.343	0.322		0.399		0.299
Cadmium	mg/L	0.005 MAC	<0.005	<0.005	<0.005	<0.002	<0.0001	<0.0001	<0.0001	<0.002	<0.002			<0.002	<0.002	<0.002		<0.002		0.000003
Calcium	mg/L		68.5	77.5	58.1	61.9	66.6	64.0	66.0	66.0	6.94			0.09	0.08	0.10		0.11		0.42
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.01	<0.003	<0.003	<0.005	<0.005	<0.003	<0.003			<0.003	<0.003	<0.003		<0.003		< 0.00008
Cobalt	mg/L		<0.005	<0.005	<0.02	<0.002	<0.0005	<0.0005	<0.0005	<0.001	<0.001			<0.001	<0.001	<0.001		<0.001		0.000027
Copper	mg/L	1 AO	<0.005	<0.005	<0.02	<0.003	<0.002	<0.001	0.002	0.003	<0.003			0.011	0.007	0.010		0.005		0.0043
Iron	mg/L	0.3 AO	<b>0.54</b>	<b>0.44</b>	<b>0.41</b>	<b>0.566</b>	<b>0.34</b>	<b>0.44</b>	<b>0.50</b>	<b>0.574</b>	0.036			<0.010	<0.010	<0.010		0.013		0.046
Lead	mg/L	0.01 MAC	0.006	<0.001	<0.05	<0.002	<0.001	<0.0005	<0.0005	0.002	<0.002			<0.002	<0.002	0.004		0.002		0.00046
Magnesium	mg/L		33.5	34.6	31.1	30.9	32.4	31.0	32.0	32.2	3.43			<0.05	<0.05	<0.05		<0.05		0.258
Manganese	mg/L	0.05 AO	0.02	0.024	0.02	0.014	0.02	0.016	0.016	0.019	0.003			<0.002	<0.002	<0.002		<0.002		0.00057
Molybdenum	mg/L		<0.02	<0.02		0.004	0.01	0.005	0.005	0.005	0.004			0.004	0.004	0.004		0.004		0.0037
Nickel	mg/L		<0.02	<0.02		<0.003	<0.003	<0.001	<0.001	<0.003	<0.003			<0.003	<0.003	0.008		<0.003		0.0006
Phosphorus	mg/L									<0.05	<0.05			<0.05	<0.05	<0.05		0.136		< 0.003
Selenium	mg/L	0.01 MAC						<0.002	<0.002	<0.004	<0.004			<0.004	<0.004	<0.004		<0.004		< 0.00004
Silicon	mg/L									6.56	5.84			5.99	5.61	5.80		6.92		5.94
Silver	mg/L		<0.005	<0.005		<0.002	<0.0001	<0.0001	<0.0001	<0.002	<0.002			<0.002	<0.002	<0.002		<0.002		< 0.00005
Sodium	mg/L	200 AO	27.4	28.8	32.1	28.2	31.3	27.0	27.0	26.9	160			178	173	164		162		162
Strontium	mg/L		5.5	5.47		6.06	5.36	5.6	5.4	5.6	0.558			<0.005	0.005	<0.005		0.005		0.02785
Sulphur	mg/L									27.6	25.6			29.0	86.1	27.4		28.2		30
Thallium	mg/L							<0.00005	<0.00005	<0.006	<0.006			<0.006	<0.006	<0.006		<0.006		< 0.000005
Tin	mg/L		<0.05	<0.05		<0.002	<0.002		<0.001	0.052	<0.002			<0.002	<0.002	<0.002		<0.002		< 0.00006
Titanium	mg/L		<0.005	<0.005		<0.002	<0.002		<0.005	0.002	<0.002			<0.002	<0.002	<0.002		0.007		< 0.00007
Uranium	mg/L	0.02 MAC						0.0002	0.0002	<0.002	<0.002			<0.002	<0.002	<0.002		<0.002		0.000225
Vanadium	mg/L		<0.005	<0.005		<0.002	<0.002	<0.001	<0.001	0.002	<0.002			<0.002	<0.002	<0.002		<0.002		0.00003
Zinc	mg/L	5 AO	0.018	0.083	<0.01	0.011	0.01	<0.005	0.006	0.271	<0.005			0.011	0.011	0.083		<0.005		0.005

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within  
 (6) ODWS exceedances indicated by **bold** en

Summary of Residential Geochemical Results WS-13

Parameters	Units	ODWS <sup>(1)</sup>	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
			Dec	Dec	Nov	June	Oct	June	June	June	June	June	June	May	June	May	May	May	May	May	June	June	May
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	261	280	247	288	249	280	294	298	284	290	264	271	265	No Sample	235	283	300	287	311	No Sample	301
Total Dissolved Solids	mg/L	500 AO <sup>(3)</sup>	278	320	388	294	264	301	305	327	311	326	270	274	280	Obtained	244	274	242	302	320	Obtained	334
Chloride	mg/L	250 AO	4.8	4.3	13.5	2.88	1.97	5.0	3.0	3.0	4.0	4.0	4.47	3.22	2.93		3.64	3.60	2.02	3.58	2.65		6
Dissolved Organic Carbon	mg/L	5 AO	2.8	2.3	5.0	3.0	2.4	3.5	2.4	2.5	2.4	2.3	2.6	2.6	2.6		3.3	3.0	2.6	3.3	2.6		3
Potassium	mg/L		<1	2.7	0.94	1.1	1.05	1.2	0.9	1.2	1.2	1.0	1.02	0.96	0.99		1.08	0.97	0.88	1.18	1.21		1.14
Sulphate	mg/L	500 AO	17.3	27	63.4	18.7	19.2	16.0	10.0	19.0	15.0	21.0	11.3	9.92	9.01		15.8	12.2	9.04	14.4	11.2		19
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>		0.34			0.09			<0.1	<0.1	<0.1	<0.05	<0.10	<0.05		<0.05	<0.05	<0.05	<0.05	<0.05		< 0.06
Hardness	mg/L	80 - 100 OG	<b>29</b>	<b>280</b>	<b>270</b>	<b>282</b>	<b>268</b>	<b>260</b>	<b>290</b>	<b>320</b>	<b>300</b>	<b>310</b>	<b>291</b>	<b>277</b>	<b>265</b>		<b>232</b>	<b>269</b>	<b>225</b>	<b>285</b>	<b>308</b>		<b>314</b>
Nitrate	mg/L	10 MAC	<0.2	<0.05	<0.05	0.06	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.10	<0.05		<0.05	<0.05	<0.05	<0.05	0.42		0.07
Nitrite	mg/L	1 MAC	<0.2	<0.01	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.10	<0.05		<0.05	<0.05	<0.05	<0.05	<0.05		< 0.03
Organic Nitrogen	mg/L	0.15 OG	0.14	<b>0.20</b>	<b>0.20</b>	<b>0.19</b>		<b>0.19</b>	<b>0.18</b>	<b>0.18</b>	<b>0.18</b>	<b>0.34</b>	<0.10	<0.10	<0.10		0.13	<b>0.24</b>	<0.10	<b>0.24</b>	<b>0.44</b>		0.09
Total Ammonia	mg/L		<0.03	<0.02	<0.05	<0.05	<0.02	0.21	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.02		<0.02	<0.02	<0.02	<0.02	<0.02		0.04
Total Kjeldahl Nitrogen (TKN)	mg/L		0.17	0.23	0.25	0.24	<0.1	0.4	0.2	0.2	0.2	0.34	<0.10	<0.10	<0.10		0.13	0.24	<0.10	0.24	0.44		0.13
Orthophosphate	mg/L		<0.3	<0.5	<0.1		<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.10	<0.20	<0.10		<0.10	<0.10	<0.10	<0.10	<0.10		< 0.03
pH	pH Units	6.5 - 8.5 OG											8.20	8.13	7.76		7.88	7.74	7.67	7.82	7.75		7.96
Conductivity	µS/cm												530	520	525		457	494	464	612	587		582
<b>Metals</b>																							
Aluminum	mg/L	0.1 OG	0.08	<0.05	0.014	0.006	0.006	0.007	0.006	<0.005	0.009	0.0073	0.016	0.007	<0.004		0.008	0.009	0.006	0.020	0.019		0.002
Arsenic	mg/L	0.01 MAC						<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003		<0.003	<0.003	<0.003	<0.003	<0.003		< 0.0002
Barium	mg/L	1 MAC	<0.005	0.034	0.018	0.012	0.016	0.017	0.016	0.018	0.018	0.017	0.016	0.015	0.016		0.016	0.016	0.016	0.018	0.015		0.01806
Beryllium	mg/L		<0.0005	<0.001	<0.001	<0.002	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001		< 0.000007
Bismuth	mg/L		<0.2	<0.1	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002		< 0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.02	0.04	0.045	<0.01	0.015	0.033	0.02	0.014	0.03	0.021	0.026	0.036	0.022		0.030	0.035	0.032	0.040	0.028		0.025
Cadmium	mg/L	0.005 MAC	<0.005	<0.005	<0.002	<0.002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002		0.000014
Calcium	mg/L		10.9	71	73.4	74.3	70.7	71	74	84	87	81	78.1	73.2	70.6		60.4	71.5	60.3	74.6	80.2		84.1
Chromium	mg/L	0.05 MAC	<0.005	0.005	<0.003	<0.003	0.003	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003		<0.003	<0.003	<0.003	<0.003	<0.003		0.00022
Cobalt	mg/L		<0.005	<0.01	<0.001	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001		0.000026
Copper	mg/L	1 AO	0.116	0.14	0.019	0.12	0.011	0.01	0.003	0.003	0.006	0.0097	0.004	0.02	0.006		0.012	0.021	0.007	0.013	0.007		0.0045
Iron	mg/L	0.3 AO	0.04	<0.01	0.292	0.237	0.17	<0.1	<0.1	<0.1	<0.1	<0.1	<0.010	<0.010	<0.010		< 0.010	<0.010	<0.010	<0.010	<0.010		< 0.007
Lead	mg/L	0.01 MAC	<0.001	<b>0.021</b>	0.002	0.004	<0.001	0.0008	<0.0005	<0.0005	<0.0005	0.00060	<0.002	<0.002	<0.002		<0.002	<0.002	<0.001	<0.001	<0.001		0.0004
Magnesium	mg/L		0.44	24	20.9	23.5	22.2	21	22	26	26	25	23.4	22.9	21.5		19.6	22.0	18.1	24	26.2		25.3
Manganese	mg/L	0.05 AO	0.01	0.008	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002		0.00004
Molybdenum	mg/L		<0.02	<0.01	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002		0.00022
Nickel	mg/L		<0.02	<0.01	<0.003	<0.003	<0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003		<0.003	<0.003	<0.003	<0.003	<0.003		0.0007
Phosphorus	mg/L												<0.05	<0.05	<0.05		<0.05	<0.05	<0.05	<0.050	0.199		< 0.003
Selenium	mg/L	0.01 MAC						<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004		<0.004	<0.004	<0.004	<0.004	0.009		0.00016
Silicon	mg/L												4.73	4.42	4.78		3.96	3.89	4.06	4.53	5.02		4.52
Silver	mg/L		<0.005	<0.01	<0.002	<0.002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002		< 0.00005
Sodium	mg/L	200 AO	129	6.8	8.8	5.25	4.07	7.7	5.3	5.8	7.1	6.9	6.41	6.12	4.92		5.34	4.95	4.34	5.57	5.08		5.11
Strontium	mg/L		0.01	0.45	0.127	0.114	0.118	0.12	0.1	0.13	0.13	0.12	0.114	0.121	0.118		0.104	0.124	0.101	0.131	0.113		0.135
Sulphur	mg/L												3.53	2.59	3.04		5.67	12.2	6.09	6.57	5.22		6
Thallium	mg/L							<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.006	<0.006	<0.006		<0.006	<0.006	<0.006	<0.006	<0.006		< 0.000005
Tin	mg/L		<0.05	<0.05	0.001	<0.002	<0.002		<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002		< 0.00006
Titanium	mg/L		<0.005	<0.01	0.001	<0.002	<0.002		<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002		0.0001
Uranium	mg/L	0.02 MAC						0.0004	0.0004	0.0006	0.0006	0.00060	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002		0.000579
Vanadium	mg/L			<0.005	<0.001	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	0.00060	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002		0.0003
Zinc	mg/L	5 AO	0.138	0.011	0.052	0.046	0.019	0.009	<0.005	<0.005	<0.005	0.013	<0.005	0.009	0.005		0.009	0.009	0.008	0.019	0.007		< 0.002

Notes:  
(1) MECP Ontario Drinking Water Standards.  
(2) Operational Guideline (OG) within ODWS.  
(3) Aesthetic Objective (AO) within ODWS.  
(4) Maximum Acceptable Concentration (MAC) within ODWS.  
(5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
(6) ODWS exceedances indicated by **bold** entries.



Summary of Residential Geochemical Results WS-14

Parameters	Units	ODWS <sup>(1)</sup>	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
			Dec	Sept	June	Aug	July	June	June	June	June	June	June	June	May	June	May	May	May	May	May	June	June
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	329	333	337	328	313	325	325	327	316	330	319	351	310	342	330	344	325	325	322	333	322
Total Dissolved Solids	mg/L	500 AO <sup>(3)</sup>	356	345	321	294	288	329	328	341	324	335	294	304	302	294	296	292	290	312	322	289	357
Chloride	mg/L	250 AO	<0.5	0.7	0.79	0.83	0.96	2.0	1.0	1.0	<1	1.0	1.3	1.43	1.38	1.46	1.28	1.45	0.99	1.40	1.06	<1	<1
Dissolved Organic Carbon	mg/L	5 AO	1.2	1.1	1.0	1.6	1.2	1.2	1.2	1.3	1.1	1.4	1.1	1.5	1.3	1.3	1.3	1.7	1.9	1.9	1.4	1.2	1
Potassium	mg/L		<1	3.0	3.0	2.95	3.32	3.0	3.1	3.2	3.3	3.3	3.13	3.15	3.10	2.93	3.1	3.02	2.68	3.2	3.3	2.98	3.3
Sulphate	mg/L	500 AO	8.3	8.5	8.0	8.37	8.48	9.0	9.0	8.0	7.0	9.0	8.91	9.18	8.53	8.99	9.59	9.58	8.85	9.9	9.49	10	11
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>					0.44			0.4	0.4	0.44	0.32	0.27	0.37	0.42	0.19	0.48	0.35	0.44	0.39	0.49	0.43
Hardness	mg/L	80 - 100 OG	<b>1.4</b>	<b>331</b>	<b>290</b>	<b>285</b>	<b>301</b>	<b>290</b>	<b>300</b>	<b>330</b>	<b>300</b>	<b>310</b>	<b>303</b>	<b>306</b>	<b>291</b>	<b>305</b>	<b>293</b>	<b>297</b>	<b>254</b>	<b>305</b>	<b>334</b>	<b>303</b>	<b>317</b>
Nitrate	mg/L	10 MAC	<0.2	<0.2	<0.1	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.10	<0.05	<0.05	<0.10	<0.05	<0.05	<0.05	<0.05	<0.06	<0.06
Nitrite	mg/L	1 MAC	<0.2	<0.2	<0.1	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.10	<0.05	<0.05	<0.10	<0.05	<0.05	<0.05	<0.05	<0.03	<0.03
Organic Nitrogen	mg/L	0.15 OG	0.05	0.01	0.07	<b>&lt;0.26</b>		0.14	<b>2.51</b>	<b>0.16</b>	<b>0.22</b>	<0.10	0.10	<0.10	0.13	<0.10	<b>0.17</b>	0.13	<b>0.25</b>	<b>0.38</b>	<b>&lt;0.5</b>	0.06	0.06
Total Ammonia	mg/L		<0.03	0.3	0.33	0.24	0.12	0.36	0.29	0.24	0.3	0.21	0.25	0.22	0.22	0.25	0.20	0.23	0.24	0.16	0.24	0.22	0.26
Total Kjeldahl Nitrogen (TKN)	mg/L		0.08	0.31	0.4	<0.5	<0.1	0.5	2.8	0.4	0.3	0.43	0.23	0.32	0.23	0.38	0.29	0.4	0.37	0.41	0.62	0.29	0.32
Orthophosphate	mg/L		<0.3	<0.3	<0.3			<0.01	<0.01	<0.01	<0.01	<0.01	<0.10	<0.20	<0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10		<0.03
pH	pH Units	6.5 - 8.5 OG											8.31	8.19	7.83	7.85	7.94	7.91	7.80	7.91	8.05	8.11	8.07
Conductivity	µS/cm												611	594	596	595	587	584	568	664	620	563	605
<b>Metals</b>																							
Aluminum	mg/L	0.1 OG	<0.05	<0.05	<0.1	0.005	<0.004	<0.005	<0.005	<0.005	<0.005	<0.005	<0.004	<0.004	<0.004	0.008	<0.004	<0.004	0.005	0.014	0.009	<0.001	<0.001
Arsenic	mg/L	0.01 MAC							0.003	0.004	0.003	0.0038	0.004	0.003	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0031	0.0029
Barium	mg/L	1 MAC	<0.005	0.081	0.08	0.065	0.08	0.079	0.079	0.083	0.082	0.086	0.081	0.076	0.079	0.077	0.081	0.080	0.076	0.077	0.061	0.0762	0.07729
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.002	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.000007	<0.000007
Bismuth	mg/L		<0.2	<0.2	<0.2	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00002	<0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.08	0.07		0.078	0.09	0.069	0.08	0.09	0.08	0.075	0.082	0.086	0.083	0.079	0.074	0.091	0.084	0.087	0.101	0.068	0.07
Cadmium	mg/L	0.005 MAC	<0.005	<0.005	<0.005	<0.002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.000003	0.000003
Calcium	mg/L		0.45	75.3	61.7	62.9	67.3	66	67	74	73	73	68.5	68.2	65.5	69.9	65.1	66.2	57.0	67.4	74.0	69.8	73.8
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.01	<0.003	<0.003	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0002	0.00009
Cobalt	mg/L		<0.005	<0.005	<0.02	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000103	0.000136
Copper	mg/L	1 AO	<0.005	<0.005	<0.02	<0.003	0.02	0.011	0.13	0.01	0.02	0.03	0.005	0.064	<0.003	<0.003	0.003	0.004	<0.003	<0.003	<0.003	0.0075	0.0007
Iron	mg/L	0.3 AO	0.01	<b>1.6</b>	<b>1.44</b>	<b>1.55</b>	<b>1.33</b>	<b>1.9</b>	<b>1.6</b>	<b>2.6</b>	<b>1.9</b>	<b>1.46</b>	<b>1.36</b>	<b>1.55</b>	<b>1.36</b>	<b>1.39</b>	<b>1.51</b>	<0.010	<0.010	<0.010	<b>2.31</b>	<b>2.20</b>	<b>1.22</b>
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.05	<0.002	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	0.00060	<0.002	0.006	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.00009	<0.00009
Magnesium	mg/L		0.07	34.7	31.9	31	32.4	32	34	35	36	35	32.1	33.0	30.9	31.7	31.6	32.1	27.1	33.1	36.3	31.3	32.1
Manganese	mg/L	0.05 AO	<0.005	0.015	0.01	0.01	0.01	0.015	0.011	0.012	0.02	0.014	0.012	0.012	0.015	0.011	0.013	0.013	0.012	0.013	0.019	0.0206	0.01188
Molybdenum	mg/L		<0.02	<0.02		0.002	0.003	0.003	0.003	0.002	0.003	0.0026	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.00296	0.00222
Nickel	mg/L												<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	0.0005	0.0003
Phosphorus	mg/L												<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.050	0.135	<0.003
Selenium	mg/L	0.01 MAC						<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.00004	<0.00004
Silicon	mg/L												4.93	4.74	4.92	4.63	4.59	4.43	4.41	4.38	5.47	4.22	4.7
Silver	mg/L		<0.005	<0.005		<0.002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.00005	<0.00005
Sodium	mg/L	200 AO	152	11.2	10.6	11.3	12.1	10.0	11.0	10.0	12.0	11.0	11.1	11.8	11.2	10.4	10.9	11.2	10.2	10.9	11.5	11.4	9.56
Strontium	mg/L		0.002	1.22		1.39	1.24	1.3	1.2	1.3	1.4	1.4	1.4	1.37	1.40	1.29	1.31	1.39	1.21	1.36	1.32	1.4	1.48
Sulphur	mg/L												2.99	2.38	3.02	3.07	3.41	9.58	4.16	5.39	4.58	2.00	3.00
Thallium	mg/L							<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.000005	<0.000005
Tin	mg/L		<0.05	<0.05		<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.00006	<0.00006
Titanium	mg/L		<0.005	<0.005		<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.003	0.007	<0.00005
Uranium	mg/L	0.02 MAC						0.0008	0.0007	0.0008	0.0008	0.0008	0.0008	0.0008	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.000771	0.000815
Vanadium	mg/L		<0.005	<0.005		<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	0.0006	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00001	<0.00001
Zinc	mg/L	5 AO	<0.005	0.038	<0.01	0.012	0.02	0.007	0.009	0.01													

Summary of Residential Geochemical Results WS-15

Parameters	Units	ODWS <sup>(1)</sup>	2003	2004	2005	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
			Dec	June	June	July	June	June	June	June	June	June	May	June	May	May	May	May	May	June	June	May
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	258	273	280	261	269	271	270	261	270	270	271	264	279	285	299	281	No Sample	278	287	No Sample
Total Dissolved Solids	mg/L	500 AO <sup>(3)</sup>	394	412	377	380	409	404	393	379	396	378	392	384	364	346	378	354	Obtained	396	389	Obtained
Chloride	mg/L	250 AO	7.6	8.7	7.02	8.54	9.0	8.0	8.0	9.0	9.0	8.52	8.11	7.75	9.32	8.29	8.51	8.04		8.78	12.0	
Dissolved Organic Carbon	mg/L	5 AO	1.1	1.2	0.9	1.1	1.0	1.0	1.1	1.1	1.4	1.0	1.4	1.4	1.3	1.4	1.5	1.8		1.2	1.2	
Potassium	mg/L		4.0	4.0	4.0	4.5	4.1	4.2	4.1	4.1	4.3	3.98	3.98	3.86	3.75	4.15	3.9	3.58		3.78	3.85	
Sulphate	mg/L	500 AO	85.0	86.2	75.7	82.2	93.0	91.0	74.0	74.0	81.0	82.3	87.1	95.0	87.1	83.7	85.4	85.6		86.3	87.0	
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>				0.9			0.9	1.0	0.94	0.70	0.63	0.79	0.97	0.59	1.21	0.75		0.81	0.96	
Hardness	mg/L	80 - 100 OG	<b>329</b>	<b>322</b>	<b>270</b>	<b>294</b>	<b>290</b>	<b>290</b>	<b>300</b>	<b>280</b>	<b>290</b>	<b>295</b>	<b>297</b>	<b>287</b>	<b>301</b>	<b>297</b>	<b>298</b>	<b>266</b>		<b>294</b>	<b>315</b>	
Nitrate	mg/L	10 MAC	<0.2	<0.2	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	<0.05	<0.05	<0.10	<0.05	<0.10		<0.05	0.15	
Nitrite	mg/L	1 MAC	<0.2	<0.2	<0.1	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.10	<0.10	<0.05	<0.05	<0.10	<0.05	<0.10		<0.05	0.08	
Organic Nitrogen	mg/L	0.15 OG	0.05	0.05	0.05		0.13	0.06	<b>0.17</b>	0.09	<b>0.33</b>	0.10	<0.10	<0.10	0.14	<0.10	<b>0.17</b>	<b>0.22</b>		<b>0.45</b>	<b>&lt; 0.5</b>	
Total Ammonia	mg/L		0.22	0.23	0.25	0.07	0.37	0.24	0.23	0.21	0.15	0.18	0.15	0.16	0.19	0.16	0.18	0.17		0.19	0.16	
Total Kjeldahl Nitrogen (TKN)	mg/L		0.27	0.28	0.3	<0.1	0.5	0.3	0.4	0.3	0.48	0.28	<0.10	0.17	0.33	0.24	0.35	0.39		0.64	0.16	
Orthophosphate	mg/L		<0.3	<0.3	<0.3		<0.01	<0.01	<0.01	<0.01	<0.01	<0.20	<0.20	<0.10	<0.10	<0.20	<0.10	<0.20		<0.10		
pH	pH Units	6.5 - 8.5 OG										8.20	8.16	7.95	7.90	7.93	7.86	7.78		7.88	8.17	
Conductivity	µS/cm											698	676	680	678	668	663	674		671	654	
<b>Metals</b>																						
Aluminum	mg/L	0.1 OG	0.08	<0.05	<0.1	0.01	<0.005	<0.005	<0.005	0.008	<0.005	0.032	<0.004	0.010	<0.004	<0.004	<0.004	0.007		0.038	0.002	
Arsenic	mg/L	0.01 MAC					<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		<0.003	0.0021	
Barium	mg/L	1 MAC	0.052	0.053	0.05	0.06	0.055	0.055	0.051	0.054	0.057	0.053	0.050	0.052	0.053	0.055	0.055	0.060		0.043	0.0547	
Beryllium	mg/L		<0.0005	<0.0005	<0.005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	< 0.000007	
Bismuth	mg/L		<0.2	<0.2	<0.2	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	< 0.00001	
Boron	mg/L	5 IMAC <sup>(5)</sup>	0.370	0.380		0.360	0.440	0.380	0.360	0.360	0.390	0.352	0.361	0.330	0.358	0.317	0.352	0.354		0.426	0.303	
Cadmium	mg/L	0.005 MAC	<0.005	<0.005	<0.005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	0.000008	
Calcium	mg/L		75.9	72.4	57.1	64	64	67	67	65	70	64.8	64.2	63.0	66.9	62.9	64.5	58.4		62.8	74.3	
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.01	<0.003	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		<0.003	0.00026	
Cobalt	mg/L		<0.005	<0.005	<0.02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	0.000353	
Copper	mg/L	1 AO	<0.005	<0.005	<0.02	0.07	<0.001	0.003	0.006	0.003	0.005	<0.003	0.006	0.004	<0.003	0.005	<0.003	<0.003		<0.003	0.0503	
Iron	mg/L	0.3 AO	<b>2.88</b>	<b>2.83</b>	<b>3.53</b>	<b>5.77</b>	<b>2.3</b>	<b>1.4</b>	<b>1.1</b>	<b>1.5</b>	<b>0.95</b>	<b>0.808</b>	<b>0.722</b>	<b>1.06</b>	<b>1.04</b>	<b>0.577</b>	<b>0.584</b>	<0.010		<b>0.748</b>	<b>1.90</b>	
Lead	mg/L	0.01 MAC	<0.001	<0.001	<0.05	0.001	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001		<0.001	0.00176	
Magnesium	mg/L		33.9	34.3	31.9	32.7	32	34	33	35	36	32.4	33.2	31.4	32.6	33.9	33.2	29.2		33.2	31.4	
Manganese	mg/L	0.05 AO	<b>0.054</b>	0.047	0.04	0.03	0.035	0.027	0.024	0.026	0.024	0.024	0.024	0.026	0.021	0.021	0.024	0.025		0.022	0.0226	
Molybdenum	mg/L		0.02	<0.02		0.01	0.005	0.005	0.005	0.004	0.0053	0.005	0.004	0.005	0.004	0.004	0.004	0.004		0.005	0.00543	
Nickel	mg/L											<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		<0.003	0.0019	
Phosphorus	mg/L											<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.050	0.005	
Selenium	mg/L	0.01 MAC					<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004		<0.004	< 0.00004	
Silicon	mg/L											5.85	5.64	5.89	5.58	5.71	5.28	5.74		7.18	5.38	
Silver	mg/L		<0.005	<0.005		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	< 0.00005	
Sodium	mg/L	200 AO	28.9	30.2	28.3	32.0	29.0	30.0	29.0	31.0	32.0	28.7	29.6	28.1	27.4	28.7	28.2	26.2		27.5	28.7	
Strontium	mg/L		5.34	5.34		5.36	5.6	5.6	5.3	5.5	5.7	5.54	5.47	5.34	5.13	5.10	5.67	5.15		5.289	5.38	
Sulphur	mg/L											26.3	24.8	28.2	28.3	28.6	85.4	26.8		28.4	26	
Thallium	mg/L						<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006		<0.006	0.000032	
Tin	mg/L		<0.05	<0.05		<0.002		<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	0.00023	
Titanium	mg/L		<0.005	<0.005		<0.002		<0.005	<0.005	<0.005	<0.005	0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002		<0.002	0.00005	
Uranium	mg/L	0.02 MAC					0.0003	0.0003	0.0002	0.0002	0.0003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	0.000292	
Vanadium	mg/L		<0.005	<0.005		<0.002	<0.001	<0.001	<0.001	<0.001	0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	0.00003	
Zinc	mg/L	5 AO	0.252	0.122	0.04	0.94	0.037	0.034	0.023	0.027	0.014	0.062	0.016	0.251	0.015	0.021	0.015	0.007		0.007	0.030	

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by bold text.

Summary of Residential Geochemical Results WS-16

Parameters	Units	ODWS <sup>(1)</sup>	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
			Dec	Sept	June	June	July	June	June	July	June	June	June	June	May	June	May	May	May	May	May	June	June
<b>General Chemistry</b>																							
Alkalinity	mg/L	30-500 OG <sup>(2)</sup>	350	361	349	346	337	339	350	347	333	360	358	No sample obtained	341	356	349	375	351	No Sample	No Sample	362	342
Total Dissolved Solids	mg/L	500 AO <sup>(3)</sup>	360	374	340	316	328	345	373	366	350	372	344	obtained	328	344	316	362	384	Obtained	Obtained	351	389
Chloride	mg/L	250 AO	1.0	1.7	1.6	1.27	1.38	2.0	2.0	2.0	1.0	2.0	2.06		1.98	2.10	1.80	2.51	1.81			2	2
Dissolved Organic Carbon	mg/L	5 AO	1.1	1.5	1.1	1	1.2	1.2	1.2	1.3	1.2	1.7	1.2		1.4	1.5	1.3	3.0	2.1			1.4	1
Potassium	mg/L		2.0	3.0	2.0	2.13	2.25	2.2	2.1	2.3	2.4	2.2	2.14		2.06	2.03	2.23	2.1	0.3			2.16	2.32
Sulphate	mg/L	500 AO	13.0	12.7	12.3	13.4	13.5	12.0	13.0	12.0	11.0	13.0	13.7		13.9	14.7	13.8	14.7	13.3			18	15
Fluoride	mg/L	1.5 MAC <sup>(4)</sup>					0.22			0.2	0.3	0.24	0.12		0.18	0.22	<0.10	0.83	0.17			0.28	0.25
Hardness	mg/L	80 - 100 OG	<b>349</b>	<b>362</b>	<b>320</b>	<b>341</b>	<b>346</b>	<b>310</b>	<b>370</b>	<b>360</b>	<b>340</b>	<b>360</b>	<b>360</b>		<b>334</b>	<b>354</b>	<b>328</b>	<b>343</b>	<b>8.40</b>			<b>349</b>	<b>347</b>
Nitrate	mg/L	10 MAC	<0.2	<0.2	<0.1	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10		<0.05	<0.05	<0.10	1.04	<0.10			< 0.06	< 0.06
Nitrite	mg/L	1 MAC	<0.2	<0.2	<0.1	<0.05	<0.05	0.01	<0.01	<0.01	<0.01	<0.01	<0.10		<0.05	<0.05	<0.10	<0.05	<0.10			< 0.03	< 0.03
Organic Nitrogen	mg/L	0.15 OG	0.04	0.05	0.08	<b>0.55</b>		<b>0.16</b>	<b>0.22</b>	<b>0.19</b>			<0.10		<0.10	<b>0.16</b>	<0.10	0.10	<0.10			< <b>0.5</b>	0.05
Total Ammonia	mg/L		0.08	0.09	0.12	0.1	<0.05	0.24	0.08	0.11	0.1	<0.05	0.05		0.03	0.07	0.03	0.05	<0.02			0.08	0.14
Total Kjeldahl Nitrogen (TKN)	mg/L		0.12	0.14	0.2	0.65	<0.1	0.4	0.3	0.3	<0.1	<0.1	0.12		<0.10	0.23	0.12	0.15	<0.10			0.05	0.19
Orthophosphate	mg/L		<0.3	<0.3	<0.3			<0.01	<0.01	<0.01	<0.01	<0.01	<0.20		<0.10	<0.10	<0.20	<0.10	<0.20				< 0.03
pH	pH Units	6.5 - 8.5 OG											8.23		7.78	7.86	7.87	7.92	7.86			7.86	7.98
Conductivity	µS/cm												679		661	654	631	626	663			632	648
<b>Metals</b>																							
Aluminum	mg/L	0.1 OG	<0.05	<b>0.2</b>	<0.1	<0.004	<0.004	<0.005	<0.005	0.005	<0.005	<0.005	0.005		<0.004	<0.004	<0.004	<0.004	<0.004			0.002	< 0.001
Arsenic	mg/L	0.01 MAC						0.003	0.003	0.003	0.003	0.0039	0.003		0.004	0.003	0.003	<0.003	0.003			0.0038	0.0035
Barium	mg/L	1 MAC	0.081	0.085	0.08	0.061	0.07	0.087	0.083	0.086	0.095	0.092	0.091		0.088	0.083	0.089	0.088	0.004			0.0927	0.08941
Beryllium	mg/L		<0.0005	<0.0005	<0.005	<0.002	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001			< 0.000007	< 0.000007
Bismuth	mg/L		<0.2	<0.2	<0.2	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002			< 0.00001	< 0.00001
Boron	mg/l	5 IMAC <sup>(5)</sup>	0.03	0.03		0.015	0.04	0.037	0.03	0.03	0.03	0.024	0.026		0.030	0.032	0.033	0.036	0.038			0.051	0.026
Cadmium	mg/L	0.005 MAC	<0.005	<0.005	<0.005	<0.002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002			< 0.000003	< 0.000003
Calcium	mg/L		83.7	86.1	74.2	82.4	83.9	76	88	85	93	89	87.7		81.3	87.4	78.4	82.3	2.21			86.6	84.7
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.01	<0.003	0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003		<0.003	<0.003	<0.003	<0.003	<0.003			0.00014	< 0.00008
Cobalt	mg/L		<0.005	<0.005	<0.02	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001			0.00026	0.00017
Copper	mg/L	1 AO	<0.005	0.011	<0.02	0.016	0.004	0.004	0.009	0.011	0.004	0.0034	0.008		0.009	0.023	0.006	0.031	<0.003			0.0257	0.0022
Iron	mg/L	0.3 AO	<b>2.34</b>	<b>1.95</b>	<b>1.55</b>	<b>1.97</b>	<0.005	<b>1.9</b>	<b>1.7</b>	<b>2.2</b>	<b>2.1</b>	<b>1.7</b>	<b>2.11</b>		<b>1.30</b>	<b>1.35</b>	<b>1.22</b>	<b>1.47</b>	<0.010			<b>1.55</b>	<b>1.48</b>
Lead	mg/L	0.01 MAC	<0.001	0.001	<0.05	0.003	<0.001	0.0007	<0.0005	0.0006	<0.0005	<0.0005	<0.002		<0.002	0.003	<0.002	0.002	<0.001			0.00324	0.00024
Magnesium	mg/L		33.9	35.7	32.7	32.9	33.2	30	36	37	38	36	34.3		31.8	33.0	32.2	33.5	0.71			32.2	32.9
Manganese	mg/L	0.05 AO	0.023	<b>0.056</b>	0.02	0.019	0.02	0.018	0.018	0.02	0.019	0.018	0.022		0.018	0.017	0.017	0.019	<0.002			0.0189	0.01607
Molybdenum	mg/L		<0.02	<0.02		<0.002	<0.002	0.002	0.002	0.002	0.002	0.0019	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002			0.00194	0.00173
Nickel	mg/L												<0.003		<0.003	<0.003	<0.003	<0.003	<0.003			0.0006	0.0003
Phosphorus	mg/L												<0.05		<0.05	<0.05	<0.05	<0.05	<0.05			0.004	< 0.003
Selenium	mg/L	0.01 MAC						<0.002	<0.002	<0.002	<0.002	<0.002	<0.004		<0.004	<0.004	<0.004	<0.004	<0.004			< 0.00004	< 0.00004
Silicon	mg/L												5.21		5.32	4.92	4.95	4.71	4.96			4.93	5.28
Silver	mg/L		<0.005	<0.005		<0.002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002			< 0.00005	< 0.00005
Sodium	mg/L	200 AO	6.9	7.5	6.8	7.19	7.45	6.7	8.1	8.1	8.6	7.7	7.32		7.23	6.84	7.23	7.12	143			7.08	6.65
Strontium	mg/L		0.331	0.383		0.359	0.34	0.48	0.35	0.41	0.51	0.4	0.379		0.446	0.439	0.536	0.477	0.016			0.502	0.519
Sulphur	mg/L												4.54		4.52	4.80	5.0	14.7	4.53			4	5
Thallium	mg/L							<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.006		<0.006	<0.006	<0.006	<0.006	<0.006			0.000016	0.000011
Tin	mg/L		<0.05	<0.05		<0.002	<0.002		<0.001	<0.001	<0.001	<0.001	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002			0.00083	< 0.00006
Titanium	mg/L		<0.005	<0.005		<0.002	<0.002		<0.005	<0.005	<0.005	<0.005	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002			< 0.00005	< 0.00007
Uranium	mg/L	0.02 MAC						0.0012	0.0015	0.0014	0.0014	0.0015	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002			0.00136	0.001306
Vanadium	mg/L		<0.005	<0.005		<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	0.00070	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002			< 0.00001	0.00001
Zinc	mg/L	5 AO	0.204	0.085	0.08	0.14	0.09	0.14	0.11	0.18	0.065	0.04	0.104		0.735	0.727	0.684	0.693	0.045			0.399	0.163

Notes:  
 (1) MECP Ontario Drinking Water Standards.  
 (2) Operational Guideline (OG) within ODWS.  
 (3) Aesthetic Objective (AO) within ODWS.  
 (4) Maximum Acceptable Concentration (MAC) within ODWS.  
 (5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.  
 (6) ODWS exceedances indicated by **bold** entries.



June 2023 Groundwater Duplicate Data

Parameters	Units	Jun-23								
		OW-24-I	NL GW DUP-1	Relative Percent Difference (%)	OW-30-III	NL GW DUP-2	Relative Percent Difference (%)	OW-1R-III	NL GW DUP-3	Relative Percent Difference (%)
<b>General Chemistry</b>										
Alkalinity	mg/L	233	236	(1.279)	182	182	0.000	797	805	(0.999)
Chloride	mg/L	< 1	< 1	NC	< 1	< 1	NC	99	130	(27.074)
Dissolved Organic Carbon	mg/L	2.0	3.0	(40.000)	3	3	0.000	18	18	0.000
Fluoride	mg/L	0.35	0.36	(2.817)	0.22	0.23	(4.444)	0.08	< 0.06	NC
Sulphate	mg/L	24	26.0	(8.000)	19	18	5.405	91	89.0	2.222
Hardness	mg/L	248	245	1.217	200.0	203	(1.489)	712	692	2.849
Nitrate	mg/L	< 0.06	< 0.06	NC	< 0.06	< 0.06	NC	0.4	0.39	2.532
Nitrite	mg/L	< 0.03	< 0.03	NC	< 0.03	< 0.03	NC	0.11	0.1	9.524
Organic Nitrogen	mg/L	< 0.05	< 0.05	NC	0.13	0.05	<b>88.889</b>	0.86	0.83	3.550
pH	pH Units	8.09	8.02	0.869	7.9	7.96	(0.757)	7.85	7.78	0.896
Electrical Conductivity	µS/cm	470	465	1.070	371	371	0.000	1850	1890	(2.139)
Total Ammonia	mg/L	0.11	0.07	44.444	0.06	0.07	(15.385)	18.1	18.60	(2.725)
Total Dissolved Solids	mg/L	309	280	9.847	229	220	4.009	1130	1090	3.604
Total Kjeldahl Nitrogen (TKN)	mg/L	0.06	< 0.05	NC	0.19	0.12	45.161	18.90	19.4	(2.611)
Total Phosphorus	mg/L	0.06	< 0.03	NC	< 0.03	0.04	NC	< 0.03	< 0.03	NC
<b>Metals</b>										
Aluminum	mg/L	0.002	0.001	<b>66.667</b>	< 0.001	< 0.001	NC	0.002	0.003	(40.000)
Arsenic	mg/L	0.0003	0.0003	0.000	< 0.0002	< 0.0002	NC	0.0004	0.0004	0.000
Barium	mg/L	0.028	0.030	(5.217)	0.071	0.069	2.712	0.12	0.122	(1.653)
Beryllium	mg/L	< 0.000007	< 0.000007	NC	0.000014	0.000015	(6.897)	< 0.000007	< 0.000007	NC
Bismuth	mg/L	< 0.00001	< 0.00001	NC	< 0.00001	< 0.00001	NC	< 0.00001	< 0.00001	NC
Boron	mg/l	0.037	0.038	(2.667)	0.025	0.027	(7.692)	1.1	0.919	17.930
Cadmium	mg/L	< 0.000003	< 0.000003	NC	< 0.000003	< 0.000003	NC	0.000034	0.000037	(8.451)
Calcium	mg/L	68.7	68	0.877	54.3	55.6	(2.366)	176.0	170	3.468
Chromium	mg/L	0.00017	0.00012	34.483	0.00014	0.00017	(19.355)	0.00057	0.00056	1.770
Cobalt	mg/L	0.000089	0.000098	(9.626)	0.000024	0.000026	(8.000)	0.00484	0.00523	(7.746)
Copper	mg/L	0.0007	0.0005	33.333	0.0004	< 0.0002	NC	0.0088	0.009	(2.247)
Iron	mg/L	0.198	0.195	1.527	1.55	1.560	(0.643)	0.013	0.012	8.000
Lead	mg/L	< 0.00009	< 0.00009	NC	< 0.00009	< 0.00009	NC	0.0003	0.00031	(3.279)
Magnesium	mg/L	18.5	18.2	1.635	15.5	15.6	(0.643)	66.1	64.7	2.141
Manganese	mg/L	0.0318	0.034	(6.393)	0.0634	0.065	(2.799)	0.905	0.97500	(7.447)
Molybdenum	mg/L	0.00222	0.00235	(5.689)	0.00064	0.0005	24.561	0.00077	0.00087	(12.195)
Nickel	mg/L	0.0005	0.0005	0.000	0.0001	0.0001	0.000	0.0274	0.0286	(4.286)
Potassium	mg/L	2.53	2.52	0.396	3.20	3.20	0.000	79.40	78.6	1.013
Selenium	mg/L	< 0.00004	< 0.00004	NC	< 0.00004	< 0.00004	NC	0.00038	0.00033	14.085
Silicon	mg/L	6.90	7.01	(1.582)	6.38	5.99	6.306	7.42	6.60	11.698
Silver	mg/L	< 0.00005	< 0.00005	NC	< 0.00005	< 0.00005	NC	< 0.00005	< 0.00005	NC
Sodium	mg/L	8.07	8.14	(0.864)	4.7	4.85	(2.717)	95.8	95.9	(0.104)
Strontium	mg/L	0.36	0.368	(2.198)	0.971	0.983	(1.228)	0.873	0.914	(4.589)
Sulphur	mg/L	7.0	7	0.000	6.00	6.00	0.000	32.0	31.0	3.175
Thallium	mg/L	< 0.000005	< 0.000005	NC	< 0.000005	< 0.000005	NC	0.000233	0.000255	(9.016)
Tin	mg/L	< 0.00006	< 0.00006	NC	< 0.00006	< 0.00006	NC	0.00012	0.00014	(15.385)
Titanium	mg/L	0.00015	0.0001	40.000	< 0.00007	0.00008	NC	0.00016	0.00019	(17.143)
Uranium	mg/L	0.000359	0.000373	(3.825)	0.000053	0.000051	3.846	0.00139	0.00139	0.000
Vanadium	mg/L	0.0003	0.0004	(28.571)	0.00011	0.00013	(16.667)	0.00041	0.0004	2.469
Zinc	mg/L	< 0.002	< 0.002	NC	< 0.002	< 0.002	NC	0.047	0.043	8.889

Notes:  
 (1) NC - not calculable as one or both concentrations are below the laboratory method detection limit.  
 (2) Relative percent differences exceeding 50% are presented as bold and shaded entries.

August 2023 Groundwater Duplicate Data

Parameters	Units	Aug-23								
		OW-10-I	NL GW DUP-1	Relative Percent Difference (%)	OW-30-II	NL GW DUP-2	Relative Percent Difference (%)	OW-17-I	NL GW DUP-3	Relative Percent Difference (%)
<b>General Chemistry</b>										
Alkalinity	mg/L	282	217	26.052	184	187	(1.617)	240	248	(3.279)
Chloride	mg/L	2.00	3.00	(40.000)	< 1	< 1	NC	< 1	< 1	NC
Dissolved Organic Carbon	mg/L	1.20	1.4	(15.385)	2.4	2.5	(4.082)	2.7	2.2	20.408
Fluoride	mg/L	0.33	0.69	<b>(70.588)</b>	0.24	0.24	0.000	0.36	0.35	2.817
Sulphate	mg/L	91	89	2.222	18	18	0.000	18	21	(15.385)
Hardness	mg/L	369	363	1.639	192	192	0.000	244	244	0.000
Nitrate	mg/L	< 0.06	< 0.06	NC	< 0.06	< 0.06	NC	< 0.06	< 0.06	NC
Nitrite	mg/L	< 0.03	< 0.03	NC	< 0.03	< 0.03	NC	< 0.03	< 0.03	NC
Organic Nitrogen	mg/L	0.06	< 0.05	NC	0.14	< 0.05	NC	0.12	< 0.05	NC
pH	pH Units	7.95	8.37	(5.147)	8.00	7.77	2.917	8.02	8.18	(1.975)
Electrical Conductivity	µS/cm	678	557	19.595	366	363	0.823	466	446	4.386
Total Ammonia	mg/L	0.10	0.11	(9.524)	0.06	0.06	0.000	0.05	0.05	0.000
Total Dissolved Solids	mg/L	431	320	29.561	217	237	(8.811)	266	306	(13.986)
Total Kjeldahl Nitrogen (TKN)	mg/L	0.16	0.14	13.333	0.2	0.08	<b>85.714</b>	0.17	0.08	<b>72.000</b>
Total Phosphorus	mg/L	< 0.03	< 0.03	NC	< 0.03	< 0.03	NC	< 0.03	< 0.03	NC
<b>Metals</b>										
Aluminum	mg/L	< 0.001	< 0.001	NC	0.001	0.001	0.000	0.001	0.002	<b>(66.667)</b>
Arsenic	mg/L	< 0.0002	< 0.0002	NC	< 0.0002	< 0.0002	NC	0.0008	0.0004	<b>66.667</b>
Barium	mg/L	0.0315	0.0306	2.899	0.0646	0.0636	1.560	0.0296	0.0303	(2.337)
Beryllium	mg/L	< 0.000007	< 0.000007	NC	0.000009	0.000012	(28.571)	< 0.000007	< 0.000007	NC
Bismuth	mg/L	< 0.00001	< 0.00001	NC	< 0.00001	< 0.00001	NC	< 0.00001	< 0.00001	NC
Boron	mg/l	0.204	0.202	0.985	0.031	0.025	21.429	0.032	0.027	16.949
Cadmium	mg/L	< 0.000003	< 0.000003	NC	< 0.000003	< 0.000003	NC	0.000004	< 0.000003	NC
Calcium	mg/L	94.8	93.6	1.274	50.6	50.8	(0.394)	65.2	65.5	(0.459)
Chromium	mg/L	0.00025	0.00028	(11.321)	0.0004	0.00018	<b>75.862</b>	0.00032	0.00021	41.509
Cobalt	mg/L	0.000018	0.000017	5.714	0.000053	0.00005	5.825	0.000189	0.000128	38.486
Copper	mg/L	0.0008	0.0002	<b>120.000</b>	0.0007	0.0003	<b>80.000</b>	0.0009	0.0003	<b>100.000</b>
Iron	mg/L	0.274	0.273	0.366	1.50	1.52	(1.325)	0.437	0.657	(40.219)
Lead	mg/L	< 0.00009	< 0.00009	NC	< 0.00009	< 0.00009	NC	< 0.00009	< 0.00009	NC
Magnesium	mg/L	32.2	31.4	2.516	16	16	0.000	19.7	19.5	1.020
Manganese	mg/L	0.0201	0.0196	2.519	0.0786	0.0772	1.797	0.0414	0.0397	4.192
Molybdenum	mg/L	0.00007	0.00046	<b>(147.170)</b>	0.00119	0.00044	<b>92.025</b>	0.00198	0.00145	30.904
Nickel	mg/L	0.0002	0.0001	<b>66.667</b>	0.0002	0.0002	0.000	0.0003	0.0003	0.000
Potassium	mg/L	5.32	5.31	0.188	3.10	3.11	(0.322)	3.30	3.46	(4.734)
Selenium	mg/L	< 0.00004	< 0.00004	NC	< 0.00004	0.00005	NC	< 0.00004	< 0.00004	NC
Silicon	mg/L	3.65	3.66	(0.274)	6.62	6.61	0.151	9.21	9.32	(1.187)
Silver	mg/L	< 0.00005	< 0.00005	NC	< 0.00005	< 0.00005	NC	< 0.00005	< 0.00005	NC
Sodium	mg/L	4.82	4.65	3.590	4.2	4.13	1.681	3.74	3.65	2.436
Strontium	mg/L	1.23	1.240	(0.810)	0.881	0.887	(0.679)	0.501	0.504	(0.597)
Sulphur	mg/L	32.0	31	3.175	6	6	0.000	6	6	0.000
Thallium	mg/L	< 0.000005	< 0.000005	NC	< 0.000005	< 0.000005	NC	< 0.000005	< 0.000005	NC
Tin	mg/L	0.00009	< 0.00006	NC	0.00007	< 0.00006	NC	0.00022	0.00012	<b>58.824</b>
Titanium	mg/L	0.00068	0.0001	<b>148.718</b>	0.00009	0.00008	11.765	0.00007	0.00014	<b>(66.667)</b>
Uranium	mg/L	0.000017	0.000019	(11.111)	0.000053	0.000051	3.846	0.000039	0.000026	40.000
Vanadium	mg/L	0.00004	0.00004	0.000	0.00021	0.00016	27.027	0.00016	0.00012	28.571
Zinc	mg/L	0.002	< 0.002	NC	0.002	< 0.002	NC	0.002	< 0.002	NC

Notes:  
 (1) NC - not calculable as one or both concentrations are below the laboratory method detection limit.  
 (2) Relative percent differences exceeding 50% are presented as bold and shaded entries.

October 2023 Groundwater Duplicate Data

Parameters	Units	Oct-23								
		OW-10-II	NL GW DUP-1	Relative Percent Difference (%)	OW-30-III	NL GW DUP-2	Relative Percent Difference (%)	OW-25-I	NL GW DUP-3	Relative Percent Difference (%)
<b>General Chemistry</b>										
Alkalinity	mg/L	288	288	0.000	185	185	0.000	233	258	(10.183)
Chloride	mg/L	2.00	3	(40.000)	< 1	< 1	NC	< 1	1	NC
Dissolved Organic Carbon	mg/L	2	2	0.000	2	2	0.000	3	2	40.000
Fluoride	mg/L	0.07	0.06	15.385	0.22	0.22	0.000	0.65	0.65	0.000
Sulphate	mg/L	110	110	0.000	17	18	(5.714)	< 2	< 2	NC
Hardness	mg/L	444	442	0.451	211	211	0.000	185	188	(1.609)
Nitrate	mg/L	< 0.06	< 0.06	NC	< 0.06	< 0.06	NC	< 0.06	< 0.06	NC
Nitrite	mg/L	< 0.03	< 0.03	NC	< 0.03	< 0.03	NC	< 0.03	< 0.03	NC
Organic Nitrogen	mg/L	0.36	0.19	<b>61.818</b>	0.11	< 0.05	NC	0.05	0.05	0.000
pH	pH Units	8.00	8.04	(0.499)	7.95	7.89	0.758	8.22	8.13	1.101
Electrical Conductivity	µS/cm	724	726	(0.276)	370	369	0.271	424	427	(0.705)
Total Ammonia	mg/L	< 0.04	< 0.04	NC	< 0.04	0.04	NC	0.35	0.35	0.000
Total Dissolved Solids	mg/L	503	480	4.680	217	214	1.392	246	269	(8.932)
Total Kjeldahl Nitrogen (TKN)	mg/L	0.38	0.21	<b>57.627</b>	0.14	< 0.05	NC	0.4	0.40	0.000
Total Phosphorus	mg/L	< 0.003	< 0.003	NC	0.006	0.005	18.182	0.03	0.029	3.390
<b>Metals</b>										
Aluminum	mg/L	0.001	0.001	0.000	0.002	0.004	<b>(66.667)</b>	0.001	0.001	0.000
Arsenic	mg/L	< 0.0002	< 0.0002	NC	< 0.0002	< 0.0002	NC	< 0.0002	0.0002	NC
Barium	mg/L	0.019	0.0194	(2.083)	0.052	0.054	(3.766)	0.0381	0.0384	(0.784)
Beryllium	mg/L	< 0.000007	< 0.000007	NC	0.000018	0.00001	NC	< 0.000007	< 0.000007	NC
Bismuth	mg/L	< 0.00001	< 0.00001	NC	< 0.00001	< 0.00001	NC	< 0.00001	< 0.00001	NC
Boron	mg/l	0.03	0.028	6.897	0.026	0.028	(7.407)	0.138	0.137	0.727
Cadmium	mg/L	< 0.000003	< 0.000003	NC	0.000003	< 0.000003	NC	< 0.000003	< 0.000003	NC
Calcium	mg/L	138	137	0.727	55.7	55.7	0.000	39.8	40.6	(1.990)
Chromium	mg/L	< 0.00008	< 0.00008	NC	0.00012	0.00011	8.696	0.00013	0.00012	8.000
Cobalt	mg/L	0.000105	0.000115	(9.091)	0.000027	0.000024	11.765	0.000014	0.000012	15.385
Copper	mg/L	0.0014	0.0039	<b>(94.340)</b>	0.001	0.0019	<b>(62.069)</b>	0.0021	0.0014	40.000
Iron	mg/L	0.073	0.08	(2.703)	0.864	0.86	0.464	0.19	0.190	0.000
Lead	mg/L	< 0.00009	< 0.00009	NC	< 0.00009	< 0.00009	NC	< 0.00009	< 0.00009	NC
Magnesium	mg/L	24.3	24.4	(0.411)	18	17.5	0.570	20.8	21.1	(1.432)
Manganese	mg/L	0.0179	0.0187	(4.372)	0.0691	0.0711	(2.853)	0.01160	0.0113	2.620
Molybdenum	mg/L	0.00017	0.00024	(34.146)	0.00047	0.0005	0.000	0.0020	0.002	(5.327)
Nickel	mg/L	0.0007	0.001	(35.294)	0.0002	0.0003	(40.000)	0.0004	0.0002	<b>66.667</b>
Potassium	mg/L	1.03	1.020	0.976	3.280	3.280	0.000	4.13	4.07	1.463
Selenium	mg/L	0.00005	0.00005	0.000	< 0.00004	< 0.00004	NC	< 0.00004	< 0.00004	NC
Silicon	mg/L	2.32	2.27	2.179	5.95	5.92	0.505	7.55	7.28	3.641
Silver	mg/L	< 0.00005	< 0.00005	NC	< 0.00005	< 0.00005	NC	< 0.00005	< 0.00005	NC
Sodium	mg/L	2.32	2.26	2.620	4.77	4.6	2.763	33.0	32.8	0.608
Strontium	mg/L	0.219	0.218	0.458	0.89	0.87	2.052	0.88	0.882	(0.683)
Sulphur	mg/L	44	44	0.000	5	5	0.000	< 3	< 3	NC
Thallium	mg/L	< 0.000005	< 0.000005	NC	< 0.000005	< 0.000005	NC	< 0.000005	< 0.000005	NC
Tin	mg/L	< 0.00006	< 0.00006	NC	< 0.00006	0.00012	NC	< 0.00006	< 0.00006	NC
Titanium	mg/L	< 0.00007	0.00007	NC	0.00009	< 0.00007	NC	0.00009	0.00007	25.000
Uranium	mg/L	0.000247	0.000248	(0.404)	0.000038	0.000039	(2.597)	0.00004	0.000046	(13.953)
Vanadium	mg/L	0.00006	0.00006	0.000	0.0001	0.00011	(9.524)	0.00007	0.00008	(13.333)
Zinc	mg/L	< 0.002	0.003	NC	< 0.002	0.002	NC	0.002	< 0.002	NC

Notes:  
 (1) NC - not calculable as one or both concentrations are below the laboratory method detection limit.  
 (2) Relative percent differences exceeding 50% are presented as bold and shaded entries.

2023 Residential Supply Well Duplicate Data

Parameters	Units	Jun-23		
		WS-7	WS DUP	Relative Percent Difference (%)
<b>General Chemistry</b>				
Alkalinity	mg/L	361	378	(4.601)
Total Dissolved Solids	mg/L	463	446	3.740
Chloride	mg/L	31	31	0.000
Dissolved Organic Carbon	mg/L	1.0	2.0	<b>(66.667)</b>
Potassium	mg/L	2.07	2.08	(0.482)
Sulphate	mg/L	28	28	0.000
Fluoride	mg/L	0.14	0.11	24.000
Hardness	mg/L	391	387	1.028
Nitrate	mg/L	< 0.06	< 0.06	NC
Nitrite	mg/L	< 0.03	< 0.03	NC
Organic Nitrogen	mg/L	0.13	0.15	(14.286)
Total Ammonia	mg/L	< 0.04	0.07	NC
Total Kjeldahl Nitrogen (TKN)	mg/L	0.16	0.22	(31.579)
pH	pH Units	8.04	8.04	0.000
Conductivity	µS/cm	768	775	(0.907)
<b>Metals</b>				
Aluminum	mg/L	0.016	0.004	<b>120.000</b>
Arsenic	mg/L	< 0.0002	< 0.0002	NC
Barium	mg/L	0.069	0.06912	0.519
Beryllium	mg/L	< 0.000007	< 0.000007	NC
Bismuth	mg/L	< 0.00001	< 0.00001	NC
Boron	mg/l	0.009	0.007	25.000
Cadmium	mg/L	< 0.000003	< 0.000003	NC
Calcium	mg/L	100	99.8	0.200
Chromium	mg/L	< 0.00008	0.00009	NC
Cobalt	mg/L	0.000071	0.000063	11.940
Copper	mg/L	0.0031	0.0007	<b>126.316</b>
Iron	mg/L	2.15	1.980	8.232
Lead	mg/L	0.00013	< 0.00009	NC
Magnesium	mg/L	34.1	34	1.775
Manganese	mg/L	0.0308	0.0306	0.750
Molybdenum	mg/L	0.00067	0.00067	0.000
Nickel	mg/L	0.0022	0.001	<b>93.333</b>
Phosphorus	mg/L	0.014	0.012	15.385
Selenium	mg/L	< 0.00004	< 0.00004	NC
Silicon	mg/L	7.3	7.1	2.356
Silver	mg/L	< 0.00005	< 0.00005	NC
Sodium	mg/L	17	17	2.326
Strontium	mg/L	0.18	0.17	3.390
Sulphur	mg/L	8	8	0.000
Thallium	mg/L	< 0.000005	< 0.000005	NC
Tin	mg/L	< 0.00006	< 0.00006	NC
Titanium	mg/L	< 0.00007	< 0.00007	NC
Uranium	mg/L	0.000062	0.000065	(4.724)
Vanadium	mg/L	0.00003	0.00002	40.000
Zinc	mg/L	0.004	0.002	<b>66.667</b>

Notes:

- (1) NC - not calculable as one or both concentrations are below the laboratory method detection limit.
- (2) Relative percent differences exceeding 50% are presented as bold and shaded entries.

# Appendix G

## Summary of Surface Water Geochemical Analyses





Surface Water Geochemical Results SW-1

Parameters	Units	PWQO <sup>1</sup>	APV <sup>2</sup>	CWQG <sup>3</sup>	2017							2018								
					1-May	6-Jun	17-Jul	17-Aug	19-Sep	18-Oct	17-Nov	18-Dec	1-May	31-May	3-Jul	2-Aug	31-Aug	1-Oct	31-Oct	30-Nov
<b>General Chemistry</b>																				
Alkalinity (as CaCO <sub>3</sub> )	mg/L				50	70	75	86	97	98	115	Frozen	63	75	71	Unsafe to sample	71	76	Frozen	Frozen
BOD (5)	mg/L				<5	<5	<5	<5	<5	<5	<5		<5	<5	<5		<5	<5		
Chemical Oxygen Demand	mg/L				25	26	26	22	18	17	17		22	19	15		<5	<5		
Total Dissolved Solids	mg/L				68	94	90	122	130	136	150		80	104	92		104	124		
Total Suspended Solids	mg/L				25	21	18	26	16	<10	23		146	43	26		44	10		
Ammonia as N	mg/L				<0.02	<0.02	0.07	<0.02	0.02	0.09	<0.02		0.08	<0.02	<0.02		<0.02	<0.02		
Nitrate as N	mg/L				0.12	<0.05	<0.05	<0.05	<0.05	0.16	0.56		0.29	0.2	<0.05		<0.05	<0.05		
Nitrite as N	mg/L				<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	<0.05	<0.05		<0.05	<0.05		
Total Kjeldahl Nitrogen	mg/L				0.33	0.26	0.34	0.48	0.46	0.42	0.67		0.38	0.24	0.27		0.37	0.46		
Chloride	mg/L		180	120	4.30	3.94	4.03	6.36	5.24	6.47	6.65		7.47	5.33	2.99		7.86	9.81		
Sulphate	mg/L				4.23	3.76	3.88	4.04	4.36	4.22	4.33		2.48	3.38	4.79		14.60	5.84		
Phenols	mg/L	0.001	0.961	0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001		<0.001	<0.001		
Total Phosphorus	mg/L	0.03			<b>0.05</b>	<b>0.05</b>	<b>0.05</b>	<b>0.05</b>	<b>0.05</b>	0.03	<b>0.05</b>		<b>0.12</b>	<b>0.06</b>	<b>0.06</b>		<b>0.11</b>	0.03		
pH	pH Units	6.5 - 8.5		6.5 - 9.0	7.45	7.54	7.72	7.24	7.80	7.66	7.64		7.22	7.00	7.80		7.63	7.63		
Electrical Conductivity	uS/cm				124	166	156	197	211	209	219		150	158	166		200	213		
<b>Metals</b>																				
Arsenic	mg/L	0.1	0.15	0.005	<0.003		<0.003						<0.003		<0.003					
Barium	mg/L		2.3		0.011		0.010						0.025		0.016					
Boron	mg/L	0.2	3.55	1.5	<0.010		<0.010						<0.010		<0.010					
Cadmium	mg/L	0.0002	0.00021		<0.0001		<0.0001						<0.0001		<0.0001					
Chromium	mg/L	0.0089	0.064		<0.003		<0.003						0.003		<0.003					
Copper	mg/L	0.005	0.0069		<0.002		<0.002						0.004		0.003					
Iron	mg/L	0.3		0.3	<b>0.34</b>	<b>0.39</b>	<b>0.36</b>	0.29	0.28	0.26	<b>0.37</b>		<b>1.07</b>	<b>0.53</b>	<b>0.46</b>		<b>0.92</b>	0.25		
Lead	mg/L	0.005	0.002		<0.001		<0.001						0.001		<0.001					
Dissolved Mercury	mg/L	0.0002	0.00077		<0.0001		<0.0001						<0.0001		<0.0001					
Zinc	mg/L	0.03	0.089	0.03	<0.005		0.006						0.007		<0.005					

Notes:

- (1) PWQO - Provincial Water Quality Objectives.
- (2) APV - Aquatic Protection Value from *Rationale for the Development of Soil and Groundwater Standards for use at Contaminated Site in Ontario*, Table 3.1.
- (3) CWQG - Canadian Water Quality Guidelines.
- (4) Exceedences of the PWQO are indicated by **BOLD** entries.
- (5) Exceedences of the APV are indicated by underlined entries.
- (6) Exceedences of the CWQG are indicated by *italicized* entries.



Surface Water Geochemical Results SW-1

Parameters	Units	PWQO <sup>1</sup>	APV <sup>2</sup>	CWQG <sup>3</sup>	2019							2020								
					25-Apr	26-May	26-Jun	25-Jul	25-Aug	24-Sep	23-Oct	22-Nov	6-Apr	6-May	5-Jun	6-Jul	11-Aug	8-Sep	2-Oct	6-Nov
<b>General Chemistry</b>																				
Alkalinity (as CaCO <sub>3</sub> )	mg/L				60	63	64	65	75	88	100	92	64	33	58	74	49	74	117	84
BOD (5)	mg/L				<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<2	3	4	2	<5
Chemical Oxygen Demand	mg/L				30	22	23	11	12	<5	20	6	16	20	31	16	11	11	28	31
Total Dissolved Solids	mg/L				128	98	122	102	86	126	156	116	110	72	98	120	106	110	102	118
Total Suspended Solids	mg/L				237	41	144	14	32	18	38	55	106	28	20	34	48	28	80	12
Ammonia as N	mg/L				<0.02	0.08	0.04	0.19	0.12	0.08	0.06	<0.02	<0.02	<0.02	<0.02	0.04	0.05	<0.02	<0.02	0.02
Nitrate as N	mg/L				0.48	0.2	0.06	<0.05	<0.05	<0.05	0.42	0.43	0.8	0.08	0.08	0.06	<0.05	<0.05	0.41	0.40
Nitrite as N	mg/L				<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Kjeldahl Nitrogen	mg/L				<0.10	0.42	0.38	0.51	0.48	0.40	0.22	0.21	0.70	0.32	0.45	0.49	0.60	0.35	0.51	0.39
Chloride	mg/L		180	120	10.6	4.33	3.94	2.94	3.33	7.42	10.3	5.89	6.39	3.36	5.28	4.31	3.74	5.85	5.32	4.07
Sulphate	mg/L				12.6	2.98	3.46	4.22	5.72	4.96	6.97	5.70	3.28	2.86	5.11	10.8	24.7	4.01	3.38	3.59
Phenols	mg/L	0.001	0.961	0.004	0.001	<b>0.002</b>	<b>0.007</b>	<0.001	<0.001	0.001	<b>0.002</b>	<0.001	<b>0.002</b>	<0.001	<b>0.002</b>	0.001	<b>0.005</b>	<b>0.006</b>	<0.001	0.001
Total Phosphorus	mg/L	0.03			<b>0.21</b>	<b>0.04</b>	<b>0.10</b>	<b>0.06</b>	<b>0.06</b>	<b>0.05</b>	<b>0.05</b>	0.03	<b>0.12</b>	<b>0.06</b>	<b>0.05</b>	<b>0.06</b>	<b>0.13</b>	0.02	<b>0.08</b>	<0.10
pH	pH Units	6.5 - 8.5		6.5 - 9.0	7.27	6.94	7.47	7.79	7.73	7.28	7.75	7.45	7.57	6.63	7.48	7.56	7.06	7.54	6.92	7.79
Electrical Conductivity	uS/cm				183	124	142	166	219	232	226	197	178	122	168	165	143	169	183	184
<b>Metals</b>																				
Arsenic	mg/L	0.1	0.15	0.005	<0.003	<0.003	<0.003	<0.003			<0.003		<0.003		<0.003	<0.003				
Barium	mg/L		2.3		0.02	0.014	0.014	0.011			0.016		0.039		0.012	0.019				
Boron	mg/L	0.2	3.55	1.5	<0.010	<0.010	0.010	<0.010			<0.010		<0.010		<0.010	<0.010				
Cadmium	mg/L	0.0002	0.00021		<0.0001	<0.0001	<0.0001	<0.0001			<0.0001		<0.0001		<0.0001	<0.0001				
Chromium	mg/L	0.0089	0.064		<0.003	<0.003	0.003	<0.003			<0.003		<b>0.012</b>		<0.003	0.004				
Copper	mg/L	0.005	0.0069		0.003	0.002	<0.002	<0.002			0.003		0.005		0.001	0.002				
Iron	mg/L	0.3		0.3	<b>0.60</b>	<b>0.49</b>	<b>0.42</b>	<b>0.53</b>	<b>0.32</b>	<b>0.34</b>	<b>0.37</b>	<b>0.34</b>	<b>4.22</b>	<b>1.49</b>	<b>0.871</b>	<b>1.41</b>	<b>1.47</b>	<b>0.818</b>	<b>1.70</b>	<b>1.04</b>
Lead	mg/L	0.005	0.002		<0.001	<0.001	<0.001	<0.001			<0.001		0.001		<0.001	<0.001				
Dissolved Mercury	mg/L	0.0002	0.00077		<0.0001	<0.0001	<0.0001	<0.0001			<0.0001		<0.0001		<0.0001	<0.0001				
Zinc	mg/L	0.03	0.089	0.03	0.007	<0.005	0.005	<0.005			<0.005		0.010		<0.005	<0.005				

- Notes:
- (1) PWQO - Provincial Water Quality Objectives.
  - (2) APV - Aquatic Protection Value from *Rationale for the Developme*
  - (3) CWQG - Canadian Water Quality Guidelines.
  - (4) Exceedences of the PWQO are indicated by **BOLD** entries.
  - (5) Exceedences of the APV are indicated by underlined entries.
  - (6) Exceedences of the CWQG are indicated by *italicized* entries.



Surface Water Geochemical Results SW-1

Parameters	Units	PWQO <sup>1</sup>	APV <sup>2</sup>	CWQG <sup>3</sup>	2021							2022					2023			
					25-Mar	23-Apr	26-May	22-Jun	10-Aug	7-Sep	3-Oct	4-Nov	22-Apr	31-May	31-Aug	26-Sep	27-Oct	19-Jun	30-Aug	17-Oct
<b>General Chemistry</b>																				
Alkalinity (as CaCO <sub>3</sub> )	mg/L				86	60	127	113	67	79	88	92	62	68	90	80	88	64	89	71
BOD (5)	mg/L				5	<2.00	<2.00	<2	<2.00	3	<2.00	<2.00	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4
Chemical Oxygen Demand	mg/L				29	<5	<5	14	25	11	5	17	17	25	12	16	31	20	24	50
Total Dissolved Solids	mg/L				130	70	111	112	104	102	124	120	83	151	97	91	114	123	137	111
Total Suspended Solids	mg/L				161	20	31	32	13	24	19	<10	42	256	46	31	16	22	27	13
Ammonia as N	mg/L				0.02	<0.02	<0.02	<0.02	0.11	0.02	<0.02	<0.02	< 0.1	0.06	< 0.04	0.04	< 0.04	0.06	0.04	< 0.04
Nitrate as N	mg/L				0.63	0.10	0.06	<0.05	<0.05	<0.05	0.17	0.11	0.42	0.14	< 0.06	< 0.06	0.16	< 0.06	0.011	0.185
Nitrite as N	mg/L				<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.003	< 0.003
Total Kjeldahl Nitrogen	mg/L				0.19	0.19	0.28	0.35	0.22	0.23	0.27	0.27	< 0.5	0.23	0.2	0.23	0.3	0.18	0.22	0.20
Chloride	mg/L		180	120	4.61	4.54	5.4	4.18	3.06	3.5	6.39	8.25	7	7	5	10	11	7	9	7
Sulphate	mg/L				3.24	3.45	3.82	3.69	2.84	4.04	4.58	4.63	2	< 2	5	6	9	6	5	< 2
Phenols	mg/L	0.001	0.961	0.004	<b>0.002</b>	<b>0.004</b>	<0.001	<0.001	<0.001	0.001	<b>0.002</b>	<b>0.002</b>	< 0.001	<b>0.002</b>	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<b>0.002</b>
Total Phosphorus	mg/L	0.03			<b>0.28</b>	<0.02	<b>0.04</b>	<b>0.11</b>	0.03	<b>0.04</b>	<b>0.04</b>	0.02	<b>0.064</b>	<b>0.140</b>	<b>0.042</b>	<b>0.034</b>	0.021	0.030	<b>0.035</b>	0.025
pH	pH Units	6.5 - 8.5		6.5 - 9.0	7.13	7.52	7.84	6.95	7.26	7.23	7.58	7.41	7.80	7.78	7.95	7.88	7.95	7.96	8.03	7.74
Electrical Conductivity	uS/cm				176	141	190	195	148	172	204	207	140	150	208	193	210	153	198	160
<b>Metals</b>																				
Arsenic	mg/L	0.1	0.15	0.005	<0.003				<0.003				0.0016		0.001			0.0011	0.0010	0.0007
Barium	mg/L		2.3		0.053				0.014				0.0267		0.0264			0.0148	0.0180	0.0162
Boron	mg/L	0.2	3.55	1.5	<0.010				<0.010				0.018		0.011			0.010	0.008	0.008
Cadmium	mg/L	0.0002	0.00021		<0.0001				<0.0001				0.00002		0.000009			0.000008	0.000011	0.000006
Chromium	mg/L	0.0089	0.064		<b>0.016</b>				<0.003				0.00594		0.00452			0.00208	0.00193	0.00185
Copper	mg/L	0.005	0.0069		<b>0.0070</b>				0.002				0.0045		0.0027			0.0020	0.0018	0.0024
Iron	mg/L	0.3		0.3	<b>5.44</b>	<b>0.727</b>	<b>1.12</b>	<b>1.47</b>	<b>0.908</b>	<b>0.97</b>	<b>0.56</b>	<b>0.385</b>	<b>2.27</b>	<b>6.02</b>	<b>1.84</b>	<b>1.46</b>	<b>0.464</b>	<b>0.828</b>	<b>0.827</b>	<b>0.756</b>
Lead	mg/L	0.005	0.002		0.002				<0.001				0.00129		0.00079			0.00038	0.00046	0.0004
Dissolved Mercury	mg/L	0.0002	0.00077		<0.0001				<0.0001				0.00001		0.00001			< 0.00001	0.00002	< 0.00001
Zinc	mg/L	0.03	0.089	0.03	0.019				0.007				0.011		0.005			0.003	0.003	0.006

- Notes:
- (1) PWQO - Provincial Water Quality Objectives.
  - (2) APV - Aquatic Protection Value from *Rationale for the Developme*
  - (3) CWQG - Canadian Water Quality Guidelines.
  - (4) Exceedences of the PWQO are indicated by **BOLD** entries.
  - (5) Exceedences of the APV are indicated by underlined entries.
  - (6) Exceedences of the CWQG are indicated by *italicized* entries.





Surface Water Geochemical Results SW-2

Parameters	Units	PWQO <sup>1</sup>	APV <sup>2</sup>	CWQG <sup>3</sup>	Trigger Concentration <sup>7</sup> (mg/L)	2017							2018								
						1-May	6-Jun	17-Jul	17-Aug	19-Sep	18-Oct	17-Nov	18-Dec	1-May	31-May	3-Jul	2-Aug	31-Aug	1-Oct	31-Oct	30-Nov
Alkalinity (as CaCO <sub>3</sub> )	mg/L					185	303	397	363	362	355	290	<b>Frozen</b>	124	275	<b>Dry</b>	<b>Dry</b>	294	315	266	<b>Frozen</b>
BOD (5)	mg/L																				
Chemical Oxygen Demand	mg/L					9	8	28	26	31	20	<5		17	<5			14	6	15	
Total Dissolved Solids	mg/L					220	306	1270	398	384	386	326		132	308			470	538	302	
Total Suspended Solids	mg/L					10	<10	<10	182	<10	161	<10		249	<10			57	<10	24	
Ammonia as N	mg/L					<0.02	<0.02	0.05	<0.02	0.12	<0.02	<0.02		<0.02	<0.02			0.03	<0.02	<0.02	
Nitrate as N	mg/L					<0.05	<0.05	<0.5	<0.25	<0.10	<0.10	<0.10		0.08	<0.10			<0.25	<0.25	<0.05	
Nitrite as N	mg/L					<0.05	<0.05	<0.5	<0.25	<0.10	<0.10	<0.10		<0.05	<0.10			<0.25	<0.25	<0.05	
Total Kjeldahl Nitrogen	mg/L					0.17	0.14	0.33	0.48	1.05	0.50	0.32		0.14	0.27			0.46	0.45	<0.10	
Chloride	mg/L		180	120	96	28.8	20.9	<u>559</u>	29.6	48.1	25.7	27.5		12.6	29.3			80.9	68.8	31.1	
Sulphate	mg/L					9.09	5.68	25.2	5.09	4.81	12.2	6.79		2.57	5.06			27.00	18.1	10.50	
Phenols	mg/L	0.001	0.961	0.004		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001			<0.001	<0.001	<0.001	
Total Phosphorus	mg/L	0.03				0.02	0.02	0.03	<b>0.06</b>	<b>0.50</b>	<b>0.14</b>	0.02		<b>0.19</b>	0.04			<b>0.19</b>	0.03	0.02	
pH	pH Units	6.5 - 8.5		6.5 - 9.0		8.21	8.46	8.18	8.22	8.32	8.39	8.04		7.67	7.94			8.07	8.10	7.81	
Electrical Conductivity	uS/cm					459	649	2330	753	793	679	545		272	547			850	884	543	
<b>Metals</b>																					
Arsenic	mg/L	0.1	0.15	0.005		<0.003		<0.003						<0.003							
Barium	mg/L		2.3			0.017		0.024						0.029							
Boron	mg/L	0.2	3.55	1.5	1.2	<0.010		0.017						<0.010							
Cadmium	mg/L	0.0002	0.00021			<b>0.0007</b>		<0.0001						<0.0001							
Chromium	mg/L	0.0089	0.064			<0.003		0.004						0.003							
Copper	mg/L	0.005	0.0069			0.003		<0.002						0.004							
Iron	mg/L	0.3		0.3		0.12	0.04	0.06	<b>0.41</b>	0.04	<b>0.63</b>	0.08		<b>0.75</b>	0.19			<b>0.75</b>	0.05	0.18	
Lead	mg/L	0.005	0.002			<0.001		<0.001						0.002							
Dissolved Mercury	mg/L	0.0002	0.00077			<0.0001		<0.0001						<0.0001							
Zinc	mg/L	0.03	0.089	0.03		0.019		0.012						0.012							

Notes:  
 (1) PWQO - Provincial Water Quality Objectives.  
 (2) APV - Aquatic Protection Value from *Rationale for the Development of Soil and Groundwater Standards for use at Contaminated Site in Ontario*, Table 3.1.  
 (3) CWQG - Canadian Water Quality Guidelines.  
 (4) Exceedences of the PWQO are indicated by **BOLD** entries.  
 (5) Exceedences of the APV are indicated by underlined entries.  
 (6) Exceedences of the CWQG are indicated by *italicized* entries.  
 (7) Trigger Level Monitoring Program was initiated in 2023, and represents 80% of the CWQG (Wood, 2020)  
 (8) Exceedance of the Trigger Concentration are indicated by shaded entries.



Surface Water Geochemical Results SW-2

Parameters	Units	PWQO <sup>1</sup>	APV <sup>2</sup>	CWQG <sup>3</sup>	Trigger Concentration <sup>7</sup> (mg/L)	2019							2020								
						25-Apr	26-May	26-Jun	25-Jul	25-Aug	24-Sep	23-Oct	22-Nov	6-Apr	6-May	5-Jun	6-Jul	11-Aug	8-Sep	2-Oct	6-Nov
Alkalinity (as CaCO <sub>3</sub> )	mg/L					136	257	275	Dry	292	287	Dry	234	142	196	303	Dry	330	298	346	328
BOD (5)	mg/L																				
Chemical Oxygen Demand	mg/L					12	8	22		21	101		<5	10	<5	8		<5	13	<5	19
Total Dissolved Solids	mg/L					188	224	286		402	446		358	220	222	326		432	354	280	344
Total Suspended Solids	mg/L					<10	26	152		50	23		37	<10	<10	83		<10	18	170	<10
Ammonia as N	mg/L					<0.02	<0.02	<0.02		0.08	0.15		<0.02	<0.02	<0.02	<0.02		0.05	<0.02	<0.02	<0.02
Nitrate as N	mg/L					0.27	<0.05	<0.05		<0.10	<0.25		0.17	<0.05	<0.05	<0.10		<0.25	<0.10	<0.05	<0.10
Nitrite as N	mg/L					<0.05	<0.05	<0.05		<0.10	<0.25		<0.10	<0.05	<0.05	<0.10		<0.25	<0.10	<0.05	<0.10
Total Kjeldahl Nitrogen	mg/L					<0.10	<0.10	0.27		0.71	1.67		0.17	0.17	0.18	0.41		0.45	0.33	0.43	0.25
Chloride	mg/L		180	120	96	12.3	8.41	5.9		61.5	54.6		73.3	28.0	15.8	17.5		<u>227</u>	37.1	13.5	12.8
Sulphate	mg/L					3.47	3.43	7.10		7.87	8.41		16.8	6.54	4.86	4.35		7.21	6.15	9.80	4.0
Phenols	mg/L	0.001	0.961	0.004		<0.001	<0.001	<0.001		<b>0.003</b>	<b>0.003</b>		<0.001	<0.001	<0.001	<b>0.002</b>		<b>0.003</b>	<b>0.002</b>	<b>0.087</b>	<0.001
Total Phosphorus	mg/L	0.03				0.03	<0.02	<b>0.09</b>		0.03	<b>0.32</b>		0.03	0.02	<0.02	<b>0.06</b>		<b>0.05</b>	0.02	<b>0.33</b>	0.03
pH	pH Units	6.5 - 8.5		6.5 - 9.0		7.82	7.88	7.94		8.10	8.09		7.98	7.77	7.60	8.08		7.94	8.10	7.81	8.15
Electrical Conductivity	uS/cm					302	416	515		809	757		637	428	530	672		1110	670	530	631
<b>Metals</b>																					
Arsenic	mg/L	0.1	0.15	0.005		<0.003	<0.003	<0.003						<0.003		<0.003					
Barium	mg/L		2.3			0.015	0.016	0.026						0.015		0.016					
Boron	mg/L	0.2	3.55	1.5	1.2	<0.010	0.013	0.018						0.015		0.020					
Cadmium	mg/L	0.0002	0.00021			<0.0001	<0.0001	<0.0001						<0.0001		<0.0001					
Chromium	mg/L	0.0089	0.064			<0.003	<0.003	0.005						<0.003		<0.003					
Copper	mg/L	0.005	0.0069			<0.002	<0.002	<0.002						0.001		0.001					
Iron	mg/L	0.3		0.3		0.18	0.07	0.30		0.06	0.07		0.24	0.246	0.206	<b>0.424</b>		<b>0.427</b>	0.088	<b>4.53</b>	<b>0.432</b>
Lead	mg/L	0.005	0.002			<0.001	<0.001	0.001						<0.001		<0.001					
Dissolved Mercury	mg/L	0.0002	0.00077			<0.0001	<0.0001	<0.0001						<0.0001		<0.0001					
Zinc	mg/L	0.03	0.089	0.03		0.007	<0.005	0.012						<0.005		<0.005					

Notes:  
 (1) PWQO - Provincial Water Quality Objectives.  
 (2) APV - Aquatic Protection Value from *Rationale for the Development of Soil and Groundwater*.  
 (3) CWQG - Canadian Water Quality Guidelines.  
 (4) Exceedences of the PWQO are indicated by **BOLD** entries.  
 (5) Exceedences of the APV are indicated by underlined entries.  
 (6) Exceedences of the CWQG are indicated by *italicized* entries.  
 (7) Trigger Level Monitoring Program was initiated in 2023, and represents 80% of the t  
 (8) Exceedance of the Trigger Concentration are indicated by shaded entries.



Surface Water Geochemical Results SW-2

Parameters	Units	PWQO <sup>1</sup>	APV <sup>2</sup>	CWQG <sup>3</sup>	Trigger Concentration <sup>7</sup> (mg/L)	2021							2022					2023			
						25-Mar	23-Apr	26-May	22-Jun	10-Aug	7-Sep	3-Oct	4-Nov	22-Apr	31-May	31-Aug	26-Sep	27-Oct	19-Jun	30-Aug	17-Oct
Alkalinity (as CaCO <sub>3</sub> )	mg/L					158	271	309	Dry	285	285	342	352	158	300	274	311	DRY	341	292	324
BOD (5)	mg/L													< 4	< 4	< 4	< 4		< 4	< 4	< 4
Chemical Oxygen Demand	mg/L					19	<5	<5		10	13	<5	<5	17	< 8	22	12		14	37	15
Total Dissolved Solids	mg/L					202	314	348		322	312	566	370	171	357	1070	446		431	383	340
Total Suspended Solids	mg/L					54	<10	<10		29	<10	<10	<10	14	5	6	12		2	12	7
Ammonia as N	mg/L					<0.02	<0.02	<0.02		0.14	<0.02	<0.02	<0.02	< 0.1	< 0.04	0.08	< 0.04		0.05	0.04	< 0.04
Nitrate as N	mg/L					0.11	<0.10	<0.05		0.5	<0.05	<0.05	<0.05	0.09	< 0.06	0.16	< 0.06		< 0.06	< 0.006	0.019
Nitrite as N	mg/L					<0.05	<0.10	<0.05		<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	< 0.3	< 0.03		< 0.03	< 0.003	< 0.003
Total Kjeldahl Nitrogen	mg/L					0.26	0.16	0.49		0.22	0.18	0.31	0.12	< 0.5	0.14	0.27	0.28		0.25	0.52	0.43
Chloride	mg/L		180	120	96	9.6	38.4	23.1		17	24.7	50	18.3	14	27	<u>480</u>	59		36	7	18
Sulphate	mg/L					2.73	5.52	4.36		3.14	1.06	5.62	7.6	5	5	64	36		2	2	3
Phenols	mg/L	0.001	0.961	0.004		<b>0.002</b>	<b>0.005</b>	<b>0.003</b>		<0.001	<b>0.004</b>	<b>0.033</b>	<b>0.036</b>	< 0.001	< 0.001	< 0.001	0.001		< 0.001	<b>0.002</b>	<b>0.002</b>
Total Phosphorus	mg/L	0.03				<b>0.2</b>	<0.02	<0.02		<0.02	0.03	0.03	0.02	0.025	< 0.03	<b>0.056</b>	0.024		0.027	<b>0.033</b>	0.016
pH	pH Units	6.5 - 8.5		6.5 - 9.0		7.68	8.03	8.20		7.91	8.04	8.00	7.97	8.12	8.39	8.33	8.32		8.20	8.41	8.20
Electrical Conductivity	uS/cm					296	606	643		576	617	761	688	311	594	2140	810		780	551	624
<b>Metals</b>																					
Arsenic	mg/L	0.1	0.15	0.005		<0.003				<0.003				0.0006		0.0006			0.0009	0.0005	0.0005
Barium	mg/L		2.3			0.034				0.028				0.0212		0.0896			0.0204	0.0200	0.0178
Boron	mg/L	0.2	3.55	1.5	1.2	<0.010				0.023				0.010		0.017			0.018	0.020	0.014
Cadmium	mg/L	0.0002	0.00021			<0.0001				<0.0001				0.000011		0.000008			< 0.000003	0.000017	0.000008
Chromium	mg/L	0.0089	0.064			0.008				<0.003				0.00267		0.00032			0.00044	0.00069	0.00061
Copper	mg/L	0.005	0.0069			0.003				0.002				0.0025		0.0021			0.0012	0.0017	0.0021
Iron	mg/L	0.3		0.3		<b>2.63</b>	0.072	0.194		<b>0.810</b>	0.048	0.019	0.192	<b>0.941</b>	0.154	0.247	0.155		0.158	0.249	0.242
Lead	mg/L	0.005	0.002			0.001				<0.001				0.00062		< 0.00009			< 0.00009	0.00019	0.00022
Dissolved Mercury	mg/L	0.0002	0.00077			<0.0001				<0.0001				< 0.00001		< 0.00001			< 0.00001	0.00002	< 0.00001
Zinc	mg/L	0.03	0.089	0.03		0.016				0.014				0.010		0.006			0.004	0.003	0.007

Notes:  
 (1) PWQO - Provincial Water Quality Objectives.  
 (2) APV - Aquatic Protection Value from *Rationale for the Development of Soil and Groundwater*.  
 (3) CWQG - Canadian Water Quality Guidelines.  
 (4) Exceedences of the PWQO are indicated by **BOLD** entries.  
 (5) Exceedences of the APV are indicated by underlined entries.  
 (6) Exceedences of the CWQG are indicated by *italicized* entries.  
 (7) Trigger Level Monitoring Program was initiated in 2023, and represents 80% of the t  
 (8) Exceedance of the Trigger Concentration are indicated by shaded entries.



Surface Water Geochemical Results SW-3

Parameters	Units	PWQO <sup>1</sup>	APV <sup>2</sup>	CWQG <sup>3</sup>	2017							2018								
					1-May	6-Jun	17-Jul	17-Aug	19-Sep	18-Oct	17-Nov	18-Dec	1-May	31-May	3-Jul	2-Aug	31-Aug	1-Oct	31-Oct	30-Nov
<b>General Chemistry</b>																				
Alkalinity (as CaCO <sub>3</sub> )	mg/L				214	300	Dry	Dry	Dry	Dry	Dry	Frozen	157	305	Dry	Dry	Dry	Dry	293	Frozen
BOD (5)	mg/L																			
Chemical Oxygen Demand	mg/L				6	12							12	<5					16	
Total Dissolved Solids	mg/L				330	318							156	358					346	
Total Suspended Solids	mg/L				<10	<10							221	<10					20	
Ammonia as N	mg/L				<0.02	<0.02							<0.02	<0.02					<0.02	
Nitrate as N	mg/L				<0.10	<0.05							0.08	<0.10					<0.25	
Nitrite as N	mg/L				<0.10	<0.05							<0.05	<0.10					<0.25	
Total Kjeldahl Nitrogen	mg/L				0.17	0.20							0.15	0.20					0.17	
Chloride	mg/L		180	120	71.6	49.6							38.8	59.4					54.4	
Sulphate	mg/L				9.26	6.52							3.32	6.14					9.9	
Phenols	mg/L	0.001	0.961	0.004	<0.001	<0.001							<0.001	<0.001					<0.001	
Total Phosphorus	mg/L	0.03			0.01	<b>0.04</b>							<b>0.14</b>	<0.02					<b>0.04</b>	
pH	pH Units	6.5 - 8.5		6.5 - 9.0	8.11	8.39							7.77	7.90					7.81	
Electrical Conductivity	uS/cm				665	746							410	665					663	
<b>Metals</b>																				
Arsenic	mg/L	0.1	0.15	0.005	<0.003								<0.003							
Barium	mg/L		2.3		0.021								0.032							
Boron	mg/L	0.2	3.55	1.5	<0.010								<0.010							
Cadmium	mg/L	0.0002	0.00021		<0.0001								<0.0001							
Chromium	mg/L	0.0089	0.064		0.004								0.003							
Copper	mg/L	0.005	0.0069		<0.002								0.004							
Iron	mg/L	0.3		0.3	0.10	0.08							<b>0.74</b>	0.14					0.21	
Lead	mg/L	0.005	0.002		<0.001								0.001							
Dissolved Mercury	mg/L	0.0002	0.00077		<0.0001								<0.0001							
Zinc	mg/L	0.03	0.089	0.03	0.008								0.013							

Notes:  
 (1) PWQO - Provincial Water Quality Objectives.  
 (2) APV - Aquatic Protection Value from *Rationale for the Development of Soil and Groundwater Standards for use at Contaminated Site in Ontario*, Table 3.1.  
 (3) CWQG - Canadian Water Quality Guidelines.  
 (4) Exceedences of the PWQO are indicated by **BOLD** entries.  
 (5) Exceedences of the APV are indicated by underlined entries.  
 (6) Exceedences of the CWQG are indicated by *italicized* entries.



Surface Water Geochemical Results SW-3

Parameters	Units	PWQO <sup>1</sup>	APV <sup>2</sup>	CWQG <sup>3</sup>	2019							2020								
					25-Apr	26-May	26-Jun	25-Jul	25-Aug	24-Sep	23-Oct	22-Nov	6-Apr	6-May	5-Jun	6-Jul	11-Aug	8-Sep	2-Oct	6-Nov
<b>General Chemistry</b>																				
Alkalinity (as CaCO <sub>3</sub> )	mg/L				159	268	337	Dry	Dry	Dry	325	260	157	Dry	318	Dry	Dry	365	363	301
BOD (5)	mg/L																			
Chemical Oxygen Demand	mg/L				14	7	19				<5	<5	7		14			14	<5	19
Total Dissolved Solids	mg/L				198	254	402				454	438	284		464			524	374	338
Total Suspended Solids	mg/L				<10	<10	61				112	<10	<10		20			30	636	<10
Ammonia as N	mg/L				<0.02	0.04	<0.02				<0.02	<0.02	<0.02		<0.02			<0.02	<0.02	<0.02
Nitrate as N	mg/L				0.31	<0.05	<0.10				<0.25	<0.10	0.2		<0.25			<0.25	<0.10	<0.10
Nitrite as N	mg/L				<0.05	<0.05	<0.10				<0.25	<0.10	<0.05		<0.25			<0.25	<0.10	<0.10
Total Kjeldahl Nitrogen	mg/L				<0.10	0.14	0.63				0.17	0.16	0.26		0.42			0.35	0.43	0.30
Chloride	mg/L		180	120	30.1	32.8	62.5				81.3	103	46.1		98.3			117	67.3	36.3
Sulphate	mg/L				4.64	4.44	2.94				11.5	14.0	6.23		6.33			4.73	4.41	4.21
Phenols	mg/L	0.001	0.961	0.004	<0.001	<0.001	0.001				0.001	<0.001	<0.001		0.001			0.001	<b>0.003</b>	<0.001
Total Phosphorus	mg/L	0.03			0.03	<0.02	<b>0.08</b>				<b>0.09</b>	<b>0.04</b>	<b>0.04</b>		<b>0.07</b>			0.03	<b>0.07</b>	<b>&lt;0.04</b>
pH	pH Units	6.5 - 8.5		6.5 - 9.0	7.82	7.89	7.95				8.06	7.89	7.82		7.96			8.12	7.85	8.09
Electrical Conductivity	uS/cm				402	507	778				808	764	523		968			983	693	661
<b>Metals</b>																				
Arsenic	mg/L	0.1	0.15	0.005	<0.003	<0.003	<0.003				<0.003		<0.003		<0.003					
Barium	mg/L		2.3		0.02	0.019	0.025				0.035		0.028		0.028					
Boron	mg/L	0.2	3.55	1.5	<0.010	0.011	0.013				0.012		<0.010		0.013					
Cadmium	mg/L	0.0002	0.00021		<0.0001	<0.0001	<0.0001				<0.0001		<0.0001		<0.0001					
Chromium	mg/L	0.0089	0.064		<0.003	<0.003	<b>0.010</b>				<0.003		<0.003		<0.003					
Copper	mg/L	0.005	0.0069		<0.002	<0.002	<0.002				0.004		0.002		0.002					
Iron	mg/L	0.3		0.3	<b>0.35</b>	0.07	0.06				0.14	0.04	<b>0.87</b>		<b>0.596</b>			<b>0.478</b>	<b>0.493</b>	0.222
Lead	mg/L	0.005	0.002		<0.001	0.001	<0.001				<0.001		<0.001		<0.001					
Dissolved Mercury	mg/L	0.0002	0.00077		<0.0001	<0.0001	<0.0001				<0.0001		<0.0001		<0.0001					
Zinc	mg/L	0.03	0.089	0.03	0.007	<0.005	0.006				0.006		0.006		0.007					

Notes:  
 (1) PWQO - Provincial Water Quality Objectives.  
 (2) APV - Aquatic Protection Value from *Rationale for the Development*  
 (3) CWQG - Canadian Water Quality Guidelines.  
 (4) Exceedences of the PWQO are indicated by **BOLD** entries.  
 (5) Exceedences of the APV are indicated by underlined entries.  
 (6) Exceedences of the CWQG are indicated by *italicized* entries.



Surface Water Geochemical Results SW-3

Parameters	Units	PWQO <sup>1</sup>	APV <sup>2</sup>	CWQG <sup>3</sup>	2021							2022					2023			
					25-Mar	23-Apr	26-May	22-Jun	10-Aug	7-Sep	3-Oct	4-Nov	22-Apr	31-May	31-Aug	26-Sep	27-Oct	19-Jun	30-Aug	17-Oct
<b>General Chemistry</b>																				
Alkalinity (as CaCO <sub>3</sub> )	mg/L				155	290	322	Dry	290	Dry	365	371	172	307	DRY	DRY	DRY	DRY	298	330
BOD (5)	mg/L												< 4	< 4					< 4	6
Chemical Oxygen Demand	mg/L				21	<5	<5		19		<5	<5	22	16					40	21
Total Dissolved Solids	mg/L				192	382	394		378		576	480	189	403					340	400
Total Suspended Solids	mg/L				33	17	27		616		<10	12	16	5					441	22
Ammonia as N	mg/L				<0.02	<0.02	<0.02		0.05		<0.02	<0.02	< 0.1	0.04					0.04	< 0.04
Nitrate as N	mg/L				0.13	<0.10	<0.05		<0.05		<0.05	<0.05	< 0.06	< 0.06					< 0.006	0.016
Nitrite as N	mg/L				<0.05	<0.10	<0.05		<0.05		<0.05	<0.05	< 0.03	< 0.03					< 0.003	0.004
Total Kjeldahl Nitrogen	mg/L				0.19	0.14	0.54		0.3		0.37	0.20	< 0.5	0.19					0.55	0.32
Chloride	mg/L		180	120	15	57.6	47.7		58.6		133	75.3	23	58					19	43
Sulphate	mg/L				2.93	5.73	4.18		2.8		6.88	6.93	5	6					2	5
Phenols	mg/L	0.001	0.961	0.004	<b>0.003</b>	<b>0.005</b>	<b>0.003</b>		<0.001		<b>0.030</b>	<b>0.036</b>	< 0.001	< 0.001					<b>0.002</b>	0.001
Total Phosphorus	mg/L	0.03			<b>0.12</b>	<0.02	<0.02		<0.02		0.03	0.02	0.017	< 0.03					<b>0.059</b>	0.022
pH	pH Units	6.5 - 8.5		6.5 - 9.0	7.68	8.00	8.15		7.97		7.91	7.84	8.21	8.35					8.35	8.10
Electrical Conductivity	uS/cm				327	696	734		698		1060	902	363	714					552	720
<b>Metals</b>																				
Arsenic	mg/L	0.1	0.15	0.005	<0.003				<0.003				0.0004						0.0008	0.0005
Barium	mg/L		2.3		0.029				0.031				0.0194						0.0277	0.0218
Boron	mg/L	0.2	3.55	1.5	<0.010				0.021				0.008						0.015	0.014
Cadmium	mg/L	0.0002	0.00021		<0.0001				<0.0001				0.000011						0.000026	0.000009
Chromium	mg/L	0.0089	0.064		0.006				0.005				0.00198						0.00145	0.00068
Copper	mg/L	0.005	0.0069		0.002				0.003				0.0027						0.0028	0.0026
Iron	mg/L	0.3		0.3	<b>1.68</b>	0.18	0.138		<b>1.65</b>		<0.010	0.18	<b>0.692</b>	0.137					<b>0.537</b>	<b>0.261</b>
Lead	mg/L	0.005	0.002		<0.001				<0.001				0.00044						0.00048	0.00024
Dissolved Mercury	mg/L	0.0002	0.00077		<0.0001				<0.0001				< 0.00001						0.00001	< 0.00001
Zinc	mg/L	0.03	0.089	0.03	0.015				0.01				0.011						0.006	0.004

Notes:  
 (1) PWQO - Provincial Water Quality Objectives.  
 (2) APV - Aquatic Protection Value from *Rationale for the Development*  
 (3) CWQG - Canadian Water Quality Guidelines.  
 (4) Exceedences of the PWQO are indicated by **BOLD** entries.  
 (5) Exceedences of the APV are indicated by underlined entries.  
 (6) Exceedences of the CWQG are indicated by *italicized* entries.



Surface Water Geochemical Results SW-4

Parameters	Units	PWQO <sup>1</sup>	APV <sup>2</sup>	CWQG <sup>3</sup>	2017							2018							
					1-May	6-Jun	17-Jul	17-Aug	19-Sep	18-Oct	17-Nov	18-Dec	1-May	31-May	3-Jul	2-Aug	31-Aug	1-Oct	31-Oct
<b>General Chemistry</b>																			
Alkalinity (as CaCO <sub>3</sub> )	mg/L																		
BOD (5)	mg/L																		
Chemical Oxygen Demand	mg/L				9	24	47	48	38	30	7		6	<5		24	21	8	18
Total Dissolved Solids	mg/L				1100	1020	1100	1110	1080	912	1090		896	1090		1770	1450	1200	1090
Total Suspended Solids	mg/L				<10	118	43	18	351	728	11		<10	<10		26	10	24	48
Ammonia as N	mg/L				<0.02	<0.02	0.06	0.04	0.04	0.04	<0.02		0.08	<0.02		<0.02	<0.02	<0.02	<0.02
Nitrate as N	mg/L				0.6	<0.25	<0.25	<0.25	<0.5	<0.25	1.0		1.4	1.0		<1.0	<0.5	<0.5	0.9
Nitrite as N	mg/L				<0.5	<0.25	<0.25	<0.25	<0.5	<0.25	<0.5		<0.25	<0.5		<1.0	<0.5	<0.5	<0.5
Total Kjeldahl Nitrogen	mg/L				0.26	0.31	0.48	0.68	0.62	0.54	0.44		0.5	0.23		0.6	0.56	1	0.14
Chloride	mg/L		180	120	<u>533</u>	<u>480</u>	<u>456</u>	<u>482</u>	<u>517</u>	<u>368</u>	<u>525</u>		<u>456</u>	<u>533</u>		<u>885</u>	<u>734</u>	<u>547</u>	<u>463</u>
Sulphate	mg/L				22.5	11.8	6.65	13.7	8.4	18.8	19.5		15.5	12.5		2.5	32.8	18.4	23.8
Phenols	mg/L	0.001	0.961	0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001		<0.001	0.001	<0.001	<0.001
Total Phosphorus	mg/L	0.03			0.02	<b>0.06</b>	<b>0.22</b>	<b>0.08</b>	<b>0.13</b>	<b>0.08</b>	0.03		0.03	0.02		<b>0.24</b>	<b>0.08</b>	<b>0.15</b>	<b>0.04</b>
pH	pH Units	6.5 - 8.5		6.5 - 9.0	8.15	8.32	8.18	8.16	8.21	8.26	8.11		7.96	7.89		8.03	8.00	8.07	7.91
Electrical Conductivity	uS/cm				2230	2190	2050	2120	2040	1670	1930		1830	1940		3330	2650	2300	1980
<b>Metals</b>																			
Arsenic	mg/L	0.1	0.15	0.005	<0.003		0.004						<0.003						
Barium	mg/L		2.3		0.064		0.115						0.069						
Boron	mg/L	0.2	3.55	1.5	<0.010		0.015						<0.010						
Cadmium	mg/L	0.0002	0.00021		<0.0001		0.0001						<0.0001						
Chromium	mg/L	0.0089	0.064		<b>0.010</b>		<b>0.009</b>						<0.003						
Copper	mg/L	0.005	0.0069		0.002		<u>0.010</u>						0.002						
Iron	mg/L	0.3		0.3	<0.01	0.26	<b>4.34</b>	0.23	<b>0.90</b>	<b>0.52</b>	0.19		0.17	0.04		<b>4.36</b>	<b>0.68</b>	<b>0.86</b>	<b>0.36</b>
Lead	mg/L	0.005	0.002		<0.001		<u>0.004</u>						<0.001						
Dissolved Mercury	mg/L	0.0002	0.00077		<0.0001		<0.0001						<0.0001						
Zinc	mg/L	0.03	0.089	0.03	<0.005		0.026						<0.005						

Notes:  
 (1) PWQO - Provincial Water Quality Objectives.  
 (2) APV - Aquatic Protection Value from *Rationale for the Development of Soil and Groundwater Standards for use at Contaminated Site in Ontario*, Table 3.1.  
 (3) CWQG - Canadian Water Quality Guidelines.  
 (4) Exceedences of the PWQO are indicated by **BOLD** entries.  
 (5) Exceedences of the APV are indicated by underlined entries.  
 (6) Exceedences of the CWQG are indicated by *italicized* entries.



Surface Water Geochemical Results SW-4

Parameters	Units	PWQO <sup>1</sup>	APV <sup>2</sup>	CWQG <sup>3</sup>	2019							2020								
					25-Apr	26-May	26-Jun	25-Jul	25-Aug	24-Sep	23-Oct	22-Nov	6-Apr	6-May	5-Jun	6-Jul	11-Aug	8-Sep	2-Oct	6-Nov
<b>General Chemistry</b>																				
Alkalinity (as CaCO <sub>3</sub> )	mg/L							Dry	Dry											
BOD (5)	mg/L																			
Chemical Oxygen Demand	mg/L				16	9	17			23	32	<5	8	<5	23	23	13	17	6	14
Total Dissolved Solids	mg/L				906	874	1110			1190	858	892	682	1110	1660	1210	1190	1020	826	714
Total Suspended Solids	mg/L				<10	<10	14			35	307	21	<10	13	96	44	19	21	80	<10
Ammonia as N	mg/L				<0.02	<0.02	<0.02			0.03	0.03	0.04	<0.02	<0.02	<0.02	0.03	0.08	<0.02	<0.02	<0.02
Nitrate as N	mg/L				2.1	2.3	1.1			<0.5	<0.25	0.71	3.02	0.70	<1.0	<0.5	<0.5	<0.5	<0.25	0.48
Nitrite as N	mg/L				<0.5	<0.5	<0.5			<0.5	<0.25	<0.25	<0.25	<0.5	<1.0	<0.5	<0.5	<0.5	<0.25	<0.25
Total Kjeldahl Nitrogen	mg/L				<0.10	0.3	0.56			0.69	0.38	0.27	0.38	0.28	1.28	0.64	0.61	0.69	0.42	0.28
Chloride	mg/L		180	120	<u>425</u>	<u>436</u>	<u>561</u>			<u>637</u>	<u>344</u>	<u>378</u>	<u>223</u>	<u>537</u>	<u>796</u>	<u>594</u>	<u>548</u>	<u>459</u>	<u>313</u>	<u>249</u>
Sulphate	mg/L				19	17.0	11.10			27.5	27.8	21.4	13.3	19.5	14.1	13.6	5.4	7.5	9.8	14.6
Phenols	mg/L	0.001	0.961	0.004	<0.001	<0.001	<0.001			<b>0.002</b>	<b>0.002</b>	<0.001	<0.001	<0.001	<b>0.002</b>	0.001	<b>0.002</b>	<0.001	<0.001	<0.001
Total Phosphorus	mg/L	0.03			<0.02	<0.02	<b>0.06</b>			<b>0.11</b>	<b>0.22</b>	<b>0.06</b>	<b>0.04</b>	<0.02	<b>0.09</b>	<b>0.40</b>	<b>0.06</b>	<b>0.04</b>	<b>0.04</b>	<b>&lt;0.10</b>
pH	pH Units	6.5 - 8.5		6.5 - 9.0	7.92	7.91	7.93			7.97	8.00	7.92	7.88	7.88	7.90	8.09	7.99	8.23	7.94	8.12
Electrical Conductivity	uS/cm				1780	1770	2200			2520	1510	1630	1330	2680	3270	2050	1960	1970	1330	1420
<b>Metals</b>																				
Arsenic	mg/L	0.1	0.15	0.005	<0.003	<0.003	0.004					<0.003		<0.003	<0.003	<0.003				
Barium	mg/L		2.3		0.062	0.061	0.074					0.045		0.047	0.082	0.084				
Boron	mg/L	0.2	3.55	1.5	<0.010	0.014	0.015					0.017		<0.010	0.018	0.013				
Cadmium	mg/L	0.0002	0.00021		<0.0001	<0.0001	<0.0001					<0.0001		<0.0001	<0.0001	<0.0001				
Chromium	mg/L	0.0089	0.064		0.005	<0.003	0.007					<0.003		<0.003	0.004	<b>0.011</b>				
Copper	mg/L	0.005	0.0069		0.003	0.004	0.003					<b>0.012</b>		0.005	0.004	<b>0.013</b>				
Iron	mg/L	0.3		0.3	0.11	0.04	0.26			<b>0.49</b>	<b>0.49</b>	0.19	<b>0.455</b>	<b>0.419</b>	<b>1.23</b>	<b>5.88</b>	<b>0.48</b>	<b>0.338</b>	<b>1.77</b>	<b>0.319</b>
Lead	mg/L	0.005	0.002		<0.001	<0.001	<0.001					0.001		<0.001	0.002	0.002				
Dissolved Mercury	mg/L	0.0002	0.00077		<0.0001	<0.0001	<0.0001					<0.0001		<0.0001	<0.0001	<0.0001				
Zinc	mg/L	0.03	0.089	0.03	<0.005	<0.005	0.009					0.006		<0.005	0.006	0.022				

Notes:  
 (1) PWQO - Provincial Water Quality Objectives.  
 (2) APV - Aquatic Protection Value from *Rationale for the Development*  
 (3) CWQG - Canadian Water Quality Guidelines.  
 (4) Exceedences of the PWQO are indicated by **BOLD** entries.  
 (5) Exceedences of the APV are indicated by underlined entries.  
 (6) Exceedences of the CWQG are indicated by *italicized* entries.





Surface Water Geochemical Results SW-4

Parameters	Units	PWQO <sup>1</sup>	APV <sup>2</sup>	CWQG <sup>3</sup>	2021							2022					2023			
					25-Mar	23-Apr	26-May	22-Jun	10-Aug	7-Sep	3-Oct	4-Nov	22-Apr	31-May	31-Aug	26-Sep	27-Oct	19-Jun	30-Aug	17-Oct
<b>General Chemistry</b>																				
Alkalinity (as CaCO <sub>3</sub> )	mg/L												278	302	Insufficient Volume	299	322	323	263	339
BOD (5)	mg/L												< 4	< 4		< 4	16	< 4	< 4	6
Chemical Oxygen Demand	mg/L				16	<5	<5	52	22	23	<5	<5	10	28		26	23	26	47	14
Total Dissolved Solids	mg/L				1100	1700	1430	1750	1020	1360	1060	982	1580	1250		1280	1070	2050	1120	923
Total Suspended Solids	mg/L				<10	<10	31	66	19	<10	<10	<10	30	8		6	1610	23	20	67
Ammonia as N	mg/L				0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	< 0.1	0.05		0.04	< 0.04	0.08	0.04	< 0.04
Nitrate as N	mg/L				<0.5	<1.0	<0.14	<0.14	<0.07	<0.14	<0.07	<0.07	0.21	< 0.06		< 0.06	< 0.06	< 0.06	< 0.006	0.02
Nitrite as N	mg/L				<0.5	<1.0	<0.11	<0.11	<0.05	<0.11	<0.05	<0.05	< 0.03	< 0.03		< 0.3	< 0.03	< 0.3	< 0.03	<0.03
Total Kjeldahl Nitrogen	mg/L				0.26	0.24	0.26	0.76	0.39	0.28	0.41	0.22	< 0.5	< 0.05		0.29	0.17	< 0.05	< 0.05	< 0.05
Chloride	mg/L		180	120	<u>520</u>	<u>764</u>	<u>671</u>	<u>747</u>	<u>444</u>	<u>647</u>	<u>511</u>	<u>419</u>	<u>740</u>	<u>580</u>		<u>550</u>	<u>480</u>	<u>1400</u>	<u>600</u>	<u>410</u>
Sulphate	mg/L				17.6	27.5	10.1	4.8	6.3	6.5	11.9	17.0	35	21		50	36	15	26	19
Phenols	mg/L	0.001	0.961	0.004	<b>0.002</b>	<b>0.004</b>	<b>0.003</b>	<b>0.003</b>	<0.001	<b>0.006</b>	<b>0.026</b>	<b>0.028</b>	< 0.001	< 0.001		<b>0.007</b>	<b>0.002</b>	<b>0.003</b>	<b>0.003</b>	<b>0.003</b>
Total Phosphorus	mg/L	0.03			<b>0.05</b>	<0.02	0.03	<b>0.74</b>	<b>0.04</b>	<b>0.04</b>	<b>0.04</b>	0.02	<b>0.039</b>	< 0.03		<b>0.048</b>	<b>1.72</b>	<b>0.067</b>	<b>0.079</b>	<b>0.046</b>
pH	pH Units	6.5 - 8.5		6.5 - 9.0	7.83	8.00	7.98	7.28	8.02	7.95	7.89	7.94	8.07	8.33		8.19	8.04	8.10	8.23	8.08
Electrical Conductivity	uS/cm				2040	2810	2640	3050	1920	2720	2010	1900	2860	2350		2420	2120	3580	2300	1830
<b>Metals</b>																				
Arsenic	mg/L	0.1	0.15	0.005	<0.003				<0.003				0.0006					0.0012	0.001	0.0005
Barium	mg/L		2.3		0.075				0.041				0.108					0.0857	0.0554	0.0540
Boron	mg/L	0.2	3.55	1.5	<0.010				0.025				0.009					0.019	0.019	0.015
Cadmium	mg/L	0.0002	0.00021		<0.0001				<0.0001				0.000031					0.000010	0.000028	0.000022
Chromium	mg/L	0.0089	0.064		<0.003				<0.003				0.00243					0.00126	0.00189	0.00144
Copper	mg/L	0.005	0.0069		0.002				0.003				0.0047					0.0021	<b>0.0173</b>	<b>0.0069</b>
Iron	mg/L	0.3		0.3	0.213	0.07	<b>0.35</b>	<b>14.8</b>	<b>0.41</b>	<b>0.805</b>	<b>0.434</b>	<b>0.469</b>	<b>1.24</b>	0.211		<b>0.617</b>	<b>50.4</b>	<b>0.845</b>	<b>1.23</b>	<b>0.92</b>
Lead	mg/L	0.005	0.002		<0.001				<0.001				0.00077					0.00019	0.00138	0.00062
Dissolved Mercury	mg/L	0.0002	0.00077		<0.0001				<0.0001				< 0.00001					< 0.00001	0.00002	0.00006
Zinc	mg/L	0.03	0.089	0.03	0.006				<0.005				0.012					0.003	0.008	0.007

Notes:  
 (1) PWQO - Provincial Water Quality Objectives.  
 (2) APV - Aquatic Protection Value from *Rationale for the Development of Aquatic Protection Values*.  
 (3) CWQG - Canadian Water Quality Guidelines.  
 (4) Exceedences of the PWQO are indicated by **BOLD** entries.  
 (5) Exceedences of the APV are indicated by underlined entries.  
 (6) Exceedences of the CWQG are indicated by *italicized* entries.



Surface Water Geochemical Results SW-5

Parameters	Units	PWQO <sup>1</sup>	APV <sup>2</sup>	CWQG <sup>3</sup>	2017							2018								
					1-May	6-Jun	17-Jul	17-Aug	19-Sep	18-Oct	17-Nov	18-Dec	1-May	31-May	3-Jul	2-Aug	31-Aug	1-Oct	31-Oct	30-Nov
<b>General Chemistry</b>																				
Alkalinity (as CaCO <sub>3</sub> )	mg/L				101	111	112	107	40	158	189	Frozen	Frozen	139	72	29	85	110	Frozen	Frozen
BOD (5)	mg/L				<5	<5	<5	<5	<5	<5	<5			<5	<5	<5	<5	<5		
Chemical Oxygen Demand	mg/L																			
Total Dissolved Solids	mg/L				150	130	152	148	82	192	232			204	112	66	152	190		
Total Suspended Solids	mg/L				70	17	14	<10	13	23	30			102	48	11	16	15		
Ammonia as N	mg/L				0.02	<0.02	0.04	<0.02	0.06	0.05	0.05			<0.02	0.02	<0.02	<0.02	0.03		
Nitrate as N	mg/L				1.18	0.25	0.32	0.61	0.11	0.32	1.77			1.95	<0.05	0.06	<0.05	0.10		
Nitrite as N	mg/L				<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.10			<0.05	<0.05	<0.05	<0.05	<0.05		
Total Kjeldahl Nitrogen	mg/L				0.42	0.42	0.48	0.80	0.90	0.50	0.77			0.48	0.41	0.36	0.37	0.78		
Chloride	mg/L		180	120	9.08	5.98	13.6	6.67	5.13	10.1	11.3			18.6	7.68	2.94	18.5	18.1		
Sulphate	mg/L				7.77	5.44	9.50	5.88	7.04	6.97	11.1			6.96	6.14	4.88	11.20	11.20		
Phenols	mg/L	0.001	0.961	0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			0.001	<0.001	<0.001	0.001	<0.001		
Total Phosphorus	mg/L	0.03			<b>0.06</b>	<b>0.06</b>	<b>0.08</b>	<b>0.04</b>	<b>0.09</b>	<b>0.06</b>	<b>0.07</b>			<b>0.13</b>	<b>0.07</b>	<b>0.04</b>	<b>0.11</b>	<b>0.08</b>		
pH	pH Units	6.5 - 8.5		6.5 - 9.0	7.84	7.89	7.78	7.76	7.22	7.96	7.91			7.29	7.83	7.12	7.60	7.70		
Electrical Conductivity	uS/cm				248	258	271	243	112	321	366			314	195	87	253	316		
<b>Metals</b>																				
Arsenic	mg/L	0.1	0.15	0.005	<0.003		<0.003													
Barium	mg/L		2.3		0.024		0.017										0.026			
Boron	mg/L	0.2	3.55	1.5	<0.010		0.015										0.016			
Cadmium	mg/L	0.0002	0.00021		0.0001		<0.0001										<0.0001			
Chromium	mg/L	0.0089	0.064		<0.003		<0.003										<0.003			
Copper	mg/L	0.005	0.0069		0.003		0.002										0.005			
Iron	mg/L	0.3		0.3	<b>0.70</b>	<b>0.49</b>	0.25	0.24	0.21	<b>0.39</b>	<b>0.37</b>			<b>1.17</b>	<b>0.8</b>	0.24	<b>0.47</b>	<b>0.34</b>		
Lead	mg/L	0.005	0.002		<0.001		<0.001										0.001			
Dissolved Mercury	mg/L	0.0002	0.00077		<0.0001		<0.0001										<0.0001			
Zinc	mg/L	0.03	0.089	0.03	0.007		0.011										0.01			

Notes:  
 (1) PWQO - Provincial Water Quality Objectives.  
 (2) APV - Aquatic Protection Value from *Rationale for the Development of Soil and Groundwater Standards for use at Contaminated Site in Ontario*, Table 3.1.  
 (3) CWQG - Canadian Water Quality Guidelines.  
 (4) Exceedences of the PWQO are indicated by **BOLD** entries.  
 (5) Exceedences of the APV are indicated by underlined entries.  
 (6) Exceedences of the CWQG are indicated by *italicized* entries.



Surface Water Geochemical Results SW-5

Parameters	Units	PWQO <sup>1</sup>	APV <sup>2</sup>	CWQG <sup>3</sup>	2019							2020								
					25-Apr	26-May	26-Jun	25-Jul	25-Aug	24-Sep	23-Oct	22-Nov	6-Apr	6-May	5-Jun	6-Jul	11-Aug	8-Sep	2-Oct	6-Nov
<b>General Chemistry</b>																				
Alkalinity (as CaCO <sub>3</sub> )	mg/L				Frozen	132	83	31	77	50	138	Frozen	Unsafe to sample	84	112	105	38	126	179	165
BOD (5)	mg/L					<5	<5	<5	<5	<5	<5			<5	<5	<2	<2	3	2	<5
Chemical Oxygen Demand	mg/L																			
Total Dissolved Solids	mg/L					234	136	48	138	104	278			154	154	194	102	188	184	198
Total Suspended Solids	mg/L					62	26	20	560	20	66			94	24	25	12	20	42	29
Ammonia as N	mg/L					0.10	0.02	0.18	0.19	0.07	0.04			<0.02	<0.02	0.04	0.07	0.05	0.07	0.04
Nitrate as N	mg/L					0.78	0.24	0.05	<0.05	<0.05	1.4			0.50	0.49	0.31	0.12	0.22	0.99	1.12
Nitrite as N	mg/L					<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Kjeldahl Nitrogen	mg/L					0.49	0.44	0.55	1.30	0.57	0.44			0.47	0.63	0.47	0.30	0.49	0.67	0.52
Chloride	mg/L		180	120		7.61	8.07	2.36	8.42	8.89	24.2			5.09	9.98	16.7	3.71	20.3	13.0	8.18
Sulphate	mg/L					5.36	6.38	4.39	8.09	6.95	11.9			5.19	6.65	13.4	5.27	9.76	10.5	8.0
Phenols	mg/L	0.001	0.961	0.004		<b>0.002</b>	<b>0.002</b>	<b>0.002</b>	<b>0.002</b>	<b>0.002</b>	<b>0.004</b>			0.001	<b>0.003</b>	<b>0.002</b>	<b>0.002</b>	0.001	<0.001	<0.001
Total Phosphorus	mg/L	0.03				<b>0.08</b>	<b>0.07</b>	<b>0.07</b>	<b>0.27</b>	<b>0.07</b>	<b>0.08</b>			<b>0.09</b>	<b>0.09</b>	<b>0.07</b>	0.03	<b>0.04</b>	<b>0.08</b>	<b>&lt;0.10</b>
pH	pH Units	6.5 - 8.5		6.5 - 9.0		7.51	7.37	7.50	7.19	7.08	7.68			7.83	7.51	7.70	7.56	8.22	7.22	7.91
Electrical Conductivity	uS/cm					244	195	95	195	159	343			239	306	267	103	314	306	355
<b>Metals</b>																				
Arsenic	mg/L	0.1	0.15	0.005		<0.003	<0.003	<0.003			<0.003			<0.003	<0.003					
Barium	mg/L		2.3			0.024	0.023	0.012			0.033			0.022	0.029					
Boron	mg/L	0.2	3.55	1.5		<0.010	<0.010	<0.010			0.013			0.011	<0.010					
Cadmium	mg/L	0.0002	0.00021			<0.0001	<0.0001	<0.0001			<0.0001			<0.0001	<0.0001					
Chromium	mg/L	0.0089	0.064			<0.003	<0.003	<0.003			<0.003			<0.003	0.004					
Copper	mg/L	0.005	0.0069			0.003	<0.002	0.003			<b>0.0060</b>			0.003	0.003					
Iron	mg/L	0.3		0.3		<b>0.55</b>	0.21	<b>0.45</b>	<b>2.39</b>	<b>0.36</b>	<b>0.54</b>			<b>3.9</b>	<b>1.10</b>	<b>1.44</b>	<b>1.11</b>	<b>0.988</b>	<b>2.83</b>	<b>1.55</b>
Lead	mg/L	0.005	0.002			<0.001	<0.001	<0.001			<0.001			<0.001	<0.001					
Dissolved Mercury	mg/L	0.0002	0.00077			<0.0001	<0.0001	<0.0001			<0.0001			<0.0001	<0.0001					
Zinc	mg/L	0.03	0.089	0.03		<0.005	0.009	<0.005			<0.005			<0.005	<0.005					

Notes:  
 (1) PWQO - Provincial Water Quality Objectives.  
 (2) APV - Aquatic Protection Value from *Rationale for the Development of Aquatic Protection Values*.  
 (3) CWQG - Canadian Water Quality Guidelines.  
 (4) Exceedences of the PWQO are indicated by **BOLD** entries.  
 (5) Exceedences of the APV are indicated by underlined entries.  
 (6) Exceedences of the CWQG are indicated by *italicized* entries.

Surface Water Geochemical Results SW-5

Parameters	Units	PWQO <sup>1</sup>	APV <sup>2</sup>	CWQG <sup>3</sup>	2021							2022					2023			
					25-Mar	23-Apr	26-May	22-Jun	10-Aug	7-Sep	3-Oct	4-Nov	22-Apr	31-May	31-Aug	26-Sep	27-Oct	19-Jun	30-Aug	17-Oct
<b>General Chemistry</b>																				
Alkalinity (as CaCO <sub>3</sub> )	mg/L				Unsafe to sample	105	141	72	60	134	52	160	138	100	65	26	130	26	66	128
BOD (5)	mg/L					11	4	<2	4	3	<2.00	2	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4
Chemical Oxygen Demand	mg/L												16	26	20	25	21	19	30	37
Total Dissolved Solids	mg/L					144	198	88	120	176	86	182	257	206	106	66	194	66	149	217
Total Suspended Solids	mg/L					21	40	<10	47	22	<10	11	314	117	7	8	184	46	9	30
Ammonia as N	mg/L					0.02	<0.02	<0.02	0.1	0.05	<0.02	0.04	< 0.1	0.06	< 0.04	0.04	0.04	< 0.04	0.05	0.04
Nitrate as N	mg/L					0.48	0.11	0.26	0.27	<0.05	0.26	0.45	1.6	0.65	< 0.06	0.20	0.57	0.170	0.066	0.875
Nitrite as N	mg/L					<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.003	0.007
Total Kjeldahl Nitrogen	mg/L					0.34	2.26	0.32	0.36	0.43	0.34	0.39	< 0.5	0.24	0.16	0.25	0.33	0.14	0.28	0.47
Chloride	mg/L		180	120		8.1	13.7	8.45	4.27	7.81	2.7	11.7	51	17	13	5	18	6	17	12
Sulphate	mg/L					5.64	9.39	5.4	5.20	7.56	5.0	8.4	10	9	11	6	15	7	9	14
Phenols	mg/L	0.001	0.961	0.004		<b>0.002</b>	0.001	<0.001	<0.001	<b>0.002</b>	<0.001	<b>0.005</b>	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	<b>0.002</b>
Total Phosphorus	mg/L	0.03				<b>0.04</b>	<b>0.16</b>	<b>0.06</b>	<b>0.07</b>	<b>0.09</b>	0.03	<b>0.04</b>	<b>0.215</b>	<b>0.08</b>	<b>0.04</b>	<b>0.033</b>	<b>0.043</b>	<b>0.061</b>	0.030	<b>0.057</b>
pH	pH Units	6.5 - 8.5		6.5 - 9.0		8.00	7.98	6.82	7.44	7.63	7.47	7.87	8.02	8.08	7.78	7.51	8.05	7.56	8.04	7.86
Electrical Conductivity	uS/cm					239	330	144	150	282	93	335	403	239	190	77	322	75	193	288
<b>Metals</b>																				
Arsenic	mg/L	0.1	0.15	0.005					<0.003				0.0013		0.0011			0.0013	0.0011	0.0008
Barium	mg/L		2.3						0.027				0.108		0.0188			0.0287	0.0181	0.0308
Boron	mg/L	0.2	3.55	1.5					0.010				0.013		0.012			0.007	0.012	0.013
Cadmium	mg/L	0.0002	0.00021						<0.0001				0.00007		0.000018			0.000035	0.000014	0.000016
Chromium	mg/L	0.0089	0.064						0.005				<b>0.0216</b>		0.00128			0.00633	0.00124	0.00411
Copper	mg/L	0.005	0.0069						0.004				<u>0.0111</u>		0.0023			<b>0.0070</b>	0.0032	0.0041
Iron	mg/L	0.3		0.3		<i>1.4</i>	<i>0.94</i>	<i>1.17</i>	<i>2.05</i>	<i>0.687</i>	<i>0.626</i>	<i>0.765</i>	<b>8.06</b>	<b>4.63</b>	<b>0.578</b>	<b>0.896</b>	<b>1.06</b>	<b>2.66</b>	<b>0.495</b>	<b>1.60</b>
Lead	mg/L	0.005	0.002						<0.001				<u>0.00417</u>		0.00035			<u>0.00238</u>	0.00043	0.00075
Dissolved Mercury	mg/L	0.0002	0.00077						<0.0001				0.00001		< 0.00001			< 0.00001	0.00001	< 0.00001
Zinc	mg/L	0.03	0.089	0.03					0.008				0.027		< 0.002			0.012	0.003	0.006

Notes:  
 (1) PWQO - Provincial Water Quality Objectives.  
 (2) APV - Aquatic Protection Value from *Rationale for the Development*  
 (3) CWQG - Canadian Water Quality Guidelines.  
 (4) Exceedences of the PWQO are indicated by **BOLD** entries.  
 (5) Exceedences of the APV are indicated by underlined entries.  
 (6) Exceedences of the CWQG are indicated by *italicized* entries.



Surface Water Geochemical Results SW-6

Parameters	Units	PWQO <sup>1</sup>	APV <sup>2</sup>	CWQG <sup>3</sup>	2017							2018								
					1-May	6-Jun	17-Jul	17-Aug	19-Sep	18-Oct	17-Nov	18-Dec	1-May	31-May	3-Jul	2-Aug	31-Aug	1-Oct	31-Oct	30-Nov
<b>General Chemistry</b>																				
Alkalinity (as CaCO <sub>3</sub> )	mg/L				102	98	108	78	38	135	190	Frozen	Frozen	140	71	27	78	106	Frozen	Frozen
BOD (5)	mg/L				<5	<5	<5	<5	<5	<5	<5			<5	<5	<5	<5	<5		
Chemical Oxygen Demand	mg/L																			
Total Dissolved Solids	mg/L				140	146	152	108	76	162	242			192	92	70	142	184		
Total Suspended Solids	mg/L				40	11	17	11	11	20	49			81	26	<10	10	13		
Ammonia as N	mg/L				0.02	<0.02	0.02	0.02	0.10	<0.02	0.04			<0.02	0.03	<0.02	0.04	<0.02		
Nitrate as N	mg/L				1.09	0.24	0.31	0.39	0.12	0.24	1.82			1.99	<0.05	0.07	<0.05	0.10		
Nitrite as N	mg/L				<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			<0.05	<0.05	<0.05	<0.05	<0.05		
Total Kjeldahl Nitrogen	mg/L				0.44	0.46	0.50	0.74	0.86	0.66	0.75			0.45	0.25	0.40	0.42	0.83		
Chloride	mg/L		180	120	8.54	5.14	11.8	5.07	5.10	7.86	10.9			9.06	2.92	2.34	15.8	15.8		
Sulphate	mg/L				7.51	16.9	9.09	5.56	7.12	6.72	11.0			6.67	4.32	4.77	10.40	13.60		
Phenols	mg/L	0.001	0.961	0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			0.002	<0.001	<0.001	0.001	<0.001		
Total Phosphorus	mg/L	0.03			<b>0.07</b>	<b>0.06</b>	<b>0.07</b>	<b>0.05</b>	<b>0.07</b>	<b>0.10</b>	<b>0.07</b>			<b>0.12</b>	<b>0.05</b>	<b>0.04</b>	<b>0.07</b>	<b>0.08</b>		
pH	pH Units	6.5 - 8.5		6.5 - 9.0	8.01	8.05	8.01	7.91	7.58	8.02	7.89			7.38	7.80	7.32	7.76	7.79		
Electrical Conductivity	uS/cm				249	256	258	183	111	275	363			286	166	81	237	306		
<b>Metals</b>																				
Arsenic	mg/L	0.1	0.15	0.005	<0.003		<0.003													
Barium	mg/L		2.3		0.022		0.015										0.015			
Boron	mg/L	0.2	3.55	1.5	<0.010		0.011										<0.010			
Cadmium	mg/L	0.0002	0.00021		<0.0001		<0.0001										<0.0001			
Chromium	mg/L	0.0089	0.064		<0.003		0.004										<0.003			
Copper	mg/L	0.005	0.0069		0.003		0.002										0.003			
Iron	mg/L	0.3		0.3	<b>0.71</b>	<b>0.42</b>	0.24	0.21	0.21	<b>0.41</b>	<b>0.53</b>			<b>0.96</b>	<b>0.39</b>	0.29	<b>0.37</b>	<b>0.35</b>		
Lead	mg/L	0.005	0.002		<0.001		<0.001										<0.001			
Dissolved Mercury	mg/L	0.0002	0.00077		<0.0001		<0.0001										<0.0001			
Zinc	mg/L	0.03	0.089	0.03	<0.005		0.007										0.008			

Notes:  
 (1) PWQO - Provincial Water Quality Objectives.  
 (2) APV - Aquatic Protection Value from *Rationale for the Development of Soil and Groundwater Standards for use at Contaminated Site in Ontario*, Table 3.1.  
 (3) CWQG - Canadian Water Quality Guidelines.  
 (4) Exceedences of the PWQO are indicated by **BOLD** entries.  
 (5) Exceedences of the APV are indicated by underlined entries.  
 (6) Exceedences of the CWQG are indicated by *italicized* entries.

Surface Water Geochemical Results SW-6

Parameters	Units	PWQO <sup>1</sup>	APV <sup>2</sup>	CWQG <sup>3</sup>	2019							2020								
					25-Apr	26-May	26-Jun	25-Jul	25-Aug	24-Sep	23-Oct	22-Nov	6-Apr	6-May	5-Jun	6-Jul	11-Aug	8-Sep	2-Oct	6-Nov
<b>General Chemistry</b>																				
Alkalinity (as CaCO <sub>3</sub> )	mg/L				Frozen	135	83	28	72	48	132	Frozen	Unsafe to sample	87	108	96	35	123	179	164
BOD (5)	mg/L					<5	<5	<5	<5	<5	<5			<5	<5	<2	2	3	4	<5
Chemical Oxygen Demand	mg/L																			
Total Dissolved Solids	mg/L					160	134	64	108	98	214			132	152	168	80	172	176	214
Total Suspended Solids	mg/L					55	20	12	93	26	24			63	18	25	13	12	34	20
Ammonia as N	mg/L					0.07	0.05	0.16	0.13	0.03	0.04			0.04	<0.02	0.05	0.06	0.05	0.06	0.04
Nitrate as N	mg/L					0.76	0.3	0.05	<0.05	<0.05	1.39			0.53	0.47	0.43	0.12	0.18	0.99	1.09
Nitrite as N	mg/L					<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Kjeldahl Nitrogen	mg/L					<0.10	0.44	0.62	0.90	0.69	0.37			0.33	0.56	0.52	0.37	0.42	0.60	0.48
Chloride	mg/L		180	120		8.36	8.13	2.05	9.52	8.82	10.6			6.17	9.35	11.0	3.68	13.6	10.7	8.12
Sulphate	mg/L					5.36	6.49	4.51	7.98	7.43	11.0			5.56	6.35	17.80	5.09	9.40	10.4	7.77
Phenols	mg/L	0.001	0.961	0.004		<b>0.002</b>	<b>0.002</b>	<b>0.002</b>	<b>0.002</b>	<b>0.002</b>	<b>0.004</b>			0.001	<b>0.003</b>	<b>0.005</b>	0.001	0.001	<0.001	<b>0.002</b>
Total Phosphorus	mg/L	0.03				<b>0.09</b>	<b>0.09</b>	<b>0.06</b>	<b>0.15</b>	<b>0.13</b>	<b>0.10</b>			<b>0.12</b>	<b>0.05</b>	<0.02	<b>0.24</b>	0.03	<b>0.08</b>	<b>&lt;0.10</b>
pH	pH Units	6.5 - 8.5		6.5 - 9.0		7.66	7.59	7.39	7.64	7.29	7.81			7.71	7.73	7.47	7.05	8.20	7.27	8.01
Electrical Conductivity	uS/cm					251	197	85	240	158	292			253	278	234	102	293	297	351
<b>Metals</b>																				
Arsenic	mg/L	0.1	0.15	0.005		<0.003	<0.003	<0.003			<0.003			<0.003	<0.003					
Barium	mg/L		2.3			0.027	0.026	0.010			0.031			0.020	0.035					
Boron	mg/L	0.2	3.55	1.5		<0.010	0.010	<0.010			0.013			<0.010	<0.010					
Cadmium	mg/L	0.0002	0.00021			<0.0001	<0.0001	<0.0001			<0.0001			<0.0001	<0.0001					
Chromium	mg/L	0.0089	0.064			<0.003	<0.003	<0.003			<0.003			0.003	0.006					
Copper	mg/L	0.005	0.0069			0.004	<0.002	0.002			0.004			0.002	0.004					
Iron	mg/L	0.3		0.3		<b>0.59</b>	0.26	<b>0.38</b>	<b>1.02</b>	<b>0.52</b>	<b>0.56</b>			<b>3.44</b>	<b>0.991</b>	<b>2.44</b>	<b>1.35</b>	<b>0.864</b>	<b>2.95</b>	<b>1.51</b>
Lead	mg/L	0.005	0.002			<0.001	<0.001	<0.001			<0.001			<0.001	<0.001					
Dissolved Mercury	mg/L	0.0002	0.00077			<0.0001	<0.0001	<0.0001			<0.0001			<0.0001	<0.0001					
Zinc	mg/L	0.03	0.089	0.03		0.006	0.01	<0.005			<0.005			<0.005	0.007					

Notes:  
 (1) PWQO - Provincial Water Quality Objectives.  
 (2) APV - Aquatic Protection Value from *Rationale for the Development of Aquatic Protection Values*.  
 (3) CWQG - Canadian Water Quality Guidelines.  
 (4) Exceedences of the PWQO are indicated by **BOLD** entries.  
 (5) Exceedences of the APV are indicated by underlined entries.  
 (6) Exceedences of the CWQG are indicated by *italicized* entries.



Surface Water Geochemical Results SW-6

Parameters	Units	PWQO <sup>1</sup>	APV <sup>2</sup>	CWQG <sup>3</sup>	2021							2022					2023			
					25-Mar	23-Apr	26-May	22-Jun	10-Aug	7-Sep	3-Oct	4-Nov	22-Apr	31-May	31-Aug	26-Sep	27-Oct	19-Jun	30-Aug	17-Oct
<b>General Chemistry</b>																				
Alkalinity (as CaCO <sub>3</sub> )	mg/L				Unsafe to sample	107	141	80	58	128	46	118	145	99	61	26	127	26	62	130
BOD (5)	mg/L					<2.00	3	2	3	4	<2.00	<2.00	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4
Chemical Oxygen Demand	mg/L												13	30	21	24	25	23	26	42
Total Dissolved Solids	mg/L					142	190	148	114	166	80	148	231	149	91	66	177	77	120	< 30
Total Suspended Solids	mg/L					22	12	36	23	18	<10	10	112	72	10	7	19	42	11	31
Ammonia as N	mg/L					0.02	0.03	<0.02	0.18	0.03	<0.02	0.04	< 0.1	0.05	< 0.04	< 0.04	0.06	< 0.04	< 0.04	0.04
Nitrate as N	mg/L					0.49	0.16	0.16	0.28	0.05	0.25	0.39	1.55	0.72	< 0.06	0.21	0.58	0.180	0.067	0.902
Nitrite as N	mg/L					<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.003	0.008
Total Kjeldahl Nitrogen	mg/L					0.41	0.36	0.34	0.30	0.29	0.36	0.32	< 0.5	0.27	0.17	0.22	0.60	0.25	0.32	0.28
Chloride	mg/L		180	120		7.9	13	5.3	8.67	7.74	2.42	7.32	19	15	12	3	17	3	13	11
Sulphate	mg/L					5.75	10.20	5.53	5.51	7.55	4.9	7.50	9	6	10	7	15	6	9	11
Phenols	mg/L	0.001	0.961	0.004		0.001	0.001	<0.001	<0.001	0.001	<0.001	<b>0.002</b>	< 0.001	0.001	< 0.001	<b>0.002</b>	<b>0.002</b>	< 0.001	<b>0.002</b>	0.001
Total Phosphorus	mg/L	0.03				<b>0.04</b>	<b>0.05</b>	<b>0.16</b>	<b>0.04</b>	<b>0.07</b>	<b>0.04</b>	<b>0.04</b>	<b>0.195</b>	<b>0.06</b>	<b>0.031</b>	<b>0.041</b>	<b>0.037</b>	<b>0.047</b>	<b>0.031</b>	<b>0.051</b>
pH	pH Units	6.5 - 8.5		6.5 - 9.0		7.94	8.09	6.67	7.59	7.49	7.30	7.70	8.05	7.97	7.76	7.53	8.06	7.58	7.99	7.92
Electrical Conductivity	uS/cm					244	327	153	154	281	88	252	304	236	177	74	318	72	170	290
<b>Metals</b>																				
Arsenic	mg/L	0.1	0.15	0.005					<0.003				0.0013		0.0011			0.0011	0.0011	0.0007
Barium	mg/L		2.3						0.021				0.0907		0.0179			0.0201	0.0174	0.0307
Boron	mg/L	0.2	3.55	1.5					<0.010				0.011		0.011			0.006	0.011	0.013
Cadmium	mg/L	0.0002	0.00021						<0.0001				0.000063		0.00001			0.000035	0.00001	0.000014
Chromium	mg/L	0.0089	0.064						0.003				<b>0.0186</b>		0.00154			0.00343	0.00135	0.00356
Copper	mg/L	0.005	0.0069						0.004				<u>0.0101</u>		0.0025			0.0041	0.0023	0.0040
Iron	mg/L	0.3		0.3		<b>1.4</b>	<b>0.326</b>	<b>4.18</b>	<b>1.27</b>	<b>0.506</b>	<b>0.411</b>	<b>0.783</b>	<b>7.25</b>	<b>4.34</b>	<b>0.638</b>	<b>0.899</b>	<b>1.05</b>	<b>1.45</b>	<b>0.551</b>	<b>1.55</b>
Lead	mg/L	0.005	0.002						<0.001				<b>0.00365</b>		0.00037			0.00076	0.00032	0.00082
Dissolved Mercury	mg/L	0.0002	0.00077						<0.0001				0.00001		0.00002			< 0.00001	0.00001	< 0.00001
Zinc	mg/L	0.03	0.089	0.03					<0.005				0.029		0.002			0.008	0.003	0.008

Notes:  
 (1) PWQO - Provincial Water Quality Objectives.  
 (2) APV - Aquatic Protection Value from *Rationale for the Development of Aquatic Protection Values*.  
 (3) CWQG - Canadian Water Quality Guidelines.  
 (4) Exceedences of the PWQO are indicated by **BOLD** entries.  
 (5) Exceedences of the APV are indicated by underlined entries.  
 (6) Exceedences of the CWQG are indicated by *italicized* entries.



2023 Surface Water Duplicate Data

Parameters	Units	Jun-23			Aug-23			Oct-23		
		SW-5	NL SW DUP	Relative Percent Difference (%)	SW-1	NL SW DUP	Relative Percent Difference (%)	SW-4	NL SW DUP	Relative Percent Difference (%)
<b>General Chemistry</b>										
Alkalinity (as CaCO3)	mg/L	26	25	3.922	89	87	2.273	339	342	(0.881)
BOD (5)	mg/L	< 4	< 4	NC	< 4	< 4	NC	6	< 4	NC
Chemical Oxygen Demand	mg/L	19	38	<b>(66.667)</b>	24	25	(4.082)	14	22	(44.444)
Total Dissolved Solids	mg/L	66	83	(22.819)	137	34	<b>120.468</b>	923	900	2.523
Total Suspended Solids	mg/L	46	39	16.471	27	25	7.692	67	30	<b>76.289</b>
Ammonia as N	mg/L	< 0.04	0.04	NC	0.04	0.04	0.000	< 0.04	< 0.04	NC
Nitrate as N	mg/L	0.17	0.17	0.000	0.01	0.12	(166.154)	0.02	0.02	22.222
Nitrite as N	mg/L	< 0.03	< 0.03	NC	< 0.003	< 0.003	NC	<0.03	<0.03	NC
Total Kjeldahl Nitrogen	mg/L	0.14	0.14	0.000	0.22	0.26	(16.667)	< 0.05	< 0.05	NC
Chloride	mg/L	6	5	18.182	9	9	0.000	410	420	(2.410)
Sulphate	mg/L	7	6	15.385	5	5	0.000	19	19	0.000
Phenols	mg/L	< 0.001	< 0.001	NC	< 0.001	< 0.001	NC	0.003	0.004	(28.571)
Total Phosphorus	mg/L	0.061	0.05	19.820	0.035	0.03	22.222	0.046	0.05	(2.151)
pH	pH Units	7.56	7.67	(1.445)	8.03	8.02	0.125	8.08	8.07	0.124
Electrical Conductivity	uS/cm	75	77	(2.632)	198	216	(8.696)	1830	1840	(0.545)
<b>Metals</b>										
Arsenic	mg/L	0.0013	0.0012	8.000	0.001	0.0009	10.526	0.0005	0.0006	(18.182)
Barium	mg/L	0.0287	0.0228	22.913	0.018	0.0182	(1.105)	0.054	0.052	3.774
Boron	mg/L	0.007	0.006	15.385	0.008	0.008	0.000	0.015	0.014	6.897
Cadmium	mg/L	0.000035	0.000037	(5.556)	0.000011	0.000009	20.000	0.000022	0.000022	0.000
Chromium	mg/L	0.00633	0.00426	39.093	0.00193	0.00231	(17.925)	0.00144	0.002	(32.558)
Copper	mg/L	0.007	0.0048	37.288	0.0018	0.0018	0.000	0.0069	0.0047	37.931
Iron	mg/L	2.66	1.8	38.565	0.827	0.896	(8.009)	0.92	1.02	(10.309)
Lead	mg/L	0.00238	0.00172	32.195	0.00046	0.00046	0.000	0.00062	0.0005	21.429
Dissolved Mercury	mg/L	< 0.00001	< 0.00001	NC	0.00002	0.00001	<b>66.667</b>	0.00006	< 0.00001	NC
Zinc	mg/L	0.012	0.008	40.000	0.003	0.004	(28.571)	0.007	0.006	15.385

Notes:

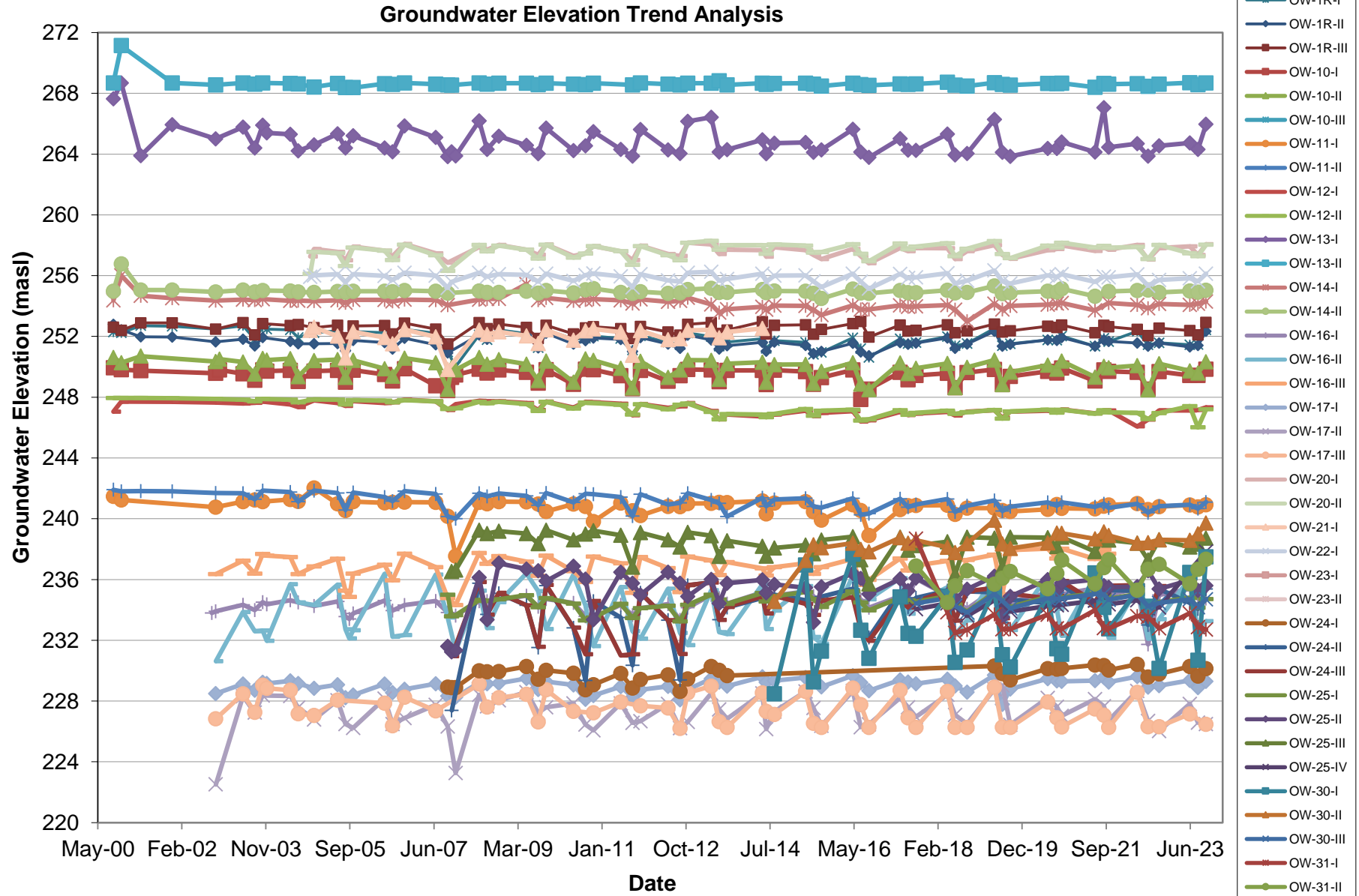
- (1) NC - not calculable as one or both concentrations are below the laboratory method detection limit.
- (2) Relative percent differences exceeding 50% are presented as bold and shaded entries.



# Appendix H

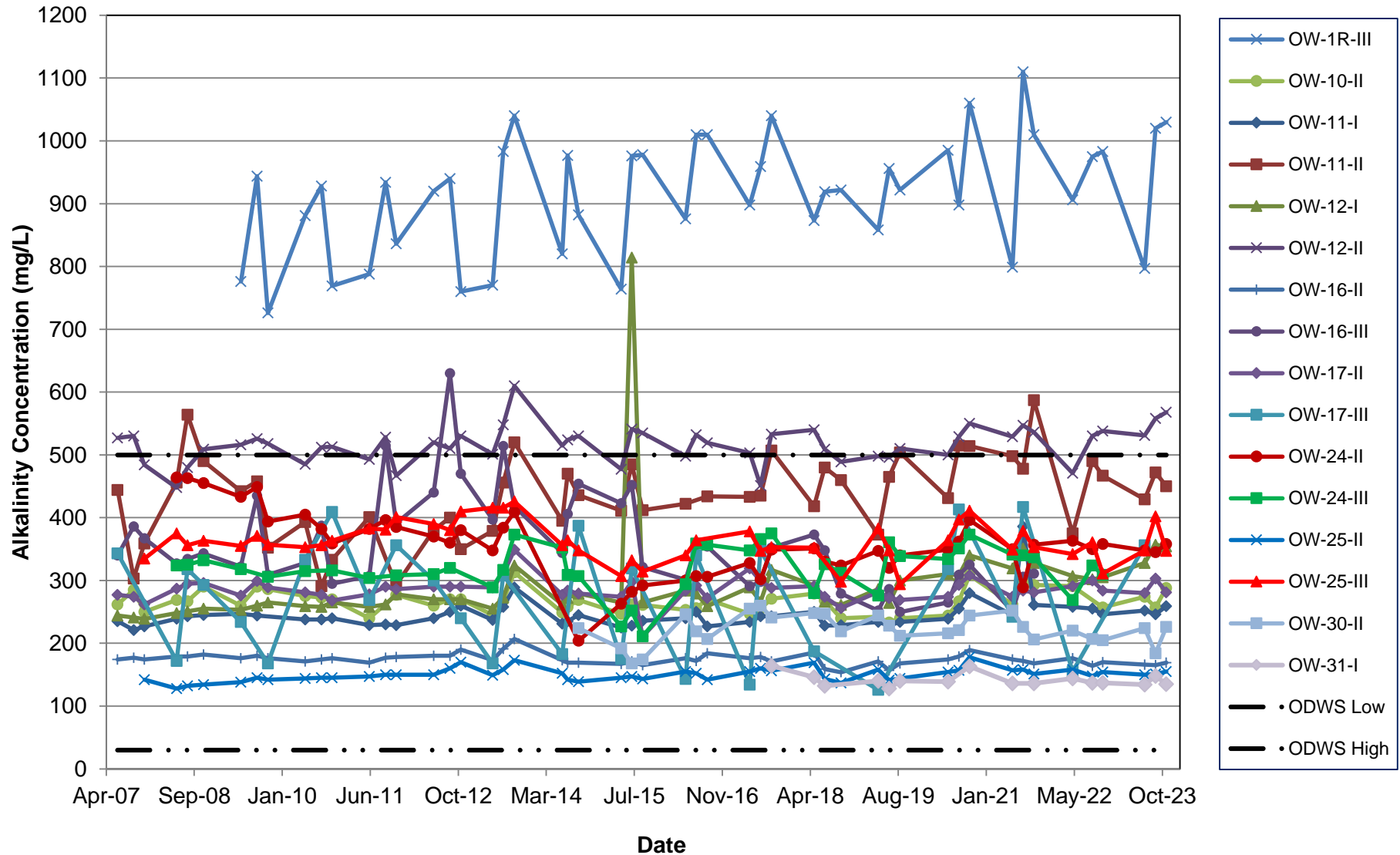
## Trend Analysis





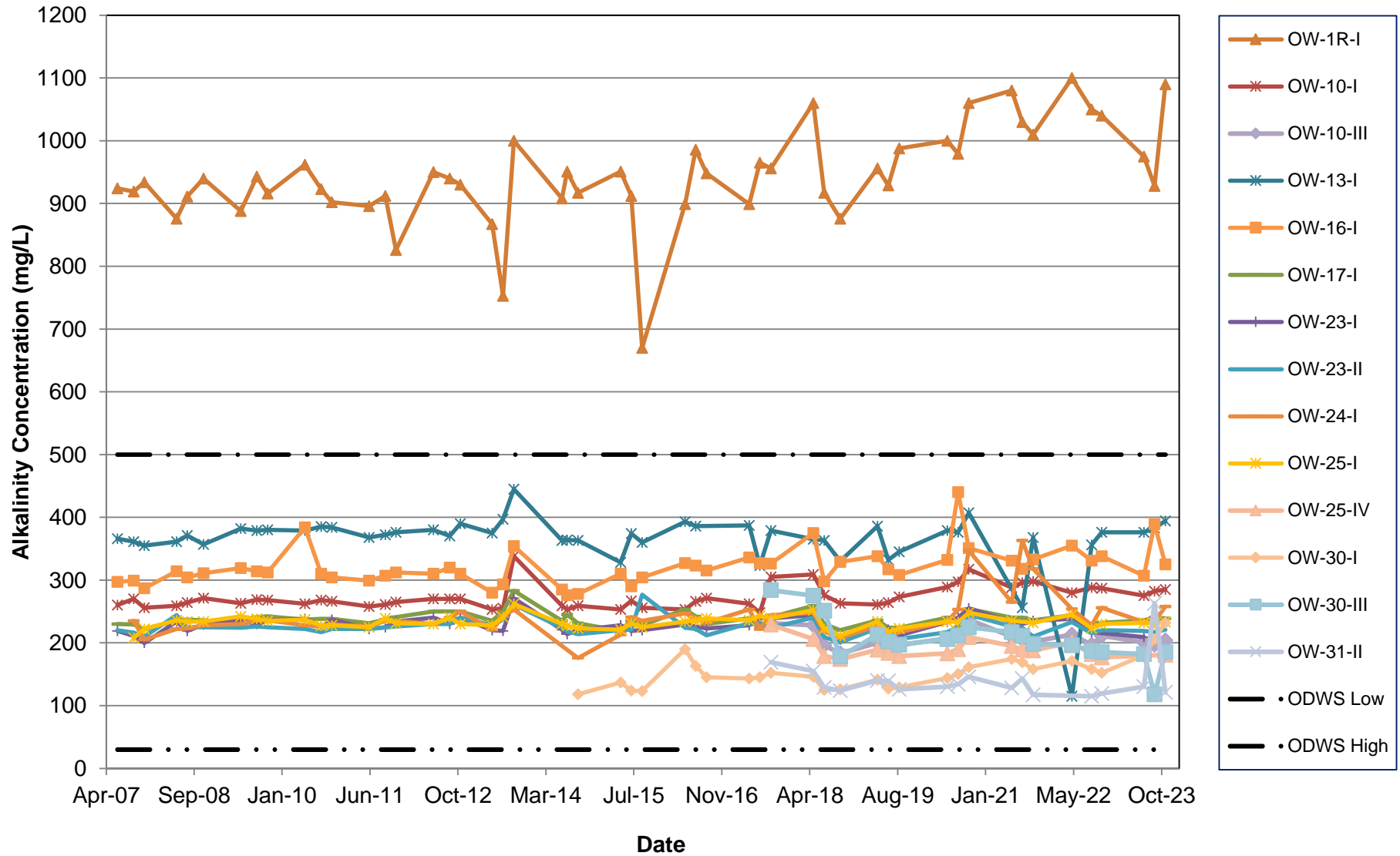


### Alkalinity Trend Analysis - Shallow Groundwater



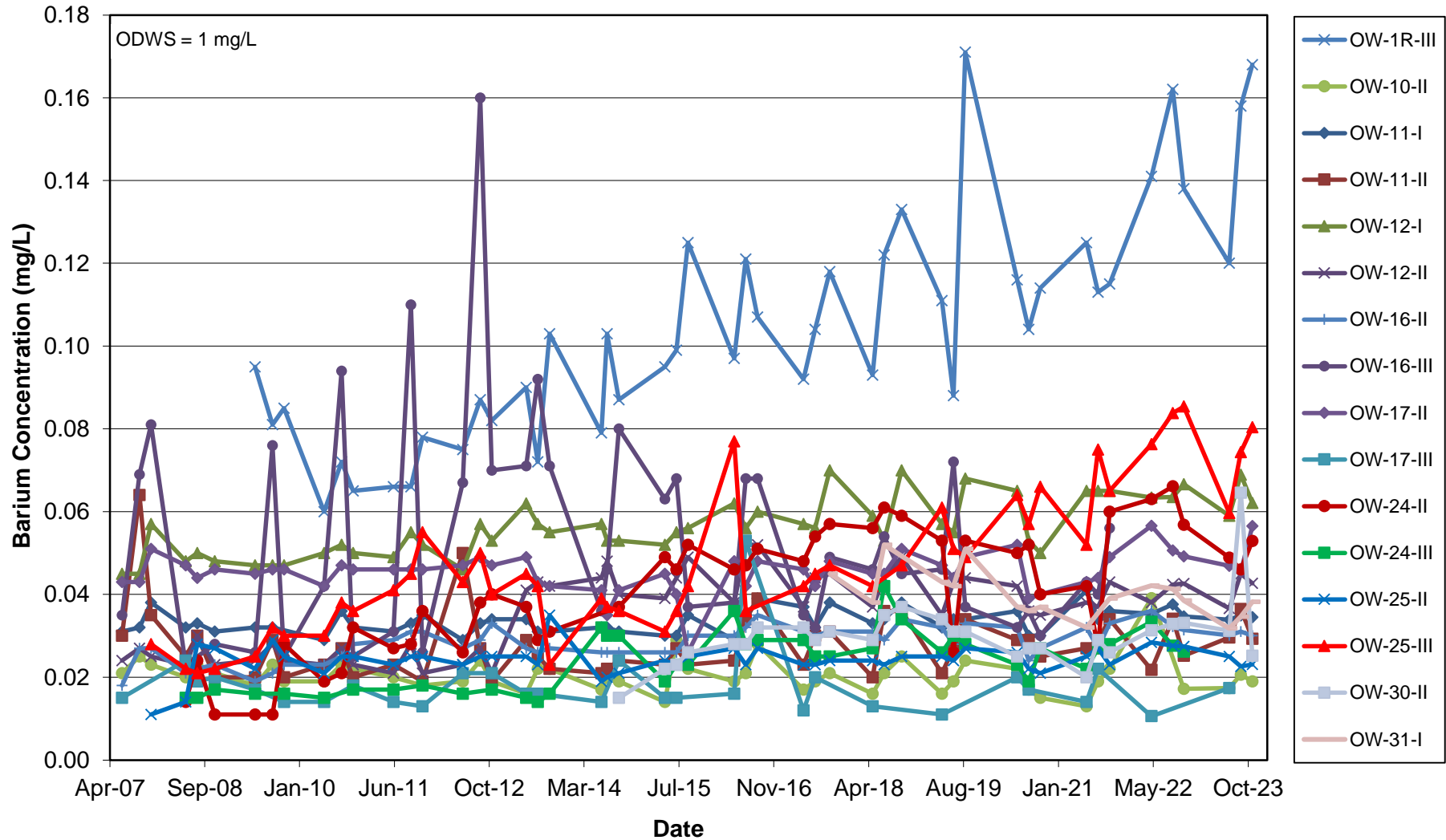


### Alkalinity Trend Analysis - Deep Groundwater



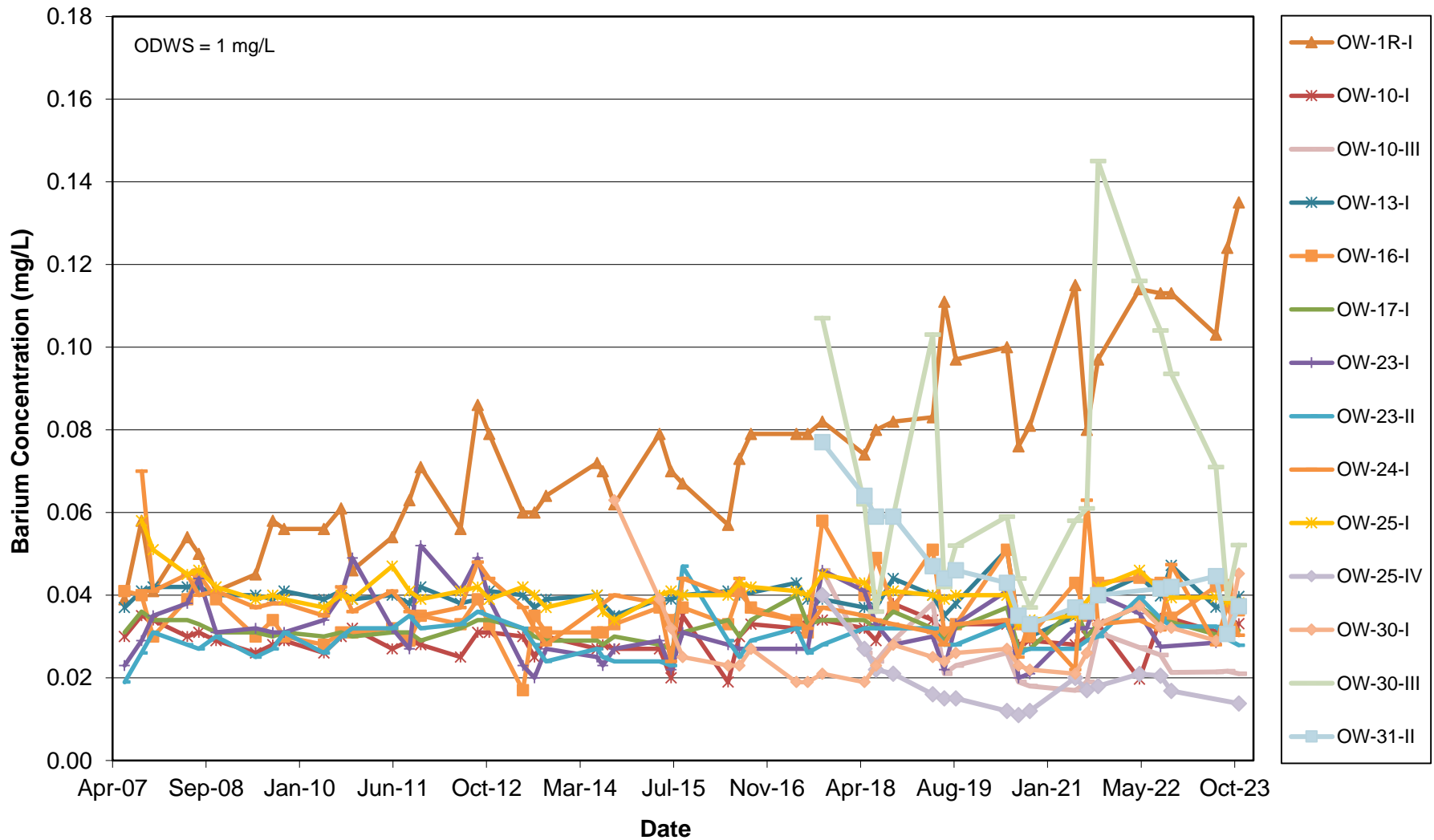


### Barium Trend Analysis - Shallow Groundwater



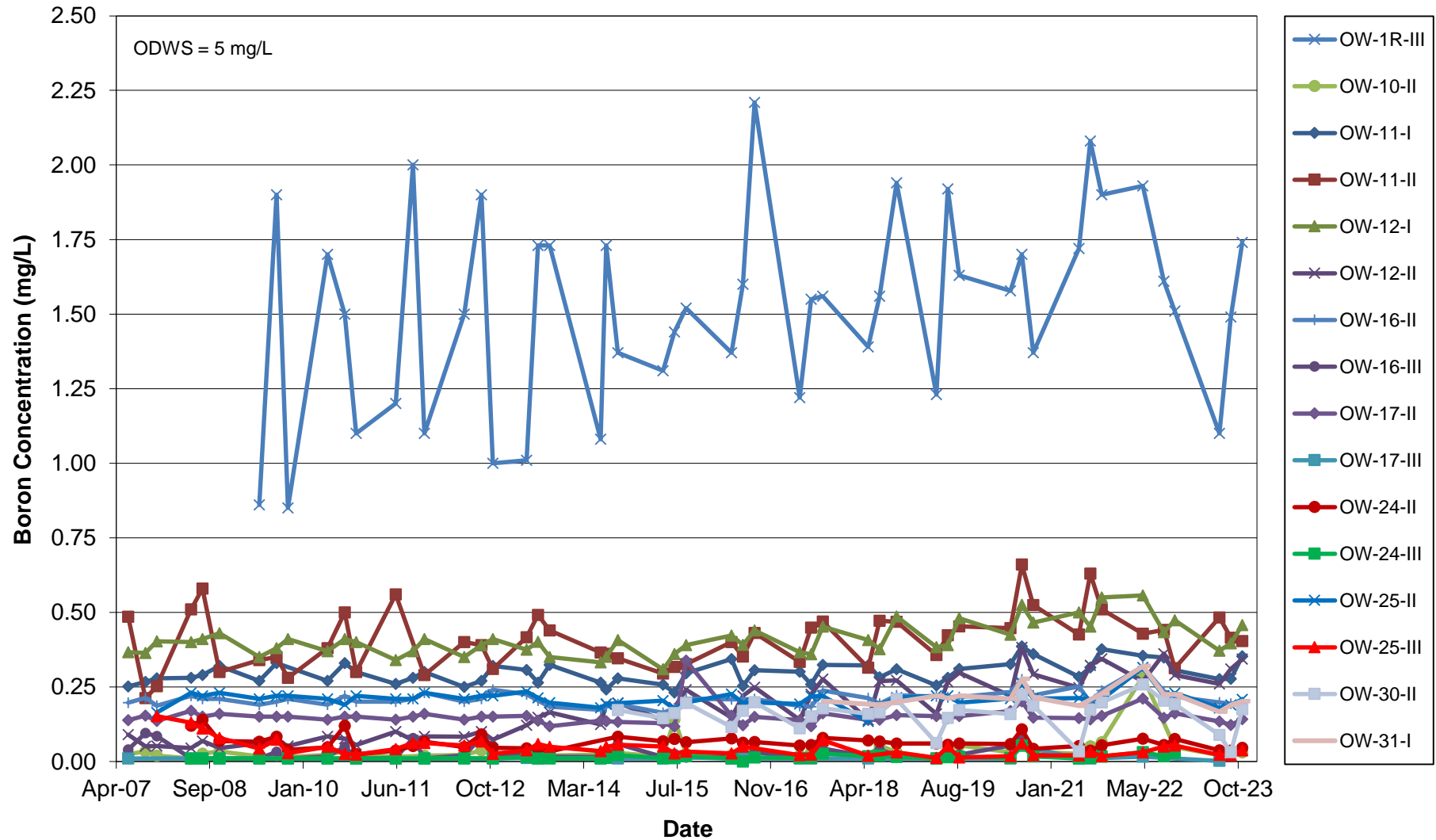


### Barium Trend Analysis - Deep Groundwater



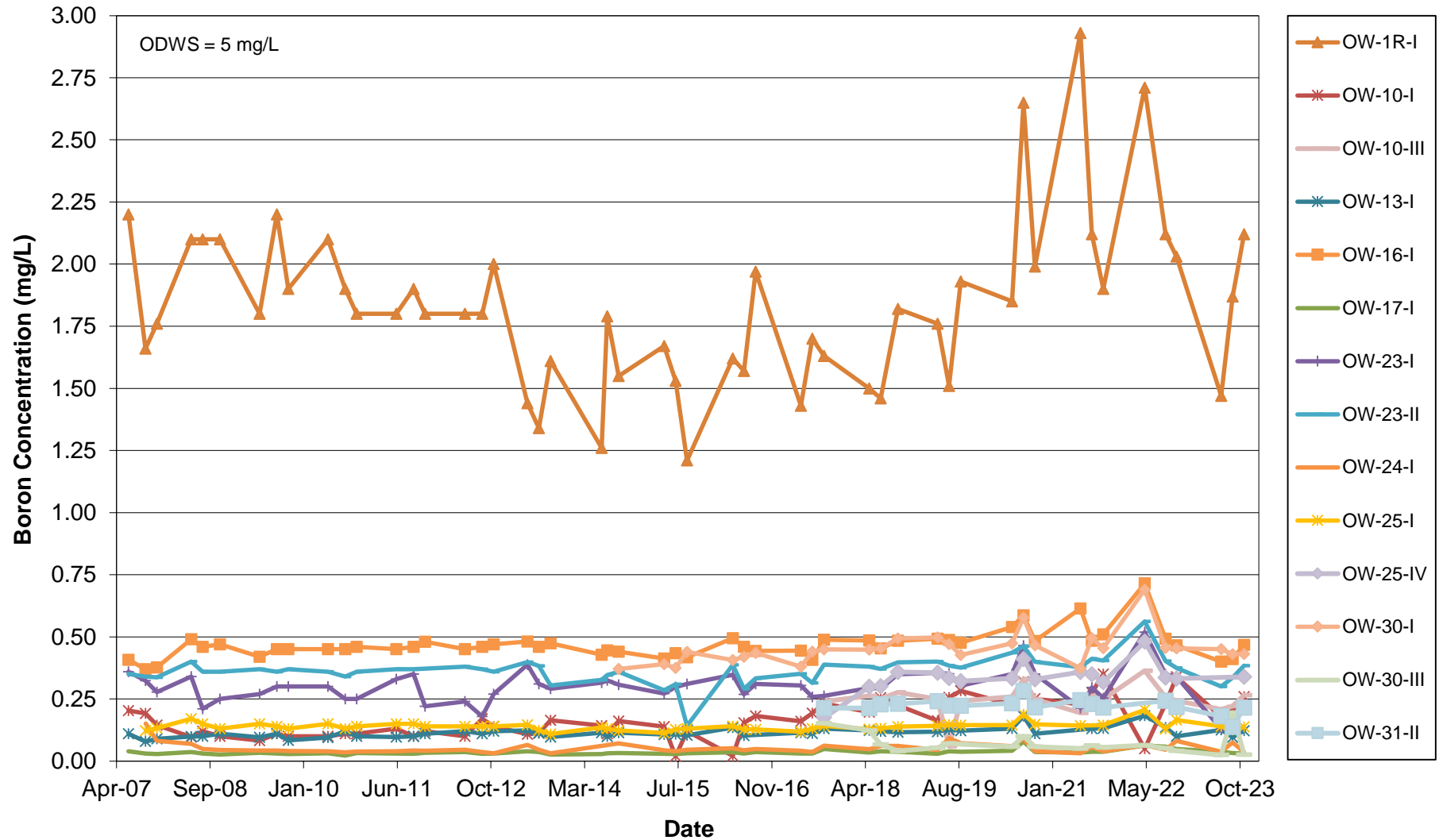


### Boron Trend Analysis - Shallow Groundwater





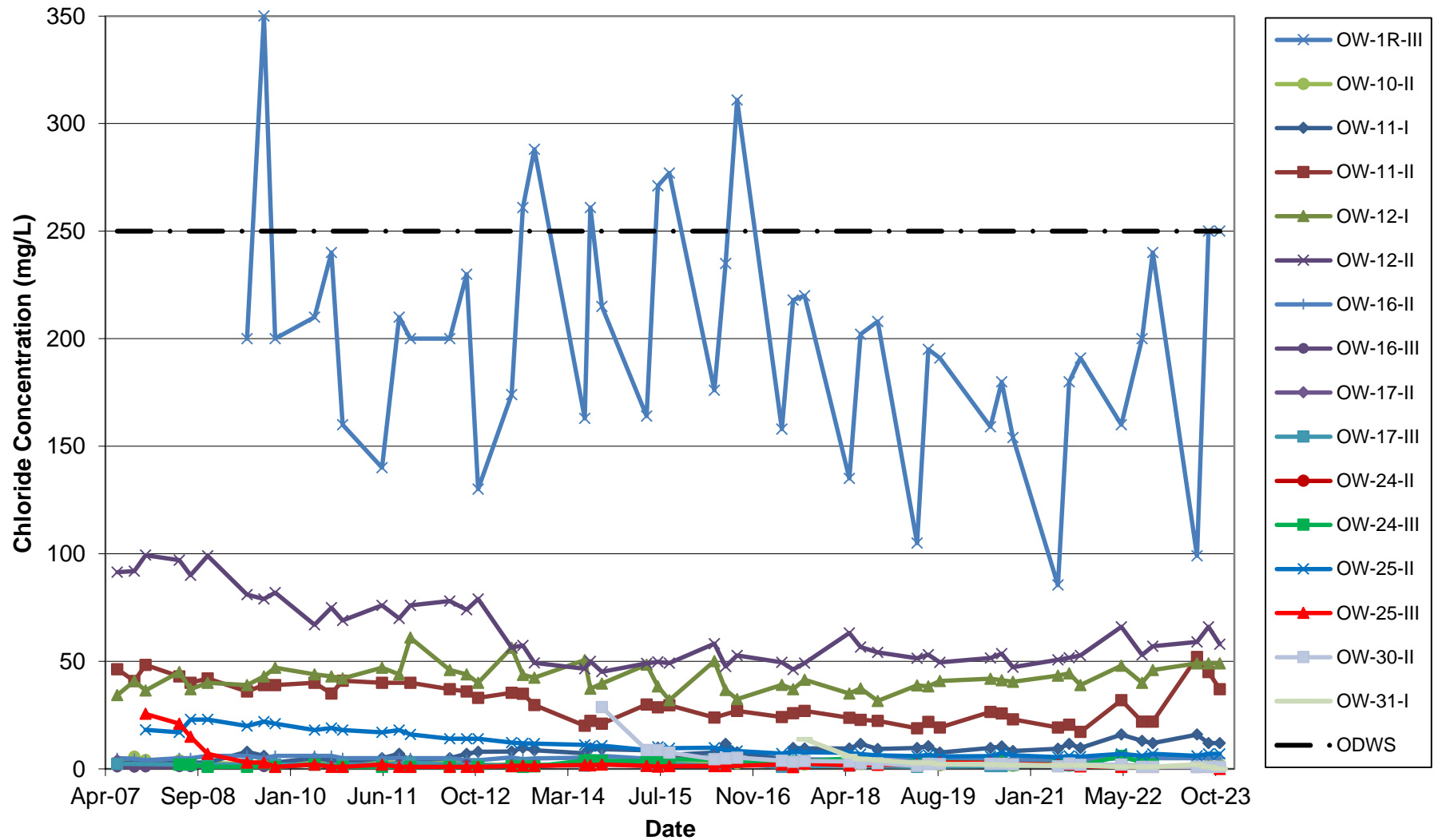
### Boron Trend Analysis - Deep Groundwater





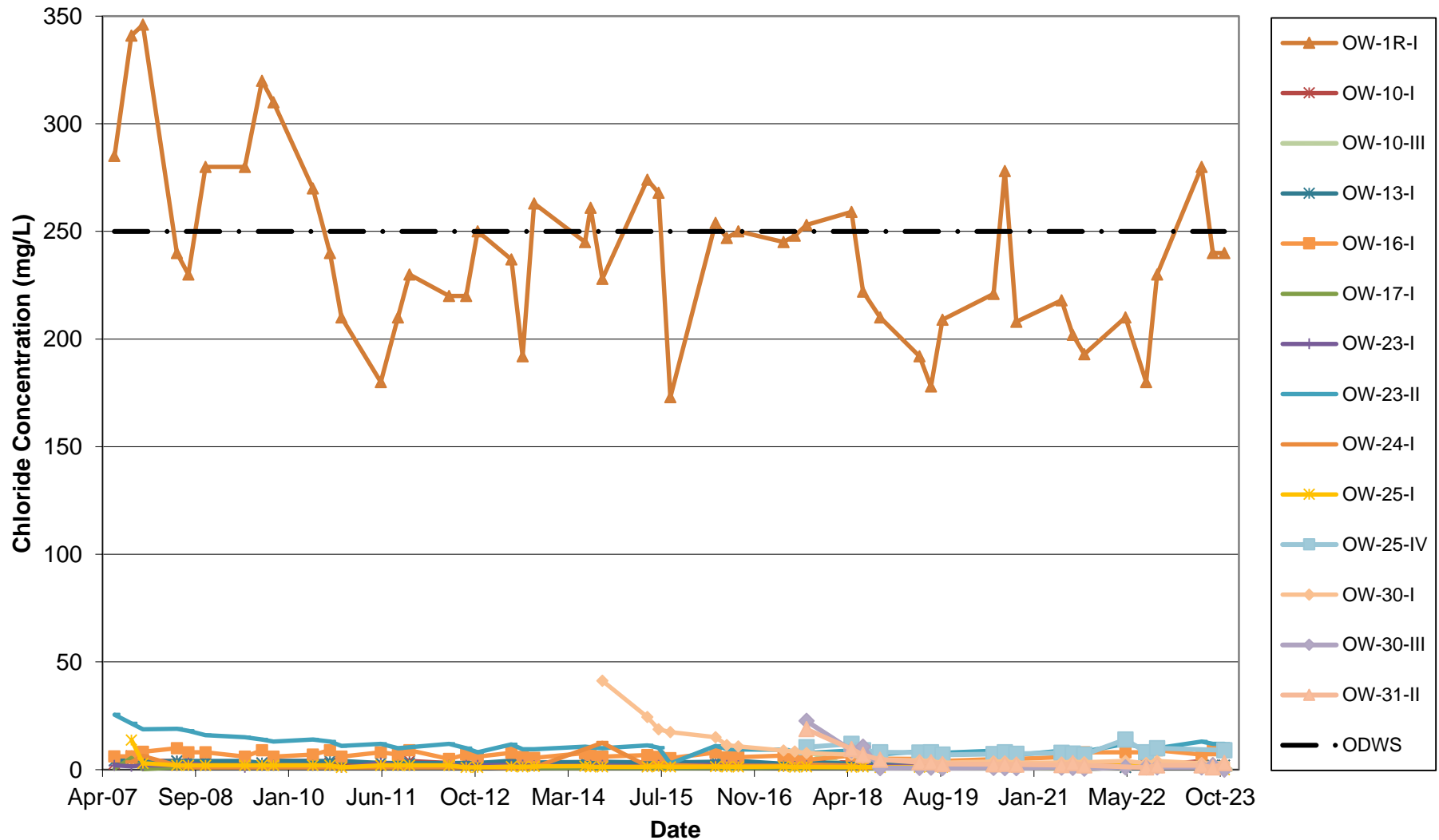


### Chloride Trend Analysis - Shallow Groundwater



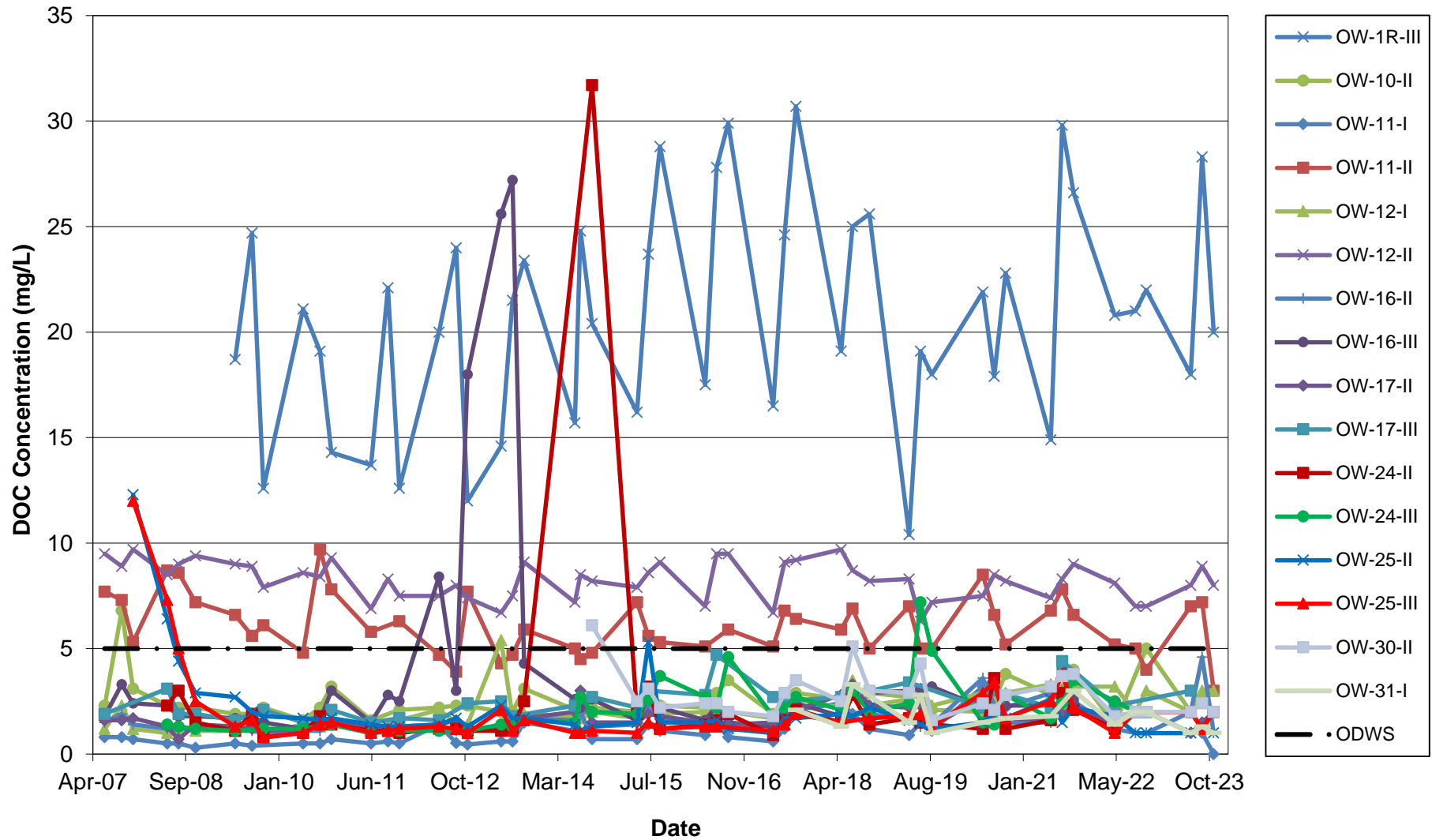


### Chloride Trend Analysis - Deep Groundwater



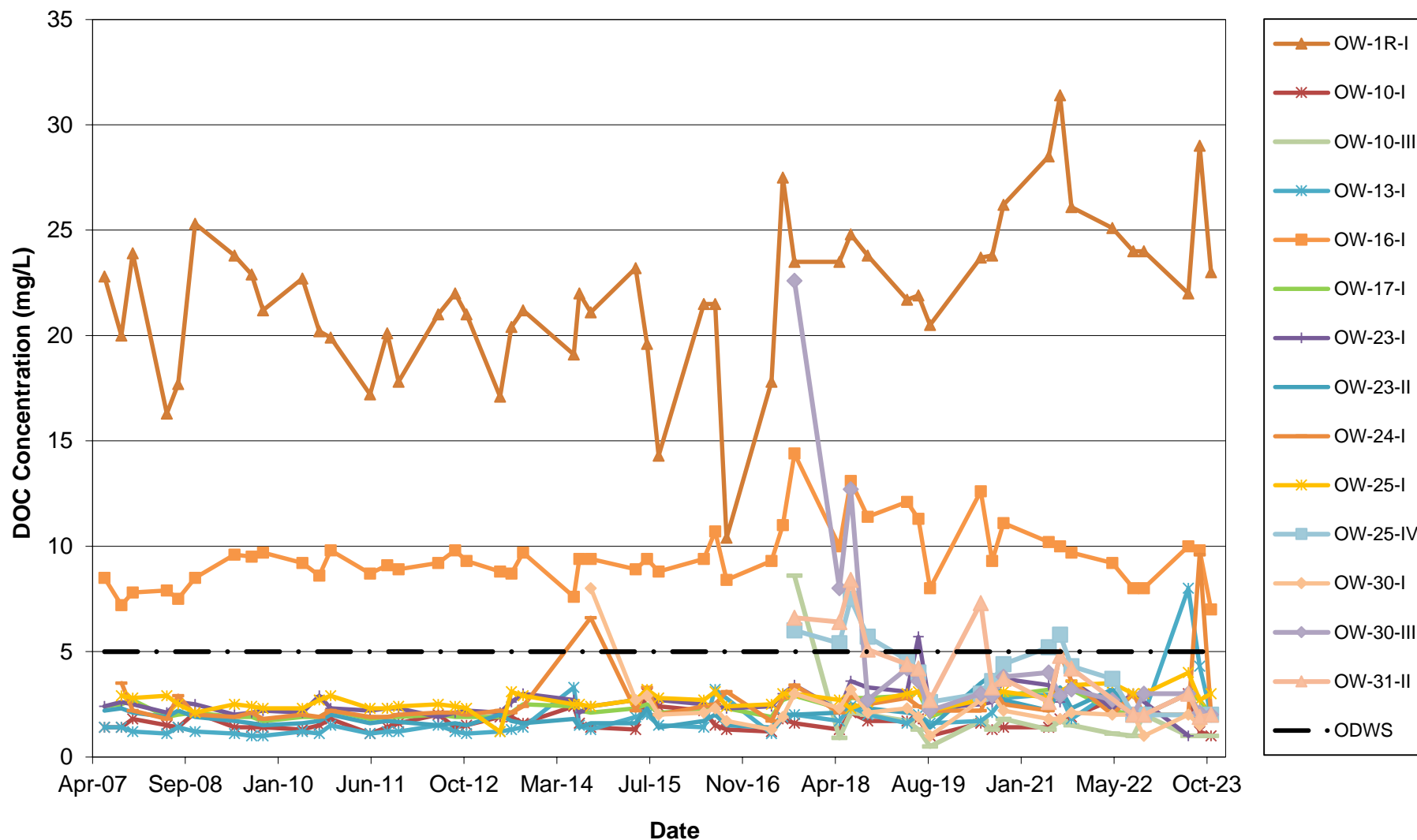


### Dissolved Organic Carbon Trend Analysis - Shallow Groundwater



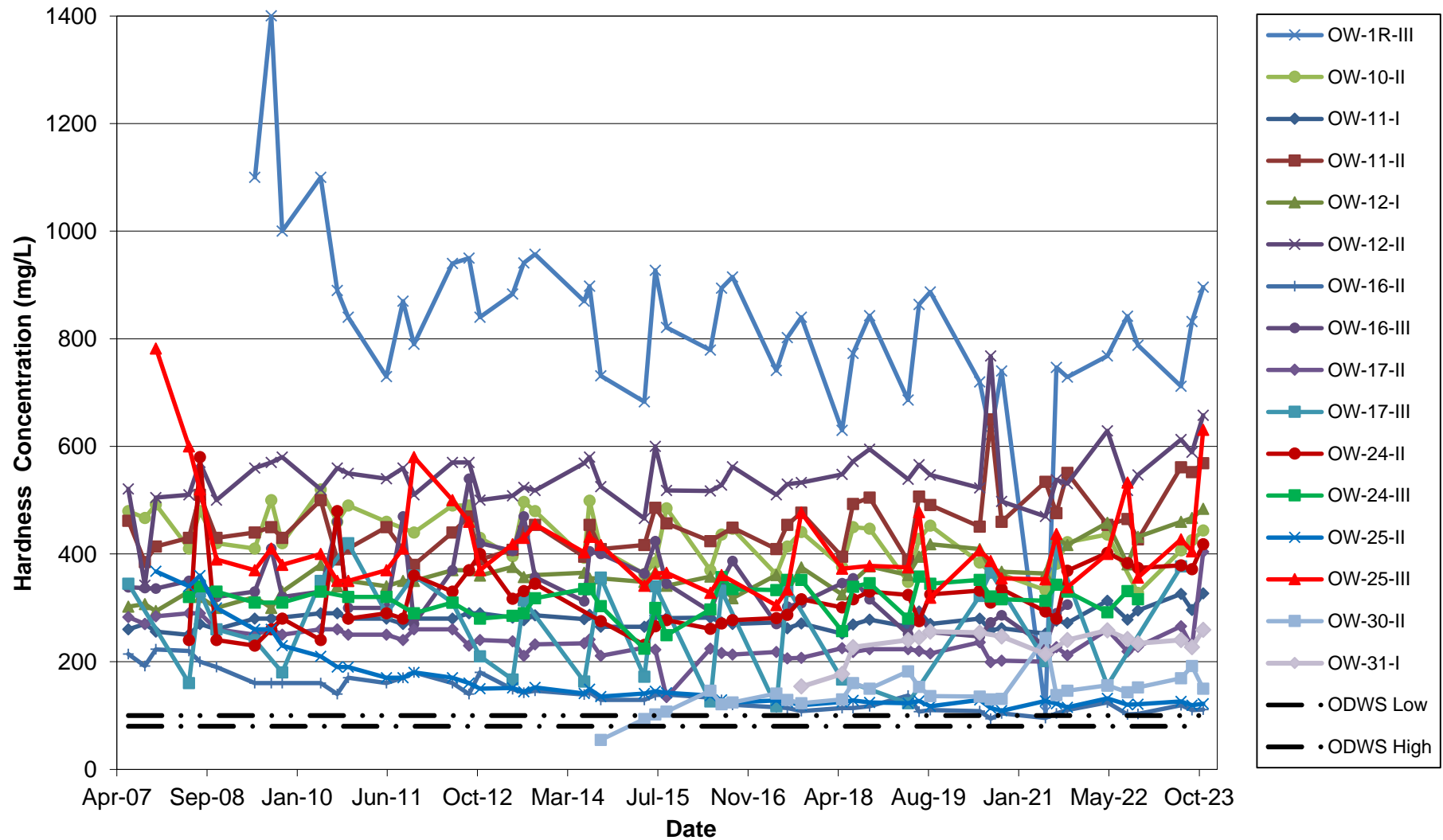


### Dissolved Organic Carbon Trend Analysis - Deep Groundwater



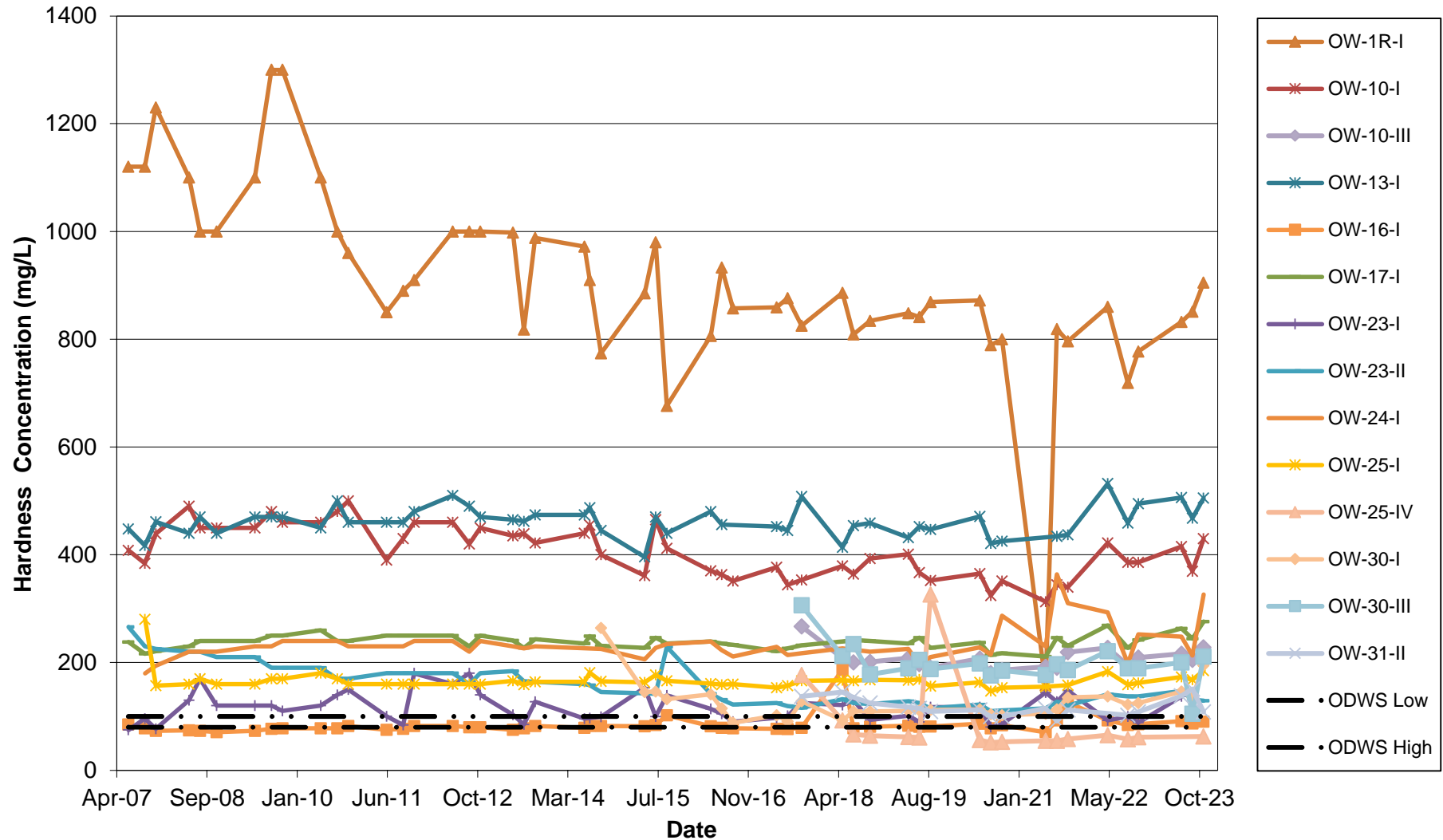


### Hardness Trend Analysis - Shallow Groundwater



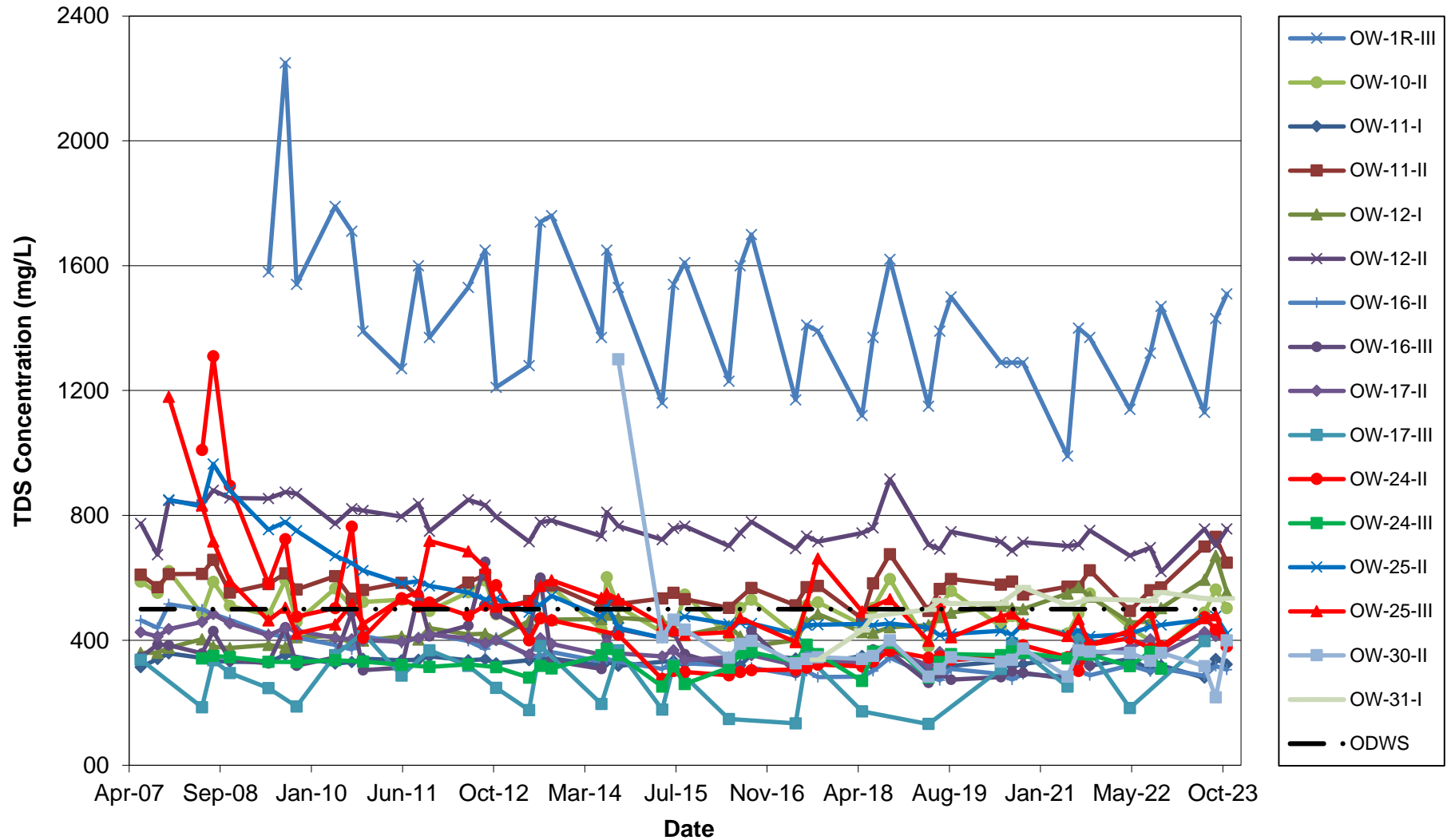


### Hardness Trend Analysis - Deep Groundwater



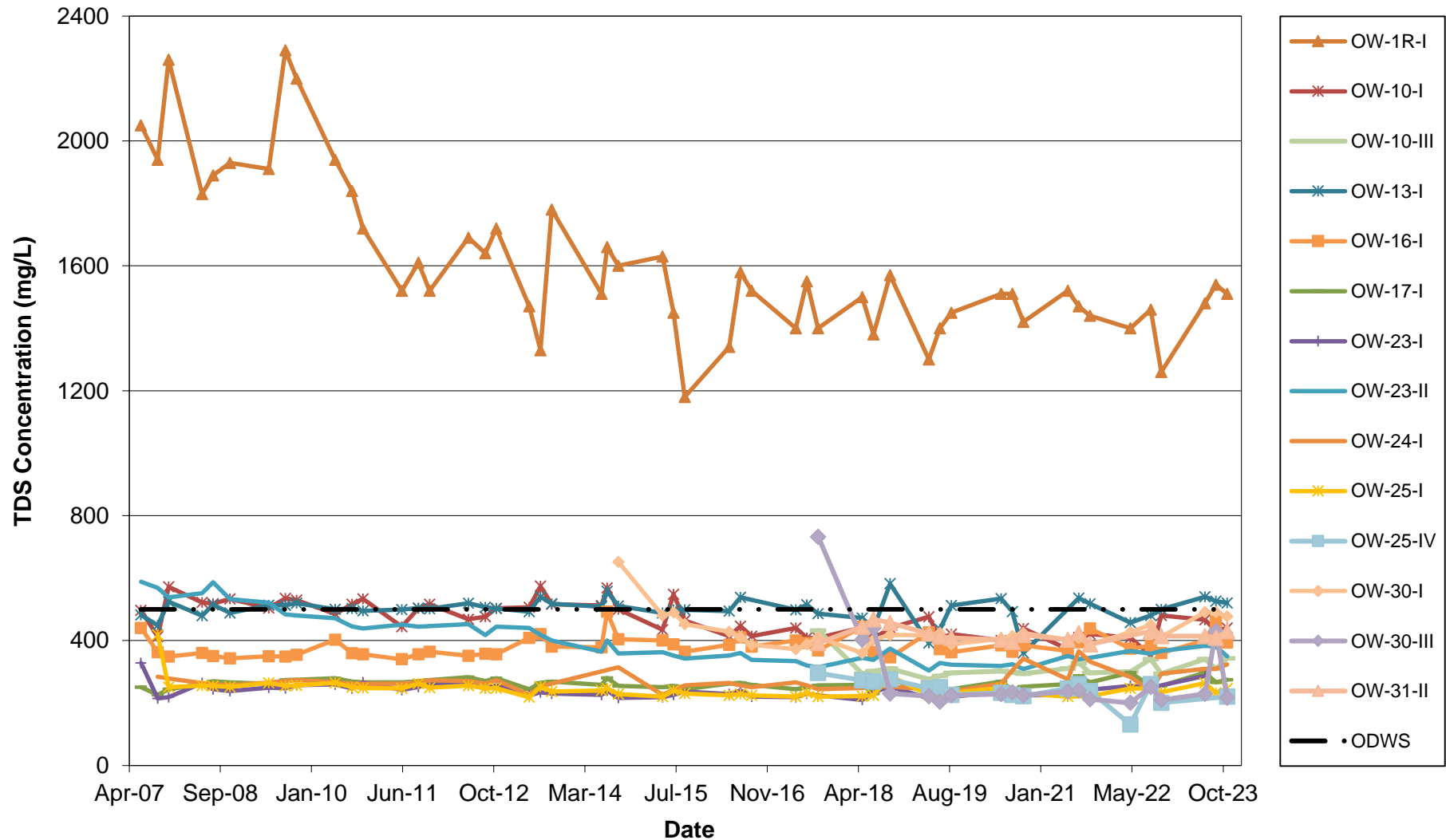


### Total Dissolved Solids Trend Analysis - Shallow Groundwater





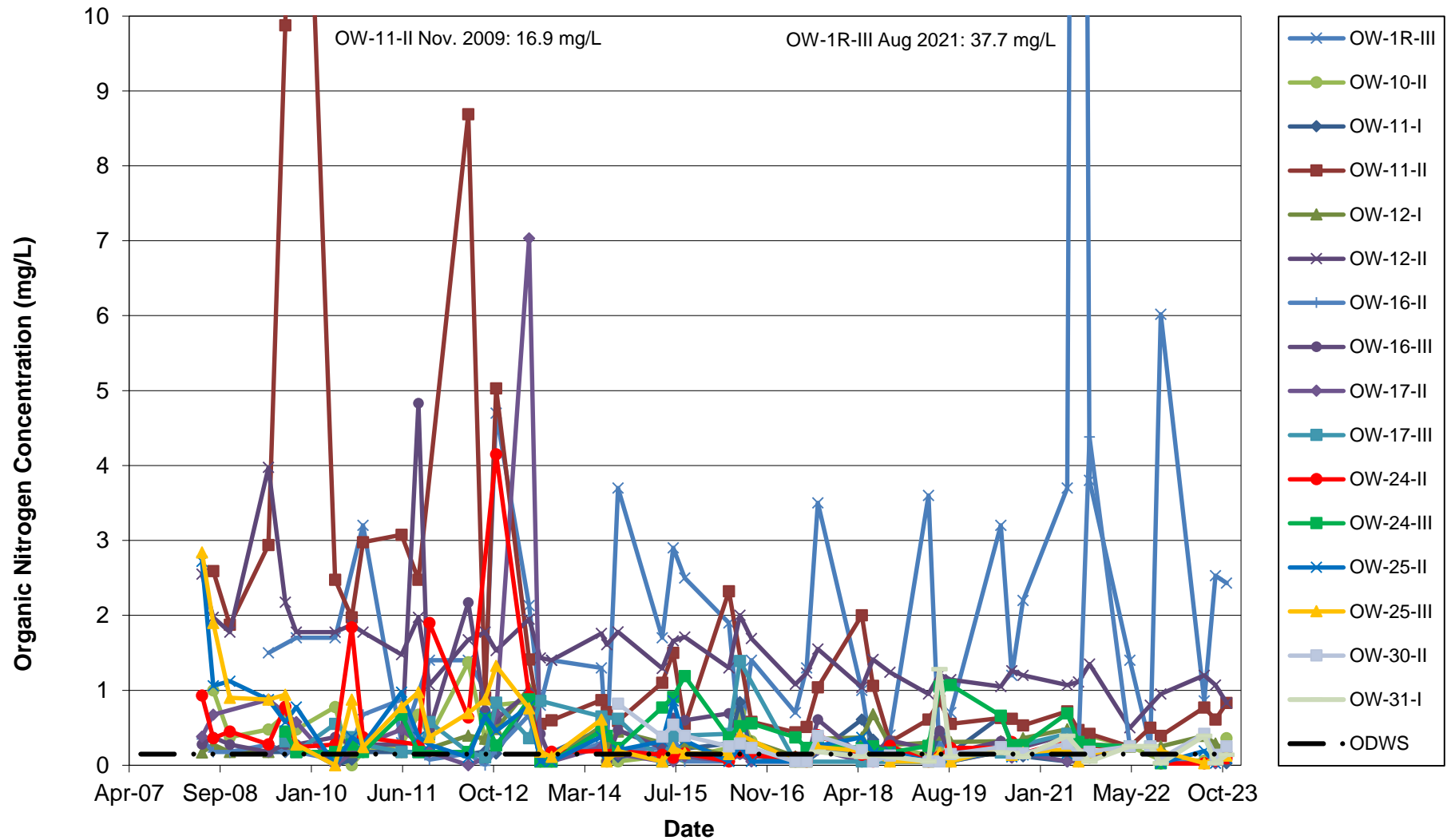
**Total Dissolved Solids Trend Analysis - Deep Groundwater**





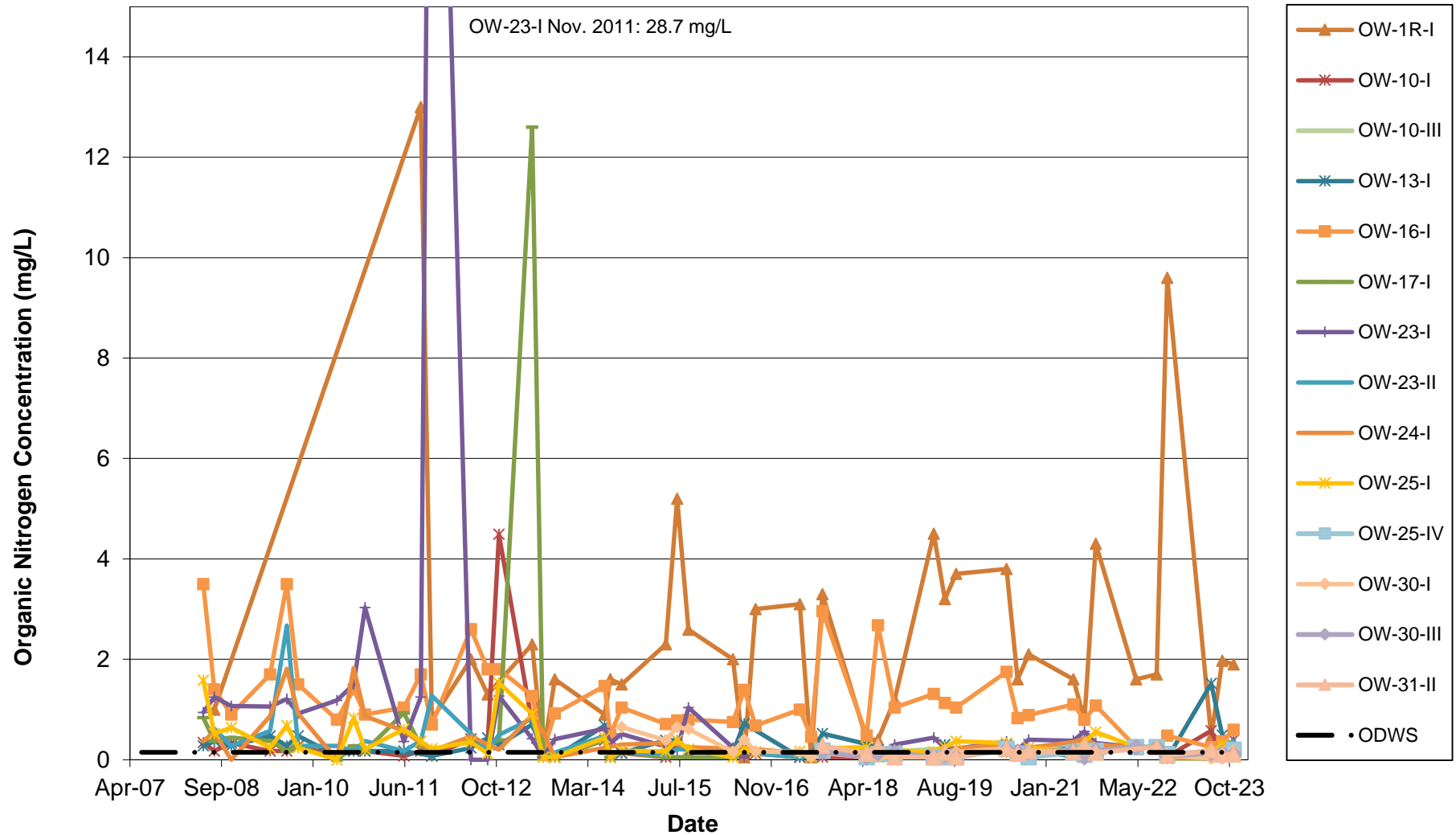


### Organic Nitrogen Trend Analysis - Shallow Groundwater



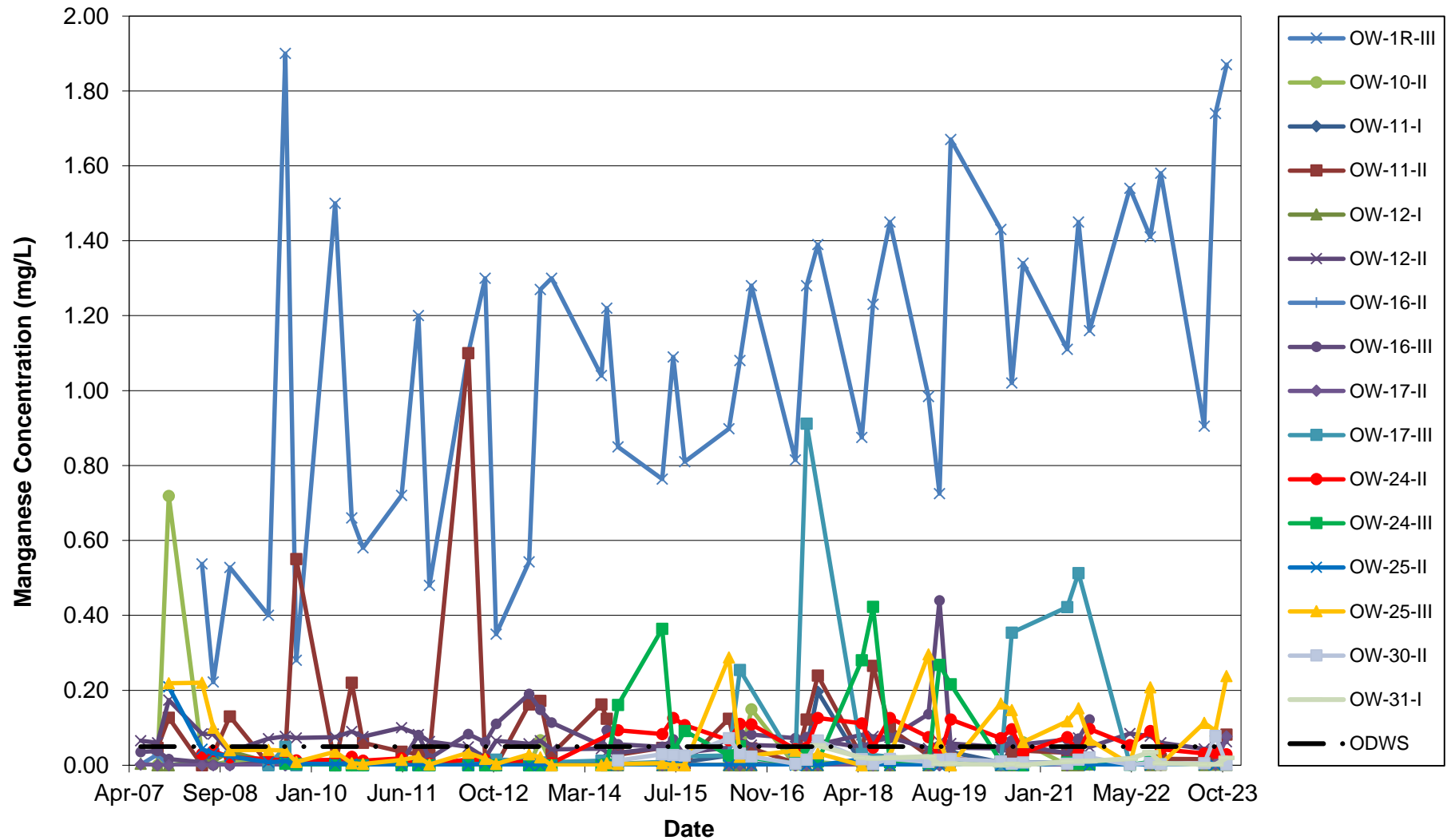


### Organic Nitrogen Trend Analysis - Deep Groundwater



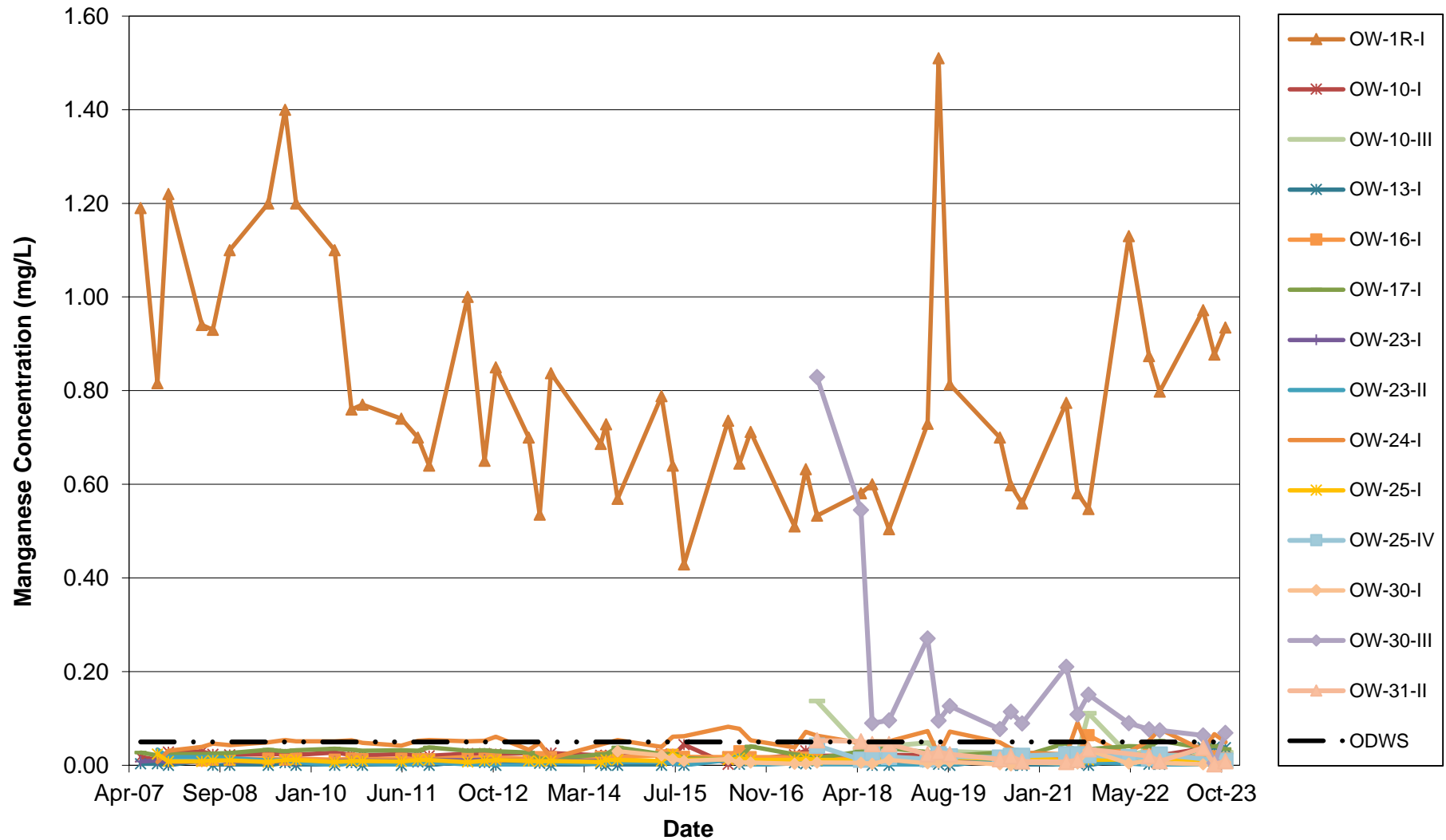


### Manganese Trend Analysis - Shallow Groundwater



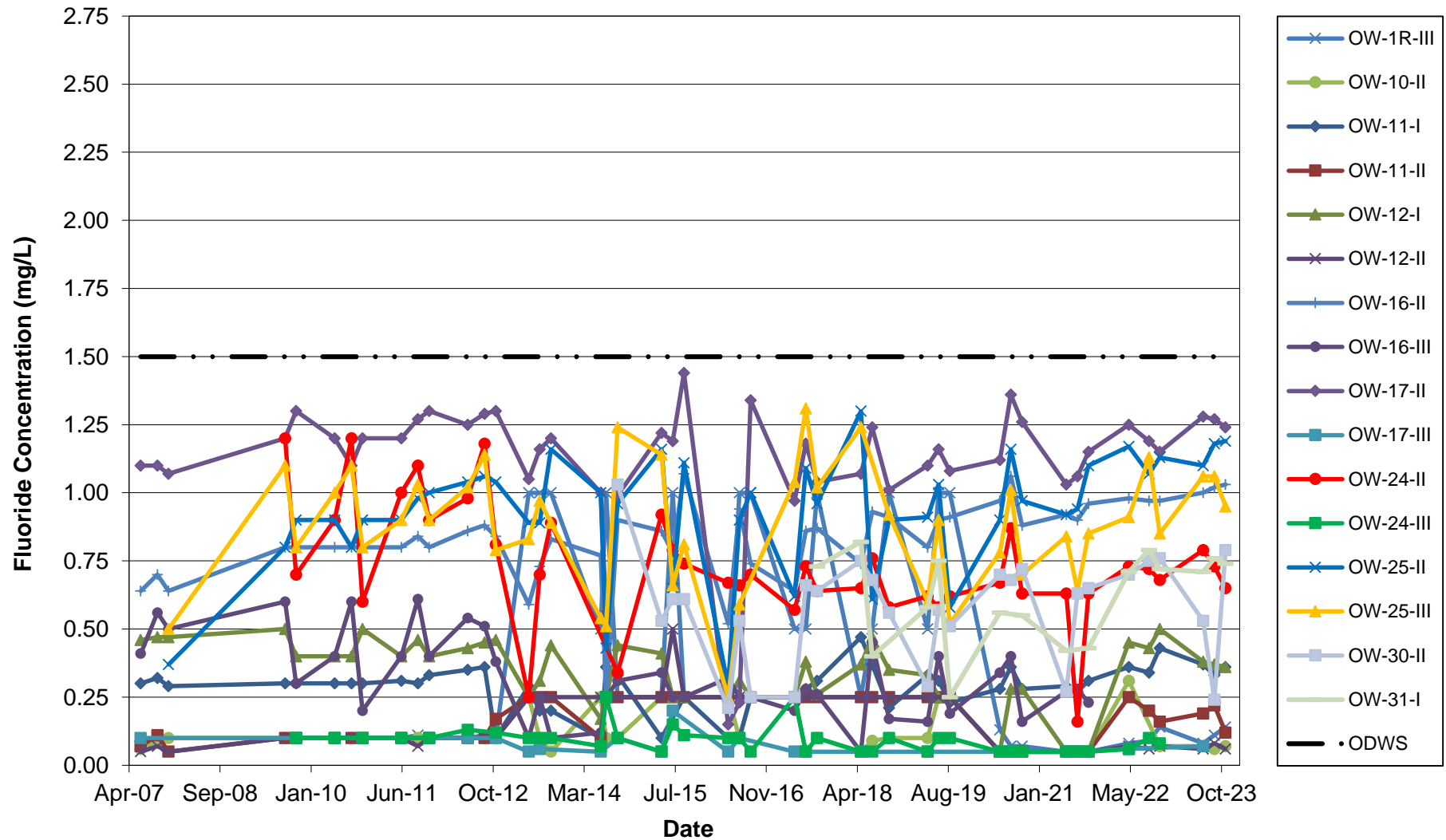


### Manganese Trend Analysis - Deep Groundwater



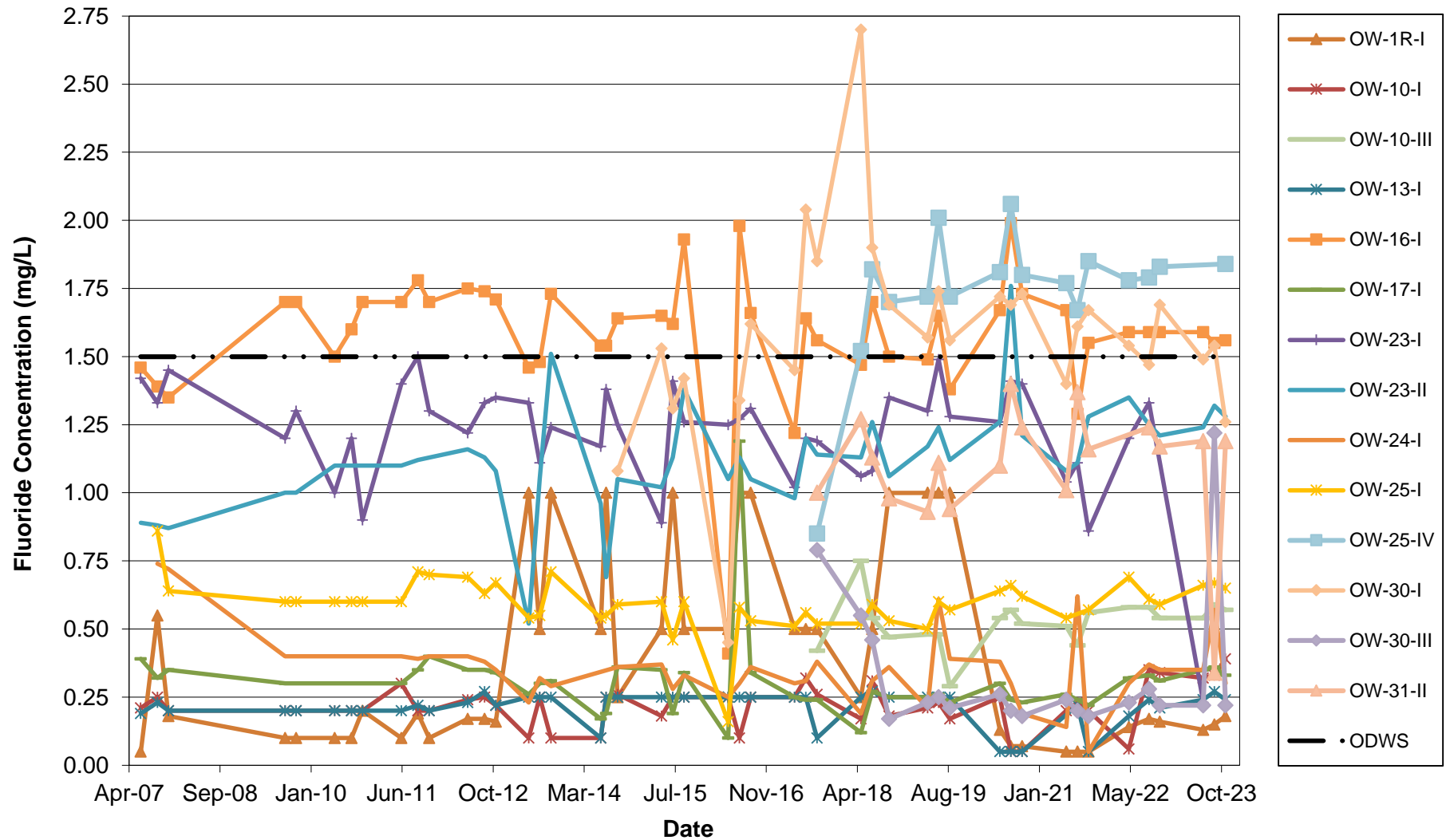


### Fluoride Trend Analysis - Shallow Groundwater



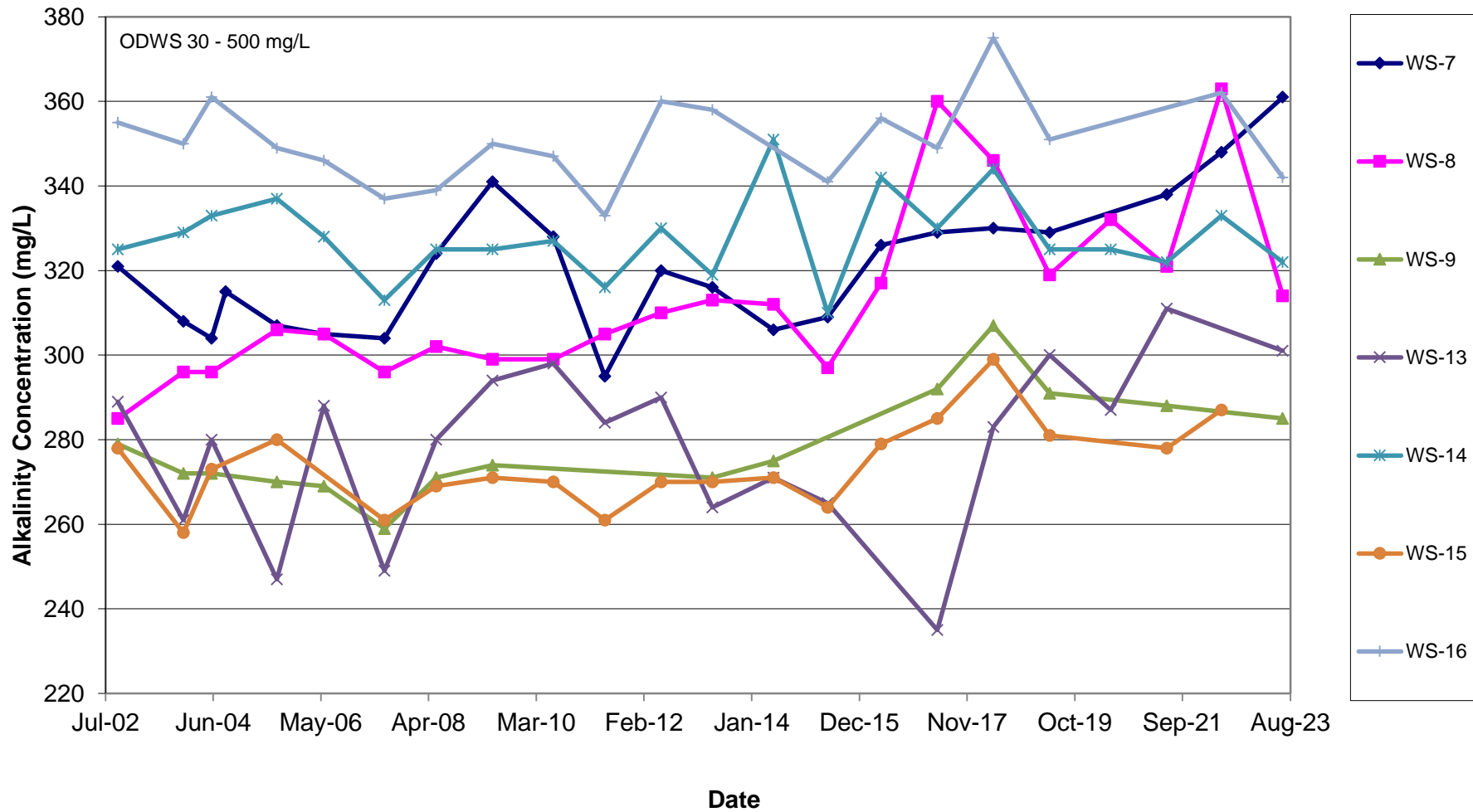


### Fluoride Trend Analysis - Deep Groundwater



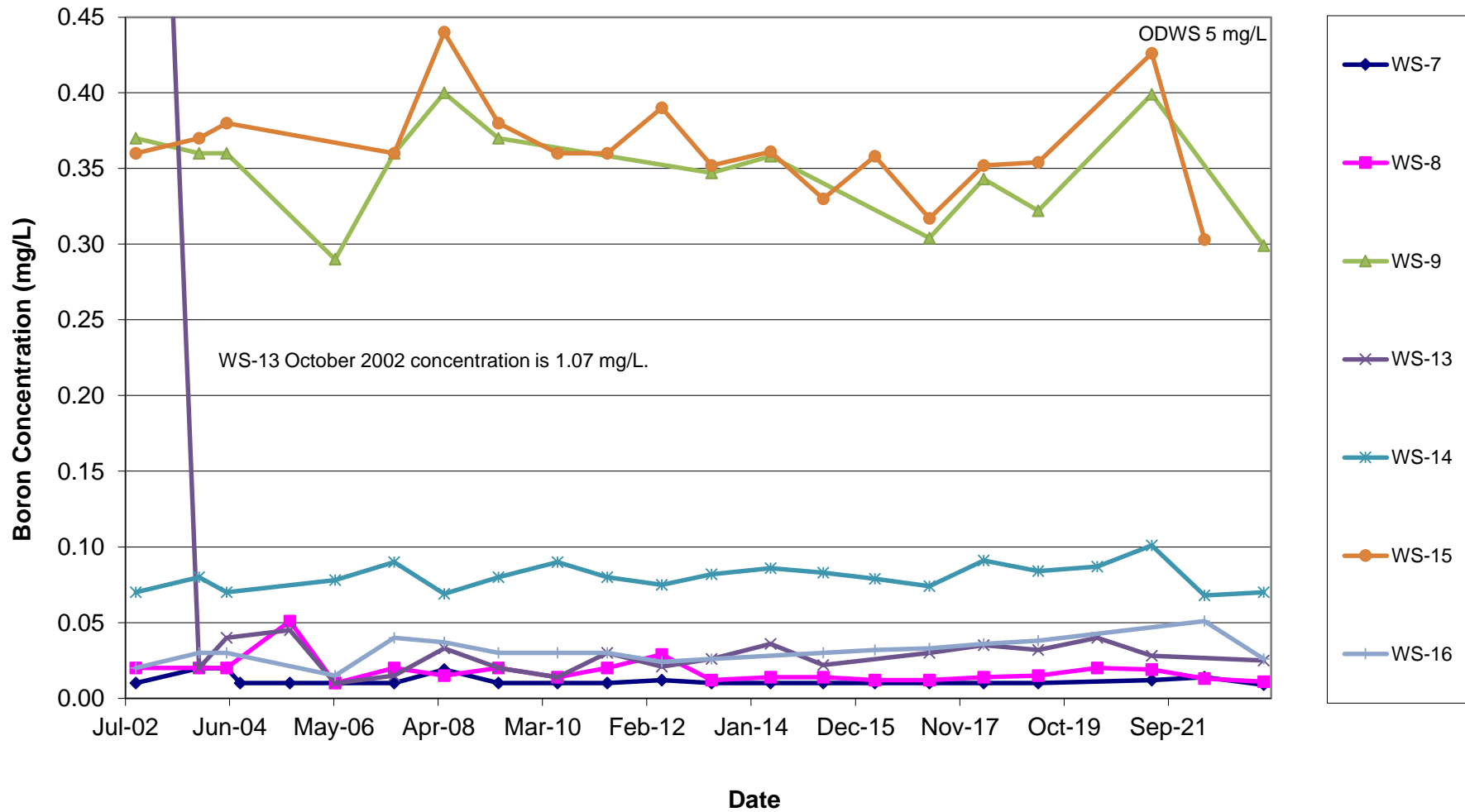


### Alkalinity Trend Analysis - Residential Groundwater





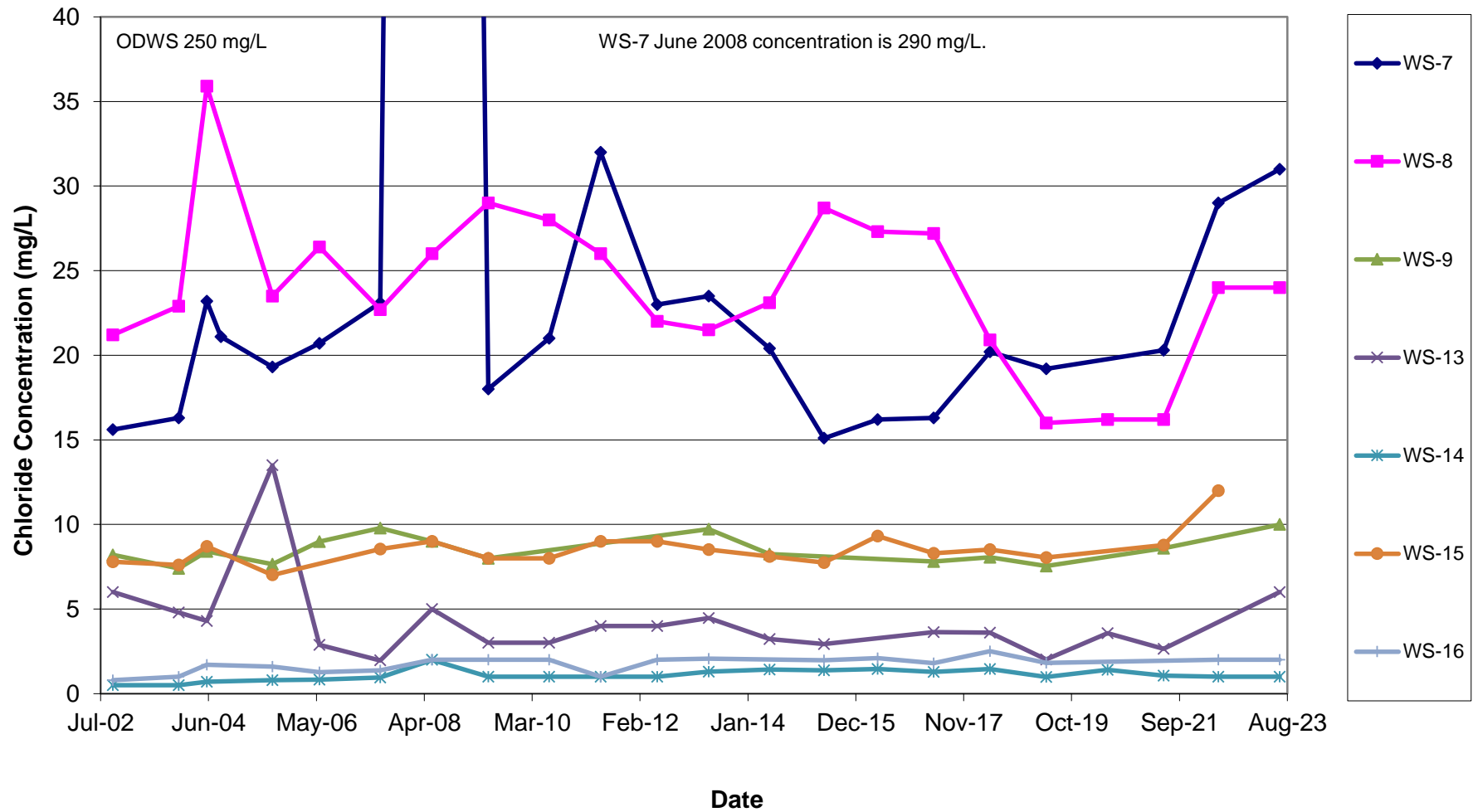
### Boron Trend Analysis - Residential Groundwater





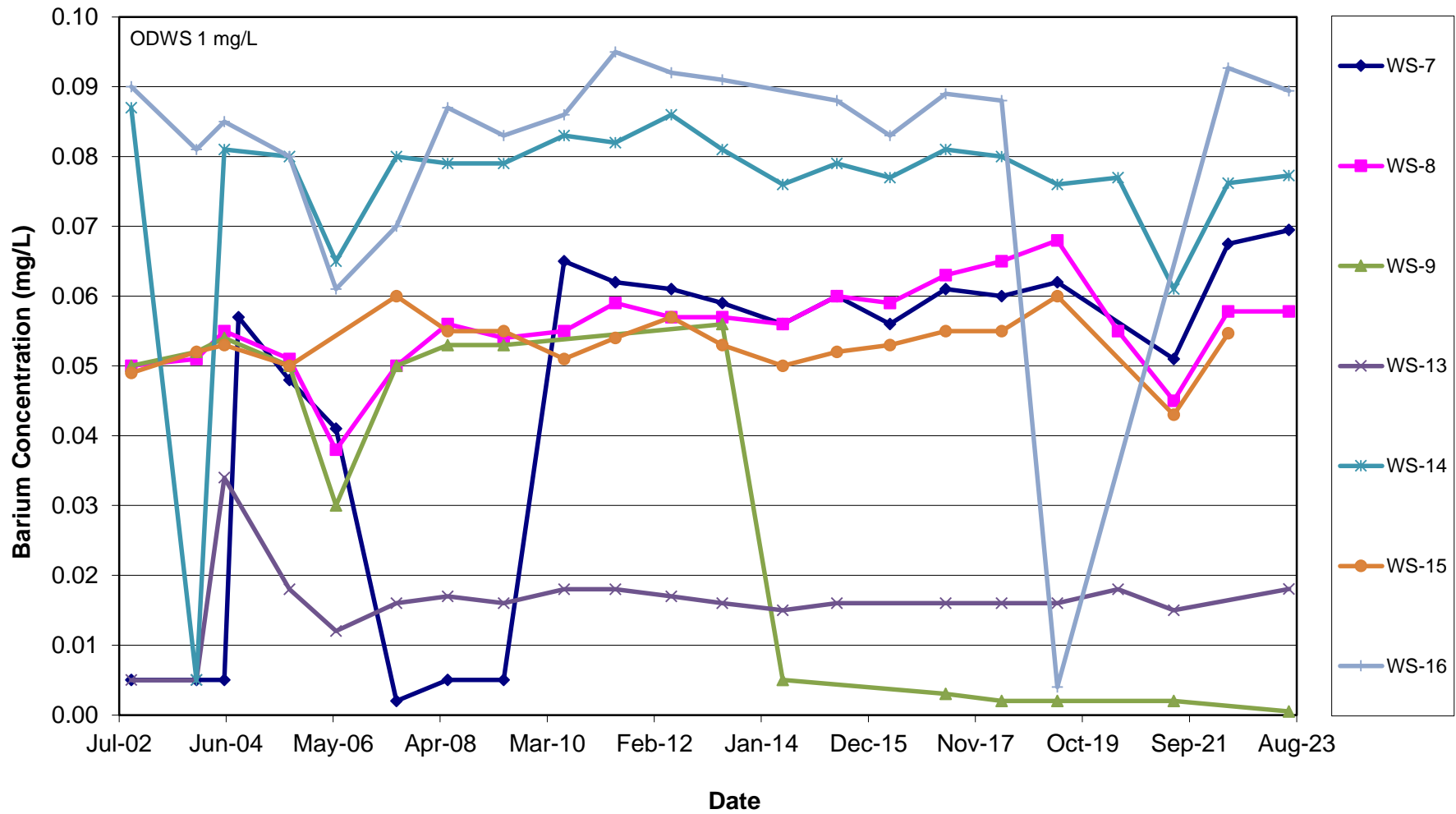


### Chloride Trend Analysis - Residential Groundwater



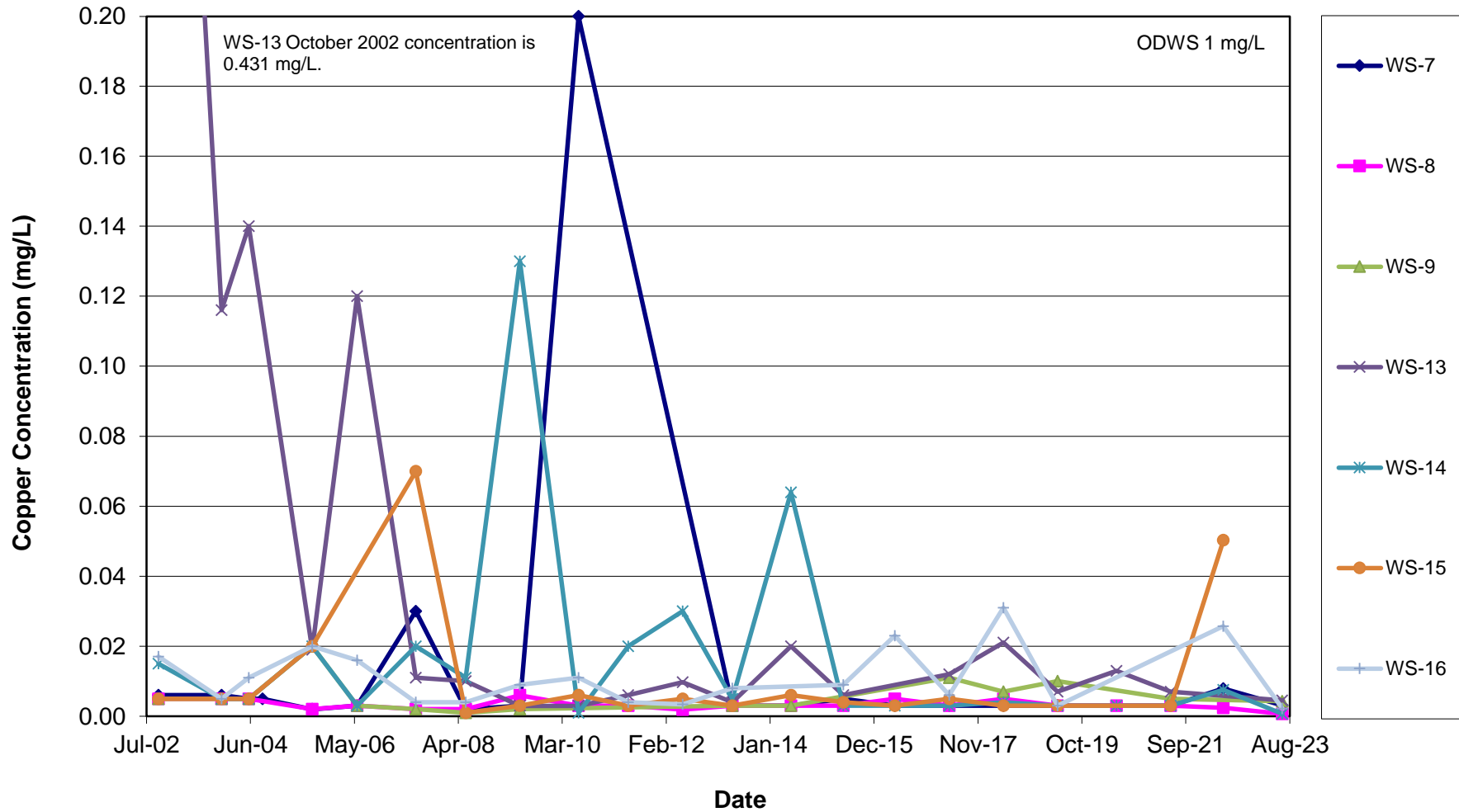


### Barium Trend Analysis - Residential Groundwater



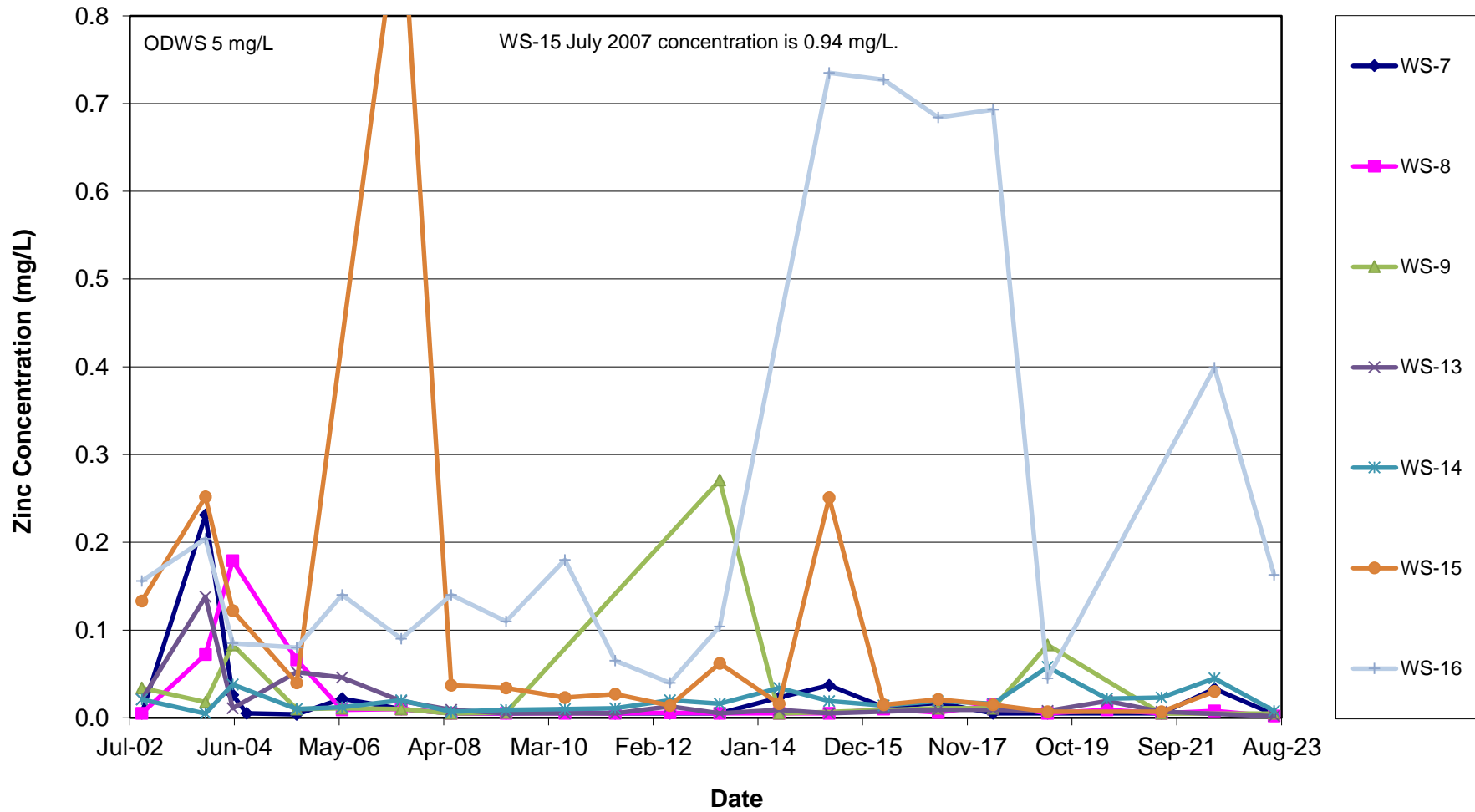


### Copper Trend Analysis - Residential Groundwater



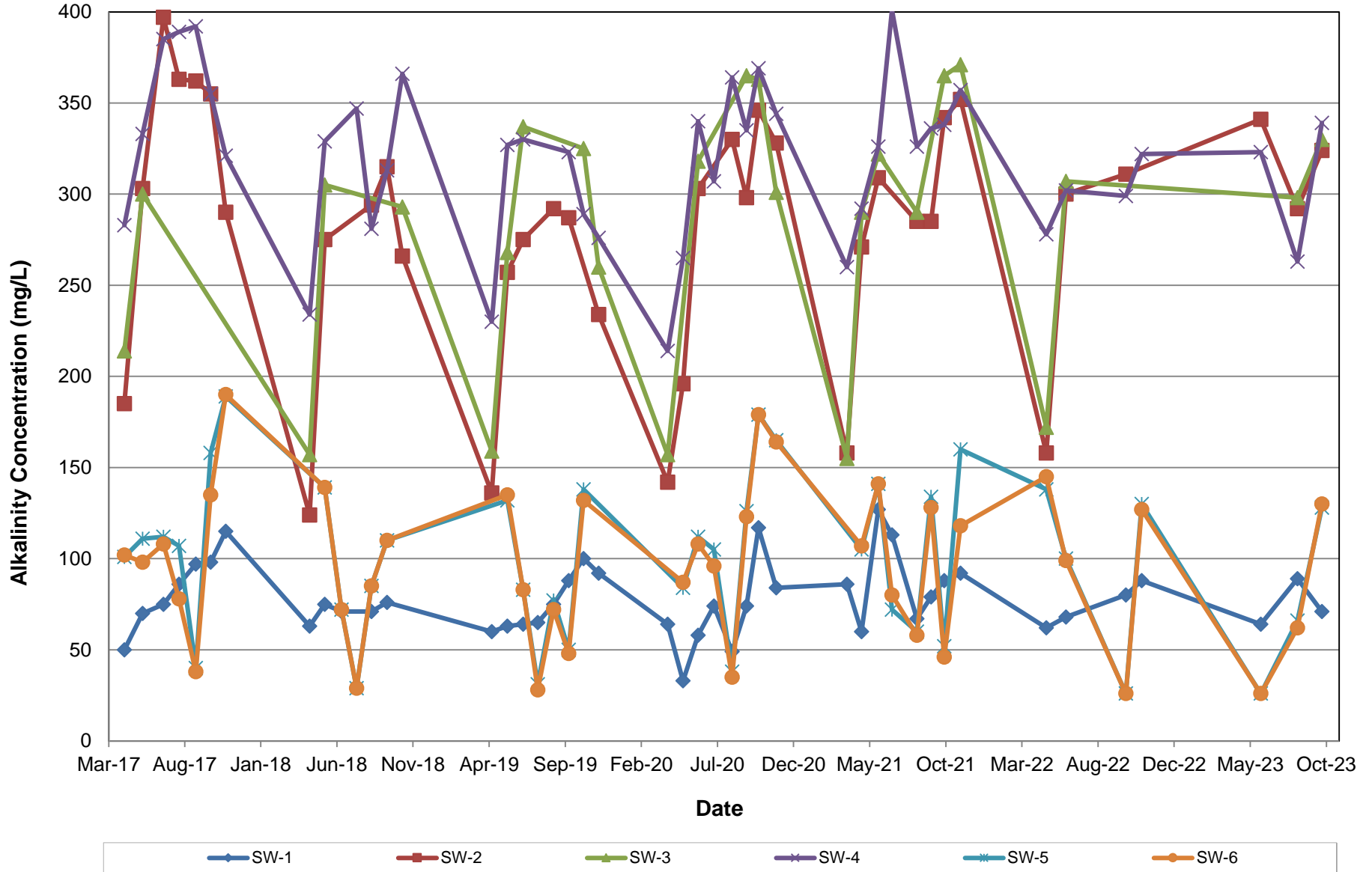


### Zinc Trend Analysis - Residential Groundwater



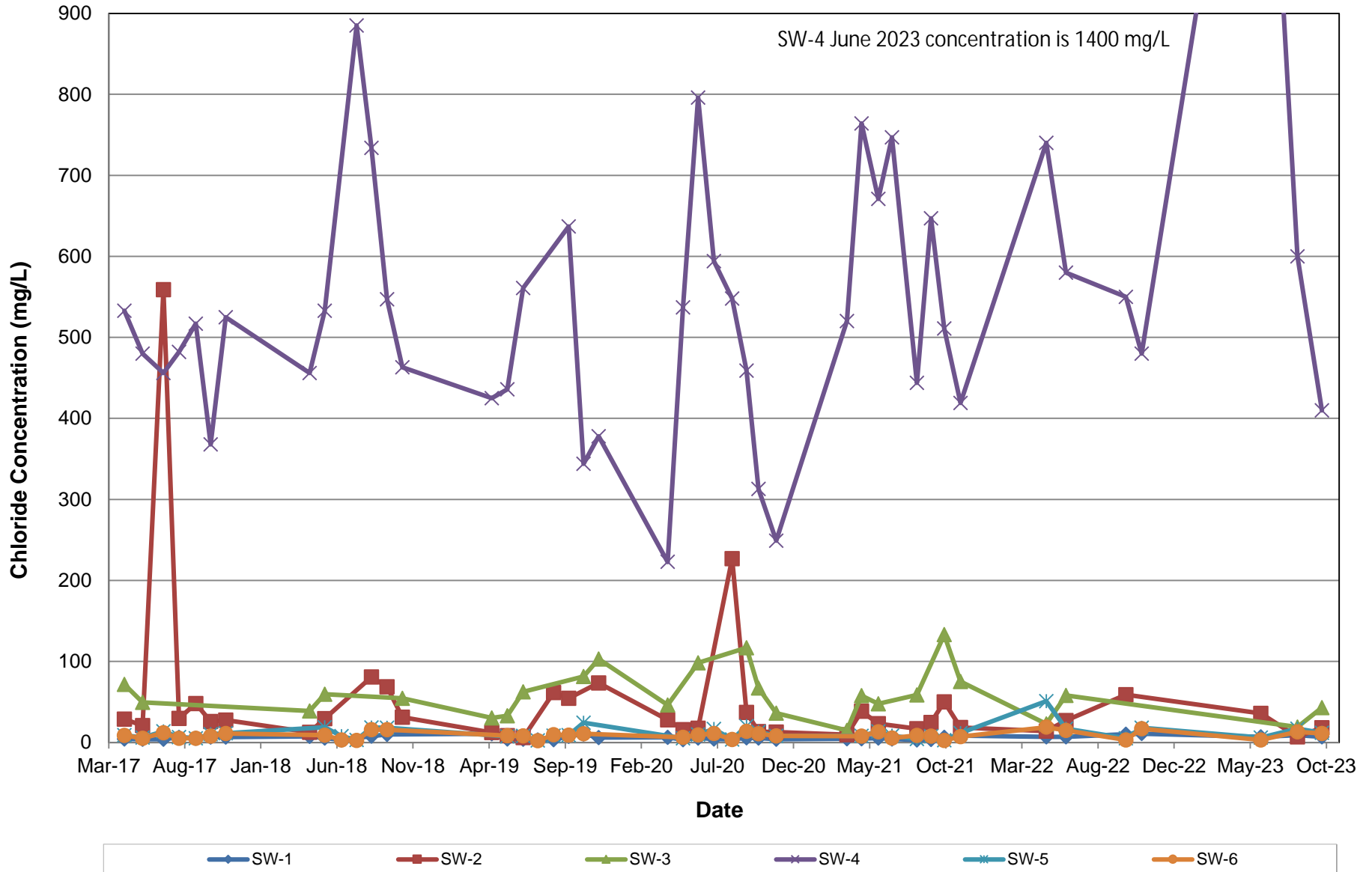


### Alkalinity Trend Analysis - Surface Water



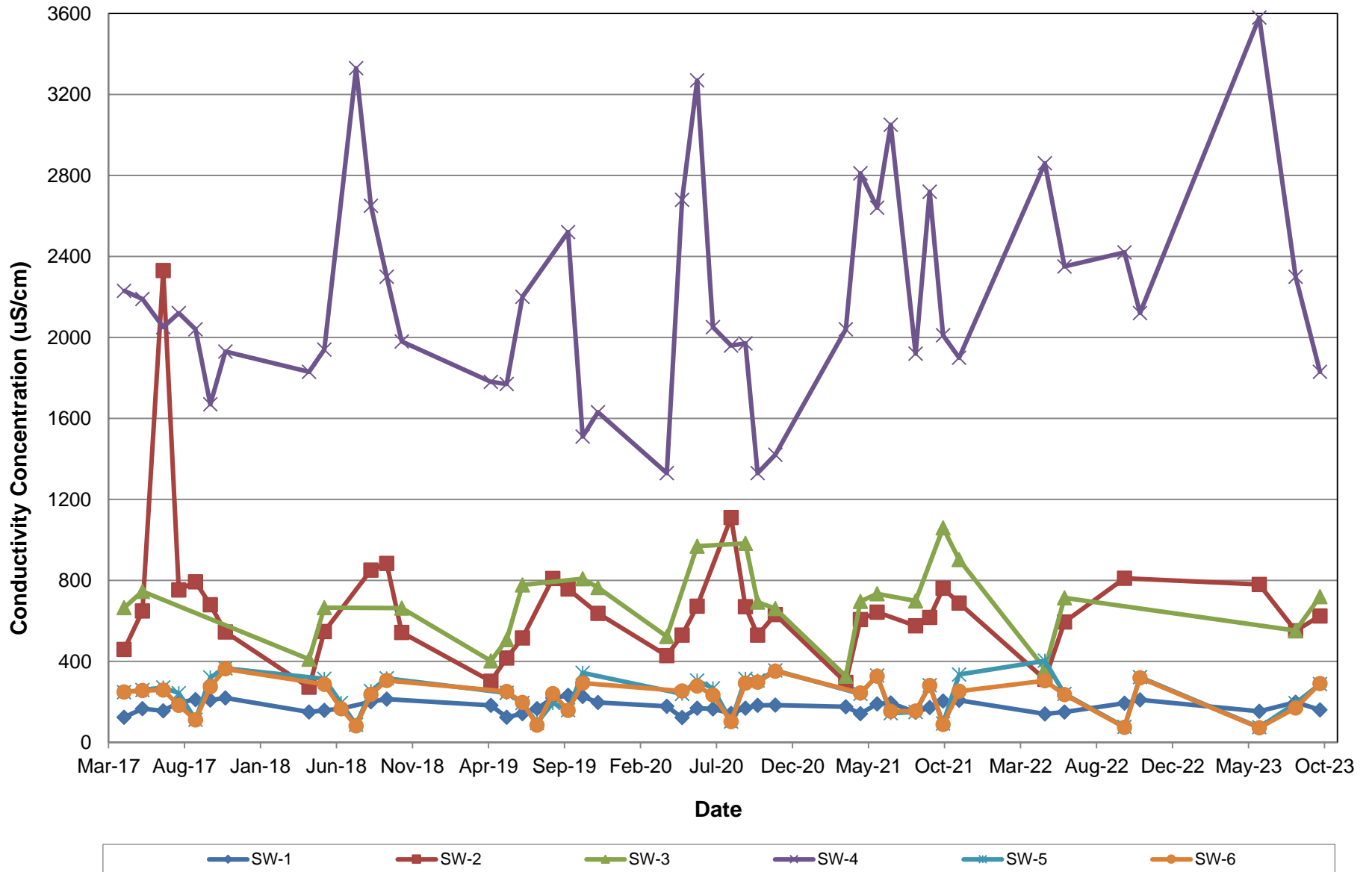


### Chloride Trend Analysis - Surface Water



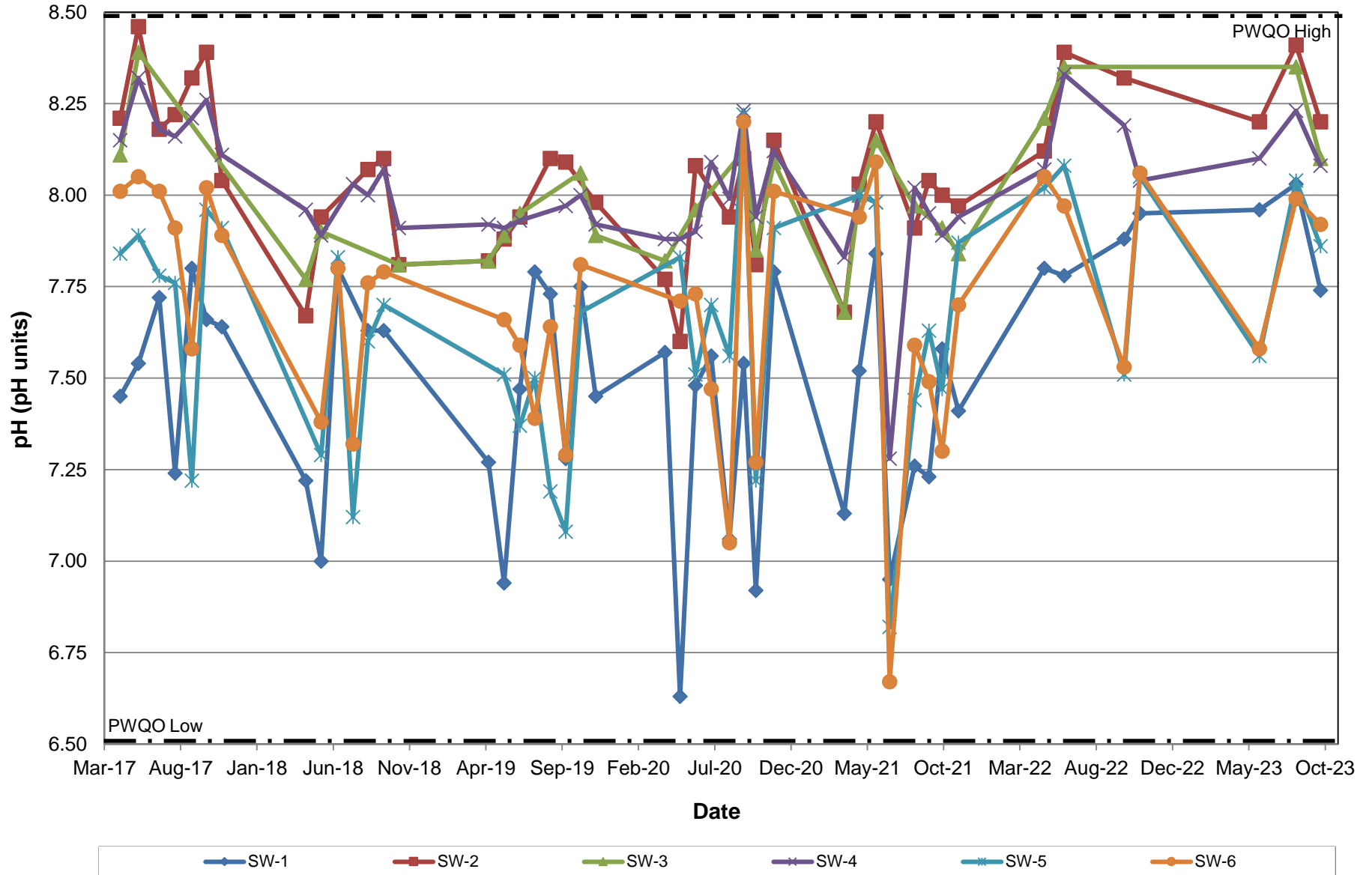


### Conductivity Trend Analysis - Surface Water





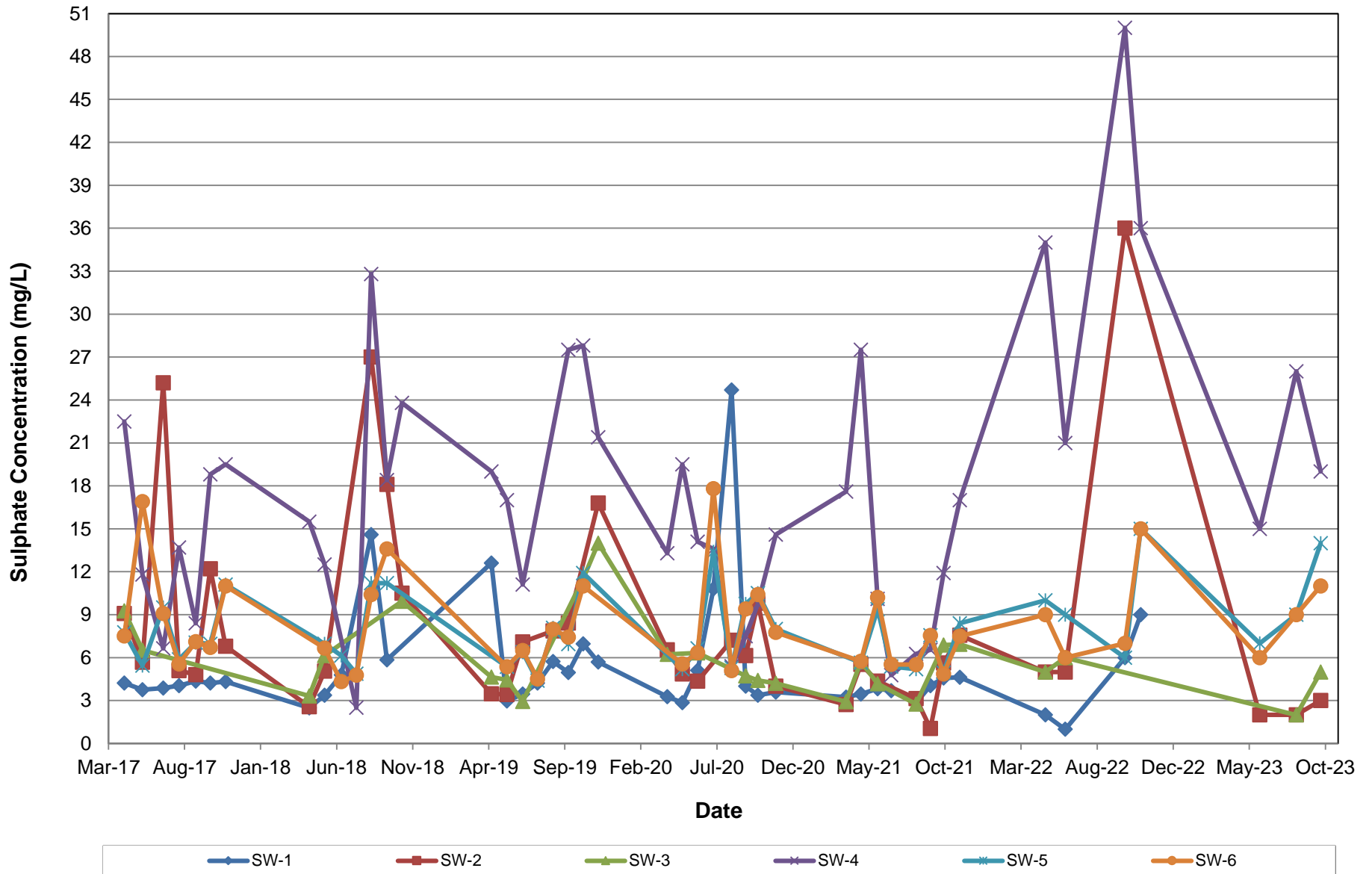
### pH Trend Analysis - Surface Water





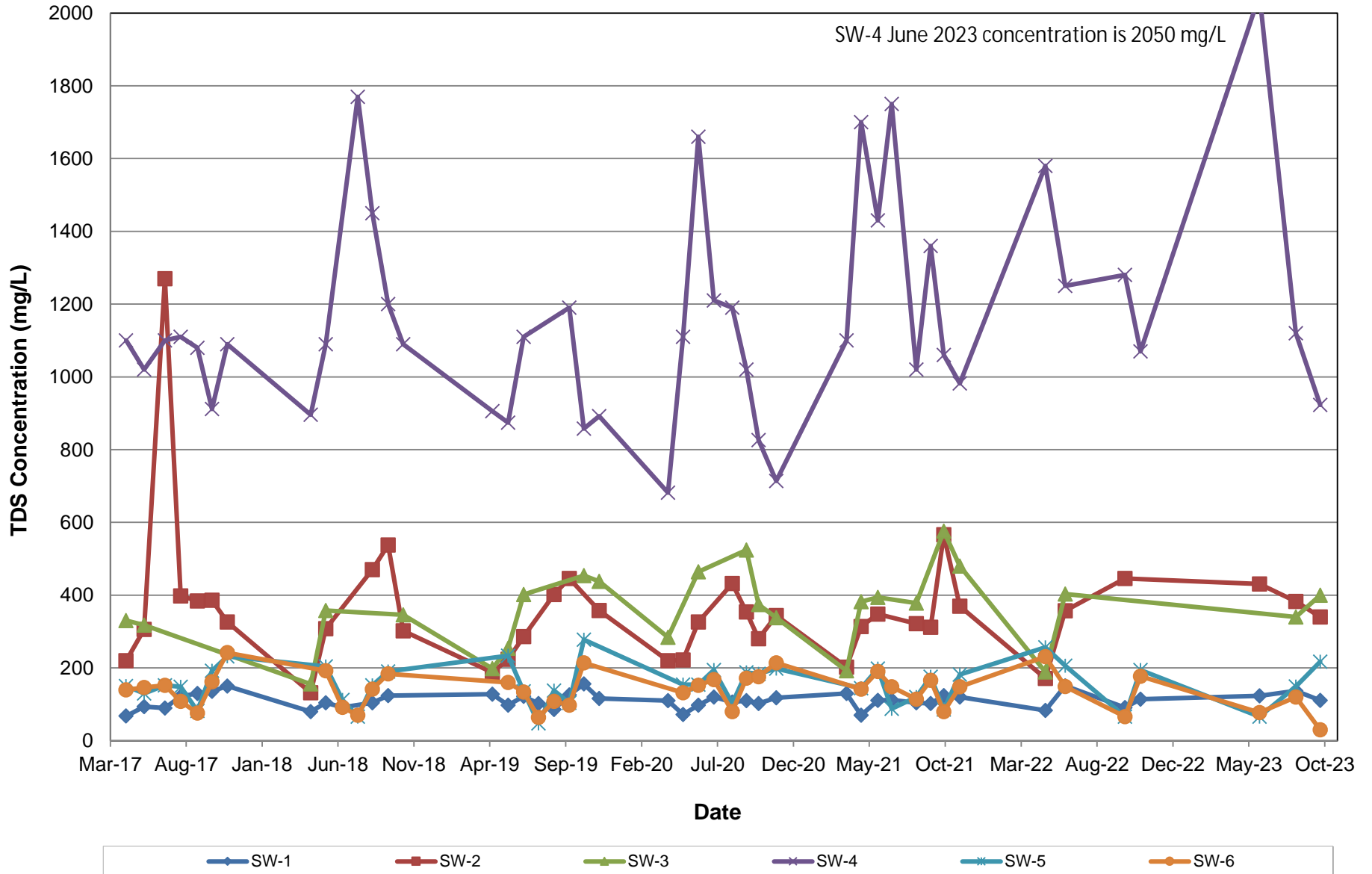


### Sulphate Trend Analysis - Surface Water





### TDS Trend Analysis - Surface Water



# Appendix I

## Photographic Inventory of Groundwater and Surface Water Monitoring Locations



**OW-1R-I  
2023**



**OW-1R-II  
2023**



**OW-1R-III  
2023**



**OW-1R  
Well Nest  
2023**





**OW-10-III**  
**2023**



**OW-10**  
**Well Nest**  
**2023**



**OW-11-I  
2023**



**OW-11-II  
2023**





**OW-11**  
**Well Nest**  
**2023**



**OW-12-I**  
**2023**



**OW-12-II  
2023**



**OW-12  
Well Nest  
2023**



**OW-13-I**  
**2023**



**OW-13-II**  
**2023**



**OW-13  
Well Nest  
2023**



**OW-14-I  
2023**



**OW-14-II  
2023**



**OW-14  
Well Nest  
2023**



**OW-16-I**  
**2023**



**OW-16-II**  
**2023**



**OW-16-III  
2023**



**OW-16-  
Well Nest  
2023**



**OW-17-I**  
**2023**



**OW-17-II**  
**2023**





**OW-17-III  
2023**



**OW-17  
Well Nest  
2023**



**OW-18-I  
2023**



**OW-18-I  
2023**



**OW-20-I**  
**2023**



**OW-20-II**  
**2023**



**OW-20**  
**Well Nest**  
**2023**



**OW-21**  
**2023**



**OW-21**  
**2023**



**OW-22-I**  
**2023**



**OW-22-I**  
**2023**



**OW-23-I**  
**2023**



**OW-23-II**  
**2023**



**OW-23**  
**Well Nest**  
**2023**



**OW-24-I  
2023**



**OW-24-II  
2023**





**OW-24-III**  
**2023**



**OW-24**  
**Well Nest**  
**2023**



**OW-25-I**  
**2023**



**OW-25-II**  
**2023**



**OW-25-III**  
**2023**



**OW-25-IV**  
**2023**



**OW-25**  
**Well Nest**  
**2023**



**OW-30-I**  
**2023**



**OW-30-II  
2023**



**OW-30-III  
2023**



**OW-30  
Well Nest  
2023**



**OW-31-I  
2023**



**OW-31-II  
2023**



**OW-31  
Well Nest  
2023**



SW-1  
2023



SW-1  
2023





SW-2  
2023



SW-2  
2023



**SW-3  
2023**



**SW-3  
2023**



**SW-4**  
**2023**



**SW-4**  
**2023**





SW-6  
2023



SW-6  
2023

# Appendix J

## Field Parameter Measurements





### 2023 Groundwater Field Chemistry Data

Well ID	Date Sampled	Temp (°C)	pH	Conductivity (uS/cm)	TDS (mg/L)	
OW-1R-I	June 19-20, 2023	11.7	6.77	2546	1273	
OW-1R-III		14.0	6.83	1946	973	
OW-10-I		7.6	7.64	766	383	
OW-10-II		12.6	7.17	421	210	
OW-10-III		10.8	7.64	572	286	
OW-11-I		9.3	7.72	644	322	
OW-11-II		15.9	7.28	1127	564	
OW-12-I		8.9	7.46	935	468	
OW-12-II		13.5	7.00	835	418	
OW-13-I		13.3	7.23	521	261	
OW-16-I		15.7	8.09	369	184	
OW-16-II		14.7	7.86	328	164	
OW-16-III		Damaged				
OW-17-I		7.9	7.64	509	255	
OW-17-II		8.6	7.89	678	339	
OW-17-III		9.1	7.27	697	349	
OW-23-I		Destroyed				
OW-23-II		9.9	7.72	362.9	181	
OW-24-I		10.1	7.83	515	258	
OW-24-II		8.7	7.34	750	375	
OW-24-III		Damaged				
OW-25-I		10.0	7.74	475	238	
OW-25-II		15.0	8.65	740	370	
OW-25-III		12.8	7.43	782	391	
OW-25-IV		Dry				
OW-30-I		10.0	8.02	408	204	
OW-30-II		9.3	7.63	300	150	
OW-30-III		9.4	7.16	203	102	
OW-31-I		12.3	7.93	835	418	
OW-31-II		13.8	8.25	676	338	



### 2023 Groundwater Field Chemistry Data

Well ID	Date Sampled	Temp (°C)	pH	Conductivity (uS/cm)	TDS (mg/L)	
OW-1R-I	August 28-30, 2023	18.9	7.28	2581	1291	
OW-1R-III		13.4	7.01	2413	1207	
OW-10-I		9.7	7.41	708	354	
OW-10-II		12.1	6.98	795	398	
OW-10-III		11.2	7.56	573	287	
OW-11-I		11.9	7.7	623.0	312	
OW-11-II		15.5	7.13	1121	561	
OW-12-I		11.3	7.53	951	476	
OW-12-II		15.0	7.00	1280	640	
OW-13-I		8.9	6.37	571.0	286	
OW-16-I		6.9	8.17	601	301	
OW-16-II		10.6	8.17	538	269	
OW-16-III		Damaged				
OW-17-I		7.7	6.96	291	146	
OW-17-II		8.9	7.09	409	205	
OW-17-III		Dry				
OW-23-I		Destroyed				
OW-23-II		10.55	8.16	392	196	
OW-24-I		8.7	7.67	526	263	
OW-24-II		9.7	7.71	767	384	
OW-24-III		Damaged				
OW-25-I		9.1	7.7	462.0	231	
OW-25-II		10.3	7.84	735	368	
OW-25-III		14.4	7.27	786	393	
OW-25-IV		Dry				
OW-30-I		8.9	7.93	734	367	
OW-30-II		9.8	7.9	599	300	
OW-30-III		10.3	7.3	412.0	206	
OW-31-I		13.4	7.7	791.0	396	
OW-31-II		9.0	7.8	688.0	344	





### 2023 Groundwater Field Chemistry Data

Well ID	Date Sampled	Temp (°C)	pH	Conductivity (uS/cm)	TDS (mg/L)	
OW-1R-I	October 16-18, 2023	8.9	6.08	2720	1360	
OW-1R-III		11.7	6.14	2550	1275	
OW-10-I		10.6	6.97	721	361	
OW-10-II		12.9	6.66	775	388	
OW-10-III		9.1	7.08	578	289	
OW-11-I		10.8	7.86	595	298	
OW-11-II		11.3	7.1	1110	555	
OW-12-I		12.0	8.06	916	458	
OW-12-II		12.4	7.42	1350	675	
OW-13-I		10.0	7.24	856	428	
OW-16-I		9.3	7.86	585	293	
OW-16-II		9.8	8.02	511	256	
OW-16-III		Damaged				
OW-17-I		6.7	7.76	457	229	
OW-17-II		8.0	7.93	603	302	
OW-17-III		Dry				
OW-23-I		Destroyed				
OW-23-II		7.4	7.3	599	300	
OW-24-I		9.3	8.07	506	253	
OW-24-II		9.3	7.65	720	360	
OW-24-III		Damaged				
OW-25-I		10.0	8.09	429	215	
OW-25-II		10.3	7.72	718	359	
OW-25-III		12.7	7.82	641	321	
OW-25-IV		9.9	7.16	399	200	
OW-30-I		10.2	7.50	738	369	
OW-30-II		10.0	7.81	578	289	
OW-30-III		9.0	7.63	390	195	
OW-31-I		Insufficient volume for field chemistry				
OW-31-II		9.3	7.58	658	329	



### 2023 Surface Water Field Chemistry Data

Station ID	Date Sampled	Temp (°C)	pH	Conductivity (uS/cm)	Dissolved Oxygen (%)	Flow Rate (m <sup>3</sup> /sec)	
SW-1	19-Jun-23	23.4	7.51	124.4	5.72	N/A	
SW-2		16.9	6.66	5953	0.29	No Measurable Flow	
SW-3		Dry					
SW-4		19.8	7.72	1775	6.23	N/A	
SW-5		24.7	8.37	63.3	0.06	N/A	
SW-6		24.9	8.48	64.2	11.4	N/A	
SW-1	30-Aug-23	16.12	7.24	264	4.84	N/A	
SW-2		15.27	7.7	373	5.77	0.0057	
SW-3		15.11	8.01	422	14.21	0.0029	
SW-4		13.3	7.66	1705	7.98	0.0046	
SW-5		19.01	8.14	70	6.48	N/A	
SW-6		19.43	8.37	81	7.4	N/A	
SW-1	17-Oct-23	8.3	8.42	167	74.4	N/A	
SW-2		6.6	7.81	648	67.9	0.0061	
SW-3		6.6	7.8	756.0	66.3	0.0075	
SW-4		7.5	6.6	1091.0	66.2	0.0013	
SW-5		9.7	7.63	293	56.5	NA	
SW-6		11.0	8.07	305	60	N/A	

# Appendix K

## Piper Plot Tables



Groundwater Ionic Balance and Piper Plot Data - June 2023

Raw Data (mg/L)	OW-1R-I	OW-1R-III	OW-10-I	OW-10-II	OW-10-III	OW-25-I	OW-25-II	OW-25-III	OW-16-I	OW-16-II	OW-24-I	OW-24-II	OW-17-I	OW-17-II	OW-30-I	OW-30-II	OW-30-III	OW-31-I	OW-31-II
<b>Ca</b>	155	176	110	127	54.5	39.5	26.0	104.0	17.2	24.7	68.7	88.1	72.0	51.9	24.9	37.0	54.3	45.2	45.2
<b>Mg</b>	108	66.1	33.9	22.0	19.3	18.1	14.9	40.6	11.7	13.9	18.5	38.6	20.1	33.2	20.2	18.5	15.5	31.0	31.0
<b>Na</b>	181	96	4.67	1.96	36.7	31.9	103	15.3	104	69.9	8.07	15.7	4.12	58.8	107	50.6	4.7	76.4	76.4
<b>K</b>	127	79	5.67	1.09	6.03	3.99	7.72	4.21	4.75	7.59	2.53	5.19	3.46	4.73	7.22	5.24	3.20	9.26	9.26
<b>Cl</b>	280	99	4.00	1.00	1.00	1.00	6.00	1.00	7.00	5.00	1.00	3.00	1.00	4.00	3.00	1.00	1.00	2.00	2.00
<b>SO4</b>	98	91	110.0	110	81.0	3.00	200	65	2.00	82.0	24.0	37.0	18.0	72.0	180	55.0	19.0	280	280
<b>ALK</b>	975	797	275	274	201	232	150	348	307	166	233	348	236	280	180	224	182	134	134
<b>pH</b>	7.84	7.85	8.13	8.09	8.14	8.22	8.19	7.99	8.22	8.24	8.09	8.10	8.17	8.24	8.35	8.17	7.90	8.10	8.10
<b>Ion Balance Data and Piper Plot (%)</b>																			
<b>Cations:</b>	27.74	20.42	8.63	8.26	6.06	4.95	7.20	9.30	6.47	5.61	5.37	8.39	5.51	8.00	7.74	5.70	4.27	8.37	8.37
<b>Anions:</b>	29.42	20.61	7.90	7.79	5.73	4.72	7.33	8.33	6.37	5.16	5.18	7.81	5.12	7.21	7.43	5.65	4.06	8.56	8.56
<b>CBE (%):</b>	-2.93	-0.47	4.42	2.92	2.79	2.33	-0.88	5.50	0.74	4.15	1.74	3.58	3.74	5.23	2.09	0.49	2.55	-1.16	-1.16
<b>Mg:</b>	32.0	26.6	32.3	21.9	26.2	30.1	17.0	35.9	14.9	20.4	28.4	37.9	30.0	34.1	21.5	26.7	29.9	30.5	30.5
<b>Ca:</b>	27.9	43.0	63.6	76.7	44.9	39.8	18.0	55.8	13.3	22.0	63.9	52.4	65.2	32.4	16.0	32.4	63.4	27.0	27.0
<b>Na+K:</b>	40.1	30.4	4.0	1.4	28.9	30.1	65.0	8.3	71.8	57.6	7.7	9.7	4.9	33.5	62.5	40.9	6.7	42.6	42.6
<b>Cl:</b>	26.8	13.5	1.4	0.4	0.5	0.6	2.3	0.3	3.1	2.7	0.5	1.1	0.6	1.6	1.1	0.5	0.7	0.7	0.7
<b>SO4:</b>	6.9	9.2	29.0	29.4	29.4	1.3	56.8	16.2	0.7	33.1	9.6	9.9	7.3	20.8	50.5	20.3	9.7	68.1	68.1
<b>HCO3+CO3:</b>	66.2	77.3	69.6	70.2	70.1	98.1	40.9	83.4	96.2	64.2	89.8	89.0	92.1	77.6	48.4	79.2	89.6	31.3	31.3

Groundwater Ionic Balance and Piper Plot Data - August 2023

Raw Data (mg/L)	OW-1R-I	OW-1R-III	OW-10-I	OW-10-II	OW-10-III	OW-25-I	OW-25-II	OW-25-III	OW-16-I	OW-16-II	OW-24-I	OW-24-II	OW-17-I	OW-17-II	OW-30-I	OW-30-II	OW-30-III	OW-31-I	OW-31-II
<b>Ca</b>	147	166	95	130	49.3	36.4	22.4	96.6	14.8	21.5	52.7	83.2	65.2	40.4	21.1	50.6	18.5	40.3	26.1
<b>Mg</b>	118	101.0	32.2	24.8	19.9	18.6	15.2	39.7	12.1	13.8	19.8	40.0	19.7	30.8	20.1	16.0	14.3	30.7	20.8
<b>Na</b>	187	147	4.82	1.86	34.3	28.4	101.0	13.9	99.5	62.5	21.40	13.6	3.74	62.0	95.8	4.2	90.30	73.3	61.7
<b>K</b>	124.0	112.0	5.32	1.19	5.88	3.75	7.34	3.74	4.36	7.48	3.02	4.82	3.30	4.40	6.18	3.10	5.44	9.01	6.16
<b>Cl</b>	240	250	2.00	2.00	1.00	1.00	7.00	1.00	9.00	5.00	1.00	4.00	1.00	4.00	3.00	1.00	2.00	1.00	1.00
<b>SO4</b>	110	99	91.0	160.0	87.0	2.0	200	64.0	2.00	89.0	32.0	33.0	18.0	70.0	210	18.0	200.0	290	83
<b>ALK</b>	928	1020	282	257	197	231	151	402	389	165	234	345	240	303	206	184	118	148	263
<b>pH</b>	8.14	7.77	7.95	8.17	8.45	8.14	8.30	8.07	8.41	8.09	8.44	8.23	8.02	8.19	8.40	8.00	8.30	8.27	8.37
Ion Balance Data and Piper Plot (%)																			
<b>Cations:</b>	28.35	25.85	7.73	8.64	5.74	4.68	6.95	8.79	6.17	5.12	5.27	8.16	5.12	7.36	7.03	4.10	6.17	7.96	5.86
<b>Anions:</b>	27.60	29.50	7.59	8.52	5.77	4.68	7.38	9.39	8.07	5.29	5.37	7.69	5.20	7.62	8.57	4.08	6.58	9.02	7.01
<b>CBE (%):</b>	1.34	-6.58	0.92	0.68	-0.29	-0.07	-2.98	-3.33	-13.29	-1.65	-0.94	2.94	-0.74	-1.76	-9.86	0.30	-3.21	-6.27	-8.97
<b>Mg:</b>	34.2	32.1	34.3	23.6	28.5	32.7	18.0	37.2	16.1	22.2	30.9	40.3	31.7	34.4	23.5	32.1	19.1	31.8	29.2
<b>Ca:</b>	25.9	32.0	61.2	75.1	42.9	38.8	16.1	54.9	12.0	21.0	49.9	50.9	63.5	27.4	15.0	61.5	15.0	25.3	22.2
<b>Na+K:</b>	39.9	35.8	4.5	1.3	28.6	28.5	65.9	8.0	71.9	56.9	19.1	8.8	4.8	38.2	61.5	6.4	66.0	43.0	48.5
<b>Cl:</b>	24.5	23.9	0.7	0.7	0.5	0.6	2.7	0.3	3.1	2.7	0.5	1.5	0.5	1.5	1.0	0.7	0.9	0.3	0.4
<b>SO4:</b>	8.3	7.0	25.0	39.1	31.4	0.9	56.4	14.2	0.5	35.0	12.4	8.9	7.2	19.1	51.0	9.2	63.3	66.9	24.7
<b>HCO3+CO3:</b>	67.2	69.1	74.3	60.2	68.1	98.5	40.9	85.5	96.3	62.3	87.1	89.6	92.2	79.4	48.0	90.1	35.8	32.8	74.9

Groundwater Ionic Balance and Piper Plot Data - October 2023

Raw Data (mg/L)	OW-1R-I	OW-1R-III	OW-10-I	OW-10-II	OW-10-III	OW-25-I	OW-25-II	OW-25-III	OW-25-IV	OW-16-I	OW-16-II	OW-24-I	OW-24-II	OW-17-I	OW-17-II	OW-30-I	OW-30-II	OW-30-III	OW-31-I	OW-31-II
<b>Ca</b>	164	182	110	138	54.8	39.8	22.2	151.0	13.3	14.6	21.1	89.0	92.5	74.5	83.9	26.0	23.8	55.7	48.3	18.2
<b>Mg</b>	120	107.0	37.8	24.3	22.2	20.8	16.1	61.5	7.15	13.0	14.1	25.2	45.5	21.9	47.2	31.5	22.0	17.6	33.7	15.3
<b>Na</b>	192	169	4.98	2.32	39.3	33.0	112.0	18.5	76.3	113.0	69.2	8.7	15.7	4.36	64.4	97.4	75.3	4.8	79.6	103.0
<b>K</b>	131.0	117.0	6.07	1.03	6.24	4.13	7.96	5.86	2.95	4.82	7.90	2.18	5.70	3.58	4.98	9.47	6.95	3.28	9.83	5.77
<b>Cl</b>	240	250	2.00	2.00	1.00	1.00	7.00	1.00	9.00	9.00	5.00	1.00	3.00	1.00	4.00	3.00	1.00	1.00	1.00	3.00
<b>SO4</b>	100	94	100	110	84.0	2.00	180	49.0	17.0	2.00	81.0	23.0	34.0	17.0	66.0	140	96	17.0	280	180
<b>ALK</b>	1090	1030	285	288	204	233	155	347	181	325	169	258	358	239	281	232	226	185	135	121
<b>pH</b>	7.84	7.89	8.11	8.00	8.21	8.22	8.12	8.13	8.27	8.23	8.17	8.09	8.06	8.15	8.21	8.29	8.26	7.95	7.99	8.03
Ion Balance Data and Piper Plot (%)																				
<b>Cations:</b>	29.76	28.23	8.97	9.01	6.43	5.24	7.51	13.55	4.65	6.84	5.43	6.95	9.19	5.80	11.00	8.37	6.45	4.52	8.90	6.80
<b>Anions:</b>	30.63	29.59	7.83	8.10	5.85	4.72	7.04	7.98	4.22	6.79	5.20	5.66	7.95	5.16	7.10	7.63	6.54	4.08	8.55	6.25
<b>CBE (%):</b>	-1.44	-2.35	6.78	5.33	4.71	5.17	3.21	25.87	4.78	0.36	2.09	10.21	7.26	5.88	21.54	4.59	-0.69	5.13	1.96	4.19
<b>Mg:</b>	33.2	31.2	34.7	22.2	28.4	32.7	17.6	37.3	12.7	15.6	21.4	29.8	40.7	31.1	35.3	31.0	28.1	32.0	31.2	18.5
<b>Ca:</b>	27.5	32.2	61.2	76.4	42.5	37.9	14.8	55.6	14.3	10.7	19.4	63.9	50.2	64.1	38.1	15.5	18.4	61.5	27.1	13.4
<b>Na+K:</b>	39.3	36.6	4.1	1.4	29.1	29.4	67.6	7.0	73.1	73.7	59.2	6.2	9.0	4.8	26.6	53.5	53.5	6.4	41.7	68.1
<b>Cl:</b>	22.1	23.8	0.7	0.7	0.5	0.6	2.8	0.4	6.0	3.7	2.7	0.5	1.1	0.5	1.6	1.1	0.4	0.7	0.3	1.4
<b>SO4:</b>	6.8	6.6	26.6	28.3	29.9	0.9	53.2	12.8	8.4	0.6	32.4	8.5	8.9	6.9	19.4	38.2	30.6	8.7	68.1	60.0
<b>HCO3+CO3:</b>	71.1	69.6	72.7	71.0	69.6	98.5	44.0	86.9	85.6	95.6	64.9	91.0	90.0	92.6	79.1	60.7	69.0	90.6	31.5	38.7



Residential Groundwater Ionic Balance and Piper Plot Data - June 2023

Raw Data (mg/L)	OW-1R-I	OW-1R-III	OW-10-I	OW-10-II	OW-10-III	WS-7	WS-8	WS-9	WS-13	WS-14	WS-16
<b>Ca</b>	155	176	110	127	54.5	100.0	87.8	0.42	84.1	73.8	84.70
<b>Mg</b>	108	66.1	33.9	22.0	19.3	34.1	32.6	0.3	25.3	32.1	32.9
<b>Na</b>	181	96	4.67	1.96	0.0	17.4	8.64	162.00	5.11	9.6	6.65
<b>K</b>	127	79	5.67	1.09	6.03	2.07	2.37	0.21	1.14	3.30	2.32
<b>Cl</b>	280	99	4.00	1.00	1.00	31.0	24.0	10.00	6.00	1.00	2
<b>SO4</b>	98	91	110	110	81.0	28.0	30.0	84.0	19.0	11.0	15
<b>ALK</b>	975	797	275	274	201	361	314	285	301	322	342
<b>pH</b>	7.84	7.85	8.13	8.09	8.14	8.04	8.07	8.12	7.96	8.07	7.98
Ion Balance Data and Piper Plot (%)											
<b>Cations:</b>	27.74	20.42	8.63	8.26	4.46	8.61	7.50	7.09	6.53	6.82	7.28
<b>Anions:</b>	29.42	20.61	7.90	7.79	5.73	8.67	7.6	7.72	6.58	6.69	7.20
<b>CBE (%):</b>	-2.93	-0.47	4.42	2.92	-12.44	-0.37	-0.50	-4.25	-0.37	0.99	0.56
<b>Mg:</b>	32.0	26.6	32.3	21.9	35.6	32.6	35.8	0.3	31.9	38.7	37.2
<b>Ca:</b>	27.9	43.0	63.6	76.7	60.9	58.0	58.4	0.3	64.3	54.0	58.0
<b>Na+K:</b>	40.1	30.4	4.0	1.4	3.5	9.4	5.8	99.4	3.9	7.3	4.8
<b>Cl:</b>	26.8	13.5	1.4	0.4	0.5	10.1	8.9	3.7	2.6	0.4	0.8
<b>SO4:</b>	6.9	9.2	29.0	29.4	29.4	6.7	8.2	22.6	6.0	3.4	4.3
<b>HCO3+CO3:</b>	66.2	77.3	69.6	70.2	70.1	83.2	82.8	73.7	91.4	96.2	94.9

# Appendix L

## Guideline B-7 Calculations





Guideline B-7  
 Spring 2023 Monitoring Event Shallow Aquifer

Reasonable Use Calculation (Guideline B-7)				Trigger Level Calculation			Downgradient Well Concentrations
Parameter	ODWS <sup>(3)</sup> C <sub>r</sub> (mg/L)	Background Concentration C <sub>b</sub> <sup>(1)</sup> (mg/L)	Maximum Concentration C <sub>m</sub> =C <sub>b</sub> +x(C <sub>r</sub> -C <sub>b</sub> ) (mg/L)	80% of Reasonable Concentration (mg/L)	Max Background Concentration C <sub>mb</sub> (mg/L)	Trigger Concentration T <sub>c</sub> =Max(0.8*C <sub>m</sub> , C <sub>mb</sub> ) <sup>(6)</sup> (mg/L)	OW-25-III (mg/L)
Health Related				x=0.25 <sup>(2)</sup>			
Arsenic	0.01	0.0011	0.003	Not Applicable - Not a trigger parameter			0.0009
Barium	1	0.024	0.268	Not Applicable - Not a trigger parameter			0.0597
Boron	5	0.078	1.31	1.05	0.350	1.05	0.0220
Cadmium	0.005	0.0005	0.0016	Not Applicable - Not a trigger parameter			< 0.000003
Chromium	0.05	0.0012	0.013	Not Applicable - Not a trigger parameter			0.00009
Fluoride	1.5	0.0934	0.445	0.356	0.350	0.356	<b>1.06</b>
Lead	0.01	0.0005	0.003	Not Applicable - Not a trigger parameter			< 0.00009
Nitrate-N	10	0.052	2.54	Not Applicable - Not a trigger parameter			< 0.06
Nitrite-N	1	0.046	0.28	Not Applicable - Not a trigger parameter			< 0.03
Non-Health Related				x=0.50 <sup>(2)</sup>			
Alkalinity (High)	500	269	384	307	338	338	<b>348</b>
Hardness (High)	100	389	389 <sup>(4)</sup>	311	520	520	427
Chloride	250	2.24	126	101	6.43	101	< 1
Copper	1	0.0014	0.50	Not Applicable - Not a trigger parameter			0.0007
DOC	5	2.11	3.56	Not Applicable - Not a trigger parameter			2.0
Manganese	0.05	0.0070	0.029	0.023	0.149	0.149	<b>0.113</b>
Sodium	200	3.08	101.5	81	5.9	81	15.3
Sulphate	500	132	316	Not Applicable - Not a trigger parameter			65.0
TDS	500	456	478	402	602	602	471
Zinc	5	0.004	2.50	Not Applicable - Not a trigger parameter			< 0.002

Notes:

- (1) Average of ten valid sampling rounds at OW10-I and OW-10-II.
- (2) Defined according to Guideline B-7 (MECP, 1994).
- (3) ODWS - Ontario Drinking Water Standards (MECP, 2001).
- (4) Background exceeds the ODWS, therefore the maximum concentration has been set at background.
- (5) **BOLD and shaded** indicates an exceedance of the Maximum Concentration.
- (6) Underlined and shaded indicates an exceedance of the Trigger Concentration.

Guideline B-7  
 Spring 2023 Monitoring Event Moderate Depth Aquifer

Reasonable Use Calculation (Guideline B-7)				Trigger Level Calculation			Downgradient Well Concentrations					
Parameter	ODWS <sup>(3)</sup> C <sub>r</sub> (mg/L)	Background Concentration C <sub>b</sub> <sup>(1)</sup> (mg/L)	Maximum Concentration C <sub>m</sub> =C <sub>b</sub> +x(C <sub>r</sub> -C <sub>b</sub> ) (mg/L)	80% of Reasonable Concentration (mg/L)	Max Background Concentration C <sub>mb</sub> (mg/L)	Trigger Concentration T <sub>c</sub> =Max(0.8*C <sub>m</sub> , C <sub>mb</sub> ) <sup>(6)</sup> (mg/L)	OW-25-II (mg/L)	OW-16-II (mg/L)	OW-24-II (mg/L)	OW-17-II (mg/L)	OW-30-II (mg/L)	OW-31-I (mg/L)
Health Related			x=0.25 <sup>(2)</sup>									
Arsenic	0.01	0.0011	0.003	Not Applicable - Not a trigger parameter			0.0017	0.0011	< 0.0002	0.0007	0.0006	0.0003
Barium	1	0.024	0.268	Not Applicable - Not a trigger parameter			0.0250	0.0301	0.0489	0.0469	0.0312	0.0318
Boron	5	0.078	1.31	1.05	0.350	1.05	0.179	0.198	0.037	0.134	0.089	0.167
Cadmium	0.005	0.0005	0.0016	Not Applicable - Not a trigger parameter			0.000017	0.000015	0.000003	0.000009	0.000012	0.000006
Chromium	0.05	0.0012	0.013	Not Applicable - Not a trigger parameter			0.00036	0.00036	0.00009	0.00056	0.00017	0.00038
Fluoride	1.5	0.0934	0.445	0.356	0.350	0.356	<b>1.10</b>	<b>1.00</b>	<b>0.790</b>	<b>1.28</b>	<b>0.530</b>	<b>0.710</b>
Lead	0.01	0.0005	0.003	Not Applicable - Not a trigger parameter			< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Nitrate-N	10	0.052	2.54	Not Applicable - Not a trigger parameter			0.12	0.09	0.13	0.07	0.09	0.44
Nitrite-N	1	0.046	0.28	Not Applicable - Not a trigger parameter			< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Non-Health Related			x=0.50 <sup>(2)</sup>									
Alkalinity (High)	500	269	384	307	338	338	150	166	<b>348</b>	280	224	134
Hardness (High)	100	389	389 <sup>(4)</sup>	311	520	520	126	119	379	266	169	240
Chloride	250	2.24	126	101	6.43	101	6.0	5.0	3.0	4.0	1.0	2.0
Copper	1	0.0014	0.50	Not Applicable - Not a trigger parameter			0.001	0.0024	0.0007	0.0009	0.0017	0.0018
DOC	5	2.11	3.56	Not Applicable - Not a trigger parameter			1.0	2.0	2.0	1.0	2.0	1.0
Manganese	0.05	0.007	0.029	0.023	0.149	0.149	0.0009	0.0011	<b>0.031</b>	0.0039	0.0056	0.0020
Sodium	200	3.08	102	81	5.9	81	<b>103</b>	69.9	15.7	58.8	50.6	76.4
Sulphate	500	132	316	Not Applicable - Not a trigger parameter			200	82.0	37.0	72.0	55.0	280
TDS	500	456	478	382	602	602	466	286	474	426	317	<b>534</b>
Zinc	5	0.004	2.50	Not Applicable - Not a trigger parameter			0.0030	< 0.002	0.003	< 0.002	< 0.002	< 0.002

Notes:  
 (1) Average of ten valid sampling rounds at OW10-I and OW-10-II.  
 (2) Defined according to Guideline B-7 (MECP, 1994).  
 (3) ODWS - Ontario Drinking Water Standards (MECP, 2001).  
 (4) Background exceeds the ODWS, therefore the maximum concentration has been set at background.  
 (5) **BOLD and shaded** indicates an exceedance of the Maximum Concentration.  
 (6) **Underlined and shaded** indicates an exceedance of the Trigger Concentration.

Guideline B-7  
 Spring 2023 Monitoring Event Deep Aquifer

Reasonable Use Calculation (Guideline B-7)				Trigger Level Calculation			Downgradient Well Concentrations							
Parameter	ODWS <sup>(3)</sup> C, (mg/L)	Background Concentration C <sub>b</sub> (1) (mg/L)	Maximum Concentration C <sub>m</sub> =C <sub>b</sub> +x(C <sub>r</sub> -C <sub>b</sub> ) (mg/L)	80% of Reasonable Concentration (mg/L)	Max Background Concentration C <sub>mb</sub> (mg/L)	Trigger Concentration T <sub>c</sub> =Max(0.8*C <sub>m</sub> , C <sub>mb</sub> ) <sup>(6)</sup> (mg/L)	OW-25-I <sup>(5)</sup> (mg/L)	OW-16-I <sup>(5)</sup> (mg/L)	OW-24-I <sup>(5)</sup> (mg/L)	OW-17-I (mg/L)	OW-23-II (mg/L)	OW-30-I <sup>(5)</sup> (mg/L)	OW-30-II <sup>(5)</sup> (mg/L)	OW-31-II <sup>(5)</sup> (mg/L)
Health Related			x=0.25 <sup>(2)</sup>											
Arsenic	0.01	0.0008	0.003	Not Applicable - Not a trigger parameter			0.0002	0.0004	0.0003	0.0003	0.0006	0.0005	< 0.0002	0.0006
Barium	1	0.024	0.268	Not Applicable - Not a trigger parameter			0.0395	0.0421	0.0280	0.0305	0.0324	0.0290	0.0710	0.0446
Boron	5	0.235	1.43	1.14	0.364	1.14	0.140	0.400	0.037	0.037	0.300	0.451	0.025	0.181
Cadmium	0.005	0.0002	0.0014	Not Applicable - Not a trigger parameter			< 0.000003	< 0.000003	< 0.000003	< 0.000003	0.000017	0.000015	< 0.000003	0.000006
Chromium	0.05	0.0010	0.013	Not Applicable - Not a trigger parameter			0.00013	0.00048	0.00017	0.00012	0.0004	0.00015	0.00014	0.00195
Fluoride	1.5	0.5158	0.762	0.609	0.750	0.750	0.660	<b>1.59</b>	0.350	0.350	<b>1.24</b>	<b>1.49</b>	0.220	<b>1.19</b>
Lead	0.01	0.0003	0.003	Not Applicable - Not a trigger parameter			< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	0.00035
Nitrate-N	10	0.029	2.5	Not Applicable - Not a trigger parameter			< 0.06	< 0.06	< 0.06	< 0.06	0.13	0.06	< 0.06	< 0.06
Nitrite-N	1	0.023	0.27	Not Applicable - Not a trigger parameter			< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Non-Health Related			x=0.50 <sup>(2)</sup>											
Alkalinity (High)	500	205	353	282	237	282	232	<u>307</u>	233	236	219	180	182	130
Hardness (High)	100	201	201 <sup>(4)</sup>	161	227	227	173	91	<b>248</b>	<b>263</b>	147	146	200	138
Chloride	250	0.809	125	100	1.10	100	< 1	7.0	< 1	< 1	13	3.0	< 1	2.0
Copper	1	0.0012	0.50	Not Applicable - Not a trigger parameter			0.0005	0.0009	0.0007	0.0009	0.0015	0.0009	0.0004	0.0034
DOC	5	1.29	3.15	Not Applicable - Not a trigger parameter			<b>4.0</b>	<b>10</b>	2.0	3.0	3.0	2.0	3.0	3.0
Manganese	0.05	0.029	0.039	0.031	0.111	0.111	0.0113	0.0177	0.0318	0.0371	0.0012	0.0018	<b>0.0634</b>	0.0367
Organic Nitrogen	0.15	0.111	0.131	0.105	0.350	0.350	<b>0.150</b>	<b>0.250</b>	< 0.05	< 0.05	< 0.05	< 0.05	0.130	<b>0.190</b>
Sodium	200	35.1	118	94	36.7	94	31.9	104	8.07	4.12	86.2	<u>107</u>	4.72	93.2
Sulphate	500	82.6	291	Not Applicable - Not a trigger parameter			3.0	< 2	24.0	18.0	90.0	180	19.0	200
TDS	500	304	402	321	340	340	263	<u>400</u>	309	297	<u>383</u>	<b>491</b>	229	<b>414</b>
Zinc	5	0.003	3	Not Applicable - Not a trigger parameter			< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.004

- Notes:
- (1) Average of ten valid sampling rounds at OW-10-III.
  - (2) Defined according to Guideline B-7 (MECP, 1994).
  - (3) ODWS - Ontario Drinking Water Standards (MECP, 2001).
  - (4) Background exceeds the ODWS, therefore the maximum concentration has been set at background.
  - (5) Downgradient property boundary well (i.e., compliance point).
  - (6) **BOLD and shaded** indicates an exceedance of the Maximum Concentration.
  - (6) Underlined and shaded indicates an exceedance of the Trigger Concentration.

Guideline B-7  
 Summer 2023 Monitoring Event Shallow Aquifer

Reasonable Use Calculation (Guideline B-7)				Trigger Level Calculation			Downgradient Well Concentrations
Parameter	ODWS <sup>(3)</sup> C <sub>r</sub> (mg/L)	Background Concentration C <sub>b(1)</sub> (mg/L)	Maximum Concentration C <sub>m</sub> =C <sub>b</sub> +x(C <sub>r</sub> -C <sub>b</sub> ) (mg/L)	80% of Reasonable Concentration (mg/L)	Max Background Concentration Cmb (mg/L)	Trigger Concentration Tc=Max (0.8*C <sub>m</sub> , Cmb) <sup>(6)</sup> (mg/L)	OW-25-III (mg/L)
Health Related			x=0.25 <sup>(2)</sup>				
Arsenic	0.01	0.0010	0.003	Not Applicable - Not a trigger parameter			0.0023
Barium	1	0.024	0.268	Not Applicable - Not a trigger parameter			0.0744
Boron	5	0.078	1.31	1.05	0.350	1.05	0.021
Cadmium	0.005	0.0004	0.0015	Not Applicable - Not a trigger parameter			< 0.000003
Chromium	0.05	0.0011	0.013	Not Applicable - Not a trigger parameter			0.00026
Fluoride	1.5	0.0970	0.448	0.358	0.350	0.358	<b><u>1.06</u></b>
Lead	0.01	0.0004	0.003	Not Applicable - Not a trigger parameter			< 0.00009
Nitrate-N	10	0.051	2.54	Not Applicable - Not a trigger parameter			< 0.06
Nitrite-N	1	0.045	0.28	Not Applicable - Not a trigger parameter			< 0.03
Non-Health Related			x=0.50 <sup>(2)</sup>				
Alkalinity (High)	500	269	385	308	338	338	<b><u>402</u></b>
Hardness (High)	100	388	388 <sup>(4)</sup>	311	520	520	<b><u>405</u></b>
Chloride	250	2.22	126	101	6.43	101	< 1
Copper	1	0.0014	0.50	Not Applicable - Not a trigger parameter			0.0004
DOC	5	2.09	3.55	Not Applicable - Not a trigger parameter			1.20
Manganese	0.05	0.007	0.029	0.023	0.149	0.149	<b><u>0.092</u></b>
Sodium	200	3.08	101.5	81	5.9	81	13.9
Sulphate	500	130	315	Not Applicable - Not a trigger parameter			64
TDS	500	457	478	383	602	602	<b><u>480</u></b>
Zinc	5	0.003	2.50	Not Applicable - Not a trigger parameter			< 0.000007

Notes:

- (1) Average of ten valid sampling rounds at OW10-I and OW-10-II.
- (2) Defined according to Guideline B-7 (MECP, 1994).
- (3) ODWS - Ontario Drinking Water Standards (MECP, 2001).
- (4) Background exceeds the ODWS, therefore the maximum concentration has been set at background.
- (5) **BOLD and shaded** indicates an exceedance of the Maximum Concentration.
- (6) **Underlined** and shaded indicates an exceedances of the Trigger Concentration.

Guideline B-7  
 Summer 2023 Monitoring Event Moderate Depth Aquifer

Reasonable Use Calculation (Guideline B-7)				Trigger Level Calculation			Downgradient Well Concentrations					
Parameter	ODWS <sup>(3)</sup> C <sub>r</sub> (mg/L)	Background Concentration C <sub>b</sub> <sup>(1)</sup> (mg/L)	Maximum Concentration C <sub>m</sub> =C <sub>b</sub> +x(C <sub>r</sub> -C <sub>b</sub> ) (mg/L)	80% of Reasonable Concentration (mg/L)	Max Background Concentration C <sub>mb</sub> (mg/L)	Trigger Concentration T <sub>c</sub> =Max(0.8*C <sub>m</sub> , C <sub>mb</sub> ) <sup>(6)</sup> (mg/L)	OW-25-II (mg/L)	OW-16-II (mg/L)	OW-24-II (mg/L)	OW-17-II (mg/L)	OW-30-II (mg/L)	OW-31-I (mg/L)
Health Related			x=0.25 <sup>(2)</sup>									
Arsenic	0.01	0.0010	0.003	Not Applicable - Not a trigger parameter			0.0026	0.0012	< 0.0002	0.0006	< 0.0002	0.0003
Barium	1	0.024	0.268	Not Applicable - Not a trigger parameter			0.0226	0.0310	0.0460	0.0455	0.0646	0.0346
Boron	5	0.078	1.31	1.05	0.350	1.05	0.189	0.194	0.036	0.122	0.031	0.189
Cadmium	0.005	0.0004	0.0015	Not Applicable - Not a trigger parameter			0.000023	0.000014	0.000005	0.000006	< 0.000003	0.000011
Chromium	0.05	0.0011	0.013	Not Applicable - Not a trigger parameter			0.00047	0.000520	0.00010	0.00055	0.00040	0.00033
Fluoride	1.5	0.0970	0.448	0.358	0.350	0.358	<b>1.18</b>	<b>1.02</b>	<b>0.730</b>	<b>1.27</b>	0.240	<b>0.760</b>
Lead	0.01	0.0004	0.003	Not Applicable - Not a trigger parameter			< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Nitrate-N	10	0.051	2.54	Not Applicable - Not a trigger parameter			0.14	0.15	0.06	0.06	< 0.06	0.40
Nitrite-N	1	0.045	0.28	Not Applicable - Not a trigger parameter			< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Non-Health Related			x=0.50 <sup>(2)</sup>									
Alkalinity (High)	500	269	385	308	338	338	151	165	<b>345</b>	303	184	148
Hardness (High)	100	388	388 <sup>(4)</sup>	311	520	520	119	110	372	228	192	227
Chloride	250	2.22	126	101	6.43	101	7.0	5.0	4.0	4.0	< 1	< 1
Copper	1	0.0014	0.50	Not Applicable - Not a trigger parameter			0.0013	0.0017	0.0017	0.0014	0.0007	0.0023
DOC	5	2.09	3.55	Not Applicable - Not a trigger parameter			1.40	<b>4.60</b>	1.20	1.50	2.40	1.30
Manganese	0.05	0.007	0.029	0.023	0.149	0.149	0.00028	0.00017	<b>0.034</b>	0.0020	0.07860	0.002
Sodium	200	3.08	102	81	5.9	81	<b>101</b>	62.5	13.6	62.0	4.2	73.3
Sulphate	500	130	315	Not Applicable - Not a trigger parameter			200	89	33	70	18	290
TDS	500	457	478	383	602	602	477	317	434	414	217	<b>529</b>
Zinc	5	0.003	2.50	Not Applicable - Not a trigger parameter			0.0020	0.003	0.004	< 0.002	0.002	0.003

Notes:  
 (1) Average of ten valid sampling rounds at OW10-I and OW-10-II.  
 (2) Defined according to Guideline B-7 (MECP, 1994).  
 (3) ODWS - Ontario Drinking Water Standards (MECP, 2001).  
 (4) Background exceeds the ODWS, therefore the maximum concentration has been set at background.  
 (5) **BOLD and shaded** indicates an exceedance of the Maximum Concentration.  
 (6) **Underlined and shaded** indicates an exceedances of the Trigger Concentration.

Guideline B-7  
 Summer 2023 Monitoring Event Deep Aquifer

Reasonable Use Calculation (Guideline B-7)				Trigger Level Calculation			Downgradient Well Concentrations							
Parameter	ODWS <sup>(3)</sup> C, (mg/L)	Background Concentration C <sub>b</sub> (1) (mg/L)	Maximum Concentration C <sub>m</sub> =C <sub>b</sub> +x(C <sub>r</sub> -C <sub>b</sub> ) (mg/L)	80% of Reasonable Concentration (mg/L)	Max Background Concentration C <sub>mb</sub> (mg/L)	Trigger Concentration T <sub>c</sub> =Max(0.8*C <sub>m</sub> , C <sub>mb</sub> ) <sup>(6)</sup> (mg/L)	OW-25-I <sup>(5)</sup> (mg/L)	OW-16-I <sup>(5)</sup> (mg/L)	OW-24-I <sup>(5)</sup> (mg/L)	OW-17-I (mg/L)	OW-23-II (mg/L)	OW-30-I <sup>(5)</sup> (mg/L)	OW-30-II <sup>(5)</sup> (mg/L)	OW-31-II <sup>(5)</sup> (mg/L)
Health Related			x=0.25 <sup>(2)</sup>											
Arsenic	0.01	0.0007	0.003	Not Applicable - Not a trigger parameter			< 0.0002	0.0004	0.0005	0.0008	0.0005	0.0004	0.001	0.0006
Barium	1	0.023	0.268	Not Applicable - Not a trigger parameter			0.0384	0.0424	0.0375	0.0296	0.0294	0.0307	0.0392	0.0306
Boron	5	0.232	1.42	1.14	0.364	1.14	0.125	0.411	0.075	0.032	0.336	0.430	0.195	0.138
Cadmium	0.005	0.0002	0.0014	Not Applicable - Not a trigger parameter			< 0.000003	0.000009	< 0.000003	0.000004	0.000018	0.000027	0.000008	0.000009
Chromium	0.05	0.0010	0.013	Not Applicable - Not a trigger parameter			0.00024	0.00053	0.00029	0.00032	0.00059	0.00032	0.00035	0.00038
Fluoride	1.5	0.508	0.756	0.605	0.750	0.750	0.670	<b>1.55</b>	0.570	0.360	<b>1.32</b>	<b>1.54</b>	<b>1.22</b>	0.340
Lead	0.01	0.0003	0.003	Not Applicable - Not a trigger parameter			< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Nitrate-N	10	0.029	2.5	Not Applicable - Not a trigger parameter			< 0.06	< 0.06	< 0.06	< 0.06	0.10	< 0.06	< 0.06	< 0.06
Nitrite-N	1	0.022	0.27	Not Applicable - Not a trigger parameter			< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Non-Health Related			x=0.50 <sup>(2)</sup>											
Alkalinity (High)	500	204	352	281	237	281	231	<b>389</b>	234	240	217	206	118	263
Hardness (High)	100	201	201 <sup>(4)</sup>	161	227	227	168	86.7	<b>213</b>	<b>244</b>	131	135	105	151
Chloride	250	0.771	125	100	1.10	100	< 1	9	< 1	< 1	12	3	2	1
Copper	1	0.0012	0.50	Not Applicable - Not a trigger parameter			0.0006	0.0003	0.0004	0.0009	0.0013	0.0011	0.0018	0.001
DOC	5	1.25	3.12	Not Applicable - Not a trigger parameter			2.7	<b>9.8</b>	<b>9.6</b>	2.7	1.8	1.5	2.1	1.9
Manganese	0.05	0.028	0.039	0.031	0.111	0.111	0.0120	0.0188	<b>0.0662</b>	<b>0.0414</b>	0.0003	0.0034	0.0049	0.0020
Organic Nitrogen	0.15	0.102	0.126	0.101	0.350	0.350	<b>0.300</b>	<b>0.370</b>	< 0.05	0.120	<b>0.130</b>	< 0.05	<b>0.130</b>	0.100
Sodium	200	35	117	94	37	94	28	<b>100</b>	21.4	3.74	80.7	<b>95.8</b>	90.3	62
Sulphate	500	82.9	291	Not Applicable - Not a trigger parameter			< 2	< 2	32	18	82	210	200	83
TDS	500	305	402	322	340	340	232	<b>461</b>	309	266	<b>380</b>	<b>491</b>	<b>429</b>	<b>409</b>
Zinc	5	0.003	3	Not Applicable - Not a trigger parameter			< 0.002	< 0.002	< 0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002

Notes:  
 (1) Average of ten valid sampling rounds at OW-10-III.  
 (2) Defined according to Guideline B-7 (MECP, 1994).  
 (3) ODWS - Ontario Drinking Water Standards (MECP, 2001).  
 (4) Background exceeds the ODWS, therefore the maximum concentration has been set at background.  
 (5) Downgradient property boundary well (i.e., compliance point).  
 (6) **BOLD and shaded** indicates an exceedance of the Maximum Concentration.  
 (7) Underlined and shaded indicates an exceedance of the Trigger Concentration.

Guideline B-7  
 Fall 2023 Monitoring Event Shallow Aquifer

Reasonable Use Calculation (Guideline B-7)				Trigger Level Calculation			Downgradient Well Concentrations
Parameter	ODWS <sup>(2)</sup> C <sub>r</sub> (mg/L)	Background Concentration C <sub>b</sub> <sup>(1)</sup> (mg/L)	Maximum Concentration C <sub>m</sub> =C <sub>b</sub> +x(C <sub>r</sub> -C <sub>b</sub> ) (mg/L)	80% of Reasonable Concentration (mg/L)	Max Background Concentration Cmb (mg/L)	Trigger Concentration Tc=Max(0.8*C <sub>m</sub> , Cmb) <sup>(6)</sup> (mg/L)	OW-25-III (mg/L)
Health Related				x=0.25 <sup>(2)</sup>			
Arsenic	0.01	0.0009	0.003	Not Applicable - Not a trigger parameter			0.0014
Barium	1	0.025	0.268	Not Applicable - Not a trigger parameter			0.0804
Boron	5	0.079	1.31	1.05	0.350	1.05	0.037
Cadmium	0.005	0.0003	0.0015	Not Applicable - Not a trigger parameter			0.000045
Chromium	0.05	0.0010	0.013	Not Applicable - Not a trigger parameter			0.00535
Fluoride	1.5	0.0979	0.448	0.359	0.390	0.390	<b>0.950</b>
Lead	0.01	0.0004	0.003	Not Applicable - Not a trigger parameter			0.00261
Nitrate-N	10	0.049	2.54	Not Applicable - Not a trigger parameter			< 0.06
Nitrite-N	1	0.041	0.28	Not Applicable - Not a trigger parameter			< 0.03
Non-Health Related				x=0.50 <sup>(2)</sup>			
Alkalinity (High)	500	270	385	308	338	338	<b>347</b>
Hardness (High)	100	387	387 <sup>(4)</sup>	310	520	520	<b>631</b>
Chloride	250	2.19	126	101	6.43	101	< 1
Copper	1	0.0014	0.50	Not Applicable - Not a trigger parameter			0.0091
DOC	5	2.08	3.54	Not Applicable - Not a trigger parameter			2.00
Manganese	0.05	0.008	0.029	0.023	0.149	0.149	<b>0.238</b>
Sodium	200	3.11	102	81	5.9	81	18.5
Sulphate	500	127	314	Not Applicable - Not a trigger parameter			49
TDS	500	453	476	381	602	602	391
Zinc	5	0.003	2.50	Not Applicable - Not a trigger parameter			0.010000

Notes:

- (1) Average of ten valid sampling rounds at OW10-I and OW-10-II.
- (2) Defined according to Guideline B-7 (MECP, 1994).
- (3) ODWS - Ontario Drinking Water Standards (MECP, 2001).
- (4) Background exceeds the ODWS, therefore the maximum concentration has been set at background.
- (5) **BOLD and shaded** indicates an exceedance of the Maximum Concentration.
- (6) **Underlined and shaded** indicates an exceedance of the Trigger Concentration.

Guideline B-7  
 Fall 2023 Monitoring Event Moderate Depth Aquifer

Reasonable Use Calculation (Guideline B-7)				Trigger Level Calculation			Downgradient Well Concentrations					
Parameter	ODWS <sup>(3)</sup> C <sub>r</sub> (mg/L)	Background Concentration C <sub>b</sub> <sup>(1)</sup> (mg/L)	Maximum Concentration C <sub>m</sub> =C <sub>b</sub> +x(C <sub>r</sub> -C <sub>b</sub> ) (mg/L)	80% of Reasonable Concentration (mg/L)	Max Background Concentration C <sub>m</sub> (mg/L)	Trigger Concentration T <sub>c</sub> =Max(0.8*C <sub>m</sub> , C <sub>m</sub> ) <sup>(6)</sup> (mg/L)	OW-25-II (mg/L)	OW-16-II (mg/L)	OW-24-II (mg/L)	OW-17-II (mg/L)	OW-30-II (mg/L)	OW-31-I (mg/L)
Health Related				x=0.25 <sup>(2)</sup>								
Arsenic	0.01	0.0009	0.003	Not Applicable - Not a trigger parameter			0.0020	0.0010	0.0002	0.0010	0.0007	0.0003
Barium	1	0.025	0.268	Not Applicable - Not a trigger parameter			0.0231	0.0300	0.0529	0.0565	0.0252	0.0382
Boron	5	0.079	1.31	1.05	0.350	1.05	0.208	0.199	0.046	0.142	0.175	0.202
Cadmium	0.005	0.0003	0.0015	Not Applicable - Not a trigger parameter			0.000013	0.000007	0.000005	0.000027	0.000004	0.000007
Chromium	0.05	0.0010	0.013	Not Applicable - Not a trigger parameter			0.00024	0.000200	0.00019	0.00423	0.00025	0.00122
Fluoride	1.5	0.0979	0.448	0.359	0.390	0.390	<b><u>1.19</u></b>	<b><u>1.03</u></b>	<b><u>0.730</u></b>	<b><u>1.24</u></b>	<b><u>0.790</u></b>	<b><u>0.740</u></b>
Lead	0.01	0.0004	0.003	Not Applicable - Not a trigger parameter			< 0.00009	< 0.00009	0.00009	0.00179	< 0.00009	0.00028
Nitrate-N	10	0.049	2.54	Not Applicable - Not a trigger parameter			0.16	0.11	0.13	< 0.06	< 0.06	0.40
Nitrite-N	1	0.041	0.28	Not Applicable - Not a trigger parameter			< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Non-Health Related				x=0.50 <sup>(2)</sup>								
Alkalinity (High)	500	270	385	308	338	338	154	170	<b><u>358</u></b>	284	205	137
Hardness (High)	100	387	387 <sup>(4)</sup>	310	520	520	121	103	374	228	152	234
Chloride	250	2.19	126	101	6.43	101	7.0	5.0	3.0	4.0	1.0	< 1
Copper	1	0.0014	0.50	Not Applicable - Not a trigger parameter			0.0034	0.0043	0.0029	0.0049	0.0043	0.0050
DOC	5	2.08	3.54	Not Applicable - Not a trigger parameter			1.00	1.00	2.00	2.00	2.00	1.00
Manganese	0.05	0.008	0.029	0.023	0.149	0.149	0.00125	0.00037	<b><u>0.043</u></b>	0.0005	0.00222	0.005
Sodium	200	3.11	102	81	5.9	81	<b><u>112</u></b>	69.2	15.7	64.4	75.3	79.6
Sulphate	500	127	314	Not Applicable - Not a trigger parameter			180	81	34	66	96	280
TDS	500	453	476	381	602	602	420	306	380	397	400	<b><u>534</u></b>
Zinc	5	0.003	2.50	Not Applicable - Not a trigger parameter			0.0030	0.004	0.002	0.006	0.004	0.005

Notes:

- (1) Average of ten valid sampling rounds at OW10-I and OW-10-II.
- (2) Defined according to Guideline B-7 (MECP, 1994).
- (3) ODWS - Ontario Drinking Water Standards (MECP, 2001).
- (4) Background exceeds the ODWS, therefore the maximum concentration has been set at background.
- (5) **BOLD and shaded** indicates an exceedance of the Maximum Concentration.
- (6) **Underlined and shaded** indicates an exceedance of the Trigger Concentration.



Guideline B-7  
 Fall 2023 Monitoring Event Deep Aquifer

Reasonable Use Calculation (Guideline B-7)				Trigger Level Calculation			Downgradient Well Concentrations								
Parameter	ODWS <sup>(3)</sup> C <sub>r</sub> (mg/L)	Background Concentration C <sub>b(1)</sub> (mg/L)	Maximum Concentration C <sub>m</sub> =C <sub>b</sub> +x(C <sub>r</sub> -C <sub>b</sub> ) (mg/L)	80% of Reasonable Concentration (mg/L)	Max Background Concentration C <sub>mb</sub> (mg/L)	Trigger Concentration T <sub>c</sub> =Max(0.8*C <sub>m</sub> , C <sub>mb</sub> ) <sup>(6)</sup> (mg/L)	OW-25-I <sup>(5)</sup> (mg/L)	OW-25-IV <sup>(5)</sup> (mg/L)	OW-16-I <sup>(5)</sup> (mg/L)	OW-24-I <sup>(5)</sup> (mg/L)	OW-17-I (mg/L)	OW-23-II (mg/L)	OW-30-I <sup>(5)</sup> (mg/L)	OW-30-III <sup>(5)</sup> (mg/L)	OW-31-II <sup>(5)</sup> (mg/L)
Health Related			x=0.25 <sup>(2)</sup>												
Arsenic	0.01	0.0006	0.003	Not Applicable - Not a trigger parameter			< 0.0002	0.0002	0.0003	0.0003	0.0002	0.0005	0.0004	< 0.0002	0.0006
Barium	1	0.023	0.268	Not Applicable - Not a trigger parameter			0.0381	0.0138	0.0363	0.0303	0.0315	0.0279	0.0452	0.0521	0.0373
Boron	5	0.235	1.43	1.14	0.364	1.14	0.138	0.339	0.468	0.036	0.030	0.384	0.431	0.026	0.215
Cadmium	0.005	0.0001	0.0013	Not Applicable - Not a trigger parameter			< 0.000003	0.000013	0.000003	0.000009	< 0.000003	0.000018	0.000008	0.000003	0.000004
Chromium	0.05	0.0008	0.013	Not Applicable - Not a trigger parameter			0.00013	0.00009	0.00057	0.00211	0.00136	0.00031	0.00133	0.00012	0.00012
Fluoride	1.5	0.523	0.767	0.614	0.750	0.750	0.650	<b>1.84</b>	<b>1.56</b>	0.300	0.330	<b>1.28</b>	<b>1.26</b>	0.220	<b>1.19</b>
Lead	0.01	0.0002	0.003	Not Applicable - Not a trigger parameter			< 0.00009	< 0.00009	< 0.00009	0.00082	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Nitrate-N	10	0.029	2.5	Not Applicable - Not a trigger parameter			< 0.06	< 0.06	< 0.06	0.09	< 0.06	0.10	0.11	< 0.06	< 0.06
Nitrite-N	1	0.022	0.27	Not Applicable - Not a trigger parameter			< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Non-Health Related			x=0.50 <sup>(2)</sup>												
Alkalinity (High)	500	205	352	282	237	282	233	181	<u>325</u>	258	239	221	232	185	121
Hardness (High)	100	203	203 <sup>(4)</sup>	162	228	228	185	62.7	90.1	<b>252</b>	<b>276</b>	129	195	<b>211</b>	108
Chloride	250	0.767	125	100	1.10	100	< 1	9	9	< 1	< 1	12	3	< 1	3
Copper	1	0.0012	0.50	Not Applicable - Not a trigger parameter			0.0021	0.0016	0.0011	0.0042	0.0013	0.0016	0.0013	0.001	0.0028
DOC	5	1.21	3.10	Not Applicable - Not a trigger parameter			3.0	2.0	<b>7.0</b>	2.0	2.0	2.0	2.0	2.0	2.0
Manganese	0.05	0.029	0.039	0.031	0.111	0.111	0.0116	0.0095	0.0153	<b>0.0495</b>	0.0348	0.0046	0.0064	<b>0.0691</b>	0.0087
Organic Nitrogen	0.15	0.105	0.128	0.102	0.350	0.350	0.050	<b>0.200</b>	<b>0.600</b>	< 0.05	<b>0.200</b>	<b>0.380</b>	<b>0.190</b>	0.110	0.110
Sodium	200	35	118	94	39	94	33.0	76.3	<u>113</u>	8.7	4.4	88.5	<u>97.4</u>	4.8	<u>103</u>
Sulphate	500	83.0	291	Not Applicable - Not a trigger parameter			< 2	17	< 2	23	17	79	140	17	180
TDS	500	306	403	322	343	343	246	220	<u>393</u>	323	274	<u>349</u>	<b>477</b>	217	<b>429</b>
Zinc	5	0.002	3	Not Applicable - Not a trigger parameter			0.002	< 0.002	< 0.002	0.004	< 0.002	0.002	< 0.002	< 0.002	< 0.002

Notes:  
 (1) Average of ten valid sampling rounds at OW-10-III.  
 (2) Defined according to Guideline B-7 (MECP, 1994).  
 (3) ODWS - Ontario Drinking Water Standards (MECP, 2001).  
 (4) Background exceeds the ODWS, therefore the maximum concentration has been set at background.  
 (5) Downgradient property boundary well (i.e., compliance point).  
 (6) **BOLD and shaded** indicates an exceedance of the Maximum Concentration.  
 (7) Underlined and shaded indicates an exceedance of the Trigger Concentration.

# Appendix M

## Monitoring and Screening Checklist



## 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

<b>Waste Disposal Site Name</b>	New Liskeard Waste Disposal Site
<b>Location (e.g. street address, lot, concession)</b>	~3 km west of New Liskeard, Ontario, West ½ of Lot 5, Concession 2, within the City of Temiskaming Shores, in the District of Temiskaming
<b>GPS Location (taken within the property boundary at front gate/ front entry)</b>	596760 Easting and 5262520 Northing, Zone 17
<b>Municipality</b>	City of Temiskaming Shores
<b>Client and/or Site Owner</b>	City of Temiskaming Shores
<b>Monitoring Period (Year)</b>	2023
This Monitoring Report is being submitted under the following:	
<b>Certificate of Approval No.:</b>	A-500-1115044194
<b>Director's Order No.:</b>	
<b>Provincial Officer's Order No.:</b>	
<b>Other:</b>	C of A No. A571505 (revoked)

<b>Report Submission Frequency</b>	<input checked="" type="radio"/> <b>Annual</b> <input type="radio"/> <b>Other</b>	Specify (Type Here):
<b>The site is:</b>	<input checked="" type="radio"/> <b>Active</b> <input type="radio"/> <b>Inactive</b> <input type="radio"/> <b>Closed</b>	
<b>If closed, specify C of A, control or authorizing document closure date:</b>		
<b>Has the nature of the operations at the site changed during this monitoring period?</b>	<input checked="" type="radio"/> <b>Yes</b> <input type="radio"/> <b>No</b>	
<b>If yes, provide details:</b>	Construction of the landfill expansion continued through 2023, and the Site became fully operational as of 17 October 2023.	
<b>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)</b>	<input type="radio"/> Yes <input checked="" type="radio"/> No	

## Groundwater WDS Verification:

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

### Sampling and Monitoring Program Status:

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

Groundwater Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
OW-25-IV	Dry during the spring and summer monitoring event.	Spring/Summer 2023
OW-17-III	Dry during the summer and fall monitoring event.	Summer/Fall 2023
OW-23-I; OW-24-III	Noted as damaged during spring 2023; not sampled during all three	Spring/Summ/Fall 2023
OW-16-III	Noted as damaged since spring 2022; not sampled during all three monitoring events.	Spring/Summ/Fall 2023

<b>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.</b>	<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Not Applicable	
<b>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:</b>	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Not Applicable	If no, list exceptions below or attach additional information.
<b>Groundwater Sampling Location</b>	<b>Description/Explanation for change (change in name or location, additions, deletions)</b>	<b>Date</b>
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
<b>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):</b>	<input checked="" type="radio"/> Yes <input type="radio"/> No	If no, specify (Type Here):

## Sampling and Monitoring Program Results/WDS Conditions and Assessment:

<p>5) The site has an adequate buffer, Contaminant Attenuation Zone (CAZ) and/or contingency plan in place. Design and operational measures, including the size and configuration of any CAZ, are adequate to prevent potential human health impacts and impairment of the environment.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>If no, the potential design and operational concerns/ exceptions are as follows (Type Here):</p>	
<p>6) The site meets compliance and assessment criteria.</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>	<p>Exceedances of Guideline B-7 were quantified in downgradient monitoring wells, see Section 5.1 of the report for more details</p>	
<p>7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>If no, list exceptions and explain reason for increase/change (Type Here):</p>	
<p>1) Is one or more of the following risk reduction practices in place at the site:</p> <p>(a) There is minimal reliance on natural attenuation of leachate due to the presence of an effective waste liner and active leachate collection/treatment; or</p> <p>(b) There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or</p> <p>(c) The site meets the following two conditions (typically achieved after 15 years or longer of site operation):</p> <p><i>i.</i> The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and</p> <p><i>ii.</i> Seasonal and annual water levels and water quality fluctuations are well understood.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>Note which practice(s):</p>	<p><input type="checkbox"/> (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/> (c)</p>
<p>9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Applicable</p>	<p>Exceedances of the trigger criteria were quantified in downgradient monitoring wells, see Section 5.1 of the report for more details</p>	

## Groundwater CEP Declaration:

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

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

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

## Recommendations:

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

No changes to the monitoring program are recommended



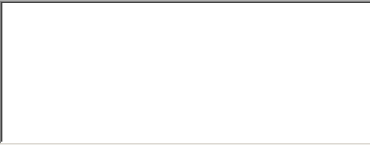
The following change(s) to the monitoring program is/are recommended:

No Changes to site design and operation are recommended

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

Type Here



<b>Name:</b>	Larry Rodricks		
<b>Seal:</b>	Add Image		
<b>Signature:</b>		<b>Date:</b>	March 15, 2024
<b>CEP Contact Information:</b>	Larry Rodricks, P.Eng.		
<b>Company:</b>	WSP Canada Inc.		
<b>Address:</b>	900 Maple Grove Road, Unit 10 Cambridge, Ontario N3H 4R7		
<b>Telephone No.:</b>	(519) 650-7108	<b>Fax No. :</b>	
<b>E-mail Address:</b>	larry.rodricks@wsp.com		
<b>Co-signers for additional expertise provided:</b>			
<b>Signature:</b>		<b>Date:</b>	Select Date
<b>Signature:</b>		<b>Date:</b>	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):

<b>Name (s)</b>	South Wabi Creek Unnamed Tributary to the Wabi River Wabi River
<b>Distance(s)</b>	~1 km west of Site Headwaters near northeast corner of CAZ ~1.5 km northeast of Site

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

### Sampling and Monitoring Program Status:

<b>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:</b>	<input checked="" type="radio"/> Yes  <input type="radio"/> No	If no, identify issues (Type Here):
<b>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):</b>	<input type="radio"/> Yes <input checked="" type="radio"/> No  <input type="radio"/> Not applicable (No C of A, authorizing / control document applies)	If no, specify below or provide details in an attachment.

Surface Water Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
SW-3	Dry during the spring monitoring event	Spring 2023
		Select Date

<p>3) a) Some or all surface water sampling and monitoring program requirements for the monitoring period have been established outside of a ministry C of A or authorizing/control document.</p>	<p><input type="radio"/> Yes</p> <p><input checked="" type="radio"/> No</p> <p><input type="radio"/> Not Applicable</p>	
<p>b) If yes, all surface water sampling and monitoring identified under 3 (a) was successfully completed in accordance with the established program from the site, including sampling protocols, frequencies, locations and parameters) as developed per the Technical Guidance Document:</p>	<p><input type="radio"/> Yes</p> <p><input checked="" type="radio"/> No</p> <p><input type="radio"/> Not Applicable</p>	<p>If no, specify below or provide details in an attachment.</p>
<p><b>Surface Water Sampling Location</b></p>	<p><b>Description/Explanation for change (change in name or location, additions, deletions)</b></p>	<p><b>Date</b></p>
<p>SW3</p>	<p>Dry during the spring monitoring event.</p>	<p>Spring 2023</p>
<p>Type Here</p>	<p>Type Here</p>	<p>Select Date</p>
<p>Type Here</p>	<p>Type Here</p>	<p>Select Date</p>
<p>Type Here</p>	<p>Type Here</p>	<p>Select Date</p>
<p>4) All field work for surface water investigations was done in accordance with standard operating procedures, including internal/external QA/QC requirements, as established/ outlined as per the Technical Guidance Document, MOE 2010, or as amended. (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):</p>	<p><input checked="" type="radio"/> Yes</p> <p><input type="radio"/> No</p>	<p>If no, specify (Type Here):</p>

## Sampling and Monitoring Program Results/WDS Conditions and Assessment:

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

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
Phenols, Iron	PWQO, CWQG	See Section 4.5 and 5.2 of the Report for details.
Total Phosphorus	PWQO	
Chloride	APV, CWQG	
Copper	PWQO, APV	
6) In my opinion, any exceedances listed in Question 5 are the result of non-WDS related influences (such as background, road salting, sampling site conditions)?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Background conditions

<p>7) <b>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.</b></p>	<p><input checked="" type="radio"/> <b>Yes</b></p> <p><input type="radio"/> <b>No</b></p>	<p>If no, list parameters and stations that is outside the expected range. Identify whether parameter concentrations show an increasing trend or are within a high historical range (Type Here)</p>
<p>8) <b>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)):</b></p>	<p><input type="radio"/> Yes</p> <p><input checked="" type="radio"/> <b>No</b></p> <p><input type="radio"/> Not Known</p> <p><input type="radio"/> Not Applicable</p>	<p>No remedial measures necessary.</p>
<p>9) <b>Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):</b></p>	<p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p><input checked="" type="radio"/> <b>Not Applicable</b></p>	<p>If yes, list value(s) that are/have been exceeded and follow-up action taken (Type Here)</p>

## Surface Water CEP Declaration:

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


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

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

## Recommendations:

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

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

<b>CEP Signature</b>		
<b>Relevant Discipline</b>		
<b>Date:</b>	March 15, 2024	
<b>CEP Contact Information:</b>	Larry Rodricks	
<b>Company:</b>	WSP Canada Inc.	
<b>Address:</b>	900 Maple Grove Road, Unit 10 Cambridge, Ontario N3H 4R7	
<b>Telephone No.:</b>	(519) 650-7108	
<b>Fax No. :</b>		
<b>E-mail Address:</b>	larry.rodricks@wsp.com	
<b>Save As</b>		<b>Print Form</b>

# Appendix N

## Limitations





## Limitations

1. The work performed in the preparation of this report and the conclusions presented are subject to the following:
  - a. The Standard Terms and Conditions which form a part of our Professional Services Contract;
  - b. The Scope of Services;
  - c. Time and Budgetary limitations as described in our Contract; and
  - d. The Limitations stated herein.
2. No other warranties or representations, either expressed or implied, are made as to the professional services provided under the terms of our Contract, or the conclusions presented.
3. The conclusions presented in this report were based, in part, on visual observations of the Site and attendant structures. Our conclusions cannot and are not extended to include those portions of the Site or structures, which are not reasonably available, in WSP's opinion, for direct observation.
4. The environmental conditions at the Site were assessed, within the limitations set out above, having due regard for applicable environmental regulations as of the date of the inspection. A review of compliance by past owners or occupants of the Site with any applicable local, provincial or federal bylaws, orders-in-council, legislative enactments and regulations was not performed.
5. The Site history research included obtaining information from third parties and employees or agents of the owner. No attempt has been made to verify the accuracy of any information provided, unless specifically noted in our report.
6. Where testing was performed, it was carried out in accordance with the terms of our contract providing for testing. Other substances, or different quantities of substances testing for, may be present on-site and may be revealed by different or other testing not provided for in our contract.
7. Because of the limitations referred to above, different environmental conditions from those stated in our report may exist. Should such different conditions be encountered, WSP must be notified in order that it may determine if modifications to the conclusions in the report are necessary.
8. The utilization of WSP's services during the implementation of any remedial measures will allow WSP to observe compliance with the conclusions and recommendations contained in the report. WSP's involvement will also allow for changes to be made as necessary to suit field conditions as they are encountered.
9. This report is for the sole use of the party to whom it is addressed unless expressly stated otherwise in the report or contract. Any use which any third party makes of the report, in whole or the part, or any reliance thereon or decisions made based on any information or conclusions in the report is the sole responsibility of such third party. WSP accepts no responsibility whatsoever for damages or loss of any nature or kind suffered by any such third party as a result of actions taken or not taken or decisions made in reliance on the report or anything set out therein.
10. This report is not to be given over to any third party for any purpose whatsoever without the written permission of WSP.
11. Provided that the report is still reliable, and less than 12 months old, WSP will issue a third-party reliance letter to parties that the client identifies in writing, upon payment of the then current fee for such letters. All third parties relying on WSP's report, by such reliance agree to be bound by our proposal and WSP's standard reliance letter. WSP's standard reliance letter indicates that in no event shall WSP be liable for any damages, howsoever arising, relating to third-party reliance on WSP's report. No reliance by any party is permitted without such agreement.