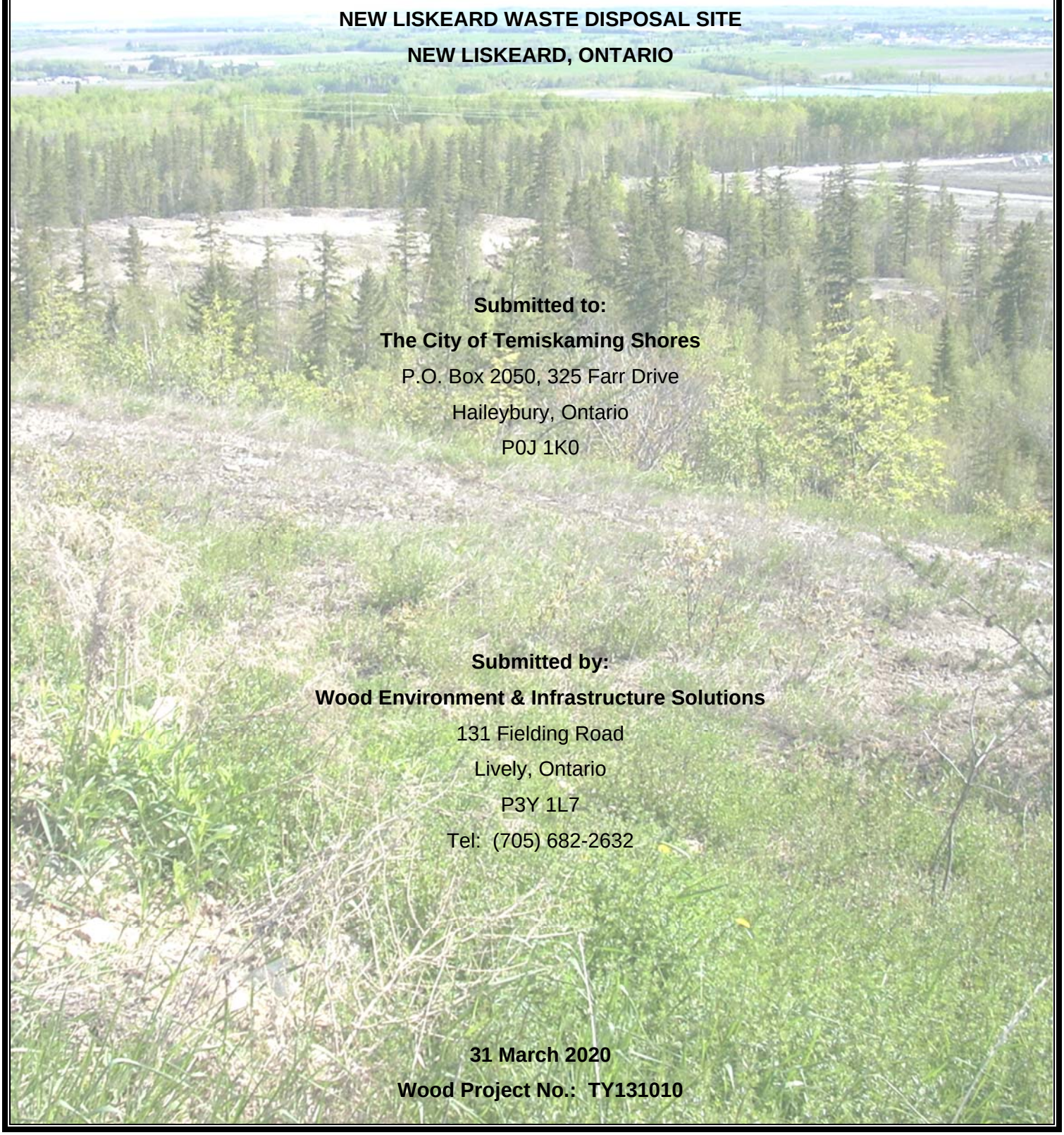
2019 ANNUAL GROUNDWATER AND SURFACE WATER MONITORING REPORT
NEW LISKEARD WASTE DISPOSAL SITE
NEW LISKEARD, ONTARIO



Submitted to:

The City of Temiskaming Shores

P.O. Box 2050, 325 Farr Drive

Haileybury, Ontario

P0J 1K0

Submitted by:

Wood Environment & Infrastructure Solutions

131 Fielding Road

Lively, Ontario

P3Y 1L7

Tel: (705) 682-2632

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Wood Project No.: TY131010

TABLE OF CONTENTS

SECTION **PAGE**

1.0 INTRODUCTION 1
1.1 Site Location 1
1.2 Ownership and Key Personnel 1
1.3 Description and Development of the Site 2
1.4 Monitoring and Reporting Program Objectives and Requirements 2
1.5 Assumptions and Limitations 3
2.0 PHYSICAL SETTING 4
2.1 Geology and Hydrogeology 4
2.2 Surface Water Features 6
3.0 DESCRIPTION OF MONITORING PROGRAM 6
3.1 Monitoring Locations 6
3.2 Monitoring Frequency 10
3.3 Field and Laboratory Parameters and Analysis 11
3.4 Monitoring Procedures and Methods 11
3.5 Quality Assurance for Sampling and Analysis 11
4.0 MONITORING RESULTS 12
4.1 Historical Data 12
4.2 Data Quality Evaluation 12
4.3 Groundwater Flow Monitoring 13
4.4 Groundwater Quality Monitoring 13
4.4.1 Background Water Quality 14
4.4.2 Upgradient Water Quality 14
4.4.3 Source Strength Water Quality 14
4.4.4 Mid-Site Downgradient Water Quality 15
4.4.5 Downgradient CAZ Boundary Water Quality 15
4.4.6 Downgradient Sentinel Water Quality 17
4.4.7 Field Parameter Measurements 17
4.4.8 Residential Supply Well Monitoring 17
4.5 Surface Water Quality Monitoring 18
4.6 Landfill Gas Monitoring 19
5.0 ASSESSMENT, INTERPRETATION AND DISCUSSION 19
5.1 Groundwater Quality 19
5.1.1 Groundwater Chemistry Analysis 19
5.1.2 Groundwater Trend Analysis 21
5.1.3 Guideline B-7 Calculations 22
5.2 Surface Water Quality 24
5.2.1 Surface Water Trend Analysis 24
5.3 Adequacy of the Monitoring Program 25
6.0 CONCLUSIONS 25
7.0 RECOMMENDATIONS 26
8.0 CLOSURE 26

TABLES

Table 1: Monitoring Well Locations On-Site 6
Table 2: Residential Supply Well Locations 7
Table 3: Surface Water Monitoring Locations 7
Table 4: Sampled Groundwater Monitoring Well Construction Details 8
Table 5: Surface Water Monitoring Stations Summary 10
Table 6: 2019 Landfill Gas Measurements 19

FIGURES

Figure 1 Site Location Map
Figure 2 Groundwater Monitoring Location Plan
Figure 3 Surface Water Monitoring Location Plan
Figure 4 Hydrogeological Cross Section
Figure 5A Inferred Shallow Groundwater Contour Plan - May 2019
Figure 5B Inferred Deep Groundwater Contour Plan - May 2019
Figure 5C Inferred Shallow Groundwater Contour Plan - July 2019
Figure 5D Inferred Deep Groundwater Contour Plan - July 2019
Figure 5E Inferred Shallow Groundwater Contour Plan - September 2019
Figure 5F Inferred Deep Groundwater Contour Plan - September 2019
Figure 6A Groundwater Tri-Linear Piper Plot - May 2019
Figure 6B Groundwater Tri-Linear Piper Plot - July 2019
Figure 6C Groundwater Tri-Linear Piper Plot - September 2019
Figure 6D Residential Groundwater Tri-Linear Piper Plot - May 2019

APPENDICES

Appendix A Certificate of Approval No. A571505
Appendix B Borehole Logs
Appendix C Hydraulic Conductivities
Appendix D Groundwater Elevations
Appendix E 2019 Laboratory Analytical Reports
Appendix F Summary of Groundwater Geochemical Analyses
Appendix G Summary of Surface Water Geochemical Analyses
Appendix H Trend Analysis
Appendix I Photographic Inventory of Monitoring Locations
Appendix J Field Parameter Measurements
Appendix K Piper Plot Tables
Appendix L Reasonable Use Calculations (Guideline B-7)
Appendix M Monitoring and Screening Checklist

1.0 INTRODUCTION

Wood Environment & Infrastructure Solutions (Wood) was retained by The City of Temiskaming Shores (the City) to prepare the 2019 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 2019 monitoring data and was completed to constitute the 2019 Annual Monitoring Report to be submitted to the Ministry of the Environment, Conservation and Parks (MECP) in accordance with Condition 26 of Certificate of Approval (C of A) No. A571505, 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.

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; a Site plan, including all groundwater monitoring locations, is presented on Figure 2.

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:

Steve Burnett
The City of Temiskaming Shores
P.O. Box 2050, 325 Farr Drive
Haileybury, Ontario P0J 1K0
Phone: (705) 672-3363 ext. 4132
Fax: (705) 672-2911
Email: sburnett@temiskamingshores.ca

Groundwater and Surface Water CEP:

Brian Grant
Wood Environment & Infrastructure Solutions
131 Fielding Road
Lively, Ontario P3E 1L7
Phone: (705) 682-2632 ext.235
Fax: (705) 682-2260
Email: brian.grant@woodplc.com

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 is approved to accept domestic, commercial and non-hazardous solid industrial waste. The C of A specifies 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 landfill area is illustrated on Figure 2.

The 2012 amendment to the C of A approves 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.

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). 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 2.

An annual surface water monitoring program was initiated in 2017, but is not a current requirement of the C of A. Surface water monitoring is now 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 undertaken eight times per year; each sampling event is a minimum of 30 days apart, with mandatory sampling events conducted during spring freshet and summer low flow periods. Surface water sampling locations are presented on Figure 3.

Although landfill gas monitoring is not currently required at the Site, Wood 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.

1.5 Assumptions and Limitations

Wood's limitation of liability and scope of work is as follows:

1. The work performed in this report was carried out in accordance with the Terms and Conditions made part of our contract. The conclusions presented herein are based solely upon the scope of services and time and budgetary limitations described in our contract.
2. The report has been prepared in accordance with generally accepted environmental study and/or engineering practices. No other warranties, either expressed or implied, are made as to the professional services provided under the terms of our contract and included in this report.
3. The services performed and outlined in this report were based, in part, upon a previously installed monitoring network, established by others and approved by the applicable regulatory agencies. Our opinion cannot be extended to portions of the Site which were unavailable for direct observations, reasonably beyond the control of Wood.
4. The objective of this report was to assess the water quality conditions at the Site, given the context of our contract, with respect to existing environmental regulations within the applicable jurisdiction.
5. The Site history interpreted herein relies on information supplied by others, such as local, provincial and federal agencies, as well as Site personnel. No attempt has been made to independently verify the accuracy of such information, unless specifically noted in our report.

6. Our interpretations relating to the landfill-derived leachate plume at the Site are described in this report. Where testing was performed, it was executed in accordance with our contract for these services. It should be noted that other compounds or materials not tested for may be present in the Site environment.
7. The conclusions of this report are based, in part, on the information provided by others. The possibility remains that unexpected environmental conditions may be encountered at the Site in locations not specifically investigated. Should such an event occur, Wood must be notified in order that we may determine if modifications to our conclusions are necessary.
8. The utilization of Wood's services during future monitoring at the Site will allow Wood to observe compliance with the conclusions and recommendations contained herein. It will also provide for changes as necessary to suit field conditions as they are encountered.
9. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Wood accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

2.0 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 X 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 X 10^{-7} m/s, increasing up to 4.0 X 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 X 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 X 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 X 10^{-8} m/s.

In general, the limestone bedrock has a hydraulic conductivity on the order of 7 X 10^{-8} m/s, with a higher value in the upper weathered reaches of the bedrock, on the order of 1.5 X 10^{-7} m/s. The overburden and bedrock test location exhibited a hydraulic conductivity of 8.9 X 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 Wood at each of the wells during the spring, summer and fall 2019 groundwater monitoring events. Appendix D presents the groundwater elevations measured during the 2019 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 2019 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.

Through the fill area and the CAZ for the Site, the hydraulic gradient of the groundwater in the shallow aquifer is approximately 0.045 m/m to 0.050 m/m (based on September and July 2017 data). 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 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 (8.9×10^{-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 (1.5×10^{-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.

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.

3.0 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 Wood field crew	26-27 May 2013
OW-10 Nest	596724	5263229				
OW11 Nest	597001	5263159				
OW-12 Nest	597007	5262919				
OW13 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				

Monitoring Location	Easting Zone 16 NAD 83	Northing Zone 16 NAD 83	Collection Method	Accuracy	Collection Personnel	Date Collected
OW-21-I	597141	526527				
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 Wood 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 Wood 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
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

Well ID	Condition	Total Depth (mbgs)	Screened Interval (mbgs)	Unit Screened	On-Site Position
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 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. 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. 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 sampling stations are indicated on Figure 3.

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

3.2 Monitoring Frequency

As per previous annual monitoring events, groundwater was sampled three times annually by Wood, during the spring, summer and fall. Landfill gas monitoring was conducted concurrently with groundwater sampling. Sampling events occurred on the following dates:

- Spring – 26-27 May 2019;
- Summer – 24-25 July 2019; and,
- Fall – 25 September 2019.

As indicated previously, surface water sampling was undertaken on eight occasions during 2019, on the following dates:

- 25 April 2019;
- 26 May 2019;
- 26 June 2019;
- 24 July 2019;
- 25 August 2019;
- 24 September 2019;
- 23 October 2019; and,
- 22 November 2019.

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 spring freshet and summer low flow events, and Column 4 of Schedule 5 during the remaining six sampling events. A detailed list of laboratory parameters is included in Appendix E. Field parameters comprised temperature, pH, conductivity and dissolved solids. Static water level measurements were also recorded. Flows and dissolved oxygen levels were recorded when possible during surface water monitoring. All field equipment was maintained and calibrated appropriately prior to each use.

3.4 Monitoring Procedures and Methods

Monitoring and sample collection followed typical industry standard practices. 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) and the above-noted SOP. 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, AGAT Laboratories (AGAT), in Mississauga for analysis. The analytical results were subsequently forwarded to Wood. Laboratory analytical reports for 2019 are provided in Appendix E.

The 2019 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 2019 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*.

3.5 Quality Assurance for Sampling and Analysis

Wood 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. 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.

4.0 MONITORING RESULTS

4.1 Historical Data

Historical groundwater data are provided in Appendix F. Water quality data dating back to 2010 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 recently installed monitoring wells. Similarly, only two years of historical data are available for the surface water monitoring stations; surface water data dating back to 2017 are provided in Appendix G.

4.2 Data Quality Evaluation

The analytical laboratory employed to perform the laboratory analyses (AGAT) 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 AGAT 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 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 duplicate samples were collected during each sampling event. All groundwater duplicate data are provided in Appendix E and are summarized in Appendices F and G. Groundwater duplicate samples were collected from OW-10-I, OW-16-I, OW-25-IV and WS-16 during the spring monitoring event, from OW-30-I, OW-24-II and OW-25-II during the summer monitoring event and from OW-24-III, OW-24-II and OW-23-I during the fall monitoring event. Surface water duplicate samples were collected from SW-4 during the 22 November event, from SW-5 during the 26 June and 24 September events, and from SW-1 during all remaining events.

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 sulphate, aluminum, barium, silicon, organic nitrogen, total Kjeldahl nitrogen (TKN), ammonia and aluminum in groundwater, and total suspended solids in surface water. A breakdown of parameters by event and duplicate 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.

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 2019 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 all monitoring wells from 2000 to 2019, presented in Appendix H. The available groundwater elevation data indicate relatively stable elevations over time at all monitoring locations.

4.4 Groundwater Quality Monitoring

Samples were collected from all applicable wells during all three 2019 monitoring events, with the exception of OW-17-III, which was dry during both the summer and fall events. A photographic inventory of the monitoring wells is provided in Appendix I. The condition of each monitoring well was confirmed during each 2019 monitoring event, with no noticeable requirement for maintenance or repair at the time of the fall 2019 event, with the exception of OW-11-I, which was noted as having heaved historically, but is still in operable condition. Damage to three monitoring wells (OW-16-III, OW-24-I and OW-24-III) was noted during the spring monitoring event; repairs to the monitoring well risers and casings were coordinated by the City and completed prior to the fall monitoring event.

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 will be used going forward 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 and boron, are higher in OW-10-I, as compared to OW-10-II. Water quality in OW-10-III is generally similar, with exceptions including slightly elevated concentrations of sodium and fluoride, and lower concentrations of sulphate, 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.

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 all quantified at levels exceeding the ODWS at well nest OW-10 during 2019. 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.

4.4.2 Upgradient Water Quality

The 2019 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 similar to background, with the exceptions of alkalinity and hardness, which are slightly elevated as compared to background water quality. No substantial impact to groundwater quality is apparent at this location.

4.4.3 Source Strength 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. No detectable concentrations of fluoride were quantified at this well nest during 2019; therefore, any elevated concentrations of fluoride quantified at downgradient locations are interpreted to be associated with background water quality conditions and not landfill-derived.

4.4.4 Mid-Site Downgradient 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, iron and manganese in comparison to background water quality. Groundwater quality in both moderate depth wells is characterized by elevated concentrations of chloride, organic nitrogen and boron, concentrations of alkalinity, hardness, DOC, TDS, calcium and magnesium 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.

4.4.5 Downgradient 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 2019 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, and low concentrations of sulphate, 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, sodium, and low concentrations of alkalinity, hardness and calcium, when compared to background water quality. Groundwater in OW-30-III, a deeper bedrock installation, is characterized by elevated concentrations of DOC, iron and manganese, and low concentrations of sulphate, boron and sodium, as compared to background.

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 in OW-31-I is characterized by slightly elevated concentrations of sulphate, TDS, barium and sodium, and low concentrations of alkalinity, hardness and calcium, as compared to background water quality. Some elevated concentrations of metals parameters were quantified at OW-31-I during the spring 2019 monitoring event, but appear to be anomalous. Water quality in OW-31-II is characterized by slightly elevated concentrations of chloride, DOC, sulphate, TDS, barium and sodium, and low concentrations of alkalinity, hardness and calcium, when compared to background water quality at a similar depth.

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 background, with the exceptions of slightly elevated concentrations of DOC and organic nitrogen, and lower levels of sulphate and boron. Groundwater quality in moderate depth well OW-25-II is characterized by slightly elevated concentrations of chloride and sodium, and concentrations of hardness, calcium and magnesium at levels lower than background. Water quality in shallow well OW-25-III is characterized by elevated concentrations of sodium, however all remaining parameters were quantified at levels similar to background groundwater quality. Various metals parameters were quantified at elevated concentrations during the spring 2019 monitoring event at this location, but appear to be anomalous. Recently installed deep bedrock monitoring well OW-25-IV has quantified water quality to date characterized by elevated concentrations of chloride, DOC, fluoride and sodium, and low concentrations of sulphate, hardness and calcium, but is generally similar to water quality conditions reported in OW-10-III. Parameters including hardness, calcium, potassium, magnesium and sodium were quantified at atypical levels during the fall 2019 monitoring event; these concentrations are interpreted to be anomalous and are potentially the result of a field or laboratory bias.

Groundwater quality also differs with depth in the OW-16 well nest. Deep well OW-16-I indicates water quality characterized by elevated concentrations of alkalinity, chloride, DOC, fluoride, organic nitrogen, TDS, boron and sodium, and low concentrations of sulphate, hardness and calcium, when compared to background water quality. Groundwater quality in OW-16-II is characterized by low concentrations of alkalinity, hardness, TDS and calcium, and elevated concentrations of sodium, relative to background. Elevated concentrations of organic nitrogen, barium, iron and manganese characterize water quality in shallow well OW-16-III, as well as low concentrations of 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 low concentrations of sulphate and boron, and high concentrations of manganese, as compared to background; concentrations of remaining parameters are generally similar to those reported in

well nest OW-10. Chloride and sodium are slightly elevated in both OW-24-II and OW-24-III in comparison to background concentrations. TDS and calcium concentrations reported in OW-24-II and OW-24-III are lower than background.

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. Water quality is relatively consistent in all three wells, however concentrations of some indicator parameters, particularly sodium, are slightly higher in OW-17-II, as compared to the shallow and deep wells (OW-17-III and OW-17-I, respectively).

4.4.6 Downgradient Sentinel Water Quality

The 2019 groundwater quality in sentinel well nest OW-23 is characterized by low concentrations of hardness and calcium, and slightly elevated concentrations of fluoride, boron and sodium, in compared to background water quality. Sulphate concentrations are lower than background in OW-23-I, while chloride concentrations are slightly elevated above background in OW-23-II. 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 de-icing.

4.4.7 Field Parameter Measurements

Field parameters were measured at all monitoring wells at the time of sampling, and are presented in Appendix J.

4.4.8 Residential Supply Well Monitoring

Samples were collected from all seven residential supply wells during the spring 2019 monitoring event. The results of the 2019 monitoring event are summarized and compared to the ODWS, with any exceedances identified by bold entries (Appendix F).

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 slightly elevated at WS-7, WS-8, WS-9 and WS-15, but is not interpreted to be landfill-related give 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, and for low hardness at WS-9 and WS-16. Organic nitrogen, iron and manganese have also exceeded the ODWS at various residential monitoring locations throughout the historical monitoring record. Fewer ODWS exceedances have been reported at all locations during recent monitoring events, as compared to historical results.

Hardness exceeded the ODWS at the background monitoring well nest OW-10, and at 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, with the exception of WS-16, which reported unusually low concentrations of parameters such as hardness and iron. 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. Wood is unaware at this time of any changes made to the treatment system prior to the 2019 sampling event, but confirmation is recommended prior to the next regularly scheduled sampling event in 2020.

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, and during 2015 or 2016, but 2017 through 2019 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 2019 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.

4.5 Surface Water Quality Monitoring

As a result of either frozen or dry conditions, samples could not be obtained at some surface water monitoring stations on various occasions during the eight monitoring events conducted during 2019. A photographic inventory of the monitoring stations is provided in Appendix I.

The 2019 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. Concentrations of indictor 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 2019 data indicate stable results at all locations. Two potentially anomalous concentrations were noted, for chromium at SW-3 during the 26 June event and for copper at SW-4 during the 23 October event, but are not interpreted to be representative of an impact to water quality. 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. Additional data are required in order to confirm this interpretation. Station- and event-specific exceedances of the PWQO, APV and CWQG are provided in Appendix G.

4.5.1 Field Parameter Measurements

Field parameter and flow measurements were undertaken at all monitoring stations at the time of sampling, and are presented in Appendix J.

4.6 Landfill Gas Monitoring

Landfill gas monitoring was undertaken during the spring, 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.

Table 6: 2019 Landfill Gas Measurements

Date	Methane (%CH_4)	Carbon Dioxide (%CO_2)	Oxygen (%O_2)	Balance Gases (%)
26 May 2019	61.7	38.0	0.1	0.2
24 July 2019	64.9	33.4	0.0	1.1
25 September 2019	63.7	35.7	0.4	0.2

5.0 ASSESSMENT, INTERPRETATION AND DISCUSSION

5.1 Groundwater Quality

5.1.1 Groundwater Chemistry Analysis

The groundwater major ion chemistry analysis for the 2019 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 2019 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 recently installed deep bedrock background well indicates a water type dissimilar to that of the two shallower background installations and actually indicates a water type more like source than shallow and moderate depth background. 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, OW-24-III and OW-17-III demonstrate a strong shift away from source water quality, indicating no landfill-derived impact and a substantial improvement in groundwater quality as compared to source wells. 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 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 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 in the OW-24 and OW-17 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, OW-16-I, OW-30-I and OW-30-III, 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 both the shallow and moderate depth background wells and the source wells illustrates not only a lack of landfill-derived impact at these downgradient wells, but confirms that these residential supply wells are similar in water type to that of the unimpacted deep bedrock aquifer. This is particularly evident based on the placement of WS-15 on the Piper Plot, which plots nearest OW-10-III. As discussed previously, WS-9 indicates a water type dissimilar to that of background, source and the surrounding residential supply wells. This is potentially the result of a treatment system that has either been installed or is no longer bypassed during sampling. The same is true for WS-16 during the 2019 monitoring event.

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 2019. 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. This is not surprising, given their source location immediately downgradient of the fill area.

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.

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.

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 2019. 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 stable at all locations from 2002 to 2019. 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. Chloride is stable at all locations; 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 2007 through 2009, at WS-9 during 2014, 2017 and 2018, 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, however additional data are required, as only a partial monitoring record is available for this well. 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 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, but a low zinc concentration, at a level similar to historical results, was quantified at this location during 2019.

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-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 2019 monitoring results that have been developed using all 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 2019 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 TDS during all 2019 monitoring events in the shallow aquifer.

Comparing concentrations observed in the downgradient groundwater monitoring wells during the 2019 sampling events to the maximum allowable concentration at the contaminant attenuation zone boundary (Appendix L), one health related and three non-health related parameter exceedances are noted. Arsenic, a health related parameter, was quantified at a concentration exceeding the Guideline B-7 maximum allowable concentration in the shallow aquifer in OW-25-III during the spring 2019 monitoring event, and is interpreted to be anomalous, as compared to the remainder of the historical monitoring record for this well. Sodium was detected at concentrations exceeding the maximum allowable concentration in the moderate depth aquifer in OW-25-II; no sodium exceedances were quantified in the shallow or deep aquifers. TDS and DOC both quantified Guideline B-7 exceedances in all three aquifers during 2019.

Exceedances of the Guideline B-7 maximum allowable concentrations have been recorded during the present monitoring review in all downgradient CAZ boundary in well nests, as well as in sentinel well nest OW-23. No Guideline B-7 exceedances were quantified in well nest OW-17 during 2019. 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 Wood's opinion that the 2019 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. Additionally,

the majority of the exceedances quantified were for DOC. There is a notable reduction in the number of Guideline B-7 exceedances with distance downgradient; one parameter exceedances was quantified in well nest OW-24, while no exceedances were quantified in nearby well nests OW-17.

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.

In addition, it should be noted that no representative health-related parameter exceedances were quantified during the present assessment; the arsenic concentration quantified in OW-25-III is interpreted to be anomalous, as various metals parameters were quantified at atypically elevated levels during that monitoring event. Confirmation of these results through additional, regularly scheduled sampling in 2020 is recommended.

5.2 Surface Water Quality

5.2.1 Surface Water Trend Analysis

The 2019 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 2019 sampling periods. These time-concentration graphs are presented in Appendix H.

The 2017-2019 surface water data indicate no apparent seasonal trends. Concentrations of the select parameters are stable throughout the monitoring period at all stations, with the exception of anomalous chloride, conductivity 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. 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.

Additional data are required before a more detailed interpretation of the present monitoring data trends can be offered.

5.3 Adequacy of the Monitoring Program

It is Wood'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. The Monitoring and Screening Checklist is provided in Appendix M.

6.0 CONCLUSIONS

Based on the results of the current (2019) monitoring program, the following conclusions have been made:

1. 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.
2. 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.
3. Based on a review of the 2019 residential supply well geochemical data, a landfill-derived impact to groundwater quality at these downgradient locations is not interpreted.
4. Surface water quality results compiled to date indicate no landfill-derived impact to surface water downstream of the CAZ.
5. The current (2019) 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 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.

7.0 RECOMMENDATIONS

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

1. The City should continue to monitor groundwater and surface water at the current sampling frequencies so that seasonal variations for certain parameters could be documented and understood. This would also facilitate the continuation of Guideline B-7 calculations for certain groundwater parameters.
2. Groundwater elevations should be measured during each groundwater sampling round to further confirm groundwater flow directions and establish seasonal fluctuations.
3. 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.

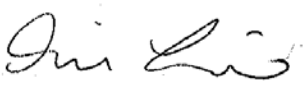
8.0 CLOSURE

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,

Wood Environment & Infrastructure Solutions,
A Division of Wood Canada Limited

Prepared by:

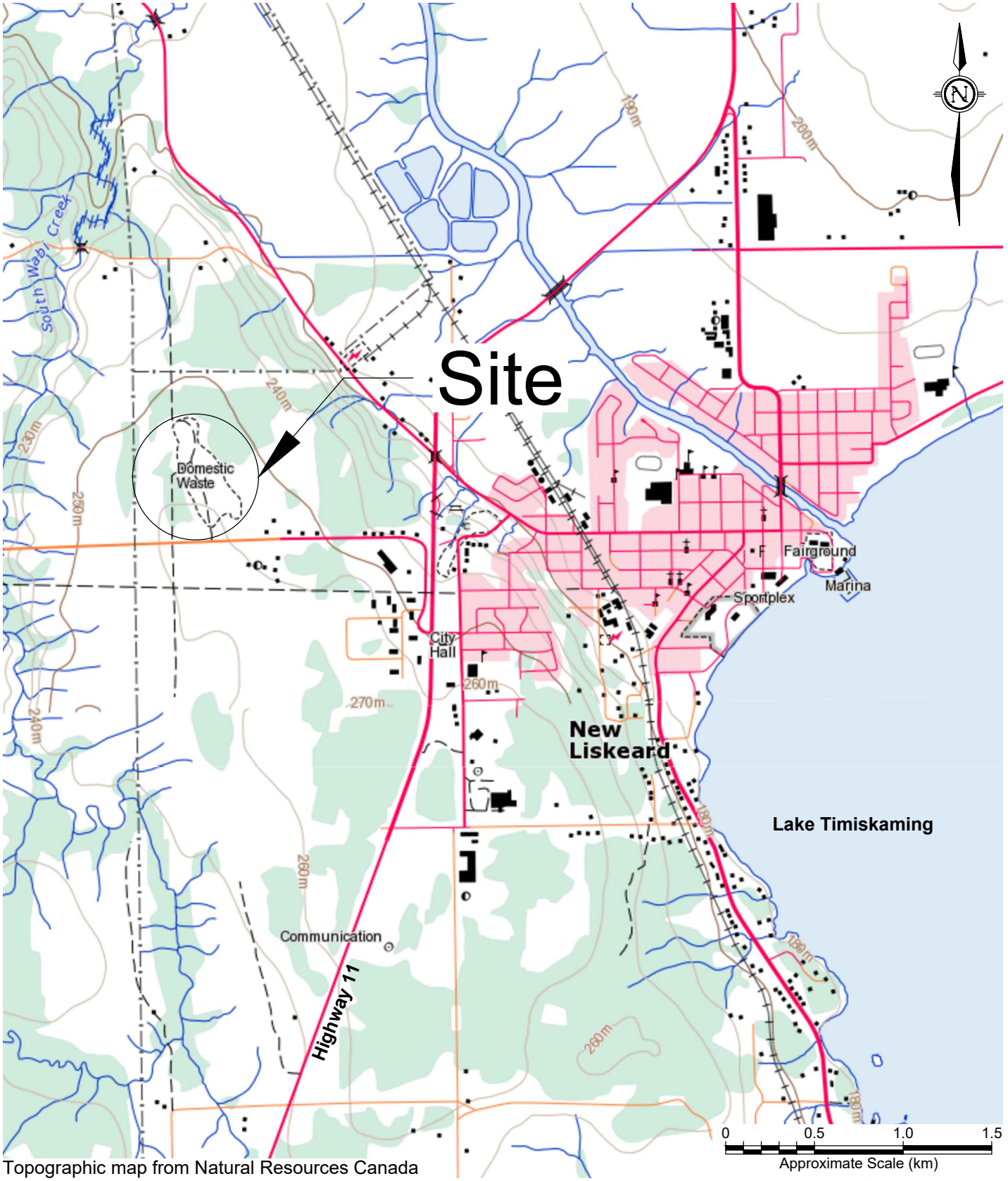


Emily Lemieux, B.Sc.
Environmental Scientist

Reviewed by:



Brian Grant, P.Eng.
Senior Hydrogeologist



Topographic map from Natural Resources Canada

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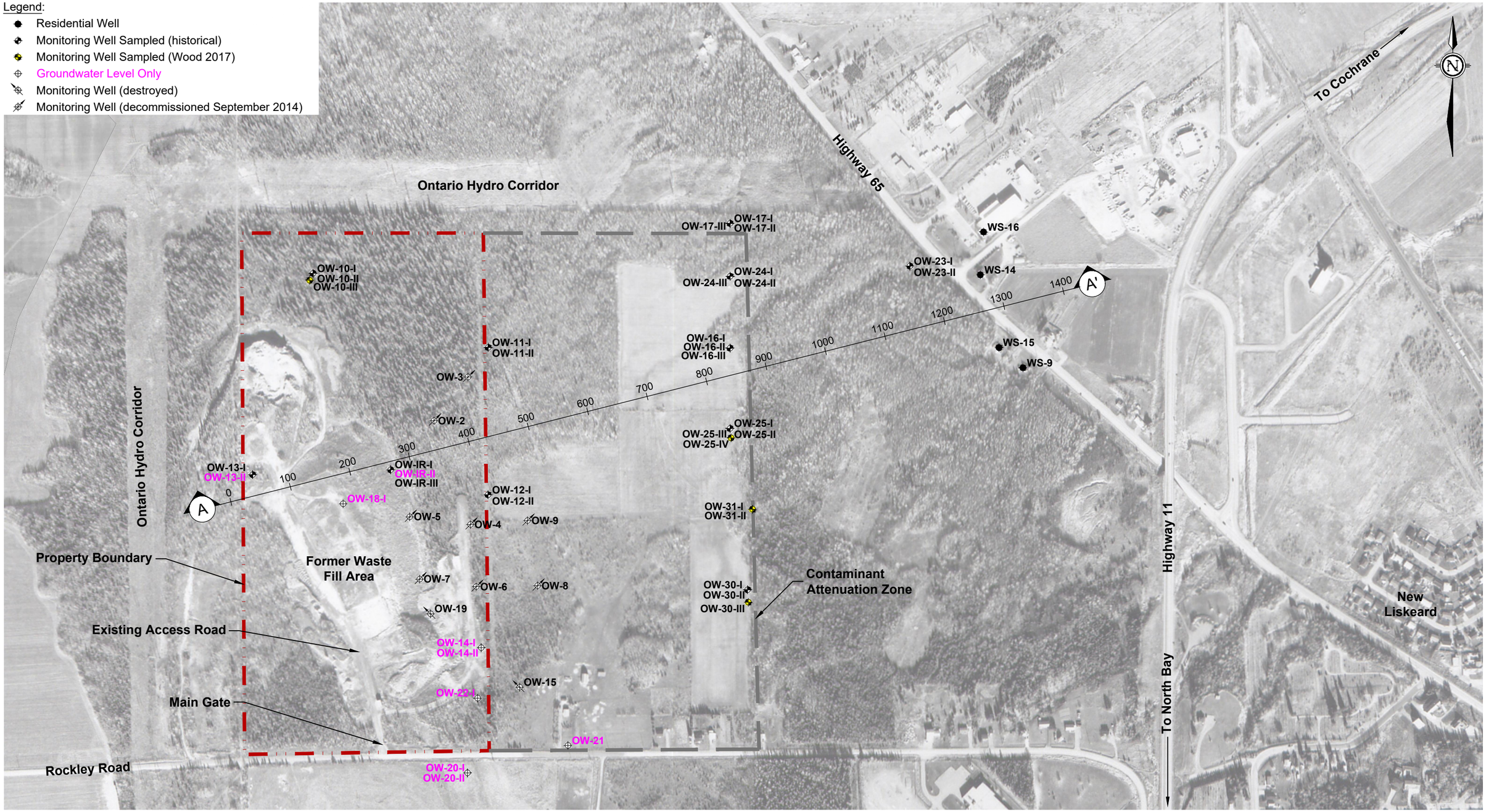
705-682-2632

The City of Temiskaming Shores

PROJECT: 2019 Annual Groundwater & Surface Water Monitoring Report New Liskeard Waste Disposal Site, New Liskeard, Ontario	DWN BY: KKJ	CHK'D BY: BRG	DATE: March 2020 PROJECT NO: TY131010.1000
TITLE: Site Locaton Map	REV. NO.: 1	SCALE: as shown	FIGURE NO: 1



0 50 100 150 200 250 300
Approximate Scale (m)

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DWN BY:	KKJ
CHK'D BY:	BRG
DATUM:	NAD 83
SCALE:	as shown

PROJECT
2019 Annual Groundwater & Surface Water Monitoring Report
New Liskeard Waste Disposal Site, New Liskeard, Ontario

TITLE
Groundwater Monitoring Location Plan

DATE	March 2020
PROJECT No.	TY131010.1000
REV. No.	1
FIGURE No.	2

Legend:
Surface Water Sample Location

SW1
SW2
SW3
SW4
SW5
SW6

South Wabi Creek
Ontario Hydro Corridor
Ontario Hydro Corridor
Former Waste Fill Area
Contaminant Attenuation Zone
Rockley Road
Highway 65
Highway 11
To Cochrane
Wabi River
New Liskeard
To North Bay

0 100 200 300 400 500
Approximate Scale (m)

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SCALE:	as shown

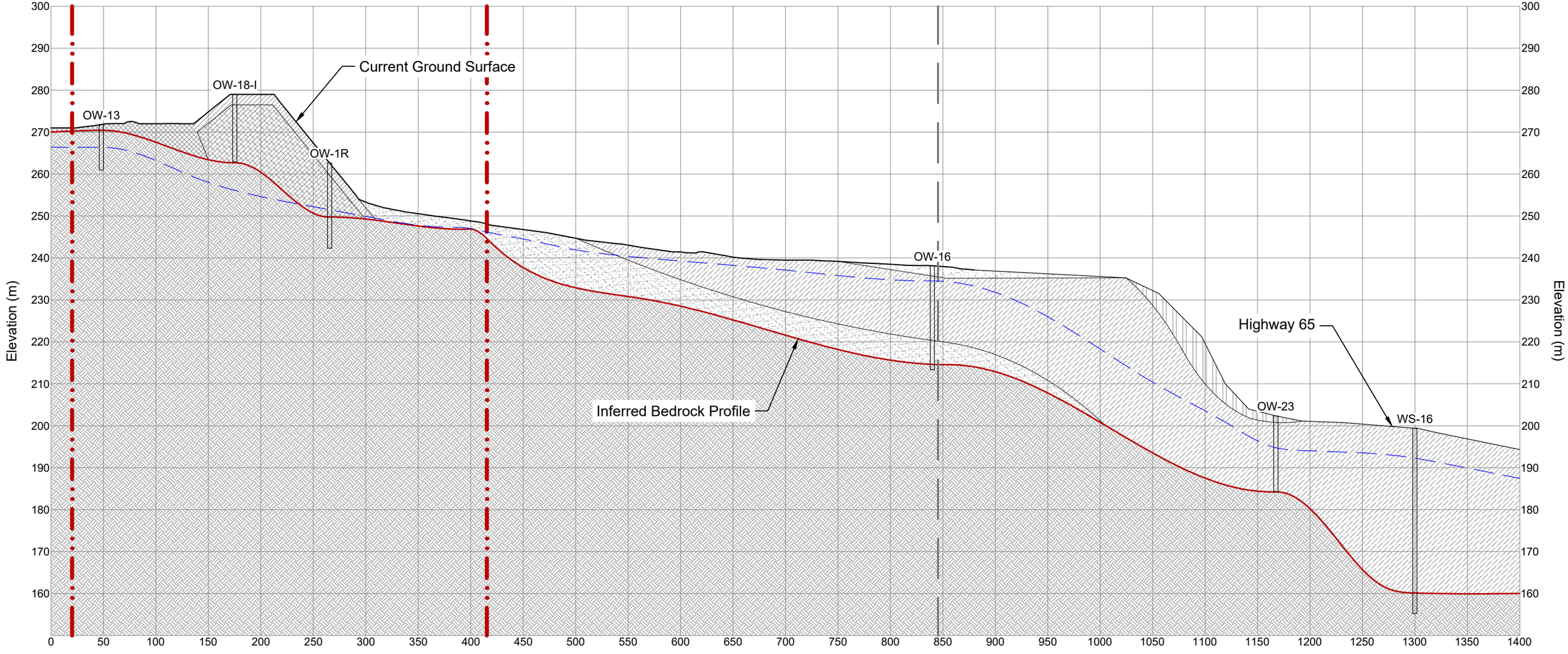
PROJECT
2019 Annual Groundwater & Surface Water Monitoring Report
New Liskeard Waste Disposal Site, New Liskeard, Ontario

TITLE
Surface Water Monitoring Location Plan

DATE	March 2020
PROJECT No.	TY131010.1000
REV. No.	1
FIGURE No.	3

Legend:

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



Section A - A'

Notes:

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

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DATUM:	NAD 83
SCALE:	as shown
PROJECT	2019 Annual Groundwater & Surface Water Monitoring Report New Liskeard Waste Disposal Site, New Liskeard, Ontario
TITLE	Hydrogeological Cross Section
DATE	March 2020
PROJECT No.	TY131010.1000
REV. No.	1
FIGURE No.	4

Legend:

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

Ontario Hydro Corridor

Highway 65

To Cochrane

N

196.0
206.0
216.0
226.0
236.0
246.0
256.0
266.0

OW-10-I
OW-10-II
OW-10-III

OW-11-I
OW-11-II

OW-3

OW-2

OW-13-I
OW-13-II

OW-IR-I
OW-IR-II
OW-IR-III

OW-18-I

OW-12-I
OW-12-II

OW-5

OW-4

OW-9

OW-7

OW-6

OW-8

OW-19

OW-14-I
OW-14-II

OW-15

OW-22-I

OW-21

OW-20-I
OW-20-II

OW-17-III
OW-17-I
OW-17-II

OW-24-III
OW-24-I
OW-24-II

OW-16-I
OW-16-II
OW-16-III

OW-25-III
OW-25-I
OW-25-II
OW-25-IV

OW-31-I
OW-31-II

OW-30-I
OW-30-II
OW-30-III

OW-23-I
OW-23-II

WS-16

WS-14

WS-15

WS-9

FLOW

Property Boundary

Former Waste Fill Area

Existing Access Road

Main Gate

Rockley Road

Contaminant Attenuation Zone

Highway 11

To North Bay

New Liskeard

0 50 100 150 200 250 300
Approximate Scale (m)

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SCALE:	as shown

PROJECT
2019 Annual Groundwater & Surface Water Monitoring Report
New Liskeard Waste Disposal Site, New Liskeard, Ontario

TITLE
Inferred Shallow Groundwater Contour Plan
May 2019

DATE	March 2020
PROJECT No.	TY131010.1000
REV. No.	1
FIGURE No.	5A

Legend:

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

Ontario Hydro Corridor

Highway 65

To Cochrane

Highway 11

To North Bay

New Liskeard

Property Boundary

Existing Access Road

Main Gate

Rockley Road

Former Waste Fill Area

Contaminant Attenuation Zone

FLOW

OW-10-I, OW-10-II, OW-10-III
OW-11-I, OW-11-II
OW-12-I, OW-12-II
OW-13-I, OW-13-II
OW-14-I, OW-14-II
OW-15
OW-16-I, OW-16-II, OW-16-III
OW-17-I, OW-17-II, OW-17-III
OW-18-I
OW-19
OW-20-I, OW-20-II
OW-21
OW-22-I
OW-23-I, OW-23-II
OW-24-I, OW-24-II, OW-24-III
OW-25-I, OW-25-II, OW-25-IV
OW-30-I, OW-30-II, OW-30-III
OW-31-I, OW-31-II
OW-2
OW-3
OW-4
OW-5
OW-6
OW-7
OW-8
OW-9
OW-IR-I, OW-IR-II, OW-IR-III
WS-9
WS-14
WS-15
WS-16

196.0
206.0
216.0
226.0
236.0
246.0
256.0
266.0

0 50 100 150 200 250 300
Approximate Scale (m)

The City of Temiskaming Shores

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DATUM:	NAD 83
SCALE:	as shown
PROJECT	2019 Annual Groundwater & Surface Water Monitoring Report New Liskeard Waste Disposal Site, New Liskeard, Ontario
TITLE	Inferred Deep Groundwater Contour Plan May 2019
DATE	March 2020
PROJECT No.	TY131010.1000
REV. No.	1
FIGURE No.	5B

Legend:

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

196.0
206.0
216.0
226.0
236.0
246.0
256.0
266.0

Ontario Hydro Corridor

Highway 65

To Cochrane

N

OW-17-III
OW-17-I
OW-17-II
WS-16
OW-23-I
OW-23-II
WS-14
OW-24-I
OW-24-III
OW-24-II
OW-10-I
OW-10-II
OW-10-III
OW-16-I
OW-16-II
OW-16-III
WS-15
WS-9
OW-11-I
OW-11-II
OW-3
OW-2
OW-25-I
OW-25-III
OW-25-II
OW-25-IV
FLOW
OW-13-I
OW-13-II
OW-IR-I
OW-IR-II
OW-IR-III
OW-18-I
OW-12-I
OW-12-II
OW-31-I
OW-31-II
OW-5
OW-4
OW-9
OW-7
OW-6
OW-8
OW-30-I
OW-30-II
OW-30-III
OW-19
OW-14-I
OW-14-II
OW-15
OW-22-I
OW-21
OW-20-I
OW-20-II

Property Boundary

Former Waste Fill Area

Existing Access Road

Main Gate

Rockley Road

Contaminant Attenuation Zone

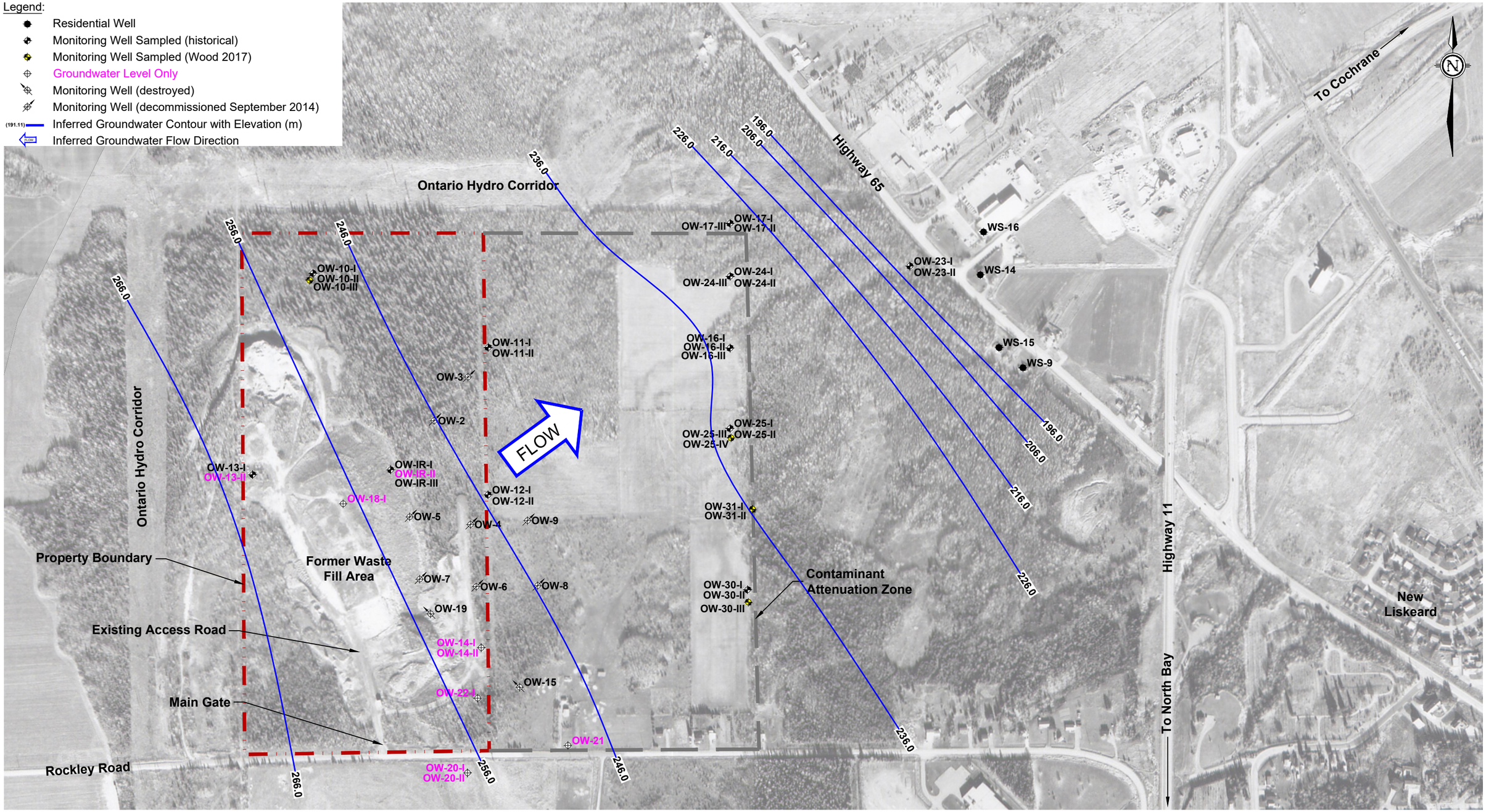
Highway 11

To North Bay

New Liskeard

0 50 100 150 200 250 300
Approximate Scale (m)

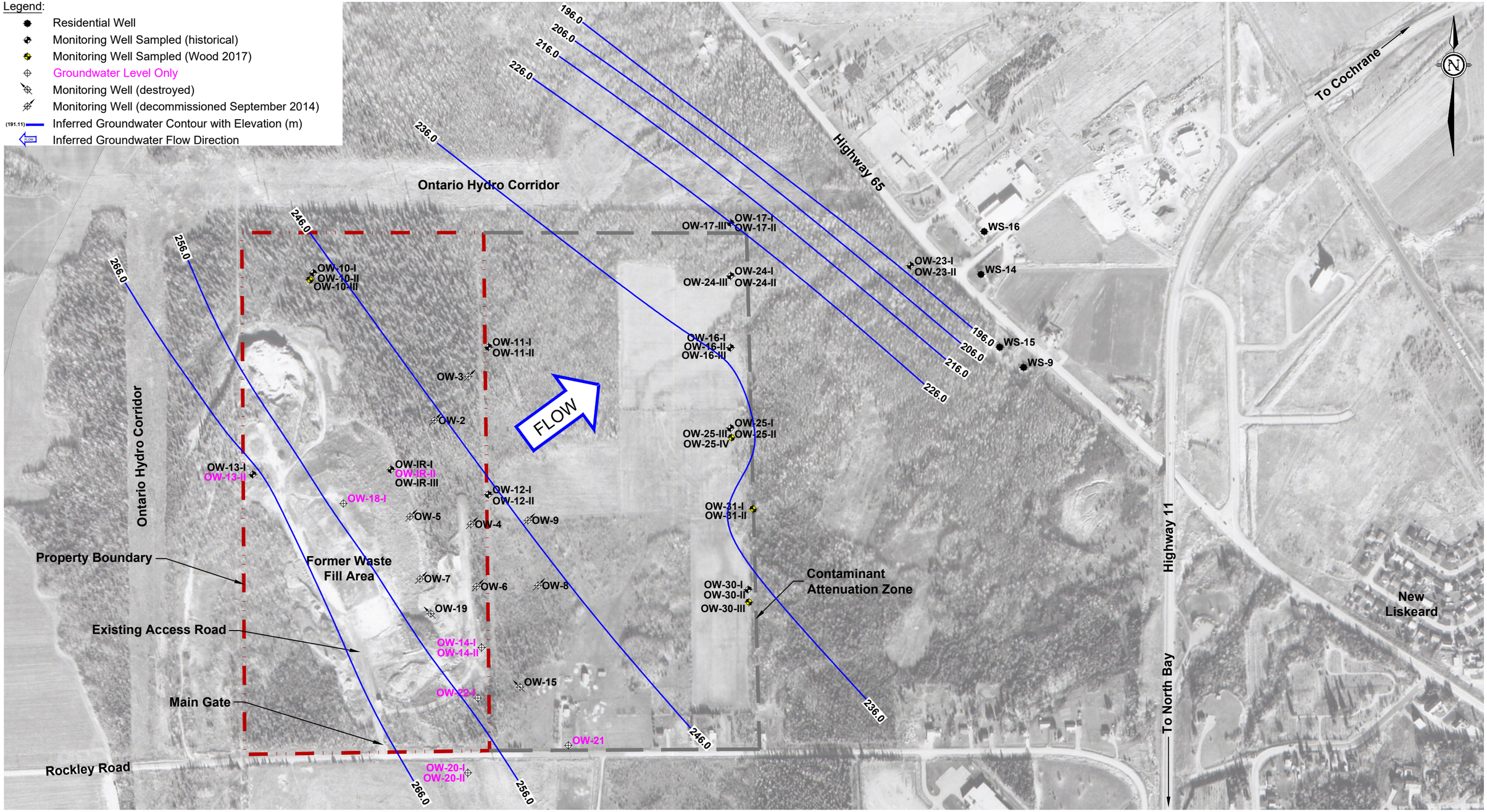
The City of Temiskaming Shores	DWN BY: KKJ	PROJECT: 2019 Annual Groundwater & Surface Water Monitoring Report, New Liskeard Waste Disposal Site, New Liskeard, Ontario	DATE: March 2020
	CHK'D BY: BRG		PROJECT No.: TY131010.1000
Wood Environment & Infrastructure Solutions, 131 Fielding Road, Lively, Ontario, P3Y 1L7, 705-682-2632	DATUM: NAD 83	TITLE: Inferred Shallow Groundwater Contour Plan, July 2019	REV. No.: 1
	SCALE: as shown		FIGURE No.: 5C



The City of Temiskaming Shores	DWN BY: KKJ	PROJECT: 2019 Annual Groundwater & Surface Water Monitoring Report, New Liskeard Waste Disposal Site, New Liskeard, Ontario	DATE: March 2020
	CHK'D BY: BRG		PROJECT No.: TY131010.1000
Wood Environment & Infrastructure Solutions 131 Fielding Road Lively, Ontario P3Y 1L7 705-682-2632	DATUM: NAD 83	TITLE: Inferred Deep Groundwater Contour Plan July 2019	REV. No.: 1
	SCALE: as shown		FIGURE No.: 5D

Legend:

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



0 50 100 150 200 250 300
Approximate Scale (m)

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DATUM:	NAD 83
SCALE:	as shown

PROJECT
2019 Annual Groundwater & Surface Water Monitoring Report
New Liskeard Waste Disposal Site, New Liskeard, Ontario

TITLE
Inferred Shallow Groundwater Contour Plan
September 2019

DATE	March 2020
PROJECT No.	TY131010.1000
REV. No.	1
FIGURE No.	5E

Legend:

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

Ontario Hydro Corridor

Highway 65

To Cochrane

Ontario Hydro Corridor

Property Boundary

Former Waste Fill Area

Existing Access Road

Main Gate

Rockley Road

Contaminant Attenuation Zone

Highway 11

To North Bay

New Liskeard

FLOW

236.0 226.0 216.0 206.0 196.0 256.0 246.0 266.0

OW-10-I OW-10-II OW-10-III

OW-11-I OW-11-II

OW-3

OW-2

OW-13-I OW-13-II

OW-IR-I OW-IR-II OW-IR-III

OW-18-I

OW-12-I OW-12-II

OW-5

OW-4

OW-9

OW-7

OW-6

OW-8

OW-19

OW-14-I OW-14-II

OW-15

OW-22-I

OW-20-I OW-20-II

OW-21

OW-17-III OW-17-I OW-17-II

OW-24-III OW-24-I OW-24-II

OW-16-I OW-16-II OW-16-III

OW-25-III OW-25-I OW-25-II OW-25-IV

OW-31-I OW-31-II

OW-30-I OW-30-II OW-30-III

WS-16

OW-23-I OW-23-II

WS-14

WS-15

WS-9

0 50 100 150 200 250 300

Approximate Scale (m)

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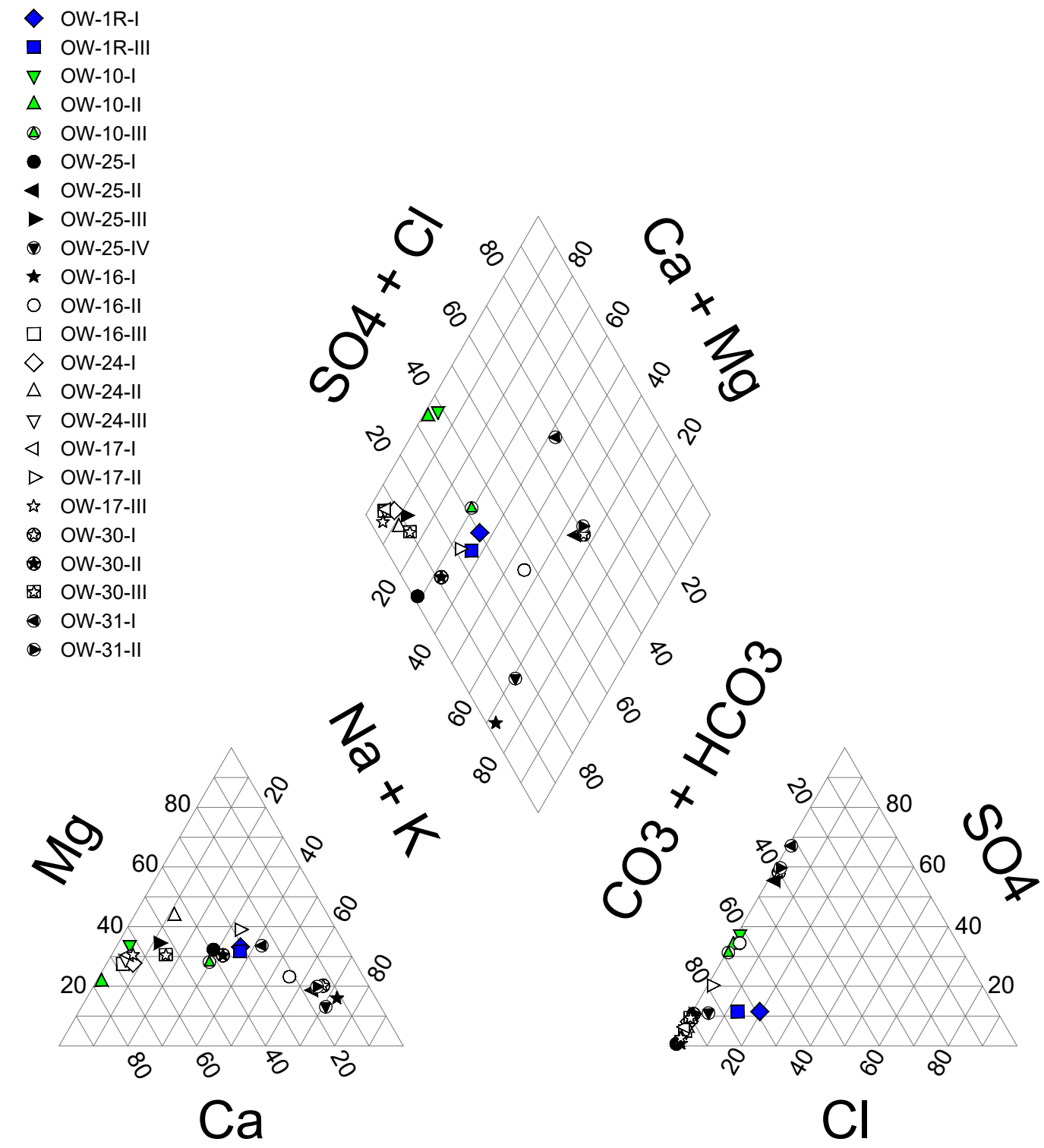
	CHK'D BY: BRG		PROJECT No.: TY131010.1000
Wood Environment & Infrastructure Solutions, 131 Fielding Road, Lively, Ontario, P3Y 1L7, 705-682-2632	DATUM: NAD 83	TITLE: Inferred Deep Groundwater Contour Plan, September 2019	REV. No.: 1
	SCALE: as shown		FIGURE No.: 5F



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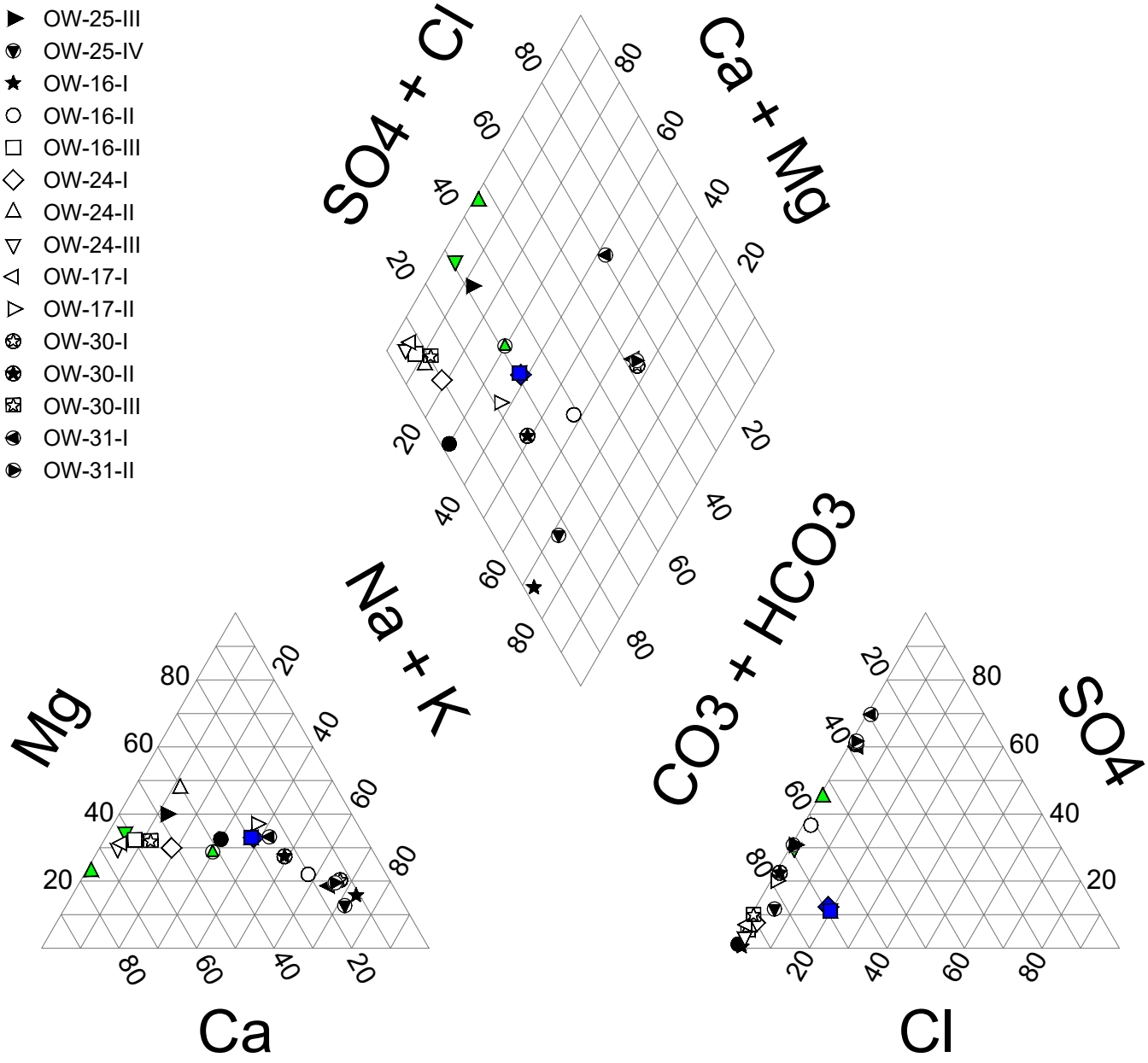
PROJECT: 2019 Annual Groundwater & Surface Water Monitoring Report New Liskeard Waste Disposal Site, New Liskeard, Ontario	DWN BY: KKJ	CHK'D BY: BRG	DATE: March 2020 PROJECT NO: TY131010.1000
TITLE: Groundwater Tri-Linear Piper Plot - May 2019	REV. NO.: 1	SCALE: not applicable	FIGURE NO: 6A

Ledged:

- 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-16-III
- OW-24-I
- OW-24-II
- OW-24-III
- OW-17-I
- OW-17-II
- OW-30-I
- OW-30-II
- OW-30-III
- OW-31-I
- OW-31-II



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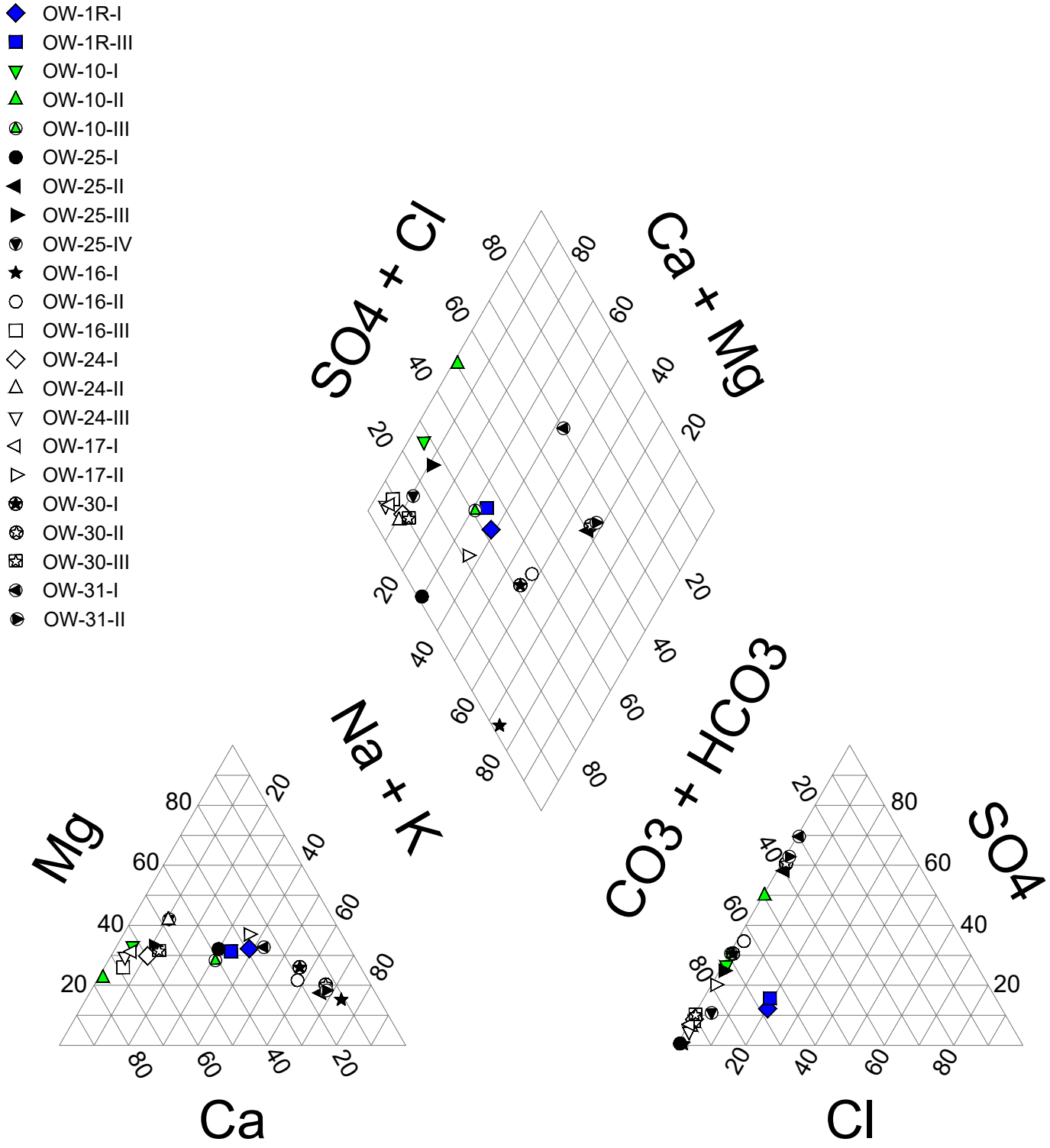
PROJECT: 2019 Annual Groundwater & Surface Water Monitoring Report, New Liskeard Waste Disposal Site, New Liskeard, Ontario	DWN BY: KKJ	CHK'D BY: BRG	DATE: March 2020; PROJECT NO: TY131010.1000
TITLE: Groundwater Tri-Linear Piper Plot - July 2019	REV. NO.: 1	SCALE: not applicable	FIGURE NO: 6B



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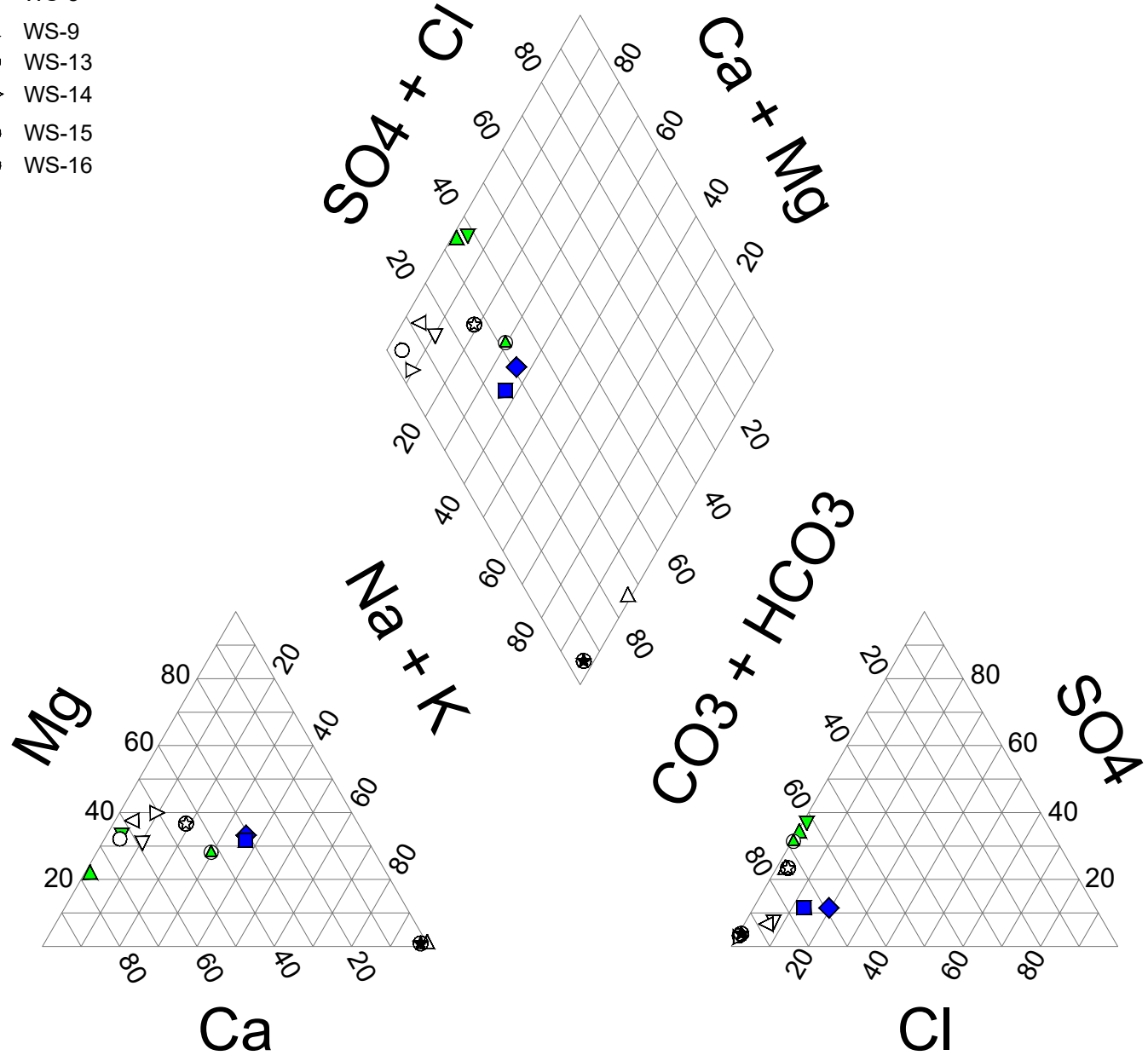
PROJECT 2019 Annual Groundwater & Surface Water Monitoring Report New Liskeard Waste Disposal Site, New Liskeard, Ontario	DWN BY: KKJ	CHK'D BY: BRG	DATE: March 2020 PROJECT NO: TY131010.1000
TITLE Groundwater Tri-Linear Piper Plot - September 2019	REV. NO.: 1	SCALE: not applicable	FIGURE NO: 6C

Ledged:

- 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-15
- WS-16



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wood.

The City of Temiskaming Shores

PROJECT: 2019 Annual Groundwater & Surface Water Monitoring Report New Liskeard Waste Disposal Site, New Liskeard, Ontario	DWN BY: KKJ	CHK'D BY: BRG	DATE: March 2020 PROJECT NO: TY131010.1000
TITLE: Residential Groundwater Tri-Linear Piper Plot - May 2019	REV. NO.: 1	SCALE: not applicable	FIGURE NO: 6D

APPENDIX A

CERTIFICATE OF APPROVAL

NO. A571505

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
P0J 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) "Regoinal 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;

(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

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;

(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.

(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:

(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:

(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.

(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

(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.

(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 1st 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.

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., 12th 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.

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

A. Dominski, 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

Ontario

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

APR 26 2007

To: Dave Treen.
April 30, 2007.
CWO

The Corporation of the City of Temiskaming Shores
PO Box 2050
Haileybury, Ontario
P0J 1K0

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 eachportion 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**

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

Ontario

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
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 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 Treen (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**

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

Ontario

Ministry of the Environment
Ministère de l'Environnement

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**

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

THIS NOTICE WAS MAILED
ON Dec. 12, 2013
DC
(Signed)

Dale D. Gable

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 ✓

APPENDIX B

BOREHOLE LOGS

morrison beatty limited
consulting engineers and hydrogeologists
290 the west mall, etobicoke, ontario M9C 1C6 (416-622-9374)

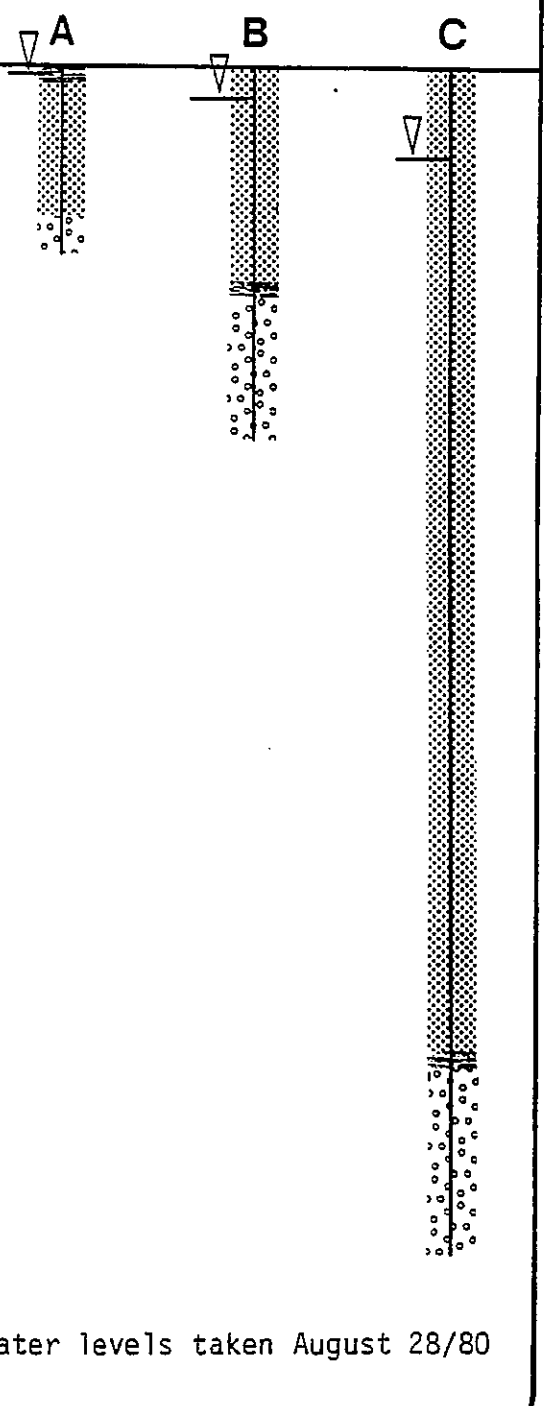
OW 1

New Liskeard Landfill — FILE NO. 147-802

Hydrogeologic Impact Study, Phase II

GEOLOGIST/ENGINEER WDB / BWB — DATE COMPLETED June 22-23, 1980

DEPTH metres	DEPTH feet	DESCRIPTION	SAMPLE no.	SAMPLE type	SAMPLE "N"
		TILL, glacial silty sand and gravel medium brown			
		LIMESTONE BEDROCK grey, with interbeds of calcareous shale			
		see next page for detailed bedrock core log			
		End Hole			

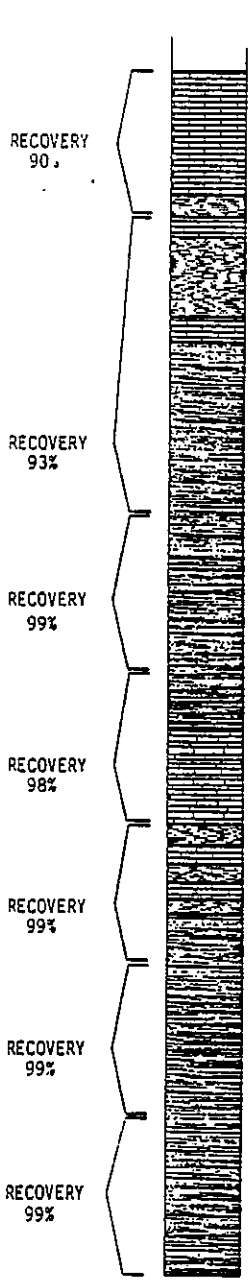


Water levels taken August 28/80

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, etobicoke, ontario M9C 1C6 (416-622-9374)

BEDROCK CORE LOG, OWI-C



Greenish grey LIMESTONE, occasional small calcite filled vugs, thin shale laminae, moderately weathered in top 0.7 metres

Grey calcareous SHALE, fossiliferous

Grey LIMESTONE, irregular bedding, fossiliferous

Greenish-grey calcareous SHALE, fissile

Grey LIMESTONE, fossiliferous

Greenish-grey calcareous SILTSTONE, fissile, occassional strata of argillaceous limestone or grey siltstone

Grey argillaceous SILTSTONE, sometimes nodular, indefinite contact with overlying unit

Greenish-grey argillaceous SHALE and LIMESTONE

Dark grey argillaceous SILTSTONE

Water levels taken August 28/80

morrison beatty limited
consulting engineers and hydrogeologists
290 the west mall, etobicoke, ontario M9C 1C6 (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	DEPTH feet	DESCRIPTION	SAMPLE no.	SAMPLE type	SAMPLE "N"	WELL DETAIL
						A B C
		TILL, glacial silty sand and gravel medium brown				
	10	LIMESTONE BEDROCK grey, with interbeds of calcareous shale				
5	20					
	30	End Hole				
10	40					
15	50					
	60					
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 1C6 (416-622-9374)

OW4

New Liskeard Landfill — FILE NO. 147-802

Hydrogeologic Impact Study, Phase II

GEOLOGIST/ENGINEER WDB / BWB — DATE COMPLETED June 24-25, 1980

DEPTH metres	DEPTH feet	DESCRIPTION	SAMPLE no.	SAMPLE type	SAMPLE "N"	WELL DETAIL
						A B C
		TILL, glacial silty sand and gravel medium brown				
	10	LIMESTONE BEDROCK grey, with interbeds of calcareous shale				
5	20					
	30	End Hole				
10	40					
15	50					
	60					
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 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 metres	feet	DESCRIPTION	SAMPLE no.	type	"N"	WELL DETAIL
						A B C
		TILL, glacial silty sand and gravel medium brown				
3	10					
		LIMESTONE BEDROCK grey, with interbeds of calcareous shale				
6	20					
9	30					
12	40	End Hole				
15	50					
18	60					
21	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 1C6 (416-622-9374)

OW6

New Liskeard Landfill

Hydrogeologic Impact Study, Phase II

FILE NO. 147-802

GEOLOGIST/ENGINEER WDB / BWB DATE COMPLETED June 24/26, 1980

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

Water levels taken August 28/80

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

WL-100280

morrison beatty limited
consulting engineers and hydrogeologists
290 the west mall, etobicoke, ontario M9C 1C6 (416-622-9374)

OW 7

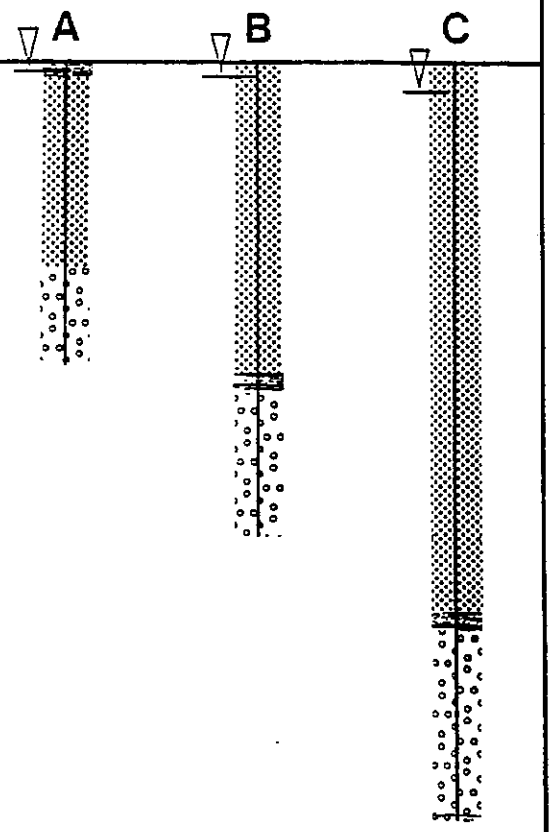
New Liskeard Landfill — FILE NO. 147-802

Hydrogeologic Impact Study, Phase II

GEOLOGIST/ENGINEER WDB / BWB — DATE COMPLETED June 24-26, 1980

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

WELL DETAIL



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 1C6 (416-622-9376)

OW 8

New Liskeard Landfill — FILE NO. 147-802

Hydrogeologic Impact Study, Phase II

GEOLOGIST/ENGINEER WDB / BWB — DATE COMPLETED June 24, 1980

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

Water levels taken August 28/80

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

WL-100980

morrison beatty limited
consulting engineers and hydrogeologists
290 the west mall, etobicoke, ontario M9C 1C6 (416-622-9374)

OW9

New Liskeard Landfill — FILE NO. 147-802

Hydrogeologic Impact Study, Phase II

GEOLOGIST/ENGINEER WDB / BWB — DATE COMPLETED June 24, 1980

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

Water levels taken August 28/80

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

WL-100880

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	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT %	REMARKS
0			I II III						10 20 30	10 20 30	
	FILL/DISTURBED SOIL: MEDIUM BROWN FINE SANDY SILT, TRACE CLAY, TRACE GRAVEL, DAMP			SS1	47		17			W_P W_L	WATER LEVEL DEPTH (mbgl) I – 0.82 II – 0.78 III – 0.75
1.2				SS2	78		100				MONITOR NEST COMPLETED IN SEPARATE ADJACENT BOREHOLES
	SAND TILL: MEDIUM GREY SILTY FINE SAND TILL, SOME GRAVEL, OCCASIONAL COBBLES, DAMP			RC	78		46				
2											INTER-FRACTURE SPACING (m):
3.3				RC			78	0			0.08
	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			100	63			0.20
4				RC			100	78			0.31
				RC			99	83			0.31
6				RC			97	83			0.37
7.9											
8.5	SILTSTONE-SHALE: GREY, WITH THIN LIMESTONE INTERBEDS, APHANITIC, LAMINATED, SOFT, VERY BROKEN.			RC			93	40			0.18
				RC			100	96			0.45
9.6	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											
10.7	SILTSTONE-SHALE: MEDIUM GREY, MICRO LAMINATED TO LAMINATED. SOFT, SLIGHT TO FRESH WEATHERING. BROKEN TO VERY BROKEN.			RC			100	94			
12											FRACTURE AT 12.68 m
	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			100	100			
14											FRACTURE AT 13.71 m
14.2				RC			95	94			
	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			100	86			0.74
16											
				RC			99	100			
18											FRACTURE AT 18.80 m
20	BOREHOLE TERMINATED AT 20.3 m										
20.3											

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 TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE ROD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P – W_L)	REMARKS
0									10 20 30	10 20 30	
	SILT: GREY BROWN SILT, TRACE SAND TO FINE SANDY, TRACE TO SOME CLAY, TRACE GRAVEL, DAMP			SS1	9		45				WATER LEVEL DEPTH (mbgl) I – 0.94 II – 0.49
				SS2	>50		43				
1.2				SS3			0				INTER-FRACTURE SPACING (m):
	SILT TILL: GREY BROWN, TRACE FINE SAND, TRACE CLAY, DAMP			RC			97	100			
2											
2.4											
	BEDROCK: LIMESTONE WITH SHALE AND SILTSTONE INTERBEDS. SEE BOREHOLE OW-1R FOR DETAIL.			RC			75	93			0.36
4				RC			100	94			0.58
				RC			85	49			0.23
5.8											
6	BOREHOLE TERMINATED AT 5.8 m										MONITOR NEST COMPLETED IN SEPARATE ADJACENT BOREHOLES
8											
10											
12											
14											
16											
18											
20											

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 TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P – W_L)	REMARKS
0			I II						10 20 30	10 20 30	
	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			II I	WATER LEVEL DEPTH (mbgl) I – 0.89 II – 0.32
				SS2	43		72				
1.3				RC			97	48			INTER–FRACTURE SPACING (m): 0.14
2	BEDROCK: LIMESTONE WITH SHALE AND SILTSTONE INTERBEDS. SEE BOREHOLE OW–1R FOR DETAIL.			RC			100	79			0.16
4				RC			100	87			0.34
				RC			100	85			0.24
5.8											
6	BOREHOLE TERMINATED AT 5.8 m										MONITOR NEST COMPLETED IN SEPARATE ADJACENT BOREHOLES
8											
10											
12											
14											
16											
18											
20											

BOREHOLE NO. OW-12

PROJECT NAME: NEW LISKEARD LANDFILL SITE
PROJECT NO.: 001148.00
CLIENT: SUTCLIFFE RODY QUESNEL INC.
DATE: SEPTEMBER 19, 2000
BOREHOLE TYPE: HQ / HW CORING
GEOLOGIST: BDT
GROUND ELEVATION: 248.00 mASL (I), 248.15 mASL (II)
REVIEWER:

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P – W_L)	REMARKS
0			I / II						10 20 30	10 20 30	
	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
				SS2	6		43				INTER-FRACTURE SPACING (m):
				SS3	22		45				
2				SS4	>50		33				
2.0	BEDROCK: LIMESTONE WITH SHALE AND SILTSTONE INTERBEDS. SEE BOREHOLE OW-1R FOR DETAIL.			RC			99	32			0.10
4				RC			100	100			0.20
				RC			100	55			0.12
5.5											
6	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
PROJECT NO.: 001148.00
CLIENT: SUTCLIFFE RODY QUESNEL INC.
DATE: SEPTEMBER 22-23, 2000
BOREHOLE TYPE: HQ / HW CORING
GEOLOGIST: BDT
GROUND ELEVATION: 272.83 mASL (I), 272.77 mASL (II)
REVIEWER:

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS I	MONITOR DETAILS II	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 (W_P – W_L)	REMARKS
0												
	FILL: BROWN FINE SAND TO SANDY SILT, WITH GRAVEL				SS1	13		33				WATER LEVEL DEPTH (MBGL) I – 4.15 II – 1.63
					SS2	>50		13				INTER-FRACTURE SPACING (m):
0.9					RC			98	47			0.10
	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.				RC			100	57		II	0.13 FRACTURES BROWN STAINED
2												
					RC			100	85			0.22 SOME FRACTURES BROWN STAINED
4											I	
					RC			100	100			0.27 NO STAINED FRACTURES
6												
					RC			100	98			0.25 BROWN STAINED FRACTURE AT 6.8 m
8					RC			100	67			0.19 NO STAINED FRACTURES
					RC			91	93			0.16 NO STAINED FRACTURES
10												
10.8	BOREHOLE TERMINATED AT 10.8 m (I) AND 4.4 m (II)											MONITOR NEST COMPLETED IN SEPARATE ADJACENT BOREHOLES
12												
14												
16												
18												
20												

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 TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (Wp – Wl)	REMARKS
0			I II						10 20 30	10 20 30	
	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):
2				SS2	6		0				
				SS3	20		0				
											DRILLER REPORTS LOSS OF CIRCULATION
				RC			0				
4				RC			0				2.9–4.0 mbgl
4.3											
	SANDY SILT TILL: GREY FINE SANDY SILT TILL, SOME GRAVEL TO FINE TO COARSE GRAVELY, OCCASIONAL COBBLE			SS4	>50		30				
5.0				RC			97	50			0.10
	BEDROCK: LIMESTONE WITH SHALE AND SILTSTONE INTERBEDS. SEE BOREHOLE OW-1R FOR DETAIL.										
6				RC			100	8			0.05
8											
				RC			85	85			FRACTURE ZONE 8.1–8.5 mbgl
9.5											
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	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P – W_L)	REMARKS
0			I II						10 20 30	10 20 30	
0.15	TOPSOIL			1SS	5	16.5	67				MONITORS ARE INSTALLED WITHIN SEPARATE BOREHOLES.
	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		50 FOR 76 mm		
2				3SS		14.6	36				
2.3	CLAYEY SILT TO SILTY CLAY: LIGHT GREY CALCAREOUS CLAYEY SILT TO SILTY CLAY, MOIST TO DRY, MDTPL, HARD, OCCASIONAL LIMESTONE BOULDERS, WEATHERED.			4SS		–	75		100 FOR 102 mm		
				5SS		–	25		75 FOR 102 mm		
4				6SS		–	100		100 FOR 102 mm		
				7SS		–	69		125 FOR 178 mm		
6				8SS		–	100		100 FOR 102 mm		
				9SS		–	100		100 FOR 76 mm		
8											
9.4	BOREHOLE TERMINATED AT 9.4 m IN HARD CLAYEY SILT TO SILTY CLAY.			10SS		–	100		50 FOR 76 mm		
10											
12											
14											
16											
18											
20											

BOREHOLE NO. OW-16

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 I II III	SAMPLE TYPE	'N' VALUE	% WATER	% RECOVERY	RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
0											
0.15	TOPSOIL										MONITORS ARE INSTALLED WITHIN SEPARATE BOREHOLES.
	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				
2				2SS		5.9	61		100 FOR 127 mm		
2.3				3SS		7.6	50		50 FOR 128 mm		– SPOON SAMPLER BOUNCING
	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.			4SS	39	8.4	92				
4				5SS	44	9.6	100		44		
				6SS	29	9.7	100				
6				7SS	36	8.6	58				
8				8SS	141	8.4	67		141		
10				9SS	37	8.8	100				
				10SS	36	8.9	96				
12				11SS	86	8.2	71		86		
14				12SS	60	8.4	100		60		
16				13SS	105	10.3	67		105		
18				14SS		8.9	100		130 FOR 230 mm		
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.			15SS	177	8.2	72		177		
20											

BOREHOLE NO. OW-16

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 TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT %	REMARKS
20	SILTY MEDIUM TO FINE SAND TO MEDIUM TO FINE SANDY SILT CONTINUED			16SS	43	10.7	100		43	Wp — Wl	
22				17SS		12.2	100		125 FOR 127 mm		
	– BOULDER AT 22.9 – 23.1 m			18SS					300 FOR 5 mm		
23.3				19RC			80	100			
24	IGNEOUS BEDROCK: BLACK WITH GREY TO WHITE SPECKLING, PHANERITIC, GRANODIORITE TO GABBRO, HARD, SLIGHTLY WEATHERED.			20SS			0	100	125 FOR 25 mm		
				21RC			100	92			
24.8											
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 I II III	SAMPLE TYPE	'N' VALUE	% WATER	% RECOVERY	RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 (W_P W_L)	REMARKS
0											
0.15	TOPSOIL										
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				MONITORS ARE INSTALLED WITHIN SEPARATE BOREHOLES.
2				2SS	11	21.3	75				
3.0	FINE SAND, TRACE TO SOME SILT: BROWN FINE SAND, TRACE SILT, INTERBEDDED CLAYEY SILT, WET, DENSE.			3SS	39	15.4	88				
4				4SS	29	7.8	75				
	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.			5SS	47	6.5	71		47		
6	– CLAYEY			6SS	21	8.4	79				
8				7SS		5.6	100		114 FOR 152 mm		
8.8											
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		81		
				9SS	132	14.2	100		132		1 ROCK CHIP WAS RECOVERED FROM THE SPOON SAMPLER.
12	11.9			10SS		–	2		200 FOR 0 mm		
	BOREHOLE TERMINATED ON ASSUMED MAFIC IGNEOUS BEDROCK.										
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	SAMPLE TYPE	'N' VALUE	% WATER	% RECOVERY	RQD (%)	CONE PENETRATION / SHEAR STRENGTH	WATER CONTENT %	REMARKS
0 – 0.6	COVER SOIL FILL: BLACK TO MEDIUM BROWN SILT, SOME SAND, TRACE GRAVEL. STIFF.	1SS	10	13.8	42				
0.6 – 1.5	CLAYEY SILT FILL: BLACK TO BROWN TO GREY CLAYEY SILT, SOME SAND, WET, VERY STIFF.	2SS	28	20.7	0				
1.5 – 15.2	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		54		
		4SS		-	100		50 FOR 150 mm		
		5SS		-	100		50 FOR 100 mm		
15.2 – 16.1	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.								

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

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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	SAMPLE TYPE	'N' VALUE	% WATER	% RECOVERY	RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % W_P W_L	REMARKS
0			I II						10 20 30	10 20 30	
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.
				2SS	10	5.2	42				
	– TRACE FINE GRAVEL, SOME SILT, GLASS, SLIGHTLY ODOURUOS.			3SS	17	10.8	42				
2.7				4SS	99	12.2	79		99		
	FINE SANDY SILT: LIGHT BROWN FINE SANDY SILT, MOIST, VERY DENSE, SOME ROCK FRAGMENTS.										– COBBLE AT 3.0 m
3.6				5SS		–	0		126 FOR 101 mm		
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.			6SS	7	23.3	83				
				7SS	18	24.0	71				
5.5											
6	SANDY SILT TILL: BROWN SANDY SILT, TRACE TO SOME CLAY TILL, OCCASIONAL MEDIUM TO FINE GRAVEL, APL, VERY STIFF.			8SS	22	12.6	83				
6.1											
	BOREHOLE TERMINATED AT 6.1 m IN SANDY SILT TILL.										
8											
10											
12											
14											
16											
18											
20											

BOREHOLE NO. OW-20

PROJECT NAME: NEW LISKEARD LANDFILL SITE

PROJECT NO.: 001148.04

CLIENT: CITY OF TEMISKAMING SHORES

DATE: NOVEMBER 11. 2004

BOREHOLE TYPE: HOLLOW STEM AUGERS 203 mm (8") O.D.

SUPERVISOR: DJW

GROUND ELEVATION: 258.52 mASL

REVIEWER: BDT

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	'N' VALUE	% WATER	% RECOVERY	RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P – W_L)	REMARKS
0			I II						10 20 30	10 20 30	
0.2	TOPSOIL, CLAYEY SILT;										STATIC WATER LEVELS AT I = 0.82 mBGL II = 0.91 mBGL ON DECEMBER 7, 2004
	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.			SS1	8		79				
2				SS2	15		100				
	– GREYISH BROWN AT 3.0 m.			SS3	7		100				
				SS4	10		50				
3.7	SAND: MEDIUM BROWN FINE TO MEDIUM SAND, TRACE TO SOME SILT, TRACE FINE GRAVEL, MOIST, VERY DENSE.			SS5	50+		37		50/50 mm		
4											
4.5				SS6	37		83				
	SILT TILL: GREY SILT TILL, SOME FINE SAND, TRACE TO SOME CLAY, TRACE TO SOME FINE TO MEDIUM GRAVEL, MOIST, COMPACT TO VERY DENSE.			SS7	48		42		48		
6				SS8	25		100				
	– WET AT 7.6 m.			SS9	27		100				
8											
9.1	BOREHOLE TERMINATED AT 9.1 m AT AUGER REFUSAL (PROBABLE BEDROCK).			SS10	80+		0		80/25 mm		
10											
12											
14											
16											
18											
20											

Revision 2/ Aug 2003

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

Project Number: **TY131010.6000**
Project Client: **City of Temiskaming Shores**
Project Name: **Monitoring Well Installation Project - New Liskeard Landfill Site**
Project Location: **New Liskeard, Ontario**
Drilling Location: **East of Solar Farm Gate**
Drilling Method: **200 mm Hollow Stem Augers**
Drilling Machine: **Track Mounted Drill**
Date Started: **9 Sep 14** Date Completed: **9 Sep 14**
Logged by: **JS**
Compiled by: **MAT**
Reviewed by: **TIM**
Revision No.: **0, 21/11/14**

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING			COMMENTS
Lithology Plot	DESCRIPTION Local Ground Surface Elevation:	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing: ○ SPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ 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	INSTRUMENTATION INSTALLATION	1 riser pipe in bentonite 1 riser pipe in sand 1 slotted pipe in sand
	light brown CLAYEY SILT trace gravel mottled, soft										STICK-UP HEIGHT: 0.95 m
	brown 0.4 SILT trace sand, gravel and clay loose to very dense	AU				1 2 3 4					
	END OF BOREHOLE 4.2 DUE TO REFUSAL ON PROBABLE BEDROCK OR BOULDERS										

AMEC Environment & Infrastructure
A division of AMEC Americas Limited
131 Fielding Road
Lively, Ontario
Canada P3Y 1L7
Tel +1(705) 682-2632
Fax +1(705) 682-2260
www.amec.com

Scale: 1 : 30

BOREHOLE NO. OW-22

PROJECT NAME: NEW LISKEARD LANDFILL SITE
PROJECT NO.: 001148.04
CLIENT: CITY OF TEMISKAMING SHORES
DATE: NOVEMBER 11. 2004
BOREHOLE TYPE: HOLLOW STEM AUGERS 203 mm (8") O.D.
SUPERVISOR: DJW
GROUND ELEVATION: 257.99 mASL
REVIEWER: BDT

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	'N' VALUE	% WATER	% RECOVERY	RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 (W_P – W_L)	REMARKS
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				SS3	4		21				
2.1	CLAYEY SILT AND BUREID TOPSOIL:										
2.3	CLAYEY SILT AND BURIED TOPSOIL, APL.			SS4	18		21				
	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		50/127 mm		
				SS6	37		38				
4	– CLAYEY SILT ZONE AT 3.0 m										
4.3	BOREHOLE TERMINATED AT 4.3 m AT AUGER REFUSAL (PROBABLE BEDROCK).			SS7	66+		4		66/102 mm		
6											
8											
10											
12											
14											
16											
18											
20											

BOREHOLE NO. OW-23

PROJECT NAME: NEW LISKEARD LANDFILL SITE
PROJECT NO.: 001148.04
CLIENT: CITY OF TEMISKAMING SHORES
DATE: NOVEMBER 12-13. 2004
BOREHOLE TYPE: HOLLOW STEM AUGERS 203 mm (8") O.D.
SUPERVISOR: DJW
GROUND ELEVATION: 202.33 mASL
REVIEWER: BDT

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS I / II	SAMPLE TYPE	'N' VALUE	% WATER	% RECOVERY	RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P – W_L)	REMARKS
0									10 20 30	10 20 30	
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.			SS3	19		25				
	– COBBLES AT 3.1 m			SS4	36		100				
4				SS5	58		38		58		
	– GREY TO DARK GREY BELOW 4.6 m.			SS6	52		50		52		
6	– COBBLES BELOW 6.1 m.			SS7	50+		4		50/25 mm		
				SS8	79		46		56/102 mm		
8											
9.1				SS9	63		100		63		
	CLAYEY SILT TILL: GREY CLAYEY SILT TILL, SOME FINE SAND, TRACE FINE GRAVEL, DTPL, HARD.										
10				SS10	53		58		53		
12											
12.2				SS11	83+		38		83/292 mm		
	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.			SS12	56		92		56		
14											
	– WET BELOW 15.2 m.			SS13	37		96				
16											
				SS14	28		79				
18				SS15	–		–				
18.1	BOREHOLE TERMINATED AT 18.1 m AT AUGER REFUSAL (PROBABLE BEDROCK).										
20											

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

Project Number: **TY131010.6000**
Project Client: **City of Temiskaming Shores**
Project Name: **Monitoring Well Installation Project - New Liskeard Landfill Site**
Project Location: **New Liskeard, Ontario**

Drilling Location: **NE Corner of Solar Farm**
Drilling Method: **200 mm Hollow Stem Augers**
Drilling Machine: **Track Mounted Drill**
Date Started: **3 Sep 14** Date Completed: **3 Sep 14**

Logged by: **JS**
Compiled by: **MAT**
Reviewed by: **TIM**
Revision No.: **0, 21/11/14**

Local Ground Surface Elevation:

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: ○ SPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ 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
	brown SILTY SAND some organics, roots moist, compact										STICK-UP HEIGHT: 0.93 m
	light brown / grey 0.8 SILTY CLAY some sand, trace cobbles very stiff to stiff					1					
						2					
						3					
						4					
						5					
						6					

AMEC Environment & Infrastructure
A division of AMEC Americas Limited
131 Fielding Road
Lively, Ontario
Canada P3Y 1L7
Tel +1(705) 682-2632
Fax +1(705) 682-2260
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Continued on Next Page

Scale: 1 : 30

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 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: ○ SPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ 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
	light brown / grey SILTY CLAY some sand, trace cobbles very stiff to stiff										
	grey / brown 7.3 SANDY SILT some gravel, some to trace clay moist very dense	AU				7 8 9 10 11 12					

Continued on Next Page

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 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: ○ SPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ 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
	grey / brown SANDY SILT some gravel, some to trace clay moist very dense					13					
	grey 13.1 SAND trace silt and gravel moist to wet, fine to medium, very dense					14					
						15					
						16					
						17					
						18					
	END OF BOREHOLE 18.3 (no refusal)										

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

Project Number: **TY131010.6000**
Project Client: **City of Temiskaming Shores**
Project Name: **Monitoring Well Installation Project - New Liskeard Landfill Site**
Project Location: **New Liskeard, Ontario**

Drilling Location: **NE Corner of Solar Farm**
Drilling Method: **200 mm Hollow Stem Augers**
Drilling Machine: **Track Mounted Drill**
Date Started: **4 Sep 14** Date Completed: **4 Sep 14**

Logged by: **JS**
Compiled by: **MAT**
Reviewed by: **TIM**
Revision No.: **0, 21/11/14**

Local Ground Surface Elevation:

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)
	brown SILTY SAND some organics, roots moist, compact					0	
	light brown / grey 0.8 SILTY CLAY some sand, trace cobbles very stiff to stiff	AU				1	
						2	
						3	
						4	
						5	
						6	

FIELD TESTING

Penetration Testing: ○ SPT ● DCPT
MTO Vane*: △ Intact ▲ Remould
Nilcon Vane*: ◇ Intact ◆ 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

INSTRUMENTATION INSTALLATION

COMMENTS

1 riser pipe in bentonite
1 riser pipe in sand
1 slotted pipe in sand

STICK-UP HEIGHT: 0.93 m

AMEC Environment & Infrastructure
A division of AMEC Americas Limited
131 Fielding Road
Lively, Ontario
Canada P3Y 1L7
Tel +1(705) 682-2632
Fax +1(705) 682-2260
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Scale: 1 : 30

Continued on Next Page

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: ○ SPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ 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 sand 1 slotted pipe in sand
	light brown / grey SILTY CLAY some sand, trace cobbles very stiff to stiff					7					
	grey / brown 7.3 SANDY SILT some gravel, some to trace clay moist very dense					8					
						9					
	END OF BOREHOLE 9.1 (no refusal)										

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

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	N VALUE	% WATER	% RECOVERY	RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P – W_L)	REMARKS
0.0											UTM CO-ORDINATES UTM Zone: 17 NAD: 27 Easting: 597359 Northing: 5263019
0.1	**TOPSOIL:** DARK BROWN SILTY SAND, ROOTS AND ORGANIC MATERIAL, MOIST.			SS1	27	23	53				OW24-I STICKUP = 0.76 m OW24-II STICKUP = 0.81 m OW24-III STICKUP = 0.81 m
0.8	**SANDY SILT:** DARK GREY FINE SANDY SILT, MOIST, COMPACT.			SS2	18	23	94				
	SILTY CLAY/CLAYEY SILT: LIGHT BROWN/GREY MOTTLED SILTY CLAY/CLAYEY SILT, APL TO WPL, VERY STIFF TO STIFF.			SS3	16	36	100				
				SS4	12	38	100				
				SS5	10	38	100				
				SS6	8	48	100				
				SS7	11	36	100				
5.3	**SILTY CLAY/CLAYEY SILT:** MOTTLED GREY/LIGHT BROWN SILTY CLAY/CLAYEY SILT, SOME FINE TO MEDIUM SAND, TRACE COBBLES, MOIST, HARD/VERY DENSE.			SS8	64	24	42		64		OW24-III MONITOR INSTALLED AT 4.9 m
7.3	**TILL:** GRAY/BROWN TILL - SANDY SILT/SILTY SAND, SOME TO TRACE CLAY, SOME FINE TO MEDIUM GRAVEL, MOIST, VERY DENSE.			SS9	50	8	53				OW24-II MONITOR INSTALLED AT 8.4 m
				SS10			0				
				SS11	140	8	72		140		
				SS12	130	9	100		130		
13.1	**SAND:** GRAY FINE TO MEDIUM SAND, TRACE SILT, TRACE FINE TO COARSE GRAVEL, MOIST TO WET, VERY DENSE.			SS13	46	8	100		46		
				SS14	186	10	100		186		
				SS15	169	9	100		169		FLOWING SANDS
				SS16	89	16	89		89		
18.7	BOREHOLE TEMINATED AT 18.7 m DUE TO AUGER REFUSAL ON ASSUMED BEDROCK.										OW24-I MONITOR INSTALLED AT 18.7 m
20.0											

JHL GEOLOGIC B/W (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 TYPE	N VALUE	% WATER	% RECOVERY	ROD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 Wp Wl	REMARKS
0.0											UTM CO-ORDINATES UTM Zone: 17 NAD: 27 Easting: 597357 Northing: 5262765
0.0	TOPSOIL: DARK BROWN SILTY SAND, ROOTS AND ORGANIC MATERIAL, MOIST.			SS1	14	8	47				MOE WELL TAG # A059653
1.0	SILTY SAND/SANDY SILT: LIGHT/DARK BROWN MOTTLED SILTY SAND/SANDY SILT, SOME FINE TO MEDIUM GRAVEL, SOME TO TRACE SILT, TRACE COBBLES, MOIST, COMPACT TO DENSE, TO VERY DENSE TO COMPACT.			SS2	61	8	75				OW25-I STICKUP = 0.81 m OW25-II STICKUP = 0.82 m OW25-III STICKUP = 0.82 m
2.0				SS3	67	9	61				
2.3				SS4	38	6	81				
3.0	TILL: GREY SILT TILL, SOME TO TRACE FINE SAND, SOME TO TRACE CLAY, OCCASIONAL FINE TO MEDIUM GRAVEL, OCCASIONAL COBBLES, MOIST, HARD.			SS5	190	6	78				
4.0				SS6	192	7	72				OW25-III MONITOR INSTALLED AT 4.0 m
5.0				SS7	85	9	100				
6.0				SS8	90	8	89				
7.0											
8.0				SS9	52	8	100				
9.0											OW25-II MONITOR INSTALLED AT 9.1 m
10.0				SS10	67	9	67				
10.1	CLAYEY SILT/SILTY CLAY: DARK GREY CLAYEY SILT/SILTY CLAY, TRACE FINE SAND, TRACE FINE TO MEDIUM GRAVEL, OCCASIONAL COBBLE, MOIST, HARD TO VERY HARD.			SS11	53	9	100				
11.0											
12.0				SS12	56	11	100				
13.0											
14.0				SS13	58	10	100				
15.0				SS14			100				
16.0											
17.0				SS15	111	11	72				
18.0											
19.0				SS16	100	10	94				
20.0				SS17	50	12	72				

JHL GEOLOGIC B/W (METRIC) WITH UTM 4-001148-08 TEMISKAMING SHORES.GPJ JAGGER HIMS BASIC.GDT 5/15/08

Jagger Hims Limited

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 TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (Wp – WL)	UTM CO-ORDINATES / REMARKS
20.0	SILT: DARK GREY SILT, SOME FINE SAND, SOME CLAY, SOME TO TRACE FINE GRAVEL, OCCASIONAL COBBLE, MOIST, HARD.			SS18	92	11	100		92		UTM Zone: 17 NAD: 27 Easting: 597357 Northing: 5262765
21.0											
22.0											
23.0				SS19	99	14	100		99		OW25-I MONITOR INSTALLED AT 22.8 m
23.3	BOREHOLE TERMINATED AT 23.3 m DUE TO AUGER REFUSAL ON ASSUMED BEDROCK.										
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 B/W (METRIC) WITH UTM 4-001148-08 TEMISKAMING SHORES.GPJ JAGGER HIMS BASIC.GDT 5/15/08

Jagger Hims Limited

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

Project Number: **TY131010.6000**
Project Client: **City of Temiskaming Shores**
Project Name: **Monitoring Well Installation Project - New Liskeard Landfill Site**
Project Location: **New Liskeard, Ontario**

Drilling Location: **East Side of Solar Farm**
Drilling Method: **200 mm Hollow Stem Augers**
Drilling Machine: **Track Mounted Drill**
Date Started: **6 Sep 14** Date Completed: **7 Sep 14**

Logged by: **JS**
Compiled by: **MAT**
Reviewed by: **TIM**
Revision No.: **0, 20/11/14**

Local Ground Surface Elevation:

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: ○ SPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ 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
	dark grey SILTY SAND some gravel and cobbles, trace clay damp to wet, dense to very dense	AU				0 1 2 3 4 5 6					STICK-UP HEIGHT: 0.90 m

AMEC Environment & Infrastructure
A division of AMEC Americas Limited
131 Fielding Road
Lively, Ontario
Canada P3Y 1L7
Tel +1(705) 682-2632
Fax +1(705) 682-2260
www.amec.com

Continued on Next Page

Scale: 1 : 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 PROFILE		SOIL SAMPLING						FIELD TESTING			INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	PenetrationTesting ○ SPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ 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
	dark grey SILTY SAND some gravel and cobbles, trace clay damp to wet, dense to very dense					7 8 9						
		SS	1	100	15			○				
						10						
		SS	2	100	21	11		○				
						12						
		SS	3	100	30			○				

Continued on Next Page

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
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	PenetrationTesting ○ SPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ 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
	dark grey SILTY SAND some gravel and cobbles, trace clay damp to wet, dense to very dense					13						
		SS	4	38	100+	14			○			
						15						
		SS	5	100	65				○			
						16						
		SS	6	100	64	17			○			
						18						
		SS	7	100	78				○			
						19						

Continued on Next Page

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
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing: ○ SPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ 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
	dark grey SILTY SAND some gravel and cobbles, trace clay damp to wet, dense to very dense										
		SS	8	100	50+	20		○			
	END OF BOREHOLE 20.3 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**
Project Client: **City of Temiskaming Shores**
Project Name: **Monitoring Well Installation Project - New Liskeard Landfill Site**
Project Location: **New Liskeard, Ontario**
Drilling Location: **East Side of Solar Farm**
Drilling Method: **200 mm Hollow Stem Augers**
Drilling Machine: **Track Mounted Drill**
Date Started: **5 Sep 14** Date Completed: **8 Sep 14**
Logged by: **JS**
Compiled by: **MAT**
Reviewed by: **TIM**
Revision No.: **0, 20/11/14**

Local Ground Surface Elevation:

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)
	light brown to dark grey SILTY SAND some gravel damp, dense	AU	1				
		SS	2	72	21	1	
		SS	3	75	18	2	
		SS	4	89	53	3	
		SS	5	79	38		
		SS	6	100	38	4	
		SS	7	100	26	5	
						6	

FIELD TESTING: Penetration Testing (○ SPT ● DCPT); MTO Vane* (△ Intact ▲ Remould); Nilcon Vane* (◇ Intact ◆ 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

INSTRUMENTATION INSTALLATION

COMMENTS
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

AMEC Environment & Infrastructure
A division of AMEC Americas Limited
131 Fielding Road
Lively, Ontario
Canada P3Y 1L7
Tel +1(705) 682-2632
Fax +1(705) 682-2260
www.amec.com

Continued on Next Page

Scale: 1 : 30

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			COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing: ○ SPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ 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	INSTRUMENTATION INSTALLATION	1 riser pipe in bentonite 1 riser pipe in grout 1 riser pipe in sand 1 slotted pipe in sand
	light brown to dark grey SILTY SAND some gravel damp, dense	SS	8	100	19	7		○			
		SS	9	87	50+			○			
	END OF BOREHOLE 7.8 (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 PROFILE		SOIL SAMPLING						FIELD TESTING			COMMENTS
Lithology Plot	DESCRIPTION Local Ground Surface Elevation:	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing: ○ SPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ 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	INSTRUMENTATION INSTALLATION	1 riser pipe in bentonite 1 riser pipe in grout 1 riser pipe in sand 1 slotted pipe in sand
	START OF CORING					0					
	BEDROCK 2.1					1					
	TCR = 78% SCR = 75% RQD = 50%	RC	1	80		2					
	TCR = 81% SCR = 83% RQD = 33% 4.0	RC	2	80		3					
	TCR = 86% SCR = 50% RQD = 26% 4.7	RC	3	86		4					
	TCR = 98% SCR = 100% RQD = 100% 5.9	RC	4	99		5					
	TCR = 98% SCR = 100% RQD = 100% 7.4	RC	5	98		6					
	TCR = 98% SCR = 100% RQD = 100% 9.0	RC	6	99		7					
	10.5					8					
						9					
						10					
						11					

Amec Foster Wheeler
Environment & Infrastructure
131 Fielding Road
Lively, Ontario
Canada P3Y 1L7
Tel +1(705) 682-2632
Fax +1(705) 682-2260
www.amecfw.com

Continued on Next Page

▽ 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

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 PROFILE		SOIL SAMPLING						FIELD TESTING			COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing: ○ SPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ 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	INSTRUMENTATION INSTALLATION	1 riser pipe in bentonite 1 riser pipe in grout 1 riser pipe in sand 1 slotted pipe in sand
	BEDROCK TCR = 92% SCR = 66% RQD = 72% TCR = 92% SCR = 66% RQD = 72%	RC	7	92		12					
	11.8 TCR = 100% SCR = 95% RQD = 97%	RC	8	100		13					
	TCR = 100% SCR = 100% RQD = 92% 13.4	RC	9	100		14					
	TCR = 100% SCR = 93% RQD = 88% 15.0	RC	10	100		15 16					
	TCR = 100% SCR = 100% RQD = 100% 16.5	RC	11	100		17 18					
	END OF CORING 18.1										

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

Project Number: **TY910491.8000**
Project Client: **City of Temiskaming Shores**
Project Name: **2017 Supplemental Hydrogeological Program**
Project Location: **New Liskeard Landfill, City of Temiskaming Shores, Ontario**

Drilling Location: **Eastern Fence Line**
Drilling Method: **200 mm Hollow Stem Augers**
Drilling Machine: **Track Mounted Drill**
Date Started: **12 Jun 17** Date Completed: **13 Jun 17**

Logged by: **ARM**
Compiled by: **MAT**
Reviewed by: **BRG**
Revision No.: **1, 23/02/18**

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING			INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION Local Ground Surface Elevation:	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing: ○ SPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ 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
	brown SILT & SAND some gravel moist	SS	1	30	14			○				
		SS	2	75	16	1		○				
		SS	3	80	52	2		○				
						3						
						4						
						5						
						6						
						7						
						8						
						9						
						10						
						11						

Amec Foster Wheeler
Environment & Infrastructure
131 Fielding Road
Lively, Ontario
Canada P3Y 1L7
Tel +1(705) 682-2632
Fax +1(705) 682-2260
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Continued on Next Page

▽ 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

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 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: ○ SPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ 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
	brown SILT & SAND some gravel moist					12 13 14 15 16 17 18 19 20 21 22 23					

Continued on Next Page

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 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: ○ SPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ 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
	brown SILT & SAND some gravel moist					24 25 26 27					
	START OF CORING 27.4 BEDROCK TCR = 85% SCR = 87% RQD = 64%	RC	4	85		28					
	TCR = 100% 28.8 SCR = 70% RQD = 63%	RC	5	100		29 30					
	END OF CORING 30.3										

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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

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
Lithology Plot	DESCRIPTION Local Ground Surface Elevation:	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing: ○ SPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ 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
	brown SILTY SAND trace clay and gravel moist to wet	SS	1	67	3	0		○			
		SS	2	51	22	1		○			
	brown 1.2 SAND some silt, trace gravel moist to wet	SS	3	59	54	2		○			
						3					
						4					
						5					
						6					
						7					
						8					
						9					
						10					
						11					

Amec Foster Wheeler
Environment & Infrastructure
131 Fielding Road
Lively, Ontario
Canada P3Y 1L7
Tel +1(705) 682-2632
Fax +1(705) 682-2260
www.amecfw.com

Continued on Next Page

▽ 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

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 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: ○ SPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ 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
	brown SAND some silt, trace gravel moist to wet					12 13 14 15 16 17 18 19					
	START CORING 20.0 brown SAND & CLAY some gravel, trace silt compressed, moist	RC				20 21 22					
	brown 22.3 SANDSTONE oxidation, wet	RC		100		23					

Continued on Next Page

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 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: ○ SPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ 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
	brown SANDSTONE oxidation, wet										
	TCR = 100% SCR = 83% RQD = 0% 23.9										
	TCR = 32% SCR = 76% RQD = 7%	RC		32		24					
	TCR = 84% SCR = 48% RQD = 24% 25.4	RC		84		25					
	TCR = 100% SCR = 85% RQD = 70% 26.6	RC		100		26					
	TCR = 92% SCR = 95% RQD = 96% 27.3	RC		92		27					
	TCR = 100% SCR = 97% RQD = 95% 28.8	RC		100		28					
	END OF CORING 30.4					29					
						30					

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**

Local Ground Surface Elevation:

Depth (m)	Description	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value
0	150 mm ORGANICS over				
	grey SILT, trace clay, moist				
0.4	brown SAND & GRAVEL, trace silt and clay, increasing silt and clay content with depth, wet	AU			
7.6	END OF BOREHOLE (no refusal)				

FIELD TESTING

Penetration Testing: ○ SPT ● DCPT

MTO Vane*: △ Intact ▲ Remould

Nilcon Vane*: ◇ Intact ◆ 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

INSTRUMENTATION INSTALLATION

COMMENTS

- 1 riser pipe in bentonite
- 1 riser pipe in grout
- 1 riser pipe in sand
- 1 slotted pipe in sand

Amec Foster Wheeler
Environment & Infrastructure
131 Fielding Road
Lively, Ontario
Canada P3Y 1L7
Tel +1(705) 682-2632
Fax +1(705) 682-2260
www.amecfw.com

▽ 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

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

Lithology Plot

DESCRIPTION

Local Ground Surface Elevation:

150 mm ORGANICS over

grey
SILT 0.4
trace clay
moist

brown
SAND & GRAVEL
trace silt and clay
increasing silt and clay content with depth
wet

10.7

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT 'N' Value
SS	1	100	24
SS	2	5	67
SS	3	33	40
SS	4	100	48
SS	5	16	41
SS	6	100	44
SS	7	100	40
SS	8	59	40
SS	9	100	27
SS	10	100	38

DEPTH (m): 1 2 3 4 5 6 7 8 9 10 11

ELEVATION (m)

FIELD TESTING

Penetration Testing
○ SPT ● DCPT
MTO Vane* △ Intact ▲ Remould
Nilcon Vane* ◇ Intact ◆ 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

INSTRUMENTATION INSTALLATION

COMMENTS

1 riser pipe in bentonite
1 riser pipe in grout
1 riser pipe in sand
1 slotted pipe in sand

amec foster wheeler
Amec Foster Wheeler
Environment & Infrastructure
131 Fielding Road
Lively, Ontario
Canada P3Y 1L7
Tel +1(705) 682-2632
Fax +1(705) 682-2260
www.amecfw.com

Continued on Next Page

▽ 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

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						FIELD TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing: ○ SPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ 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
	brown SILTY SAND some gravel moist	SS	11	75	30						
						12					
		SS	12	59	40						
						13					
		SS	13	72	51	14					
						15					
	brown SAND & GRAVEL moist 15.3	SS	14	42	78						
	END OF BOREHOLE 15.9 DUE TO REFUSAL ON POSSIBLE COBBLE / BOULDERS OR BEDROCK										

amec foster wheeler

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

APPENDIX C

HYDRAULIC CONDUCTIVITIES

PROJECT NO.:	TY91049.8000	TOP OF TEST INTERVAL:	59	FEET			
CLIENT:	City of Temiskaming Shores	BOTTOM OF TEST INTERVAL:	59.4	FEET	INTERVAL LENGTH:	0.1	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^3)	(litres)	(litres)	(m^3)	(litres)	(litres)	(m^3)	(litres)	(litres)	(m^3)	(litres)	(litres)	(m^3)	(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		
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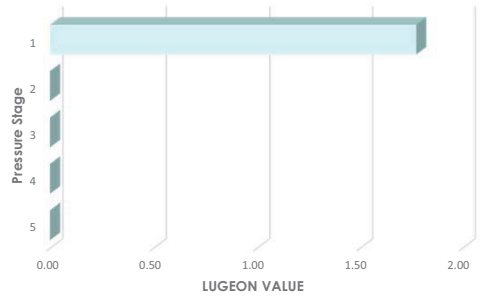

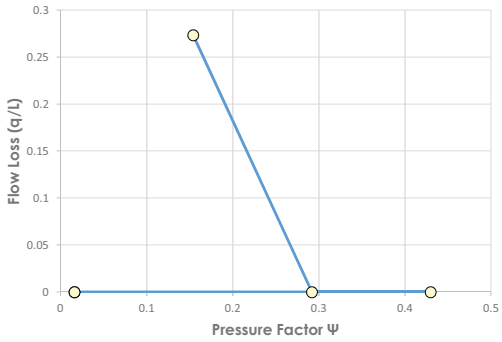

AVERAGE FLOW (litres / min)	0.03	AVERAGE FLOW (litres / min)	0.00	AVERAGE FLOW (litres / min)	0.00	AVERAGE FLOW (litres / min)		AVERAGE FLOW (litres / min)		
LUGEON VALUE	1.77	LUGEON VALUE	0.00	LUGEON VALUE	0.00	LUGEON VALUE	INCOMPLETE DATA	LUGEON VALUE	INCOMPLETE DATA	
HYDRAULIC CONDUCTIVITY K (m/s)	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:
Houlsby, 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^3)	(litres)	(litres)	(m^3)	(litres)	(litres)	(m^3)	(litres)	(litres)	(m^3)	(litres)	(litres)	(m^3)	(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		
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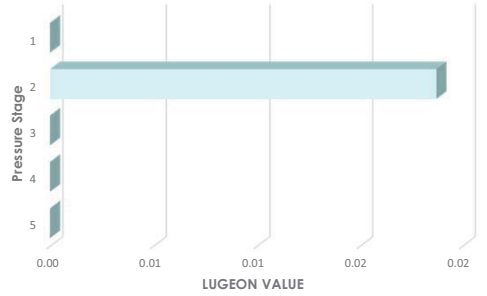

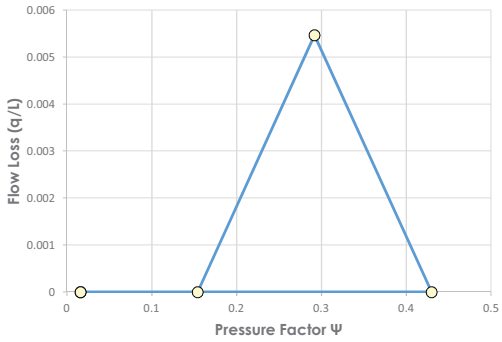

AVERAGE FLOW (litres / min)	0.00	**AVERAGE FLOW (litres / min)**	0.03	**AVERAGE FLOW (litres / min)**	0.00	**AVERAGE FLOW (litres / min)**		**AVERAGE FLOW (litres / min)**	
LUGEON VALUE	0.00	**LUGEON VALUE**	0.02	**LUGEON VALUE**	0.00	**LUGEON VALUE**	INCOMPLETE DATA	**LUGEON VALUE**	INCOMPLETE DATA
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:
Houlsby, 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			

	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	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^3)	(litres)	(litres)	(m^3)	(litres)	(litres)	(m^3)	(litres)	(litres)	(m^3)	(litres)	(litres)	(m^3)	(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		
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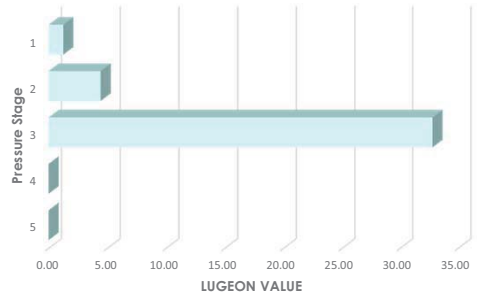
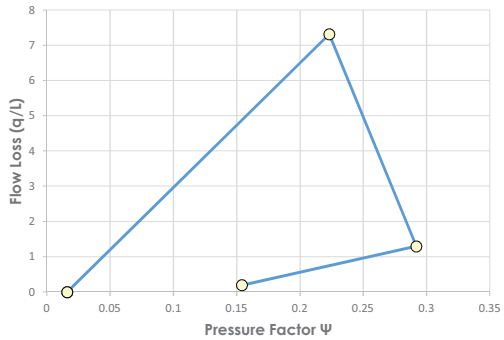




AVERAGE FLOW (litres / min)	1.00	AVERAGE FLOW (litres / min)	6.70	AVERAGE FLOW (litres / min)	37.90	AVERAGE FLOW (litres / min)		AVERAGE FLOW (litres / min)	
LUGEON VALUE	1.25	LUGEON VALUE	4.43	LUGEON VALUE	32.80	LUGEON VALUE	INCOMPLETE DATA	LUGEON VALUE	INCOMPLETE DATA
HYDRAULIC CONDUCTIVITY K (m/s)	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	

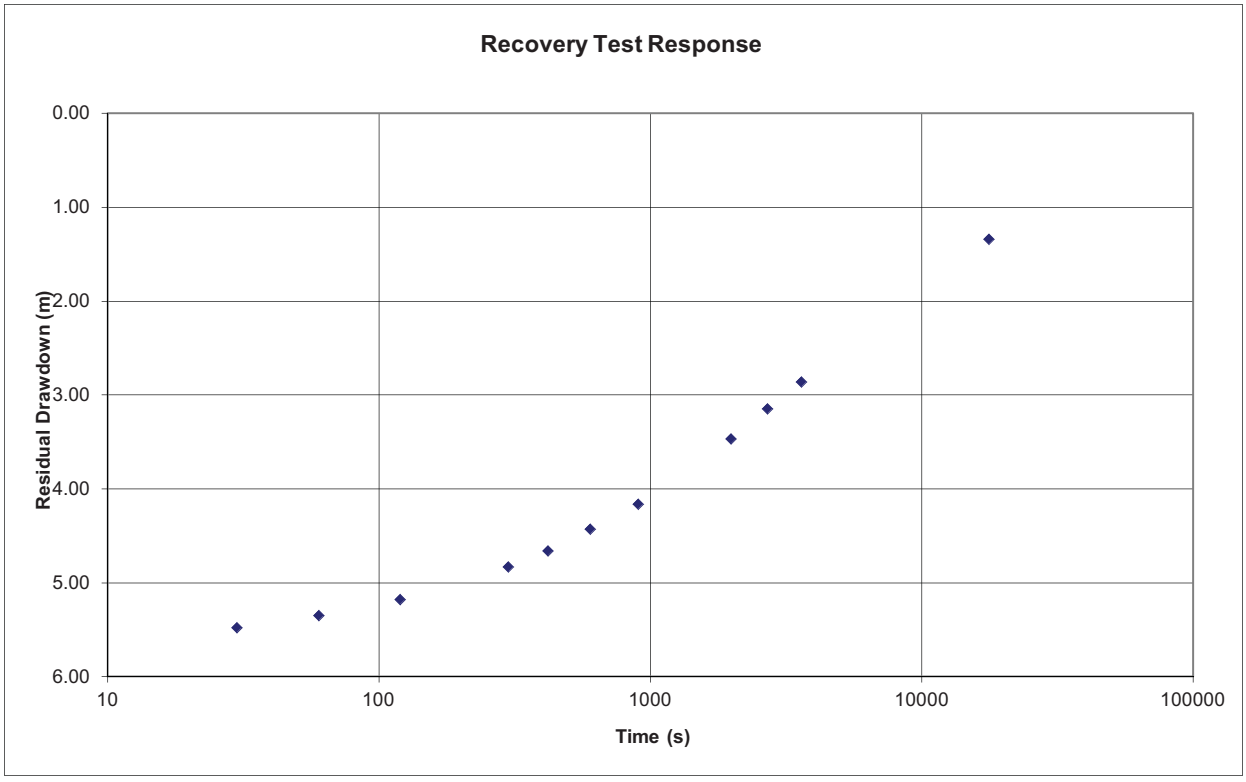
Interpretation References:
Houlsby, A. (1976). Routine Interpretation of the Lugeon Water-Test. Q. J. Eng. Geol. Vol. 9, pp. 303-313.
Quiñones-Rozo, Camilo (2010):Lugeon test interpretation, revisited. In: Collaborative Management of Integrated Watersheds, US Society of Dams, 30th Annual Conference,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

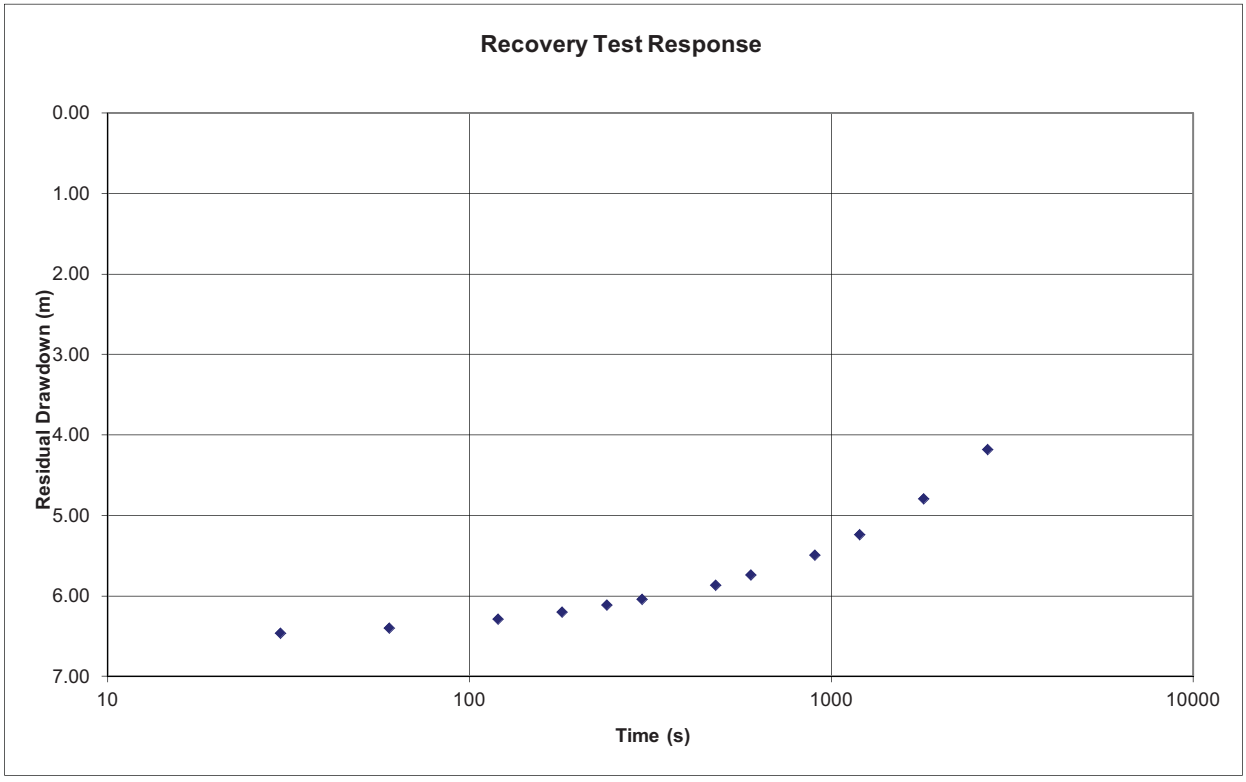


Hydraulic Conductivity Calculations - Hvorslev

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

GROUNDWATER ELEVATIONS

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

wood.

Summary of Groundwater Elevations

Monitor No.	UTM Coordinates		Current Measuring Point Elevation (masl)[1]	Elevation of Water (masl)[1]																										
	Easting	Northing		Jun-11	Sep-11	Nov-11	Jun-12	Sep-12	Nov-12	May-13	Jul-13	Sep-13	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
OW-1R-I	596848	5262959	254.17	251.87	251.10	252.04	251.63	251.46	252.22	251.99	251.36	251.62	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
OW-1R-II	596848	5262959	254.06	251.80	251.01	251.93	251.50	251.22	252.08	251.76	251.16	251.39	251.61	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
OW-1R-III	596848	5262959	254.19	252.51	251.87	252.66	252.29	252.09	252.79	252.91	252.20	252.42	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
OW-2B	596919	5263040	247.26	246.37	245.69	246.37	246.13	246.21	246.40	246.79	246.26	246.52	ND	246.31	Decommissioned															
OW-2C	596919	5263040	247.14	245.27	244.57	245.40	245.14	245.20	245.41	245.18	245.04	245.18	ND	245.11	Decommissioned															
OW-3A	596974	5263111	244.55	243.32			242.62	242.78	243.31	243.29	242.89	243.22	243.28	242.41	Decommissioned															
OW-3B	596974	5263111	244.50	243.59	242.07	243.57	242.91	243.09	243.57	243.57	243.11	243.42	243.55	242.67	Decommissioned															
OW-4A	596978	5262870	251.20	250.12	250.13		249.96	250.05	250.11	250.07	249.62	250.14	250.14	249.23	Decommissioned															
OW-4C	596978	5262870	251.31	249.43	249.15	249.58	249.37	249.34	249.45	248.96	248.61	248.89	249.52	249.85	Decommissioned															
OW-5A	596879	5262883	253.48	253.30	253.19	253.32	253.14	253.12	253.34	250.31	250.15	250.23	250.32	250.09	Decommissioned															
OW-6A	596973	5262769	254.32	253.12	252.96		252.96	253.05	253.19	253.16	253.02	253.10	253.15	252.93	Decommissioned															
OW-6B	596973	5262769	254.35	252.56	252.43	252.68	252.51	252.61	252.76	252.29	252.23	252.30	252.34	252.28	Decommissioned															
OW-7A	596895	5262781	255.83	255.42	255.29	255.51	255.35	255.20	255.59	ND	ND	252.19	252.45	252.22	Decommissioned															
OW-7B	596895	5262781	256.01							ND	ND	252.25	252.51	252.26	Decommissioned															
OW-7C	596895	5262781	255.90						251.33	ND	ND	248.15	248.30	248.13	Decommissioned															
OW-8A	597088	5262770	249.47							248.30	247.35	Damaged	248.15	248.03	Decommissioned															
OW-8B	597088	5262770	249.54	Destroyed																										
OW-9A	597071	5262876	247.25	246.26	244.85	246.25	245.83	245.55	246.27	246.11	245.15	245.72	245.45	245.45	Decommissioned															
OW-9B	597071	5262876	247.33	245.78	244.62	245.77	245.47	246.03	245.81	245.79	244.89	245.48	245.14	245.36	Decommissioned															
OW-10-I	596724	5263229	251.67	249.41	248.57	249.77	249.05	249.42	249.82	249.79	249.01	249.76	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
OW-10-II	596724	5263229	251.69	249.90	248.61	250.37	249.31	249.80	250.44	250.43	249.18	250.21	250.31	248.99	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
OW-10-III	596724	5263229	ND																					ND	ND	ND	ND	ND	ND	ND
OW-11-I	597001	5263159	242.93	241.03	240.53	240.21	240.81	240.79	241.00	241.02	241.08	241.07	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	240.71	240.54	240.48
OW-11-II	597001	5263159	242.82	241.43	240.17	241.62	240.94	241.05	241.67	241.23	241.02	240.14	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
OW-12-I	597007	5262919	248.92	247.57	246.81	247.55	247.30	247.39	247.62	247.09	246.54	246.86	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
OW-12-II	597007	5262919	248.95	247.51	246.85	247.53	247.20	247.50	247.59	247.04	246.55	246.89	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
OW-13-I	596602	5262921	273.70	264.31	263.86	265.62	264.28	264.04	266.16	266.43	264.13	264.29	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
OW-13-II	596602	5262921	273.85		268.56	268.68	268.61	268.55	268.67	268.67	268.82	268.56	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
OW-14-I	596977	5262674	258.81	254.37	254.17	254.44	254.28	254.34	254.55	254.11	253.57	253.80	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
OW-14-II	596977	5262674	258.72	254.90	254.83	254.95	254.84	254.86	255.08	255.16	254.90	254.90	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
OW-15-I	597059	5262605	254.32	251.37	251.18	251.35	251.30	251.15	251.64	Destroyed																				
OW-15-II	597059	5262605	254.40	253.32		253.33	252.81	253.08	253.34	Destroyed																				
OW-16-I	597372	5263132	238.59	234.34	233.65	234.11	234.38	233.34	234.15	234.98	234.78	234.42	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
OW-16-II	597372	5263132	238.73	235.50	232.60	232.11	235.40	232.48	231.68	235.30	232.53	232.41	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
OW-16-III	597372	5263132	238.94	237.06	235.12	237.48	236.75	235.17	237.51	237.26	236.30	237.14	236.74	236.27	236.81	237.07	236.37	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
OW-17-I	597359	5263362	230.08	228.95	228.26	228.74	228.97	228.08	228.76	229.46	229.25	228.97	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
OW-17-II	597359	5263362	229.88	227.85	226.57	226.68	227.81	226.21	226.62	228.51	227.46	226.83	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
OW-17-III	597359	5263362	230.04	227.94		227.68	227.54	226.20	228.54	228.98	226.64	<226.26	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	<226.26	228.91	226.28	<226.26
OW-18-I	596771	5262904	280.52							<273.48	<273.48	<273.48	<273.48	<273.48	<273.48	<273.48	<273.48	<273.48	<273.48	<273.48	<273.48	<273.48	<273.48	<273.48	<273.49	<273.50	<273.51	<273.49	<273.50	<273.51
OW-20-I	596970	5262468	259.31	257.59	257.03	257.97	257.42	257.29	258.17	258.06	257.42	257.71	257.67	257.24	257.86	257.67	257.35	257.09	257.76	257.28	256.82	257.81	257.61	257.82	257.80	257.09	257.61	258.00	257.35	257.10
OW-20-II	596970	5262468	259.19	257.62	256.71	257.94	257.34	257.02	258.16	258.30	257.71	258.02	258.01	257.45	258.06	257.98	257.52	257.55	258.08	257.44	256.95	258.12	257.75	257.92	258.14	257.28	257.77	258.28	257.43	257.16
OW-21-I	597141	526527	ND	252.28	250.76	252.38	251.78	251.85	252.40	252.44	251.92	252.30	252.54	Destroyed	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OW-22-I	596974	5262607	258.63	255.96	255.23	256.10	255.69	255.60	256.19	256.26	255.68	255.79	256.13	255.59	256.01	256.02	255.63	255.25	256.14	255.61	255.15	256.12	255.85	255.90	256.17	255.48	255.67	256.35	255.62	255.48
OW-23-I	597678	5263239	202.71	197.34	196.68	196.84	197.22	196.05	196.58	197.29	197.01	196.70	197.80	197.21	197.35	197.55	197.10	196.68	197.77	197.24	196.54	196.82	196.60	191.74	196.71	196.21	195.84	197.28	196.47	195.90
OW-23-II	597678	5263239	203.02	196.86	191.49	191.54	197.29	192.25	191.24	196.07	193.50	192.52	197.51	194.78	193.80	197.93	192.35	192.56	197.92	195.14	192.62	196.69	193.40	196.70	196.48	192.06	192.01	196.95	195.45	192.71
OW-24-I	597372	5263251	237.05	229.82	228.86	229.43	229.73	228.64	229.45	230.27	230.02	229.67	Destroyed		230.00	230.21	229.95	229.05	229.35	229.64	229.15	229.99	229.83	229.75	230.05	229.53	229.12	230.31	229.80	229.385
OW-24-II	597372	5263251	236.99	233.49	230.36	235.13	233.32	229.39	235.62	235.82	233.35	234.16	Destroyed		235.00	234.64	233.63	234.87	235.39	232.97	232.18	235.18	234.20	234.79	235.27	233.27	235.22	235.16	233.16	234.68
OW-24-III	597372	5263251	236.96	231.01	231.08	235.13	233.32	231.09	235.63	235.81	233.34	234.20	234.89	233.77	234.93	234.41	233.68	234.63	234.84	232.72	231.97	234.72	234.16	234.55	235.28	233.30	235.23	235.46	233.45	235.06
OW-25-I	597370	5263000	240.33	234.39	233.46	234.12	234.27	233.25	234.34	235.00	234.68	234.40	235.12	234.56	234.90	235.17	234.72	234.19	235.23	234.49	233.98	234.82	234.64	234.54	234.91	234.35	233.90	235.15	234.66	234.19
OW-25-II	597370	5263000	240.38	236.49	235.75	234.98	236.49	235.76	234.89	236.01	234.44	235.76	235.98	235.13	235.68	235.46	233.18	235.53	236.41	236.08	235.05	236.04	235.27	236.11	235.02	234.73	235.37	236.22	233.53	234.89
OW-25-III	597370	5263000	240.36	238.91	236.82	239.08	238.61	238.14	239.10	238.88	237.53	238.55	238.18	237.54	238.07	238.27	237.70	238.60	238.82	237.30	235.71	238.78	237.94	238.23	238.48	236.31	238.78	238.73	236.80	238.79
OW-25-IV	597370	5263000	239.89																					234.05	234.43	234.20	233.62	234.64	234.39	233.89
OW-30-I	597401	5262836	241.43												228.48	236.95	229.26	231.29	237.54	232.53	230.69	234.73	232.33	232.13	234.90	230.55	231.36	235.33	231.05	230.25
OW-30-II	597401	5262836	241.56												234.55	237.25	238.29	238.09	238.53	238.11	237.96	238.88	238.53	238.72	238.13	237.77	238.36	239.91	238.35	238.04
OW-30-III	597401	5262836	241.35																					234.43	234.77	234.25	233.84	235.06	234.60	234.10
OW-31-I	597398	5262893	240.19																					238.70	233.85	232.49	232.67	233.70	232.72	232.74
OW-31-II	597398	5262893	240.20																					236.89	234.49	235.58	236.57	235.70	236.08	236.53

Notes:
(1) masl - metres above sea level.
(2) ND - no current elevation data available.

Wood Project No.: **TY131010**

APPENDIX E

2019 LABORATORY ANALYTICAL REPORTS

AGAT Laboratories

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

CLIENT NAME: WOOD CANADA LTD.
131 FIELDING ROAD
LIVELY, ON P3Y1L7
(705) 682-2632

ATTENTION TO: Emily Lemieux

PROJECT: New Liskeard GW (TY131010)

AGAT WORK ORDER: 19T472743

WATER ANALYSIS REVIEWED BY: Parvathi Malemath, Data Reviewer

DATE REPORTED: Jun 14, 2019

PAGES (INCLUDING COVER): 24

VERSION*: 2

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

*NOTES

VERSION 2: REVISED REPORT TO CORRECT ERROR IN SAMPLE ID FOR CLIENT'S SAMPLES OW-17-II and OW-17-III, ISSUED ON JANUARY 13, 2020.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. Measurement Uncertainty is not taken into consideration when stating conformity with a specified requirement.

Results relate only to the items tested. Results apply to samples as received.
All reportable information as specified by ISO 17025:2017 is available from AGAT Laboratories upon request

AGAT Laboratories

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

Certificate of Analysis

AGAT WORK ORDER: 19T472743

PROJECT: New Liskeard GW (TY131010)

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-05-29

DATE REPORTED: 2019-06-14

		SAMPLE DESCRIPTION:		OW-1R-I		OW-1R-II		OW-10-I	OW-10-II		OW-10-III
		SAMPLE TYPE:		Water		Water		Water	Water		Water
		DATE SAMPLED:		2019-05-26		2019-05-26		2019-05-26	2019-05-26		2019-05-26
Parameter	Unit	G / S	RDL	231314	RDL	231348	RDL	231349	231350	RDL	231351
pH	pH Units		NA	7.72	NA	7.62	NA	7.53	7.83	NA	7.82
Alkalinity (as CaCO3)	mg/L		5	956	5	858	5	261	242	5	200
Electrical Conductivity	uS/cm		2	2450	2	2000	2	730	640	2	528
Total Hardness (as CaCO3)	mg/L		0.5	848	0.5	686	0.5	401	348	0.5	208
Total Dissolved Solids	mg/L		20	1300	20	1150	20	476	380	20	276
Fluoride	mg/L	1.5	1.0	<1.0	0.5	<0.5	0.10	0.21	<0.10	0.05	0.48
Chloride	mg/L		2.0	192	1.0	105	0.20	2.46	1.69	0.10	0.98
Nitrate as N	mg/L	10.0	1.0	<1.0	0.5	<0.5	0.10	<0.10	<0.10	0.05	<0.05
Nitrite as N	mg/L	1.0	1.0	<1.0	0.5	<0.5	0.10	<0.10	<0.10	0.05	<0.05
Sulphate	mg/L		2.0	153	1.0	126	0.20	152	120	0.10	88.3
Phosphate as P	mg/L		2.0	<2.0	1.0	<1.0	0.20	<0.20	<0.20	0.10	<0.10
Ammonia as N	mg/L		0.5	12.6	0.5	13.8	0.02	<0.02	<0.02	0.02	0.04
Total Kjeldahl Nitrogen	mg/L		0.10	17.1	0.10	17.4	0.10	<0.10	0.14	0.10	0.25
Organic Nitrogen	mg/L		0.10	4.50	0.10	3.60	0.10	<0.10	0.14	0.10	0.21
Dissolved Organic Carbon	mg/L		0.5	21.7	0.5	10.4	0.5	1.7	2.7	0.5	1.7
Calcium	mg/L		0.25	163	0.25	137	0.05	104	109	0.05	50.0
Magnesium	mg/L		0.25	107	0.25	83.4	0.05	34.2	18.5	0.05	20.1
Sodium	mg/L	20	0.25	**165**	0.25	**134**	0.05	4.04	2.06	0.05	**36.1**
Potassium	mg/L		0.25	93.2	0.25	82.2	0.05	4.95	0.88	0.05	6.95
Aluminum	mg/L		0.004	0.010	0.004	<0.004	0.004	<0.004	<0.004	0.004	<0.004
Arsenic	mg/L	0.01	0.003	<0.003	0.003	<0.003	0.003	<0.003	<0.003	0.003	<0.003
Barium	mg/L	1	0.002	0.083	0.002	0.111	0.002	0.034	0.016	0.002	0.038
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	0.010	1.76	0.010	1.23	0.010	0.162	0.012	0.010	0.249
Cadmium	mg/L	0.005	0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002	0.002	<0.002
Chromium	mg/L	0.05	0.003	0.012	0.003	0.012	0.003	<0.003	<0.003	0.003	<0.003
Cobalt	mg/L		0.001	0.006	0.001	0.007	0.001	<0.001	<0.001	0.001	<0.001
Copper	mg/L		0.003	0.009	0.003	0.012	0.003	<0.003	<0.003	0.003	<0.003
Iron	mg/L		0.010	<0.010	0.010	<0.010	0.010	0.097	<0.010	0.010	<0.010

Certified By:



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

Certificate of Analysis

AGAT WORK ORDER: 19T472743

PROJECT: New Liskeard GW (TY131010)

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-05-29

DATE REPORTED: 2019-06-14

		SAMPLE DESCRIPTION:		OW-1R-I		OW-1R-II		OW-10-I	OW-10-II		OW-10-III
		SAMPLE TYPE:		Water		Water		Water	Water		Water
		DATE SAMPLED:		2019-05-26		2019-05-26		2019-05-26	2019-05-26		2019-05-26
Parameter	Unit	G / S	RDL	231314	RDL	231348	RDL	231349	231350	RDL	231351
Lead	mg/L	0.01	0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001	0.001	<0.001
Manganese	mg/L		0.002	0.729	0.002	0.984	0.002	0.021	<0.002	0.002	0.048
Molybdenum	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002	0.002	0.008
Nickel	mg/L		0.003	0.044	0.003	0.041	0.003	<0.003	<0.003	0.003	<0.003
Phosphorus	mg/L		0.05	<0.05	0.05	<0.05	0.05	<0.05	<0.05	0.05	<0.05
Selenium	mg/L	0.05	0.004	<0.004	0.004	<0.004	0.004	<0.004	<0.004	0.004	<0.004
Silicon	mg/L		0.05	8.42	0.05	7.36	0.05	3.81	2.51	0.05	3.57
Silver	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002	0.002	<0.002
Strontium	mg/L		0.005	1.23	0.005	0.748	0.005	1.17	0.151	0.005	1.69
Sulfur	mg/L		0.25	54.3	0.25	45.5	0.05	50.5	40.6	0.05	27.2
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	0.003	0.002	0.002	0.002	0.003	0.002	0.002	<0.002
Uranium	mg/L	0.02	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		0.005	<0.005	0.005	<0.005	0.005	<0.005	<0.005	0.005	<0.005

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Certificate of Analysis

AGAT WORK ORDER: 19T472743

PROJECT: New Liskeard GW (TY131010)

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-05-29

DATE REPORTED: 2019-06-14

		SAMPLE DESCRIPTION:		OW-11-I		OW-11-II		OW-12-I		OW-12-II
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		2019-05-27		2019-05-27		2019-05-27		2019-05-27
Parameter	Unit	G / S	RDL	231352	RDL	231353	RDL	231354	RDL	231355
pH	pH Units		NA	7.86	NA	7.85	NA	7.80	NA	7.79
Alkalinity (as CaCO3)	mg/L		5	234	5	373	5	286	5	498
Electrical Conductivity	uS/cm		2	543	2	815	2	752	2	1180
Total Hardness (as CaCO3)	mg/L		0.5	265	0.5	387	0.5	361	0.5	539
Total Dissolved Solids	mg/L		20	304	20	494	20	448	20	706
Fluoride	mg/L	1.5	0.05	0.33	0.25	<0.25	0.10	0.33	0.25	<0.25
Chloride	mg/L		0.10	9.69	0.50	18.9	0.20	38.8	0.50	51.4
Nitrate as N	mg/L	10.0	0.05	0.18	0.25	<0.25	0.10	<0.10	0.25	<0.25
Nitrite as N	mg/L	1.0	0.05	<0.05	0.25	<0.25	0.10	<0.10	0.25	<0.25
Sulphate	mg/L		0.10	53.8	0.50	72.2	0.20	74.6	0.50	99.2
Phosphate as P	mg/L		0.10	<0.10	0.50	<0.50	0.20	<0.20	0.50	<0.50
Ammonia as N	mg/L		0.02	<0.02	0.02	<0.02	0.02	<0.02	0.02	<0.02
Total Kjeldahl Nitrogen	mg/L		0.10	<0.10	0.10	0.61	0.10	0.30	0.10	0.95
Organic Nitrogen	mg/L		0.10	<0.10	0.10	0.61	0.10	0.30	0.10	0.95
Dissolved Organic Carbon	mg/L		0.5	0.9	0.5	7.0	0.5	2.6	0.5	8.3
Calcium	mg/L		0.05	63.4	0.05	98.8	0.05	86.2	0.10	162
Magnesium	mg/L		0.05	26.0	0.05	34.1	0.05	35.5	0.10	32.6
Sodium	mg/L	20	0.05	12.6	0.05	**25.5**	0.05	15.1	0.10	**61.7**
Potassium	mg/L		0.05	5.92	0.05	4.71	0.05	7.82	0.10	2.67
Aluminum	mg/L		0.004	<0.004	0.004	<0.004	0.004	<0.004	0.004	<0.004
Arsenic	mg/L	0.01	0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003
Barium	mg/L	1	0.002	0.032	0.002	0.021	0.002	0.057	0.002	0.035
Beryllium	mg/L		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
Boron	mg/L	5	0.010	0.255	0.010	0.357	0.010	0.383	0.010	0.160
Cadmium	mg/L	0.005	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Chromium	mg/L	0.05	0.003	<0.003	0.003	0.003	0.003	0.003	0.003	0.006
Cobalt	mg/L		0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Copper	mg/L		0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003
Iron	mg/L		0.010	<0.010	0.010	<0.010	0.010	<0.010	0.010	0.059

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

Certificate of Analysis

AGAT WORK ORDER: 19T472743

PROJECT: New Liskeard GW (TY131010)

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-05-29

DATE REPORTED: 2019-06-14

		SAMPLE DESCRIPTION:		OW-11-I		OW-11-II		OW-12-I		OW-12-II
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		2019-05-27		2019-05-27		2019-05-27		2019-05-27
Parameter	Unit	G / S	RDL	231352	RDL	231353	RDL	231354	RDL	231355
Lead	mg/L	0.01	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Manganese	mg/L		0.002	0.002	0.002	0.026	0.002	<0.002	0.002	0.045
Molybdenum	mg/L		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	0.008
Phosphorus	mg/L		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
Selenium	mg/L	0.05	0.004	<0.004	0.004	<0.004	0.004	<0.004	0.004	<0.004
Silicon	mg/L		0.05	3.48	0.05	4.60	0.05	4.51	0.05	4.65
Silver	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Strontium	mg/L		0.005	1.93	0.005	0.187	0.005	2.12	0.005	0.444
Sulfur	mg/L		0.05	23.3	0.05	23.6	0.05	30.8	0.10	37.3
Thallium	mg/L		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
Titanium	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Uranium	mg/L	0.02	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
Zinc	mg/L		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005

Certified By:

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
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Certificate of Analysis

AGAT WORK ORDER: 19T472743

PROJECT: New Liskeard GW (TY131010)

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-05-29

DATE REPORTED: 2019-06-14

		SAMPLE DESCRIPTION:		OW-13-I		OW-16-I	OW-16-II	OW-16-III	OW-17-I		OW-17-II
		SAMPLE TYPE:		Water		Water	Water	Water	Water		Water
		DATE SAMPLED:		2019-05-26		2019-05-27	2019-05-27	2019-05-27	2019-05-26		2019-05-26
Parameter	Unit	G / S	RDL	231356	RDL	231358	231372	231373	231374	RDL	231375
pH	pH Units		NA	7.76	NA	7.89	7.75	7.83	7.84	NA	7.93
Alkalinity (as CaCO3)	mg/L		5	386	5	338	171	252	236	5	282
Electrical Conductivity	uS/cm		2	814	2	568	506	474	448	2	620
Total Hardness (as CaCO3)	mg/L		0.5	432	0.5	82.8	137	251	235	0.5	223
Total Dissolved Solids	mg/L		20	392	20	426	288	264	230	20	320
Fluoride	mg/L	1.5	0.25	<0.25	0.05	1.49	0.80	0.16	0.25	0.10	1.10
Chloride	mg/L		0.50	3.06	0.10	4.97	4.18	2.09	0.76	0.20	3.02
Nitrate as N	mg/L	10.0	0.25	<0.25	0.05	<0.05	0.11	0.29	0.05	0.10	<0.10
Nitrite as N	mg/L	1.0	0.25	<0.25	0.05	<0.05	<0.05	<0.05	<0.05	0.10	<0.10
Sulphate	mg/L		0.50	93.6	0.10	2.60	89.5	13.0	15.6	0.20	69.9
Phosphate as P	mg/L		0.50	<0.50	0.10	<0.10	<0.10	<0.10	<0.10	0.20	<0.20
Ammonia as N	mg/L		0.02	<0.02	0.02	0.46	<0.02	0.14	0.02	0.02	<0.02
Total Kjeldahl Nitrogen	mg/L		0.10	<0.10	0.10	1.77	<0.10	0.36	<0.10	0.10	<0.10
Organic Nitrogen	mg/L		0.10	<0.10	0.10	1.31	<0.10	0.22	<0.10	0.10	<0.10
Dissolved Organic Carbon	mg/L		0.5	1.6	0.5	12.1	1.6	3.0	2.9	0.5	2.2
Calcium	mg/L		0.05	110	0.05	13.7	26.4	71.6	63.8	0.05	37.3
Magnesium	mg/L		0.05	38.2	0.05	11.8	17.2	17.6	18.3	0.05	31.5
Sodium	mg/L	20	0.05	2.50	0.05	**98.9**	**73.0**	4.50	3.83	0.05	**47.9**
Potassium	mg/L		0.05	5.47	0.05	4.49	8.03	2.33	3.16	0.05	4.17
Aluminum	mg/L		0.004	<0.004	0.004	0.006	0.008	<0.004	<0.004	0.004	<0.004
Arsenic	mg/L	0.01	0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003
Barium	mg/L	1	0.002	0.040	0.002	0.051	0.032	0.046	0.032	0.002	0.047
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	0.010	0.118	0.010	0.492	0.217	<0.010	0.029	0.010	0.152
Cadmium	mg/L	0.005	0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002
Chromium	mg/L	0.05	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		0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003
Iron	mg/L		0.010	<0.010	0.010	<0.010	<0.010	<0.010	0.314	0.010	<0.010

Certified By:



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Certificate of Analysis

AGAT WORK ORDER: 19T472743

PROJECT: New Liskeard GW (TY131010)

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-05-29

DATE REPORTED: 2019-06-14

		SAMPLE DESCRIPTION:		OW-13-I		OW-16-I	OW-16-II	OW-16-III	OW-17-I		OW-17-II
		SAMPLE TYPE:		Water		Water	Water	Water	Water		Water
		DATE SAMPLED:		2019-05-26		2019-05-27	2019-05-27	2019-05-27	2019-05-26		2019-05-26
Parameter	Unit	G / S	RDL	231356	RDL	231358	231372	231373	231374	RDL	231375
Lead	mg/L	0.01	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001
Manganese	mg/L		0.002	0.007	0.002	0.014	<0.002	0.136	0.028	0.002	<0.002
Molybdenum	mg/L		0.002	<0.002	0.002	0.008	0.027	<0.002	<0.002	0.002	0.013
Nickel	mg/L		0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003
Phosphorus	mg/L		0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05
Selenium	mg/L	0.05	0.004	<0.004	0.004	<0.004	<0.004	<0.004	<0.004	0.004	<0.004
Silicon	mg/L		0.05	5.41	0.05	7.91	3.65	4.67	8.71	0.05	4.84
Silver	mg/L		0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002
Strontium	mg/L		0.005	0.614	0.005	0.545	0.507	0.226	0.453	0.005	3.22
Sulfur	mg/L		0.05	34.6	0.05	1.06	30.8	5.99	6.66	0.05	23.9
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	0.002	<0.002	0.002	<0.002	0.003	<0.002	<0.002	0.002	0.005
Vanadium	mg/L		0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002
Zinc	mg/L		0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005

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Certificate of Analysis

AGAT WORK ORDER: 19T472743

PROJECT: New Liskeard GW (TY131010)

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-05-29

DATE REPORTED: 2019-06-14

		SAMPLE DESCRIPTION:		OW-17-III	OW-23-I	OW-23-II	OW-24-I		OW-24-II		OW-24-III
		SAMPLE TYPE:		Water	Water	Water	Water		Water		Water
		DATE SAMPLED:		2019-05-26	2019-05-26	2019-05-26	2019-05-27		2019-05-27		2019-05-27
Parameter	Unit	G / S	RDL	231376	231377	231378	231379	RDL	231380	RDL	231381
pH	pH Units		NA	7.44	8.00	7.95	7.82	NA	7.99	NA	7.69
Alkalinity (as CaCO3)	mg/L		5	126	227	223	227	5	347	5	276
Electrical Conductivity	uS/cm		2	236	409	593	437	2	631	2	521
Total Hardness (as CaCO3)	mg/L		0.5	123	101	128	225	0.5	324	0.5	280
Total Dissolved Solids	mg/L		20	132	214	304	244	20	344	20	280
Fluoride	mg/L	1.5	0.05	<0.05	1.30	1.17	0.21	0.10	0.62	0.05	<0.05
Chloride	mg/L		0.10	0.94	1.58	8.44	1.22	0.20	3.25	0.10	2.91
Nitrate as N	mg/L	10.0	0.05	<0.05	0.06	0.06	<0.05	0.10	<0.10	0.05	0.38
Nitrite as N	mg/L	1.0	0.05	<0.05	<0.05	<0.05	<0.05	0.10	<0.10	0.05	<0.05
Sulphate	mg/L		0.10	3.36	4.92	86.9	19.6	0.20	18.9	0.10	14.3
Phosphate as P	mg/L		0.10	<0.10	<0.10	<0.10	<0.10	0.20	<0.20	0.10	<0.10
Ammonia as N	mg/L		0.02	<0.02	0.27	<0.02	0.02	0.02	<0.02	0.02	<0.02
Total Kjeldahl Nitrogen	mg/L		0.10	<0.10	0.71	<0.10	0.10	0.10	<0.10	0.10	0.26
Organic Nitrogen	mg/L		0.10	<0.10	0.44	<0.10	<0.10	0.10	<0.10	0.10	0.26
Dissolved Organic Carbon	mg/L		0.5	3.4	3.1	2.1	2.8	0.5	1.7	0.5	2.4
Calcium	mg/L		0.05	33.3	15.5	20.6	63.2	0.05	65.8	0.05	77.7
Magnesium	mg/L		0.05	9.79	15.1	18.6	16.4	0.05	38.9	0.05	20.8
Sodium	mg/L	20	0.05	3.18	**54.2**	**80.0**	6.83	0.05	16.2	0.05	5.86
Potassium	mg/L		0.05	1.02	3.07	3.78	2.82	0.05	6.10	0.05	0.91
Aluminum	mg/L		0.004	0.006	<0.004	<0.004	<0.004	0.004	<0.004	0.004	0.011
Arsenic	mg/L	0.01	0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	0.003	<0.003
Barium	mg/L	1	0.002	0.011	0.030	0.032	0.031	0.002	0.053	0.002	0.026
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	0.010	<0.010	0.355	0.400	0.045	0.010	0.060	0.010	<0.010
Cadmium	mg/L	0.005	0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002
Chromium	mg/L	0.05	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		0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	0.003	<0.003
Iron	mg/L		0.010	<0.010	<0.010	<0.010	0.044	0.010	<0.010	0.010	<0.010

Certified By:

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

Certificate of Analysis

AGAT WORK ORDER: 19T472743

PROJECT: New Liskeard GW (TY131010)

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-05-29

DATE REPORTED: 2019-06-14

		SAMPLE DESCRIPTION:		OW-17-III	OW-23-I	OW-23-II	OW-24-I		OW-24-II		OW-24-III
		SAMPLE TYPE:		Water	Water	Water	Water		Water		Water
		DATE SAMPLED:		2019-05-26	2019-05-26	2019-05-26	2019-05-27		2019-05-27		2019-05-27
Parameter	Unit	G / S	RDL	231376	231377	231378	231379	RDL	231380	RDL	231381
Lead	mg/L	0.01	0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001
Manganese	mg/L		0.002	0.013	0.011	<0.002	0.073	0.002	0.075	0.002	0.005
Molybdenum	mg/L		0.002	<0.002	0.010	0.035	0.004	0.002	0.008	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
Phosphorus	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05
Selenium	mg/L	0.05	0.004	<0.004	<0.004	<0.004	<0.004	0.004	<0.004	0.004	<0.004
Silicon	mg/L		0.05	5.43	4.99	3.81	6.28	0.05	5.92	0.05	5.73
Silver	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002
Strontium	mg/L		0.005	0.062	0.474	0.746	0.271	0.005	1.21	0.005	0.110
Sulfur	mg/L		0.05	1.96	2.19	29.3	8.08	0.05	7.79	0.05	6.69
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	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		0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	0.005	<0.005

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Certificate of Analysis

AGAT WORK ORDER: 19T472743

PROJECT: New Liskeard GW (TY131010)

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-05-29

DATE REPORTED: 2019-06-14

SAMPLE DESCRIPTION:				OW-25-I		OW-25-II	OW-25-III	OW-30-I		OW-30-II	OW-30-III
SAMPLE TYPE:				Water		Water	Water	Water		Water	Water
DATE SAMPLED:				2019-05-27		2019-05-27	2019-05-27	2019-05-27		2019-05-27	2019-05-27
Parameter	Unit	G / S	RDL	231382	RDL	231384	231385	231386	RDL	231387	231388
pH	pH Units		NA	7.83	NA	7.97	7.86	7.66	NA	7.95	7.80
Alkalinity (as CaCO3)	mg/L		5	234	5	158	383	141	5	244	213
Electrical Conductivity	uS/cm		2	414	2	716	734	680	2	483	420
Total Hardness (as CaCO3)	mg/L		0.5	167	0.5	123	375	110	0.5	182	189
Total Dissolved Solids	mg/L		20	226	20	440	398	416	20	284	222
Fluoride	mg/L	1.5	0.05	0.50	0.10	0.91	0.60	**1.57**	0.05	0.29	0.23
Chloride	mg/L		0.10	1.11	0.20	5.93	2.06	4.28	0.10	1.42	0.78
Nitrate as N	mg/L	10.0	0.05	<0.05	0.10	0.12	<0.10	<0.10	0.05	<0.05	<0.05
Nitrite as N	mg/L	1.0	0.05	<0.05	0.10	<0.10	<0.10	<0.10	0.05	<0.05	<0.05
Sulphate	mg/L		0.10	1.53	0.20	199	44.5	196	0.10	28.3	21.1
Phosphate as P	mg/L		0.10	<0.10	0.20	<0.20	<0.20	<0.20	0.10	<0.10	<0.10
Ammonia as N	mg/L		0.02	0.16	0.02	<0.02	<0.02	<0.02	0.02	<0.02	0.05
Total Kjeldahl Nitrogen	mg/L		0.10	0.32	0.10	<0.10	<0.10	<0.10	0.10	<0.10	<0.10
Organic Nitrogen	mg/L		0.10	0.16	0.10	<0.10	<0.10	<0.10	0.10	<0.10	<0.10
Dissolved Organic Carbon	mg/L		0.5	3.0	0.5	1.6	1.8	2.3	0.5	2.9	4.2
Calcium	mg/L		0.05	36.6	0.05	23.2	91.5	17.4	0.05	40.2	48.5
Magnesium	mg/L		0.05	18.4	0.05	15.8	35.6	16.1	0.05	19.9	16.6
Sodium	mg/L	20	0.05	**28.7**	0.05	**99.0**	**21.3**	**97.1**	0.05	**38.0**	14.1
Potassium	mg/L		0.05	3.79	0.05	7.04	2.76	5.91	0.05	3.64	3.84
Aluminum	mg/L		0.004	<0.004	0.004	0.008	0.016	<0.004	0.004	<0.004	<0.004
Arsenic	mg/L	0.01	0.003	<0.003	0.003	<0.003	0.005	<0.003	0.003	<0.003	<0.003
Barium	mg/L	1	0.002	0.040	0.002	0.025	0.061	0.025	0.002	0.034	0.103
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	0.010	0.142	0.010	0.220	0.012	0.498	0.010	0.062	0.054
Cadmium	mg/L	0.005	0.002	<0.002	0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002
Chromium	mg/L	0.05	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	0.004	<0.001	0.001	<0.001	<0.001
Copper	mg/L		0.003	<0.003	0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003
Iron	mg/L		0.010	0.046	0.010	<0.010	2.57	<0.010	0.010	<0.010	1.12

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

Certificate of Analysis

AGAT WORK ORDER: 19T472743

PROJECT: New Liskeard GW (TY131010)

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-05-29

DATE REPORTED: 2019-06-14

		SAMPLE DESCRIPTION:		OW-25-I		OW-25-II	OW-25-III	OW-30-I		OW-30-II	OW-30-III
		SAMPLE TYPE:		Water		Water	Water	Water		Water	Water
		DATE SAMPLED:		2019-05-27		2019-05-27	2019-05-27	2019-05-27		2019-05-27	2019-05-27
Parameter	Unit	G / S	RDL	231382	RDL	231384	231385	231386	RDL	231387	231388
Lead	mg/L	0.01	0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001
Manganese	mg/L		0.002	0.012	0.002	<0.002	0.296	0.004	0.002	0.009	0.271
Molybdenum	mg/L		0.002	0.002	0.002	0.048	0.006	0.044	0.002	0.007	<0.002
Nickel	mg/L		0.003	<0.003	0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003
Phosphorus	mg/L		0.05	<0.05	0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05
Selenium	mg/L	0.05	0.004	<0.004	0.004	<0.004	<0.004	<0.004	0.004	<0.004	<0.004
Silicon	mg/L		0.05	7.57	0.05	3.68	8.13	2.86	0.05	3.93	6.35
Silver	mg/L		0.002	<0.002	0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002
Strontium	mg/L		0.005	0.733	0.005	0.548	0.926	0.803	0.005	0.360	1.47
Sulfur	mg/L		0.05	1.57	0.05	67.7	11.2	65.2	0.05	8.74	7.71
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	0.004	<0.002	0.004	0.002	<0.002	<0.002
Uranium	mg/L	0.02	0.002	<0.002	0.002	0.005	0.006	<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		0.005	<0.005	0.005	<0.005	<0.005	<0.005	0.005	<0.005	0.007

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CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
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Certificate of Analysis

AGAT WORK ORDER: 19T472743

PROJECT: New Liskeard GW (TY131010)

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-05-29

DATE REPORTED: 2019-06-14

		SAMPLE DESCRIPTION:		OW-25-IV		OW-31-I		OW-31-II		NL GW DUP 1
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		2019-05-27		2019-05-27		2019-05-27		2019-05-26
Parameter	Unit	G / S	RDL	231389	RDL	231390	RDL	231391	RDL	231392
pH	pH Units		NA	7.90	NA	7.81	NA	7.88	NA	7.91
Alkalinity (as CaCO3)	mg/L		5	189	5	140	5	140	5	264
Electrical Conductivity	uS/cm		2	415	2	808	2	688	2	724
Total Hardness (as CaCO3)	mg/L		0.5	61.8	0.5	240	0.5	117	0.5	395
Total Dissolved Solids	mg/L		20	246	20	498	20	422	20	434
Fluoride	mg/L	1.5	0.05	**1.72**	0.25	0.58	0.10	0.93	0.10	0.21
Chloride	mg/L		0.10	7.89	0.50	2.75	0.20	3.47	0.20	2.39
Nitrate as N	mg/L	10.0	0.05	<0.05	0.25	0.64	0.10	<0.10	0.10	<0.10
Nitrite as N	mg/L	1.0	0.05	<0.05	0.25	<0.25	0.10	<0.10	0.10	<0.10
Sulphate	mg/L		0.10	23.7	0.50	282	0.50	206	0.20	152
Phosphate as P	mg/L		0.10	<0.10	0.50	<0.50	0.20	<0.20	0.20	<0.20
Ammonia as N	mg/L		0.02	0.03	0.02	<0.02	0.02	0.04	0.02	<0.02
Total Kjeldahl Nitrogen	mg/L		0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10
Organic Nitrogen	mg/L		0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10
Dissolved Organic Carbon	mg/L		0.5	4.6	0.5	1.5	0.5	4.4	0.5	1.7
Calcium	mg/L		0.05	13.6	0.05	40.4	0.05	20.2	0.05	103
Magnesium	mg/L		0.05	6.77	0.05	33.8	0.05	16.2	0.05	33.5
Sodium	mg/L	20	0.05	**67.5**	0.05	**74.9**	0.05	**96.7**	0.05	4.02
Potassium	mg/L		0.05	2.89	0.05	8.73	0.05	5.50	0.05	4.73
Aluminum	mg/L		0.004	<0.004	0.004	0.230	0.004	0.008	0.004	<0.004
Arsenic	mg/L	0.01	0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003
Barium	mg/L	1	0.002	0.016	0.002	0.043	0.002	0.047	0.002	0.034
Beryllium	mg/L		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
Boron	mg/L	5	0.010	0.355	0.010	0.220	0.010	0.241	0.010	0.177
Cadmium	mg/L	0.005	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Chromium	mg/L	0.05	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
Copper	mg/L		0.003	<0.003	0.003	0.007	0.003	<0.003	0.003	<0.003
Iron	mg/L		0.010	<0.010	0.010	0.337	0.010	<0.010	0.010	0.080

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CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 19T472743

PROJECT: New Liskeard GW (TY131010)

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-05-29

DATE REPORTED: 2019-06-14

		SAMPLE DESCRIPTION:		OW-25-IV		OW-31-I		OW-31-II		NL GW DUP 1
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		2019-05-27		2019-05-27		2019-05-27		2019-05-26
Parameter	Unit	G / S	RDL	231389	RDL	231390	RDL	231391	RDL	231392
Lead	mg/L	0.01	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Manganese	mg/L		0.002	0.013	0.002	0.023	0.002	0.023	0.002	0.021
Molybdenum	mg/L		0.002	0.041	0.002	0.013	0.002	0.016	0.002	<0.002
Nickel	mg/L		0.003	<0.003	0.003	0.003	0.003	<0.003	0.003	<0.003
Phosphorus	mg/L		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
Selenium	mg/L	0.05	0.004	<0.004	0.004	<0.004	0.004	<0.004	0.004	<0.004
Silicon	mg/L		0.05	5.02	0.05	3.80	0.05	3.77	0.05	3.62
Silver	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Strontium	mg/L		0.005	0.445	0.005	1.19	0.005	0.833	0.005	1.23
Sulfur	mg/L		0.05	8.55	0.05	93.2	0.05	70.2	0.05	50.4
Thallium	mg/L		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
Titanium	mg/L		0.002	<0.002	0.002	0.015	0.002	0.005	0.002	0.003
Uranium	mg/L	0.02	0.002	<0.002	0.002	0.004	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
Zinc	mg/L		0.005	<0.005	0.005	0.008	0.005	<0.005	0.005	<0.005

Certified By:

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AGAT Laboratories

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

Certificate of Analysis

AGAT WORK ORDER: 19T472743

PROJECT: New Liskeard GW (TY131010)

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-05-29

DATE REPORTED: 2019-06-14

		SAMPLE DESCRIPTION:		NL GW DUP 2	NL GW DUP 3
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2019-05-27	2019-05-27
Parameter	Unit	G / S	RDL	231393	231394
pH	pH Units		NA	8.04	7.80
Alkalinity (as CaCO3)	mg/L		5	346	190
Electrical Conductivity	uS/cm		2	566	409
Total Hardness (as CaCO3)	mg/L		0.5	82.7	64.1
Total Dissolved Solids	mg/L		20	360	256
Fluoride	mg/L	1.5	0.05	**1.52**	**1.70**
Chloride	mg/L		0.10	4.55	7.84
Nitrate as N	mg/L	10.0	0.05	<0.05	<0.05
Nitrite as N	mg/L	1.0	0.05	<0.05	<0.05
Sulphate	mg/L		0.10	1.39	23.0
Phosphate as P	mg/L		0.10	<0.10	<0.10
Ammonia as N	mg/L		0.02	0.48	0.04
Total Kjeldahl Nitrogen	mg/L		0.10	1.74	0.13
Organic Nitrogen	mg/L		0.10	1.26	<0.10
Dissolved Organic Carbon	mg/L		0.5	10.5	4.0
Calcium	mg/L		0.05	13.5	14.1
Magnesium	mg/L		0.05	11.9	7.02
Sodium	mg/L	20	0.05	**100**	**69.0**
Potassium	mg/L		0.05	4.48	3.07
Aluminum	mg/L		0.004	0.008	0.005
Arsenic	mg/L	0.01	0.003	<0.003	<0.003
Barium	mg/L	1	0.002	0.048	0.016
Beryllium	mg/L		0.001	<0.001	<0.001
Bismuth	mg/L		0.002	<0.002	<0.002
Boron	mg/L	5	0.010	0.504	0.345
Cadmium	mg/L	0.005	0.002	<0.002	<0.002
Chromium	mg/L	0.05	0.003	<0.003	<0.003
Cobalt	mg/L		0.001	<0.001	<0.001
Copper	mg/L		0.003	<0.003	<0.003
Iron	mg/L		0.010	<0.010	<0.010

Certified By:



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Certificate of Analysis

AGAT WORK ORDER: 19T472743

PROJECT: New Liskeard GW (TY131010)

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-05-29

DATE REPORTED: 2019-06-14

		SAMPLE DESCRIPTION:		NL GW DUP 2	NL GW DUP 3
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2019-05-27	2019-05-27
Parameter	Unit	G / S	RDL	231393	231394
Lead	mg/L	0.01	0.001	<0.001	<0.001
Manganese	mg/L		0.002	0.014	0.012
Molybdenum	mg/L		0.002	0.008	0.040
Nickel	mg/L		0.003	<0.003	<0.003
Phosphorus	mg/L		0.05	<0.05	<0.05
Selenium	mg/L	0.05	0.004	<0.004	<0.004
Silicon	mg/L		0.05	7.59	4.81
Silver	mg/L		0.002	<0.002	<0.002
Strontium	mg/L		0.005	0.563	0.442
Sulfur	mg/L		0.05	1.10	8.77
Thallium	mg/L		0.006	<0.006	<0.006
Tin	mg/L		0.002	<0.002	<0.002
Titanium	mg/L		0.002	<0.002	<0.002
Uranium	mg/L	0.02	0.002	<0.002	<0.002
Vanadium	mg/L		0.002	<0.002	<0.002
Zinc	mg/L		0.005	<0.005	<0.005

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Ontario Drinking Water Quality Standards. Na value is derived from O. Reg. 248
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

231314-231394 Elevated RDLs indicate the degree of sample dilutions prior to analyses to keep analytes within the calibration range, reduce matrix interference and to avoid contaminating the instruments.
Please note that Total Hardness (as CaCO3) & Organic Nitrogen are calculated parameters.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



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Guideline Violation

AGAT WORK ORDER: 19T472743

PROJECT: New Liskeard GW (TY131010)

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
231314	OW-1R-I	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	165
231348	OW-1R-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	134
231351	OW-10-III	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	36.1
231353	OW-11-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	25.5
231355	OW-12-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	61.7
231358	OW-16-I	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	98.9
231372	OW-16-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	73.0
231375	OW-17-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	47.9
231377	OW-23-I	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	54.2
231378	OW-23-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	80.0
231382	OW-25-I	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	28.7
231384	OW-25-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	99.0
231385	OW-25-III	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	21.3
231386	OW-30-I	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Fluoride	mg/L	1.5	1.57
231386	OW-30-I	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	97.1
231387	OW-30-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	38.0
231389	OW-25-IV	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Fluoride	mg/L	1.5	1.72
231389	OW-25-IV	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	67.5
231390	OW-31-I	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	74.9
231391	OW-31-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	96.7
231393	NL GW DUP 2	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Fluoride	mg/L	1.5	1.52
231393	NL GW DUP 2	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	100
231394	NL GW DUP 3	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Fluoride	mg/L	1.5	1.70
231394	NL GW DUP 3	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	69.0

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Quality Assurance

CLIENT NAME: WOOD CANADA LTD.

AGAT WORK ORDER: 19T472743

PROJECT: New Liskeard GW (TY131010)

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Jun 14, 2019

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
New Liskeard Groundwater Package															
pH	231384	231384	7.97	7.90	0.9%	NA	102%	90%	110%						
Alkalinity (as CaCO3)	231384	231384	158	156	1.3%	< 5	99%	80%	120%						
Electrical Conductivity	231384	231384	716	713	0.4%	< 2	96%	80%	120%						
Total Dissolved Solids	229026		354	370	4.4%	< 20	98%	80%	120%						
Fluoride	231356	231356	<0.25	<0.25	NA	< 0.05	101%	90%	110%	106%	90%	110%	107%	80%	120%
Chloride	231356	231356	3.06	2.90	5.4%	< 0.10	93%	90%	110%	103%	90%	110%	103%	80%	120%
Nitrate as N	231356	231356	<0.25	<0.25	NA	< 0.05	94%	90%	110%	105%	90%	110%	106%	80%	120%
Nitrite as N	231356	231356	<0.25	<0.25	NA	< 0.05	NA	90%	110%	106%	90%	110%	108%	80%	120%
Sulphate	231356	231356	93.6	91.7	2.1%	< 0.10	96%	90%	110%	102%	90%	110%	104%	80%	120%
Phosphate as P	231356	231356	<0.50	<0.50	NA	< 0.10	104%	90%	110%	102%	90%	110%	109%	80%	120%
Ammonia as N	231394	231394	0.04	0.04	NA	< 0.02	101%	90%	110%	96%	90%	110%	81%	80%	120%
Total Kjeldahl Nitrogen	233196		1.86	1.87	0.5%	< 0.10	98%	80%	120%	103%	80%	120%	106%	70%	130%
Dissolved Organic Carbon	231400		6.1	6.1	0.0%	< 0.5	93%	90%	110%	101%	90%	110%	103%	80%	120%
Calcium	231350	231350	109	102	6.6%	< 0.05	98%	90%	110%	98%	90%	110%	100%	70%	130%
Magnesium	231350	231350	18.5	16.2	13.3%	< 0.05	95%	90%	110%	95%	90%	110%	98%	70%	130%
Sodium	231350	231350	2.06	1.82	12.4%	< 0.05	96%	90%	110%	96%	90%	110%	97%	70%	130%
Potassium	231350	231350	0.88	0.76	14.6%	< 0.05	97%	90%	110%	97%	90%	110%	98%	70%	130%
Aluminum	231314	231314	0.010	0.015	NA	< 0.004	94%	90%	110%	94%	90%	110%	92%	70%	130%
Arsenic	231314	231314	< 0.003	<0.003	NA	< 0.003	100%	90%	110%	100%	90%	110%	103%	70%	130%
Barium	231314	231314	0.083	0.083	0.0%	< 0.002	101%	90%	110%	100%	90%	110%	101%	70%	130%
Beryllium	231314	231314	< 0.001	<0.001	NA	< 0.001	91%	90%	110%	92%	90%	110%	106%	70%	130%
Bismuth	231314	231314	< 0.002	<0.002	NA	< 0.002	97%	90%	110%	100%	90%	110%	98%	70%	130%
Boron	231314	231314	1.76	1.76	0.0%	< 0.010	98%	90%	110%	100%	90%	110%	86%	70%	130%
Cadmium	231314	231314	< 0.002	<0.002	NA	< 0.002	93%	90%	110%	109%	90%	110%	103%	70%	130%
Chromium	231314	231314	0.012	0.013	NA	< 0.003	100%	90%	110%	99%	90%	110%	106%	70%	130%
Cobalt	231314	231314	0.006	0.006	0.0%	< 0.001	98%	90%	110%	100%	90%	110%	95%	70%	130%
Copper	231314	231314	0.009	0.011	NA	< 0.003	103%	90%	110%	107%	90%	110%	96%	70%	130%
Iron	231314	231314	< 0.010	<0.010	NA	< 0.010	104%	90%	110%	101%	90%	110%	85%	70%	130%
Lead	231314	231314	< 0.001	<0.001	NA	< 0.001	104%	90%	110%	107%	90%	110%	107%	70%	130%
Manganese	231314	231314	0.729	0.722	1.0%	< 0.002	100%	90%	110%	102%	90%	110%	99%	70%	130%
Molybdenum	231314	231314	< 0.002	<0.002	NA	< 0.002	95%	90%	110%	94%	90%	110%	106%	70%	130%
Nickel	231314	231314	0.044	0.044	0.0%	< 0.003	99%	90%	110%	102%	90%	110%	95%	70%	130%
Phosphorus	231314	231314	< 0.05	<0.05	NA	< 0.05	99%	90%	110%	104%	90%	110%	125%	70%	130%
Selenium	231314	231314	< 0.004	<0.004	NA	< 0.004	97%	90%	110%	99%	90%	110%	103%	70%	130%
Silicon	231314	231314	8.42	8.29	1.6%	< 0.05	109%	90%	110%	94%	90%	110%	110%	70%	130%
Silver	231314	231314	< 0.002	<0.002	NA	< 0.002	98%	90%	110%	108%	90%	110%	95%	70%	130%
Strontium	231314	231314	1.23	1.22	0.8%	< 0.005	99%	90%	110%	103%	90%	110%	87%	70%	130%
Sulfur	231350	231350	40.6	41.3	1.7%	< 0.05	101%	90%	110%	101%	80%	130%	119%	70%	130%
Thallium	231314	231314	< 0.006	<0.006	NA	< 0.006	102%	90%	110%	91%	90%	110%	91%	70%	130%

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

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CANADA L4Z 1Y2
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Quality Assurance

CLIENT NAME: WOOD CANADA LTD.

AGAT WORK ORDER: 19T472743

PROJECT: New Liskeard GW (TY131010)

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

Water Analysis (Continued)

RPT Date: Jun 14, 2019			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Tin	231314	231314	< 0.002	<0.002	NA	< 0.002	94%	90%	110%	93%	90%	110%	100%	70%	130%
Titanium	231314	231314	0.003	0.004	NA	< 0.002	98%	90%	110%	99%	90%	110%	98%	70%	130%
Uranium	231314	231314	0.002	0.002	NA	< 0.002	96%	90%	110%	98%	90%	110%	120%	70%	130%
Vanadium	231314	231314	< 0.002	<0.002	NA	< 0.002	97%	90%	110%	96%	90%	110%	97%	70%	130%
Zinc	231314	231314	< 0.005	<0.005	NA	< 0.005	101%	90%	110%	105%	90%	110%	105%	70%	130%
New Liskeard Groundwater Package															
pH	231350	231350	7.83	7.78	0.6%	NA	101%	90%	110%						
Alkalinity (as CaCO3)	231350	231350	242	244	1.1%	< 5	94%	80%	120%						
Electrical Conductivity	231350	231350	640	643	0.5%	< 2	103%	80%	120%						
Total Dissolved Solids	231384	231384	440	432	1.8%	< 20	98%	80%	120%						
Fluoride	231353	231353	< 0.05	< 0.05	0.0%	< 0.05	92%	90%	110%	102%	90%	110%	103%	80%	120%
Chloride	231353	231353	18.9	17.5	7.7%	< 0.10	92%	90%	110%	101%	90%	110%	102%	80%	120%
Nitrate as N	231353	231353	< 0.05	< 0.05	0.0%	< 0.05	90%	90%	110%	99%	90%	110%	102%	80%	120%
Nitrite as N	231353	231353	< 0.05	< 0.05	0.0%	< 0.05	NA	90%	110%	104%	90%	110%	109%	80%	120%
Sulphate	231353	231353	72.2	66.1	8.8%	< 0.10	94%	90%	110%	98%	90%	110%	98%	80%	120%
Phosphate as P	231353	231353	< 0.10	< 0.10	0.0%	< 0.10	104%	90%	110%	97%	90%	110%	111%	80%	120%
Ammonia as N	231375	231375	<0.02	<0.02	NA	< 0.02	101%	90%	110%	107%	90%	110%	95%	80%	120%
Total Kjeldahl Nitrogen	231377	231377	0.71	0.70	1.9%	< 0.10	104%	80%	120%	101%	80%	120%	104%	70%	130%
Dissolved Organic Carbon	231348	231348	10.4	10.4	0.1%	< 0.5	104%	90%	110%	101%	90%	110%	109%	80%	120%
Calcium	231381	231381	77.7	78.8	1.4%	< 0.05	101%	90%	110%	100%	90%	110%	100%	70%	130%
Magnesium	231381	231381	20.8	21.1	1.5%	< 0.05	97%	90%	110%	97%	90%	110%	98%	70%	130%
Sodium	231381	231381	5.86	5.98	1.9%	< 0.05	98%	90%	110%	98%	90%	110%	97%	70%	130%
Potassium	231381	231381	0.91	0.89	2.9%	< 0.05	99%	90%	110%	99%	90%	110%	99%	70%	130%
Aluminum	231381	231381	0.011	0.009	NA	< 0.004	95%	90%	110%	97%	90%	110%	96%	70%	130%
Arsenic	231381	231381	< 0.003	<0.003	NA	< 0.003	101%	90%	110%	99%	90%	110%	110%	70%	130%
Barium	231381	231381	0.026	0.026	0.0%	< 0.002	101%	90%	110%	105%	90%	110%	83%	70%	130%
Beryllium	231381	231381	< 0.001	<0.001	NA	< 0.001	102%	90%	110%	103%	90%	110%	108%	70%	130%
Bismuth	231381	231381	< 0.002	<0.002	NA	< 0.002	94%	90%	110%	103%	90%	110%	102%	70%	130%
Boron	231381	231381	< 0.010	<0.010	NA	< 0.010	107%	90%	110%	106%	90%	110%	116%	70%	130%
Cadmium	231381	231381	< 0.002	<0.002	NA	< 0.002	96%	90%	110%	100%	90%	110%	102%	70%	130%
Chromium	231381	231381	< 0.003	<0.003	NA	< 0.003	102%	90%	110%	101%	90%	110%	108%	70%	130%
Cobalt	231381	231381	< 0.001	<0.001	NA	< 0.001	96%	90%	110%	98%	90%	110%	98%	70%	130%
Copper	231381	231381	< 0.003	<0.003	NA	< 0.003	102%	90%	110%	108%	90%	110%	106%	70%	130%
Iron	231381	231381	< 0.010	<0.010	NA	< 0.010	103%	90%	110%	96%	90%	110%	94%	70%	130%
Lead	231381	231381	< 0.001	<0.001	NA	< 0.001	106%	90%	110%	101%	90%	110%	110%	70%	130%
Manganese	231381	231381	0.005	0.005	NA	< 0.002	102%	90%	110%	105%	90%	110%	106%	70%	130%
Molybdenum	231381	231381	< 0.002	<0.002	NA	< 0.002	97%	90%	110%	101%	90%	110%	105%	70%	130%
Nickel	231381	231381	< 0.003	<0.003	NA	< 0.003	97%	90%	110%	100%	90%	110%	100%	70%	130%
Phosphorus	231381	231381	< 0.05	<0.05	NA	< 0.05	96%	90%	110%	102%	90%	110%	110%	70%	130%

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Results relate only to the items tested. Results apply to samples as received.

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

Quality Assurance

CLIENT NAME: WOOD CANADA LTD.
AGAT WORK ORDER: 19T472743
PROJECT: New Liskeard GW (TY131010)
ATTENTION TO: Emily Lemieux
SAMPLING SITE:
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Jun 14, 2019			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Selenium	231381	231381	< 0.004	<0.004	NA	< 0.004	99%	90%	110%	101%	90%	110%	111%	70%	130%
Silicon	231381	231381	5.73	5.58	2.7%	< 0.05	108%	90%	110%	95%	90%	110%	95%	70%	130%
Silver	231381	231381	< 0.002	<0.002	NA	< 0.002	102%	90%	110%	110%	90%	110%	115%	70%	130%
Strontium	231381	231381	0.110	0.109	0.9%	< 0.005	101%	90%	110%	106%	90%	110%	109%	70%	130%
Sulfur	231381	231381	6.69	6.60	1.5%	< 0.05	101%	90%	110%	101%	80%	130%	117%	70%	130%
Thallium	231381	231381	< 0.006	<0.006	NA	< 0.006	106%	90%	110%	95%	90%	110%	108%	70%	130%
Tin	231381	231381	< 0.002	<0.002	NA	< 0.002	98%	90%	110%	99%	90%	110%	103%	70%	130%
Titanium	231381	231381	< 0.002	<0.002	NA	< 0.002	97%	90%	110%	102%	90%	110%	101%	70%	130%
Uranium	231381	231381	< 0.002	<0.002	NA	< 0.002	105%	90%	110%	103%	90%	110%	128%	70%	130%
Vanadium	231381	231381	< 0.002	<0.002	NA	< 0.002	96%	90%	110%	98%	90%	110%	101%	70%	130%
Zinc	231381	231381	< 0.005	<0.005	NA	< 0.005	102%	90%	110%	107%	90%	110%	108%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate Qualifier: For duplicates as the measured result approaches the Reporting Limit (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.

Certified By:



AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: WOOD CANADA LTD.

AGAT WORK ORDER: 19T472743

PROJECT: New Liskeard GW (TY131010)

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
Total Hardness (as CaCO3)	MET-93-6105	EPA SW-846 6010C & 200.7	CALCULATION
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Fluoride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Phosphate as P	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6002	AQ2 EPA-103A & SM 4500 NH3-F	AQ-2 DISCRETE ANALYZER
Total Kjeldahl Nitrogen	INOR-93-6048	QuikChem 10-107-06-2-I & SM 4500-Norg D	LACHAT FIA
Organic Nitrogen		SM 4500-Norg A	CALCULATION
Dissolved Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310 B	SHIMADZU CARBON ANALYZER
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Potassium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Aluminum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Bismuth	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Phosphorus	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silicon	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Strontium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Sulfur	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Tin	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Titanium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS

Results relate only to the items tested. Results apply to samples as received.

3 Large + 1 med blue

AGAT Laboratories

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

Chain of Custody Record

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

Laboratory Use Only

Work Order #: 19T472743

Cooler Quantity:

Arrival Temperatures: * See attached temp log *

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes: ON ICE

Report Information:

Company: Wood E & I S
Contact: Emily Lemieux
Address: 131 Fielding Rd
Lively, ON P3Y 1L7
Phone: 705 682 2632 Fax:

Reports to be sent to:
1. Email: emily.lemieux@woodplc.com
2. Email:

Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☐ Regulation 153/04
Table (Indicate One) ☐ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One) ☐ Coarse ☐ Fine

☐ Sewer Use ☐ Sanitary ☐ Storm
Region (Indicate One) ☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☒ Other ODWS (Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: TY131010
Site Location: NEW LISKEARD GW
Sampled By: WOOD
AGAT Quote #: 17252 PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email:

Sample Matrix Legend

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

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	O. Reg 153: Metals and Inorganics (☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides))	O. Reg 153: ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr6+ ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	Sewer Use	QUOTE #: 17252
OW-1R-1	May 26/19	11 AM	5	GW		Y														X
OW-1R-11	↓	↓	5	↓		Y														X
OW-10-1			5			Y														X
OW-10-11			5			Y														X
OW-10-111			5			Y														X
OW-11-1	May 27	↓	5			Y														X
OW-11-11	May 27	↓	5			Y														X
OW-12-1	May 27	11 AM	5			Y														X
OW-12-11	May 27	11 AM	5			Y														X
OW-13-1	May 26	11 AM	5			Y														X
OW-16-1	May 27	11 AM	5	↓		Y														X

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Dominique Couchesne D Couchesne	May 26/19	9 am	Avneet Minhas AM	May 29/19	1:40 pm
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

Page 1 of 3

N°: T 088432

AGAT Laboratories

3 large + 1 med blue

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

Chain of Custody Record

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

Report Information:

Company: Wood E & I S.
Contact: Emily Lemieux
Address: 131 Fielding Rd
Lively, ON P3Y 1L7
Phone: ~~705~~ 682 2632 Fax:
Reports to be sent to:
1. Email: emily.lemieux@woodplc.com
2. Email:

Project Information:

Project: TY131010
Site Location: NEW LISKEARD GW
Sampled By: WOOD
AGAT Quote #: 17252 PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐
Company:
Contact:
Address:
Email:

Regulatory Requirements:

☐ No Regulatory Requirement
(Please check all applicable boxes)

☐ Regulation 153/04
Table (Indicate One) ☐ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One) ☐ Coarse ☐ Fine

☐ Sewer Use ☐ Sanitary ☐ Storm
Region (Indicate One) ☐ MISA

☐ Regulation 558 ☐ CCME ☐ Prov. Water Quality Objectives (PWQO) ☒ Other
ODWS (Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Laboratory Use Only

Work Order #: 19T472743
Cooler Quantity:
Arrival Temperatures: * See attached temp log *
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes: ON ICE

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Sample Matrix Legend

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

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y / N
OW-16-I	May 27	11 AM	5	GW		Y
OW-16-III	May 27	11 AM	5			Y
OW-17-I	May 26	11 AM	5			Y
OW-17-II	↓	↓	5			Y
OW-17-III			5			Y
OW-23-I			5			Y
OW-23-II	↓	↓	5			Y
OW-24-I	May 27	11 AM	5			Y
OW-24-II	↓	↓	5			Y
OW-24-III			5			Y
OW-25-I	↓	↓	5	↓		Y

Field Filtered - Metals, Hg, CrVI

O. Reg 153
- Metals and Inorganics ☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides)
- ORPs: ☐ B-HWS ☐ Cl⁻ ☐ CN ☐ Cr^{6+} ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR
- Full Metals Scan
- Regulation/Custom Metals
- Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2
- Volatiles: ☐ VOC ☐ BTEX ☐ THM
- PHCs F1 - F4
- ABNs
- PAHs
- PCBs: ☐ Total ☐ Aroclors
- Organochlorine Pesticides
- TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs
- Sewer Use
- QUOTE #: 17252

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Dominique Lourchesne DLourchesne	May 28/19	9 AM.	Avneet Minhas AM	May 29/19	1:40 pm

Page 2 of 3

№: T 088205

3 Large + 1 Med blue

AGAT Laboratories

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

Chain of Custody Record

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

Laboratory Use Only

Work Order #: 19T472743

Cooler Quantity:

Arrival Temperatures: X See attached temp log X

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes: ON ICE

Report Information:

Company: Wood E & I S.
Contact: Emily Lemieux
Address: 131 Fielding Rd
Lively, ON P3Y 1L7
Phone: 705 682 2632 Fax:
Reports to be sent to:
1. Email: emily.lemieux@woodplc.com
2. Email:

Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☐ Regulation 153/04
Table _____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region _____ *Indicate One*
☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☒ Other
ODWS *Indicate One*

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: TY131010
Site Location: NEW LISKEARD GW
Sampled By: WOOD
AGAT Quote #: 17252 PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email:

Sample Matrix Legend

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

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y/N
OW-25-II	May 27	11 AM	5	GW		Y
OW-25-III			5			Y
OW-30-I			5			Y
OW-30-II			5			Y
OW-30-III			5			Y
OW-25-IV			5			Y
OW-31-I			5			Y
OW-31-II			5			Y
NL GW DUP1	May 26	11 AM	5			Y
NL GW DUP2	May 27	↓	5			Y
NL GW DUP3	May 27	↓	5			Y

Field Filtered - Metals, Hg, CrVI	O. Reg 153	Full Metals Scan	Regulation/Custom Metals	Nutrients	Volatiles	PHCs F1 - F4	ABNs	PAHs	PCBs	Organochlorine Pesticides	TCLP	Sewer Use	QUOTE #: 17252
	Metals and Inorganics; ORPs												X
													X
													X
													X
													X
													X
													X
													X
													X
													X
													X

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Dominique Courchesne DCourchesne	May 28/19	9 AM	Avneet Minhas AM	May 29/19	1:40 pm

Page 3 of 3

Nº: T 088206

AGAT Laboratories

Sample Temperature Log

Client: WOOD

COC# or Work Order #: _____

# of Coolers: 3 large + 1 med blue

# of Submissions: _____

Arrival Temperatures - Branch/Driver

Cooler #1:	8.3	8.2	8.1
Cooler #2:	6.1	6.2	6.3
Cooler #3:	2.8	2.6	2.5
Cooler #4:	3.7	3.6	3.8
Cooler #5:			
Cooler #6:			
Cooler #7:			
Cooler #8			
Cooler #9:			
Cooler #10:			

IR Gun ID: _____

Taken By: Avineet Minhas

Date (yyyy/mm/dd): 2019/05/29 Time: 1:40 AM / (PM)

Arrival Temperatures - Laboratory

Cooler #1:			
Cooler #2:			
Cooler #3:			
Cooler #4:			
Cooler #5:			
Cooler #6:			
Cooler #7:			
Cooler #8			
Cooler #9:			
Cooler #10:			

IR Gun ID: _____

Taken By: _____

Date (yyyy/mm/dd): _____ Time: ____:____ AM / PM

Instructions for use of this form: 1) complete all fields of info including total # of coolers and # of submissions rec'd, 2) photocopy and place in each submission prior to giving a WO#, 3) Proceed as normal, write the WO# and scan (please make sure to scan along with the COC)

AGAT Laboratories

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

CLIENT NAME: WOOD CANADA LTD.
131 FIELDING ROAD
LIVELY, ON P3Y1L7
(705) 682-2632

ATTENTION TO: Emily Lemieux

PROJECT: TY131010

AGAT WORK ORDER: 19T472738

WATER ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer

DATE REPORTED: Jun 10, 2019

PAGES (INCLUDING COVER): 10

VERSION*: 1

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

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. Measurement Uncertainty is not taken into consideration when stating conformity with a specified requirement.

Results relate only to the items tested. Results apply to samples as received.
All reportable information as specified by ISO 17025:2017 is available from AGAT Laboratories upon request

AGAT Laboratories

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

Certificate of Analysis

AGAT WORK ORDER: 19T472738

PROJECT: TY131010

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-05-29

DATE REPORTED: 2019-06-10

SAMPLE DESCRIPTION:				WS-7	WS-8	WS-9		WS-13	WS-14		WS-15
SAMPLE TYPE:				Water	Water	Water		Water	Water		Water
DATE SAMPLED:				2019-05-27	2019-05-27	2019-05-27		2019-05-27	2019-05-27		2019-05-27
Parameter	Unit	G / S	RDL	229026	229037	229038	RDL	229039	229040	RDL	229041
pH	pH Units		NA	7.94	7.85	7.96	NA	7.67	7.80	NA	7.78
Alkalinity (as CaCO3)	mg/L		5	329	319	291	5	300	325	5	281
Electrical Conductivity	uS/cm		2	691	654	741	2	464	568	2	674
Total Hardness (as CaCO3)	mg/L		0.5	319	306	<0.5	0.5	225	254	0.5	266
Total Dissolved Solids	mg/L		20	354	346	422	20	242	290	20	354
Fluoride	mg/L	1.5	0.10	<0.10	0.14	0.76	0.05	<0.05	0.35	0.10	0.75
Chloride	mg/L		0.20	19.2	16.0	7.54	0.10	2.02	0.99	0.20	8.04
Nitrate as N	mg/L	10.0	0.10	<0.10	<0.10	<0.10	0.05	<0.05	<0.05	0.10	<0.10
Nitrite as N	mg/L	1.0	0.10	<0.10	<0.10	<0.10	0.05	<0.05	<0.05	0.10	<0.10
Sulphate	mg/L		0.20	29.2	23.8	85.4	0.10	9.04	8.85	0.20	85.6
Phosphate as P	mg/L		0.20	<0.20	<0.20	<0.20	0.10	<0.10	<0.10	0.20	<0.20
Ammonia as N	mg/L		0.02	<0.02	0.09	<0.02	0.02	<0.02	0.24	0.02	0.17
Total Kjeldahl Nitrogen	mg/L		0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.37	0.10	0.39
Organic Nitrogen	mg/L		0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.13	0.10	0.22
Dissolved Organic Carbon	mg/L		0.5	2.2	2.1	1.8	0.5	2.6	1.9	0.5	1.8
Calcium	mg/L		0.05	83.0	74.1	0.10	0.05	60.3	57.0	0.05	58.4
Magnesium	mg/L		0.05	27.2	29.4	<0.05	0.05	18.1	27.1	0.05	29.2
Sodium	mg/L	20	0.05	15.5	6.00	164	0.05	4.34	10.2	0.05	26.2
Potassium	mg/L		0.05	1.67	1.96	0.14	0.05	0.88	2.68	0.05	3.58
Aluminum	mg/L		0.004	0.004	<0.004	0.005	0.004	0.006	0.005	0.004	0.007
Arsenic	mg/L	0.010	0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	0.003	<0.003
Barium	mg/L	1	0.002	0.062	0.068	<0.002	0.002	0.016	0.076	0.002	0.060
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	0.010	<0.010	0.015	0.322	0.010	0.032	0.084	0.010	0.354
Cadmium	mg/L	0.005	0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	0.002	<0.002
Chromium	mg/L	0.05	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		0.003	<0.003	<0.003	0.010	0.003	0.007	<0.003	0.003	<0.003
Iron	mg/L		0.010	<0.010	<0.010	<0.010	0.010	<0.010	<0.010	0.010	<0.010

Certified By: Divine Basily

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AGAT Laboratories

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

Certificate of Analysis

AGAT WORK ORDER: 19T472738

PROJECT: TY131010

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-05-29

DATE REPORTED: 2019-06-10

SAMPLE DESCRIPTION:				WS-7	WS-8	WS-9		WS-13	WS-14		WS-15
SAMPLE TYPE:				Water	Water	Water		Water	Water		Water
DATE SAMPLED:				2019-05-27	2019-05-27	2019-05-27		2019-05-27	2019-05-27		2019-05-27
Parameter	Unit	G / S	RDL	229026	229037	229038	RDL	229039	229040	RDL	229041
Lead	mg/L	0.01	0.001	<0.001	<0.001	0.004	0.001	<0.001	<0.001	0.001	<0.001
Manganese	mg/L		0.002	0.029	0.057	<0.002	0.002	<0.002	0.012	0.002	0.025
Molybdenum	mg/L		0.002	<0.002	<0.002	0.004	0.002	<0.002	0.003	0.002	0.004
Nickel	mg/L		0.003	<0.003	<0.003	0.008	0.003	<0.003	<0.003	0.003	<0.003
Phosphorus	mg/L		0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05	0.05	<0.05
Selenium	mg/L	0.05	0.004	<0.004	<0.004	<0.004	0.004	<0.004	<0.004	0.004	<0.004
Silicon	mg/L		0.05	6.33	8.57	5.80	0.05	4.06	4.41	0.05	5.74
Silver	mg/L		0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	0.002	<0.002
Strontium	mg/L		0.005	0.144	0.204	<0.005	0.005	0.101	1.21	0.005	5.15
Sulfur	mg/L		0.05	10.7	9.39	27.4	0.05	6.09	4.16	0.05	26.8
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	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		0.005	<0.005	<0.005	0.083	0.005	0.008	0.058	0.005	0.007

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Certificate of Analysis

AGAT WORK ORDER: 19T472738

PROJECT: TY131010

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-05-29

DATE REPORTED: 2019-06-10

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: WS-16 SAMPLE TYPE: Water DATE SAMPLED: 2019-05-27 229042	SAMPLE DESCRIPTION: WS-Dup SAMPLE TYPE: Water DATE SAMPLED: 2019-05-27 229043
pH	pH Units		NA	7.86	7.79
Alkalinity (as CaCO3)	mg/L		5	351	351
Electrical Conductivity	uS/cm		2	663	663
Total Hardness (as CaCO3)	mg/L		0.5	8.4	9.0
Total Dissolved Solids	mg/L		20	384	384
Fluoride	mg/L	1.5	0.10	0.17	0.18
Chloride	mg/L		0.20	1.81	1.75
Nitrate as N	mg/L	10.0	0.10	<0.10	<0.10
Nitrite as N	mg/L	1.0	0.10	<0.10	<0.10
Sulphate	mg/L		0.20	13.3	13.5
Phosphate as P	mg/L		0.20	<0.20	<0.20
Ammonia as N	mg/L		0.02	<0.02	<0.02
Total Kjeldahl Nitrogen	mg/L		0.10	<0.10	<0.10
Organic Nitrogen	mg/L		0.10	<0.10	<0.10
Dissolved Organic Carbon	mg/L		0.5	2.1	1.9
Calcium	mg/L		0.05	2.21	2.35
Magnesium	mg/L		0.05	0.71	0.77
Sodium	mg/L	20	0.05	143	150
Potassium	mg/L		0.05	0.30	0.34
Aluminum	mg/L		0.004	<0.004	<0.004
Arsenic	mg/L	0.010	0.003	0.003	0.003
Barium	mg/L	1	0.002	0.004	0.003
Beryllium	mg/L		0.001	<0.001	<0.001
Bismuth	mg/L		0.002	<0.002	<0.002
Boron	mg/L	5	0.010	0.038	0.033
Cadmium	mg/L	0.005	0.002	<0.002	<0.002
Chromium	mg/L	0.05	0.003	<0.003	<0.003
Cobalt	mg/L		0.001	<0.001	<0.001
Copper	mg/L		0.003	<0.003	<0.003
Iron	mg/L		0.010	<0.010	<0.010

Certified By: Vivine Basily

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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Certificate of Analysis

AGAT WORK ORDER: 19T472738

PROJECT: TY131010

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-05-29

DATE REPORTED: 2019-06-10

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: WS-16 SAMPLE TYPE: Water DATE SAMPLED: 2019-05-27 229042	SAMPLE DESCRIPTION: WS-Dup SAMPLE TYPE: Water DATE SAMPLED: 2019-05-27 229043
Lead	mg/L	0.01	0.001	<0.001	<0.001
Manganese	mg/L		0.002	<0.002	<0.002
Molybdenum	mg/L		0.002	<0.002	<0.002
Nickel	mg/L		0.003	<0.003	<0.003
Phosphorus	mg/L		0.05	<0.05	<0.05
Selenium	mg/L	0.05	0.004	<0.004	<0.004
Silicon	mg/L		0.05	4.96	4.96
Silver	mg/L		0.002	<0.002	<0.002
Strontium	mg/L		0.005	0.016	0.014
Sulfur	mg/L		0.05	4.53	5.43
Thallium	mg/L		0.006	<0.006	<0.006
Tin	mg/L		0.002	<0.002	<0.002
Titanium	mg/L		0.002	<0.002	<0.002
Uranium	mg/L	0.02	0.002	<0.002	<0.002
Vanadium	mg/L		0.002	<0.002	<0.002
Zinc	mg/L		0.005	0.045	0.040

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Ontario Drinking Water Quality Standards. Na value is derived from O. Reg. 248
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

229026-229038 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analytes within the calibration range of the instrument and to reduce matrix interference.
Please note:Total Hardness (as CaCO3), Organic Nitrogen are calculated parameters.

229039-229040 Please note:Total Hardness (as CaCO3), Organic Nitrogen are calculated parameters.

229041-229043 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analytes within the calibration range of the instrument and to reduce matrix interference.
Please note:Total Hardness (as CaCO3), Organic Nitrogen are calculated parameters.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Vivine Basily

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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FAX (905)712-5122
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Guideline Violation

AGAT WORK ORDER: 19T472738

PROJECT: TY131010

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
229038	WS-9	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	164
229041	WS-15	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	26.2
229042	WS-16	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	143
229043	WS-Dup	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	150

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TEL (905)712-5100
FAX (905)712-5122
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Quality Assurance

CLIENT NAME: WOOD CANADA LTD.

AGAT WORK ORDER: 19T472738

PROJECT: TY131010

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Jun 10, 2019			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
New Liskeard Groundwater Package															
pH	229298		7.68	7.68	0.0%	NA	101%	90%	110%						
Alkalinity (as CaCO3)	229298		137	137	0.2%	< 5	112%	80%	120%						
Electrical Conductivity	229298		767	773	0.8%	< 2	92%	80%	120%						
Total Dissolved Solids	229026	229026	354	370	4.4%	< 20	98%	80%	120%						
Fluoride	226248		<0.25	<0.25	NA	< 0.05	96%	90%	110%	102%	90%	110%	103%	80%	120%
Chloride	226248		134	137	1.8%	< 0.10	92%	90%	110%	101%	90%	110%	103%	80%	120%
Nitrate as N	226248		<0.25	<0.25	NA	< 0.05	93%	90%	110%	99%	90%	110%	101%	80%	120%
Nitrite as N	226248		<0.25	<0.25	NA	< 0.05	NA	90%	110%	104%	90%	110%	103%	80%	120%
Sulphate	226248		67.3	69.1	2.7%	< 0.10	92%	90%	110%	98%	90%	110%	100%	80%	120%
Phosphate as P	226248		<0.50	<0.50	NA	< 0.10	105%	90%	110%	97%	90%	110%	102%	80%	120%
Ammonia as N	251855		<0.02	<0.02	NA	< 0.02	107%	90%	110%	96%	90%	110%	86%	80%	120%
Total Kjeldahl Nitrogen	228555		0.75	0.70	5.7%	< 0.10	116%	80%	120%	100%	80%	120%	99%	70%	130%
Dissolved Organic Carbon	231400		6.1	6.1	1.0%	< 0.5	93%	90%	110%	103%	90%	110%	103%	80%	120%
Calcium	231889		1.52	1.50	1.3%	< 0.05	106%	90%	110%	107%	90%	110%	85%	70%	130%
Magnesium	231889		0.46	0.43	6.2%	< 0.05	101%	90%	110%	102%	90%	110%	87%	70%	130%
Sodium	231889		0.75	0.73	3.2%	< 0.05	92%	90%	110%	92%	90%	110%	89%	70%	130%
Potassium	231889		0.32	0.30	4.8%	< 0.05	95%	90%	110%	96%	90%	110%	89%	70%	130%
Aluminum	229026	229026	0.004	0.004	NA	< 0.004	100%	90%	110%	96%	90%	110%	93%	70%	130%
Arsenic	229026	229026	<0.003	<0.003	NA	< 0.003	99%	90%	110%	99%	90%	110%	106%	70%	130%
Barium	229026	229026	0.062	0.063	2.4%	< 0.002	108%	90%	110%	105%	90%	110%	107%	70%	130%
Beryllium	229026	229026	<0.001	<0.001	NA	< 0.001	101%	90%	110%	97%	90%	110%	98%	70%	130%
Bismuth	229026	229026	<0.002	<0.002	NA	< 0.002	101%	90%	110%	101%	90%	110%	100%	70%	130%
Boron	229026	229026	<0.010	<0.010	NA	< 0.010	100%	90%	110%	100%	90%	110%	96%	70%	130%
Cadmium	229026	229026	<0.002	<0.002	NA	< 0.002	102%	90%	110%	102%	90%	110%	107%	70%	130%
Chromium	229026	229026	<0.003	<0.003	NA	< 0.003	103%	90%	110%	102%	90%	110%	100%	70%	130%
Cobalt	229026	229026	<0.001	<0.001	NA	< 0.001	108%	90%	110%	107%	90%	110%	102%	70%	130%
Copper	229026	229026	<0.003	<0.003	NA	< 0.003	99%	90%	110%	99%	90%	110%	100%	70%	130%
Iron	229026	229026	<0.010	<0.010	NA	< 0.010	108%	90%	110%	103%	90%	110%	92%	70%	130%
Lead	229026	229026	<0.001	<0.001	NA	< 0.001	102%	90%	110%	100%	90%	110%	100%	70%	130%
Manganese	229026	229026	0.029	0.030	4.6%	< 0.002	109%	90%	110%	108%	90%	110%	104%	70%	130%
Molybdenum	229026	229026	<0.002	<0.002	NA	< 0.002	96%	90%	110%	96%	90%	110%	102%	70%	130%
Nickel	229026	229026	<0.003	<0.003	NA	< 0.003	108%	90%	110%	105%	90%	110%	98%	70%	130%
Phosphorus	229026	229026	<0.05	<0.05	NA	< 0.05	96%	90%	110%	98%	90%	110%	104%	70%	130%
Selenium	229026	229026	<0.004	<0.004	NA	< 0.004	96%	90%	110%	93%	90%	110%	104%	70%	130%
Silicon	229026	229026	6.33	6.57	3.7%	< 0.05	100%	90%	110%	99%	90%	110%	93%	70%	130%
Silver	229026	229026	<0.002	<0.002	NA	< 0.002	95%	90%	110%	99%	90%	110%	101%	70%	130%
Strontium	229026	229026	0.144	0.139	3.5%	< 0.005	96%	90%	110%	95%	90%	110%	97%	70%	130%
Sulfur	229026	229026	10.7	11.3	5.3%	< 0.05	94%	90%	110%	98%	80%	130%	107%	70%	130%
Thallium	229026	229026	<0.006	<0.006	NA	< 0.006	105%	90%	110%	104%	90%	110%	105%	70%	130%

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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FAX (905)712-5122
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Quality Assurance

CLIENT NAME: WOOD CANADA LTD.
AGAT WORK ORDER: 19T472738
PROJECT: TY131010
ATTENTION TO: Emily Lemieux
SAMPLING SITE:
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Jun 10, 2019

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Tin	229026	229026	<0.002	<0.002	NA	< 0.002	106%	90%	110%	102%	90%	110%	104%	70%	130%
Titanium	229026	229026	<0.002	<0.002	NA	< 0.002	107%	90%	110%	105%	90%	110%	104%	70%	130%
Uranium	229026	229026	<0.002	<0.002	NA	< 0.002	106%	90%	110%	104%	90%	110%	105%	70%	130%
Vanadium	229026	229026	<0.002	<0.002	NA	< 0.002	102%	90%	110%	102%	90%	110%	101%	70%	130%
Zinc	229026	229026	<0.005	0.006	NA	< 0.005	100%	90%	110%	102%	90%	110%	105%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate Qualifier: 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.

Certified By: Nivine Basily

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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

Method Summary

CLIENT NAME: WOOD CANADA LTD.

AGAT WORK ORDER: 19T472738

PROJECT: TY131010

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
Total Hardness (as CaCO3)	MET-93-6105	EPA SW-846 6010C & 200.7	CALCULATION
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Fluoride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Phosphate as P	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6002	AQ2 EPA-103A & SM 4500 NH3-F	AQ-2 DISCRETE ANALYZER
Total Kjeldahl Nitrogen	INOR-93-6048	QuikChem 10-107-06-2-I & SM 4500-Norg D	LACHAT FIA
Organic Nitrogen		SM 4500-Norg A	CALCULATION
Dissolved Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310 B	SHIMADZU CARBON ANALYZER
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Potassium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Aluminum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Bismuth	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Phosphorus	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silicon	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Strontium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Sulfur	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Tin	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Titanium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

1 large

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

Chain of Custody Record

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

Laboratory Use Only

Work Order #: 19T472738

Cooler Quantity:

Arrival Temperatures: 1: 5.8 | 5.7 | 5.6

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes: ON ICE

Report Information:

Company: Wood
Contact: Emily Lemieux
Address: 131 Fielding Rd, Lively, Ontario P3Y 1L7
Phone: 705 682 2682 Fax:
Reports to be sent to:
1. Email: Emily.lemieux@woodplc.com
2. Email:

Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☐ Regulation 153/04
Table _____ (Indicate One)
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture (Check One)
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region _____ (Indicate One)
☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☒ Other
ODWS (Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
*TAT is exclusive of weekends and statutory holidays

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: TY131010
Site Location: New Liskeard Residencial
Sampled By: Wood
AGAT Quote #: 17252 PO: TY131010
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email:

Sample Matrix Legend

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

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	O. Reg 153: Metals and Inorganics (☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides))	O. Reg 153: ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr^{6+} ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	Sewer Use	GW Quote #
WS-7	27/05/19	2 PM	5	GW		N														X
WS-8	"	"	5	GW		N														X
WS-9	"	"	5	GW		N														X
WS-13	"	"	5	GW		N														X
WS-14	"	"	5	GW		N														X
WS-15	"	"	5	GW		N														X
WS-16	"	"	5	GW		N														X
WS-Dup	"	"	5	GW		N														X

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Camila Valcarcel	28/05/19	5:30PM	Avneet Minhas AM	May 29/19	1:35PM
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
		9 AM			
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

Page 1 of 1

Nº: T 088077

AGAT Laboratories

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

CLIENT NAME: WOOD CANADA LTD.
131 FIELDING ROAD
LIVELY, ON P3Y1L7
(705) 682-2632

ATTENTION TO: Emily Lemieux

PROJECT: New Liskeard GW

AGAT WORK ORDER: 19T498250

WATER ANALYSIS REVIEWED BY: Parvathi Malemath, Data Reviewer

DATE REPORTED: Aug 13, 2019

PAGES (INCLUDING COVER): 26

VERSION*: 1

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

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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Results relate only to the items tested. Results apply to samples as received.
All reportable information as specified by ISO 17025:2017 is available from AGAT Laboratories upon request

AGAT Laboratories

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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Certificate of Analysis

AGAT WORK ORDER: 19T498250

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-07-29

DATE REPORTED: 2019-08-13

SAMPLE DESCRIPTION:				OW-1R-I		OW-1R-III		OW-10-I		OW-10-II
SAMPLE TYPE:				Water		Water		Water		Water
DATE SAMPLED:				2019-07-24		2019-07-24		2019-07-24		2019-07-24
Parameter	Unit	G / S	RDL	386196	RDL	386198	RDL	386199	RDL	386200
pH	pH Units		NA	7.18	NA	7.19	NA	7.65	NA	7.57
Alkalinity (as CaCO3)	mg/L		5	929	5	956	5	264	5	233
Electrical Conductivity	uS/cm		2	2760	2	2740	2	749	2	819
Total Hardness (as CaCO3) (Calculated)	mg/L		0.5	841	0.5	864	0.5	367	0.5	428
Total Dissolved Solids	mg/L		20	1400	20	1390	20	406	20	508
Fluoride	mg/L	1.5	1.0	<1.0	1.0	<1.0	0.10	0.23	0.25	<0.25
Chloride	mg/L		2.0	178	2.0	195	0.20	2.93	0.50	2.64
Nitrate as N	mg/L	10.0	1.0	<1.0	1.0	<1.0	0.10	<0.10	0.25	<0.25
Nitrite as N	mg/L	1.0	1.0	<1.0	1.0	<1.0	0.10	<0.10	0.25	<0.25
Sulphate	mg/L		2.0	159	2.0	147	0.20	110	0.50	187
Phosphate as P	mg/L		2.0	<2.0	2.0	<2.0	0.20	<0.20	0.50	<0.50
Ammonia as N	mg/L		0.08	23.3	0.10	19.5	0.02	0.04	0.02	0.02
Total Kjeldahl Nitrogen	mg/L		0.50	26.5	0.50	19.6	0.10	0.16	0.10	0.19
Organic Nitrogen (Calculated)	mg/L		0.10	3.20	0.10	0.10	0.10	0.12	0.10	0.17
Dissolved Organic Carbon	mg/L		1.0	21.9	1.0	19.1	0.5	1.8	0.5	2.8
Calcium	mg/L		0.25	157	0.25	163	0.05	93.7	0.05	132
Magnesium	mg/L		0.25	109	0.25	111	0.05	32.2	0.05	24.0
Sodium	mg/L	20	0.25	173	0.25	180	0.05	4.76	0.05	2.14
Potassium	mg/L		0.25	112	0.25	101	0.05	4.80	0.05	1.19
Aluminum	mg/L		0.004	0.011	0.004	0.006	0.004	<0.004	0.004	0.007
Arsenic	mg/L	0.025	0.003	<0.003	0.003	0.004	0.003	<0.003	0.003	<0.003
Barium	mg/L	1	0.002	0.111	0.002	0.088	0.002	0.031	0.002	0.019
Beryllium	mg/L		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
Boron	mg/L	5	0.010	1.51	0.010	1.92	0.010	0.256	0.010	0.045
Cadmium	mg/L	0.005	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Chromium	mg/L	0.05	0.003	0.004	0.003	<0.003	0.003	<0.003	0.003	<0.003
Cobalt	mg/L		0.001	0.011	0.001	0.007	0.001	<0.001	0.001	<0.001
Copper	mg/L		0.003	0.005	0.003	0.003	0.003	<0.003	0.003	<0.003

Certified By:

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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Certificate of Analysis

AGAT WORK ORDER: 19T498250

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-07-29

DATE REPORTED: 2019-08-13

		SAMPLE DESCRIPTION:		OW-1R-I		OW-1R-III		OW-10-I		OW-10-II
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		2019-07-24		2019-07-24		2019-07-24		2019-07-24
Parameter	Unit	G / S	RDL	386196	RDL	386198	RDL	386199	RDL	386200
Iron	mg/L		0.010	0.350	0.010	0.104	0.010	<0.010	0.010	<0.010
Lead	mg/L	0.01	0.001	0.002	0.001	<0.001	0.001	<0.001	0.001	<0.001
Manganese	mg/L		0.002	1.51	0.002	0.725	0.002	0.021	0.002	0.003
Molybdenum	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Nickel	mg/L		0.003	0.053	0.003	0.049	0.003	<0.003	0.003	<0.003
Phosphorus	mg/L		0.05	0.06	0.05	<0.05	0.05	<0.05	0.05	<0.05
Selenium	mg/L	0.05	0.004	0.011	0.004	0.013	0.004	<0.004	0.004	<0.004
Silicon	mg/L		0.05	7.61	0.05	7.91	0.05	2.38	0.05	0.94
Silver	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Strontium	mg/L		0.005	0.927	0.005	1.20	0.005	1.16	0.005	0.198
Sulfur	mg/L		0.25	52.9	0.25	53.0	0.05	35.6	0.05	61.1
Thallium	mg/L		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
Titanium	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	0.002
Uranium	mg/L	0.02	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
Zinc	mg/L		0.005	<0.005	0.005	0.005	0.005	<0.005	0.005	<0.005

Certified By:



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Certificate of Analysis

AGAT WORK ORDER: 19T498250

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-07-29

DATE REPORTED: 2019-08-13

		SAMPLE DESCRIPTION:		OW-11-I		OW-11-II		OW-12-I		OW-12-II
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		2019-07-25		2019-07-25		2019-07-25		2019-07-25
Parameter	Unit	G / S	RDL	386201	RDL	386202	RDL	386203	RDL	386204
pH	pH Units		NA	7.97	NA	7.74	NA	7.92	NA	7.41
Alkalinity (as CaCO3)	mg/L		5	228	5	465	5	264	5	496
Electrical Conductivity	uS/cm		2	626	2	1110	2	831	2	1360
Total Hardness (as CaCO3) (Calculated)	mg/L		0.5	293	0.5	507	0.5	395	0.5	566
Total Dissolved Solids	mg/L		20	304	20	564	20	474	20	692
Fluoride	mg/L	1.5	0.10	0.31	0.25	<0.25	0.25	<0.25	0.25	<0.25
Chloride	mg/L		0.20	10.6	0.50	21.8	0.50	38.3	0.50	53.1
Nitrate as N	mg/L	10.0	0.10	0.27	0.25	0.56	0.25	<0.25	0.25	<0.25
Nitrite as N	mg/L	1.0	0.10	<0.10	0.25	<0.25	0.25	<0.25	0.25	<0.25
Sulphate	mg/L		0.20	57.4	0.50	58.7	0.50	77.3	0.50	119
Phosphate as P	mg/L		0.20	<0.20	0.50	<0.50	0.50	<0.50	0.50	<0.50
Ammonia as N	mg/L		0.02	0.04	0.02	0.04	0.02	0.04	0.02	0.02
Total Kjeldahl Nitrogen	mg/L		0.10	0.47	0.10	0.90	0.10	0.45	0.10	1.23
Organic Nitrogen (Calculated)	mg/L		0.10	0.43	0.10	0.86	0.10	0.41	0.10	1.21
Dissolved Organic Carbon	mg/L		0.5	1.5	0.5	5.0	0.5	3.1	0.5	6.3
Calcium	mg/L		0.05	69.5	0.10	131	0.05	91.3	0.25	168
Magnesium	mg/L		0.05	29.0	0.10	43.8	0.05	40.5	0.25	35.5
Sodium	mg/L	20	0.05	13.9	0.10	36.0	0.05	17.2	0.25	64.9
Potassium	mg/L		0.05	6.58	0.10	8.07	0.05	8.77	0.25	3.74
Aluminum	mg/L		0.004	0.006	0.004	<0.004	0.004	0.009	0.004	0.004
Arsenic	mg/L	0.025	0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003
Barium	mg/L	1	0.002	0.034	0.002	0.027	0.002	0.055	0.002	0.043
Beryllium	mg/L		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
Boron	mg/L	5	0.010	0.280	0.010	0.423	0.010	0.390	0.010	0.267
Cadmium	mg/L	0.005	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Chromium	mg/L	0.05	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
Copper	mg/L		0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003

Certified By:



Results relate only to the items tested. Results apply to samples as received.

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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 19T498250

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-07-29

DATE REPORTED: 2019-08-13

		SAMPLE DESCRIPTION:		OW-11-I		OW-11-II		OW-12-I		OW-12-II
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		2019-07-25		2019-07-25		2019-07-25		2019-07-25
Parameter	Unit	G / S	RDL	386201	RDL	386202	RDL	386203	RDL	386204
Iron	mg/L		0.010	<0.010	0.010	<0.010	0.010	<0.010	0.010	0.179
Lead	mg/L	0.01	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Manganese	mg/L		0.002	<0.002	0.002	0.030	0.002	0.006	0.002	0.062
Molybdenum	mg/L		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	0.003	0.004	0.003	0.008
Phosphorus	mg/L		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
Selenium	mg/L	0.05	0.004	<0.004	0.004	<0.004	0.004	<0.004	0.004	<0.004
Silicon	mg/L		0.05	2.01	0.05	5.17	0.05	3.64	0.05	3.03
Silver	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Strontium	mg/L		0.005	2.15	0.005	0.279	0.005	2.26	0.005	0.494
Sulfur	mg/L		0.05	22.2	0.10	21.6	0.05	30.1	0.25	39.1
Thallium	mg/L		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
Titanium	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Uranium	mg/L	0.02	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
Zinc	mg/L		0.005	<0.005	0.005	<0.005	0.005	0.009	0.005	0.006

Certified By:



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

Certificate of Analysis

AGAT WORK ORDER: 19T498250

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-07-29

DATE REPORTED: 2019-08-13

SAMPLE DESCRIPTION:				OW-13-I		OW-16-I		OW-16-II		OW-16-III
SAMPLE TYPE:				Water		Water		Water		Water
DATE SAMPLED:				2019-07-25		2019-07-25		2019-07-25		2019-07-25
Parameter	Unit	G / S	RDL	386205	RDL	386206	RDL	386207	RDL	386221
pH	pH Units		NA	7.82	NA	7.93	NA	8.02	NA	7.70
Alkalinity (as CaCO3)	mg/L		5	332	5	317	5	157	5	286
Electrical Conductivity	uS/cm		2	852	2	627	2	546	2	630
Total Hardness (as CaCO3) (Calculated)	mg/L		0.5	452	0.5	80.7	0.5	107	0.5	291
Total Dissolved Solids	mg/L		20	436	20	372	20	272	20	294
Fluoride	mg/L	1.5	0.25	<0.25	0.10	1.65	0.05	0.90	0.10	0.40
Chloride	mg/L		0.50	3.24	0.20	5.06	0.10	3.66	0.20	2.95
Nitrate as N	mg/L	10.0	0.25	0.38	0.10	0.11	0.05	0.05	0.10	0.13
Nitrite as N	mg/L	1.0	0.25	<0.25	0.10	<0.10	0.05	<0.05	0.10	<0.10
Sulphate	mg/L		0.50	92.7	0.20	1.51	0.10	90.3	0.20	16.5
Phosphate as P	mg/L		0.50	<0.50	0.20	<0.20	0.10	<0.10	0.20	<0.20
Ammonia as N	mg/L		0.02	<0.02	0.02	0.65	0.02	0.04	0.02	0.33
Total Kjeldahl Nitrogen	mg/L		0.10	0.30	0.10	1.78	0.10	0.13	0.10	0.79
Organic Nitrogen (Calculated)	mg/L		0.10	0.30	0.10	1.13	0.10	<0.10	0.10	0.46
Dissolved Organic Carbon	mg/L		0.5	2.0	0.5	11.3	0.5	1.3	0.5	3.1
Calcium	mg/L		0.05	116	0.05	13.2	0.05	20.5	0.05	75.6
Magnesium	mg/L		0.05	39.5	0.05	11.6	0.05	13.5	0.05	24.8
Sodium	mg/L	20	0.05	2.52	0.05	99.2	0.05	63.3	0.05	8.94
Potassium	mg/L		0.05	5.75	0.05	4.05	0.05	6.69	0.05	4.26
Aluminum	mg/L		0.004	0.006	0.004	0.009	0.004	0.014	0.004	<0.004
Arsenic	mg/L	0.025	0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003
Barium	mg/L	1	0.002	0.035	0.002	0.031	0.002	0.028	0.002	0.072
Beryllium	mg/L		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
Boron	mg/L	5	0.010	0.126	0.010	0.487	0.010	0.215	0.010	0.038
Cadmium	mg/L	0.005	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Chromium	mg/L	0.05	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
Copper	mg/L		0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003

Certified By:



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Certificate of Analysis

AGAT WORK ORDER: 19T498250

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-07-29

DATE REPORTED: 2019-08-13

		SAMPLE DESCRIPTION:		OW-13-I		OW-16-I		OW-16-II		OW-16-III
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		2019-07-25		2019-07-25		2019-07-25		2019-07-25
Parameter	Unit	G / S	RDL	386205	RDL	386206	RDL	386207	RDL	386221
Iron	mg/L		0.010	<0.010	0.010	<0.010	0.010	<0.010	0.010	0.827
Lead	mg/L	0.01	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Manganese	mg/L		0.002	0.002	0.002	0.016	0.002	<0.002	0.002	0.440
Molybdenum	mg/L		0.002	<0.002	0.002	0.007	0.002	0.026	0.002	0.003
Nickel	mg/L		0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003
Phosphorus	mg/L		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
Selenium	mg/L	0.05	0.004	<0.004	0.004	<0.004	0.004	<0.004	0.004	<0.004
Silicon	mg/L		0.05	3.84	0.05	7.16	0.05	2.23	0.05	5.32
Silver	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Strontium	mg/L		0.005	0.645	0.005	0.590	0.005	0.482	0.005	0.457
Sulfur	mg/L		0.05	33.2	0.05	1.27	0.05	29.3	0.05	6.45
Thallium	mg/L		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
Titanium	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Uranium	mg/L	0.02	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
Zinc	mg/L		0.005	0.007	0.005	<0.005	0.005	0.006	0.005	<0.005

Certified By:



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Certificate of Analysis

AGAT WORK ORDER: 19T498250

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-07-29

DATE REPORTED: 2019-08-13

		SAMPLE DESCRIPTION:		OW-17-I		OW-17-II		OW-23-I		OW-23-II
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		2019-07-25		2019-07-25		2019-07-25		2019-07-25
Parameter	Unit	G / S	RDL	386222	RDL	386223	RDL	386224	RDL	386225
pH	pH Units		NA	7.81	NA	7.96	NA	8.07	NA	8.04
Alkalinity (as CaCO3)	mg/L		5	224	5	272	5	221	5	205
Electrical Conductivity	uS/cm		2	503	2	700	2	451	2	639
Total Hardness (as CaCO3) (Calculated)	mg/L		0.5	246	0.5	220	0.5	89.8	0.5	125
Total Dissolved Solids	mg/L		20	246	20	362	20	228	20	328
Fluoride	mg/L	1.5	0.05	0.26	0.10	1.16	0.05	1.49	0.10	1.24
Chloride	mg/L		0.10	0.78	0.20	3.12	0.10	2.02	0.20	8.40
Nitrate as N	mg/L	10.0	0.05	<0.05	0.10	0.13	0.05	<0.05	0.10	<0.10
Nitrite as N	mg/L	1.0	0.05	<0.05	0.10	<0.10	0.05	0.09	0.10	<0.10
Sulphate	mg/L		0.10	16.2	0.20	66.8	0.10	5.11	0.20	81.0
Phosphate as P	mg/L		0.10	<0.10	0.20	<0.20	0.10	<0.10	0.20	<0.20
Ammonia as N	mg/L		0.02	0.03	0.02	0.03	0.02	0.47	0.02	0.05
Total Kjeldahl Nitrogen	mg/L		0.10	0.14	0.10	0.15	0.10	0.71	0.10	0.18
Organic Nitrogen (Calculated)	mg/L		0.10	0.11	0.10	0.12	0.10	0.24	0.10	0.13
Dissolved Organic Carbon	mg/L		0.5	3.1	0.5	2.3	0.5	5.7	0.5	2.0
Calcium	mg/L		0.05	66.1	0.05	36.2	0.05	13.2	0.05	19.8
Magnesium	mg/L		0.05	19.7	0.05	31.4	0.05	13.8	0.05	18.3
Sodium	mg/L	20	0.05	3.98	0.05	56.6	0.05	58.4	0.05	82.6
Potassium	mg/L		0.05	3.23	0.05	4.21	0.05	2.83	0.05	3.78
Aluminum	mg/L		0.004	0.004	0.004	0.005	0.004	0.006	0.004	0.007
Arsenic	mg/L	0.025	0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003
Barium	mg/L	1	0.002	0.029	0.002	0.044	0.002	0.022	0.002	0.028
Beryllium	mg/L		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
Boron	mg/L	5	0.010	0.040	0.010	0.144	0.010	0.351	0.010	0.384
Cadmium	mg/L	0.005	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Chromium	mg/L	0.05	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
Copper	mg/L		0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003

Certified By:



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CANADA L4Z 1Y2
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FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 19T498250

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-07-29

DATE REPORTED: 2019-08-13

		SAMPLE DESCRIPTION:		OW-17-I		OW-17-II		OW-23-I		OW-23-II
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		2019-07-25		2019-07-25		2019-07-25		2019-07-25
Parameter	Unit	G / S	RDL	386222	RDL	386223	RDL	386224	RDL	386225
Iron	mg/L		0.010	<0.010	0.010	<0.010	0.010	<0.010	0.010	<0.010
Lead	mg/L	0.01	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Manganese	mg/L		0.002	0.011	0.002	<0.002	0.002	0.009	0.002	0.003
Molybdenum	mg/L		0.002	<0.002	0.002	0.011	0.002	0.010	0.002	0.034
Nickel	mg/L		0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003
Phosphorus	mg/L		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
Selenium	mg/L	0.05	0.004	<0.004	0.004	<0.004	0.004	<0.004	0.004	<0.004
Silicon	mg/L		0.05	8.11	0.05	3.03	0.05	3.76	0.05	2.23
Silver	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Strontium	mg/L		0.005	0.477	0.005	3.13	0.005	0.442	0.005	0.732
Sulfur	mg/L		0.05	6.68	0.05	22.2	0.05	2.44	0.05	26.7
Thallium	mg/L		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
Titanium	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Uranium	mg/L	0.02	0.002	<0.002	0.002	0.003	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
Zinc	mg/L		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005

Certified By:



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CANADA L4Z 1Y2
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Certificate of Analysis

AGAT WORK ORDER: 19T498250

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-07-29

DATE REPORTED: 2019-08-13

SAMPLE DESCRIPTION:				OW-24-I		OW-24-II		OW-24-III		OW-25-I
SAMPLE TYPE:				Water		Water		Water		Water
DATE SAMPLED:				2019-07-25		2019-07-25		2019-07-25		2019-07-25
Parameter	Unit	G / S	RDL	386226	RDL	386227	RDL	386228	RDL	386229
pH	pH Units		NA	7.86	NA	7.84	NA	7.46	NA	7.86
Alkalinity (as CaCO3)	mg/L		5	207	5	320	5	361	5	217
Electrical Conductivity	uS/cm		2	473	2	733	2	784	2	463
Total Hardness (as CaCO3) (Calculated)	mg/L		0.5	197	0.5	275	0.5	358	0.5	169
Total Dissolved Solids	mg/L		20	238	20	348	20	330	20	220
Fluoride	mg/L	1.5	0.05	0.61	0.10	0.58	0.10	<0.10	0.05	0.60
Chloride	mg/L		0.10	3.57	0.20	3.45	0.20	4.28	0.10	1.44
Nitrate as N	mg/L	10.0	0.05	0.06	0.10	0.12	0.10	<0.10	0.05	<0.05
Nitrite as N	mg/L	1.0	0.05	<0.05	0.10	<0.10	0.10	<0.10	0.05	<0.05
Sulphate	mg/L		0.10	16.7	0.20	21.1	0.20	12.5	0.10	2.64
Phosphate as P	mg/L		0.10	<0.10	0.20	<0.20	0.20	<0.20	0.10	<0.10
Ammonia as N	mg/L		0.02	0.06	0.02	0.03	0.02	4.10	0.02	0.29
Total Kjeldahl Nitrogen	mg/L		0.10	0.18	0.10	0.15	0.50	5.15	0.10	0.54
Organic Nitrogen (Calculated)	mg/L		0.10	0.12	0.10	0.12	0.10	1.05	0.10	0.25
Dissolved Organic Carbon	mg/L		0.5	2.4	0.5	1.5	1.0	7.2	0.5	3.1
Calcium	mg/L		0.05	49.9	0.05	50.4	0.05	98.4	0.05	36.3
Magnesium	mg/L		0.05	17.6	0.05	36.2	0.05	27.2	0.05	19.1
Sodium	mg/L	20	0.05	18.5	0.05	14.3	0.05	6.48	0.05	31.2
Potassium	mg/L		0.05	3.68	0.05	4.57	0.05	2.61	0.05	3.72
Aluminum	mg/L		0.004	0.006	0.004	<0.004	0.004	<0.004	0.004	0.004
Arsenic	mg/L	0.025	0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003
Barium	mg/L	1	0.002	0.028	0.002	0.026	0.002	0.030	0.002	0.039
Beryllium	mg/L		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
Boron	mg/L	5	0.010	0.093	0.010	0.056	0.010	0.014	0.010	0.147
Cadmium	mg/L	0.005	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Chromium	mg/L	0.05	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
Copper	mg/L		0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003

Certified By:



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Certificate of Analysis

AGAT WORK ORDER: 19T498250

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-07-29

DATE REPORTED: 2019-08-13

		SAMPLE DESCRIPTION:		OW-24-I		OW-24-II		OW-24-III		OW-25-I
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		2019-07-25		2019-07-25		2019-07-25		2019-07-25
Parameter	Unit	G / S	RDL	386226	RDL	386227	RDL	386228	RDL	386229
Iron	mg/L		0.010	0.068	0.010	<0.010	0.010	<0.010	0.010	<0.010
Lead	mg/L	0.01	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Manganese	mg/L		0.002	0.022	0.002	0.017	0.002	0.268	0.002	0.020
Molybdenum	mg/L		0.002	0.010	0.002	0.007	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
Phosphorus	mg/L		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
Selenium	mg/L	0.05	0.004	<0.004	0.004	<0.004	0.004	<0.004	0.004	<0.004
Silicon	mg/L		0.05	4.63	0.05	2.78	0.05	8.32	0.05	6.93
Silver	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Strontium	mg/L		0.005	0.323	0.005	1.03	0.005	0.139	0.005	0.740
Sulfur	mg/L		0.05	6.18	0.05	10.2	0.05	7.23	0.05	1.83
Thallium	mg/L		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
Titanium	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Uranium	mg/L	0.02	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
Zinc	mg/L		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005

Certified By:



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CANADA L4Z 1Y2
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FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 19T498250

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-07-29

DATE REPORTED: 2019-08-13

SAMPLE DESCRIPTION:				OW-25-II		OW-25-III		OW-30-I		OW-30-II
SAMPLE TYPE:				Water		Water		Water		Water
DATE SAMPLED:				2019-07-25		2019-07-25		2019-07-25		2019-07-25
Parameter	Unit	G / S	RDL	386230	RDL	386234	RDL	386235	RDL	386236
pH	pH Units		NA	8.03	NA	7.69	NA	8.10	NA	7.92
Alkalinity (as CaCO3)	mg/L		5	141	5	348	5	127	5	228
Electrical Conductivity	uS/cm		2	795	2	974	2	741	2	615
Total Hardness (as CaCO3) (Calculated)	mg/L		0.5	127	0.5	478	0.5	111	0.5	153
Total Dissolved Solids	mg/L		20	416	20	522	20	424	20	308
Fluoride	mg/L	1.5	0.10	1.03	0.25	0.90	0.10	1.74	0.10	0.57
Chloride	mg/L		0.20	6.54	0.50	2.54	0.20	3.92	0.20	2.36
Nitrate as N	mg/L	10.0	0.10	<0.10	0.25	<0.25	0.10	<0.10	0.10	<0.10
Nitrite as N	mg/L	1.0	0.10	<0.10	0.25	<0.25	0.10	<0.10	0.10	<0.10
Sulphate	mg/L		0.50	218	0.50	150	0.50	205	0.20	64.2
Phosphate as P	mg/L		0.20	<0.20	0.50	<0.50	0.20	<0.20	0.20	<0.20
Ammonia as N	mg/L		0.02	0.05	0.02	<0.02	0.02	0.04	0.02	0.03
Total Kjeldahl Nitrogen	mg/L		0.10	0.12	0.10	0.16	0.10	0.12	0.10	0.10
Organic Nitrogen (Calculated)	mg/L		0.10	<0.10	0.10	0.16	0.10	<0.10	0.10	<0.10
Dissolved Organic Carbon	mg/L		0.5	1.4	0.5	1.9	0.5	1.9	0.5	4.3
Calcium	mg/L		0.05	23.8	0.10	104	0.05	17.1	0.05	28.4
Magnesium	mg/L		0.05	16.5	0.10	52.9	0.05	16.5	0.05	19.9
Sodium	mg/L	20	0.05	105	0.10	26.8	0.05	99.2	0.05	64.3
Potassium	mg/L		0.05	7.26	0.10	6.23	0.05	5.99	0.05	5.26
Aluminum	mg/L		0.004	0.006	0.004	<0.004	0.004	0.010	0.004	0.005
Arsenic	mg/L	0.025	0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003
Barium	mg/L	1	0.002	0.024	0.002	0.051	0.002	0.024	0.002	0.031
Beryllium	mg/L		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
Boron	mg/L	5	0.010	0.220	0.010	0.051	0.010	0.471	0.010	0.146
Cadmium	mg/L	0.005	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Chromium	mg/L	0.05	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	0.002	0.001	<0.001	0.001	<0.001
Copper	mg/L		0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003

Certified By:



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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
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Certificate of Analysis

AGAT WORK ORDER: 19T498250

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-07-29

DATE REPORTED: 2019-08-13

		SAMPLE DESCRIPTION:		OW-25-II		OW-25-III		OW-30-I		OW-30-II
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		2019-07-25		2019-07-25		2019-07-25		2019-07-25
Parameter	Unit	G / S	RDL	386230	RDL	386234	RDL	386235	RDL	386236
Iron	mg/L		0.010	<0.010	0.010	<0.010	0.010	<0.010	0.010	<0.010
Lead	mg/L	0.01	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Manganese	mg/L		0.002	<0.002	0.002	0.060	0.002	0.006	0.002	0.015
Molybdenum	mg/L		0.002	0.050	0.002	0.009	0.002	0.043	0.002	0.018
Nickel	mg/L		0.003	<0.003	0.003	0.003	0.003	<0.003	0.003	<0.003
Phosphorus	mg/L		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
Selenium	mg/L	0.05	0.004	<0.004	0.004	<0.004	0.004	<0.004	0.004	<0.004
Silicon	mg/L		0.05	2.10	0.05	4.34	0.05	1.16	0.05	2.76
Silver	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Strontium	mg/L		0.005	0.557	0.005	2.94	0.005	0.823	0.005	0.430
Sulfur	mg/L		0.05	69.1	0.10	51.6	0.05	65.0	0.05	21.5
Thallium	mg/L		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
Titanium	mg/L		0.002	0.003	0.002	0.002	0.002	0.002	0.002	<0.002
Uranium	mg/L	0.02	0.002	0.003	0.002	0.005	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
Zinc	mg/L		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005

Certified By:

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CANADA L4Z 1Y2
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Certificate of Analysis

AGAT WORK ORDER: 19T498250

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-07-29

DATE REPORTED: 2019-08-13

SAMPLE DESCRIPTION:				OW-30-III	OW-10-III	OW-25-IV		OW-31-I		OW-31-II	NL GW DUP-1
SAMPLE TYPE:				Water	Water	Water		Water		Water	Water
DATE SAMPLED:				2019-07-25	2019-07-24	2019-07-25		2019-07-25		2019-07-25	2019-07-25
Parameter	Unit	G / S	RDL	386237	386238	386240	RDL	386241	RDL	386242	386243
pH	pH Units		NA	7.77	7.93	8.00	NA	7.97	NA	8.04	8.13
Alkalinity (as CaCO3)	mg/L		5	202	195	184	5	128	5	139	131
Electrical Conductivity	uS/cm		2	458	577	458	2	886	2	768	744
Total Hardness (as CaCO3) (Calculated)	mg/L		0.5	205	197	60.8	0.5	245	0.5	115	111
Total Dissolved Solids	mg/L		20	204	286	250	20	528	20	412	394
Fluoride	mg/L	1.5	0.05	0.25	0.48	2.01	0.25	0.75	0.10	1.11	1.78
Chloride	mg/L		0.10	0.93	0.89	8.03	0.50	2.85	0.20	3.36	3.87
Nitrate as N	mg/L	10.0	0.05	<0.05	<0.05	0.05	0.25	0.58	0.10	<0.10	<0.10
Nitrite as N	mg/L	1.0	0.05	<0.05	<0.05	<0.05	0.25	<0.25	0.10	<0.10	<0.10
Sulphate	mg/L		0.10	21.5	83.7	24.8	0.50	292	0.50	223	204
Phosphate as P	mg/L		0.10	<0.10	<0.10	<0.10	0.50	<0.50	0.20	<0.20	<0.20
Ammonia as N	mg/L		0.02	0.08	0.08	0.04	0.02	0.09	0.02	0.10	0.03
Total Kjeldahl Nitrogen	mg/L		0.10	0.18	0.22	0.13	0.10	1.37	0.10	0.24	0.13
Organic Nitrogen (Calculated)	mg/L		0.10	0.10	0.14	<0.10	0.10	1.28	0.10	0.14	0.10
Dissolved Organic Carbon	mg/L		0.5	3.6	1.3	4.0	0.5	2.8	0.5	4.2	1.7
Calcium	mg/L		0.05	52.2	46.6	13.3	0.05	41.7	0.05	19.7	17.1
Magnesium	mg/L		0.05	18.1	19.5	6.69	0.05	34.1	0.05	16.0	16.6
Sodium	mg/L	20	0.05	10.7	35.2	70.0	0.05	76.9	0.05	99.4	98.8
Potassium	mg/L		0.05	3.95	5.45	2.61	0.05	8.89	0.05	5.46	5.98
Aluminum	mg/L		0.004	0.005	0.006	<0.004	0.004	0.008	0.004	0.016	0.037
Arsenic	mg/L	0.025	0.003	<0.003	<0.003	<0.003	0.003	<0.003	0.003	<0.003	<0.003
Barium	mg/L	1	0.002	0.042	0.021	0.015	0.002	0.042	0.002	0.044	0.024
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	0.010	0.071	0.060	0.334	0.010	0.212	0.010	0.224	0.470
Cadmium	mg/L	0.005	0.002	<0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002
Chromium	mg/L	0.05	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		0.003	<0.003	<0.003	<0.003	0.003	<0.003	0.003	<0.003	<0.003

Certified By:



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

Certificate of Analysis

AGAT WORK ORDER: 19T498250

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-07-29

DATE REPORTED: 2019-08-13

SAMPLE DESCRIPTION:				OW-30-III	OW-10-III	OW-25-IV		OW-31-I		OW-31-II	NL GW DUP-1
SAMPLE TYPE:				Water	Water	Water		Water		Water	Water
DATE SAMPLED:				2019-07-25	2019-07-24	2019-07-25		2019-07-25		2019-07-25	2019-07-25
Parameter	Unit	G / S	RDL	386237	386238	386240	RDL	386241	RDL	386242	386243
Iron	mg/L		0.010	0.037	<0.010	<0.010	0.010	<0.010	0.010	<0.010	<0.010
Lead	mg/L	0.01	0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001
Manganese	mg/L		0.002	0.095	0.027	0.023	0.002	0.003	0.002	0.028	0.005
Molybdenum	mg/L		0.002	<0.002	<0.002	0.037	0.002	0.012	0.002	0.015	0.043
Nickel	mg/L		0.003	<0.003	<0.003	<0.003	0.003	<0.003	0.003	<0.003	<0.003
Phosphorus	mg/L		0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05	<0.05
Selenium	mg/L	0.05	0.004	<0.004	<0.004	<0.004	0.004	<0.004	0.004	<0.004	<0.004
Silicon	mg/L		0.05	5.51	2.17	3.58	0.05	2.29	0.05	2.22	1.19
Silver	mg/L		0.002	<0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002
Strontium	mg/L		0.005	1.17	1.76	0.445	0.005	1.20	0.005	0.825	0.813
Sulfur	mg/L		0.05	8.20	27.9	8.39	0.05	95.1	0.05	69.1	65.3
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	0.004	0.002	0.002	0.002
Uranium	mg/L	0.02	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		0.005	<0.005	<0.005	<0.005	0.005	<0.005	0.005	<0.005	<0.005

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Certificate of Analysis

AGAT WORK ORDER: 19T498250

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-07-29

DATE REPORTED: 2019-08-13

		SAMPLE DESCRIPTION:		NL GW DUP-2		NL GW DUP-3
		SAMPLE TYPE:		Water		Water
		DATE SAMPLED:		2019-07-25		2019-07-25
Parameter	Unit	G / S	RDL	386244	RDL	386245
pH	pH Units		NA	7.76	NA	8.05
Alkalinity (as CaCO3)	mg/L		5	337	5	140
Electrical Conductivity	uS/cm		2	732	2	800
Total Hardness (as CaCO3) (Calculated)	mg/L		0.5	332	0.5	127
Total Dissolved Solids	mg/L		20	346	20	422
Fluoride	mg/L	1.5	0.10	0.58	0.25	1.02
Chloride	mg/L		0.20	3.40	0.50	6.91
Nitrate as N	mg/L	10.0	0.10	0.13	0.25	<0.25
Nitrite as N	mg/L	1.0	0.10	<0.10	0.25	<0.25
Sulphate	mg/L		0.20	21.6	0.50	211
Phosphate as P	mg/L		0.20	<0.20	0.50	<0.50
Ammonia as N	mg/L		0.02	<0.02	0.02	0.03
Total Kjeldahl Nitrogen	mg/L		0.10	<0.10	0.10	<0.10
Organic Nitrogen (Calculated)	mg/L		0.10	<0.10	0.10	<0.10
Dissolved Organic Carbon	mg/L		0.5	2.1	0.5	2.1
Calcium	mg/L		0.05	77.6	0.05	23.7
Magnesium	mg/L		0.05	33.6	0.05	16.5
Sodium	mg/L	20	0.05	15.6	0.05	104
Potassium	mg/L		0.05	5.59	0.05	7.28
Aluminum	mg/L		0.004	<0.004	0.004	0.006
Arsenic	mg/L	0.025	0.003	<0.003	0.003	<0.003
Barium	mg/L	1	0.002	0.047	0.002	0.024
Beryllium	mg/L		0.001	<0.001	0.001	<0.001
Bismuth	mg/L		0.002	<0.002	0.002	<0.002
Boron	mg/L	5	0.010	0.060	0.010	0.214
Cadmium	mg/L	0.005	0.002	<0.002	0.002	<0.002
Chromium	mg/L	0.05	0.003	<0.003	0.003	<0.003
Cobalt	mg/L		0.001	<0.001	0.001	<0.001
Copper	mg/L		0.003	<0.003	0.003	<0.003

Certified By:

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CANADA L4Z 1Y2
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Certificate of Analysis

AGAT WORK ORDER: 19T498250

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Groundwater Package

DATE RECEIVED: 2019-07-29

DATE REPORTED: 2019-08-13

		SAMPLE DESCRIPTION:		NL GW DUP-2		NL GW DUP-3
		SAMPLE TYPE:		Water		Water
		DATE SAMPLED:		2019-07-25		2019-07-25
Parameter	Unit	G / S	RDL	386244	RDL	386245
Iron	mg/L		0.010	<0.010	0.010	<0.010
Lead	mg/L	0.01	0.001	<0.001	0.001	<0.001
Manganese	mg/L		0.002	0.016	0.002	<0.002
Molybdenum	mg/L		0.002	0.007	0.002	0.050
Nickel	mg/L		0.003	<0.003	0.003	<0.003
Phosphorus	mg/L		0.05	<0.05	0.05	<0.05
Selenium	mg/L	0.05	0.004	<0.004	0.004	<0.004
Silicon	mg/L		0.05	4.83	0.05	2.02
Silver	mg/L		0.002	<0.002	0.002	<0.002
Strontium	mg/L		0.005	1.03	0.005	0.548
Sulfur	mg/L		0.05	9.20	0.05	68.2
Thallium	mg/L		0.006	<0.006	0.006	<0.006
Tin	mg/L		0.002	<0.002	0.002	<0.002
Titanium	mg/L		0.002	<0.002	0.002	0.002
Uranium	mg/L	0.02	0.002	<0.002	0.002	0.003
Vanadium	mg/L		0.002	<0.002	0.002	<0.002
Zinc	mg/L		0.005	<0.005	0.005	<0.005

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Ontario Drinking Water Quality Standards. Na value is derived from O. Reg. 248
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

386196-386234 Elevated RDLs indicate the degree of sample dilutions prior to analyses to keep analytes within the calibration range, reduce matrix interference and to avoid contaminating the instruments.

386235 Elevated RDLs indicate the degree of sample dilutions prior to analyses to keep analytes within the calibration range, reduce matrix interference and to avoid contaminating the instruments.
TDS Analysis: Please note that sample was analyzed past hold time.

386236-386245 Elevated RDLs indicate the degree of sample dilutions prior to analyses to keep analytes within the calibration range, reduce matrix interference and to avoid contaminating the instruments.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

Guideline Violation

AGAT WORK ORDER: 19T498250

PROJECT: New Liskeard GW

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

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
386196	OW-1R-I	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	173
386198	OW-1R-III	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	180
386202	OW-11-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	36.0
386204	OW-12-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	64.9
386206	OW-16-I	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Fluoride	mg/L	1.5	1.65
386206	OW-16-I	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	99.2
386207	OW-16-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	63.3
386223	OW-17-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	56.6
386224	OW-23-I	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	58.4
386225	OW-23-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	82.6
386229	OW-25-I	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	31.2
386230	OW-25-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	105
386234	OW-25-III	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	26.8
386235	OW-30-I	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Fluoride	mg/L	1.5	1.74
386235	OW-30-I	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	99.2
386236	OW-30-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	64.3
386238	OW-10-III	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	35.2
386240	OW-25-IV	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Fluoride	mg/L	1.5	2.01
386240	OW-25-IV	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	70.0
386241	OW-31-I	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	76.9
386242	OW-31-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	99.4
386243	NL GW DUP-1	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Fluoride	mg/L	1.5	1.78
386243	NL GW DUP-1	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	98.8
386245	NL GW DUP-3	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	104

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Quality Assurance

CLIENT NAME: WOOD CANADA LTD.
AGAT WORK ORDER: 19T498250
PROJECT: New Liskeard GW
ATTENTION TO: Emily Lemieux
SAMPLING SITE:
SAMPLED BY:

Water Analysis

RPT Date: Aug 13, 2019

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
New Liskeard Groundwater Package															
pH	386203	386203	7.92	7.95	0.4%	NA	100%	90%	110%						
Alkalinity (as CaCO3)	386203	386203	264	272	3.0%	< 5	99%	80%	120%						
Electrical Conductivity	386203	386203	831	834	0.4%	< 2	99%	80%	120%						
Total Dissolved Solids	386196	386196	1400	1450	3.5%	< 20	98%	80%	120%						
Fluoride	386203	386203	< 0.25	<0.25	NA	< 0.05	101%	90%	110%	105%	90%	110%	108%	85%	115%
Chloride	386203	386203	38.3	38.3	0.0%	< 0.10	92%	90%	110%	103%	90%	110%	107%	85%	115%
Nitrate as N	386203	386203	< 0.25	<0.25	NA	< 0.05	92%	90%	110%	108%	90%	110%	108%	85%	115%
Nitrite as N	386203	386203	< 0.25	<0.25	NA	< 0.05	NA	90%	110%	104%	90%	110%	104%	85%	115%
Sulphate	386203	386203	77.3	76.7	0.8%	< 0.10	96%	90%	110%	104%	90%	110%	109%	85%	115%
Phosphate as P	386203	386203	< 0.50	<0.50	NA	< 0.10	101%	90%	110%	103%	90%	110%	109%	85%	115%
Ammonia as N	386227	386227	0.03	0.02	NA	< 0.02	100%	90%	110%	101%	90%	110%	85%	70%	130%
Total Kjeldahl Nitrogen	386196	386196	26.5	26.1	1.5%	< 0.10	102%	80%	120%	105%	80%	120%	103%	70%	130%
Dissolved Organic Carbon	386196	386196	21.9	23.2	5.8%	< 0.5	101%	90%	110%	97%	90%	110%	91%	80%	120%
Calcium	386199	386199	93.7	95.2	1.6%	< 0.05	100%	90%	110%	101%	90%	110%	101%	70%	130%
Magnesium	386199	386199	32.2	32.3	0.3%	< 0.05	98%	90%	110%	99%	90%	110%	100%	70%	130%
Sodium	386199	386199	4.76	4.78	0.4%	< 0.05	98%	90%	110%	99%	90%	110%	99%	70%	130%
Potassium	386199	386199	4.80	4.81	0.2%	< 0.05	99%	90%	110%	100%	90%	110%	101%	70%	130%
Aluminum	386196	386196	0.011	0.007	NA	< 0.004	91%	90%	110%	93%	90%	110%	85%	70%	130%
Arsenic	386196	386196	< 0.003	0.004	NA	< 0.003	103%	90%	110%	106%	90%	110%	113%	70%	130%
Barium	386196	386196	0.111	0.116	4.4%	< 0.002	98%	90%	110%	94%	90%	110%	92%	70%	130%
Beryllium	386196	386196	< 0.001	<0.001	NA	< 0.001	90%	90%	110%	96%	90%	110%	94%	70%	130%
Bismuth	386196	386196	< 0.002	<0.002	NA	< 0.002	98%	90%	110%	99%	90%	110%	85%	70%	130%
Boron	386196	386196	1.51	1.67	10.1%	< 0.010	100%	90%	110%	103%	90%	110%	128%	70%	130%
Cadmium	386196	386196	< 0.002	<0.002	NA	< 0.002	100%	90%	110%	102%	90%	110%	99%	70%	130%
Chromium	386196	386196	0.004	0.005	NA	< 0.003	96%	90%	110%	99%	90%	110%	96%	70%	130%
Cobalt	386196	386196	0.011	0.011	0.0%	< 0.001	95%	90%	110%	98%	90%	110%	91%	70%	130%
Copper	386196	386196	0.005	0.005	NA	< 0.003	99%	90%	110%	100%	90%	110%	86%	70%	130%
Iron	386196	386196	0.350	0.301	15.1%	< 0.010	104%	90%	110%	96%	90%	110%	72%	70%	130%
Lead	386196	386196	0.002	0.002	NA	< 0.001	99%	90%	110%	99%	90%	110%	91%	70%	130%
Manganese	386196	386196	1.51	1.57	3.9%	< 0.002	103%	90%	110%	102%	90%	110%	95%	70%	130%
Molybdenum	386196	386196	< 0.002	<0.002	NA	< 0.002	105%	90%	110%	101%	90%	110%	114%	70%	130%
Nickel	386196	386196	0.053	0.056	5.5%	< 0.003	99%	90%	110%	100%	90%	110%	88%	70%	130%
Phosphorus	386196	386196	0.06	<0.05	NA	< 0.05	95%	90%	110%	98%	90%	110%	96%	70%	130%
Selenium	386196	386196	0.011	0.014	NA	< 0.004	98%	90%	110%	102%	90%	110%	110%	70%	130%
Silicon	386196	386196	7.61	7.98	4.7%	< 0.05	94%	90%	110%	100%	90%	110%	85%	70%	130%
Silver	386196	386196	< 0.002	<0.002	NA	< 0.002	100%	90%	110%	106%	90%	110%	75%	70%	130%
Strontium	386196	386196	0.927	0.931	0.4%	< 0.005	96%	90%	110%	97%	90%	110%	88%	70%	130%
Sulfur	386199	386199	35.6	36.3	1.9%	< 0.05	100%	90%	110%	100%	80%	130%	116%	70%	130%
Thallium	386196	386196	< 0.006	<0.006	NA	< 0.006	101%	90%	110%	100%	90%	110%	93%	70%	130%

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
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http://www.agatlabs.com

Quality Assurance

CLIENT NAME: WOOD CANADA LTD.
PROJECT: New Liskeard GW
SAMPLING SITE:

AGAT WORK ORDER: 19T498250
ATTENTION TO: Emily Lemieux
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Aug 13, 2019			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Tin	386196	386196	< 0.002	<0.002	NA	< 0.002	98%	90%	110%	98%	90%	110%	103%	70%	130%
Titanium	386196	386196	< 0.002	0.002	NA	< 0.002	100%	90%	110%	101%	90%	110%	100%	70%	130%
Uranium	386196	386196	0.002	0.002	NA	< 0.002	96%	90%	110%	97%	90%	110%	96%	70%	130%
Vanadium	386196	386196	< 0.002	<0.002	NA	< 0.002	94%	90%	110%	94%	90%	110%	94%	70%	130%
Zinc	386196	386196	< 0.005	<0.005	NA	< 0.005	98%	90%	110%	104%	90%	110%	86%	70%	130%
New Liskeard Groundwater Package															
pH	386238	386238	7.93	7.94	0.1%	NA	100%	90%	110%						
Alkalinity (as CaCO3)	386238	386238	195	197	1.0%	< 5	98%	80%	120%						
Electrical Conductivity	386238	386238	577	580	0.5%	< 2	103%	80%	120%						
Total Dissolved Solids	379350	379350	1410	1450	2.8%	< 20	94%	80%	120%						
Fluoride	386245	386245	1.02	1.05	2.9%	< 0.05	109%	90%	110%	105%	90%	110%	109%	85%	115%
Chloride	386245	386245	6.91	6.92	0.1%	< 0.10	95%	90%	110%	103%	90%	110%	104%	85%	115%
Nitrate as N	386245	386245	< 0.25	< 0.05	NA	< 0.05	96%	90%	110%	108%	90%	110%	108%	85%	115%
Nitrite as N	386245	386245	< 0.25	< 0.05	NA	< 0.05	NA	90%	110%	104%	90%	110%	106%	85%	115%
Sulphate	386245	386245	211	211	0.0%	< 0.10	98%	90%	110%	104%	90%	110%	109%	85%	115%
Phosphate as P	386245	386245	< 0.50	< 0.10	NA	< 0.10	101%	90%	110%	103%	90%	110%	105%	85%	115%
Ammonia as N	387807		<0.02	< 0.02	NA	< 0.02	99%	90%	110%	102%	90%	110%	96%	70%	130%
Total Kjeldahl Nitrogen	386228	386228	5.15	5.05	2.0%	< 0.10	102%	80%	120%	105%	80%	120%	103%	70%	130%
Dissolved Organic Carbon	386228	386228	7.2	7.1	1.4%	< 0.5	98%	90%	110%	92%	90%	110%	101%	80%	120%
Calcium	386230	386230	23.8	23.9	0.4%	< 0.05	103%	90%	110%	104%	90%	110%	102%	70%	130%
Magnesium	386230	386230	16.5	16.5	0.0%	< 0.05	100%	90%	110%	101%	90%	110%	101%	70%	130%
Sodium	386230	386230	105	104	1.0%	< 0.05	99%	90%	110%	100%	90%	110%	100%	70%	130%
Potassium	386230	386230	7.26	7.30	0.5%	< 0.05	100%	90%	110%	101%	90%	110%	101%	70%	130%
Aluminum	386226	386226	0.006	<0.004	NA	< 0.004	91%	90%	110%	97%	90%	110%	88%	70%	130%
Arsenic	386226	386226	< 0.003	<0.003	NA	< 0.003	103%	90%	110%	106%	90%	110%	110%	70%	130%
Barium	386226	386226	0.028	0.026	7.4%	< 0.002	93%	90%	110%	98%	90%	110%	91%	70%	130%
Beryllium	386226	386226	< 0.001	<0.001	NA	< 0.001	94%	90%	110%	107%	90%	110%	101%	70%	130%
Bismuth	386226	386226	< 0.002	<0.002	NA	< 0.002	98%	90%	110%	100%	90%	110%	95%	70%	130%
Boron	386226	386226	0.093	0.090	3.3%	< 0.010	99%	90%	110%	109%	90%	110%	103%	70%	130%
Cadmium	386226	386226	< 0.002	<0.002	NA	< 0.002	101%	90%	110%	106%	90%	110%	109%	70%	130%
Chromium	386226	386226	< 0.003	<0.003	NA	< 0.003	97%	90%	110%	103%	90%	110%	95%	70%	130%
Cobalt	386226	386226	< 0.001	<0.001	NA	< 0.001	99%	90%	110%	98%	90%	110%	95%	70%	130%
Copper	386226	386226	< 0.003	<0.003	NA	< 0.003	97%	90%	110%	105%	90%	110%	93%	70%	130%
Iron	386226	386226	0.068	0.018	NA	< 0.010	108%	90%	110%	94%	90%	110%	90%	70%	130%
Lead	386226	386226	< 0.001	<0.001	NA	< 0.001	98%	90%	110%	101%	90%	110%	98%	70%	130%
Manganese	386226	386226	0.022	0.020	9.5%	< 0.002	106%	90%	110%	101%	90%	110%	101%	70%	130%
Molybdenum	386226	386226	0.010	0.010	0.0%	< 0.002	105%	90%	110%	104%	90%	110%	107%	70%	130%
Nickel	386226	386226	< 0.003	<0.003	NA	< 0.003	98%	90%	110%	102%	90%	110%	96%	70%	130%
Phosphorus	386226	386226	< 0.05	<0.05	NA	< 0.05	93%	90%	110%	101%	90%	110%	103%	70%	130%

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Quality Assurance

CLIENT NAME: WOOD CANADA LTD.
AGAT WORK ORDER: 19T498250
PROJECT: New Liskeard GW
ATTENTION TO: Emily Lemieux
SAMPLING SITE:
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Aug 13, 2019			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Selenium	386226	386226	< 0.004	<0.004	NA	< 0.004	104%	90%	110%	102%	90%	110%	114%	70%	130%
Silicon	386226	386226	4.63	4.27	8.1%	< 0.05	91%	90%	110%	103%	90%	110%	90%	70%	130%
Silver	386226	386226	< 0.002	<0.002	NA	< 0.002	100%	90%	110%	102%	90%	110%	107%	70%	130%
Strontium	386226	386226	0.323	0.307	5.1%	< 0.005	99%	90%	110%	96%	90%	110%	89%	70%	130%
Sulfur	386230	386230	69.1	69.1	0.0%	< 0.05	101%	90%	110%	101%	80%	130%	118%	70%	130%
Thallium	386226	386226	< 0.006	<0.006	NA	< 0.006	98%	90%	110%	102%	90%	110%	98%	70%	130%
Tin	386226	386226	< 0.002	<0.002	NA	< 0.002	99%	90%	110%	102%	90%	110%	99%	70%	130%
Titanium	386226	386226	< 0.002	<0.002	NA	< 0.002	99%	90%	110%	101%	90%	110%	101%	70%	130%
Uranium	386226	386226	< 0.002	<0.002	NA	< 0.002	96%	90%	110%	98%	90%	110%	95%	70%	130%
Vanadium	386226	386226	< 0.002	<0.002	NA	< 0.002	93%	90%	110%	96%	90%	110%	95%	70%	130%
Zinc	386226	386226	< 0.005	<0.005	NA	< 0.005	97%	90%	110%	105%	90%	110%	104%	70%	130%
New Liskeard Groundwater Package															
Total Dissolved Solids	405637		192	180	6.5%	< 20	98%	80%	120%						

Comments: NA signifies Not Applicable.
Duplicate Qualifier: For duplicates as the measured result approaches the Reporting Limit (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.

Certified By:



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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
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http://www.agatlabs.com

Method Summary

CLIENT NAME: WOOD CANADA LTD.

AGAT WORK ORDER: 19T498250

PROJECT: New Liskeard GW

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
Total Hardness (as CaCO3) (Calculated)	MET-93-6105	EPA SW-846 6010C & 200.7	CALCULATION
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Fluoride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Phosphate as P	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	SM 4500-NH3 H	LACHAT FIA
Total Kjeldahl Nitrogen	INOR-93-6048	QuikChem 10-107-06-2-I & SM 4500-Norg D	LACHAT FIA
Organic Nitrogen (Calculated)		SM 4500-Norg A	CALCULATION
Dissolved Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310 B	SHIMADZU CARBON ANALYZER
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Potassium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Aluminum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Bismuth	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Phosphorus	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silicon	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Strontium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Sulfur	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Tin	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Titanium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS

Results relate only to the items tested. Results apply to samples as received.

4 Cg BLK

AGAT Laboratories

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

Chain of Custody Record

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

Report Information:

Company: Wood
Contact: Emily Lemieux
Address: 131 Fielding Road
Lively, ON P3Y 1L7
Phone: 705-682-2632 Fax: 705-682-2260
Reports to be sent to:
1. Email: emily.lemieux@woodplc.com
2. Email:

Project Information:

Project: New Liskeard GW
Site Location: New Liskeard, ON.
Sampled By: Dominique Courchesne.
AGAT Quote #: 17252 PO: TY181010.
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐
Company:
Contact:
Address:
Email:

Regulatory Requirements:

☐ No Regulatory Requirement
(Please check all applicable boxes)

☐ Regulation 153/04
Table (Indicate One) ☐ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One) ☐ Coarse ☐ Fine

☐ Sewer Use
☐ Sanitary ☐ Storm
Region (Indicate One) ☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☒ Other
ODWS (Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Laboratory Use Only

Work Order #: 19T498250
Cooler Quantity:
Arrival Temperatures: SEE ATTACHED
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes: MELTED ICE

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day
OR Date Required (Rush Surcharges May Apply):
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*
For 'Same Day' analysis, please contact your AGAT CPM

Sample Matrix Legend

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

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y/N
OW-1R-I	07/24/19	2pm	5	Water		Y
OW-1-R-III	07/24/19	2pm	5	Water		Y
OW-10-I	07/24/19	2pm	5	Water		Y
OW-10-II	07/24/19	2pm	5	Water		Y
OW-11-I	07/25/19	11 AM	5	Water		Y
OW-11-II	↓	↓	5	Water		Y
OW-12-I			4	Water	Subsample	Y
OW-12-II			5	Water		Y
OW-13-I			4	Water	Subsample	Y
OW-16-I			5	Water		Y
OW-16-II			5	Water		Y

Field Filtered - Metals, Hg, CrVI

O. Reg 153

Metals and Inorganics ☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides)
ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr^{6+} ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR
Full Metals Scan
Regulation/Custom Metals
Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2
Volatiles: ☐ VOC ☐ BTEX ☐ THM
PHCs F1 - F4
ABNs
PAHs
PCBs: ☐ Total ☐ Aroclors
Organochlorine Pesticides
TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs
Sewer Use
Groundwater parameters

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Dominique Courchesne	07/26/19	10:30	MANOJ JOHN	July 29/19	9:15
D Courchesne					

Page 1 of 3
N°:

AGAT Laboratories
5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

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

Report Information:

Company: Wood
Contact: Emily Lemieux
Address: 131 Fielding Road
Lively, ON P3Y 1L7
Phone: 705-682-2632 Fax: 705-682-2260
Reports to be sent to:
1. Email: emily.lemieux@woodplc.com
2. Email:

Regulatory Requirements:

☐ No Regulatory Requirement
(Please check all applicable boxes)

☐ Regulation 153/04
Table (Indicate One) ☐ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One) ☐ Coarse ☐ Fine

☐ Sewer Use
☐ Sanitary ☐ Storm
Region (Indicate One) ☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☒ Other ODWS (Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Project Information:

Project: New Liskeard GW
Site Location: New Liskeard, ON.
Sampled By: Dominique Courchesne
AGAT Quote #: 17252 PO: TYIR1010
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☐ No ☐
Company:
Contact:
Address:
Email:

Sample Matrix Legend

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

Laboratory Use Only

Work Order #:
Cooler Quantity:
Arrival Temperatures:
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes:

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	O. Reg 153: Metals and Inorganics (☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides))	O. Reg 153: ORPs: ☐ B-HWS ☐ Cl⁻ ☐ CN ☐ Cr^{6+} ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	Sewer Use	Groundwater parameters					
OW-16-III	07/25/19	11 AM	5	Water		Y																☑					
OW-17-I	↓	↓	5	Water		Y																☑					
OW-17-II			5	Water		Y																☑					
~~OW-17-III~~				~~Water~~	DRY	~~Y~~																☑					
OW-23-I			5	Water		Y																☑					
OW-23-II			5	Water		Y																☑					
OW-24-I			5	Water		Y																☑					
OW-24-II			5	Water		Y																☑					
OW-24-III			5	Water		Y																☑					
OW-25-I			5	Water		Y																☑					
OW-25-II	↓	↓	5	Water		Y																☑					

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Dominique Courchesne.	07/26/19	10:20	MANOJ JOHN	JULY 29/19	9:15
D Courchesne					

Page 2 of 3
N°:

AGAT Laboratories
5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

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

Report Information:

Company: Wood
Contact: Emily Lemieux
Address: 131 Fielding Road
Lively, ON P3Y 1L7
Phone: 705-682-2632 Fax: 705-682-2260
Reports to be sent to:
1. Email: emily.lemieux@woodplc.com
2. Email:

Project Information:

Project: New Liskeard GW
Site Location: New Liskeard, On.
Sampled By: Dominique Couchesne.
AGAT Quote #: 17252 PO: TY131010.
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐
Company:
Contact:
Address:
Email:

Regulatory Requirements:

☐ No Regulatory Requirement
(Please check all applicable boxes)

☐ Regulation 153/04
Table _____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region _____ *Indicate One*
☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☒ Other
ODWS *Indicate One*

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Sample Matrix Legend

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

Laboratory Use Only

Work Order #:
Cooler Quantity:
Arrival Temperatures:
Custody Seal Intact: ☐Yes ☐No ☐N/A
Notes:

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y/N	Field Filtered - Metals, Hg, CrVI	O. Reg 153: Metals and Inorganics (☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides))	ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ C_2^{6+} ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	Sewer Use	Groundwater parameters
OW-25-III	07/25/19	11 AM	5	Water		Y															☑
OW-30-I	↓	↓	5	Water		Y															☑
OW-30-II	↓	↓	5	Water		Y															☑
OW-30-III	↓	↓	5	Water		Y															☑
OW-10-III	07/24/19	2PM	5	Water		Y															☑
OW-25-IV	07/25/19	11 AM	5	Water		Y															☑
OW-31-I	↓	↓	3	Water		Y															☑
OW-31-II	↓	↓	5	Water		Y															☑
NL GW DUP-1	↓	↓	5	Water		Y															☑
NL GW DUP-2	↓	↓	5	Water		Y															☑
NL GW DUP-3	↓	↓	5	Water		Y															☑

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Dominique Couchesne.	07/26/19	10:30	MANOJ JOHN	JULY 29/19	9:15
D Couchesne.					

Page 3 of 3
N°:

AGAT Laboratories

Sample Temperature Log

Client: WOOD

COC# or Work Order #: 19T498250

# of Coolers: 4

# of Submissions:

Arrival Temperatures - Branch/Driver

Cooler #1:	19.5	20.1	19.8
Cooler #2:	18.8	18.9	18.5
Cooler #3:	19.5	19.4	19.5
Cooler #4:	19.6	19.3	19.4
Cooler #5:			
Cooler #6:			
Cooler #7:			
Cooler #8			
Cooler #9:			
Cooler #10:			

IR Gun ID:

Taken By: MANOJ JOHN

Date (yyyy/mm/dd): 2019-JULY-29 Time: 9 : 15 AM / PM

Arrival Temperatures - Laboratory

Cooler #1:			
Cooler #2:			
Cooler #3:			
Cooler #4:			
Cooler #5:			
Cooler #6:			
Cooler #7:			
Cooler #8			
Cooler #9:			
Cooler #10:			

IR Gun ID:

Taken By:

Date (yyyy/mm/dd): _____ Time: ____ : ____ AM / PM

Instructions for use of this form: 1) complete all fields of info including total # of coolers and # of submissions rec'd, 2) photocopy and place in each submission prior to giving a WO#, 3) Proceed as normal, write the WO# and scan (please make sure to scan along with the COC)

AGAT Laboratories

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

CLIENT NAME: WOOD CANADA LTD.
131 FIELDING ROAD
LIVELY, ON P3Y1L7
(705) 682-2632

ATTENTION TO: Emily Lemieux

PROJECT: New Liskeard GW

AGAT WORK ORDER: 19T522734

WATER ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer

DATE REPORTED: Oct 04, 2019

PAGES (INCLUDING COVER): 24

VERSION*: 1

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

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. Measurement Uncertainty is not taken into consideration when stating conformity with a specified requirement.

Results relate only to the items tested. Results apply to samples as received.
All reportable information as specified by ISO 17025:2017 is available from AGAT Laboratories upon request

AGAT Laboratories

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

Certificate of Analysis

AGAT WORK ORDER: 19T522734

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:Greg Way

New Liskeard Groundwater Package

DATE RECEIVED: 2019-09-26

DATE REPORTED: 2019-10-04

		SAMPLE DESCRIPTION:		OW-1R-I		OW-1-R-III		OW-10-I		OW-10-II
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		2019-09-25		2019-09-25		2019-09-25		2019-09-25
Parameter	Unit	G / S	RDL	563493	RDL	563522	RDL	563523	RDL	563524
pH	pH Units		NA	7.57	NA	7.47	NA	7.44	NA	7.57
Alkalinity (as CaCO3)	mg/L		5	988	5	922	5	273	5	240
Electrical Conductivity	uS/cm		2	2910	2	2810	2	762	2	907
Total Hardness (as CaCO3) (Calculated)	mg/L		0.5	869	0.5	887	0.5	352	0.5	453
Total Dissolved Solids	mg/L		20	1450	20	1500	20	420	20	558
Fluoride	mg/L	1.5	1.0	<1.0	1.0	<1.0	0.10	0.17	0.25	<0.25
Chloride	mg/L		2.0	209	2.0	191	0.20	2.65	0.50	1.64
Nitrate as N	mg/L	10.0	1.0	<1.0	1.0	1.9	0.10	<0.10	0.25	<0.25
Nitrite as N	mg/L	1.0	1.0	<1.0	1.0	<1.0	0.10	<0.10	0.25	<0.25
Sulphate	mg/L		2.0	172	2.0	213	0.20	96.7	0.50	231
Phosphate as P	mg/L		2.0	<2.0	2.0	<2.0	0.20	<0.20	0.50	<0.50
Ammonia as N	mg/L		0.08	16.5	0.04	15.9	0.02	<0.02	0.02	<0.02
Total Kjeldahl Nitrogen	mg/L		0.50	20.2	0.10	16.6	0.10	<0.10	0.10	<0.10
Organic Nitrogen (Calculated)	mg/L		0.10	3.70	0.10	0.70	0.10	<0.10	0.10	<0.10
Dissolved Organic Carbon	mg/L		1.0	20.5	1.0	18.0	0.5	1.0	0.5	2.1
Calcium	mg/L		0.25	165	0.25	187	0.05	92.1	0.05	140
Magnesium	mg/L		0.25	111	0.25	102	0.05	29.7	0.05	25.0
Sodium	mg/L	20	0.25	188	0.25	150	0.05	4.93	0.05	2.17
Potassium	mg/L		0.25	109	0.25	99.5	0.05	4.96	0.05	1.18
Aluminum	mg/L		0.004	0.015	0.004	0.009	0.004	0.007	0.004	0.007
Arsenic	mg/L	0.025	0.003	0.004	0.003	0.003	0.003	<0.003	0.003	<0.003
Barium	mg/L	1	0.002	0.097	0.002	0.171	0.002	0.033	0.002	0.024
Beryllium	mg/L		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
Boron	mg/L	5	0.010	1.93	0.010	1.63	0.010	0.283	0.010	0.054
Cadmium	mg/L	0.005	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Chromium	mg/L	0.05	0.003	0.004	0.003	0.003	0.003	<0.003	0.003	<0.003
Cobalt	mg/L		0.001	0.010	0.001	0.011	0.001	<0.001	0.001	<0.001
Copper	mg/L		0.003	<0.003	0.003	0.016	0.003	<0.003	0.003	<0.003

Certified By: Vivine Basily

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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TEL (905)712-5100
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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 19T522734

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:Greg Way

New Liskeard Groundwater Package

DATE RECEIVED: 2019-09-26

DATE REPORTED: 2019-10-04

		SAMPLE DESCRIPTION:		OW-1R-I		OW-1-R-III		OW-10-I		OW-10-II
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		2019-09-25		2019-09-25		2019-09-25		2019-09-25
Parameter	Unit	G / S	RDL	563493	RDL	563522	RDL	563523	RDL	563524
Iron	mg/L		0.010	0.093	0.010	<0.010	0.010	0.087	0.010	<0.010
Lead	mg/L	0.01	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Manganese	mg/L		0.002	0.813	0.002	1.67	0.002	0.020	0.002	0.004
Molybdenum	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Nickel	mg/L		0.003	0.052	0.003	0.051	0.003	<0.003	0.003	<0.003
Phosphorus	mg/L		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
Selenium	mg/L	0.05	0.004	0.013	0.004	0.013	0.004	<0.004	0.004	<0.004
Silicon	mg/L		0.05	7.64	0.05	6.63	0.05	3.31	0.05	2.17
Silver	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Strontium	mg/L		0.005	1.36	0.005	1.05	0.005	1.15	0.005	0.214
Sulfur	mg/L		0.25	60.8	0.25	76.6	0.05	31.4	0.05	69.5
Thallium	mg/L		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
Titanium	mg/L		0.002	0.002	0.002	0.003	0.002	<0.002	0.002	0.003
Uranium	mg/L	0.02	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
Zinc	mg/L		0.005	0.007	0.005	0.007	0.005	<0.005	0.005	<0.005

Certified By: Vivine Basily

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

Certificate of Analysis

AGAT WORK ORDER: 19T522734

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:Greg Way

New Liskeard Groundwater Package

DATE RECEIVED: 2019-09-26

DATE REPORTED: 2019-10-04

		SAMPLE DESCRIPTION:		OW-11-I		OW-11-II		OW-12-I		OW-12-II
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		2019-09-25		2019-09-25		2019-09-25		2019-09-25
Parameter	Unit	G / S	RDL	563525	RDL	563526	RDL	563527	RDL	563528
pH	pH Units		NA	7.73	NA	7.85	NA	7.68	NA	7.64
Alkalinity (as CaCO3)	mg/L		5	234	5	504	5	300	5	510
Electrical Conductivity	uS/cm		2	637	2	1180	2	935	2	1410
Total Hardness (as CaCO3) (Calculated)	mg/L		0.5	270	0.5	491	0.5	418	0.5	547
Total Dissolved Solids	mg/L		20	318	20	596	20	488	20	748
Fluoride	mg/L	1.5	0.10	0.23	0.25	<0.25	0.25	<0.25	0.25	<0.25
Chloride	mg/L		0.20	7.61	0.50	19.2	0.50	40.8	0.50	49.5
Nitrate as N	mg/L	10.0	0.10	0.19	0.25	<0.25	0.25	<0.25	0.25	<0.25
Nitrite as N	mg/L	1.0	0.10	<0.10	0.25	<0.25	0.25	<0.25	0.25	<0.25
Sulphate	mg/L		0.20	59.3	0.50	60.7	0.50	90.2	0.50	112
Phosphate as P	mg/L		0.20	<0.20	0.50	<0.50	0.50	<0.50	0.50	<0.50
Ammonia as N	mg/L		0.02	<0.02	0.02	<0.02	0.02	<0.02	0.02	<0.02
Total Kjeldahl Nitrogen	mg/L		0.10	0.16	0.10	0.55	0.10	0.31	0.10	1.14
Organic Nitrogen (Calculated)	mg/L		0.10	0.16	0.10	0.55	0.10	0.31	0.10	1.14
Dissolved Organic Carbon	mg/L		0.5	1.1	0.5	5.0	0.5	2.3	0.5	7.2
Calcium	mg/L		0.05	65.1	0.10	129	0.05	102	0.10	164
Magnesium	mg/L		0.05	26.2	0.10	41.0	0.05	39.7	0.10	33.3
Sodium	mg/L	20	0.05	12.9	0.10	34.6	0.05	17.8	0.10	63.9
Potassium	mg/L		0.05	6.58	0.10	6.56	0.05	9.14	0.10	3.47
Aluminum	mg/L		0.004	0.008	0.004	0.007	0.004	0.007	0.004	0.006
Arsenic	mg/L	0.025	0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003
Barium	mg/L	1	0.002	0.034	0.002	0.034	0.002	0.068	0.002	0.044
Beryllium	mg/L		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
Boron	mg/L	5	0.010	0.310	0.010	0.453	0.010	0.480	0.010	0.297
Cadmium	mg/L	0.005	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Chromium	mg/L	0.05	0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003
Cobalt	mg/L		0.001	0.002	0.001	<0.001	0.001	<0.001	0.001	<0.001
Copper	mg/L		0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003

Certified By: Vivine Basily

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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Certificate of Analysis

AGAT WORK ORDER: 19T522734

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:Greg Way

New Liskeard Groundwater Package

DATE RECEIVED: 2019-09-26

DATE REPORTED: 2019-10-04

		SAMPLE DESCRIPTION:		OW-11-I		OW-11-II		OW-12-I		OW-12-II
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		2019-09-25		2019-09-25		2019-09-25		2019-09-25
Parameter	Unit	G / S	RDL	563525	RDL	563526	RDL	563527	RDL	563528
Iron	mg/L		0.010	<0.010	0.010	<0.010	0.010	<0.010	0.010	0.119
Lead	mg/L	0.01	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Manganese	mg/L		0.002	0.035	0.002	0.019	0.002	<0.002	0.002	0.058
Molybdenum	mg/L		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	0.003	0.004	0.003	0.009
Phosphorus	mg/L		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
Selenium	mg/L	0.05	0.004	<0.004	0.004	<0.004	0.004	<0.004	0.004	<0.004
Silicon	mg/L		0.05	3.06	0.05	4.58	0.05	4.80	0.05	4.20
Silver	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Strontium	mg/L		0.005	1.98	0.005	0.296	0.005	2.31	0.005	0.516
Sulfur	mg/L		0.05	21.5	0.10	19.5	0.05	31.3	0.10	37.4
Thallium	mg/L		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
Titanium	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Uranium	mg/L	0.02	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
Zinc	mg/L		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	0.006

Certified By: Vivine Basily

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CANADA L4Z 1Y2
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Certificate of Analysis

AGAT WORK ORDER: 19T522734

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:Greg Way

New Liskeard Groundwater Package

DATE RECEIVED: 2019-09-26

DATE REPORTED: 2019-10-04

		SAMPLE DESCRIPTION:		OW-13-I		OW-16-I		OW-16-II	OW-16-III	OW-17-I
		SAMPLE TYPE:		Water		Water		Water	Water	Water
		DATE SAMPLED:		2019-09-25		2019-09-25		2019-09-25	2019-09-25	2019-09-25
Parameter	Unit	G / S	RDL	563529	RDL	563530	RDL	563531	563532	563533
pH	pH Units		NA	7.72	NA	7.81	NA	7.59	7.70	7.72
Alkalinity (as CaCO3)	mg/L		5	345	5	308	5	168	250	224
Electrical Conductivity	uS/cm		2	919	2	649	2	578	570	503
Total Hardness (as CaCO3) (Calculated)	mg/L		0.5	447	0.5	81.3	0.5	110	255	227
Total Dissolved Solids	mg/L		20	512	20	362	20	308	274	244
Fluoride	mg/L	1.5	0.25	<0.25	0.10	1.38	0.05	0.91	0.19	0.23
Chloride	mg/L		0.50	2.30	0.20	4.12	0.10	3.99	1.90	0.70
Nitrate as N	mg/L	10.0	0.25	<0.25	0.10	<0.10	0.05	0.30	0.05	<0.05
Nitrite as N	mg/L	1.0	0.25	<0.25	0.10	<0.10	0.05	<0.05	<0.05	<0.05
Sulphate	mg/L		0.50	111	0.20	1.07	0.10	88.4	21.4	16.3
Phosphate as P	mg/L		0.50	<0.50	0.20	<0.20	0.10	<0.10	<0.10	<0.10
Ammonia as N	mg/L		0.02	<0.02	0.02	0.70	0.02	0.06	0.16	<0.02
Total Kjeldahl Nitrogen	mg/L		0.10	0.16	0.10	1.74	0.10	0.16	0.32	<0.10
Organic Nitrogen (Calculated)	mg/L		0.10	0.16	0.10	1.04	0.10	0.10	0.16	<0.10
Dissolved Organic Carbon	mg/L		0.5	1.6	0.5	8.0	0.5	1.4	3.2	1.9
Calcium	mg/L		0.05	117	0.05	13.6	0.05	21.3	73.9	61.0
Magnesium	mg/L		0.05	37.7	0.05	11.5	0.05	13.8	17.0	18.2
Sodium	mg/L	20	0.05	2.50	0.05	103	0.05	65.1	5.42	3.96
Potassium	mg/L		0.05	5.81	0.05	4.21	0.05	7.57	1.99	3.15
Aluminum	mg/L		0.004	0.007	0.004	0.009	0.004	0.012	0.007	0.006
Arsenic	mg/L	0.025	0.003	<0.003	0.003	<0.003	0.003	<0.003	<0.003	<0.003
Barium	mg/L	1	0.002	0.038	0.002	0.033	0.002	0.033	0.037	0.032
Beryllium	mg/L		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
Boron	mg/L	5	0.010	0.122	0.010	0.476	0.010	0.216	0.023	0.037
Cadmium	mg/L	0.005	0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002	<0.002
Chromium	mg/L	0.05	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
Copper	mg/L		0.003	<0.003	0.003	<0.003	0.003	<0.003	<0.003	<0.003

Certified By: Vivine Basily

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

Certificate of Analysis

AGAT WORK ORDER: 19T522734

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:Greg Way

New Liskeard Groundwater Package

DATE RECEIVED: 2019-09-26

DATE REPORTED: 2019-10-04

		SAMPLE DESCRIPTION:		OW-13-I		OW-16-I		OW-16-II	OW-16-III	OW-17-I
		SAMPLE TYPE:		Water		Water		Water	Water	Water
		DATE SAMPLED:		2019-09-25		2019-09-25		2019-09-25	2019-09-25	2019-09-25
Parameter	Unit	G / S	RDL	563529	RDL	563530	RDL	563531	563532	563533
Iron	mg/L		0.010	<0.010	0.010	0.190	0.010	<0.010	<0.010	0.252
Lead	mg/L	0.01	0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001
Manganese	mg/L		0.002	<0.002	0.002	0.016	0.002	<0.002	0.047	0.020
Molybdenum	mg/L		0.002	<0.002	0.002	0.008	0.002	0.027	<0.002	<0.002
Nickel	mg/L		0.003	<0.003	0.003	<0.003	0.003	<0.003	<0.003	<0.003
Phosphorus	mg/L		0.05	<0.05	0.05	<0.05	0.05	<0.05	<0.05	<0.05
Selenium	mg/L	0.05	0.004	<0.004	0.004	<0.004	0.004	<0.004	<0.004	<0.004
Silicon	mg/L		0.05	4.61	0.05	7.43	0.05	3.22	4.19	8.48
Silver	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002	<0.002
Strontium	mg/L		0.005	0.631	0.005	0.581	0.005	0.514	0.196	0.461
Sulfur	mg/L		0.05	36.4	0.05	1.37	0.05	28.7	6.91	5.63
Thallium	mg/L		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
Titanium	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002	<0.002
Uranium	mg/L	0.02	0.002	<0.002	0.002	<0.002	0.002	0.003	<0.002	<0.002
Vanadium	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002	<0.002
Zinc	mg/L		0.005	0.007	0.005	<0.005	0.005	<0.005	<0.005	<0.005

Certified By: Vivine Basily

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Certificate of Analysis

AGAT WORK ORDER: 19T522734

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:Greg Way

New Liskeard Groundwater Package

DATE RECEIVED: 2019-09-26

DATE REPORTED: 2019-10-04

		SAMPLE DESCRIPTION:		OW-17-II		OW-23-I		OW-23-II		OW-24-I
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		2019-09-25		2019-09-25		2019-09-25		2019-09-25
Parameter	Unit	G / S	RDL	563534	RDL	563535	RDL	563536	RDL	563537
pH	pH Units		NA	7.85	NA	8.01	NA	7.80	NA	7.75
Alkalinity (as CaCO3)	mg/L		5	269	5	212	5	206	5	217
Electrical Conductivity	uS/cm		2	701	2	472	2	644	2	505
Total Hardness (as CaCO3) (Calculated)	mg/L		0.5	215	0.5	117	0.5	115	0.5	210
Total Dissolved Solids	mg/L		20	336	20	218	20	322	20	236
Fluoride	mg/L	1.5	0.10	1.08	0.05	1.28	0.10	1.12	0.05	0.39
Chloride	mg/L		0.20	2.60	0.10	1.63	0.20	7.75	0.10	1.34
Nitrate as N	mg/L	10.0	0.10	<0.10	0.05	<0.05	0.10	<0.10	0.05	<0.05
Nitrite as N	mg/L	1.0	0.10	<0.10	0.05	<0.05	0.10	<0.10	0.05	<0.05
Sulphate	mg/L		0.20	66.4	0.10	5.53	0.20	75.5	0.10	20.1
Phosphate as P	mg/L		0.20	<0.20	0.10	<0.10	0.20	<0.20	0.10	<0.10
Ammonia as N	mg/L		0.02	<0.02	0.02	0.49	0.02	<0.02	0.02	0.11
Total Kjeldahl Nitrogen	mg/L		0.10	<0.10	0.10	0.71	0.10	<0.10	0.10	0.34
Organic Nitrogen (Calculated)	mg/L		0.10	<0.10	0.10	0.22	0.10	<0.10	0.10	0.23
Dissolved Organic Carbon	mg/L		0.5	1.3	0.5	2.3	0.5	1.4	0.5	2.2
Calcium	mg/L		0.05	36.2	0.05	19.3	0.05	18.7	0.05	56.1
Magnesium	mg/L		0.05	30.3	0.05	16.6	0.05	16.7	0.05	17.0
Sodium	mg/L	20	0.05	53.6	0.05	47.9	0.05	81.4	0.05	9.71
Potassium	mg/L		0.05	4.31	0.05	3.11	0.05	3.73	0.05	3.00
Aluminum	mg/L		0.004	0.008	0.004	<0.004	0.004	0.008	0.004	0.009
Arsenic	mg/L	0.025	0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003
Barium	mg/L	1	0.002	0.049	0.002	0.033	0.002	0.028	0.002	0.033
Beryllium	mg/L		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
Boron	mg/L	5	0.010	0.152	0.010	0.303	0.010	0.376	0.010	0.072
Cadmium	mg/L	0.005	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Chromium	mg/L	0.05	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
Copper	mg/L		0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003

Certified By: Vivine Basily

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Certificate of Analysis

AGAT WORK ORDER: 19T522734

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:Greg Way

New Liskeard Groundwater Package

DATE RECEIVED: 2019-09-26

DATE REPORTED: 2019-10-04

		SAMPLE DESCRIPTION:		OW-17-II		OW-23-I		OW-23-II		OW-24-I
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		2019-09-25		2019-09-25		2019-09-25		2019-09-25
Parameter	Unit	G / S	RDL	563534	RDL	563535	RDL	563536	RDL	563537
Iron	mg/L		0.010	<0.010	0.010	<0.010	0.010	<0.010	0.010	0.386
Lead	mg/L	0.01	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Manganese	mg/L		0.002	<0.002	0.002	0.010	0.002	0.002	0.002	0.072
Molybdenum	mg/L		0.002	0.012	0.002	0.009	0.002	0.035	0.002	0.004
Nickel	mg/L		0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003
Phosphorus	mg/L		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
Selenium	mg/L	0.05	0.004	<0.004	0.004	<0.004	0.004	<0.004	0.004	<0.004
Silicon	mg/L		0.05	4.10	0.05	5.05	0.05	3.03	0.05	6.41
Silver	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Strontium	mg/L		0.005	3.19	0.005	0.609	0.005	0.688	0.005	0.423
Sulfur	mg/L		0.05	22.2	0.05	2.34	0.05	25.2	0.05	6.62
Thallium	mg/L		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
Titanium	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Uranium	mg/L	0.02	0.002	0.004	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
Zinc	mg/L		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005

Certified By: Vivine Basily

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

Certificate of Analysis

AGAT WORK ORDER: 19T522734

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:Greg Way

New Liskeard Groundwater Package

DATE RECEIVED: 2019-09-26

DATE REPORTED: 2019-10-04

		SAMPLE DESCRIPTION:		OW-24-II	OW-24-III		OW-25-I		OW-25-II	OW-25-III
		SAMPLE TYPE:		Water	Water		Water		Water	Water
		DATE SAMPLED:		2019-09-25	2019-09-25		2019-09-25		2019-09-25	2019-09-25
Parameter	Unit	G / S	RDL	563538	563539	RDL	563540	RDL	563541	563542
pH	pH Units		NA	7.90	7.67	NA	7.70	NA	7.64	7.82
Alkalinity (as CaCO3)	mg/L		5	340	339	5	223	5	144	294
Electrical Conductivity	uS/cm		2	746	748	2	468	2	810	813
Total Hardness (as CaCO3) (Calculated)	mg/L		0.5	325	345	0.5	156	0.5	117	319
Total Dissolved Solids	mg/L		20	338	356	20	232	20	420	410
Fluoride	mg/L	1.5	0.10	0.62	<0.10	0.05	0.57	0.25	0.58	0.52
Chloride	mg/L		0.20	3.08	3.16	0.10	1.13	0.50	5.80	3.01
Nitrate as N	mg/L	10.0	0.10	0.12	0.79	0.05	<0.05	0.25	<0.25	<0.25
Nitrite as N	mg/L	1.0	0.10	<0.10	0.14	0.05	<0.05	0.25	<0.25	<0.25
Sulphate	mg/L		0.20	21.5	16.0	0.10	1.31	0.50	203	95.1
Phosphate as P	mg/L		0.20	<0.20	<0.20	0.10	<0.10	0.50	<0.50	<0.50
Ammonia as N	mg/L		0.02	0.07	0.32	0.02	0.36	0.02	<0.02	<0.02
Total Kjeldahl Nitrogen	mg/L		0.10	0.30	1.39	0.10	0.73	0.10	<0.10	<0.10
Organic Nitrogen (Calculated)	mg/L		0.10	0.23	1.07	0.10	0.37	0.10	<0.10	<0.10
Dissolved Organic Carbon	mg/L		0.5	1.4	4.9	0.5	2.2	0.5	1.2	1.3
Calcium	mg/L		0.05	69.4	95.7	0.05	33.9	0.05	22.1	80.3
Magnesium	mg/L		0.05	36.9	25.8	0.05	17.3	0.05	15.1	28.8
Sodium	mg/L	20	0.05	14.3	6.27	0.05	28.5	0.05	105	15.9
Potassium	mg/L		0.05	5.68	1.18	0.05	3.60	0.05	7.54	3.28
Aluminum	mg/L		0.004	0.006	0.011	0.004	0.009	0.004	0.007	0.008
Arsenic	mg/L	0.025	0.003	<0.003	<0.003	0.003	<0.003	0.003	<0.003	<0.003
Barium	mg/L	1	0.002	0.053	0.028	0.002	0.040	0.002	0.027	0.049
Beryllium	mg/L		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
Boron	mg/L	5	0.010	0.060	0.016	0.010	0.145	0.010	0.197	0.013
Cadmium	mg/L	0.005	0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002
Chromium	mg/L	0.05	0.003	<0.003	<0.003	0.003	<0.003	0.003	<0.003	<0.003
Cobalt	mg/L		0.001	<0.001	0.003	0.001	<0.001	0.001	<0.001	<0.001
Copper	mg/L		0.003	<0.003	<0.003	0.003	<0.003	0.003	<0.003	<0.003

Certified By: Vivine Basily

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

Certificate of Analysis

AGAT WORK ORDER: 19T522734

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:Greg Way

New Liskeard Groundwater Package

DATE RECEIVED: 2019-09-26

DATE REPORTED: 2019-10-04

		SAMPLE DESCRIPTION:		OW-24-II	OW-24-III		OW-25-I		OW-25-II	OW-25-III
		SAMPLE TYPE:		Water	Water		Water		Water	Water
		DATE SAMPLED:		2019-09-25	2019-09-25		2019-09-25		2019-09-25	2019-09-25
Parameter	Unit	G / S	RDL	563538	563539	RDL	563540	RDL	563541	563542
Iron	mg/L		0.010	<0.010	0.444	0.010	0.069	0.010	<0.010	<0.010
Lead	mg/L	0.01	0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001
Manganese	mg/L		0.002	0.122	0.216	0.002	0.016	0.002	<0.002	<0.002
Molybdenum	mg/L		0.002	0.008	<0.002	0.002	0.002	0.002	0.048	0.008
Nickel	mg/L		0.003	<0.003	<0.003	0.003	<0.003	0.003	<0.003	<0.003
Phosphorus	mg/L		0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05	<0.05
Selenium	mg/L	0.05	0.004	<0.004	<0.004	0.004	<0.004	0.004	<0.004	<0.004
Silicon	mg/L		0.05	5.43	7.97	0.05	7.38	0.05	3.14	5.67
Silver	mg/L		0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002
Strontium	mg/L		0.005	1.17	0.142	0.005	0.738	0.005	0.536	1.32
Sulfur	mg/L		0.05	7.60	5.29	0.05	1.31	0.05	66.3	24.3
Thallium	mg/L		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
Titanium	mg/L		0.002	<0.002	<0.002	0.002	<0.002	0.002	0.003	<0.002
Uranium	mg/L	0.02	0.002	<0.002	<0.002	0.002	<0.002	0.002	0.004	0.004
Vanadium	mg/L		0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002
Zinc	mg/L		0.005	<0.005	0.005	0.005	<0.005	0.005	0.009	<0.005

Certified By: Vivine Basily

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 19T522734

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:Greg Way

New Liskeard Groundwater Package

DATE RECEIVED: 2019-09-26

DATE REPORTED: 2019-10-04

SAMPLE DESCRIPTION:				OW-30-I	OW-30-II		OW-30-III		OW-10-III		OW-25-IV
SAMPLE TYPE:				Water	Water		Water		Water		Water
DATE SAMPLED:				2019-09-25	2019-09-25		2019-09-25		2019-09-25		2019-09-25
Parameter	Unit	G / S	RDL	563543	563544	RDL	563545	RDL	563546	RDL	563547
pH	pH Units		NA	7.57	7.90	NA	7.69	NA	7.78	NA	7.94
Alkalinity (as CaCO3)	mg/L		5	129	212	5	197	5	196	5	179
Electrical Conductivity	uS/cm		2	764	676	2	474	2	602	2	440
Total Hardness (as CaCO3) (Calculated)	mg/L		0.5	112	136	0.5	188	0.5	190	0.5	326
Total Dissolved Solids	mg/L		20	388	346	20	224	20	296	20	226
Fluoride	mg/L	1.5	0.10	1.56	0.51	0.05	0.21	0.10	0.29	0.05	1.72
Chloride	mg/L		0.20	3.14	2.20	0.10	0.69	0.20	0.78	0.10	6.96
Nitrate as N	mg/L	10.0	0.10	<0.10	<0.10	0.05	<0.05	0.10	<0.10	0.05	<0.05
Nitrite as N	mg/L	1.0	0.10	<0.10	<0.10	0.05	<0.05	0.10	<0.10	0.05	<0.05
Sulphate	mg/L		0.20	197	91.0	0.10	21.2	0.20	83.4	0.10	22.0
Phosphate as P	mg/L		0.20	<0.20	<0.20	0.10	<0.10	0.20	<0.20	0.10	<0.10
Ammonia as N	mg/L		0.02	<0.02	<0.02	0.02	0.03	0.02	0.05	0.02	0.05
Total Kjeldahl Nitrogen	mg/L		0.10	0.15	0.15	0.10	<0.10	0.10	<0.10	0.10	0.13
Organic Nitrogen (Calculated)	mg/L		0.10	0.15	0.15	0.10	<0.10	0.10	<0.10	0.10	<0.10
Dissolved Organic Carbon	mg/L		0.5	1.0	1.6	0.5	2.2	0.5	0.5	0.5	2.6
Calcium	mg/L		0.05	17.6	22.0	0.05	48.1	0.05	45.0	0.05	69.1
Magnesium	mg/L		0.05	16.5	19.7	0.05	16.5	0.05	18.9	0.05	37.2
Sodium	mg/L	20	0.05	100	77.3	0.05	10.7	0.05	35.8	0.05	14.4
Potassium	mg/L		0.05	6.14	6.26	0.05	3.92	0.05	5.66	0.05	5.76
Aluminum	mg/L		0.004	0.008	0.009	0.004	0.007	0.004	0.013	0.004	0.012
Arsenic	mg/L	0.025	0.003	<0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003
Barium	mg/L	1	0.002	0.026	0.031	0.002	0.052	0.002	0.023	0.002	0.015
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	0.010	0.427	0.172	0.010	0.068	0.010	0.242	0.010	0.322
Cadmium	mg/L	0.005	0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Chromium	mg/L	0.05	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		0.003	<0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003

Certified By: Divine Basily

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
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Certificate of Analysis

AGAT WORK ORDER: 19T522734

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:Greg Way

New Liskeard Groundwater Package

DATE RECEIVED: 2019-09-26

DATE REPORTED: 2019-10-04

		SAMPLE DESCRIPTION:		OW-30-I	OW-30-II		OW-30-III		OW-10-III		OW-25-IV
		SAMPLE TYPE:		Water	Water		Water		Water		Water
		DATE SAMPLED:		2019-09-25	2019-09-25		2019-09-25		2019-09-25		2019-09-25
Parameter	Unit	G / S	RDL	563543	563544	RDL	563545	RDL	563546	RDL	563547
Iron	mg/L		0.010	<0.010	<0.010	0.010	0.658	0.010	<0.010	0.010	0.037
Lead	mg/L	0.01	0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Manganese	mg/L		0.002	0.007	0.017	0.002	0.126	0.002	0.029	0.002	0.019
Molybdenum	mg/L		0.002	0.042	0.023	0.002	<0.002	0.002	<0.002	0.002	0.041
Nickel	mg/L		0.003	<0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003
Phosphorus	mg/L		0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
Selenium	mg/L	0.05	0.004	<0.004	<0.004	0.004	<0.004	0.004	<0.004	0.004	<0.004
Silicon	mg/L		0.05	2.29	3.94	0.05	5.95	0.05	2.94	0.05	4.32
Silver	mg/L		0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Strontium	mg/L		0.005	0.850	0.476	0.005	1.21	0.005	1.80	0.005	0.438
Sulfur	mg/L		0.05	64.6	29.5	0.05	7.30	0.05	27.0	0.05	7.56
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	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		0.005	0.011	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005

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Certificate of Analysis

AGAT WORK ORDER: 19T522734

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:Greg Way

New Liskeard Groundwater Package

DATE RECEIVED: 2019-09-26

DATE REPORTED: 2019-10-04

		SAMPLE DESCRIPTION:		OW-31-I		OW-31-II		NL GW DUP-1	NL GW DUP-2		NL GW DUP-3
		SAMPLE TYPE:		Water		Water		Water	Water		Water
		DATE SAMPLED:		2019-09-25		2019-09-25		2019-09-25	2019-09-25		2019-09-25
Parameter	Unit	G / S	RDL	563548	RDL	563549	RDL	563550	563551	RDL	563552
pH	pH Units		NA	7.66	NA	7.72	NA	7.71	7.82	NA	7.71
Alkalinity (as CaCO3)	mg/L		5	140	5	126	5	338	339	5	216
Electrical Conductivity	uS/cm		2	958	2	764	2	738	741	2	459
Total Hardness (as CaCO3) (Calculated)	mg/L		0.5	256	0.5	109	0.5	343	326	0.5	117
Total Dissolved Solids	mg/L		20	518	20	408	20	348	362	20	212
Fluoride	mg/L	1.5	0.25	<0.25	0.10	0.94	0.10	<0.10	0.55	0.05	1.32
Chloride	mg/L		0.50	2.08	0.20	2.60	0.20	3.24	3.05	0.10	1.58
Nitrate as N	mg/L	10.0	0.25	0.82	0.10	<0.10	0.10	0.78	0.14	0.05	<0.05
Nitrite as N	mg/L	1.0	0.25	<0.25	0.10	<0.10	0.10	0.18	<0.10	0.05	<0.05
Sulphate	mg/L		0.50	313	0.50	211	0.20	16.3	21.3	0.10	5.40
Phosphate as P	mg/L		0.50	<0.50	0.20	<0.20	0.20	<0.20	<0.20	0.10	<0.10
Ammonia as N	mg/L		0.02	<0.02	0.02	0.08	0.02	0.49	0.04	0.02	0.47
Total Kjeldahl Nitrogen	mg/L		0.10	0.11	0.10	0.12	0.10	0.82	0.20	0.10	0.72
Organic Nitrogen (Calculated)	mg/L		0.10	0.11	0.10	<0.10	0.10	0.33	0.16	0.10	0.25
Dissolved Organic Carbon	mg/L		0.5	1.0	0.5	2.7	0.5	4.0	1.3	0.5	2.2
Calcium	mg/L		0.05	44.1	0.05	18.8	0.05	95.6	69.1	0.05	19.4
Magnesium	mg/L		0.05	35.4	0.05	15.1	0.05	25.4	37.3	0.05	16.7
Sodium	mg/L	20	0.05	81.9	0.05	103	0.05	6.15	14.4	0.05	48.1
Potassium	mg/L		0.05	9.93	0.05	5.63	0.05	1.17	5.79	0.05	3.15
Aluminum	mg/L		0.004	0.008	0.004	0.009	0.004	0.009	0.014	0.004	0.007
Arsenic	mg/L	0.025	0.003	<0.003	0.003	<0.003	0.003	<0.003	<0.003	0.003	<0.003
Barium	mg/L	1	0.002	0.051	0.002	0.046	0.002	0.029	0.052	0.002	0.031
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	0.010	0.220	0.010	0.222	0.010	0.023	0.046	0.010	0.277
Cadmium	mg/L	0.005	0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002	0.002	<0.002
Chromium	mg/L	0.05	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	0.003	<0.001	0.001	<0.001
Copper	mg/L		0.003	0.004	0.003	<0.003	0.003	<0.003	<0.003	0.003	<0.003

Certified By: Vivine Basily

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CANADA L4Z 1Y2
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Certificate of Analysis

AGAT WORK ORDER: 19T522734

PROJECT: New Liskeard GW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:Greg Way

New Liskeard Groundwater Package

DATE RECEIVED: 2019-09-26

DATE REPORTED: 2019-10-04

		SAMPLE DESCRIPTION:		OW-31-I		OW-31-II		NL GW DUP-1	NL GW DUP-2		NL GW DUP-3
		SAMPLE TYPE:		Water		Water		Water	Water		Water
		DATE SAMPLED:		2019-09-25		2019-09-25		2019-09-25	2019-09-25		2019-09-25
Parameter	Unit	G / S	RDL	563548	RDL	563549	RDL	563550	563551	RDL	563552
Iron	mg/L		0.010	<0.010	0.010	<0.010	0.010	0.660	<0.010	0.010	<0.010
Lead	mg/L	0.01	0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001	0.001	<0.001
Manganese	mg/L		0.002	0.004	0.002	0.023	0.002	0.264	0.121	0.002	0.010
Molybdenum	mg/L		0.002	0.013	0.002	0.016	0.002	<0.002	0.007	0.002	0.008
Nickel	mg/L		0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	0.003	<0.003
Phosphorus	mg/L		0.05	<0.05	0.05	<0.05	0.05	0.06	<0.05	0.05	<0.05
Selenium	mg/L	0.05	0.004	<0.004	0.004	<0.004	0.004	<0.004	<0.004	0.004	<0.004
Silicon	mg/L		0.05	3.32	0.05	3.21	0.05	7.82	5.50	0.05	5.14
Silver	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002	0.002	<0.002
Strontium	mg/L		0.005	1.30	0.005	0.820	0.005	0.142	1.20	0.005	0.605
Sulfur	mg/L		0.05	101	0.05	68.4	0.05	5.24	7.73	0.05	2.32
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	0.004	0.002	0.003	0.002	<0.002	<0.002	0.002	<0.002
Uranium	mg/L	0.02	0.002	0.003	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		0.005	0.005	0.005	<0.005	0.005	<0.005	<0.005	0.005	<0.005

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Ontario Drinking Water Quality Standards. Na value is derived from O. Reg. 248
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

563493-563530 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analytes within the calibration range of the instrument and to reduce matrix interference.

563534 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analytes within the calibration range of the instrument and to reduce matrix interference.

563536 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analytes within the calibration range of the instrument and to reduce matrix interference.

563538-563539 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analytes within the calibration range of the instrument and to reduce matrix interference.

563541-563544 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analytes within the calibration range of the instrument and to reduce matrix interference.

563546 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analytes within the calibration range of the instrument and to reduce matrix interference.

563548-563551 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analytes within the calibration range of the instrument and to reduce matrix interference.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Vivine Basily

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

Guideline Violation

AGAT WORK ORDER: 19T522734

PROJECT: New Liskeard GW

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

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
563493	OW-1R-I	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	188
563522	OW-1-R-III	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	150
563526	OW-11-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	34.6
563528	OW-12-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	63.9
563530	OW-16-I	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	103
563531	OW-16-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	65.1
563534	OW-17-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	53.6
563535	OW-23-I	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	47.9
563536	OW-23-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	81.4
563540	OW-25-I	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	28.5
563541	OW-25-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	105
563543	OW-30-I	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Fluoride	mg/L	1.5	1.56
563543	OW-30-I	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	100
563544	OW-30-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	77.3
563546	OW-10-III	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	35.8
563547	OW-25-IV	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Fluoride	mg/L	1.5	1.72
563548	OW-31-I	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	81.9
563549	OW-31-II	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	103
563552	NL GW DUP-3	O.Reg.169/03(mg/L)	New Liskeard Groundwater Package	Sodium	mg/L	20	48.1

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Quality Assurance

CLIENT NAME: WOOD CANADA LTD.
PROJECT: New Liskeard GW
SAMPLING SITE:

AGAT WORK ORDER: 19T522734
ATTENTION TO: Emily Lemieux
SAMPLED BY:Greg Way

Water Analysis

RPT Date: Oct 04, 2019

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
New Liskeard Groundwater Package															
pH	564041		7.12	7.08	0.6%	NA	99%	90%	110%						
Alkalinity (as CaCO3)	564041		43	42	2.4%	< 5	100%	80%	120%						
Electrical Conductivity	564041		111	110	0.9%	< 2	102%	80%	120%						
Total Dissolved Solids	558597		754	764	1.3%	< 20	102%	80%	120%						
Fluoride	563524	563524	<0.25	<0.25	NA	< 0.05	107%	90%	110%	92%	90%	110%	100%	85%	115%
Chloride	563524	563524	1.64	1.62	1.2%	< 0.10	90%	90%	110%	101%	90%	110%	104%	85%	115%
Nitrate as N	563524	563524	<0.25	<0.25	NA	< 0.05	95%	90%	110%	105%	90%	110%	104%	85%	115%
Nitrite as N	563524	563524	<0.25	<0.25	NA	< 0.05	NA	90%	110%	102%	90%	110%	106%	85%	115%
Sulphate	563524	563524	231	221	4.4%	< 0.10	99%	90%	110%	104%	90%	110%	95%	85%	115%
Phosphate as P	563524	563524	<0.50	<0.50	NA	< 0.10	96%	90%	110%	99%	90%	110%	100%	85%	115%
Ammonia as N	563523	563523	<0.02	<0.02	NA	< 0.02	94%	90%	110%	103%	90%	110%	93%	70%	130%
Total Kjeldahl Nitrogen	563493	563493	20.2	20.4	1.0%	< 0.10	103%	80%	120%	101%	80%	120%	97%	70%	130%
Dissolved Organic Carbon	563493	563493	20.5	20.9	1.9%	< 0.5	103%	90%	110%	97%	90%	110%	94%	80%	120%
Calcium	563530	563530	13.6	13.3	2.2%	< 0.05	96%	90%	110%	97%	90%	110%	97%	70%	130%
Magnesium	563530	563530	11.5	11.3	1.8%	< 0.05	93%	90%	110%	93%	90%	110%	94%	70%	130%
Sodium	563530	563530	103	103	0.0%	< 0.05	98%	90%	110%	99%	90%	110%	100%	70%	130%
Potassium	563530	563530	4.21	4.13	1.9%	< 0.05	101%	90%	110%	102%	90%	110%	100%	70%	130%
Aluminum	563493	563493	0.015	0.016	NA	< 0.004	104%	90%	110%	108%	90%	110%	101%	70%	130%
Arsenic	563493	563493	0.004	0.004	NA	< 0.003	102%	90%	110%	102%	90%	110%	111%	70%	130%
Barium	563493	563493	0.097	0.099	2.0%	< 0.002	101%	90%	110%	100%	90%	110%	102%	70%	130%
Beryllium	563493	563493	<0.001	<0.001	NA	< 0.001	102%	90%	110%	107%	90%	110%	102%	70%	130%
Bismuth	563493	563493	<0.002	<0.002	NA	< 0.002	101%	90%	110%	101%	90%	110%	94%	70%	130%
Boron	563493	563493	1.93	1.95	1.0%	< 0.010	100%	90%	110%	107%	90%	110%	98%	70%	130%
Cadmium	563493	563493	<0.002	<0.002	NA	< 0.002	101%	90%	110%	101%	90%	110%	106%	70%	130%
Chromium	563493	563493	0.004	0.004	NA	< 0.003	102%	90%	110%	105%	90%	110%	98%	70%	130%
Cobalt	563493	563493	0.010	0.010	0.0%	< 0.001	103%	90%	110%	105%	90%	110%	104%	70%	130%
Copper	563493	563493	<0.003	<0.003	NA	< 0.003	104%	90%	110%	106%	90%	110%	97%	70%	130%
Iron	563493	563493	0.093	0.082	12.6%	< 0.010	98%	90%	110%	98%	90%	110%	98%	70%	130%
Lead	563493	563493	<0.001	<0.001	NA	< 0.001	99%	90%	110%	101%	90%	110%	99%	70%	130%
Manganese	563493	563493	0.813	0.806	0.9%	< 0.002	102%	90%	110%	104%	90%	110%	103%	70%	130%
Molybdenum	563493	563493	<0.002	<0.002	NA	< 0.002	103%	90%	110%	101%	90%	110%	108%	70%	130%
Nickel	563493	563493	0.052	0.052	0.0%	< 0.003	107%	90%	110%	107%	90%	110%	103%	70%	130%
Phosphorus	563493	563493	<0.05	<0.05	NA	< 0.05	98%	90%	110%	105%	90%	110%	112%	70%	130%
Selenium	563493	563493	0.013	0.012	NA	< 0.004	100%	90%	110%	103%	90%	110%	114%	70%	130%
Silicon	563493	563493	7.64	7.49	2.0%	< 0.05	104%	90%	110%	97%	90%	110%	95%	70%	130%
Silver	563493	563493	<0.002	<0.002	NA	< 0.002	103%	90%	110%	108%	90%	110%	104%	70%	130%
Strontium	563493	563493	1.36	1.35	0.7%	< 0.005	98%	90%	110%	99%	90%	110%	102%	70%	130%
Sulfur	563530	563530	1.37	1.38	0.7%	< 0.05	100%	90%	110%	101%	80%	130%	107%	70%	130%
Thallium	563493	563493	<0.006	<0.006	NA	< 0.006	99%	90%	110%	100%	90%	110%	100%	70%	130%

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

Quality Assurance

CLIENT NAME: WOOD CANADA LTD.
PROJECT: New Liskeard GW
SAMPLING SITE:

AGAT WORK ORDER: 19T522734
ATTENTION TO: Emily Lemieux
SAMPLED BY:Greg Way

Water Analysis (Continued)

RPT Date: Oct 04, 2019			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Tin	563493	563493	<0.002	<0.002	NA	< 0.002	100%	90%	110%	100%	90%	110%	102%	70%	130%
Titanium	563493	563493	0.002	0.002	NA	< 0.002	102%	90%	110%	100%	90%	110%	100%	70%	130%
Uranium	563493	563493	<0.002	<0.002	NA	< 0.002	96%	90%	110%	93%	90%	110%	105%	70%	130%
Vanadium	563493	563493	<0.002	<0.002	NA	< 0.002	101%	90%	110%	102%	90%	110%	102%	70%	130%
Zinc	563493	563493	0.007	0.007	NA	< 0.005	100%	90%	110%	104%	90%	110%	106%	70%	130%
New Liskeard Groundwater Package															
pH	563535	563535	8.01	7.86	1.9%	NA	99%	90%	110%						
Alkalinity (as CaCO3)	563535	563535	212	212	0.3%	< 5	98%	80%	120%						
Electrical Conductivity	563535	563535	472	469	0.6%	< 2	103%	80%	120%						
Total Dissolved Solids	563538	563538	338	344	1.8%	< 20	102%	80%	120%						
Fluoride	563541	563541	0.58	0.61	5.0%	< 0.05	104%	90%	110%	101%	90%	110%	103%	85%	115%
Chloride	563541	563541	5.80	5.95	2.6%	< 0.10	96%	90%	110%	104%	90%	110%	104%	85%	115%
Nitrate as N	563541	563541	<0.25	<0.25	NA	< 0.05	92%	90%	110%	108%	90%	110%	107%	85%	115%
Nitrite as N	563541	563541	<0.25	<0.25	NA	< 0.05	NA	90%	110%	108%	90%	110%	111%	85%	115%
Sulphate	563541	563541	203	207	2.0%	< 0.10	98%	90%	110%	106%	90%	110%	96%	85%	115%
Phosphate as P	563541	563541	<0.50	<0.50	NA	< 0.10	98%	90%	110%	101%	90%	110%	103%	85%	115%
Ammonia as N	563539	563539	0.32	0.32	0.0%	< 0.02	101%	90%	110%	104%	90%	110%	94%	70%	130%
Total Kjeldahl Nitrogen	563539	563539	1.39	1.38	0.7%	< 0.10	101%	80%	120%	99%	80%	120%	98%	70%	130%
Dissolved Organic Carbon	563539	563539	4.9	4.9	0.1%	< 0.5	94%	90%	110%	90%	90%	110%	84%	80%	120%
Calcium	563552	563552	19.4	19.3	0.3%	< 0.05	96%	90%	110%	96%	90%	110%	98%	70%	130%
Magnesium	563552	563552	16.7	17.0	1.6%	< 0.05	93%	90%	110%	94%	90%	110%	94%	70%	130%
Sodium	563552	563552	48.1	47.8	0.4%	< 0.05	99%	90%	110%	99%	90%	110%	101%	70%	130%
Potassium	563552	563552	3.15	3.16	0.3%	< 0.05	101%	90%	110%	101%	90%	110%	100%	70%	130%
Aluminum	563541	563541	0.007	0.006	NA	< 0.004	107%	90%	110%	107%	90%	110%	100%	70%	130%
Arsenic	563541	563541	<0.003	<0.003	NA	< 0.003	107%	90%	110%	104%	90%	110%	115%	70%	130%
Barium	563541	563541	0.027	0.026	3.6%	< 0.002	101%	90%	110%	100%	90%	110%	102%	70%	130%
Beryllium	563541	563541	<0.001	<0.001	NA	< 0.001	101%	90%	110%	98%	90%	110%	101%	70%	130%
Bismuth	563541	563541	<0.002	<0.002	NA	< 0.002	103%	90%	110%	101%	90%	110%	101%	70%	130%
Boron	563541	563541	0.197	0.199	1.3%	< 0.010	101%	90%	110%	102%	90%	110%	106%	70%	130%
Cadmium	563541	563541	<0.002	<0.002	NA	< 0.002	105%	90%	110%	104%	90%	110%	114%	70%	130%
Chromium	563541	563541	<0.003	<0.003	NA	< 0.003	105%	90%	110%	104%	90%	110%	104%	70%	130%
Cobalt	563541	563541	<0.001	<0.001	NA	< 0.001	107%	90%	110%	106%	90%	110%	109%	70%	130%
Copper	563541	563541	<0.003	<0.003	NA	< 0.003	107%	90%	110%	108%	90%	110%	107%	70%	130%
Iron	563541	563541	<0.050	(-0.562)	NA	< 0.010	99%	90%	110%	90%	90%	110%	77%	70%	130%
Lead	563541	563541	<0.001	<0.001	NA	< 0.001	102%	90%	110%	100%	90%	110%	105%	70%	130%
Manganese	563541	563541	<0.002	<0.002	NA	< 0.002	105%	90%	110%	104%	90%	110%	105%	70%	130%
Molybdenum	563541	563541	0.048	0.048	1.8%	< 0.002	105%	90%	110%	101%	90%	110%	114%	70%	130%
Nickel	563541	563541	<0.003	<0.003	NA	< 0.003	109%	90%	110%	110%	90%	110%	110%	70%	130%
Phosphorus	563541	563541	<0.05	<0.05	NA	< 0.05	97%	90%	110%	102%	90%	110%	110%	70%	130%

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Quality Assurance

CLIENT NAME: WOOD CANADA LTD.
AGAT WORK ORDER: 19T522734
PROJECT: New Liskeard GW
ATTENTION TO: Emily Lemieux
SAMPLING SITE:
SAMPLED BY:Greg Way

Water Analysis (Continued)

RPT Date: Oct 04, 2019			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Selenium	563541	563541	<0.004	<0.004	NA	< 0.004	106%	90%	110%	102%	90%	110%	118%	70%	130%
Silicon	563541	563541	3.14	3.08	2.1%	< 0.05	106%	90%	110%	101%	90%	110%	96%	70%	130%
Silver	563541	563541	<0.002	<0.002	NA	< 0.002	107%	90%	110%	107%	90%	110%	106%	70%	130%
Strontium	563541	563541	0.536	0.538	0.2%	< 0.005	101%	90%	110%	101%	90%	110%	101%	70%	130%
Sulfur	563552	563552	2.32	2.33	0.8%	< 0.05	99%	90%	110%	99%	80%	130%	107%	70%	130%
Thallium	563541	563541	<0.006	<0.006	NA	< 0.006	102%	90%	110%	99%	90%	110%	102%	70%	130%
Tin	563541	563541	<0.002	<0.002	NA	< 0.002	101%	90%	110%	100%	90%	110%	105%	70%	130%
Titanium	563541	563541	0.003	0.002	NA	< 0.002	104%	90%	110%	99%	90%	110%	103%	70%	130%
Uranium	563541	563541	0.004	0.004	NA	< 0.002	98%	90%	110%	94%	90%	110%	105%	70%	130%
Vanadium	563541	563541	<0.002	<0.002	NA	< 0.002	105%	90%	110%	100%	90%	110%	105%	70%	130%
Zinc	563541	563541	0.009	<0.005	NA	< 0.005	107%	90%	110%	107%	90%	110%	114%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate Qualifier: 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.

Certified By: Nivine Basily

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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

Method Summary

CLIENT NAME: WOOD CANADA LTD.

AGAT WORK ORDER: 19T522734

PROJECT: New Liskeard GW

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:Greg Way

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
Total Hardness (as CaCO3) (Calculated)	MET-93-6105	EPA SW-846 6010C & 200.7	CALCULATION
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Fluoride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Phosphate as P	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	SM 4500-NH3 H	LACHAT FIA
Total Kjeldahl Nitrogen	INOR-93-6048	QuikChem 10-107-06-2-I & SM 4500-Norg D	LACHAT FIA
Organic Nitrogen (Calculated)		SM 4500-Norg A	CALCULATION
Dissolved Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310 B	SHIMADZU CARBON ANALYZER
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Potassium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Aluminum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Bismuth	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Phosphorus	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silicon	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Strontium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Sulfur	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Tin	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Titanium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

3Lq

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

Chain of Custody Record

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

Laboratory Use Only
Work Order #: 19T522734
Cooler Quantity:
Arrival Temperatures: see attached
Custody Seal Intact: ☐Yes ☐No ☐N/A
Notes:

Report Information:
Company: Wood
Contact: Emily Lemieux
Address: 131 Fielding Road
Lively, ON P3Y 1L7
Phone: 705-682-2632 Fax: 705-682-2260
Reports to be sent to:
1. Email: emily.lemieux@woodplc.com
2. Email:

Regulatory Requirements: ☐ No Regulatory Requirement
(Please check all applicable boxes)

☐ Regulation 153/04
Table (Indicate One) ☐ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One) ☐ Coarse ☐ Fine

☐ Sewer Use
☐ Sanitary ☐ Storm
Region (Indicate One)
☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☒ Other
ODWS (Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Turnaround Time (TAT) Required:
Regular TAT ☑ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day
OR Date Required (Rush Surcharges May Apply):
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*
For 'Same Day' analysis, please contact your AGAT CPM

Project Information:
Project: New Liskeard GW
Site Location:
Sampled By:
AGAT Quote #: 17252 PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:
Bill To Same: Yes ☒ No ☐
Company:
Contact:
Address:
Email:

Sample Matrix Legend
B Biota
GW Ground Water
O Oil
P Paint
S Soil
SD Sediment
SW Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y/N	Field Filtered (Metals, Hg, CrVI)	O. Reg 153: Metals and Inorganics (All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (incl. Hydrides))	ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr^{6+} ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	Sewer Use	Groundwater parameters
OW-1R-I	25/09/2019	12pm	5	Water		Y															☑
OW-1-R-III	"	"	5	Water		Y															☑
OW-10-I	"	"	5	Water		Y															☑
OW-10-II	"	"	5	Water		Y															☑
OW-11-I	"	"	5	Water		Y															☑
OW-11-II	"	"	5	Water		Y															☑
OW-12-I	"	"	5	Water		Y															☑
OW-12-II	"	"	5	Water		Y															☑
OW-13-I	"	"	3	Water	please grab sample if possible	Y															☑
OW-16-I	"	"	5	Water		Y															☑
OW-16-II	"	"	5	Water		Y															☑

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Greg Wry	25/09/2019	5:30pm	Simon	19/9/26	902
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

Page 1 of 3
N°:

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT

Date Issued: March 10, 2016

AGAT Laboratories

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

Chain of Custody Record

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

Report Information:

Company: Wood
Contact: Emily Lemieux
Address: 131 Fielding Road
Lively, ON P3Y 1L7
Phone: 705-682-2632 Fax: 705-682-2260
Reports to be sent to:
1. Email: emily.lemieux@woodplc.com
2. Email:

Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☐ Regulation 153/04
Table (Indicate One) ☐ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One) ☐ Coarse ☐ Fine

☐ Sewer Use
☐ Sanitary ☐ Storm
Region (Indicate One)
☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☒ Other
ODWS (Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Laboratory Use Only

Work Order #:
Cooler Quantity:
Arrival Temperatures:
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes:

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: New Liskeard GW
Site Location:
Sampled By:
AGAT Quote #: 17252 PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐
Company:
Contact:
Address:
Email:

Sample Matrix Legend

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

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	O. Reg 153: Metals and Inorganics (☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides))	ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr^{6+} ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	Sewer Use	Groundwater parameters
OW-16-III			5	Water		Y														☑
OW-17-I			5	Water																☑
OW-17-II			5	Water																☑
~~OW-17-III~~			~~5~~	~~Water~~	*Dry*															☑
OW-23-I			5	Water																☑
OW-23-II			5	Water																☑
OW-24-I			5	Water																☑
OW-24-II			5	Water																☑
OW-24-III			5	Water																☑
OW-25-I			5	Water																☑
OW-25-II			5	Water																☑

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Greg Way	25/09/19	5:30pm	Simin	19/9/26	902
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

Page 2 of 3

N°:

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

Chain of Custody Record

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

Report Information:

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Contact: Emily Lemieux
Address: 131 Fielding Road
Lively, ON P3Y 1L7
Phone: 705-682-2632 Fax: 705-682-2260
Reports to be sent to:
1. Email: emily.lemieux@woodplc.com
2. Email:

Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☐ Regulation 153/04
Table (Indicate One) ☐ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One) ☐ Coarse ☐ Fine

☐ Sewer Use
☐ Sanitary ☐ Storm
Region (Indicate One)
☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☒ Other — ODWS (Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Laboratory Use Only

Work Order #:
Cooler Quantity:
Arrival Temperatures:
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes:

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

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**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: New Liskeard GW
Site Location:
Sampled By:
AGAT Quote #: 17252 PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
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SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	Metals and Inorganics	O. Reg 153	Full Metals Scan	Regulation/Custom Metals	Nutrients	Volatiles	PHCs F1 - F4	ABNs	PAHs	PCBs	Organochlorine Pesticides	TCLP	Sewer Use	Groundwater parameters
OW-25-III	25/09/2019	12pm	5	Water		Y														☑
OW-30-I	"	"	15	Water		"														☑
OW-30-II	"	"	5	Water		"														☑
OW-30-III	"	"	5	Water		"														☑
OW-10-III	"	"	5	Water		"														☑
OW-25-IV	"	"	5	Water		"														☑
OW-31-I	"	"	5	Water		"														☑
OW-31-II	"	"	5	Water		"														☑
NL GW DUP-1	"	"	5	Water		"														☑
NL GW DUP-2	"	"	5	Water		"														☑
NL GW DUP-3	"	"	5	Water		"														☑

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Greg Way	25/09/19	5:30pm	Simi	19/9/26	902
Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time

Page 3 of 3
N°:

AGAT Laboratories

Sample Temperature Log

Client: WOOD

COC# or Work Order #: 19T522734

# of Coolers: 3 cg

# of Submissions: 1

Arrival Temperatures - Branch/Driver

Cooler #1:	69	72	64
Cooler #2:	73	76	67
Cooler #3:	61	63	72
Cooler #4:			
Cooler #5:			
Cooler #6:			
Cooler #7:			
Cooler #8			
Cooler #9:			
Cooler #10:			

IR Gun ID:

Taken By: Simon

Date (yyyy/mm/dd): 19/9/26 Time: 9:02 (AM) / PM

Arrival Temperatures - Laboratory

Cooler #1:			
Cooler #2:			
Cooler #3:			
Cooler #4:			
Cooler #5:			
Cooler #6:			
Cooler #7:			
Cooler #8			
Cooler #9:			
Cooler #10:			

IR Gun ID:

Taken By:

Date (yyyy/mm/dd): Time: : AM / PM

Instructions for use of this form: 1) complete all fields of info including total # of coolers and # of submissions rec'd, 2) photocopy and place in each submission prior to giving a WO#, 3) Proceed as normal, write the WO# and scan (please make sure to scan along with the COC)

Document ID: SR-78-9511.003
Date Issued: 2017-2-23

Page: of

AGAT Laboratories

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

CLIENT NAME: WOOD CANADA LTD.
131 FIELDING ROAD
LIVELY, ON P3Y1L7
(705) 682-2632

ATTENTION TO: Emily Lemieux

PROJECT: New Liskeard SW

AGAT WORK ORDER: 19T460389

WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer

DATE REPORTED: May 23, 2019

PAGES (INCLUDING COVER): 7

VERSION*: 1

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

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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Results relate only to the items tested. Results apply to samples as received.
All reportable information as specified by ISO 17025:2017 is available from AGAT Laboratories upon request

AGAT Laboratories

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

Certificate of Analysis

AGAT WORK ORDER: 19T460389

PROJECT: New Liskeard SW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Surface Water - Column 3 Parameters

DATE RECEIVED: 2019-04-25

DATE REPORTED: 2019-05-23

SAMPLE DESCRIPTION:				SW-1	SW-2	SW-3		SW-4		SW-Dup
SAMPLE TYPE:				Water	Water	Water		Water		Water
DATE SAMPLED:				2019-04-25	2019-04-25	2019-04-25		2019-04-25		2019-04-25
Parameter	Unit	G / S	RDL	158093	158097	158098	RDL	158099	RDL	158100
BOD (5)	mg/L		5	<5	<5	<5	5	<5	5	<5
Electrical Conductivity	uS/cm		2	183	302	402	2	1780	2	143
pH	pH Units	6.5-8.5	NA	7.27	7.82	7.82	NA	7.92	NA	7.24
Total Dissolved Solids	mg/L		20	128	188	198	20	906	20	128
Total Suspended Solids	mg/L		10	237	<10	<10	10	<10	10	133
Alkalinity (as CaCO3)	mg/L		5	60	136	159	5	230	5	56
Chloride	mg/L		0.10	10.6	12.3	30.1	1.0	425	0.10	7.23
Nitrate as N	mg/L		0.05	0.48	0.27	0.31	0.5	2.1	0.05	0.48
Nitrite as N	mg/L		0.05	<0.05	<0.05	<0.05	0.5	<0.5	0.05	<0.05
Sulphate	mg/L		0.10	12.6	3.47	4.64	1.0	19.0	0.10	3.27
Ammonia as N	mg/L		0.02	<0.02	<0.02	<0.02	0.02	<0.02	0.02	<0.02
Total Phosphorus	mg/L	0.030	0.02	0.21	0.03	0.03	0.02	<0.02	0.02	0.14
Total Kjeldahl Nitrogen	mg/L		0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.10	0.13
Chemical Oxygen Demand	mg/L		5	30	12	14	5	16	5	28
Phenols	mg/L	0.001	0.001	0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001
Arsenic	mg/L	0.1	0.003	<0.003	<0.003	<0.003	0.003	<0.003	0.003	<0.003
Barium	mg/L		0.002	0.020	0.015	0.020	0.002	0.062	0.002	0.017
Boron	mg/L	0.20	0.010	<0.010	<0.010	<0.010	0.010	<0.010	0.010	<0.010
Cadmium	mg/L	0.0002	0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Chromium	mg/L		0.003	<0.003	<0.003	<0.003	0.003	0.005	0.003	<0.003
Copper	mg/L	0.005	0.002	0.003	<0.002	<0.002	0.002	0.003	0.002	0.003
Iron	mg/L	0.3	0.01	0.60	0.18	0.35	0.01	0.11	0.01	0.61
Lead	mg/L	0.005	0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001
Dissolved Mercury	mg/L	0.0002	0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Zinc	mg/L	0.02	0.005	0.007	0.007	0.007	0.005	<0.005	0.005	0.005

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to PWQO (mg/L)
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

158093-158100 BOD - The analysis was completed beyond the recommended hold times.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Verástegui

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

Guideline Violation

AGAT WORK ORDER: 19T460389

PROJECT: New Liskeard SW

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

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
158093	SW-1	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Iron	mg/L	0.3	0.60
158093	SW-1	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Total Phosphorus	mg/L	0.030	0.21
158098	SW-3	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Iron	mg/L	0.3	0.35
158100	SW-Dup	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Iron	mg/L	0.3	0.61
158100	SW-Dup	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Total Phosphorus	mg/L	0.030	0.14

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FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: WOOD CANADA LTD.

AGAT WORK ORDER: 19T460389

PROJECT: New Liskeard SW

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: May 23, 2019			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
New Liskeard Surface Water - Column 3 Parameters															
BOD (5)	153820		<5	<5	NA	< 5	100%	75%	125%	NA			NA		
Electrical Conductivity	156078		548	549	0.2%	< 2	95%	80%	120%						
pH	156078		7.75	7.77	0.3%	NA	100%	90%	110%						
Total Dissolved Solids	153566		68	64	NA	< 20	100%	80%	120%						
Total Suspended Solids	159602		<10	<10	NA	< 10	100%	80%	120%						
Alkalinity (as CaCO3)	156078		130	134	2.9%	< 5	104%	80%	120%						
Chloride	158099	158099	425	429	0.9%	< 0.10	95%	90%	110%	99%	90%	110%	97%	80%	120%
Nitrate as N	158099	158099	2.1	2.0	NA	< 0.05	96%	90%	110%	99%	90%	110%	97%	80%	120%
Nitrite as N	158099	158099	<0.5	<0.5	NA	< 0.05	NA	90%	110%	109%	90%	110%	110%	80%	120%
Sulphate	158099	158099	19.0	19.1	0.4%	< 0.10	94%	90%	110%	99%	90%	110%	99%	80%	120%
Ammonia as N	154991		<0.02	<0.02	NA	< 0.02	105%	90%	110%	88%	90%	110%	87%	80%	120%
Total Phosphorus	202477		0.69	0.71	2.8%	< 0.02	99%	90%	110%	97%	90%	110%	NA	70%	130%
Total Kjeldahl Nitrogen	153563		<0.10	<0.10	NA	< 0.10	99%	80%	120%	100%	80%	120%	102%	70%	130%
Chemical Oxygen Demand	158507		13	13	NA	< 5	103%	80%	120%	109%	90%	110%	112%	70%	130%
Phenols	158297		<0.001	<0.001	NA	< 0.001	96%	90%	110%	98%	90%	110%	99%	80%	120%
Arsenic	158093	158093	<0.003	<0.003	NA	< 0.003	103%	90%	110%	104%	90%	110%	108%	70%	130%
Barium	158093	158093	0.020	0.021	4.9%	< 0.002	102%	90%	110%	99%	90%	110%	101%	70%	130%
Boron	158093	158093	<0.010	<0.010	NA	< 0.010	109%	90%	110%	105%	90%	110%	102%	70%	130%
Cadmium	158093	158093	<0.0001	<0.0001	NA	< 0.0001	103%	90%	110%	101%	90%	110%	103%	70%	130%
Chromium	158093	158093	<0.003	<0.003	NA	< 0.003	101%	90%	110%	102%	90%	110%	106%	70%	130%
Copper	158093	158093	0.003	0.003	NA	< 0.002	100%	90%	110%	105%	90%	110%	105%	70%	130%
Iron	158093	158093	0.60	0.60	0.0%	< 0.01	106%	90%	110%	105%	90%	110%	110%	70%	130%
Lead	158093	158093	<0.001	<0.001	NA	< 0.001	104%	90%	110%	106%	90%	110%	103%	70%	130%
Dissolved Mercury	153169		<0.0001	<0.0001	NA	< 0.0001	103%	90%	110%	100%	90%	110%	100%	70%	130%
Zinc	158093	158093	0.007	0.007	NA	< 0.005	101%	90%	110%	105%	90%	110%	106%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate Qualifier: 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.

Certified By: Iris Verástegui

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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

QA Violation

CLIENT NAME: WOOD CANADA LTD.

AGAT WORK ORDER: 19T460389

PROJECT: New Liskeard SW

ATTENTION TO: Emily Lemieux

RPT Date: May 23, 2019

PARAMETER	Sample Id	Sample Description	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
				Lower	Upper		Lower	Upper		Lower	Upper
New Liskeard Surface Water - Column 3 Parameters											
Ammonia as N		SW-1	105%	90%	110%	88%	90%	110%	87%	80%	120%

Comments: NA signifies Not Applicable.
Duplicate Qualifier: 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.

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

Method Summary

CLIENT NAME: WOOD CANADA LTD.

AGAT WORK ORDER: 19T460389

PROJECT: New Liskeard SW

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
BOD (5)	INOR-93-6006	SM 5210 B	DO METER
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Total Suspended Solids	INOR-93-6028	SM 2540 D	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	QuikChem 10-107-06-1-J & SM 4500 NH3-F	LACHAT FIA
Total Phosphorus	INOR-93-6022	SM 4500-P B&E	SPECTROPHOTOMETER
Total Kjeldahl Nitrogen	INOR-93-6048	QuikChem 10-107-06-2-I & SM 4500-Norg D	LACHAT FIA
Chemical Oxygen Demand	INOR-93-6042	SM 5220 D	SPECTROPHOTOMETER
Phenols	INOR-93-6050	MOE ROPHEN-E 3179 & SM 5530 D	TECHNICON AUTO ANALYZER
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Dissolved Mercury	MET-93-6100	EPA SW 846 7470 & 245.1	CVAAS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS

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AGAT Laboratories

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

Chain of Custody Record

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

Laboratory Use Only
Work Order #: 19TL460389
Cooler Quantity:
Arrival Temperatures: 8.6 | 9 | 7.9
Custody Seal Intact: ☐Yes ☐No ☐N/A
Notes: on ice

Turnaround Time (TAT) Required:
Regular TAT ☒ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day
OR Date Required (Rush Surcharges May Apply):
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*
For 'Same Day' analysis, please contact your AGAT CPM

Report Information:
Company: Wood Environment & Infrastructure
Contact: Emily Lemieux
Address: 131 Fielding Rd, Lively ON P3Y 1L7
Phone: 705 682 2632 Fax:
Reports to be sent to:
1. Email: emily.lemieux@woodplc.com
2. Email:

Regulatory Requirements: ☐ No Regulatory Requirement
(Please check all applicable boxes)
☐ Regulation 153/04 — Table (Indicate One): ☐Ind/Com ☐Res/Park ☐Agriculture; Soil Texture (Check One): ☐Coarse ☐Fine
☐ Sewer Use — ☐Sanitary ☐Storm; Region (Indicate One): ☐MISA
☐ Regulation 558 ☐ CCME ☒ Prov. Water Quality Objectives (PWQO) ☐ Other (Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No
Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Project Information:
Project: New Liskeard SW
Site Location: New Liskeard
Sampled By: Camila Valcarcel
AGAT Quote #: 1752 PO: TY131010
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information: Bill To Same: Yes ☒ No ☐
Company:
Contact:
Address:
Email:

Sample Matrix Legend
B Biota
GW Ground Water
O Oil
P Paint
S Soil
SD Sediment
SW Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	O. Reg 153: Metals and Inorganics (☐All Metals ☐153 Metals (excl. Hydrides) ☐Hydride Metals ☐153 Metals (incl. Hydrides); ORPs: ☐B-HWS ☐Cl⁻ ☐CN ☐Cr⁶⁺ ☐EC ☐FOC ☐Hg ☐pH ☐SAR)	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐TP ☐NH_3 ☐TKN ☐NO_3 ☐NO_2 ☐NO_3+NO_2	Volatiles: ☐VOC ☐BTEX ☐THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐Total ☐Aroclors	Organochlorine Pesticides	TCLP: ☐M&I ☐VOCs ☐ABNs ☐B(a)P ☐PCBs	Sewer Use	Column 3 of schedule 5 SW
SW-1	25/04/19	1 PM	10															X
SW-2	↓	↓	10															X
SW-3			10															X
SW-4			10															X
~~SW-5~~					unsafe to Sample													X
~~SW-6~~					unsafe to Sample													X
SW-DUP	25/04/19	1 PM	10															X

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Camila Valcarcel	25/04/19	2 PM	Sima	19/4/26	8:25

Page ____ of ____
Nº: T 087338

AGAT Laboratories

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

CLIENT NAME: WOOD CANADA LTD.
131 FIELDING ROAD
LIVELY, ON P3Y1L7
(705) 682-2632

ATTENTION TO: Emily Lemieux

PROJECT: TY131010

AGAT WORK ORDER: 19T472792

WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer

DATE REPORTED: Jun 17, 2019

PAGES (INCLUDING COVER): 7

VERSION*: 1

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

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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Results relate only to the items tested. Results apply to samples as received.
All reportable information as specified by ISO 17025:2017 is available from AGAT Laboratories upon request

AGAT Laboratories

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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Certificate of Analysis

AGAT WORK ORDER: 19T472792

PROJECT: TY131010

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Surface Water - Column 3 Parameters

DATE RECEIVED: 2019-05-29

DATE REPORTED: 2019-06-17

SAMPLE DESCRIPTION:				SW-1	SW-2	SW-3		SW-4		SW-5	SW-6
SAMPLE TYPE:				Water	Water	Water		Water		Water	Water
DATE SAMPLED:				2019-05-26	2019-05-26	2019-05-26		2019-05-26		2019-05-26	2019-05-26
Parameter	Unit	G / S	RDL	229193	229232	229233	RDL	229234	RDL	229235	229236
BOD (5)	mg/L		5	<5	<5	<5	5	<5	5	<5	<5
Electrical Conductivity	uS/cm		2	124	416	507	2	1770	2	244	251
pH	pH Units	6.5-8.5	NA	6.94	7.88	7.89	NA	7.91	NA	7.51	7.66
Total Dissolved Solids	mg/L		20	98	224	254	20	874	20	234	160
Total Suspended Solids	mg/L		10	41	26	<10	10	<10	10	62	55
Alkalinity (as CaCO3)	mg/L		5	63	257	268	5	327	5	132	135
Chloride	mg/L		0.10	4.33	8.41	32.8	1.0	436	0.10	7.61	8.36
Nitrate as N	mg/L		0.05	0.18	<0.05	<0.05	0.5	2.3	0.05	0.78	0.76
Nitrite as N	mg/L		0.05	<0.05	<0.05	<0.05	0.5	<0.5	0.05	<0.05	<0.05
Sulphate	mg/L		0.10	2.98	3.43	4.44	1.0	17.0	0.10	5.36	5.36
Ammonia as N	mg/L		0.02	0.08	<0.02	0.04	0.02	<0.02	0.02	0.10	0.07
Total Phosphorus	mg/L	0.030	0.02	0.04	<0.02	<0.02	0.02	<0.02	0.02	0.08	0.09
Total Kjeldahl Nitrogen	mg/L		0.10	0.42	<0.10	0.14	0.10	0.30	0.10	0.49	<0.10
Chemical Oxygen Demand	mg/L		5	22	8	7	5	9	5	22	21
Phenols	mg/L	0.001	0.001	0.002	<0.001	<0.001	0.001	<0.001	0.001	0.002	0.002
Arsenic	mg/L	0.1	0.003	<0.003	<0.003	<0.003	0.003	<0.003	0.003	<0.003	<0.003
Barium	mg/L		0.002	0.014	0.016	0.019	0.002	0.061	0.002	0.024	0.027
Boron	mg/L	0.20	0.010	<0.010	0.013	0.011	0.010	0.014	0.010	<0.010	<0.010
Cadmium	mg/L	0.0002	0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	<0.0001
Chromium	mg/L		0.003	<0.003	<0.003	<0.003	0.003	<0.003	0.003	<0.003	<0.003
Copper	mg/L	0.005	0.002	0.002	<0.002	<0.002	0.002	0.004	0.002	0.003	0.004
Iron	mg/L	0.3	0.01	0.49	0.07	0.07	0.01	0.04	0.01	0.55	0.59
Lead	mg/L	0.005	0.001	<0.001	<0.001	0.001	0.001	<0.001	0.001	<0.001	<0.001
Dissolved Mercury	mg/L	0.0002	0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	<0.0001
Zinc	mg/L	0.02	0.005	<0.005	<0.005	<0.005	0.005	<0.005	0.005	<0.005	0.006

Certified By: Iris Verástegui

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

Certificate of Analysis

AGAT WORK ORDER: 19T472792

PROJECT: TY131010

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Surface Water - Column 3 Parameters

DATE RECEIVED: 2019-05-29

DATE REPORTED: 2019-06-17

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: SW-Dup SAMPLE TYPE: Water DATE SAMPLED: 2019-05-26 229237
BOD (5)	mg/L		5	<5
Electrical Conductivity	uS/cm		2	124
pH	pH Units	6.5-8.5	NA	7.23
Total Dissolved Solids	mg/L		20	104
Total Suspended Solids	mg/L		10	39
Alkalinity (as CaCO3)	mg/L		5	65
Chloride	mg/L		0.10	4.30
Nitrate as N	mg/L		0.05	0.17
Nitrite as N	mg/L		0.05	<0.05
Sulphate	mg/L		0.10	2.97
Ammonia as N	mg/L		0.02	0.08
Total Phosphorus	mg/L	0.030	0.02	0.04
Total Kjeldahl Nitrogen	mg/L		0.10	0.39
Chemical Oxygen Demand	mg/L		5	23
Phenols	mg/L	0.001	0.001	0.002
Arsenic	mg/L	0.1	0.003	<0.003
Barium	mg/L		0.002	0.014
Boron	mg/L	0.20	0.010	<0.010
Cadmium	mg/L	0.0002	0.0001	<0.0001
Chromium	mg/L		0.003	<0.003
Copper	mg/L	0.005	0.002	0.002
Iron	mg/L	0.3	0.01	0.49
Lead	mg/L	0.005	0.001	<0.001
Dissolved Mercury	mg/L	0.0002	0.0001	<0.0001
Zinc	mg/L	0.02	0.005	<0.005

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to PWQO (mg/L)
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

229234 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range, reduce matrix interference and/or to avoid contaminating the instrument.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Verástegui

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AGAT Laboratories

Guideline Violation

AGAT WORK ORDER: 19T472792

PROJECT: TY131010

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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http://www.agatlabs.com

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
229193	SW-1	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Iron	mg/L	0.3	0.49
229193	SW-1	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Phenols	mg/L	0.001	0.002
229193	SW-1	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Total Phosphorus	mg/L	0.030	0.04
229235	SW-5	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Iron	mg/L	0.3	0.55
229235	SW-5	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Phenols	mg/L	0.001	0.002
229235	SW-5	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Total Phosphorus	mg/L	0.030	0.08
229236	SW-6	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Iron	mg/L	0.3	0.59
229236	SW-6	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Phenols	mg/L	0.001	0.002
229236	SW-6	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Total Phosphorus	mg/L	0.030	0.09
229237	SW-Dup	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Iron	mg/L	0.3	0.49
229237	SW-Dup	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Phenols	mg/L	0.001	0.002
229237	SW-Dup	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Total Phosphorus	mg/L	0.030	0.04

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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

Quality Assurance

CLIENT NAME: WOOD CANADA LTD.

AGAT WORK ORDER: 19T472792

PROJECT: TY131010

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Jun 17, 2019

PARAMETER	Batch	Sample Id	DUPLICATE Dup #1	DUPLICATE Dup #2	DUPLICATE RPD	Method Blank	REFERENCE MATERIAL Measured Value	REFERENCE MATERIAL Acceptable Limits Lower	REFERENCE MATERIAL Acceptable Limits Upper	METHOD BLANK SPIKE Recovery	METHOD BLANK SPIKE Acceptable Limits Lower	METHOD BLANK SPIKE Acceptable Limits Upper	MATRIX SPIKE Recovery	MATRIX SPIKE Acceptable Limits Lower	MATRIX SPIKE Acceptable Limits Upper
New Liskeard Surface Water - Column 3 Parameters															
BOD (5)	231138		80	83	3.7%	< 5	100%	75%	125%	NA			NA		
Electrical Conductivity	229038		741	733	1.1%	< 2	96%	80%	120%	NA			NA		
pH	229038		7.96	7.80	2.0%	NA	100%	90%	110%	NA			NA		
Total Dissolved Solids	229233	229233	254	300	16.6%	< 20	94%	80%	120%	NA			NA		
Total Suspended Solids	234400		98	103	5.0%	< 10	98%	80%	120%	NA			NA		
Alkalinity (as CaCO3)	229038		349	351	0.6%	< 5	97%	80%	120%	NA			NA		
Chloride	232617		104	105	1.0%	< 0.10	103%	90%	110%	103%	90%	110%	107%	80%	120%
Nitrate as N	232617		<0.25	<0.25	NA	< 0.05	99%	90%	110%	106%	90%	110%	102%	80%	120%
Nitrite as N	232617		<0.25	<0.25	NA	< 0.05	NA	90%	110%	106%	90%	110%	117%	80%	120%
Sulphate	232617		26.7	26.9	0.7%	< 0.10	100%	90%	110%	105%	90%	110%	98%	80%	120%
Ammonia as N	231394		0.04	0.04	NA	< 0.02	101%	90%	110%	96%	90%	110%	81%	80%	120%
Total Phosphorus	229193	229193	0.04	0.04	NA	< 0.02	95%	90%	110%	106%	90%	110%	104%	70%	130%
Total Kjeldahl Nitrogen	228555		0.75	0.70	6.9%	< 0.10	116%	80%	120%	100%	80%	120%	99%	70%	130%
Chemical Oxygen Demand	228957		42	43	2.4%	< 5	96%	80%	120%	101%	90%	110%	105%	70%	130%
Phenols	240228		<0.001	<0.001	NA	< 0.001	96%	90%	110%	99%	90%	110%	97%	80%	120%
Arsenic	227620		<0.015	<0.015	NA	< 0.003	104%	90%	110%	104%	90%	110%	116%	70%	130%
Barium	227620		0.270	0.268	0.7%	< 0.002	102%	90%	110%	104%	90%	110%	115%	70%	130%
Boron	227620		0.104	0.099	4.9%	< 0.010	109%	90%	110%	104%	90%	110%	98%	70%	130%
Cadmium	227620		<0.0005	<0.0005	NA	< 0.0001	100%	90%	110%	107%	90%	110%	112%	70%	130%
Chromium	227620		<0.015	<0.015	NA	< 0.003	102%	90%	110%	101%	90%	110%	105%	70%	130%
Copper	227620		<0.010	<0.010	NA	< 0.002	104%	90%	110%	109%	90%	110%	103%	70%	130%
Iron	227620		<0.01	0.01	NA	< 0.01	109%	90%	110%	104%	90%	110%	113%	70%	130%
Lead	227620		<0.005	<0.005	NA	< 0.001	103%	90%	110%	102%	90%	110%	96%	70%	130%
Dissolved Mercury	229233	229233	<0.0001	<0.0001	NA	< 0.0001	102%	90%	110%	103%	90%	110%	96%	70%	130%
Zinc	227620		<0.025	<0.025	NA	< 0.005	107%	90%	110%	110%	90%	110%	114%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate Qualifier: 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.

Certified By: Iris Verástegui

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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

Method Summary

CLIENT NAME: WOOD CANADA LTD.

AGAT WORK ORDER: 19T472792

PROJECT: TY131010

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
BOD (5)	INOR-93-6006	SM 5210 B	DO METER
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Total Suspended Solids	INOR-93-6028	SM 2540 D	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	QuikChem 10-107-06-1-J & SM 4500 NH3-F	LACHAT FIA
Total Phosphorus	INOR-93-6022	SM 4500-P B&E	SPECTROPHOTOMETER
Total Kjeldahl Nitrogen	INOR-93-6048	QuikChem 10-107-06-2-I & SM 4500-Norg D	LACHAT FIA
Chemical Oxygen Demand	INOR-93-6042	SM 5220 D	SPECTROPHOTOMETER
Phenols	INOR-93-6050	MOE ROPHEN-E 3179 & SM 5530 D	TECHNICON AUTO ANALYZER
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Dissolved Mercury	MET-93-6100	EPA SW 846 7470 & 245.1	CVAAS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS

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AGAT Laboratories

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

Chain of Custody Record

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

Laboratory Use Only
Work Order #: 19T472792
Cooler Quantity:
Arrival Temperatures: 4.0 | 8.6 | 7.4
Custody Seal Intact: ☐Yes ☐No ☐N/A
Notes:

Report Information:
Company: Wood E&S
Contact: Emily Lemieux
Address: 131 Fielding Rd
Lively, ON P3Y 1L7
Phone: 705 682 2632 Fax:
Reports to be sent to:
1. Email: emily.lemieux@woodplc.com
2. Email:

Regulatory Requirements: ☐ No Regulatory Requirement
(Please check all applicable boxes)

☐ Regulation 153/04
Table (Indicate One) ☐ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One) ☐ Coarse ☐ Fine

☐ Sewer Use
☐ Sanitary ☐ Storm
Region (Indicate One) ☐ MISA

☐ Regulation 558
☐ CCME
☒ Prov. Water Quality Objectives (PWQO)
☐ Other
(Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Turnaround Time (TAT) Required:
Regular TAT ☒ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day
OR Date Required (Rush Surcharges May Apply):
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*
For 'Same Day' analysis, please contact your AGAT CPM

Project Information:
Project: TY131010
Site Location: NEW LISKEARD SW
Sampled By: WOOD
AGAT Quote #: 17252 PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:
Bill To Same: Yes ☒ No ☐
Company:
Contact:
Address:
Email:

Sample Matrix Legend
B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	O. Reg 153: Metals and Inorganics (☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides))	O. Reg 153: ORPs: ☐ B-HWS ☐ Cl⁻ ☐ CN ☐ CrVI ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR	O. Reg 153: Full Metals Scan	O. Reg 153: Regulation/Custom Metals	O. Reg 153: Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	O. Reg 153: Volatiles: ☐ VOC ☐ BTEX ☐ THM	O. Reg 153: PHCs F1 - F4	O. Reg 153: ABNs	O. Reg 153: PAHs	O. Reg 153: PCBs: ☐ Total ☐ Aroclors	O. Reg 153: Organochlorine Pesticides	O. Reg 153: TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	O. Reg 153: Sewer Use	QUOTE #: Column 1 SW					
SW-1	26/05/19	9 AM	7	SW		N																X					
SW-2	↓	↓	7	SW		N																X					
SW-3			7	SW		N																X					
SW-4			7	SW		N																X					
SW-5			7	SW		N																X					
SW-6			7	SW		N																X					
SW-Dup.			7	SW		N																X					

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Camila Valcarcel	28/05/19	9 AM ~~3:00 PM~~	Jay Patel	29/5/19	1:30 pm

Page ____ of ____
Nº: T 088408

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT

AGAT Laboratories

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

CLIENT NAME: WOOD CANADA LTD.
131 FIELDING ROAD
LIVELY, ON P3Y1L7
(705) 682-2632

ATTENTION TO: Emily Lemieux

PROJECT: New Liskeard SW

AGAT WORK ORDER: 19T485225

WATER ANALYSIS REVIEWED BY: Jacky Zhu, Spectroscopy Technician

DATE REPORTED: Jul 08, 2019

PAGES (INCLUDING COVER): 7

VERSION*: 1

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

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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Results relate only to the items tested. Results apply to samples as received.
All reportable information as specified by ISO 17025:2017 is available from AGAT Laboratories upon request

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
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Certificate of Analysis

AGAT WORK ORDER: 19T485225

PROJECT: New Liskeard SW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Surface Water - Column 3 Parameters

DATE RECEIVED: 2019-06-27

DATE REPORTED: 2019-07-08

SAMPLE DESCRIPTION:				SW-1	SW-2		SW-3		SW-4		SW-5
SAMPLE TYPE:				Water	Water		Water		Water		Water
DATE SAMPLED:				2019-06-26	2019-06-26		2019-06-26		2019-06-26		2019-06-26
Parameter	Unit	G / S	RDL	307377	307384	RDL	307385	RDL	307387	RDL	307388
BOD (5)	mg/L		5	<5	<5	5	<5	5	<5	5	<5
Electrical Conductivity	uS/cm		2	142	515	2	778	2	2200	2	195
pH	pH Units	6.5-8.5	NA	7.47	7.94	NA	7.95	NA	7.93	NA	7.37
Total Dissolved Solids	mg/L		20	122	286	20	402	20	1110	20	136
Total Suspended Solids	mg/L		10	144	152	10	61	10	14	10	26
Alkalinity (as CaCO3)	mg/L		5	64	275	5	337	5	330	5	83
Chloride	mg/L		0.10	3.94	5.90	0.20	62.5	1.0	561	0.10	8.07
Nitrate as N	mg/L		0.05	0.06	<0.05	0.10	<0.10	0.5	1.1	0.05	0.24
Nitrite as N	mg/L		0.05	<0.05	<0.05	0.10	<0.10	0.5	<0.5	0.05	<0.05
Sulphate	mg/L		0.10	3.46	7.10	0.20	2.94	1.0	11.1	0.10	6.38
Ammonia as N	mg/L		0.02	0.04	<0.02	0.02	<0.02	0.02	<0.02	0.02	0.02
Total Phosphorus	mg/L	0.030	0.02	0.10	0.09	0.02	0.08	0.02	0.06	0.02	0.07
Total Kjeldahl Nitrogen	mg/L		0.10	0.38	0.27	0.10	0.63	0.10	0.56	0.10	0.44
Chemical Oxygen Demand	mg/L		5	23	22	5	19	5	17	5	35
Phenols	mg/L	0.001	0.001	0.007	<0.001	0.001	0.001	0.001	<0.001	0.001	0.002
Arsenic	mg/L	0.1	0.003	<0.003	<0.003	0.003	<0.003	0.003	0.004	0.003	<0.003
Barium	mg/L		0.002	0.014	0.026	0.002	0.025	0.002	0.074	0.002	0.023
Boron	mg/L	0.20	0.010	0.010	0.018	0.010	0.013	0.010	0.015	0.010	<0.010
Cadmium	mg/L	0.0002	0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Chromium	mg/L		0.003	0.003	0.005	0.003	0.010	0.003	0.007	0.003	<0.003
Copper	mg/L	0.005	0.002	<0.002	<0.002	0.002	<0.002	0.002	0.003	0.002	<0.002
Iron	mg/L	0.3	0.01	0.42	0.30	0.01	0.06	0.01	0.26	0.01	0.21
Lead	mg/L	0.005	0.001	<0.001	0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Dissolved Mercury	mg/L	0.0002	0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Zinc	mg/L	0.02	0.005	0.005	0.012	0.005	0.006	0.005	0.009	0.005	0.009

Certified By:

Results relate only to the items tested. Results apply to samples as received.

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MISSISSAUGA, ONTARIO
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TEL (905)712-5100
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Certificate of Analysis

AGAT WORK ORDER: 19T485225

PROJECT: New Liskeard SW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Surface Water - Column 3 Parameters

DATE RECEIVED: 2019-06-27

DATE REPORTED: 2019-07-08

		SAMPLE DESCRIPTION:		SW-6	SW DUP
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2019-06-26	2019-06-26
Parameter	Unit	G / S	RDL	307389	307390
BOD (5)	mg/L		5	<5	<5
Electrical Conductivity	uS/cm		2	197	196
pH	pH Units	6.5-8.5	NA	7.59	7.61
Total Dissolved Solids	mg/L		20	134	126
Total Suspended Solids	mg/L		10	20	21
Alkalinity (as CaCO3)	mg/L		5	83	81
Chloride	mg/L		0.10	8.13	8.11
Nitrate as N	mg/L		0.05	0.30	0.25
Nitrite as N	mg/L		0.05	<0.05	<0.05
Sulphate	mg/L		0.10	6.49	7.03
Ammonia as N	mg/L		0.02	0.05	<0.02
Total Phosphorus	mg/L	0.030	0.02	0.09	0.09
Total Kjeldahl Nitrogen	mg/L		0.10	0.44	0.48
Chemical Oxygen Demand	mg/L		5	29	32
Phenols	mg/L	0.001	0.001	0.002	0.002
Arsenic	mg/L	0.1	0.003	<0.003	<0.003
Barium	mg/L		0.002	0.026	0.022
Boron	mg/L	0.20	0.010	0.010	0.010
Cadmium	mg/L	0.0002	0.0001	<0.0001	<0.0001
Chromium	mg/L		0.003	<0.003	<0.003
Copper	mg/L	0.005	0.002	<0.002	<0.002
Iron	mg/L	0.3	0.01	0.26	0.24
Lead	mg/L	0.005	0.001	<0.001	<0.001
Dissolved Mercury	mg/L	0.0002	0.0001	<0.0001	<0.0001
Zinc	mg/L	0.02	0.005	0.010	0.007

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to PWQO (mg/L)
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

307385-307387 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analytes within the calibration range of the instrument and to reduce matrix interference.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

Guideline Violation

AGAT WORK ORDER: 19T485225

PROJECT: New Liskeard SW

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

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
307377	SW-1	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Iron	mg/L	0.3	0.42
307377	SW-1	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Phenols	mg/L	0.001	0.007
307377	SW-1	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Total Phosphorus	mg/L	0.030	0.10
307384	SW-2	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Total Phosphorus	mg/L	0.030	0.09
307385	SW-3	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Total Phosphorus	mg/L	0.030	0.08
307387	SW-4	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Total Phosphorus	mg/L	0.030	0.06
307388	SW-5	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Phenols	mg/L	0.001	0.002
307388	SW-5	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Total Phosphorus	mg/L	0.030	0.07
307389	SW-6	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Phenols	mg/L	0.001	0.002
307389	SW-6	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Total Phosphorus	mg/L	0.030	0.09
307390	SW DUP	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Phenols	mg/L	0.001	0.002
307390	SW DUP	ON PWQO (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Total Phosphorus	mg/L	0.030	0.09

Results relate only to the items tested. Results apply to samples as received.

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5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
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Quality Assurance

CLIENT NAME: WOOD CANADA LTD.

AGAT WORK ORDER: 19T485225

PROJECT: New Liskeard SW

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Jul 08, 2019			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
New Liskeard Surface Water - Column 3 Parameters															
BOD (5)	307377	307377	<5	<5	NA	< 5	100%	75%	125%						
Electrical Conductivity	307377	307377	142	142	0.0%	< 2	102%	80%	120%						
pH	307377	307377	7.47	7.42	0.7%	NA	100%	90%	110%						
Total Dissolved Solids	309654		684	690	0.9%	< 20	96%	80%	120%						
Total Suspended Solids	312514		<10	<10	NA	< 10	100%	80%	120%						
Alkalinity (as CaCO3)	307377	307377	64	65	1.6%	< 5	101%	80%	120%						
Chloride	302644		172	183	6.2%	< 0.10	93%	90%	110%	100%	90%	110%	101%	80%	120%
Nitrate as N	302644		0.83	0.85	2.4%	< 0.05	94%	90%	110%	102%	90%	110%	105%	80%	120%
Nitrite as N	302644		<0.25	<0.25	NA	< 0.05	NA	90%	110%	108%	90%	110%	112%	80%	120%
Sulphate	302644		77.1	83.6	8.1%	< 0.10	94%	90%	110%	97%	90%	110%	101%	80%	120%
Ammonia as N	304104		<0.02	<0.02	NA	< 0.02	90%	90%	110%	92%	90%	110%	87%	80%	120%
Total Phosphorus	304004		0.30	0.31	3.3%	< 0.02	100%	90%	110%	103%	90%	110%	100%	70%	130%
Total Kjeldahl Nitrogen	304004		1.83	1.99	8.4%	< 0.10	98%	80%	120%	105%	80%	120%	99%	70%	130%
Chemical Oxygen Demand	307377	307377	23	21	NA	< 5	99%	80%	120%	97%	90%	110%	98%	70%	130%
Phenols	307384	307384	<0.001	<0.001	NA	< 0.001	98%	90%	110%	98%	90%	110%	97%	80%	120%
Arsenic	317769		<0.003	<0.003	NA	< 0.003	99%	90%	110%	98%	90%	110%	101%	70%	130%
Barium	317769		0.066	0.058	12.9%	< 0.002	101%	90%	110%	105%	90%	110%	100%	70%	130%
Boron	317769		0.013	0.013	NA	< 0.010	106%	90%	110%	101%	90%	110%	105%	70%	130%
Cadmium	317769		<0.0001	<0.0001	NA	< 0.0001	100%	90%	110%	101%	90%	110%	99%	70%	130%
Chromium	317769		<0.003	<0.003	NA	< 0.003	99%	90%	110%	101%	90%	110%	97%	70%	130%
Copper	317769		<0.002	<0.002	NA	< 0.002	98%	90%	110%	101%	90%	110%	95%	70%	130%
Iron	317769		<0.05	<0.05	NA	< 0.01	93%	90%	110%	107%	90%	110%	100%	70%	130%
Lead	317769		<0.001	<0.001	NA	< 0.001	98%	90%	110%	102%	90%	110%	96%	70%	130%
Dissolved Mercury	307377	307377	<0.0001	<0.0001	NA	< 0.0001	104%	90%	110%	100%	90%	110%	103%	70%	130%
Zinc	317769		0.015	0.009	NA	< 0.005	99%	90%	110%	101%	90%	110%	97%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate Qualifier: 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.

Certified By:

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
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Method Summary

CLIENT NAME: WOOD CANADA LTD.

AGAT WORK ORDER: 19T485225

PROJECT: New Liskeard SW

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
BOD (5)	INOR-93-6006	SM 5210 B	DO METER
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Total Suspended Solids	INOR-93-6028	SM 2540 D	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	QuikChem 10-107-06-1-J & SM 4500 NH3-F	LACHAT FIA
Total Phosphorus	INOR-93-6022	SM 4500-P B&E	SPECTROPHOTOMETER
Total Kjeldahl Nitrogen	INOR-93-6048	QuikChem 10-107-06-2-I & SM 4500-Norg D	LACHAT FIA
Chemical Oxygen Demand	INOR-93-6042	SM 5220 D	SPECTROPHOTOMETER
Phenols	INOR-93-6050	MOE ROPHEN-E 3179 & SM 5530 D	TECHNICON AUTO ANALYZER
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Dissolved Mercury	MET-93-6100	EPA SW 846 7470 & 245.1	CVAAS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS

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AGAT Laboratories

1 - Lg BLK

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

Laboratory Use Only

Work Order #: 19T485225

Cooler Quantity:

Arrival Temperatures: 9.7 | 9.3 | 9.5

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes: MELTED ICE

Chain of Custody Record

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

Report Information:

Company: Wood

Contact: Emily Lemieux

Address: 131 Fielding Road
Lively, ON P3Y 1L7

Phone: 705-682-2632 Fax: 705-682-2260

Reports to be sent to:

1. Email: emily.lemieux@woodplc.com
2. Email:

Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☐ Regulation 153/04
Table _____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region _____ *Indicate One*
☐ MISA

☐ Regulation 558
☐ CCME
☒ Prov. Water Quality Objectives (PWQO)
☐ Other
_____ *Indicate One*

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: New Liskeard SW

Site Location:

Sampled By:

AGAT Quote #: 17252 PO:

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

Invoice Information:

Bill To Same: Yes ☐ No ☐

Company:

Contact:

Address:

Email:

Sample Matrix Legend

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

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	Metals and Inorganics (O. Reg 153)	☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (incl. Hydrides)	ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr^{6+} ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	Sewer Use	Surfacewater paramet
SW-1	26/06/19	12 PM	7	Water	SW column 3 parameters	N															☑
SW-2	↓	↓	7	Water	for spring and summer	N															☑
SW-3	↓	↓	7	Water	Column 4 parameters for	N															☑
SW-4	↓	↓	7	Water	all other events	N															☑
SW-5	↓	↓	7	Water		N															☑
SW-6	↓	↓	7	Water		N															☑
SW DUP	↓	↓	7	Water		N															☑

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Camila Valcarcel [signature]	26/06/19	1:30 PM	MANOJ JOHN	JUNE 27, 19	9:00

Page 1 of 1

N°:

AGAT Laboratories

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

CLIENT NAME: WOOD CANADA LTD.
131 FIELDING ROAD
LIVELY, ON P3Y1L7
(705) 682-2632

ATTENTION TO: Emily Lemieux

PROJECT: New Liskeard SW

AGAT WORK ORDER: 19T498241

WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer

DATE REPORTED: Aug 08, 2019

PAGES (INCLUDING COVER): 6

VERSION*: 1

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

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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Results relate only to the items tested. Results apply to samples as received.
All reportable information as specified by ISO 17025:2017 is available from AGAT Laboratories upon request

AGAT Laboratories

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MISSISSAUGA, ONTARIO
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Certificate of Analysis

AGAT WORK ORDER: 19T498241

PROJECT: New Liskeard SW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Surface Water - Column 3 Parameters

DATE RECEIVED: 2019-07-29

DATE REPORTED: 2019-08-08

		SAMPLE DESCRIPTION:		SW-1	SW-5	SW-6	SW DUP
		SAMPLE TYPE:		Water	Water	Water	Water
		DATE SAMPLED:					
Parameter	Unit	G / S	RDL	386106	386107	386108	386109
BOD (5)	mg/L		5	<5	<5	<5	<5
Electrical Conductivity	uS/cm		2	166	95	85	166
pH	pH Units	6.5-8.5	NA	7.79	7.50	7.39	7.80
Total Dissolved Solids	mg/L		20	102	48	64	96
Total Suspended Solids	mg/L		10	14	20	12	16
Alkalinity (as CaCO3)	mg/L		5	65	31	28	72
Chloride	mg/L		0.10	2.94	2.36	2.05	2.86
Nitrate as N	mg/L		0.05	<0.05	0.05	0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L		0.10	4.22	4.39	4.51	4.11
Ammonia as N	mg/L		0.02	0.19	0.18	0.16	0.16
Total Phosphorus	mg/L	0.030	0.02	0.06	0.07	0.06	0.08
Total Kjeldahl Nitrogen	mg/L		0.10	0.51	0.55	0.62	0.48
Chemical Oxygen Demand	mg/L		5	11	21	22	13
Phenols	mg/L	0.001	0.001	<0.001	0.002	0.002	0.001
Arsenic	mg/L	0.1	0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L		0.002	0.011	0.012	0.010	0.010
Boron	mg/L	0.20	0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	0.0002	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	mg/L		0.003	<0.003	<0.003	<0.003	<0.003
Copper	mg/L	0.005	0.002	<0.002	0.003	0.002	<0.002
Iron	mg/L	0.3	0.01	0.53	0.45	0.38	0.48
Lead	mg/L	**	0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Mercury	mg/L	0.0002	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Zinc	mg/L	0.03	0.005	<0.005	<0.005	<0.005	<0.005

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to PWQO (mg/L) * Dependent on Hardness as CaCO3 **Dependent on alkalinity as CaCO3
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Verástegui

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MISSISSAUGA, ONTARIO
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Guideline Violation

AGAT WORK ORDER: 19T498241

PROJECT: New Liskeard SW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
386106	SW-1	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Iron	mg/L	0.3	0.53
386106	SW-1	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Total Phosphorus	mg/L	0.030	0.06
386107	SW-5	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Iron	mg/L	0.3	0.45
386107	SW-5	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Phenols	mg/L	0.001	0.002
386107	SW-5	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Total Phosphorus	mg/L	0.030	0.07
386108	SW-6	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Iron	mg/L	0.3	0.38
386108	SW-6	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Phenols	mg/L	0.001	0.002
386108	SW-6	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Total Phosphorus	mg/L	0.030	0.06
386109	SW DUP	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Iron	mg/L	0.3	0.48
386109	SW DUP	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Total Phosphorus	mg/L	0.030	0.08

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Quality Assurance

CLIENT NAME: WOOD CANADA LTD.

AGAT WORK ORDER: 19T498241

PROJECT: New Liskeard SW

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Aug 08, 2019			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
New Liskeard Surface Water - Column 3 Parameters															
BOD (5)	386106	386106	<5	<5	NA	< 5	101%	75%	125%	NA			NA		
Electrical Conductivity	386238		577	580	0.5%	< 2	103%	80%	120%	NA			NA		
pH	386238		7.93	7.94	0.1%	NA	100%	90%	110%	NA			NA		
Total Dissolved Solids	387807		334	348	4.1%	< 20	98%	80%	120%	NA			NA		
Total Suspended Solids	392711		176	174	1.1%	< 10	100%	80%	120%	NA			NA		
Alkalinity (as CaCO3)	386238		195	197	1.0%	< 5	98%	80%	120%	NA			NA		
Chloride	386172		80.3	83.2	3.5%	< 0.10	91%	90%	110%	103%	90%	110%	105%	85%	115%
Nitrate as N	386172		28.0	28.6	2.1%	< 0.05	92%	90%	110%	102%	90%	110%	101%	85%	115%
Nitrite as N	386172		<0.25	<0.25	NA	< 0.05	NA	90%	110%	104%	90%	110%	106%	85%	115%
Sulphate	386172		346	355	2.6%	< 0.10	95%	90%	110%	104%	90%	110%	92%	85%	115%
Ammonia as N	392544		<0.02	<0.02	NA	< 0.02	100%	90%	110%	98%	90%	110%	84%	70%	130%
Total Phosphorus	386106	386106	0.06	0.06	NA	< 0.02	96%	90%	110%	103%	90%	110%	102%	70%	130%
Total Kjeldahl Nitrogen	394363		13.5	12.2	10.1%	< 0.10	103%	80%	120%	104%	80%	120%	102%	70%	130%
Chemical Oxygen Demand	386171		14	16	NA	< 5	106%	80%	120%	105%	90%	110%	84%	70%	130%
Phenols	386106	386106	<0.001	0.001	NA	< 0.001	102%	90%	110%	99%	90%	110%	105%	80%	120%
Arsenic	407126		<0.003	<0.003	NA	< 0.003	102%	90%	110%	102%	90%	110%	123%	70%	130%
Barium	407126		0.113	0.125	10.1%	< 0.002	99%	90%	110%	100%	90%	110%	99%	70%	130%
Boron	407126		0.106	0.104	1.9%	< 0.010	106%	90%	110%	106%	90%	110%	106%	70%	130%
Cadmium	407126		<0.0001	<0.0001	NA	< 0.0001	100%	90%	110%	104%	90%	110%	121%	70%	130%
Chromium	407126		<0.003	<0.003	NA	< 0.003	101%	90%	110%	101%	90%	110%	101%	70%	130%
Copper	407126		<0.002	<0.002	NA	< 0.002	105%	90%	110%	109%	90%	110%	99%	70%	130%
Iron	407126		0.21	0.21	0.0%	< 0.01	107%	90%	110%	108%	90%	110%	119%	70%	130%
Lead	407126		<0.001	<0.001	NA	< 0.001	100%	90%	110%	100%	90%	110%	96%	70%	130%
Dissolved Mercury	386106	386106	<0.0001	<0.0001	NA	< 0.0001	100%	90%	110%	102%	90%	110%	98%	70%	130%
Zinc	407126		<0.005	<0.005	NA	< 0.005	105%	90%	110%	104%	90%	110%	108%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate Qualifier: 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.

Certified By: Iris Verástegui

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AGAT Laboratories

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

Method Summary

CLIENT NAME: WOOD CANADA LTD.

AGAT WORK ORDER: 19T498241

PROJECT: New Liskeard SW

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
BOD (5)	INOR-93-6006	SM 5210 B	DO METER
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Total Suspended Solids	INOR-93-6028	SM 2540 D	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	SM 4500-NH3 H	LACHAT FIA
Total Phosphorus	INOR-93-6022	SM 4500-P B&E	SPECTROPHOTOMETER
Total Kjeldahl Nitrogen	INOR-93-6048	QuikChem 10-107-06-2-I & SM 4500-Norg D	LACHAT FIA
Chemical Oxygen Demand	INOR-93-6042	SM 5220 D	SPECTROPHOTOMETER
Phenols	INOR-93-6050	MOE ROPHEN-E 3179 & SM 5530 D	TECHNICON AUTO ANALYZER
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Dissolved Mercury	MET-93-6100	EPA SW 846 7470 & 245.1	CVAAS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS

Results relate only to the items tested. Results apply to samples as received.

1Lg

AGAT Laboratories

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

Chain of Custody Record

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

Laboratory Use Only

Work Order #: 19T498241

Cooler Quantity:

Arrival Temperatures: 21.3 | 21.8 | 21.4

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes: MELTED ICE

Report Information:

Company: Wood

Contact: Emily Lemieux

Address: 131 Fielding Road
Lively, ON P3Y 1L7

Phone: 705-682-2632 Fax: 705-682-2260

Reports to be sent to:
1. Email: emily.lemieux@woodplc.com
2. Email:

Regulatory Requirements:

(Please check all applicable boxes)

☐ No Regulatory Requirement

☐ Regulation 153/04
Table ____ Indicate One
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture (Check One)
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region ____ Indicate One
☐ MISA

☐ Regulation 558
☐ CCME
☒ Prov. Water Quality Objectives (PWQO)
☐ Other
____ Indicate One

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on Certificate of Analysis ☐ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: New Liskeard SW

Site Location: New Liskeard, ON.

Sampled By: Dominique Courchesne.

AGAT Quote #: 17252 PO: TY131010

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

Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:

Contact:

Address:

Email:

Sample Matrix Legend

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

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	Metals and Inorganics (O. Reg 153)	☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (incl. Hydrides)	ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr6+ ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	Sewer Use	Surfacewater paramet
SW-1			7	Water	SW column 3 parameters	N															☑
SW-2				Water	for spring and summer DRY	N															☑
SW-3				Water	~~Column 4~~ parameters for DRY	N															☑
SW-4				Water	all other events DRY																☑
SW-5			7	Water		N															☑
SW-6			7	Water		N															☑
SW DUP			7	Water		N															☑

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Dominique Courchesne	07/26/19	10:30	MANOJ JOHN	JULY 29/13	8:50
D Courchesne					

Page 1 of 1

N°:

Document ID: DIV-76-1511.015

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT

Date Issued: March 16, 2019

AGAT Laboratories

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

CLIENT NAME: WOOD CANADA LTD.
131 FIELDING ROAD
LIVELY, ON P3Y1L7
(705) 682-2632

ATTENTION TO: Emily Lemieux

PROJECT: New Liskeard SW

AGAT WORK ORDER: 19T510071

WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer

DATE REPORTED: Sep 06, 2019

PAGES (INCLUDING COVER): 5

VERSION*: 1

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

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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Environmental Services Association of Alberta (ESAA)

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All reportable information as specified by ISO 17025:2017 is available from AGAT Laboratories upon request

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Certificate of Analysis

AGAT WORK ORDER: 19T510071

PROJECT: New Liskeard SW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Surface Water - Column 4 Parameters

DATE RECEIVED: 2019-08-27

DATE REPORTED: 2019-09-06

		SAMPLE DESCRIPTION:		SW-1		SW-2		SW-5		SW-6	SW DUP
		SAMPLE TYPE:		Water		Water		Water		Water	Water
		DATE SAMPLED:		2019-08-25		2019-08-25		2019-08-25		2019-08-25	2019-08-25
Parameter	Unit	G / S	RDL	474034	RDL	474035	RDL	474036	RDL	474037	474038
BOD (5)	mg/L		5	<5	5	<5	5	<5	5	<5	<5
Electrical Conductivity	uS/cm		2	219	2	809	2	195	2	240	214
pH	pH Units	6.5-8.5	NA	7.73	NA	8.10	NA	7.19	NA	7.64	7.78
Total Dissolved Solids	mg/L		20	86	20	402	20	138	20	108	78
Total Suspended Solids	mg/L		10	32	10	50	10	560	10	93	22
Alkalinity (as CaCO3)	mg/L		5	75	5	292	5	77	5	72	75
Chloride	mg/L		0.10	3.33	0.20	61.5	0.10	8.42	0.10	9.52	3.25
Nitrate as N	mg/L		0.05	<0.05	0.10	<0.10	0.05	<0.05	0.05	<0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05	0.10	<0.10	0.05	<0.05	0.05	<0.05	<0.05
Sulphate	mg/L		0.10	5.72	0.20	7.87	0.10	8.09	0.10	7.98	5.36
Ammonia as N	mg/L		0.02	0.12	0.02	0.08	0.02	0.19	0.02	0.13	0.14
Total Phosphorus	mg/L		0.02	0.06	0.02	0.03	0.04	0.27	0.02	0.15	0.04
Total Kjeldahl Nitrogen	mg/L		0.10	0.48	0.10	0.71	0.10	1.30	0.10	0.90	0.51
Chemical Oxygen Demand	mg/L		5	12	5	21	5	21	5	21	13
Phenols	mg/L		0.001	<0.001	0.001	0.003	0.001	0.002	0.001	0.002	0.002
Iron	mg/L		0.01	0.32	0.01	0.06	0.01	2.39	0.01	1.02	0.30

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to PWQO (ug/L) **Dependent on alkalinity
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

474035-474036 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range, reduce matrix interference and/or to avoid contaminating the instrument.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Verástegui

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Quality Assurance

CLIENT NAME: WOOD CANADA LTD.

AGAT WORK ORDER: 19T510071

PROJECT: New Liskeard SW

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Sep 06, 2019			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
New Liskeard Surface Water - Column 4 Parameters															
BOD (5)	475305		1190	1240	4.1%	< 5	100%	75%	125%	NA			NA		
Electrical Conductivity	474622		827	828	0.1%	< 2	100%	80%	120%	NA			NA		
pH	474622		8.24	8.21	0.4%	NA	100%	90%	110%	NA			NA		
Total Dissolved Solids	474872		368	370	0.5%	< 20	98%	80%	120%	NA			NA		
Total Suspended Solids	473791		28	28	NA	< 10	98%	80%	120%	NA			NA		
Alkalinity (as CaCO3)	474622		226	223	1.3%	< 5	99%	80%	120%	NA			NA		
Chloride	473820		185	198	6.8%	< 0.10	91%	90%	110%	103%	90%	110%	102%	85%	115%
Nitrate as N	473820		0.45	0.43	4.5%	< 0.05	97%	90%	110%	109%	90%	110%	104%	85%	115%
Nitrite as N	473820		<0.25	<0.25	NA	< 0.05	NA	90%	110%	92%	90%	110%	101%	85%	115%
Sulphate	473820		27.3	28.6	4.7%	< 0.10	98%	90%	110%	105%	90%	110%	104%	85%	115%
Ammonia as N	473874		<0.02	<0.02	NA	< 0.02	97%	90%	110%	99%	90%	110%	95%	70%	130%
Total Phosphorus	474034	474034	0.06	0.06	NA	< 0.02	103%	90%	110%	105%	90%	110%	100%	70%	130%
Total Kjeldahl Nitrogen	467675		1.66	1.58	4.9%	< 0.10	99%	80%	120%	108%	80%	120%	95%	70%	130%
Chemical Oxygen Demand	474553		<5	<5	NA	< 5	100%	80%	120%	105%	90%	110%	116%	70%	130%
Phenols	478274		<0.001	<0.001	NA	< 0.001	100%	90%	110%	95%	90%	110%	98%	80%	120%
Iron	474553		<0.01	<0.01	NA	< 0.01	100%	90%	110%	103%	90%	110%	90%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate Qualifier: 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.

Certified By: Iris Verástegui

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

Method Summary

CLIENT NAME: WOOD CANADA LTD.

AGAT WORK ORDER: 19T510071

PROJECT: New Liskeard SW

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
BOD (5)	INOR-93-6006	SM 5210 B	DO METER
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Total Suspended Solids	INOR-93-6028	SM 2540 D	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	SM 4500-NH3 H	LACHAT FIA
Total Phosphorus	INOR-93-6022	SM 4500-P B&E	SPECTROPHOTOMETER
Total Kjeldahl Nitrogen	INOR-93-6048	QuikChem 10-107-06-2-I & SM 4500-Norg D	LACHAT FIA
Chemical Oxygen Demand	INOR-93-6042	SM 5220 D	SPECTROPHOTOMETER
Phenols	INOR-93-6050	MOE ROPHEN-E 3179 & SM 5530 D	TECHNICON AUTO ANALYZER
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

149

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

Chain of Custody Record

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

Laboratory Use Only

Work Order #: 19T510071

Cooler Quantity:

Arrival Temperatures: 8.6 | 7.9 | 8.4

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes: on ice

Report Information:

Company: Wood
Contact: Emily Lemieux
Address: 131 Fielding Road
Lively, ON P3Y 1L7
Phone: 705-682-2632 Fax: 705-682-2260
Reports to be sent to:
1. Email: emily.lemieux@woodplc.com
2. Email:

Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☐ Regulation 153/04
Table (Indicate One): ☐Ind/Com ☐Res/Park ☐Agriculture
Soil Texture (Check One): ☐Coarse ☐Fine

☐ Sewer Use
☐Sanitary ☐Storm
Region (Indicate One): ☐MISA

☐ Regulation 558
☐ CCME
☑ Prov. Water Quality Objectives (PWQO)
☐ Other
(Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: New Liskeard SW
Site Location:
Sampled By:
AGAT Quote #: 17252 PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☐ No ☐

Company:
Contact:
Address:
Email:

Sample Matrix Legend

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

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	O. Reg 153: Metals and Inorganics (☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides))	ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr^{6+} ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	Sewer Use	Surfacewater parameters
SW-1	25-08-19	1 pm	7	Water	SW column 3 parameters	N														☑
SW-2	↓	↓	7	Water	for spring and summer	N														☑
~~SW-3~~ DRY				Water	Column 4 parameters for															☑
~~SW-4~~ DRY				~~Water~~	all other events															☑
SW-5	25-08-19	1 pm	7	Water		N														☑
SW-6	↓	↓	7	Water		N														☑
SW DUP	↓	↓	7	Water		N														☑

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Gabriela Maas	26-08-19	9 am	Sima Z	19/8/27	9 am

Page 1 of 1

N°:

AGAT Laboratories

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

CLIENT NAME: WOOD CANADA LTD.
131 FIELDING ROAD
LIVELY, ON P3Y1L7
(705) 682-2632

ATTENTION TO: Emily Lemieux

PROJECT: New Liskeard SW

AGAT WORK ORDER: 19T522205

WATER ANALYSIS REVIEWED BY: Jacky Zhu, Spectroscopy Technician

DATE REPORTED: Oct 02, 2019

PAGES (INCLUDING COVER): 8

VERSION*: 1

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

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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Western Enviro-Agricultural Laboratory Association (WEALA)
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All reportable information as specified by ISO 17025:2017 is available from AGAT Laboratories upon request

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TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 19T522205

PROJECT: New Liskeard SW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Surface Water - Column 4 Parameters

DATE RECEIVED: 2019-09-25

DATE REPORTED: 2019-10-02

		SAMPLE DESCRIPTION:		SW-1		SW-2		SW-4		SW-5	SW-6
		SAMPLE TYPE:		Water		Water		Water		Water	Water
		DATE SAMPLED:		2019-09-24		2019-09-24		2019-09-24		2019-09-24	2019-09-24
Parameter	Unit	G / S	RDL	560176	RDL	560786	RDL	560787	RDL	560788	560789
BOD (5)	mg/L		5	<5	5	<5	5	<5	5	<5	<5
Electrical Conductivity	uS/cm		2	232	2	757	2	2520	2	159	158
pH	pH Units	6.5-8.5	NA	7.28	NA	8.09	NA	7.97	NA	7.08	7.29
Total Dissolved Solids	mg/L		20	126	20	446	20	1190	20	104	98
Total Suspended Solids	mg/L		10	18	10	23	10	35	10	20	26
Alkalinity (as CaCO3)	mg/L		5	88	5	287	5	323	5	50	48
Chloride	mg/L		0.10	7.42	0.50	54.6	1.0	637	0.10	8.89	8.82
Nitrate as N	mg/L		0.05	<0.05	0.25	<0.25	0.5	<0.5	0.05	<0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05	0.25	<0.25	0.5	<0.5	0.05	<0.05	<0.05
Sulphate	mg/L		0.10	4.96	0.50	8.41	1.0	27.5	0.10	6.95	7.43
Ammonia as N	mg/L		0.02	0.08	0.02	0.15	0.02	0.03	0.02	0.07	0.03
Total Phosphorus	mg/L	0.030	0.02	0.05	0.02	0.32	0.02	0.11	0.02	0.07	0.13
Total Kjeldahl Nitrogen	mg/L		0.10	0.40	0.10	1.67	0.10	0.69	0.10	0.57	0.69
Chemical Oxygen Demand	mg/L		5	<5	10	101	5	23	5	16	13
Phenols	mg/L	0.001	0.001	0.001	0.001	0.003	0.001	0.002	0.001	0.002	0.002
Iron	mg/L	0.3	0.01	0.34	0.01	0.07	0.01	0.49	0.01	0.36	0.52

Certified By:

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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

Certificate of Analysis

AGAT WORK ORDER: 19T522205

PROJECT: New Liskeard SW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Surface Water - Column 4 Parameters

DATE RECEIVED: 2019-09-25

DATE REPORTED: 2019-10-02

		SAMPLE DESCRIPTION:		SW DUP
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2019-09-24
Parameter	Unit	G / S	RDL	560850
BOD (5)	mg/L		5	<5
Electrical Conductivity	uS/cm		2	158
pH	pH Units	6.5-8.5	NA	7.36
Total Dissolved Solids	mg/L		20	108
Total Suspended Solids	mg/L		10	21
Alkalinity (as CaCO3)	mg/L		5	50
Chloride	mg/L		0.10	8.90
Nitrate as N	mg/L		0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05
Sulphate	mg/L		0.10	7.07
Ammonia as N	mg/L		0.02	0.06
Total Phosphorus	mg/L	0.030	0.02	0.07
Total Kjeldahl Nitrogen	mg/L		0.10	0.58
Chemical Oxygen Demand	mg/L		5	10
Phenols	mg/L	0.001	0.001	0.002
Iron	mg/L	0.3	0.01	0.34

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to PWQO (mg/L) * Dependent on Hardness as CaCO3 **Dependent on alkalinity as CaCO3
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

560786-560787 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analytes within the calibration range of the instrument and to reduce matrix interference.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

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AGAT Laboratories

Guideline Violation

AGAT WORK ORDER: 19T522205

PROJECT: New Liskeard SW

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

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
560176	SW-1	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 4 Parameters	Iron	mg/L	0.3	0.34
560176	SW-1	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 4 Parameters	Total Phosphorus	mg/L	0.030	0.05
560786	SW-2	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 4 Parameters	Phenols	mg/L	0.001	0.003
560786	SW-2	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 4 Parameters	Total Phosphorus	mg/L	0.030	0.32
560787	SW-4	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 4 Parameters	Iron	mg/L	0.3	0.49
560787	SW-4	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 4 Parameters	Phenols	mg/L	0.001	0.002
560787	SW-4	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 4 Parameters	Total Phosphorus	mg/L	0.030	0.11
560788	SW-5	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 4 Parameters	Iron	mg/L	0.3	0.36
560788	SW-5	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 4 Parameters	Phenols	mg/L	0.001	0.002
560788	SW-5	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 4 Parameters	Total Phosphorus	mg/L	0.030	0.07
560789	SW-6	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 4 Parameters	Iron	mg/L	0.3	0.52
560789	SW-6	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 4 Parameters	Phenols	mg/L	0.001	0.002
560789	SW-6	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 4 Parameters	Total Phosphorus	mg/L	0.030	0.13
560850	SW DUP	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 4 Parameters	Iron	mg/L	0.3	0.34
560850	SW DUP	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 4 Parameters	Phenols	mg/L	0.001	0.002
560850	SW DUP	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 4 Parameters	Total Phosphorus	mg/L	0.030	0.07

Results relate only to the items tested. Results apply to samples as received.

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5835 COOPERS AVENUE
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CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
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Quality Assurance

CLIENT NAME: WOOD CANADA LTD.

AGAT WORK ORDER: 19T522205

PROJECT: New Liskeard SW

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Oct 02, 2019			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
New Liskeard Surface Water - Column 4 Parameters															
BOD (5)	560176	560176	<5	<5	NA	< 5	101%	75%	125%						
Electrical Conductivity	560768		1130	1130	0.0%	< 2	101%	80%	120%						
pH	560768		7.74	7.67	0.9%	NA	100%	90%	110%						
Total Dissolved Solids	559922		294	284	3.5%	< 20	100%	80%	120%						
Total Suspended Solids	559925		<10	<10	NA	< 10	100%	80%	120%						
Alkalinity (as CaCO3)	560768		387	386	0.3%	< 5	99%	80%	120%						
Chloride	560786	560786	54.6	54.9	0.5%	< 0.10	106%	90%	110%	106%	90%	110%	96%	85%	115%
Nitrate as N	560786	560786	<0.25	<0.25	NA	< 0.05	101%	90%	110%	108%	90%	110%	111%	85%	115%
Nitrite as N	560786	560786	<0.25	<0.25	NA	< 0.05	NA	90%	110%	98%	90%	110%	112%	85%	115%
Sulphate	560786	560786	8.41	7.59	10.3%	< 0.10	91%	90%	110%	106%	90%	110%	108%	85%	115%
Ammonia as N	560762		0.53	0.53	0.0%	< 0.02	102%	90%	110%	99%	90%	110%	90%	70%	130%
Total Phosphorus	564786		0.02	0.02	NA	< 0.02	105%	90%	110%	106%	90%	110%	96%	70%	130%
Total Kjeldahl Nitrogen	560762		2.61	2.63	0.8%	< 0.10	100%	80%	120%	97%	80%	120%	102%	70%	130%
Chemical Oxygen Demand	558618		12	11	NA	< 5	103%	80%	120%	106%	90%	110%	108%	70%	130%
Phenols	571965		<0.001	<0.001	NA	< 0.001	104%	90%	110%	104%	90%	110%	106%	80%	120%
Iron	560176	560176	0.34	0.36	5.7%	< 0.01	103%	90%	110%	95%	90%	110%	100%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate Qualifier: 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.

Certified By:



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Results relate only to the items tested. Results apply to samples as received.

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

Method Summary

CLIENT NAME: WOOD CANADA LTD.

AGAT WORK ORDER: 19T522205

PROJECT: New Liskeard SW

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
BOD (5)	INOR-93-6006	SM 5210 B	DO METER
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Total Suspended Solids	INOR-93-6028	SM 2540 D	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	SM 4500-NH3 H	LACHAT FIA
Total Phosphorus	INOR-93-6022	SM 4500-P B&E	SPECTROPHOTOMETER
Total Kjeldahl Nitrogen	INOR-93-6048	QuikChem 10-107-06-2-I & SM 4500-Norg D	LACHAT FIA
Chemical Oxygen Demand	INOR-93-6042	SM 5220 D	SPECTROPHOTOMETER
Phenols	INOR-93-6050	MOE ROPHEN-E 3179 & SM 5530 D	TECHNICON AUTO ANALYZER
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS

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AGAT Laboratories

24

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

Chain of Custody Record

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

Laboratory Use Only
Work Order #: 19T522205
Cooler Quantity:
Arrival Temperatures: See attached
Custody Seal Intact: ☐Yes ☐No ☐N/A
Notes:

Report Information:
Company: Wood
Contact: Emily Lemieux
Address: 131 Fielding Road
Lively, ON P3Y 1L7
Phone: 705-682-2632 Fax: 705-682-2260
Reports to be sent to:
1. Email: emily.lemieux@woodplc.com
2. Email:

Regulatory Requirements: ☐ No Regulatory Requirement
(Please check all applicable boxes)

☐ Regulation 153/04
Table (Indicate One) ☐ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One) ☐ Coarse ☐ Fine

☐ Sewer Use
☐ Sanitary ☐ Storm
Region (Indicate One)
☐ MISA

☐ Regulation 558
☐ CCME
☒ Prov. Water Quality Objectives (PWQO)
☐ Other
(Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Turnaround Time (TAT) Required:
Regular TAT ☑ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day
OR Date Required (Rush Surcharges May Apply):
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*
For 'Same Day' analysis, please contact your AGAT CPM

Project Information:
Project: New Liskeard SW
Site Location:
Sampled By:
AGAT Quote #: 17252 PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:
Bill To Same: Yes ☒ No ☐
Company:
Contact:
Address:
Email:

Sample Matrix Legend
B Biota
GW Ground Water
O Oil
P Paint
S Soil
SD Sediment
SW Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI Y/N	O. Reg 153: Metals and Inorganics (☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides))	ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr⁶⁺ ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	Sewer Use	Surfacewater parameti
SW-1	24/09/19	1500	7	Water	SW column 3 parameters	N													☑
SW-2	24/09/19	1500	7	Water	for spring and summer	N													☑
~~SW-3~~				~~Water~~	Column 4 parameters for	~	DRY												☑
SW-4	24/09/19	1500	7	Water	all other events	N													☑
SW-5	↓	↓	7	Water		N													☑
SW-6			7	Water		N													☑
SW DUP			7	Water		N													☑

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Dominique Courchesne.	24/09/19	1800	Simin Z	19/9/25	950
D Courchesne.					

Page 1 of 1
N°:

AGAT Laboratories

Sample Temperature Log

Client: WOOD

COC# or Work Order #: 19T522205

# of Coolers: 5

# of Submissions: 3

Arrival Temperatures - Branch/Driver

Cooler #1:	76	7	68
Cooler #2:	73	74	76
Cooler #3:	8	79	77
Cooler #4:	66	64	57
Cooler #5:	73	71	69
Cooler #6:			
Cooler #7:			
Cooler #8			
Cooler #9:			
Cooler #10:			

IR Gun ID:

Taken By: Simon

Date (yyyy/mm/dd): 19/9/25 Time: 9:40 AM / PM

Arrival Temperatures - Laboratory

Cooler #1:			
Cooler #2:			
Cooler #3:			
Cooler #4:			
Cooler #5:			
Cooler #6:			
Cooler #7:			
Cooler #8			
Cooler #9:			
Cooler #10:			

IR Gun ID:

Taken By:

Date (yyyy/mm/dd): Time: : AM / PM

Instructions for use of this form: 1) complete all fields of info including total # of coolers and # of submissions rec'd, 2) photocopy and place in each submission prior to giving a WO#, 3) Proceed as normal, write the WO# and scan (please make sure to scan along with the COC)

Document ID: SR-78-9511.003
Date Issued: 2017-2-23

Page: of

AGAT Laboratories

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

CLIENT NAME: WOOD CANADA LTD.
131 FIELDING ROAD
LIVELY, ON P3Y1L7
(705) 682-2632

ATTENTION TO: Emily Lemieux

PROJECT: New Liskeard SW

AGAT WORK ORDER: 19T534750

WATER ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Supervisor

DATE REPORTED: Nov 01, 2019

PAGES (INCLUDING COVER): 6

VERSION*: 1

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

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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Results relate only to the items tested. Results apply to samples as received.
All reportable information as specified by ISO 17025:2017 is available from AGAT Laboratories upon request

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
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Certificate of Analysis

AGAT WORK ORDER: 19T534750

PROJECT: New Liskeard SW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Surface Water - Column 3 Parameters

DATE RECEIVED: 2019-10-24

DATE REPORTED: 2019-11-01

SAMPLE DESCRIPTION:				SW-1		SW-3	SW-4		SW-5	SW-6	SW DUP
SAMPLE TYPE:				Water		Water	Water		Water	Water	Water
DATE SAMPLED:				2019-10-23		2019-10-23	2019-10-23		2019-10-23	2019-10-23	2019-10-23
Parameter	Unit	G / S	RDL	646325	RDL	646400	646401	RDL	646402	646403	646404
BOD (5)	mg/L		5	<5	5	<5	<5	5	<5	<5	<5
Electrical Conductivity	uS/cm		2	226	2	808	1510	2	343	292	224
pH	pH Units	6.5-8.5	NA	7.75	NA	8.06	8.00	NA	7.68	7.81	7.70
Total Dissolved Solids	mg/L		20	156	20	454	858	20	278	214	154
Total Suspended Solids	mg/L		10	38	10	112	307	10	66	24	22
Alkalinity (as CaCO3)	mg/L		5	100	5	325	289	5	138	132	100
Chloride	mg/L		0.10	10.3	0.50	81.3	344	0.10	24.2	10.6	10.9
Nitrate as N	mg/L		0.05	0.42	0.25	<0.25	<0.25	0.05	1.40	1.39	0.40
Nitrite as N	mg/L		0.05	<0.05	0.25	<0.25	<0.25	0.05	<0.05	<0.05	<0.05
Sulphate	mg/L		0.10	6.97	0.50	11.5	27.8	0.10	11.9	11.0	7.06
Ammonia as N	mg/L		0.02	0.06	0.02	<0.02	0.03	0.02	0.04	0.04	<0.02
Total Phosphorus	mg/L	0.030	0.02	0.05	0.02	0.09	0.22	0.02	0.08	0.10	0.05
Total Kjeldahl Nitrogen	mg/L		0.10	0.22	0.10	0.17	0.38	0.10	0.44	0.37	0.20
Chemical Oxygen Demand	mg/L		5	20	5	<5	32	5	33	26	12
Phenols	mg/L	0.001	0.001	0.002	0.001	0.001	0.002	0.001	0.004	0.004	0.002
Arsenic	mg/L	0.1	0.003	<0.003	0.003	<0.003	<0.003	0.003	<0.003	<0.003	<0.003
Barium	mg/L		0.002	0.016	0.002	0.035	0.045	0.002	0.033	0.031	0.018
Boron	mg/L	0.20	0.010	<0.010	0.010	0.012	0.017	0.010	0.013	0.013	<0.010
Cadmium	mg/L	0.0002	0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001
Chromium	mg/L		0.003	<0.003	0.003	<0.003	<0.003	0.003	<0.003	<0.003	<0.003
Copper	mg/L	0.005	0.002	0.003	0.002	0.004	0.012	0.002	0.006	0.004	0.002
Iron	mg/L	0.3	0.01	0.37	0.01	0.14	0.49	0.01	0.54	0.56	0.38
Lead	mg/L	**	0.001	<0.001	0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001
Dissolved Mercury	mg/L	0.0002	0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001
Zinc	mg/L	0.03	0.005	<0.005	0.005	0.006	0.006	0.005	<0.005	<0.005	<0.005

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to PWQO (mg/L) * Dependent on Hardness as CaCO3 **Dependent on alkalinity as CaCO3
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

646325-646404 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analytes within the calibration range of the instrument and to reduce matrix interference

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

Guideline Violation

AGAT WORK ORDER: 19T534750

PROJECT: New Liskeard SW

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

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
646325	SW-1	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Iron	mg/L	0.3	0.37
646325	SW-1	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Phenols	mg/L	0.001	0.002
646325	SW-1	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Total Phosphorus	mg/L	0.030	0.05
646400	SW-3	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Total Phosphorus	mg/L	0.030	0.09
646401	SW-4	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Copper	mg/L	0.005	0.012
646401	SW-4	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Iron	mg/L	0.3	0.49
646401	SW-4	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Phenols	mg/L	0.001	0.002
646401	SW-4	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Total Phosphorus	mg/L	0.030	0.22
646402	SW-5	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Copper	mg/L	0.005	0.006
646402	SW-5	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Iron	mg/L	0.3	0.54
646402	SW-5	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Phenols	mg/L	0.001	0.004
646402	SW-5	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Total Phosphorus	mg/L	0.030	0.08
646403	SW-6	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Iron	mg/L	0.3	0.56
646403	SW-6	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Phenols	mg/L	0.001	0.004
646403	SW-6	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Total Phosphorus	mg/L	0.030	0.10
646404	SW DUP	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Iron	mg/L	0.3	0.38
646404	SW DUP	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Phenols	mg/L	0.001	0.002
646404	SW DUP	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 3 Parameters	Total Phosphorus	mg/L	0.030	0.05

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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

Quality Assurance

CLIENT NAME: WOOD CANADA LTD.

AGAT WORK ORDER: 19T534750

PROJECT: New Liskeard SW

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Nov 01, 2019			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
New Liskeard Surface Water - Column 3 Parameters															
BOD (5)	646325	646325	<5	<5	NA	< 5	90%	75%	125%	NA			NA		
Electrical Conductivity	645460		1960	1960	0.0%	< 2	97%	80%	120%	NA			NA		
pH	645460		6.78	6.82	0.6%	NA	100%	90%	110%	NA			NA		
Total Dissolved Solids	646691		200	206	3.0%	< 20	98%	80%	120%	NA			NA		
Total Suspended Solids	645790		12	12	NA	< 10	98%	80%	120%	NA			NA		
Alkalinity (as CaCO3)	645460		139	140	0.7%	< 5	99%	80%	120%	NA			NA		
Chloride	646400	646400	81.3	82.4	1.3%	< 0.10	91%	90%	110%	103%	90%	110%	105%	85%	115%
Nitrate as N	646400	646400	< 0.25	<0.25	NA	< 0.05	95%	90%	110%	104%	90%	110%	104%	85%	115%
Nitrite as N	646400	646400	< 0.25	<0.25	NA	< 0.05	NA	90%	110%	106%	90%	110%	108%	85%	115%
Sulphate	646400	646400	11.5	12.1	5.1%	< 0.10	101%	90%	110%	105%	90%	110%	106%	85%	115%
Ammonia as N	650334		1.43	1.38	3.6%	< 0.02	96%	90%	110%	102%	90%	110%	94%	70%	130%
Total Phosphorus	645758		0.04	0.05	NA	< 0.02	97%	90%	110%	102%	90%	110%	95%	70%	130%
Total Kjeldahl Nitrogen	645758		0.92	0.91	1.1%	< 0.10	102%	80%	120%	92%	80%	120%	95%	70%	130%
Chemical Oxygen Demand	641307		<5	<5	NA	< 5	98%	80%	120%	107%	90%	110%	104%	70%	130%
Phenols	659883		<0.001	<0.001	NA	< 0.001	100%	90%	110%	105%	90%	110%	104%	80%	120%
Arsenic	646229		<0.015	<0.015	NA	< 0.003	99%	90%	110%	100%	90%	110%	105%	70%	130%
Barium	646229		0.100	0.097	3.0%	< 0.002	97%	90%	110%	99%	90%	110%	96%	70%	130%
Boron	646229		0.030	0.030	NA	< 0.010	101%	90%	110%	103%	90%	110%	99%	70%	130%
Cadmium	646229		<0.0001	<0.0001	NA	< 0.0001	100%	90%	110%	101%	90%	110%	112%	70%	130%
Chromium	646229		<0.003	<0.003	NA	< 0.003	100%	90%	110%	98%	90%	110%	99%	70%	130%
Copper	646229		<0.002	<0.002	NA	< 0.002	97%	90%	110%	100%	90%	110%	91%	70%	130%
Iron	646229		0.34	0.32	6.1%	< 0.01	98%	90%	110%	93%	90%	110%	93%	70%	130%
Lead	646229		<0.001	<0.001	NA	< 0.001	98%	90%	110%	101%	90%	110%	95%	70%	130%
Dissolved Mercury	647384		<0.0001	<0.0001	NA	< 0.0001	100%	90%	110%	97%	90%	110%	100%	70%	130%
Zinc	646229		<0.005	<0.005	NA	< 0.005	100%	90%	110%	99%	90%	110%	98%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate Qualifier: 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

New Liskeard Surface Water - Column 3 Parameters															
Total Dissolved Solids	646400	646400	454	486	6.8%	< 20	98%	80%	120%	NA			NA		
Ammonia as N	646402	646402	0.04	0.03	NA	< 0.02	101%	90%	110%	104%	90%	110%	96%	70%	130%

Certified By:

Amanjot Bhela

CHARTERED CHEMIST AMANJOT BHELA — ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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

Method Summary

CLIENT NAME: WOOD CANADA LTD.

AGAT WORK ORDER: 19T534750

PROJECT: New Liskeard SW

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
BOD (5)	INOR-93-6006	SM 5210 B	DO METER
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Total Suspended Solids	INOR-93-6028	SM 2540 D	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	SM 4500-NH3 H	LACHAT FIA
Total Phosphorus	INOR-93-6022	SM 4500-P B&E	SPECTROPHOTOMETER
Total Kjeldahl Nitrogen	INOR-93-6048	QuikChem 10-107-06-2-I & SM 4500-Norg D	LACHAT FIA
Chemical Oxygen Demand	INOR-93-6042	SM 5220 D	SPECTROPHOTOMETER
Phenols	INOR-93-6050	MOE ROPHEN-E 3179 & SM 5530 D	TECHNICON AUTO ANALYZER
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Dissolved Mercury	MET-93-6100	EPA SW 846 7470 & 245.1	CVAAS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

2 Lg

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

Chain of Custody Record

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

Laboratory Use Only

Work Order #: 19T534750

Cooler Quantity:

Arrival Temperatures: 7.3 | 6.7 | 6.9
8 | 7.9 | 6.4

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes: on ice

Report Information:

Company: Wood
Contact: Emily Lemieux
Address: 131 Fielding Road
Lively, ON P3Y 1L7
Phone: 705-682-2632 Fax: 705-682-2260
Reports to be sent to:
1. Email: emily.lemieux@woodplc.com
2. Email:

Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☐ Regulation 153/04
Table ___ *Indicate One*
☐Ind/Com ☐Res/Park ☐Agriculture
Soil Texture *(Check One)* ☐Coarse ☐Fine

☐ Sewer Use
☐Sanitary ☐Storm
Region ___ *Indicate One*
☐MISA

☐ Regulation 558
☐CCME
☒ Prov. Water Quality Objectives (PWQO)
☐Other
___ *Indicate One*

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply): ___

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: New Liskeard SW
Site Location:
Sampled By:
AGAT Quote #: 17252 PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☐ No ☐

Company:
Contact:
Address:
Email:

Sample Matrix Legend

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

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI Y/N	O. Reg 153: Metals and Inorganics (☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides))	ORPs: ☐ B-HWS ☐ Cl⁻ ☐ CN⁻ ☐ Cr^{6+} ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	Sewer Use	Surfacewater parameti
SW-1	23 Oct 19	13:00	7	Water	SW column 3 parameters	N													☑
~~SW-2~~				~~Water~~	for spring and summer Dry	~~N~~													☑
SW-3	23 Oct 19	13:00	7	Water	Column 4 parameters for	N													☑
SW-4	↓	↓	7	Water	all other events	N													☑
SW-5			7	Water		N													☑
SW-6			7	Water		N													☑
SW DUP	↓	↓	7	Water		N													☑

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Camila Valcarcel ~~CV~~	23 Oct 19	14:00	Simran 19/10/24		8:52
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

Page 1 of 1

N°:

AGAT Laboratories

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

CLIENT NAME: WOOD CANADA LTD.
131 FIELDING ROAD
LIVELY, ON P3Y1L7
(705) 682-2632

ATTENTION TO: Emily Lemieux

PROJECT: New Liskeard SW

AGAT WORK ORDER: 19T547836

WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer

DATE REPORTED: Dec 03, 2019

PAGES (INCLUDING COVER): 6

VERSION*: 1

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

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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Results relate only to the items tested. Results apply to samples as received.
All reportable information as specified by ISO 17025:2017 is available from AGAT Laboratories upon request

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
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Certificate of Analysis

AGAT WORK ORDER: 19T547836

PROJECT: New Liskeard SW

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

New Liskeard Surface Water - Column 4 Parameters

DATE RECEIVED: 2019-11-25

DATE REPORTED: 2019-12-03

		SAMPLE DESCRIPTION:		SW-1		SW-2	SW-3		SW-4	SW DUP
		SAMPLE TYPE:		Water		Water	Water		Water	Water
		DATE SAMPLED:		2019-11-22		2019-11-22	2019-11-22		2019-11-22	2019-11-22
Parameter	Unit	G / S	RDL	743632	RDL	743633	743634	RDL	743635	743636
BOD (5)	mg/L		5	<5	5	<5	<5	5	<5	<5
pH	pH Units	6.5-8.5	NA	7.45	NA	7.98	7.89	NA	7.92	7.96
Electrical Conductivity	uS/cm		2	197	2	637	764	2	1630	1630
Total Dissolved Solids	mg/L		20	116	20	358	438	20	892	906
Total Suspended Solids	mg/L		10	55	10	37	<10	10	21	23
Alkalinity (as CaCO3)	mg/L		5	92	5	234	260	5	276	269
Chloride	mg/L		0.10	5.89	0.20	73.3	103	1.0	378	402
Nitrate as N	mg/L		0.05	0.43	0.10	0.17	<0.10	0.25	0.71	0.70
Nitrite as N	mg/L		0.05	<0.05	0.10	<0.10	<0.10	0.25	<0.25	<0.25
Sulphate	mg/L		0.10	5.70	0.20	16.8	14.0	0.50	21.4	21.8
Ammonia as N	mg/L		0.02	<0.02	0.02	<0.02	<0.02	0.02	0.04	0.04
Total Phosphorus	mg/L	0.030	0.02	0.03	0.02	0.03	0.04	0.02	0.06	0.04
Total Kjeldahl Nitrogen	mg/L		0.10	0.21	0.10	0.17	0.16	0.10	0.27	0.29
Chemical Oxygen Demand	mg/L		5	6	5	<5	<5	5	<5	<5
Phenols	mg/L	0.001	0.001	<0.001	0.001	<0.001	<0.001	0.001	<0.001	<0.001
Iron	mg/L	0.3	0.01	0.34	0.01	0.24	0.04	0.01	0.19	0.21

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to PWQO (mg/L) * Dependent on Hardness as CaCO3 **Dependent on alkalinity as CaCO3
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

743632-743636 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range, reduce matrix interference and/or to avoid contaminating the instrument.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Verástegui

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

Guideline Violation

AGAT WORK ORDER: 19T547836

PROJECT: New Liskeard SW

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

CLIENT NAME: WOOD CANADA LTD.

ATTENTION TO: Emily Lemieux

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
743632	SW-1	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 4 Parameters	Iron	mg/L	0.3	0.34
743634	SW-3	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 4 Parameters	Total Phosphorus	mg/L	0.030	0.04
743635	SW-4	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 4 Parameters	Total Phosphorus	mg/L	0.030	0.06
743636	SW DUP	ON PWQO 2015 (mg/L)	New Liskeard Surface Water - Column 4 Parameters	Total Phosphorus	mg/L	0.030	0.04

Results relate only to the items tested. Results apply to samples as received.

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Quality Assurance

CLIENT NAME: WOOD CANADA LTD.

AGAT WORK ORDER: 19T547836

PROJECT: New Liskeard SW

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Dec 03, 2019			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
New Liskeard Surface Water - Column 4 Parameters															
BOD (5)	741164		327	303	7.6%	< 5	101%	75%	125%	NA			NA		
pH	743560		7.68	7.64	0.5%	NA	100%	90%	110%	NA			NA		
Electrical Conductivity	743560		1310	1320	0.8%	< 2	101%	80%	120%	NA			NA		
Total Dissolved Solids	744710		518	522	0.8%	< 20	102%	80%	120%	NA			NA		
Total Suspended Solids	738264		18	17	NA	< 10	98%	80%	120%	NA			NA		
Alkalinity (as CaCO3)	743560		598	598	0.0%	< 5	100%	80%	120%	NA			NA		
Chloride	743760		48.5	50.5	4.0%	< 0.10	92%	90%	110%	100%	90%	110%	106%	85%	115%
Nitrate as N	743760		0.63	0.66	4.7%	< 0.05	96%	90%	110%	101%	90%	110%	102%	85%	115%
Nitrite as N	743760		<0.25	<0.25	NA	< 0.05	NA	90%	110%	100%	90%	110%	103%	85%	115%
Sulphate	743760		21.5	22.5	4.5%	< 0.10	100%	90%	110%	101%	90%	110%	104%	85%	115%
Ammonia as N	744710		<0.02	<0.02	NA	< 0.02	99%	90%	110%	101%	90%	110%	93%	70%	130%
Total Phosphorus	743645		0.07	0.08	NA	< 0.02	103%	90%	110%	100%	90%	110%	115%	70%	130%
Total Kjeldahl Nitrogen	736367		0.28	0.34	NA	< 0.10	98%	80%	120%	91%	80%	120%	95%	70%	130%
Chemical Oxygen Demand	743645		22	24	NA	< 5	97%	80%	120%	97%	90%	110%	114%	70%	130%
Phenols	743563		<0.001	<0.001	NA	< 0.001	96%	90%	110%	97%	90%	110%	111%	80%	120%
Iron	743955		0.33	0.31	6.3%	< 0.01	108%	90%	110%	104%	90%	110%	101%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate Qualifier: 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.

Certified By: Iris Verástegui

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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

Method Summary

CLIENT NAME: WOOD CANADA LTD.

AGAT WORK ORDER: 19T547836

PROJECT: New Liskeard SW

ATTENTION TO: Emily Lemieux

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
BOD (5)	INOR-93-6006	SM 5210 B	DO METER
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Total Suspended Solids	INOR-93-6028	SM 2540 D	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	SM 4500-NH3 H	LACHAT FIA
Total Phosphorus	INOR-93-6022	SM 4500-P B&E	SPECTROPHOTOMETER
Total Kjeldahl Nitrogen	INOR-93-6048	QuikChem 10-107-06-2-I & SM 4500-Norg D	LACHAT FIA
Chemical Oxygen Demand	INOR-93-6042	SM 5220 D	SPECTROPHOTOMETER
Phenols	INOR-93-6050	MOE ROPHEN-E 3179 & SM 5530 D	TECHNICON AUTO ANALYZER
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS

Results relate only to the items tested. Results apply to samples as received.

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Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

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

Laboratory Use Only
Work Order #: 19TS47836
Cooler Quantity:
Arrival Temperatures: 8.6 18.4 18.0 (no 4)
Custody Seal Intact: ☐Yes ☐No ☐N/A
Notes:

Report Information:
Company: Wood
Contact: Emily Lemieux
Address: 131 Fielding Road
Lively, ON P3Y 1L7
Phone: 705-682-2632 Fax: 705-682-2260
Reports to be sent to:
1. Email: emily.lemieux@woodplc.com
2. Email:

Regulatory Requirements: ☐ No Regulatory Requirement
(Please check all applicable boxes)

☐ Regulation 153/04
Table (Indicate One) ☐Ind/Com ☐Res/Park ☐Agriculture
Soil Texture (Check One) ☐Coarse ☐Fine

☐ Sewer Use
☐Sanitary ☐Storm
Region (Indicate One) ☐MISA

☐ Regulation 558
☐ CCME
☒ Prov. Water Quality Objectives (PWQO)
☐ Other
(Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Turnaround Time (TAT) Required:
Regular TAT ☑ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day
OR Date Required (Rush Surcharges May Apply):
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*
For 'Same Day' analysis, please contact your AGAT CPM

Project Information:
Project: New Liskeard SW
Site Location:
Sampled By:
AGAT Quote #: 17252 PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:
Bill To Same: Yes ☒ No ☐
Company:
Contact:
Address:
Email:

Sample Matrix Legend
B Biota
GW Ground Water
O Oil
P Paint
S Soil
SD Sediment
SW Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI Y/N	O. Reg 153: Metals and Inorganics	O. Reg 153: All Metals ☐ 153 Metals (exd. Hydrides)	O. Reg 153: Hydride Metals ☐ 153 Metals (Incl. Hydrides)	O. Reg 153: ORPs: ☐B-HWS ☐Cl⁻ ☐CN	O. Reg 153: ☐Cr⁶⁺ ☐EC ☐FOC ☐Hg	O. Reg 153: ☐pH ☐SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐TP ☐NH_3 ☐TKN	☐NO_3 ☐NO_2 ☐NO_3+NO_2	Volatiles: ☐VOC ☐BTEX ☐THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐Total ☐Aroclors	Organochlorine Pesticides	TCLP: ☐M&I ☐VOCs ☐ABNs ☐B(a)P ☐PCBs	Sewer Use	Surfacewater parameters
SW-1	Nov 22/19	11 AM	6	Water		N																			☑
SW-2	↓	↓	6	Water		N																			☑
SW-3			6	Water	Column 4 parameters	N																			☑
SW-4			6	Water		N																			☑
~~SW-5~~				~~Water~~	no sample	N																			☑
~~SW-6~~				~~Water~~	no sample	N																			☑
SW DUP	↓	↓	6	Water		N																			☑

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Dominique Courchesne	Nov 22/19	13:00	Shawn	Nov 25/19	9:00am

Page 1 of 1
N°:

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT

APPENDIX F

SUMMARY OF GROUNDWATER GEOCHEMICAL ANALYSES

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-1R-I

Parameters	Units	ODWS [1]	2010			2011			2012			2013			2014		
General Chemistry			**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**May**	**July**	**Sep**	**June**	**July**	**Sep**
Alkalinity	mg/L	30-500 OG [2]	**962**	**923**	**902**	**896**	**912**	**826**	**950**	**940**	**930**	**867**	**753**	**1000**	**908**	**951**	**917**
Chloride	mg/L	250 AO [3]	**270**	240	210	180	210	230	220	220	250	237	192	**263**	245	**261**	228
Dissolved Organic Carbon	mg/L	5 AO	**22.7**	**20.2**	**19.9**	**17.2**	**20.1**	**17.8**	**21**	**22**	**21**	**17.1**	**20.4**	**21.2**	**19.1**	**22.0**	**21.1**
Fluoride	mg/L	1.5 MAC [4]	0.1	0.1	0.2	0.1	0.19	<0.1	0.17	0.17	0.16	<1.0	<0.5	<1.0	<0.5	<1.0	<0.25
Sulphate	mg/L	500 AO	380	350	310	230	240	210	220	220	250	223	208	252	244	257	240
Hardness	mg/L	80-100 OG	**1100**	**1000**	**960**	**850**	**890**	**910**	**1000**	**1000**	**1000**	**998**	**818**	**988**	**972**	**910**	**774**
Nitrate	mg/L	10 MAC	0.3	0.5	0.8	<0.1	<1	0.9	<0.1	0.41	0.41	<1.0	0.81	<1.0	<0.5	<1.0	1.0
Nitrite	mg/L	1 MAC	0.11	0.13	0.12	0.04	0.1	0.02	0.032	0.021	0.063	<1.0	<0.5	<1.0	<0.5	<1.0	<0.25
Organic Nitrogen	mg/L	0.15 OG					**13**	**0.8**	**2.0**	**1.3**		**2.3**	0.10	**1.6**	**0.9**	**1.6**	**1.5**
Orthophosphate	mg/L		0.15	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<2.0	<1.0	<2.0	<1.0	<2.0	<0.50
pH	pH Units											7.65	7.47	6.82	7.82	7.67	7.3
Electrical Conductivity	µS/cm											2590	2110	2830	2620	2780	2730
Total Ammonia	mg/L		11.0	10.00	10.00	11	13	9.2	13	9.7	15	10.9	13.3	11.9	13	15.5	13
Total Dissolved Solids	mg/L	500 AO	**1940**	**1840**	**1720**	**1520**	**1610**	**1520**	**1690**	**1640**	**1720**	**1470**	**1330**	**1780**	**1510**	**1660**	**1600**
Total Kjeldahl Nitrogen (TKN)	mg/L		11	12	12	11	26	10	15	11	15	13.2	13.4	13.5	13.9	17.1	14.5
Total Phosphorus	mg/L		0.04									<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals																	
Aluminum	mg/L	0.1 OG	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.012	<0.005	<0.005	0.005	0.033	<0.004	<0.004	<0.004	<0.004
Arsenic	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.056	0.061	0.046	0.054	0.063	0.071	0.056	0.086	0.079	0.060	0.060	0.064	0.072	0.07	0.062
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC [5]	2.1	1.9	1.8	1.8	1.9	1.8	1.8	1.8	2.0	1.44	1.34	1.61	1.26	1.79	1.55
Cadmium	mg/L	0.005 MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		200	200	180	170	170	180	180	200	190	200	184	201	188	178	146
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	0.004	<0.003	<0.003	<0.003
Cobalt	mg/L		0.007	0.0044	0.0048	0.0051	0.0047	0.004	0.0071	0.0045	0.0062	0.006	0.004	0.007	0.005	0.007	0.004
Copper	mg/L	1 AO	0.02	0.006	0.005	0.009	0.005	0.012	0.0071	0.0097	0.0064	<0.003	0.005	<0.003	0.004	0.004	<0.003
Iron	mg/L	0.3 AO	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.043	0.073	**0.795**	<0.010	0.021	0.125
Lead	mg/L	0.01 MAC	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Magnesium	mg/L		140	130	130	100	110	110	140	120	130	121	87	118	122	113.0	99.4
Manganese	mg/L	0.05 AO	**1.1**	**0.76**	**0.77**	**0.74**	**0.7**	**0.64**	**1.0**	**0.65**	**0.85**	**0.70**	**0.535**	**0.837**	**0.686**	**0.728**	**0.569**
Molybdenum	mg/L		0.001	0.001	0.001	0.001	0.0011	0.0012	0.001	0.0019	0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel	mg/L		0.043	0.036	0.035	0.036	0.035	0.03	0.042	0.035	0.04	0.029	0.022	0.04	0.033	0.043	0.027
Potassium	mg/L		110.00	99.00	100.00	90	99	84	110	94	99	89.1	66.3	96.2	89.8	89.6	80.2
Selenium	mg/L	0.05 MAC	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	0.005	<0.004	<0.004	<0.004
Silicon	mg/L											6.30	7.02	8.25	7.14	7.68	6.07
Silver	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	**230**	**230**	**230**	190	**210**	190	**220**	190	200	168	115	188	187	179	168
Strontium	mg/L		2.2	2.1	1.2	1.5	1.5	2.4	1.4	2.7	2.4	1.40	1.01	1.2	2.05	2.13	1.57
Sulphur	mg/L											81.9	67.2	95.9	75.6	87.1	76.4
Thallium	mg/L		0.00029	0.00017	0.00012	0.00014	0.00013	0.00008	0.00025	0.0001	0.00012	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	mg/L		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium	mg/L		<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	<0.002
Uranium	mg/L	0.02 MAC	0.0027	0.0021	0.0022	0.0021	0.002	0.0021	0.0022	0.0024	0.0021	<0.002	0.002	0.002	0.002	0.003	<0.002
Vanadium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	0.00079	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc	mg/L	5 AO	0.04	<0.005	<0.005	0.009	<0.005	<0.005	<0.005	<0.005	0.0052	0.007	0.013	0.012	0.007	0.007	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-1R-I

Parameters	Units	ODWS [1]	2015			2016			2017			2018			2019		
General Chemistry			**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	**951**	**912**	**670**	**899**	**986**	**948**	**899**	**965**	**956**	**1060**	**917**	**876**	**956**	**929**	**988**
Chloride	mg/L	250 AO [3]	**274**	**268**	173	**254**	247	250	245	248	**253**	**259**	222	210	192	178	209
Dissolved Organic Carbon	mg/L	5 AO	**23.2**	**19.6**	**14.3**	**21.5**	**21.5**	**10.4**	**17.8**	**27.5**	**23.5**	**23.5**	**24.8**	**23.8**	**21.7**	**21.9**	**20.5**
Fluoride	mg/L	1.5 MAC [4]	<0.5	<1.0	<0.5	<0.5	<1.0	<1.0	<0.5	<0.5	<0.5	<0.25	<0.5	<1.0	<1.0	<1.0	<1.0
Sulphate	mg/L	500 AO	207	206	162	177	192	194	169	145	165	154	139	135	153	159	172
Hardness	mg/L	80-100 OG	**885**	**980**	**676**	**806**	**933**	**857**	**859**	**876**	**825**	**886**	**809**	**834**	**848**	**841**	**869**
Nitrate	mg/L	10 MAC	<0.5	<1.0	0.6	1.3	<1.0	<1.0	1.2	<0.5	<0.5	0.36	<0.5	<1.0	<1.0	<1.0	<1.0
Nitrite	mg/L	1 MAC	<0.5	<1.0	<0.5	<0.5	<1.0	<1.0	<0.5	<0.5	<0.5	<0.25	<0.5	<1.0	<1.0	<1.0	<1.0
Organic Nitrogen	mg/L	0.15 OG	**2.3**	**5.2**	**2.59**	**2.0**	<0.10	**3.0**	**3.1**	<0.10	**3.3**	**0.4**	**0.4**	**1.2**	**4.5**	**3.2**	**3.7**
Orthophosphate	mg/L		<1.0	<2.0	<1.0	<1.0	<2.0	<2.0	<1.0	<1.0	<1.0	<0.50	<1.0	<2.0	<2.0	<2.0	<2.0
pH	pH Units		7.6	7.97	7.98	7.81	7.72	7.66	7.99	8.01	7.84	7.9	7.85	7.72	7.72	7.18	7.57
Electrical Conductivity	µS/cm		2850	2730	2040	2280	2810	2730	2420	2610	2520	2550	2510	2470	2450	2760	2910
Total Ammonia	mg/L		12	12	6.39	14.7	13.4	12.7	15.9	16.6	12.4	15.2	16.4	16.0	12.6	23.3	16.5
Total Dissolved Solids	mg/L	500 AO	**1630**	**1450**	**1180**	**1340**	**1580**	**1520**	**1400**	**1550**	**1400**	**1500**	**1380**	**1570**	**1300**	**1400**	**1450**
Total Kjeldahl Nitrogen (TKN)	mg/L		14.3	17.2	8.98	16.7	13.4	15.7	19	16.6	15.7	15.6	16.8	17.2	17.1	26.5	20.2
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	0.06	<0.05
Metals																	
Aluminum	mg/L	0.1 OG	<0.004	0.004	0.006	0.014	0.011	0.015	0.005	0.008	0.008	<0.004	<0.004	<0.004	0.010	0.011	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	0.004
Barium	mg/L	1 MAC	0.079	0.070	0.067	0.057	0.073	0.079	0.079	0.079	0.082	0.074	0.080	0.082	0.083	0.111	0.097
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 [5]	1.67	1.53	1.21	1.62	1.57	1.97	1.43	1.70	1.63	1.50	1.46	1.82	1.76	1.51	1.93
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		163	188	132	148	179	162	161	161	164	165	151	156	163	157	165
Chromium	mg/L	0.05 MAC	0.008	0.006	<0.003	0.005	0.003	0.007	0.011	0.01	<0.003	0.012	0.005	0.014	0.012	0.004	0.004
Cobalt	mg/L		0.005	0.005	0.003	0.007	0.005	0.007	0.004	0.006	0.005	0.006	0.006	0.005	0.006	0.011	0.010
Copper	mg/L	1 AO	0.003	0.005	0.003	0.004	<0.003	<0.003	0.005	0.009	0.004	0.009	0.011	0.009	0.009	0.005	<0.003
Iron	mg/L	0.3 AO	0.157	<0.010	<0.010	0.084	0.080	0.172	<0.010	<0.010	0.012	<0.010	<0.010	<0.010	<0.010	**0.350**	0.093
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	0.002	<0.001
Magnesium	mg/L		116	124	84	106	118	110	111	115	101	115	105	108	107	109	111
Manganese	mg/L	0.05 AO	**0.788**	**0.64**	**0.429**	**0.736**	**0.644**	**0.712**	**0.51**	**0.632**	**0.533**	**0.581**	**0.60**	**0.504**	**0.729**	**1.51**	**0.813**
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		0.043	0.036	0.03	0.039	0.036	0.045	0.033	0.048	0.037	0.043	0.045	0.045	0.044	0.053	0.052
Potassium	mg/L		78.9	89.6	56.8	83.4	87.6	100	77.3	91	81.9	80.3	88.2	97.0	93.2	112	109
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	0.010	0.01	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.011	0.013
Silicon	mg/L		8.14	6.01	6.19	6.44	6.15	7.70	8.1	8.94	7.57	5.42	7.92	8.33	8.42	7.61	7.64
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	186	127	173	196	190	160	176	158	170	166	178	165	173	188
Strontium	mg/L		2.25	2.12	2.69	1.07	2.80	1.80	2.31	1.95	1.83	1.41	1.65	1.57	1.23	0.927	1.36
Sulphur	mg/L		88.9	66.8	60.4	46.6	60.5	57.6	55.5	52.9	46.1	50.3	46.1	50.4	54.3	52.9	60.8
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		0.004	0.003	0.004	0.003	<0.002	0.004	0.003	0.003	<0.002	0.003	<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	0.007	0.006	0.007	0.006	0.007	<0.005	0.012	0.005	0.005	<0.005	<0.005	<0.005	<0.005	0.007

Notes:
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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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-1R-III

Parameters	Units	ODWS (1)	2010			2011			2012			2013			2014		
General Chemistry			**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**May**	**July**	**Sep**	**June**	**July**	**Sep**
Alkalinity	mg/L	30-500 OG (2)	**881**	**928**	**769**	**788**	**934**	**836**	**920**	**940**	**760**	**770**	**983**	**1040**	**820**	**977**	**882**
Chloride	mg/L	250 AO (3)	210	240	160	140	210	200	200	230	130	174	**261**	**288**	163	**261**	215
Dissolved Organic Carbon	mg/L	5 AO	**21.1**	**19.1**	**14.3**	**13.7**	**22.1**	**12.6**	**20**	**24**	**12.0**	**14.6**	**21.5**	**23.4**	**15.7**	**24.8**	**20.4**
Fluoride	mg/L	1.5 MAC (4)	<0.1	<0.1	<0.1	<0.1	0.11	<0.1	0.1	0.11	<0.1	<1.0	<1.0	<1.0	<0.5	<1.0	<0.25
Sulphate	mg/L	500 AO	290	300	210	170	190	160	170	190	140	202	217	253	235	230	207
Hardness	mg/L	80-100 OG	**1100**	**890**	**840**	**730**	**870**	**790**	**940**	**950**	**840**	**883**	**941**	**957**	**870**	**898**	**731**
Nitrate	mg/L	10 MAC	4.7	1.8	5.0	1.8	0.8	5.5	0.93	3.6	5.2	<1.0	<1.0	<1.0	0.95	<1.0	1.17
Nitrite	mg/L	1 MAC	0.28	0.04	0.27	0.52	0.08	0.04	0.04	0.089	0.33	<1.0	<1.0	<1.0	<0.5	<1.0	<0.25
Organic Nitrogen	mg/L	0.15 OG	**1.7**		**3.2**	**0.3**		**1.4**	**1.4**	**1.0**	**4.7**	**2.13**	**0.80**	**1.4**	**1.3**	**0.2**	**3.7**
Orthophosphate	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<2.0	<2.0	<2.0	<1.0	<2.0	<0.50
pH	pH Units											7.66	7.52	7.01	7.91	7.72	7.37
Electrical Conductivity	µS/cm											2220	2750	2830	2270	2880	2570
Total Ammonia	mg/L		9.3	6.9	4.1	7.2	14	4.1	8.6	14	3.4	5.49	12.90	11.1	11.8	17.6	10.3
Total Dissolved Solids	mg/L	500 AO	**1790**	**1710**	**1390**	**1270**	**1600**	**1370**	**1530**	**1650**	**1210**	**1280**	**1740**	**1760**	**1370**	**1650**	**1530**
Total Kjeldahl Nitrogen (TKN)	mg/L		11	9.6	7.3	7.5	15	5.5	10	15	8.1	7.62	13.70	12.5	13.1	17.8	14
Total Phosphorus	mg/L											<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals																	
Aluminum	mg/L	0.1 OG	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	0.008	<0.004	<0.004	0.004	0.004
Arsenic	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.06	0.072	0.065	0.066	0.066	0.078	0.075	0.087	0.082	0.090	0.072	0.103	0.079	0.103	0.087
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC (5)	1.7	1.5	1.1	1.2	2.0	1.1	1.5	1.9	1.0	1.01	1.73	1.73	1.08	1.73	1.37
Cadmium	mg/L	0.005 MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		240	200	190	160	160	180	190	180	200	210	189	210	188	175	152
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	0.007	<0.003	<0.003	<0.003
Cobalt	mg/L		0.0067	0.0029	0.002	0.003	0.0076	0.002	0.0049	0.0068	0.0019	0.004	0.010	0.008	0.006	0.009	0.005
Copper	mg/L	1 AO	0.013	0.01	0.009	0.008	0.009	0.008	0.0082	0.012	0.0057	0.006	0.006	0.009	0.01	0.012	0.01
Iron	mg/L	0.3 AO	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.010	0.211	0.04	<0.010	0.043	<0.010
Lead	mg/L	0.01 MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00051	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Magnesium	mg/L		130	97	90	77	110	82	110	120	83	87.0	114.0	105	97.2	112.0	85.4
Manganese	mg/L	0.05 AO	**1.5**	**0.66**	**0.58**	**0.72**	**1.2**	**0.48**	**1.1**	**1.3**	**0.35**	**0.54**	**1.27**	**1.3**	**1.04**	**1.22**	**0.85**
Molybdenum	mg/L		0.001	<0.001	<0.001	<0.001	0.0013	0.0005	0.0009	0.0013	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel	mg/L		0.045	0.029	0.023	0.025	0.045	0.022	0.035	0.045	0.017	0.017	0.043	0.04	0.03	0.049	0.026
Potassium	mg/L		110	82	66	72	110	59	83	110	53	61.9	96.0	82.2	81.2	101	72.4
Selenium	mg/L	0.05 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	0.006	<0.004	<0.004	<0.004
Silicon	mg/L											5.78	7.65	7.19	6.58	7.55	5.92
Silver	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	**240**	200	180	140	**220**	140	190	**210**	110	127	184	171	150	199	152
Strontium	mg/L		1.0	0.95	0.87	0.76	0.9	0.91	0.99	1.0	0.91	0.972	0.924	1.26	0.985	1.03	0.845
Sulphur	mg/L											70.4	72.2	105	70.1	81.0	70.4
Thallium	mg/L		0.00031	0.00025	0.00017	0.00021	0.00032	0.00016	0.00026	0.00045	0.00012	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	mg/L		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	0.004	0.002	<0.002	<0.002
Uranium	mg/L	0.02 MAC	0.0025	0.0024	0.0021	0.0017	0.0025	0.0017	0.0018	0.0023	0.0015	<0.002	0.003	0.002	0.002	0.002	<0.002
Vanadium	mg/L		<0.001	<0.001	<0.001	<0.001	0.0005	0.001	0.00095	0.00098	0.00051	<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	<0.005	<0.005	<0.005	0.007	0.006	0.007	<0.005	<0.005	0.006

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The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-1R-III

Parameters	Units	ODWS (1)	2015			2016			2017			2018			2019		
General Chemistry			**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG (2)	**764**	**976**	**978**	**876**	**1010**	**1010**	**898**	**959**	**1040**	**873**	**919**	**922**	**858**	**956**	**922**
Chloride	mg/L	250 AO (3)	164	**271**	**277**	176	235	**311**	158	218	220	135	202	208	105	195	191
Dissolved Organic Carbon	mg/L	5 AO	**16.2**	**23.7**	**28.8**	**17.5**	**27.8**	**29.9**	**16.5**	**24.6**	**30.7**	**19.1**	**25.0**	**25.6**	**10.4**	**19.1**	**18.0**
Fluoride	mg/L	1.5 MAC (4)	<0.25	<1.0	<0.25	<0.25	<1.0	<1.0	<0.5	<0.5	<1.0	<0.25	<0.5	<1.0	<0.5	<1.0	<1.0
Sulphate	mg/L	500 AO	131	177	171	202	180	196	127	118	114	97.7	112	113	126	147	213
Hardness	mg/L	80-100 OG	**683**	**927**	**821**	**779**	**894**	**915**	**741**	**802**	**840**	**630**	**773**	**843**	**686**	**864**	**887**
Nitrate	mg/L	10 MAC	9.87	3.70	7.18	0.66	<1.0	2.4	5.1	<0.5	<1.0	6.48	1.2	3.7	<0.5	<1.0	1.9
Nitrite	mg/L	1 MAC	<0.25	<1.0	<0.25	<0.25	<1.0	<1.0	**1.5**	<0.5	<1.0	<0.25	<0.5	<1.0	<0.5	<1.0	<1.0
Organic Nitrogen	mg/L	0.15 OG	**1.7**	**2.9**	**2.5**	**1.9**	**0.3**	**1.4**	**0.7**	**1.3**	**3.5**	**1.0**	<0.10	**0.4**	**3.6**	0.10	**0.7**
Orthophosphate	mg/L		<0.50	<2.0	<0.50	<0.50	<2.0	<2.0	<1.0	<1.0	<2.0	<0.50	<1.0	<2.0	<1.0	<2.0	<2.0
pH	pH Units		7.81	7.87	7.94	7.82	7.63	7.69	8.01	7.99	7.77	7.81	7.90	7.69	7.62	7.19	7.47
Electrical Conductivity	µS/cm		2210	2840	2920	2080	2840	3130	2080	2480	2680	1980	2490	2580	2000	2740	2810
Total Ammonia	mg/L		11.5	14.7	21.1	9.8	17.2	23.4	13.5	16.2	20.3	17.7	22.6	25.3	13.8	19.5	15.9
Total Dissolved Solids	mg/L	500 AO	**1160**	**1540**	**1610**	**1230**	**1600**	**1700**	**1170**	**1410**	**1390**	**1120**	**1370**	**1620**	**1150**	**1390**	**1500**
Total Kjeldahl Nitrogen (TKN)	mg/L		13.2	17.6	23.6	11.7	17.5	24.8	14.2	17.5	23.8	18.7	22.0	25.7	17.4	19.6	16.6
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
Metals																	
Aluminum	mg/L	0.1 OG	0.014	<0.004	<0.004	0.027	0.035	0.025	0.016	0.015	0.012	0.015	**0.118**	0.018	<0.004	0.006	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	0.004	0.003
Barium	mg/L	1 MAC	0.095	0.099	0.125	0.097	0.121	0.107	0.092	0.104	0.118	0.093	0.122	0.133	0.111	0.088	0.171
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	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC (5)	1.31	1.44	1.52	1.37	1.60	2.21	1.22	1.55	1.56	1.39	1.56	1.94	1.23	1.92	1.63
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		131	190	149	169	180	170	154	153	165	121	145	156	137	163	187
Chromium	mg/L	0.05 MAC	0.005	0.007	0.004	0.005	<0.003	0.006	0.007	0.008	<0.003	0.008	0.005	0.008	0.012	<0.003	0.003
Cobalt	mg/L		0.005	0.007	0.005	0.006	0.007	0.010	0.006	0.01	0.012	0.007	0.010	0.012	0.007	0.007	0.011
Copper	mg/L	1 AO	0.012	0.01	0.012	0.011	0.009	0.010	0.011	0.006	0.005	0.017	0.020	0.016	0.012	0.003	0.016
Iron	mg/L	0.3 AO	<0.010	<0.010	<0.010	<0.010	0.013	0.096	<0.010	0.187	0.172	<0.010	0.05	<0.010	<0.010	0.104	<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	<0.001	0.003	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		86.4	110	109	86.6	108	119	86.5	102	104	79.7	99.7	110	83.4	111	102
Manganese	mg/L	0.05 AO	**0.764**	**1.09**	**0.81**	**0.898**	**1.08**	**1.28**	**0.815**	**1.28**	**1.39**	**0.875**	**1.23**	**1.45**	**0.984**	**0.725**	**1.67**
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	0.044	0.04	0.032	0.040	0.059	0.035	0.053	0.043	0.042	0.057	0.068	0.041	0.049	0.051
Potassium	mg/L		78.1	94.9	107	72.3	110	127	77.5	95.2	98.9	72.2	102	112	82.2	101	99.5
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	0.013	0.013
Silicon	mg/L		6.43	5.57	6.59	5.84	6.13	8.47	6.57	7.95	6.54	4.24	7.91	6.96	7.36	7.91	6.63
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	155	177	**204**	142	**202**	**222**	147	162	173	127	155	182	134	180	150
Strontium	mg/L		0.802	1.06	1.05	0.876	0.889	1.00	0.846	0.889	0.971	0.623	0.866	1.02	0.748	1.20	1.05
Sulphur	mg/L		50	56.1	56.1	53.9	57.2	63.8	41.8	42.3	36.5	33.1	38.7	43.0	45.5	53.0	76.6
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		0.003	0.003	0.005	0.003	<0.002	0.004	0.003	0.003	<0.002	0.002	0.002	0.002	0.002	<0.002	0.003
Uranium	mg/L	0.02 MAC	<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	<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	0.006	0.006	0.025	0.014	0.008	0.006	0.010	0.011	0.011	0.022	0.014	<0.005	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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-10-I

Parameters	Units	ODWS [1]	2010			2011			2012			2013			2014		
General Chemistry			**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**May**	**July**	**Sep**	**June**	**July**	**Sep**
Alkalinity	mg/L	30-500 OG [2]	262	268	266	258	261	265	270	270	270	253	255	338	259	253	259
Chloride	mg/L	250 AO [3]	4.0	3.0	3.0	3.0	3.0	4.0	3.0	3.0	3.0	3.21	2.98	2.89	3.26	3.27	3.38
Dissolved Organic Carbon	mg/L	5 AO	1.3	1.5	1.8	1.1	1.4	1.6	2.0	1.4	1.5	1.9	1.9	1.6	2.4	1.6	1.4
Fluoride	mg/L	1.5 MAC [4]	0.2	0.2	0.2	0.3	0.2	0.2	0.24	0.25	0.22	<0.10	<0.25	<0.10	<0.10	<0.25	0.26
Sulphate	mg/L	500 AO	150	170	180	140	180	180	130	150	170	182	182	158	186	192	166
Hardness	mg/L	80-100 OG	**460**	**480**	**500**	**390**	**430**	**460**	**460**	**420**	**450**	**435**	**439**	**422**	**440**	**455**	**400**
Nitrate	mg/L	10 MAC	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.25	<0.10	<0.10	<0.25	<0.10
Nitrite	mg/L	1 MAC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.10	<0.25	<0.10	<0.10	<0.25	<0.10
Organic Nitrogen	mg/L	0.15 OG	0.075	**0.175**	**0.175**	0.08	**0.18**	0.08	**0.42**	**0.32**	**4.49**	**0.72**	0.12	<0.10	**0.39**	<0.10	0.13
Orthophosphate	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.20	<0.50	<0.20	<0.20	<0.05	<0.20
pH	pH Units											7.88	7.75	7.09	8.16	8.05	7.82
Electrical Conductivity	µS/cm											819	798	792	802	821	809
Total Ammonia	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.11	<0.02	0.02	<0.02	0.06	0.07	0.03
Total Dissolved Solids	mg/L	500 AO	485	**516**	**533**	444	**503**	**516**	468	476	**503**	**506**	**574**	**516**	**512**	**568**	**500**
Total Kjeldahl Nitrogen (TKN)	mg/L		0.1	0.2	0.2	0.1	0.2	0.1	0.44	0.34	4.6	0.72	0.14	<0.10	0.45	<0.10	0.16
Total Phosphorus	mg/L		0.02						24	9.0		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals																	
Aluminum	mg/L	0.1 OG	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.017	<0.004	0.005	<0.004	0.007	<0.004	<0.004
Arsenic	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.026	0.03	0.032	0.027	0.029	0.028	0.025	0.031	0.031	0.03	0.025	0.03	0.027	0.028	0.027
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC [5]	0.1	0.11	0.11	0.13	0.1	0.12	0.1	0.17	0.14	0.108	0.113	0.164	0.143	0.11	0.161
Cadmium	mg/L	0.005 MAC	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		120	130	140	100	120	120	120	110	120	116	118	112	117	122	105
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.1	0.14	<0.1	<0.1	<0.1	<0.1	0.15	<0.1	0.10	0.107	0.05	0.177	0.104	0.134	0.177
Lead	mg/L	0.01 MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Magnesium	mg/L		36	39	40	32	33	38	40	35	37	35.3	35.0	34.5	36.0	36.5	33.4
Manganese	mg/L	0.05 AO	0.027	0.022	0.021	0.024	0.021	0.02	0.025	0.025	0.024	0.026	0.013	0.026	0.021	0.021	0.02
Molybdenum	mg/L		<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	0.00075	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		4.00	4.30	4.40	3.8	3.9	4.3	3.7	4.7	4.6	4.04	3.96	4.43	4.21	4.17	4.35
Selenium	mg/L	0.05 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L											2.7	2.66	3.23	2.74	2.76	2.96
Silver	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	3.6	3.5	3.7	3.8	3.2	3.5	3.8	3.9	3.6	3.38	3.13	3.71	3.4	3.25	3.63
Strontium	mg/L		0.82	0.86	0.9	0.87	0.87	0.85	0.84	0.99	1.0	0.981	0.785	1.13	0.92	0.868	0.91
Sulphur	mg/L											61.9	62.0	56.8	55.6	64.4	60.5
Thallium	mg/L		<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	mg/L		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium	mg/L		<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	<0.002	<0.002
Uranium	mg/L	0.02 MAC	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00013	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc	mg/L	5 AO	<0.005	0.01	<0.005	0.012	<0.005	<0.005	<0.005	<0.005	0.012	0.006	<0.005	0.006	0.006	0.005	<0.005

Notes:
(1) MECP Ontario Drinking Water Standards.
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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-10-I

Parameters	Units	ODWS [1]	2015			2016			2017			2018			2019		
General Chemistry			**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	253	267	256	253	266	271	262	248	305	309	276	263	261	264	273
Chloride	mg/L	250 AO [3]	3.25	2.59	3.05	2.38	2.87	3.17	2.64	3.95	3.53	3.28	2.89	2.54	2.46	2.93	2.65
Dissolved Organic Carbon	mg/L	5 AO	1.3	3.0	2.4	2.2	1.5	1.3	1.2	1.8	1.6	1.3	2.1	1.7	1.7	1.8	1.0
Fluoride	mg/L	1.5 MAC [4]	0.18	<0.25	<0.25	<0.25	<0.10	<0.25	<0.25	0.32	0.26	0.17	0.31	0.18	0.21	0.23	0.17
Sulphate	mg/L	500 AO	137	200	153	147	124	119	162	108	92.1	113	93.1	123	152	110	96.7
Hardness	mg/L	80-100 OG	**361**	**465**	**412**	**370**	**363**	**351**	**377**	**344**	**353**	**379**	**364**	**393**	**401**	**367**	**352**
Nitrate	mg/L	10 MAC	<0.10	<0.25	<0.25	<0.25	<0.10	<0.25	<0.25	<0.05	<0.10	<0.05	<0.05	<0.10	<0.10	<0.10	<0.10
Nitrite	mg/L	1 MAC	<0.10	<0.25	<0.25	<0.25	<0.10	<0.25	<0.25	<0.05	<0.10	<0.05	<0.05	<0.10	<0.10	<0.10	<0.10
Organic Nitrogen	mg/L	0.15 OG	<0.10	**0.29**	**0.18**	**0.23**	0.11	0.12	<0.10	<0.10	<0.10	<0.10	0.11	**0.16**	<0.10	0.12	<0.10
Orthophosphate	mg/L		<0.20	<0.50	<0.50	<0.50	<0.20	<0.50	<0.50	<0.10	<0.20	<0.10	<0.10	<0.20	<0.20	<0.20	<0.20
pH	pH Units		8.15	7.74	7.65	7.96	7.58	8.12	7.93	7.84	8.21	7.65	8.07	7.51	7.53	7.65	7.44
Electrical Conductivity	µS/cm		741	868	779	655	742	739	728	650	706	713	709	733	730	749	762
Total Ammonia	mg/L		<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	0.06	<0.02	0.04	<0.02
Total Dissolved Solids	mg/L	500 AO	434	**548**	464	414	446	414	440	408	408	442	406	440	476	406	420
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.10	0.29	0.2	0.23	0.11	0.12	<0.10	<0.10	0.12	<0.10	0.11	0.22	<0.10	0.16	<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
Metals																	
Aluminum	mg/L	0.1 OG	<0.004	<0.004	<0.004	0.015	0.012	0.005	0.005	<0.004	0.005	<0.004	<0.004	0.004	<0.004	<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	0.027	0.020	0.035	0.019	0.030	0.033	0.032	0.034	0.034	0.032	0.029	0.038	0.034	0.031	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	<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 [5]	0.139	0.020	0.120	0.021	0.154	0.182	0.160	0.193	0.232	0.197	0.255	0.225	0.162	0.256	0.283
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		93.4	143	110	115	95.4	93.4	97.6	85.2	90.2	96.7	93.3	101	104	93.7	92.1
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	0.005	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	0.129	0.049	**0.778**	<0.010	0.075	0.073	0.141	0.159	0.169	0.10	0.149	0.177	0.097	<0.010	0.087
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		31.1	26.1	33.3	20.2	30.4	28.6	32.3	31.8	31.0	33.4	31.9	34.1	34.2	32.2	29.7
Manganese	mg/L	0.05 AO	0.024	0.020	0.044	0.002	0.014	0.012	0.022	0.031	0.020	0.021	0.020	0.022	0.021	0.021	0.020
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	0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		4.01	1.37	4.48	1.07	4.45	4.46	4.19	5.42	5.32	4.46	4.77	5.31	4.95	4.80	4.96
Selenium	mg/L	0.05 MAC	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		3.24	1.96	3.04	1.88	2.83	3.13	3.27	3.54	3.45	2.74	3.52	3.57	3.81	2.38	3.31
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	4.15	2.10	3.87	2.51	4.76	4.76	4.16	5.85	5.09	4.06	4.84	4.83	4.04	4.76	4.93
Strontium	mg/L		0.878	0.20	1.08	0.147	0.93	0.987	1.04	1.26	1.24	1.12	1.15	1.22	1.17	1.16	1.15
Sulphur	mg/L		49.2	68.0	59.6	39.0	40.4	37.6	52.1	35.2	28.7	38.5	30.4	43.0	50.5	35.6	31.4
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	0.003	0.004	<0.002	<0.002	0.002	0.003	<0.002	<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	0.006	0.008	0.007	<0.005	0.006	<0.005	0.009	<0.005	<0.005	<0.005	<0.005	<0.005

Notes:
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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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-10-II

Parameters	Units	ODWS [1]	2010			2011		2012			2013			2014		
General Chemistry			**Jun**	**Sep**	**Nov**	**Jun**	**Nov**	**Jun**	**Sep**	**Nov**	**May**	**July**	**Sep**	**June**	**July**	**Sep**
Alkalinity	mg/L	30-500 OG [2]	275	273	270	240	277	260	270	270	245	268	313	249	258	269
Chloride	mg/L	250 AO [3]	4.0	3.0	3.0	3.0	3.0	3.0	3.0	2.0	1.84	2.53	1.85	2.06	2.37	2.43
Dissolved Organic Carbon	mg/L	5 AO	1.6	2.2	3.2	1.6	2.1	2.2	2.3	2.3	2.0	2.0	3.1	2.1	1.7	2.2
Fluoride	mg/L	1.5 MAC [4]	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.25	<0.10	<0.05	<0.25	<0.10
Sulphate	mg/L	500 AO	200	160	170	210	160	210	240	150	144	215	191	142	218	162
Hardness	mg/L	80-100 OG	**520**	**460**	**490**	**460**	**440**	**490**	**490**	**430**	**396**	**497**	**480**	**393**	**499**	**409**
Nitrate	mg/L	10 MAC	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.25	<0.10	<0.05	<0.25	<0.10
Nitrite	mg/L	1 MAC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.10	<0.25	<0.10	<0.05	<0.25	<0.10
Organic Nitrogen	mg/L	0.15 OG		**0.175**	**0.275**	**0.68**	**0.38**	**1.38**	**0.345**	**0.805**	**0.85**	<0.10	<0.10	**0.48**	<0.10	<0.10
Orthophosphate	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.20	<0.50	<0.20	<0.10	<0.50	<0.20
pH	pH Units										7.82	7.50	7.19	8.16	8.00	7.73
Electrical Conductivity	µS/cm										736	840	860	716	863	814
Total Ammonia	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.02	0.04	0.07	0.1
Total Dissolved Solids	mg/L	500 AO	**566**	**506**	**523**	**530**	494	**554**	**591**	483	432	**586**	**570**	436	**602**	**508**
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.5	0.2	0.3	0.7	0.4	1.4	0.37	0.83	0.85	<0.20	<0.10	0.52	<0.10	0.16
Total Phosphorus	mg/L		0.12								<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals																
Aluminum	mg/L	0.1 OG	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.004	0.005	<0.004	<0.004	<0.004	<0.004
Arsenic	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.019	0.023	0.022	0.02	0.018	0.019	0.024	0.019	0.016	0.022	0.022	0.017	0.020	0.019
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	0.001	<0.001	<0.001	<0.001
Bismuth	mg/L		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC [5]	0.022	0.035	0.024	0.015	0.019	0.022	0.037	0.027	0.031	0.040	0.02	0.023	0.033	0.029
Cadmium	mg/L	0.005 MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		160	140	150	140	130	150	150	130	123	154	149	122	154	126
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.010	**0.593**	<0.010	<0.010	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Magnesium	mg/L		29	26	27	25	24	29	30	24	21.5	27.4	26.1	21.5	27.9	22.9
Manganese	mg/L	0.05 AO	<0.002	<0.002	<0.002	<0.002	<0.002	0.0056	<0.002	<0.002	<0.002	**0.067**	0.004	<0.002	<0.002	<0.002
Molybdenum	mg/L		<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel	mg/L		<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.0011	<0.003	<0.003	0.003	<0.003	<0.003	<0.003
Potassium	mg/L		1.10	1.10	1.00	0.86	0.9	0.94	1.1	0.97	0.97	1.52	1.4	0.96	1.71	1.18
Selenium	mg/L	0.05 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L										1.69	2.02	2.49	1.97	2.03	2.04
Silver	mg/L		<0.0001	<0.0001	0.0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	2.2	2.6	2.9	2.1	3.1	2.2	2.1	3.1	2.55	2.33	2.54	2.4	2.18	2.25
Strontium	mg/L		0.19	0.19	0.2	0.19	0.16	0.2	0.22	0.18	0.149	0.202	0.22	0.167	0.212	0.181
Sulphur	mg/L										49.1	73.5	66.0	41.7	73.0	60
Thallium	mg/L		<0.00005	<0.00005	<0.00005	0.00007	<0.00005	<0.00005	<0.00005	<0.00005	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	mg/L		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	0.004	<0.002	<0.002	<0.002
Uranium	mg/L	0.02 MAC	0.0003	0.0003	0.0004	0.0003	0.0002	0.00025	0.00032	0.00022	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<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	<0.005	0.006	0.018	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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-10-II

Parameters	Units	ODWS [1]	2015			2016			2017			2018			2019		
General Chemistry			**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	247	262	261	253	256	270	247	255	271	279	268	240	242	233	240
Chloride	mg/L	250 AO [3]	2.14	2.78	2.73	2.38	2.38	2.65	2.14	1.67	2.05	2.15	2.21	1.84	1.69	2.64	1.64
Dissolved Organic Carbon	mg/L	5 AO	2.0	3.0	2.3	2.2	2.9	3.5	1.9	2.4	2.9	2.6	3.2	2.9	2.7	2.8	2.1
Fluoride	mg/L	1.5 MAC [4]	<0.10	<0.25	<0.25	<0.25	<0.10	<0.25	<0.25	<0.05	<0.10	<0.05	0.09	<0.10	<0.10	<0.25	<0.25
Sulphate	mg/L	500 AO	126	135	200	147	191	177	150	199	184	135	187	177	120	187	231
Hardness	mg/L	80-100 OG	**363**	**384**	**485**	**370**	**436**	**447**	**362**	**414**	**441**	**376**	**450**	**447**	**348**	**428**	**453**
Nitrate	mg/L	10 MAC	<0.10	<0.25	<0.25	<0.25	<0.10	<0.25	<0.25	<0.05	<0.10	<0.05	0.06	<0.10	<0.10	<0.25	<0.25
Nitrite	mg/L	1 MAC	<0.10	<0.25	<0.25	<0.25	<0.10	<0.25	<0.25	<0.05	<0.10	<0.05	<0.05	<0.10	<0.10	<0.25	<0.25
Organic Nitrogen	mg/L	0.15 OG	0.12	**0.16**	0.10	**0.23**	**0.70**	**0.32**	<0.10	<0.10	**0.29**	<0.10	0.13	**0.23**	0.14	**0.17**	<0.10
Orthophosphate	mg/L		<0.20	<0.50	<0.50	<0.50	<0.20	<0.50	<0.50	<0.10	<0.20	<0.10	<0.10	<0.20	<0.20	<0.50	<0.50
pH	pH Units		8.10	8.03	7.93	7.96	7.81	8.20	8.14	8.18	8.05	7.78	7.94	7.76	7.83	7.57	7.57
Electrical Conductivity	µS/cm		715	744	871	655	836	853	684	799	818	694	815	791	640	819	907
Total Ammonia	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	<0.02	0.04	<0.02	0.02	<0.02
Total Dissolved Solids	mg/L	500 AO	426	426	**546**	414	**504**	**530**	418	**512**	**522**	450	**504**	**596**	380	**508**	**558**
Total Kjeldahl Nitrogen (TKN)	mg/L		0.12	0.16	0.10	0.23	0.70	0.32	<0.10	<0.10	0.33	<0.10	0.13	0.27	0.14	0.19	<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
Metals																	
Aluminum	mg/L	0.1 OG	<0.004	<0.004	0.007	0.015	0.010	0.010	0.005	0.026	0.005	<0.004	<0.004	0.004	<0.004	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	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.014	0.029	0.022	0.019	0.021	0.028	0.017	0.019	0.021	0.016	0.021	0.025	0.016	0.019	0.024
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	<0.004	<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
Boron	mg/l	5 IMAC [5]	0.016	0.141	0.026	0.021	0.025	0.037	0.019	0.03	0.031	0.018	0.054	0.030	0.012	0.045	0.054
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		113	100	150	115	135	138	112	127	135	117	139	138	109	132	140
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	0.112	<0.010	<0.010	<0.010	**0.501**	<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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		19.7	32.5	26.8	20.2	24.1	24.9	19.9	23.5	25.3	20.4	25.1	24.8	18.5	24.0	25.0
Manganese	mg/L	0.05 AO	<0.002	0.021	<0.002	0.002	0.010	**0.149**	<0.002	0.005	0.008	<0.002	<0.002	<0.002	<0.002	0.003	0.004
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	0.006	<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		1.04	4.35	1.78	1.07	1.17	1.75	0.87	1.02	1.4	0.85	1.36	1.22	0.88	1.19	1.18
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	<0.004	<0.004
Silicon	mg/L		2.13	2.82	2.33	1.88	2.12	2.24	2.11	2.3	2.29	1.79	2.30	2.57	2.51	0.94	2.17
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	2.21	4.30	2.27	2.51	2.20	2.25	2.17	1.99	2.22	1.99	2.14	2.25	2.06	2.14	2.17
Strontium	mg/L		0.138	0.943	0.209	0.147	0.193	0.219	0.159	0.19	0.201	0.145	0.208	0.205	0.151	0.198	0.214
Sulphur	mg/L		44.8	43.9	71.3	39.0	59.8	58.7	49.0	62.5	60.6	44.9	55.1	63.6	40.6	61.1	69.5
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	0.004	<0.002	0.002	0.004	0.003	0.004	<0.002	0.003	0.002	0.003	0.002	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	<0.005	<0.005	<0.005	0.006	0.011	0.005	<0.005	0.009	0.006	<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-10-III

Parameters	Units	ODWS [1]	2017	2018			2019		
General Chemistry			**Sept**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	231	228	196	183	200	195	196
Chloride	mg/L	250 AO [3]	8.69	1.08	1.10	0.90	0.98	0.89	0.78
Dissolved Organic Carbon	mg/L	5 AO	**8.6**	0.9	2.1	2.0	1.7	1.3	0.5
Fluoride	mg/L	1.5 MAC [4]	0.42	0.75	0.54	0.47	0.48	0.48	0.29
Sulphate	mg/L	500 AO	177	82.1	80.2	81.8	88.3	83.7	83.4
Hardness	mg/L	80-100 OG	**267**	**208**	**200**	**201**	**208**	**197**	**190**
Nitrate	mg/L	10 MAC	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.10
Nitrite	mg/L	1 MAC	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.10
Organic Nitrogen	mg/L	0.15 OG	**0.26**	0.10	<0.10	**0.16**	0.21	0.14	<0.10
Orthophosphate	mg/L		<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.20
pH	pH Units		8.22	8.00	8.08	7.94	7.82	7.93	7.78
Electrical Conductivity	µS/cm		813	546	538	528	528	577	602
Total Ammonia	mg/L		0.07	0.05	0.04	0.08	0.04	0.08	0.05
Total Dissolved Solids	mg/L	500 AO	432	294	302	310	276	286	296
Total Kjeldahl Nitrogen (TKN)	mg/L		0.33	0.15	<0.10	0.24	0.25	0.22	<0.10
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals									
Aluminum	mg/L	0.1 OG	0.009	0.007	0.005	0.011	<0.004	0.006	0.013
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.046	0.026	0.024	0.029	0.038	0.021	0.023
Beryllium	mg/L		<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
Boron	mg/l	5 IMAC [5]	0.24	0.262	0.251	0.277	0.249	0.060	0.242
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		63.9	48.8	47.2	47.7	50.0	46.6	45.0
Chromium	mg/L	0.05 MAC	<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
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	0.04	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		26.2	20.8	20.0	19.8	20.1	19.5	18.9
Manganese	mg/L	0.05 AO	**0.137**	0.036	0.026	0.041	0.048	0.027	0.029
Molybdenum	mg/L		0.074	<0.002	<0.002	<0.002	0.008	<0.002	<0.002
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		7.73	5.82	5.36	6.33	6.95	5.45	5.66
Selenium	mg/L		<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		4.35	2.79	3.08	2.71	3.57	2.17	2.94
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	47.5	36.4	34.0	36.2	36.1	35.2	35.8
Strontium	mg/L		2.25	1.65	1.74	1.84	1.69	1.76	1.80
Sulphur	mg/L		57	27.3	25.3	30.5	27.2	27.9	27.0
Thallium	mg/L		<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
Titanium	mg/L		<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
Vanadium	mg/L		<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	<0.005	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-11-I

Parameters	Units	ODWS [1]	2010			2011			2012			2013			2014		
General Chemistry			**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**May**	**July**	**Sep**	**June**	**July**	**Sep**
Alkalinity	mg/L	30-500 OG [2]	238	238	240	229	230	229	240	250	260	237	258	289	231	235	245
Chloride	mg/L	250 AO [3]	5.0	4.0	3.0	5.0	7.0	4.0	5.0	7.0	8.0	8.05	9.86	8.69	7.22	9.65	9.1
Dissolved Organic Carbon	mg/L	5 AO	0.5	0.5	0.7	0.5	0.6	0.5	1.4	0.53	0.46	0.6	0.6	1.5	1.1	2.0	0.7
Fluoride	mg/L	1.5 MAC [4]	0.3	0.3	0.3	0.3	0.31	0.3	0.33	0.35	0.36	<0.10	0.29	0.2	0.2	<0.10	0.36
Sulphate	mg/L	500 AO	48	57	67	74	74	82	64	54	40	72.3	50.9	55.5	81.2	58.7	55.7
Hardness	mg/L	80-100 OG	**290**	**290**	**280**	**280**	**270**	**280**	**280**	**290**	**290**	**282**	**277**	**286**	**279**	**287**	**265**
Nitrate	mg/L	10 MAC	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.10	0.25	0.22	0.25	0.11	0.25
Nitrite	mg/L	1 MAC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.10	<0.05	<0.10	<0.05	<0.10	<0.05
Organic Nitrogen	mg/L	0.15 OG		0.075	**0.175**	**0.18**	**0.18**		0.145	**0.185**	**0.155**	**0.86**	<0.10	**0.17**	**0.48**	**0.29**	0.11
Orthophosphate	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.20	<0.10	<0.20	<0.10	<0.20	<0.10
pH	pH Units											8.04	7.67	7.32	8.23	8.21	7.95
Electrical Conductivity	µS/cm											616	587	606	594	584	607
Total Ammonia	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.02	0.04	0.08	0.03
Total Dissolved Solids	mg/L	500 AO	325	330	341	336	338	348	336	339	326	336	340	342	320	332	318
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.1	0.1	0.2	0.2	0.2	<0.1	0.17	0.21	0.18	0.86	<0.10	0.17	0.52	0.37	0.14
Total Phosphorus	mg/L		0.06									<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals																	
Aluminum	mg/L	0.1 OG	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	0.018	<0.004	<0.004	<0.004	<0.004
Arsenic	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.029	0.036	0.032	0.031	0.033	0.035	0.029	0.033	0.034	0.034	0.031	0.031	0.032	0.032	0.031
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC [5]	0.27	0.33	0.3	0.26	0.28	0.3	0.25	0.27	0.32	0.307	0.264	0.324	0.264	0.241	0.279
Cadmium	mg/L	0.005 MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		69	67	65	66	62	64	64	69	66	66.8	65.7	68.4	65.8	67.8	62.4
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	0.002	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Magnesium	mg/L		29	29	29	27	27	29	29	30	29	27.9	27.5	28	27.8	28.5	26.4
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		<0.001	<0.001	<0.001	<0.001	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel	mg/L		<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		6.50	6.80	6.80	5.8	6.2	6.7	6.1	6.7	6.7	6.20	6.18	6.6	6.5	6.6	6.31
Selenium	mg/L	0.05 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L											2.91	3.12	3.61	2.83	3.02	3.17
Silver	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	18	18	19	13	17	18	17	16	15	14.9	13.3	13.9	15.6	14.1	13.1
Strontium	mg/L		1.9	2.1	2.0	1.9	2.1	2.2	2.0	2.1	2.1	2.07	1.76	2.19	2.07	1.88	1.75
Sulphur	mg/L											24.5	17.5	16.5	23.9	18.8	19
Thallium	mg/L		<0.00005	<0.00005	<0.00005	0.00006	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	mg/L		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium	mg/L		<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	<0.002
Uranium	mg/L	0.02 MAC	0.0003	0.0003	0.0005	0.0003	0.0003	0.0003	0.0003	0.00037	0.00028	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.0005	0.001	<0.0005	<0.0005	<0.0005	<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	0.0064	0.007	0.038	<0.005	0.008	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-11-I

Parameters	Units	ODWS [1]	2015			2016			2017			2018			2019		
General Chemistry			**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	225	228	236	240	250	227	234	243	243	250	228	229	234	228	234
Chloride	mg/L	250 AO [3]	8.67	9.88	6.56	7.65	11.6	7.76	4.67	9.71	9.53	9.53	11.6	9.21	9.69	10.6	7.61
Dissolved Organic Carbon	mg/L	5 AO	0.7	1.4	1.1	0.9	1.5	0.8	0.6	1.2	2.1	2.4	1.9	1.2	0.9	1.5	1.1
Fluoride	mg/L	1.5 MAC [4]	0.33	<0.10	<0.25	<0.10	<0.10	<0.25	<0.25	0.28	0.31	0.47	0.37	0.21	0.33	0.31	0.23
Sulphate	mg/L	500 AO	72.3	71.5	70.3	95.4	68.6	94.3	104	62.5	68.1	74	62.8	48.6	53.8	57.4	59.3
Hardness	mg/L	80-100 OG	**265**	**286**	**281**	**282**	**273**	**270**	**273**	**262**	**271**	**252**	**269**	**278**	**265**	**293**	**270**
Nitrate	mg/L	10 MAC	0.53	0.54	<0.25	0.34	0.19	0.35	0.28	0.14	0.2	0.32	0.22	0.22	0.18	0.27	0.19
Nitrite	mg/L	1 MAC	<0.10	<0.10	<0.25	<0.10	<0.10	<0.25	<0.25	<0.05	<0.05	<0.05	<0.05	<0.10	<0.05	<0.10	<0.10
Organic Nitrogen	mg/L	0.15 OG	**0.17**	**0.59**	**0.22**	**0.29**	**0.84**	0.13	<0.10	<0.10		**0.61**	**0.34**	<0.10	<0.10	**0.43**	**0.16**
Orthophosphate	mg/L		<0.20	<0.20	<0.50	<0.20	<0.20	<0.50	<0.50	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.20	<0.20
pH	pH Units		8.34	8.15	8.07	8.02	8.10	8.32	8.33	8.24	7.71	7.85	8.03	7.93	7.86	7.97	7.73
Electrical Conductivity	µS/cm		599	590	601	590	631	653	615	582	606	601	589	563	543	626	637
Total Ammonia	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02	0.04	<0.02	0.04	<0.02
Total Dissolved Solids	mg/L	500 AO	-	334	324	336	320	354	342	318		350	318	378	304	304	318
Total Kjeldahl Nitrogen (TKN)	mg/L		0.17	0.59	0.22	0.29	0.84	0.13	<0.10	<0.10		0.61	0.34	<0.10	<0.10	0.47	0.16
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
Metals																	
Aluminum	mg/L	0.1 OG	0.043	<0.004	0.008	0.012	0.058	0.009	0.013	<0.004	0.007	0.005	<0.004	0.005	<0.004	0.006	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	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.030	0.030	0.035	0.029	0.034	0.039	0.037	0.032	0.038	0.033	0.034	0.038	0.032	0.034	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	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC [5]	0.257	0.231	0.296	0.343	0.253	0.306	0.301	0.258	0.324	0.322	0.282	0.309	0.255	0.280	0.310
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		62.7	68.4	67.7	66.9	65.6	64.6	63.7	61.8	64.6	59.5	63.8	66.9	63.4	69.5	65.1
Chromium	mg/L	0.05 MAC	<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	<0.003
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.006	<0.001	<0.001	<0.001	<0.001	<0.001	0.002
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	0.043	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	0.041	<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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		26.3	27.9	27.2	28.0	26.6	26.5	27.7	26.2	26.7	25.0	26.7	26.9	26.0	29.0	26.2
Manganese	mg/L	0.05 AO	0.008	0.005	0.009	0.026	0.005	0.004	<0.002	0.045	**0.196**	0.003	0.008	<0.002	0.002	<0.002	0.035
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	0.004	<0.003	<0.003	<0.003	<0.003	<0.003	0.006	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		6.1	7.09	6.96	6.29	6.52	7.38	6.45	6.21	6.61	5.91	6.11	6.59	5.92	6.58	6.58
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		2.68	2.81	3.45	3.09	3.65	3.07	3.06	3.4	3.13	2.79	3.29	3.3	3.48	2.01	3.06
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	15.3	17.8	16.0	16.1	14.3	16.7	15.9	13.6	14.0	14.8	13.9	11.4	12.6	13.9	12.9
Strontium	mg/L		1.81	1.82	2.01	1.72	1.84	2.29	2.18	1.94	2.1	1.9	2.12	1.92	1.93	2.15	1.98
Sulphur	mg/L		25.7	24.6	56.9	26.5	19.7	29.8	35.2	19.7	21.7	28.4	20.4	14.2	23.3	22.2	21.5
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		0.003	<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	<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	0.007	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	0.007	0.006	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-11-II

Parameters	Units	ODWS [1]	2010			2011		2012			2013			2014		
General Chemistry			**Jun**	**Sep**	**Nov**	**Jun**	**Nov**	**Jun**	**Sep**	**Nov**	**May**	**July**	**Sep**	**June**	**July**	**Sep**
Alkalinity	mg/L	30-500 OG [2]	393	291	333	401	293	380	400	350	379	456	**520**	395	470	436
Chloride	mg/L	250 AO [3]	40	35	41	40	40	37	36	33	35.4	34.9	29.7	20.1	22.3	21.0
Dissolved Organic Carbon	mg/L	5 AO	4.8	**9.7**	**7.8**	**5.8**	**6.3**	4.7	3.9	**7.7**	4.3	4.7	**5.9**	5.0	4.5	4.8
Fluoride	mg/L	1.5 MAC [4]	<0.1	0.1	0.1	<0.1	0.1	<0.1	<0.1	0.17	<0.25	<0.25	<0.25	<0.10	<0.25	<0.25
Sulphate	mg/L	500 AO	92	130	120	88	110	99	100	68	88.1	68.6	52.2	51.2	44.9	42.1
Hardness	mg/L	80-100 OG	**500**	**390**	**410**	**450**	**380**	**440**	**470**	**390**	**408**	**442**	**454**	**395**	**454**	**409**
Nitrate	mg/L	10 MAC	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.36	<0.1	<0.25	<0.25	<0.25	0.12	<0.25	<0.25
Nitrite	mg/L	1 MAC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.25	<0.25	<0.25	<0.10	<0.25	<0.25
Organic Nitrogen	mg/L	0.15 OG	**1.98**	**2.98**	**3.08**	**2.48**		**8.69**	**0.905**	**5.03**	**1.41**	**0.55**	**0.6**	**0.87**	**0.71**	**0.59**
Orthophosphate	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.50	<0.50	<0.50	<0.20	<0.50	<0.50
pH	pH Units										7.99	7.51	7.33	8.13	8.00	7.76
Electrical Conductivity	µS/cm										967	1010	1030	857	986	961
Total Ammonia	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	0.91	<0.05	0.072	<0.02	0.08	<0.02	0.14	0.12	0.06
Total Dissolved Solids	mg/L	500 AO	**605**	**533**	**561**	**584**	**514**	**585**	**609**	499	**526**	**576**	**576**	**506**	**528**	**516**
Total Kjeldahl Nitrogen (TKN)	mg/L		2.0	3.0	3.1	2.5	<2	9.6	0.93	5.1	1.41	0.63	0.6	1.01	0.83	0.65
Total Phosphorus	mg/L		0.34								<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals																
Aluminum	mg/L	0.1 OG	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	<0.004	0.007	<0.004	0.004	<0.004	<0.004
Arsenic	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.023	0.027	0.02	0.023	0.019	0.05	0.027	0.019	0.029	0.025	0.022	0.021	0.022	0.024
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC [5]	0.38	0.5	0.3	0.56	0.29	0.4	0.39	0.31	0.416	0.491	0.439	0.365	0.361	0.346
Cadmium	mg/L	0.005 MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		130	94	97	110	86	110	120	88	102	115	116	96.6	117	103
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	0.001	0.001	0.001	0.001	0.001	<0.001	<0.001	0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.1	<0.1	<0.1	<0.1	<0.1	**3.4**	<0.1	<0.1	**0.597**	**0.322**	<0.010	<0.010	0.193	0.068
Lead	mg/L	0.01 MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Magnesium	mg/L		42	37	42	40	40	43	40	42	37.3	37.6	40.0	37.4	39.3	36.8
Manganese	mg/L	0.05 AO	**0.22**	**0.06**	0.036	0.03	0.027	**1.1**	0.015	<0.002	**0.162**	**0.172**	0.029	**0.162**	**0.124**	0.028
Molybdenum	mg/L		<0.001	0.001	<0.001	<0.001	0.0007	<0.0005	<0.0005	0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel	mg/L		0.005	0.004	0.004	0.006	0.004	0.0046	0.0041	0.0046	<0.003	<0.003	0.004	<0.003	<0.003	<0.003
Potassium	mg/L		4.00	8.20	6.50	5.3	7	5	5.1	7.9	4.64	4.13	4.89	5.99	4.96	4.43
Selenium	mg/L	0.05 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L										3.30	4.35	4.36	4.24	4.26	3.76
Silver	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	52	46	49	49	46	56	53	45	40.6	44.6	45	32.4	41.1	36.4
Strontium	mg/L		0.19	0.18	0.18	0.2	0.17	0.19	0.23	0.18	0.189	0.208	0.231	0.199	0.204	0.231
Sulphur	mg/L										29.5	22.8	16	14.8	15.6	15.8
Thallium	mg/L		<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	mg/L		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium	mg/L		<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	<0.002
Uranium	mg/L	0.02 MAC	0.0006	0.0006	0.0008	0.0007	0.0006	0.00066	0.00069	0.00078	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/L		<0.001	<0.001	<0.001	<0.001	0.001	<0.0005	<0.0005	<0.0005	<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	<0.005	<0.005	0.008	0.007	<0.005

Notes:
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The City of Temiskaming Shores
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New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-11-II

Parameters	Units	ODWS [1]	2015			2016			2017			2018			2019		
General Chemistry			**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	411	485	412	422		434	433	435	**507**	418	480	460	373	465	**504**
Chloride	mg/L	250 AO [3]	29.9	28.6	29.6	23.9		27.0	24.1	25.9	26.9	23.8	22.8	22.3	18.9	21.8	19.2
Dissolved Organic Carbon	mg/L	5 AO	**7.2**	**5.6**	**5.3**	**5.1**		**5.9**	**5.1**	**6.8**	**6.4**	**5.9**	**6.9**	5.0	**7.0**	5.0	5.0
Fluoride	mg/L	1.5 MAC [4]	<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	58.8	41.2	79.2	81.9		78.9	<0.50	58.9	55.4	58.5	55.2	65.4	72.2	58.7	60.7
Hardness	mg/L	80-100 OG	**417**	**486**	**457**	**424**		**449**	**409**	**454**	**477**	**395**	**493**	**505**	**387**	**507**	**491**
Nitrate	mg/L	10 MAC	<0.25	<0.25	<0.25	<0.25		<0.25	<0.25	<0.25	<0.25	0.27	<0.25	<0.25	<0.25	0.56	<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
Organic Nitrogen	mg/L	0.15 OG	**1.1**	**1.5**	**0.53**	**2.32**		**0.58**	**0.44**	**0.51**	**1.04**	**2.0**	**1.06**	**0.31**	**0.61**	**0.86**	**0.55**
Orthophosphate	mg/L		<0.50	<0.50	<0.50	<0.50		<0.50	67.2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
pH	pH Units		8.16	8.11	8.05	8.06		8.22	8.3	8.29	8.11	8.02	8.06	8.03	7.85	7.74	7.85
Electrical Conductivity	µS/cm		950	1060	987	891		1040	900	936	1080	841	1040	1040	815	1110	1180
Total Ammonia	mg/L		<0.02	0.06	<0.02	<0.02		<0.02	<0.02	0.11	0.07	<0.02	0.26	0.17	<0.02	0.04	<0.02
Total Dissolved Solids	mg/L	500 AO	**534**	**552**	**532**	**504**		**568**	**512**	**570**	**574**	470	**582**	**676**	494	**564**	**596**
Total Kjeldahl Nitrogen (TKN)	mg/L		1.1	1.56	0.53	2.32		0.58	0.44	0.62	1.11	2.0	1.32	0.48	0.61	0.90	0.55
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
Metals																	
Aluminum	mg/L	0.1 OG	<0.004	0.019	<0.004	0.008	0.011	0.011	0.006	<0.004	0.008	0.004	0.006	0.006	<0.004	<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	0.023	0.027	0.023	0.024	0.034	0.039	0.023	0.03	0.031	0.020	0.036	0.036	0.021	0.027	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 [5]	0.295	0.317	0.326	0.400	0.352	0.431	0.334	0.449	0.469	0.314	0.472	0.468	0.357	0.423	0.453
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		104	124	119	104		116	101	115	123	99	127	130	98.8	131	129
Chromium	mg/L	0.05 MAC	<0.003	0.027	<0.003	<0.003	0.005	<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	0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.010	0.195	<0.010	0.055	<0.010	<0.010	<0.010	**0.475**	**0.492**	<0.010	**0.316**	0.207	<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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		38.1	42.9	38.8	39.8		38.7	38.1	40.5	41.3	36.0	42.6	43.8	34.1	43.8	41.0
Manganese	mg/L	0.05 AO	0.046	0.042	0.005	**0.124**	<0.002	0.045	0.006	**0.122**	**0.239**	0.022	**0.265**	**0.098**	0.026	0.030	0.019
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		0.004	0.005	0.007	<0.003	0.005	0.004	0.003	0.005	<0.003	<0.003	0.003	0.004	<0.003	0.004	0.004
Potassium	mg/L		6.11	5.79	4.76	5.59		5.85	5.89	7.79	6.29	4.54	6.47	7.06	4.71	8.07	6.56
Selenium	mg/L	0.05 MAC	<0.004	<0.004	0.004	<0.004	0.007	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		4.42	4.40	4.12	4.05	3.99	4.52	3.94	4.95	4.71	2.82	5.52	5.30	4.60	5.17	4.58
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	34.1	38.1	39.2	28.6		36.8	32.2	37.8	36.8	26.9	35.3	38.6	25.5	36.0	34.6
Strontium	mg/L		0.192	0.226	0.193	0.204	0.267	0.352	0.211	0.266	0.254	0.182	0.279	0.277	0.187	0.279	0.296
Sulphur	mg/L		21.4	13.0	26.6	21.5	22.0	24.2	28.3	20.1	18.7	19.1	20.1	24.6	23.6	21.6	19.5
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	<0.002	<0.002	<0.002	<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	0.014	<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	<0.005	0.005	0.006	<0.005	<0.005	0.030	<0.005	<0.005	<0.005	0.011	<0.005	<0.005	<0.005

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New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-12-I

Parameters	Units	ODWS [1]	2010			2011			2012			2013			2014		
General Chemistry			**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**May**	**July**	**Sep**	**June**	**July**	**Sep**
Alkalinity	mg/L	30-500 OG [2]	259	258	265	258	262	278	270	270	270	255	273	324	262	272	279
Chloride	mg/L	250 AO [3]	44	43	42	47	44	61	46	44	40	56.3	43.7	42.4	50.6	37.3	39.7
Dissolved Organic Carbon	mg/L	5 AO	1.4	1.3	1.6	1.2	1.4	1.6	2.1	1.5	1.4	**5.4**	1.8	1.9	1.8	2.7	2.0
Fluoride	mg/L	1.5 MAC [4]	0.4	0.4	0.5	0.4	0.46	0.4	0.43	0.45	0.46	<0.25	0.31	0.44	0.17	<0.25	0.44
Sulphate	mg/L	500 AO	51	47	47	64	52	59	57	58	46	82.2	69.6	69.8	84	67.8	70.9
Hardness	mg/L	80-100 OG	**380**	**340**	**350**	**340**	**350**	**350**	**370**	**370**	**360**	**376**	**357**	**361**	**365**	**355**	**355**
Nitrate	mg/L	10 MAC	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.25	<0.10	<0.10	0.14	<0.25	0.11
Nitrite	mg/L	1 MAC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.25	<0.10	<0.10	<0.10	<0.25	<0.10
Organic Nitrogen	mg/L	0.15 OG	**0.175**	**0.175**	**0.275**	**0.18**	**0.18**		**0.395**	**0.355**	**0.485**	**1.03**	<0.10	<0.10	**0.52**	**0.26**	**0.45**
Orthophosphate	mg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.50	<0.20	<0.20	<0.20	<0.50	<0.20
pH	pH Units											8.16	7.9	7.4	8.2	8.23	8.06
Electrical Conductivity	µS/cm											815	769	790	784	771	817
Total Ammonia	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.02	0.05	0.07	0.03
Total Dissolved Solids	mg/L	500 AO	414	391	399	412	402	439	419	421	405	462	476	466	468	482	472
Total Kjeldahl Nitrogen (TKN)	mg/L		0.2	0.2	0.3	0.2	0.2	<0.5	0.42	0.38	0.51	1.03	<0.10	<0.10	0.57	0.33	0.48
Total Phosphorus	mg/L		0.02									<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals																	
Aluminum	mg/L	0.1 OG	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	0.007	<0.004	<0.004	<0.004	<0.004
Arsenic	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.05	0.052	0.05	0.049	0.055	0.052	0.046	0.057	0.053	0.062	0.057	0.055	0.057	0.053	0.053
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC [5]	0.37	0.41	0.4	0.34	0.37	0.41	0.35	0.39	0.41	0.375	0.401	0.35	0.332	0.351	0.407
Cadmium	mg/L	0.005 MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		89	78	80	82	83	82	83	84	85	89.2	84.3	86	86.5	83.3	83.7
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Magnesium	mg/L		38	35	35	33	34	36	39	38	36	37.1	35.5	35.5	36.1	35.6	35.5
Manganese	mg/L	0.05 AO	0.009	<0.002	0.004	0.009	0.004	0.005	0.0053	<0.002	0.0027	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Molybdenum	mg/L		<0.001	<0.001	<0.001	<0.001	0.0007	0.0005	0.00059	0.00058	0.00083	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel	mg/L		0.001	<0.001	<0.001	0.002	0.002	<0.001	0.0012	0.0011	0.002	<0.003	<0.003	0.003	<0.003	<0.003	<0.003
Potassium	mg/L		8.50	8.20	8.40	7.5	8	8.5	7.7	8.6	8.4	8.09	8.21	8.53	8.19	8.75	8.7
Selenium	mg/L	0.05 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L											3.87	3.81	4.45	3.8	3.81	3.97
Silver	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	17	15	16	15	16	16	17	16	16	15.6	14.6	15.7	17.2	15.7	16.5
Strontium	mg/L		2.0	2.0	2.0	1.8	2.0	2.1	2.0	2.1	2.1	2.12	2.1	2.18	1.91	1.98	1.91
Sulphur	mg/L											27.9	24.9	22.1	24.9	24.0	27.3
Thallium	mg/L		<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	mg/L		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium	mg/L		<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	<0.002
Uranium	mg/L	0.02 MAC	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.00022	0.0003	0.00027	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/L		<0.001	0.003	<0.001	<0.001	<0.0005	0.0009	<0.0005	<0.0005	<0.0005	<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	0.006	<0.005	<0.005	0.006	0.006	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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-12-I

Parameters	Units	ODWS [1]	2015			2016			2017			2018			2019		
General Chemistry			**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	265	**814**	265	284	279	259	289	266	317	292	266	261	286	264	300
Chloride	mg/L	250 AO [3]	48.4	38.4	32.0	50.1	36.7	32.4	39.1	37.1	41.5	35.0	37.4	31.6	38.8	38.3	40.8
Dissolved Organic Carbon	mg/L	5 AO	1.7	2.6	1.9	2.0	1.9	2.0	1.7	2.7	2.6	2.2	3.5	2.3	2.6	3.1	2.3
Fluoride	mg/L	1.5 MAC [4]	0.41	<0.50	<0.25	<0.25	0.31	<0.25	<0.25	0.38	0.26	0.37	0.47	0.35	0.33	<0.25	<0.25
Sulphate	mg/L	500 AO	78.5	73.9	68.9	98.5	79.7	67.1	97.2	72.6	82.5	65.6	69.8	60.9	74.6	77.3	90.2
Hardness	mg/L	80-100 OG	**348**	**367**	**341**	**358**	**340**	**318**	**361**	**331**	**375**	**325**	**349**	**377**	**361**	**395**	**418**
Nitrate	mg/L	10 MAC	<0.10	<0.50	<0.25	<0.25	<0.10	<0.25	<0.25	0.09	<0.10	<0.05	0.08	<0.10	<0.10	<0.25	<0.25
Nitrite	mg/L	1 MAC	<0.10	<0.50	<0.25	<0.25	<0.10	<0.25	<0.25	<0.05	<0.10	<0.05	<0.05	<0.10	<0.10	<0.25	<0.25
Organic Nitrogen	mg/L	0.15 OG	**0.30**	**0.47**	**0.28**	0.12	**0.26**	**0.32**	0.12	0.14	**0.35**	**0.37**	**0.68**	**0.27**	**0.30**	**0.41**	**0.31**
Orthophosphate	mg/L		<0.20	<1.00	<0.50	<0.50	<0.20	<0.50	<0.50	<0.10	<0.20	<0.10	<0.10	<0.20	<0.20	<0.50	<0.50
pH	pH Units		8.23	7.98	7.96	8.06	8.12	8.28	8.22	8.13	8.03	7.85	7.91	7.80	7.8	7.92	7.68
Electrical Conductivity	µS/cm		797	287	738	766	784	751	792	728	859	692	743	720	752	831	935
Total Ammonia	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	0.04	<0.02
Total Dissolved Solids	mg/L	500 AO	462	440	416	446	412	382	400	458	484	426	424	442	448	474	488
Total Kjeldahl Nitrogen (TKN)	mg/L		0.30	0.47	0.28	0.12	0.26	0.32	0.12	0.14	0.35	0.37	0.68	0.31	0.30	0.45	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
Metals																	
Aluminum	mg/L	0.1 OG	<0.004	<0.004	<0.004	0.007	0.045	0.007	0.008	0.006	0.005	0.007	<0.004	0.012	<0.004	0.009	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	0.052	0.055	0.056	0.062	0.056	0.060	0.057	0.056	0.07	0.059	0.053	0.070	0.057	0.055	0.068
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 [5]	0.309	0.360	0.390	0.422	0.391	0.439	0.366	0.359	0.452	0.407	0.376	0.486	0.383	0.390	0.480
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		81.0	86.4	81.3	83.0	80.6	75.6	84.8	78.0	90.0	76.5	82.5	89.9	86.2	91.3	102
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	0.011	<0.010	<0.010	<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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		35.3	36.7	33.6	36.7	33.6	31.4	36.3	33.2	36.6	32.6	34.8	37.1	35.5	40.5	39.7
Manganese	mg/L	0.05 AO	<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	0.006	<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	0.005	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	0.003	0.004	<0.003	0.004	0.004
Potassium	mg/L		8.0	9.28	8.59	8.00	8.59	8.90	8.12	7.95	8.23	7.02	7.89	8.87	7.82	8.77	9.14
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		3.75	3.93	4.18	3.97	4.36	4.26	4.11	4.35	4.58	3.11	4.55	5.15	4.51	3.64	4.80
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	17.5	15.4	16.7	16.1	14.8	15.9	14.9	15.2	12.9	14.4	16.4	15.1	17.2	17.8
Strontium	mg/L		1.71	1.99	1.96	1.99	1.89	2.14	2.11	1.95	2.15	1.95	2.14	2.27	2.12	2.26	2.31
Sulphur	mg/L		28.6	25.2	23.5	26.6	22.4	22.6	28.9	22.6	26.1	29.7	23.2	27.4	30.8	30.1	31.3
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	0.003	<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	0.007	<0.005	<0.005	0.006	0.005	<0.005	0.009	<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.

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New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-12-II

Parameters	Units	ODWS [1]	2010			2011			2012			2013			2014		
General Chemistry			**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**May**	**July**	**Sep**	**June**	**July**	**Sep**
Alkalinity	mg/L	30-500 OG [2]	485	**512**	**513**	493	**528**	467	**520**	**510**	**530**	**501**	**548**	**610**	**515**	**524**	**530**
Chloride	mg/L	250 AO [3]	67	75	69	76	70	76	78	74	79	56.4	57.4	49.3	46.5	50.0	45.2
Dissolved Organic Carbon	mg/L	5 AO	**8.6**	**8.4**	**9.3**	**6.9**	**8.3**	**7.5**	**7.5**	**8.0**	**7.4**	**6.7**	**7.5**	**9.1**	**7.2**	**8.5**	**8.2**
Fluoride	mg/L	1.5 MAC [4]	<0.1	<0.1	<0.1	<0.1	0.07	<0.1	<0.1	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Sulphate	mg/L	500 AO	120	120	130	130	130	110	130	130	120	111	115	117	111	135	122
Hardness	mg/L	80-100 OG	**520**	**560**	**550**	**540**	**560**	**510**	**570**	**570**	**500**	**508**	**524**	**518**	**569**	**580**	**525**
Nitrate	mg/L	10 MAC	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Nitrite	mg/L	1 MAC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Organic Nitrogen	mg/L	0.15 OG	**1.775**	**1.875**	**1.775**	**1.48**	**1.98**	**1.08**	**1.68**	**1.78**	**1.53**	**1.95**	**1.43**	**1.4**	**1.76**	**1.61**	**1.78**
Orthophosphate	mg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
pH	pH Units											7.88	7.24	7.12	8.02	8.10	7.52
Electrical Conductivity	µS/cm											1290	1280	1320	1260	1320	1330
Total Ammonia	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.071	<0.02	0.03	<0.02	0.07	0.07	0.05
Total Dissolved Solids	mg/L	500 AO	**773**	**821**	**816**	**796**	**838**	**749**	**850**	**833**	**795**	**716**	**778**	**784**	**734**	**810**	**766**
Total Kjeldahl Nitrogen (TKN)	mg/L		1.8	1.9	1.8	1.5	2.0	1.1	1.7	1.8	1.6	1.95	1.46	1.4	1.83	1.68	1.83
Total Phosphorus	mg/L		0.04									<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals																	
Aluminum	mg/L	0.1 OG	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0062	0.070	0.014	<0.004	<0.004	<0.004	<0.004
Arsenic	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.023	0.027	0.023	0.021	0.028	0.021	0.023	0.027	0.021	0.041	0.043	0.042	0.044	0.048	0.04
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC [5]	0.084	0.076	0.055	0.1	0.071	0.084	0.083	0.10	0.073	0.121	0.148	0.165	0.124	0.193	0.196
Cadmium	mg/L	0.005 MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		170	180	170	170	180	160	180	180	160	151	158	155	171	174	156
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	0.005	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	0.002	<0.001	<0.001	<0.001	0.001	<0.001	0.0016	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.052	0.074	0.099	0.092	**0.308**	0.171
Lead	mg/L	0.01 MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Magnesium	mg/L		25	27	28	28	25	27	32	30	27	31.7	31.4	31.8	34.6	35.3	32.8
Manganese	mg/L	0.05 AO	**0.075**	**0.09**	**0.076**	**0.1**	**0.082**	**0.063**	0.049	0.02	**0.065**	**0.057**	**0.065**	0.042	0.044	0.035	0.033
Molybdenum	mg/L		<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel	mg/L		0.01	0.011	0.01	0.012	0.013	0.011	0.01	0.011	0.01	0.005	0.005	0.009	0.006	0.006	0.003
Potassium	mg/L		1.10	1.30	1.00	0.71	1.4	0.85	1.0	1.4	0.77	2.86	3.53	3.69	3.31	4.32	3.88
Selenium	mg/L	0.05 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L											3.68	4.30	4.78	3.66	4.09	3.71
Silver	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	93	100	100	89	99	89	110	100	85	70.1	77.5	74.1	80.5	77.6	74.6
Strontium	mg/L		0.25	0.27	0.26	0.22	0.29	0.24	0.25	0.27	0.23	0.647	0.580	0.633	0.626	0.604	0.517
Sulphur	mg/L											37.1	38.0	49.7	35.8	46.1	42.2
Thallium	mg/L		<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	mg/L		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium	mg/L		<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	<0.002
Uranium	mg/L	0.02 MAC	0.0006	0.0006	0.0006	0.0006	0.0006	0.0008	0.00064	0.00073	0.00055	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	<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	0.113	0.016	<0.005	0.006	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-12-II

Parameters	Units	ODWS [1]	2015			2016			2017			2018			2019		
General Chemistry			**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	477	**541**	**535**	498	**532**	**519**	**503**	451	**533**	**540**	**509**	489	498	496	**510**
Chloride	mg/L	250 AO [3]	49.1	49.8	49.2	58.2	47.6	52.7	49.5	46.2	49.2	63.2	56.7	54.1	51.4	53.1	49.5
Dissolved Organic Carbon	mg/L	5 AO	**7.9**	**8.6**	**9.1**	**7.0**	**9.5**	**9.5**	**6.7**	**9.1**	**9.2**	**9.7**	**8.7**	**8.2**	**8.3**	**6.3**	**7.2**
Fluoride	mg/L	1.5 MAC [4]	<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	118	134	127	139	135	130	123	125	132	127	126	126	99.2	119	112
Hardness	mg/L	80-100 OG	**466**	**600**	**518**	**517**	**528**	**562**	**510**	**530**	**533**	**548**	**572**	**595**	**539**	**566**	**547**
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	**1.29**	**1.66**	**1.71**	**1.3**	**2.0**	**1.69**	**1.08**	**1.23**	**1.55**	**1.04**	**1.41**	**1.24**	**0.95**	**1.21**	**1.14**
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		7.90	7.98	7.95	8.03	7.92	8.05	8.18	8.16	8.02	7.95	7.91	7.83	7.79	7.41	7.64
Electrical Conductivity	µS/cm		1250	1360	1340	1170	1290	1370	1200	1150	1320	1240	1310	1280	1180	1360	1410
Total Ammonia	mg/L		<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	0.03	<0.02	0.02	<0.02
Total Dissolved Solids	mg/L	500 AO	**722**	**758**	**766**	**702**	**744**	**780**	**694**	**734**	**716**	**744**	**760**	**916**	**706**	**692**	**748**
Total Kjeldahl Nitrogen (TKN)	mg/L		1.29	1.69	1.71	1.3	2.0	1.69	1.08	1.23	1.55	1.06	1.41	1.27	0.95	1.23	1.14
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
Metals																	
Aluminum	mg/L	0.1 OG	<0.004	<0.004	<0.004	0.010	**0.475**	0.006	0.006	0.004	0.007	0.004	<0.004	0.005	<0.004	0.004	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	0.039	0.044	0.049	0.038	0.052	0.052	0.037	0.044	0.045	0.037	0.044	0.049	0.035	0.043	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	<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 [5]	0.138	0.181	0.240	0.147	0.220	0.249	0.139	0.225	0.276	0.139	0.269	0.272	0.160	0.267	0.297
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		133	180	151	155	159	170	152	156	160	164	171	178	162	168	164
Chromium	mg/L	0.05 MAC	0.004	<0.003	<0.003	0.005	<0.003	<0.003	0.004	<0.003	<0.003	0.005	<0.003	<0.003	0.006	<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	0.006	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	0.131	**0.387**	0.042	0.260	**0.826**	0.179	0.293	**0.432**	0.222	**1.57**	0.141	0.168	0.059	0.179	0.119
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		32.6	36.5	34.3	31.6	31.9	33.3	31.6	34.0	32.4	33.6	35.2	36.6	32.6	35.5	33.3
Manganese	mg/L	0.05 AO	0.046	0.041	0.034	0.047	**0.068**	**0.054**	0.050	0.047	**0.055**	**0.081**	**0.077**	**0.074**	0.045	**0.062**	**0.058**
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		0.008	0.01	0.014	0.006	0.009	0.009	0.007	0.009	0.006	0.009	0.008	0.009	0.008	0.008	0.009
Potassium	mg/L		2.92	3.85	4.62	2.83	4.13	4.27	2.54	3.35	3.64	2.50	3.43	3.84	2.67	3.74	3.47
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		4.16	3.70	4.53	3.42	5.66	4.54	4.02	4.47	4.27	2.68	4.95	4.81	4.65	3.03	4.20
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	73.3	73.9	73.7	66.8	68.9	71.4	62.6	63.5	60	60.4	63.9	68.5	61.7	64.9	63.9
Strontium	mg/L		0.468	0.505	0.539	0.467	0.495	0.586	0.458	0.517	0.547	0.434	0.52	0.515	0.444	0.494	0.516
Sulphur	mg/L		41.5	40.9	42.8	38.1	38.7	44.8	41.0	42.0	42.1	42.6	42.1	45.3	37.3	39.1	37.4
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	0.003	0.002	0.011	0.002	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	<0.005	0.007	<0.005	0.008	0.008	<0.005	<0.005	0.007	<0.005	0.009	0.007	0.006	<0.005	0.006	0.006

Notes:
(1) MECP Ontario Drinking Water Standards.
(2) Operational Guideline (OG) within ODWS.
(3) Aesthetic Objective (AO) within ODWS.
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(5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.
(6) ODWS exceedances indicated by **bold** entries.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-13-I

Parameters	Units	ODWS [1]	2010			2011			2012			2013			2014		
General Chemistry			**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**May**	**July**	**Sep**	**June**	**July**	**Sep**
Alkalinity	mg/L	30-500 OG [2]	379	385	384	368	372	376	380	370	390	375	397	445	363	364	363
Chloride	mg/L	250 AO [3]	4.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	4.11	3.17	3.27	3.49	3.49	3.69
Dissolved Organic Carbon	mg/L	5 AO	1.2	1.1	1.5	1.1	1.2	1.2	1.5	1.2	1.1	1.2	1.3	1.4	3.3	1.5	1.3
Fluoride	mg/L	1.5 MAC [4]	0.2	0.2	0.2	0.2	0.22	0.2	0.23	0.27	0.22	<0.25	<0.25	<0.25	<0.10	<0.25	<0.25
Sulphate	mg/L	500 AO	93	76	83	97	100	88	99	93	85	96.3	95.9	99.4	101	113	102
Hardness	mg/L	80-100 OG	**450**	**500**	**460**	**460**	**460**	**480**	**510**	**490**	**470**	**465**	**462**	**474**	**474**	**487**	**445**
Nitrate	mg/L	10 MAC	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.25	<0.25	<0.25	<0.10	<0.25	<0.25
Nitrite	mg/L	1 MAC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.25	<0.25	<0.25	<0.10	<0.25	<0.25
Organic Nitrogen	mg/L	0.15 OG	0.075	**0.175**	**0.175**	**0.18**		0.08	**0.235**	**0.433**	**0.295**	**0.70**	**0.21**	<0.10	**0.68**	<0.10	0.13
Orthophosphate	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.50	<0.50	<0.50	<0.20	<0.50	<0.50
pH	pH Units											8.03	7.37	7.22	8.02	8.05	7.8
Electrical Conductivity	µS/cm											867	832	867	814	880	878
Total Ammonia	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.067	<0.05	<0.02	<0.02	<0.02	0.06	0.42	0.03
Total Dissolved Solids	mg/L	500 AO	500	**502**	495	499	**504**	**501**	**519**	**506**	**502**	492	**540**	**518**	**508**	**558**	**510**
Total Kjeldahl Nitrogen (TKN)	mg/L		0.1	0.2	0.2	0.2	<0.5	0.1	0.26	0.5	0.32	0.70	0.21	<0.10	0.74	0.47	0.16
Total Phosphorus	mg/L		<0.02									<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals																	
Aluminum	mg/L	0.1 OG	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.004	0.031	<0.004	0.005	<0.004	<0.004
Arsenic	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.039	0.041	0.039	0.04	0.038	0.042	0.038	0.039	0.041	0.040	0.037	0.039	0.04	0.038	0.035
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC [5]	0.095	0.12	0.1	0.097	0.1	0.11	0.12	0.11	0.12	0.123	0.112	0.097	0.114	0.099	0.114
Cadmium	mg/L	0.005 MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		120	130	120	120	120	120	120	120	120	121	120	124	121	126	115
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	0.002	<0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.012	<0.010	<0.010	<0.010	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Magnesium	mg/L		39	44	41	38	38	44	48	43	40	39.5	39.5	39.9	41.7	41.9	38.4
Manganese	mg/L	0.05 AO	<0.002	0.005	<0.002	<0.002	0.007	<0.002	0.0089	0.0056	<0.002	0.009	0.004	<0.002	0.003	<0.002	<0.002
Molybdenum	mg/L		<0.001	<0.001	<0.001	<0.001	0.0008	0.0008	0.00064	0.00091	0.00078	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel	mg/L		<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	0.0016	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		5.30	5.60	5.50	5.3	5.6	5.8	6	6	5.7	5.82	5.56	5.51	5.96	6.09	5.63
Selenium	mg/L	0.05 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L											5.10	4.53	5.16	5.43	4.53	4.57
Silver	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	2.2	2.6	2.5	2.2	2.2	2.3	2.6	2.6	2.4	2.82	2.26	2.45	2.74	2.58	2.53
Strontium	mg/L		0.59	0.58	0.56	0.59	0.66	0.65	0.71	0.66	0.61	0.675	0.557	0.676	0.657	0.625	0.526
Sulphur	mg/L											31.9	32.7	31.9	29.7	38.0	33.5
Thallium	mg/L		<0.00005	<0.00005	0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	mg/L		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium	mg/L		<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	<0.002
Uranium	mg/L	0.02 MAC	0.0005	0.0003	0.0006	0.0005	0.0005	0.0005	0.00054	0.00057	0.00047	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	<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	0.007	<0.005	0.008	0.008	<0.005	0.079	0.006	0.008	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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-13-I

Parameters	Units	ODWS [1]	2015			2016			2017			2018			2019		
General Chemistry			**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	328	374	360	393	386	**Insufficient**	387	323	379	365	363	330	386	332	345
Chloride	mg/L	250 AO [3]	3.35	3.28	3.29	3.67	4.34	**volume**	2.72	2.52	3.36	2.85	2.85	2.83	3.06	3.24	2.30
Dissolved Organic Carbon	mg/L	5 AO	1.9	2.0	1.5	1.4	3.2	**to sample**	1.1	1.9	2.0	1.7	2.4	2.0	1.6	2.0	1.6
Fluoride	mg/L	1.5 MAC [4]	<0.25	<0.25	<0.25	<0.25	<0.25		<0.25	<0.25	<0.10	<0.25	0.27	<0.25	<0.25	<0.25	<0.25
Sulphate	mg/L	500 AO	96.9	104	107	125	108		115	102	111	107	98.6	107	93.6	92.7	111
Hardness	mg/L	80-100 OG	**396**	**470**	**440**	**480**	**456**		**452**	**445**	**508**	**414**	**454**	**459**	**432**	**452**	**447**
Nitrate	mg/L	10 MAC	<0.25	<0.25	<0.25	<0.25	<0.25		<0.25	<0.25	0.13	<0.25	0.13	0.26	<0.25	0.38	<0.25
Nitrite	mg/L	1 MAC	<0.25	<0.25	<0.25	<0.25	<0.25		<0.25	<0.25	<0.10	<0.25	<0.05	<0.25	<0.25	<0.25	<0.25
Organic Nitrogen	mg/L	0.15 OG	**0.39**	**0.39**	0.14	0.15	**0.72**		<0.10	<0.10	**0.52**	**0.31**	**0.20**	<0.10	<0.10	**0.30**	**0.16**
Orthophosphate	mg/L		<0.50	<0.50	<0.50	<0.50	<0.50		<0.50	<0.50	<0.20	<0.50	<0.10	<0.50	<0.50	<0.50	<0.50
pH	pH Units		7.99	8.05	7.93	7.97	7.92		8.17	8.06	8.02	7.87	7.92	7.79	7.76	7.82	7.72
Electrical Conductivity	µS/cm		805	885	859	833	902		845	748	880	772	853	822	814	852	919
Total Ammonia	mg/L		<0.02	<0.02	<0.02	<0.02	0.06		<0.02	<0.02	0.06	<0.02	<0.02	0.04	<0.02	<0.02	<0.02
Total Dissolved Solids	mg/L	500 AO	488	498	498	494	**538**		498	**514**	486	472	436	**582**	392	436	**512**
Total Kjeldahl Nitrogen (TKN)	mg/L		0.39	0.39	0.14	0.15	0.78		<0.10	<0.10	0.58	0.31	0.20	0.10	<0.10	0.30	0.16
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
Metals																	
Aluminum	mg/L	0.1 OG	0.004	<0.004	<0.004	0.009	<0.004		0.008	0.004	0.006	0.007	<0.004	<0.004	<0.004	0.006	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
Barium	mg/L	1 MAC	0.039	0.039	0.040	0.041	0.040		0.043	0.039	0.039	0.037	0.037	0.044	0.040	0.035	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
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 [5]	0.107	0.108	0.104	0.135	0.103		0.114	0.111	0.13	0.123	0.119	0.116	0.118	0.126	0.122
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		96.1	121	111	124	119		116	113	132	101	118	119	110	116	117
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	0.016		<0.003	<0.003	<0.003	0.071	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.010	0.197	<0.010	0.139	<0.010		<0.010	0.014	0.053	<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	0.004	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		38.0	40.7	39.6	41.3	38.5		39.5	39.5	43.4	39.2	38.8	39.3	38.2	39.5	37.7
Manganese	mg/L	0.05 AO	<0.002	0.012	<0.002	0.018	0.002		0.005	0.003	0.009	0.009	<0.002	<0.002	0.007	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	0.006	<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		5.49	5.70	5.77	5.98	6.25		5.65	5.5	6.08	5.34	5.74	5.77	5.47	5.75	5.81
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		5.08	4.54	4.85	4.76	4.45		5.11	5.01	4.69	3.64	5.52	5.27	5.41	3.84	4.61
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
Sodium	mg/L	200 AO	2.66	2.58	2.49	2.62	2.77		2.36	2.39	3.03	2.51	2.55	2.69	2.50	2.52	2.50
Strontium	mg/L		0.574	0.657	0.6	0.633	0.609		0.627	0.652	0.64	0.575	0.638	0.638	0.614	0.645	0.631
Sulphur	mg/L		34.7	35.1	37.4	32.5	33.2		35.2	35.0	33.2	33.0	32.7	38.5	34.6	33.2	36.4
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
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	0.003	<0.002	0.003		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
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	0.007	0.007	<0.005	0.011	0.008		<0.005	0.007	<0.005	0.086	<0.005	0.007	<0.005	0.007	0.007

Notes:
(1) MECP Ontario Drinking Water Standards.
(2) Operational Guideline (OG) within ODWS.
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(5) Interim Maximum Acceptable Concentration (IMAC) within ODWS.
(6) ODWS exceedances indicated by **bold** entries.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-16-I

Parameters	Units	ODWS [1]	2010			2011			2012			2013			2014		
General Chemistry			**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**May**	**July**	**Sep**	**June**	**July**	**Sep**
Alkalinity	mg/L	30-500 OG [2]	384	310	304	299	307	312	310	320	310	280	293	354	285	276	278
Chloride	mg/L	250 AO [3]	7.0	9.0	6.0	8.0	7.0	9.0	5.0	7.0	6.0	7.86	5.86	5.38	7.64	6.85	5.97
Dissolved Organic Carbon	mg/L	5 AO	**9.2**	**8.6**	**9.8**	**8.7**	**9.1**	**8.9**	**9.2**	**9.8**	**9.3**	**8.8**	**8.7**	**9.7**	**7.6**	**9.4**	**9.4**
Fluoride	mg/L	1.5 MAC [4]	1.5	**1.6**	**1.7**	**1.7**	**1.78**	**1.7**	**1.75**	**1.74**	**1.71**	1.46	1.48	**1.73**	**1.54**	**1.54**	**1.64**
Sulphate	mg/L	500 AO	4.0	5.0	<1	3.0	2.0	<1	<1	2.0	2.0	3.93	2.29	1.99	4.26	4.0	2.4
Hardness	mg/L	80-100 OG	**78**	**78**	82	**75**	**77**	82	82	80	80	**75**	**78**	82	**79**	82	82.3
Nitrate	mg/L	10 MAC	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.05	<0.10	0.05	<0.10	<0.05
Nitrite	mg/L	1 MAC	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.028	<0.01	<0.10	<0.05	<0.10	<0.05	<0.10	<0.05
Organic Nitrogen	mg/L	0.15 OG	**0.8**	**1.4**	**0.9**	**1.04**	**1.7**	**0.7**	**2.6**	**1.8**	**1.8**	**1.27**	**0.16**	**0.92**	**1.47**	**0.49**	**1.04**
Orthophosphate	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.026	<0.01	<0.01	<0.20	<0.10	<0.20	<0.10	<0.20	<0.10
pH	pH Units											8.35	8.02	7.54	8.49	8.45	8.16
Electrical Conductivity	µS/cm											587	569	599	549	592	543
Total Ammonia	mg/L		1.2	1.20	1.20	0.96	1.3	1.1	1.6	1.6	1.4	1.20	1.22	0.78	1.1	1.16	1.56
Total Dissolved Solids	mg/L	500 AO	402	359	356	340	356	364	351	357	356	408	420	380	378	492	404
Total Kjeldahl Nitrogen (TKN)	mg/L		2.0	2.6	2.1	2.0	3.0	1.8	4.2	3.4	3.2	2.47	1.38	1.7	2.57	1.65	2.6
Total Phosphorus	mg/L		0.39									0.07	<0.05	0.06	0.07	0.07	<0.05
Metals																	
Aluminum	mg/L	0.1 OG	<0.005	<0.005	<0.005	<0.005	<0.005	0.014	0.0088	<0.005	0.006	0.005	0.009	0.005	0.011	0.01	0.004
Arsenic	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.028	0.031	0.031	0.032	0.029	0.035	0.033	0.039	0.033	0.017	0.035	0.031	0.031	0.031	0.033
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L		<0.001	<0.001				<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC [5]	0.45	0.45	0.46	0.45	0.46	0.48	0.45	0.46	0.47	0.481	0.460	0.474	0.428	0.445	0.44
Cadmium	mg/L	0.005 MAC	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		12	12	12	12	12	13	13	13	13	12.1	13.4	14.1	13.1	13.1	14
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	0.24	0.23	**0.31**	**0.33**	0.26	0.27	**0.33**	0.26	0.26	0.085	0.036	0.171	0.204	0.281	0.226
Lead	mg/L	0.01 MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Magnesium	mg/L		11	12	12	11	12	12	12	12	12	10.9	10.7	11.3	11.2	11.9	11.5
Manganese	mg/L	0.05 AO	0.014	0.013	0.013	0.018	0.014	0.016	0.014	0.017	0.017	0.013	0.016	0.023	0.018	0.015	0.017
Molybdenum	mg/L		0.013	0.011	0.01	0.015	0.012	0.014	0.0085	0.0098	0.012	0.017	0.013	0.011	0.016	0.013	0.009
Nickel	mg/L		<0.001	<0.001	<0.001	<0.001	0.014	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		4.70	4.50	4.70	4.3	4.4	4.6	4.7	4.5	4.4	4.50	4.09	4.16	4.41	4.77	4.42
Selenium	mg/L	0.05 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L											7.00	6.77	7.83	7.62	6.86	6.86
Silver	mg/L		<0.0001	<0.0001	0.0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	110	110	120	110	120	120	110	110	110	100	95.6	105	108	109	106
Strontium	mg/L		0.47	0.48	0.51	0.47	0.48	0.47	0.53	0.55	0.51	0.482	0.493	0.562	0.53	0.497	0.499
Sulphur	mg/L											1.77	1.00	1.23	1.8	2.0	2.79
Thallium	mg/L		<0.00005	<0.00005	0.00009	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	mg/L		<0.001	<0.001				<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium	mg/L		<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	<0.002
Uranium	mg/L	0.02 MAC	<0.0001	<0.0001	0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/L		<0.001	<0.001	<0.001	<0.001	0.0017	0.0008	0.00061	0.00076	0.00091	<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	0.0077	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-16-I

Parameters	Units	ODWS [1]	2015			2016			2017			2018			2019		
General Chemistry			**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	310	290	304	327	323	315	336	327	326	375	298	329	338	317	308
Chloride	mg/L	250 AO [3]	6.69	5.90	5.33	7.89	5.72	5.82	6.49	5.03	4.45	6.45	5.28	5.02	4.97	5.06	4.12
Dissolved Organic Carbon	mg/L	5 AO	**8.9**	**9.4**	**8.8**	**9.4**	**10.7**	**8.4**	**9.3**	**11.0**	**14.4**	**10.0**	**13.1**	**11.4**	**12.1**	**11.3**	**8.0**
Fluoride	mg/L	1.5 MAC [4]	**1.65**	**1.62**	**1.93**	0.41	**1.98**	**1.66**	1.22	**1.64**	**1.56**	1.47	**1.70**	1.50	1.49	**1.65**	1.38
Sulphate	mg/L	500 AO	3.55	2.70	1.82	5.2	1.60	2.64	4.09	1.82	1.64	3.06	2.36	2.43	2.60	1.51	1.07
Hardness	mg/L	80-100 OG	81.7	84.1	**102**	81.9	**78.8**	**77.9**	**77.0**	**76.6**	**78.7**	**187**	**77.8**	80.9	82.8	80.7	81.3
Nitrate	mg/L	10 MAC	<0.05	<0.10	<0.25	<0.25	<0.05	<0.25	<0.10	<0.05	<0.10	<0.05	<0.05	<0.10	<0.05	0.11	<0.10
Nitrite	mg/L	1 MAC	<0.05	<0.10	<0.25	<0.25	<0.05	<0.25	<0.10	<0.05	<0.10	<0.05	<0.05	<0.10	<0.05	<0.10	<0.10
Organic Nitrogen	mg/L	0.15 OG	**0.71**	**0.78**	**0.80**	**0.75**	**1.39**	**0.68**	**1.0**	**0.46**	**2.96**	**0.48**	**2.68**	**1.04**	**1.31**	**1.13**	**1.04**
Orthophosphate	mg/L		<0.10	<0.20	<0.50	<0.50	<0.10	<0.50	<0.20	<0.10	<0.20	<0.10	<0.10	<0.20	<0.10	<0.20	<0.20
pH	pH Units		8.26	8.19	8.12	8.12	8.32	8.28	8.22	8.39	8.21	8.05	8.11	7.93	7.89	7.93	7.81
Electrical Conductivity	µS/cm		600	570	592	573	606	616	585	590	606	598	587	577	568	627	649
Total Ammonia	mg/L		1.15	1.34	0.83	0.92	0.75	1.10	0.91	1.33	1.0	1.36	0.54	0.91	0.46	0.65	0.70
Total Dissolved Solids	mg/L	500 AO	400	388	364	386	410	380	400	392	368	444	362	346	426	372	362
Total Kjeldahl Nitrogen (TKN)	mg/L		1.86	2.12	1.63	1.67	2.14	1.78	1.91	1.79	3.96	1.84	3.22	1.95	1.77	1.78	1.74
Total Phosphorus	mg/L		<0.05	0.05	<0.05	0.08	0.07	0.06	<0.05	0.05	0.07	0.06	<0.05	0.08	<0.05	<0.05	<0.05
Metals																	
Aluminum	mg/L	0.1 OG	0.007	0.009	0.006	0.016	**0.334**	0.014	0.016	0.005	0.034	0.014	0.007	0.015	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	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.037	0.034	0.037	0.033	0.041	0.037	0.034	0.031	0.058	0.040	0.049	0.037	0.051	0.031	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	<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 [5]	0.413	0.434	0.418	0.494	0.460	0.443	0.444	0.408	0.488	0.485	0.454	0.484	0.492	0.487	0.476
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		13.6	13.9	18.1	13.5	13.1	12.9	12.7	12.2	12.9	30.5	12.7	13.1	13.7	13.2	13.6
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<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	0.157	0.149	0.090	0.235	**0.554**	0.245	0.212	0.202	0.081	0.179	0.044	**0.404**	<0.010	<0.010	0.190
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		11.6	12.0	13.7	11.7	11.2	11.1	11.0	11.2	11.3	26.8	11.2	11.7	11.8	11.6	11.5
Manganese	mg/L	0.05 AO	0.021	0.022	0.018	0.017	0.030	0.017	0.017	0.016	0.013	0.015	0.016	0.017	0.014	0.016	0.016
Molybdenum	mg/L		0.013	0.01	0.008	0.014	0.010	0.011	0.013	0.009	0.009	0.012	0.011	0.008	0.008	0.007	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		4.44	4.52	5.94	4.74	4.90	4.62	4.53	4.2	4.09	7.14	4.08	4.55	4.49	4.05	4.21
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		7.41	6.25	6.96	7.26	8.92	7.47	7.56	7.67	7.27	5.19	8.43	7.60	7.91	7.16	7.43
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	106	109	117	112	108	107	99.3	90.7	62.3	97.8	103	98.9	99.2	103
Strontium	mg/L		0.491	0.553	0.507	0.514	0.539	0.578	0.55	0.55	0.546	0.445	0.551	0.50	0.545	0.590	0.581
Sulphur	mg/L		1.8	1.33	1.39	1.88	0.82	1.59	1.82	1.03	1.36	1.03	1.48	1.62	1.06	1.27	1.37
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	0.014	<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	<0.005	<0.005	0.005	<0.005	0.009	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-16-II

Parameters	Units	ODWS [1]	2010			2011			2012			2013			2014		
General Chemistry			**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**May**	**July**	**Sep**	**June**	**July**	**Sep**
Alkalinity	mg/L	30-500 OG [2]	171	174	176	169	177	178	180	180	190	173	191	207	173	169	169
Chloride	mg/L	250 AO [3]	6.0	6.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	5.32	4.49	4.86	5.24	5.51	6.14
Dissolved Organic Carbon	mg/L	5 AO	1.1	1.1	1.4	1.0	1.1	1.2	1.2	1.1	1.2	1.3	1.2	1.7	1.6	1.1	1.3
Fluoride	mg/L	1.5 MAC [4]	0.8	0.8	0.8	0.8	0.84	0.8	0.86	0.88	0.84	0.59	0.73	0.83	0.77	<0.25	0.9
Sulphate	mg/L	500 AO	130	120	150	140	150	150	140	120	140	135	121	120	119	114	108
Hardness	mg/L	80-100 OG	**160**	**140**	**170**	**160**	**170**	**180**	**160**	**140**	**180**	**149**	**142**	**146**	**139**	**143**	**129**
Nitrate	mg/L	10 MAC	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	0.05	<0.10	0.06	<0.25	<0.10
Nitrite	mg/L	1 MAC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.10	<0.05	<0.10	<0.05	<0.25	<0.10
Organic Nitrogen	mg/L	0.15 OG	0.075	**0.275**	**0.675**	**0.88**	**0.18**	0.08	**0.155**		**0.215**	**0.67**	0.10	<0.10	**0.3**	<0.10	**0.19**
Orthophosphate	mg/L		<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.20	<0.10	<0.20	<0.10	<0.50	<0.20
pH	pH Units											7.95	7.72	7.36	8.35	8.22	8.21
Electrical Conductivity	µS/cm											646	600	612	588	592	588
Total Ammonia	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.02	0.09	0.04	0.02
Total Dissolved Solids	mg/L	500 AO	385	370	414	391	409	421	397	372	409	350	350	362	332	340	332
Total Kjeldahl Nitrogen (TKN)	mg/L		0.1	0.3	0.7	0.9	0.2	0.1	0.18	<0.1	0.24	0.67	0.10	<0.10	0.39	<0.10	0.21
Total Phosphorus	mg/L		0.02									<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals																	
Aluminum	mg/L	0.1 OG	0.008	0.007	0.008	0.009	0.018	0.008	<0.005	0.011	0.0055	0.008	0.010	0.006	0.017	0.005	0.005
Arsenic	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.023	0.025	0.028	0.029	0.031	0.031	0.027	0.029	0.033	0.027	0.026	0.027	0.026	0.026	0.026
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L		<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC [5]	0.19	0.22	0.2	0.20	0.21	0.23	0.2	0.21	0.24	0.225	0.204	0.183	0.173	0.184	0.192
Cadmium	mg/L	0.005 MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		31	27	33	31	33	34	32	28	34	29.2	27.9	28.8	26.9	27.8	25.0
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.001	<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00093	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Magnesium	mg/L		20	18	21	20	21	22	20	18	22	18.5	17.5	17.9	17.5	17.9	16.1
Manganese	mg/L	0.05 AO	<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
Molybdenum	mg/L		0.044	0.041	0.038	0.041	0.037	0.035	0.038	0.033	0.033	0.039	0.036	0.03	0.031	0.034	0.031
Nickel	mg/L		<0.001	0.001	0.004	<0.001	<0.001	<0.001	<0.001	<0.001	0.0014	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		8.60	8.20	8.80	8.1	9.2	9.4	8.6	8.0	9.3	7.87	7.82	8.33	7.88	8.12	8.08
Selenium	mg/L	0.05 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L											3.17	3.18	3.62	3.03	3.1	3.17
Silver	mg/L		<0.0001	<0.0001	0.0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	76	74	78	74	79	83	76	73	81	68.8	66.9	71.3	71.3	71.2	71.3
Strontium	mg/L		0.64	0.61	0.68	0.68	0.69	0.69	0.66	0.64	0.72	0.617	0.577	0.633	0.565	0.55	0.517
Sulphur	mg/L											45.9	42.4	43.8	35.4	39.8	41
Thallium	mg/L		<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	mg/L		<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium	mg/L		<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	<0.002
Uranium	mg/L	0.02 MAC	0.0028	0.0026	0.003	0.0028	0.0026	0.0026	0.0028	0.0025	0.0027	0.002	0.002	0.002	0.003	0.003	0.002
Vanadium	mg/L		<0.001	0.002	0.001	<0.001	0.0013	0.0012	0.00092	0.0016	0.0014	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc	mg/L	5 AO	<0.005	<0.005	0.017	<0.005	<0.005	<0.005	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-16-II

Parameters	Units	ODWS [1]	2015			2016			2017			2018			2019		
General Chemistry			**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	167	171	165	176	172	184	176	178	171	185	159	154	171	157	168
Chloride	mg/L	250 AO [3]	4.74	4.81	5.40	5.26	5.23	5.18	4.03	4.58	4.4	4.37	4.06	3.99	4.18	3.66	3.99
Dissolved Organic Carbon	mg/L	5 AO	1.4	2.4	1.7	1.4	1.8	1.1	1.4	1.7	1.9	1.5	1.9	1.9	1.6	1.3	1.4
Fluoride	mg/L	1.5 MAC [4]	0.86	0.78	1.07	0.52	0.94	0.74	0.64	0.86	0.87	0.74	0.93	0.91	0.80	0.90	0.91
Sulphate	mg/L	500 AO	108	117	118	114	112	101	95.5	94.8	91.7	95.0	94.8	92.2	89.5	90.3	88.4
Hardness	mg/L	80-100 OG	**129**	**138**	**139**	**133**	**129**	**120**	**115**	**114**	**108**	**114**	**114**	**117**	**137**	**107**	**110**
Nitrate	mg/L	10 MAC	0.06	0.15	0.28	<0.10	0.15	<0.25	<0.10	0.10	0.06	0.09	0.10	0.12	0.11	0.05	0.30
Nitrite	mg/L	1 MAC	<0.05	<0.10	<0.05	<0.10	<0.05	<0.25	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Organic Nitrogen	mg/L	0.15 OG	**0.23**	**0.38**	<0.10	<0.10	**0.17**	<0.10	<0.10	<0.10	**0.20**	**0.18**	<0.10	<0.10	<0.10	<0.10	0.10
Orthophosphate	mg/L		<0.10	<0.20	<0.10	<0.20	<0.10	<0.50	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
pH	pH Units		8.3	8.06	7.94	7.99	8.09	8.33	8.07	8.10	8.09	7.75	7.88	7.71	7.75	8.02	7.59
Electrical Conductivity	µS/cm		576	603	596	547	577	581	530	542	548	534	527	524	506	546	578
Total Ammonia	mg/L		<0.02	0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.06	0.04	0.06	<0.02	0.04	0.06
Total Dissolved Solids	mg/L	500 AO	308	332	326	320	298	312	288	302	282	284	302	344	288	272	308
Total Kjeldahl Nitrogen (TKN)	mg/L		0.23	0.4	<0.10	<0.10	0.17	<0.10	<0.10	<0.10	0.20	0.24	<0.10	<0.10	<0.10	0.13	0.16
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
Metals																	
Aluminum	mg/L	0.1 OG	0.008	0.024	0.006	0.012	**0.112**	0.013	0.010	0.007	0.010	0.009	0.007	0.009	0.008	0.014	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	0.026	0.026	0.030	0.030	0.032	0.035	0.031	0.030	0.031	0.031	0.029	0.034	0.032	0.028	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	<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 [5]	0.163	0.178	0.211	0.208	0.208	0.209	0.186	0.183	0.238	0.212	0.194	0.222	0.217	0.215	0.216
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		24.8	27.1	26.8	25.4	25.2	23.8	22.0	21.7	21.1	21.9	22.1	22.6	26.4	20.5	21.3
Chromium	mg/L	0.05 MAC	<0.003	0.015	<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	0.005	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.010	<0.010	<0.010	<0.010	0.031	<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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		16.2	17.2	17.4	16.9	16.1	14.8	14.7	14.5	13.4	14.4	14.4	14.7	17.2	13.5	13.8
Manganese	mg/L	0.05 AO	<0.002	0.003	<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
Molybdenum	mg/L		0.028	0.027	0.028	0.030	0.029	0.030	0.029	0.030	0.029	0.026	0.024	0.025	0.027	0.026	0.027
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		7.58	7.80	8.34	7.61	8.27	8.12	7.35	7.2	6.62	6.40	6.72	7.47	8.03	6.69	7.57
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		3.04	2.53	3.39	2.90	3.70	3.24	3.03	3.33	3.31	2.65	3.55	3.30	3.65	2.23	3.22
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	69.7	68.5	70.0	73.0	69.2	69.6	66.7	62.9	59.7	60.3	61.9	66.3	73.0	63.3	65.1
Strontium	mg/L		0.495	0.593	0.602	0.541	0.536	0.578	0.528	0.522	0.508	0.475	0.487	0.504	0.507	0.482	0.514
Sulphur	mg/L		40	40.2	42.3	35.0	32.4	31.7	32.5	31.4	29.6	30.7	29.3	32.6	30.8	29.3	28.7
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	<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	0.003	<0.002	0.008	<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	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.002	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	0.008	0.007	<0.005	<0.005	<0.005	<0.005	0.005	0.006	<0.005	0.007	<0.005	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-16-III

Parameters	Units	ODWS [1]	2010			2011			2012			2013			2014		
General Chemistry			**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**May**	**July**	**Sep**	**June**	**July**	**Sep**
Alkalinity	mg/L	30-500 OG [2]	328	387	295	307	**515**	391	440	**630**	470	397	**514**	418	344	406	454
Chloride	mg/L	250 AO [3]	2.0	1.0	<1	1.0	2.0	1.0	2.0	2.0	<1	1.98	2.11	1.18	2.31	2.33	3.14
Dissolved Organic Carbon	mg/L	5 AO	1.2	1.6	3	1.5	2.8	2.5	**8.4**	3.0	**18**	**25.6**	**27.2**	4.3	2.6	2.2	2.6
Fluoride	mg/L	1.5 MAC [4]	0.4	0.6	0.2	0.4	0.61	0.4	0.54	0.51	0.38	<0.10	<0.25	<0.10	0.12	<0.25	0.31
Sulphate	mg/L	500 AO	13	66	8	8	26	55	17	33	19	1.61	0.91	2.12	5.92	7.34	4.24
Hardness	mg/L	80-100 OG	**330**	**460**	**300**	**300**	**470**	**270**	**370**	**540**	**420**	**406**	**470**	**357**	**312**	**405**	**400**
Nitrate	mg/L	10 MAC	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.10	<0.25	<0.10	<0.05	<0.25	<0.25
Nitrite	mg/L	1 MAC	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.10	<0.25	<0.10	<0.05	<0.25	<0.25
Organic Nitrogen	mg/L	0.15 OG	**0.375**	**0.275**	**0.275**	**0.28**	**4.83**	**0.48**	**2.17**	**0.73**	**0.615**	**0.97**	**0.42**	<0.10	**0.46**	<0.10	**0.47**
Orthophosphate	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.20	<0.50	<0.20	<0.10	<0.50	<0.50
pH	pH Units											7.90	7.31	7.22	8.1	7.84	7.63
Electrical Conductivity	µS/cm											773	879	682	633	770	865
Total Ammonia	mg/L		<0.05	<0.05	<0.05	<0.05	0.17	<0.05	0.23	0.37	<0.05	<0.02	<0.02	<0.02	0.09	0.15	0.15
Total Dissolved Solids	mg/L	500 AO	345	489	304	312	**547**	413	447	**651**	483	426	**600**	334	308	414	436
Total Kjeldahl Nitrogen (TKN)	mg/L		0.4	0.3	0.3	0.3	5	0.5	2.4	1.1	0.64	0.97	0.42	<0.10	0.55	0.23	0.62
Total Phosphorus	mg/L		0.15									<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals																	
Aluminum	mg/L	0.1 OG	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	0.008	<0.004	<0.004	<0.004	<0.004
Arsenic	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	0.0017	<0.001	0.0037	0.003	0.004	0.005	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.042	0.094	0.025	0.031	0.11	0.026	0.067	0.16	0.07	0.071	0.092	0.071	0.036	0.046	0.08
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L		<0.001	0.001				<0.001	<0.001	0.0017	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC [5]	0.017	0.049	<0.01	0.012	0.078	<0.01	0.02	0.081	0.02	0.028	0.030	0.016	0.015	0.013	0.058
Cadmium	mg/L	0.005 MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		82	98	77	78	90	69	79	98	96	106	116	97.7	83.9	108	91.1
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.001	<0.001	0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	0.18	<0.1	<0.1	<0.1	**2.0**	<0.1	**2.4**	<0.1	**1.7**	**5.20**	**6.04**	**4.43**	**1.7**	**2.72**	**1.24**
Lead	mg/L	0.01 MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Magnesium	mg/L		30	52	27	25	59	23	42	73	45	34.2	43.9	27.4	24.9	32.8	41.9
Manganese	mg/L	0.05 AO	0.011	0.01	0.008	0.008	**0.08**	0.018	**0.083**	**0.061**	**0.11**	**0.190**	**0.148**	**0.114**	**0.053**	**0.093**	**0.056**
Molybdenum	mg/L		0.007	0.012	0.002	0.004	0.0049	0.0015	0.013	0.0036	0.0037	<0.002	<0.002	<0.002	<0.002	<0.002	0.002
Nickel	mg/L		<0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.0018	0.0025	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		2.40	6.60	0.90	1.1	8.4	0.66	4.0	10.0	3.0	1.33	4.22	2.13	2.22	4.08	7.54
Selenium	mg/L	0.05 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L											6.83	8.61	9.23	5.22	6.98	7.53
Silver	mg/L		<0.0001	0.0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00027	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	7	19	5.6	4.4	30	18	21	36	25	10.2	15.4	6.77	5.01	9.81	17.4
Strontium	mg/L		0.43	1.2	0.23	0.25	1.5	0.21	0.79	1.9	0.74	0.439	0.800	0.639	0.257	0.329	1.15
Sulphur	mg/L											0.90	0.30	<0.05	<0.05	3.9	6.65
Thallium	mg/L		<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	mg/L		<0.001	<0.001				<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium	mg/L		<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	<0.002
Uranium	mg/L	0.02 MAC	0.0015	0.0042	0.0006	0.0012	0.0017	0.0011	0.0029	0.0014	0.0024	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/L		0.001	0.004	<0.001	0.001	0.0015	0.0007	<0.0005	<0.0005	0.0009	<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	<0.005	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-16-III

Parameters	Units	ODWS (1)	2015			2016			2017			2018			2019		
General Chemistry			**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG (2)	423	452	321	301	357	354	291	298	352	373	348	279	252	286	250
Chloride	mg/L	250 AO (3)	3.35	3.98	5.45	4.60	3.97	2.93	3.80	3.74	4.32	3.31	3.06	2.93	2.09	2.95	1.90
Dissolved Organic Carbon	mg/L	5 AO	1.6	2.7	2.2	1.6	2.3	1.5	1.3	2.0	2.4	1.8	2.8	2.9	3.0	3.1	3.2
Fluoride	mg/L	1.5 MAC (4)	0.34	<0.25	0.25	0.32	<0.25	<0.25	0.20	0.28	0.26	<0.05	0.45	0.17	0.16	0.40	0.19
Sulphate	mg/L	500 AO	7.59	4.54	29.9	21.7	34.0	72.7	24.8	14.3	17.5	22.4	25.8	26.3	13.0	16.5	21.4
Hardness	mg/L	80-100 OG	**364**	**424**	**345**	**293**	**348**	**387**	**270**	**302**	**309**	**346**	**355**	**316**	**251**	**291**	**255**
Nitrate	mg/L	10 MAC	<0.10	<0.25	0.31	0.32	<0.25	<0.25	<0.10	<0.05	<0.10	<0.05	<0.05	<0.10	0.29	0.13	0.05
Nitrite	mg/L	1 MAC	<0.10	<0.25	<0.05	<0.10	<0.25	<0.25	<0.10	<0.05	<0.10	<0.05	<0.05	<0.10	<0.05	<0.10	<0.05
Organic Nitrogen	mg/L	0.15 OG	**0.23**	**0.63**	**0.60**	**0.69**	0.15	**0.17**	0.10	<0.10	**0.61**	0.12	**0.16**	**0.33**	**0.22**	**0.46**	**0.16**
Orthophosphate	mg/L		<0.20	<0.50	<0.10	<0.20	<0.50	<0.50	<0.20	<0.10	<0.20	<0.10	<0.10	<0.20	<0.10	<0.20	<0.10
pH	pH Units		7.99	8.1	8.06	8.06	8.00	8.12	8.26	8.24	8.21	8.03	8.02	7.92	7.83	7.70	7.70
Electrical Conductivity	µS/cm		804	853	671	558	719	819	557	561	663	660	700	592	474	630	570
Total Ammonia	mg/L		0.41	0.68	0.1	0.16	0.34	0.28	0.02	0.12	0.19	0.03	0.10	0.02	0.14	0.33	0.16
Total Dissolved Solids	mg/L	500 AO	408	426	356	314	378	430	296	328	320	338	370	362	264	294	274
Total Kjeldahl Nitrogen (TKN)	mg/L		0.64	1.31	0.7	0.85	0.49	0.45	0.12	<0.10	0.80	0.15	0.26	0.35	0.36	0.79	0.32
Total Phosphorus	mg/L		0.12	0.14	<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
Metals																	
Aluminum	mg/L	0.1 OG	<0.004	0.005	<0.004	0.022	**0.294**	0.014	0.013	<0.004	0.006	0.006	0.004	0.011	<0.004	<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	0.063	0.068	0.037	0.038	0.068	0.068	0.035	0.032	0.049	0.046	0.054	0.045	0.046	0.072	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 (5)	0.015	0.025	0.013	0.016	0.022	0.032	<0.010	0.014	0.043	0.017	0.039	0.021	<0.010	0.038	0.023
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		87.7	105	94.5	78.7	90.6	100	73.3	82.6	82.4	92.8	87.5	87.5	71.6	75.6	73.9
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	**0.684**	**0.804**	0.159	**0.455**	**0.733**	**2.85**	**0.828**	**0.657**	**0.584**	0.227	**1.33**	**0.39**	<0.010	**0.827**	<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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		35.3	39.2	26.4	23.5	29.6	33.3	21.1	23.3	25.1	27.7	33.2	23.8	17.6	24.8	17.0
Manganese	mg/L	0.05 AO	0.049	**0.069**	0.025	**0.068**	**0.085**	**0.082**	**0.072**	**0.075**	**0.065**	0.048	**0.064**	**0.073**	**0.136**	**0.440**	0.047
Molybdenum	mg/L		<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	0.003	<0.002
Nickel	mg/L		<0.003	<0.003	0.004	<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		7.43	9.65	2.77	2.43	5.51	6.06	1.77	2.08	3.29	1.99	4.58	2.49	2.33	4.26	1.99
Selenium	mg/L	0.05 MAC	**0.065**	0.005	<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		6.01	6.19	5.19	5.11	8.69	6.59	4.16	5.51	5.90	3.48	6.94	4.16	4.67	5.32	4.19
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	10.7	12.2	8.5	8.74	11.5	12.2	8.6	7.99	8.71	6.23	10.6	6.62	4.50	8.94	5.42
Strontium	mg/L		0.591	0.763	0.241	0.361	0.554	0.646	0.271	0.22	0.422	0.393	0.623	0.312	0.226	0.457	0.196
Sulphur	mg/L		9.93	4.58	12.6	6.22	9.95	23.0	8.89	6.51	7.03	7.79	9.79	11.3	5.99	6.45	6.91
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	0.011	<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	<0.005	0.006	0.008	<0.005	<0.005	<0.005	0.007	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-17-I

Parameters	Units	ODWS [1]	2010			2011			2012			2013			2014		
General Chemistry			**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**May**	**July**	**Sep**	**June**	**July**	**Sep**
Alkalinity	mg/L	30-500 OG [2]	237	238	238	231	237	241	250	250	250	235	250	283	235	245	231
Chloride	mg/L	250 AO [3]	1	<1	<1	<1	<1	<1	<1	<1	<1	0.77	0.80	0.81	0.69	0.78	0.83
Dissolved Organic Carbon	mg/L	5 AO	1.9	1.9	2.2	1.8	1.9	1.9	2.0	1.9	1.9	1.9	2.1	2.5	2.4	2.2	2.1
Fluoride	mg/L	1.5 MAC [4]	0.3	0.3	0.3	0.3	0.35	0.4	0.35	0.35	0.34	0.26	0.30	0.31	0.17	0.19	0.36
Sulphate	mg/L	500 AO	15	15	15	15	15	13	15	15	14	15.3	15.1	15.6	16.2	15.9	15.5
Hardness	mg/L	80-100 OG	**260**	**240**	**240**	**250**	**250**	**250**	**250**	**230**	**250**	**241**	**227**	**243**	**235**	**249**	**231**
Nitrate	mg/L	10 MAC	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.05	0.06	<0.05	<0.10	0.06
Nitrite	mg/L	1 MAC	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	<0.01	0.01	<0.10	<0.05	<0.05	<0.05	<0.10	<0.05
Organic Nitrogen	mg/L	0.15 OG		**0.275**	**0.175**	**0.93**	**0.28**	**0.18**	**0.437**	**0.295**	**0.394**	**12.6**	<0.10	<0.10	**0.39**	<0.10	**0.16**
Orthophosphate	mg/L		<0.01	0.01	<0.01	<0.01	<0.01	0.01	0.011	<0.01	<0.01	<0.20	<0.10	<0.10	<0.10	<0.20	<0.10
pH	pH Units											8.09	7.75	7.31	8.26	8.14	7.96
Electrical Conductivity	µS/cm											481	462	479	459	474	483
Total Ammonia	mg/L		<0.05	<0.05	<0.05	0.07	<0.05	<0.05	0.063	<0.05	0.066	<0.02	0.03	0.03	0.09	0.09	0.07
Total Dissolved Solids	mg/L	500 AO	279	268	266	266	269	273	282	270	279	244	264	268	258	280	254
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.5	0.3	0.2	1.0	0.3	0.2	0.5	0.32	0.46	12.6	<0.10	0.12	0.48	<0.10	0.23
Total Phosphorus	mg/L		0.53									<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals																	
Aluminum	mg/L	0.1 OG	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	0.016	<0.004	<0.004	<0.004	0.009
Arsenic	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.03	0.031	0.03	0.031	0.031	0.029	0.032	0.034	0.034	0.032	0.030	0.029	0.029	0.028	0.03
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L		<0.001	<0.001				<0.001	<0.001	0.0012	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC [5]	0.031	0.023	0.032	0.03	0.029	0.033	0.036	0.029	0.03	0.039	0.036	0.026	0.028	0.031	0.032
Cadmium	mg/L	0.005 MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		69	63	61	65	65	66	68	62	65	64.0	59.9	64.8	63.0	66.2	61.1
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.419**	<0.010	0.052	0.129	**0.415**	**0.352**
Lead	mg/L	0.01 MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00054	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Magnesium	mg/L		22	21	20	20	20	21	20	20	20	19.7	18.9	19.7	18.9	20.3	19.0
Manganese	mg/L	0.05 AO	0.035	0.033	0.031	0.032	0.031	0.038	0.031	0.032	0.03	0.027	0.014	0.013	0.023	0.024	0.038
Molybdenum	mg/L		0.002	0.002	0.002	0.002	0.0019	0.0018	0.002	0.0022	0.0022	0.002	0.002	0.002	<0.002	0.002	0.003
Nickel	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	0.003	<0.003	<0.003	<0.003
Potassium	mg/L		3.70	3.30	3.30	3.4	3.3	3.4	3.5	3.2	3.2	3.59	3.17	3.27	3.19	3.44	3.39
Selenium	mg/L	0.05 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L											8.41	8.04	7.9	8.49	8.25	8.02
Silver	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00019	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	5.1	5	5.5	5	4.9	6	5.6	5.8	5.9	4.95	4.74	4.67	4.61	5.21	4.64
Strontium	mg/L		0.51	0.49	0.47	0.5	0.49	0.47	0.5	0.49	0.49	0.453	0.444	0.499	0.455	0.472	0.438
Sulphur	mg/L											5.59	5.34	3.01	4.41	5.9	5.85
Thallium	mg/L		<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	mg/L		<0.001	<0.001				<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium	mg/L		<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	<0.002
Uranium	mg/L	0.02 MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00018	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<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	0.0058	0.006	0.005	0.006	0.006	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-17-I

Parameters	Units	ODWS [1]	2015			2016			2017			2018			2019		
General Chemistry			**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	219	235	228	253	242	230	239	222	241	259	230	220	236	224	224
Chloride	mg/L	250 AO [3]	0.85	0.82	0.69	0.82	0.72	0.73	0.97	0.28	0.90	0.88	0.76	0.62	0.76	0.78	0.70
Dissolved Organic Carbon	mg/L	5 AO	2.3	2.5	2.1	2.2	2.5	2.3	1.9	2.7	2.9	2.3	2.8	2.8	2.9	3.1	1.9
Fluoride	mg/L	1.5 MAC [4]	0.35	0.19	0.34	<0.10	0.23	0.34	0.25	0.24	0.24	0.12	0.27	0.25	0.25	0.26	0.23
Sulphate	mg/L	500 AO	14.8	16.5	16.5	20.0	16.8	15.5	15.5	14.6	15.4	16.4	16.0	15.4	15.6	16.2	16.3
Hardness	mg/L	80-100 OG	**227**	**246**	**235**	**239**	**235**	**233**	**221**	**226**	**232**	**239**	**242**	**240**	**235**	**246**	**227**
Nitrate	mg/L	10 MAC	<0.10	<0.10	<0.05	<0.10	<0.05	<0.05	0.14	0.05	0.13	<0.05	<0.05	<0.05	0.05	<0.05	<0.05
Nitrite	mg/L	1 MAC	<0.10	<0.10	<0.05	<0.10	<0.05	<0.05	<0.10	0.14	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Organic Nitrogen	mg/L	0.15 OG	<0.10	<0.10	<0.10	<0.10	0.15	0.15	<0.10	<0.10	**0.23**	0.12	0.11	**0.22**	<0.10	0.11	<0.10
Orthophosphate	mg/L		<0.20	<0.20	<0.10	<0.20	<0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
pH	pH Units		8.27	8.18	8.03	8.09	7.97	8.24	8.27	8.13	8.30	7.88	7.95	7.85	7.84	7.81	7.72
Electrical Conductivity	µS/cm		454	486	471	456	497	490	449	420	483	467	470	455	448	503	503
Total Ammonia	mg/L		<0.02	0.07	<0.02	<0.02	0.04	0.04	0.03	0.03	<0.02	0.02	0.03	<0.02	0.02	0.03	<0.02
Total Dissolved Solids	mg/L	500 AO	250	254	244	262	264	258	244	250	256	258	230	278	230	246	244
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.10	<0.10	<0.10	<0.10	0.19	0.19	<0.10	<0.10	0.23	0.14	0.14	0.22	<0.10	0.14	<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
Metals																	
Aluminum	mg/L	0.1 OG	<0.004	<0.004	<0.004	0.014	0.015	0.005	0.006	0.005	0.008	0.006	<0.004	0.009	<0.004	0.004	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	0.028	0.027	0.031	0.034	0.030	0.034	0.040	0.033	0.034	0.034	0.032	0.036	0.032	0.029	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 [5]	0.029	0.028	0.031	0.035	0.030	0.036	0.030	0.030	0.049	0.034	0.039	0.037	0.029	0.040	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		61.1	65.5	62.9	63.1	63.4	62.9	58.0	59.9	62.4	63.4	65.1	64.3	63.8	66.1	61.0
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<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	0.004	<0.003	0.014	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	**0.453**	**0.371**	0.123	0.115	0.152	0.280	0.249	**0.33**	**0.302**	0.112	**0.370**	0.084	**0.314**	<0.010	0.252
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		18.1	19.9	19.0	19.7	18.6	18.5	18.5	18.5	18.6	19.6	19.2	19.4	18.3	19.7	18.2
Manganese	mg/L	0.05 AO	0.024	0.024	0.015	0.012	0.015	0.040	0.023	0.019	0.015	0.029	0.037	0.036	0.028	0.011	0.020
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	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		3.06	3.29	3.26	3.40	3.36	3.61	3.34	3.05	3.0	3.18	3.05	3.35	3.16	3.23	3.15
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		8.04	6.63	8.43	8.56	7.54	8.44	8.02	8.98	8.49	6.37	10.1	7.56	8.71	8.11	8.48
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	4.49	4.91	4.84	4.58	4.56	4.34	4.10	3.82	3.95	3.74	3.81	4.07	3.83	3.98	3.96
Strontium	mg/L		0.404	0.499	0.484	0.483	0.451	0.508	0.485	0.479	0.479	0.441	0.474	0.528	0.453	0.477	0.461
Sulphur	mg/L		5.86	5.31	5.65	5.27	5.34	5.71	5.38	5.49	5.03	5.48	6.47	7.00	6.66	6.68	5.63
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	<0.005	<0.005	0.023	0.007	0.020	<0.005	0.027	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005

Notes:
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The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-17-II

Parameters	Units	ODWS [1]	2010			2011			2012			2013			2014		
General Chemistry			**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**May**	**July**	**Sep**	**June**	**July**	**Sep**
Alkalinity	mg/L	30-500 OG [2]	281	277	268	278	290	286	290	290	290	289	310	349	277	284	279
Chloride	mg/L	250 AO [3]	3.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.52	2.51	2.48	2.26	2.58	2.58
Dissolved Organic Carbon	mg/L	5 AO	1.2	1.3	1.6	1.2	1.2	1.3	1.4	1.6	1.2	1.3	1.5	1.7	2.0	3.0	1.5
Fluoride	mg/L	1.5 MAC [4]	1.2	1.1	1.2	1.2	1.27	1.3	1.25	1.29	1.3	1.05	1.16	1.2	1.0	0.56	0.99
Sulphate	mg/L	500 AO	84	83	85	80	79	83	76	74	72	83.1	70.7	72.7	73	69.9	68.8
Hardness	mg/L	80-100 OG	**260**	**260**	**250**	**250**	**240**	**260**	**260**	**230**	**240**	**238**	**211**	**232**	**234**	**241**	**211**
Nitrate	mg/L	10 MAC	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	<0.10	<0.05	<0.25	<0.10
Nitrite	mg/L	1 MAC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.10	<0.10	<0.10	<0.05	<0.25	<0.10
Organic Nitrogen	mg/L	0.15 OG			**0.275**	**0.48**		**0.18**		0.095	**0.692**	**7.03**	<0.10	<0.10	**0.24**	0.13	0.150
Orthophosphate	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.20	<0.20	<0.20	<0.10	<0.50	<0.20
pH	pH Units											8.23	7.90	7.54	8.36	8.27	8.15
Electrical Conductivity	µS/cm											713	695	705	649	674	676
Total Ammonia	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.078	<0.02	<0.02	<0.02	0.03	0.07	0.03
Total Dissolved Solids	mg/L	500 AO	407	403	400	396	407	418	406	391	401	354	406	388	354	390	358
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.5	<0.5	0.3	0.5	0.6	0.2	<0.1	0.12	0.77	7.03	<0.10	<0.10	0.27	0.2	0.18
Total Phosphorus	mg/L		0.13									<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals																	
Aluminum	mg/L	0.1 OG	<0.005	0.005	<0.005	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	0.006	0.008	<0.004	0.005	<0.004	<0.004
Arsenic	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.042	0.047	0.046	0.046	0.046	0.046	0.047	0.049	0.047	0.049	0.043	0.042	0.041	0.035	0.041
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L		<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC [5]	0.14	0.15	0.15	0.14	0.15	0.16	0.14	0.15	0.15	0.153	0.137	0.118	0.137	0.135	0.132
Cadmium	mg/L	0.005 MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		44	42	41	42	41	43	45	38	39	40.6	36.0	39.6	38.7	40.9	34.8
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Magnesium	mg/L		36	37	37	35	35	38	36	33	35	33.2	29.5	32.4	33.4	33.7	30.1
Manganese	mg/L	0.05 AO	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Molybdenum	mg/L		0.025	0.024	0.022	0.023	0.021	0.021	0.02	0.019	0.019	0.020	0.018	0.015	0.014	0.019	0.014
Nickel	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		5.10	5.10	5.00	4.9	4.9	5.2	5.1	4.5	4.7	4.63	4.46	4.6	4.62	5.01	4.48
Selenium	mg/L	0.05 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L											3.87	3.78	4.21	3.72	4.23	3.75
Silver	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	58	57	58	56	63	63	59	57	62	57.1	65.3	65	54.5	61.3	56.9
Strontium	mg/L		3.2	3.4	3.3	3.4	3.2	3.3	3.4	3.3	3.3	3.34	3.04	3.47	3.1	3.2	3.07
Sulphur	mg/L											27.7	24.1	25.4	21.6	24.6	25.5
Thallium	mg/L		<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	mg/L		<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium	mg/L		<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	<0.002
Uranium	mg/L	0.02 MAC	0.0035	0.0037	0.0035	0.0038	0.0037	0.0038	0.0038	0.0036	0.0039	0.004	0.004	0.004	0.003	0.004	0.003
Vanadium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.0005	0.0006	<0.0005	0.00064	0.00088	<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	0.007	<0.005	<0.005	<0.005	<0.005	0.005	0.009	0.008	<0.005	0.006

Notes:
(1) MECP Ontario Drinking Water Standards.
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New Liskeard Waste Disposal Site
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Groundwater Geochemical Results OW-17-II

Parameters	Units	ODWS [1]	2015			2016			2017			2018			2019		
General Chemistry			**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	274	298	211	284	292	272	319	299	288	291	274	256	282	272	269
Chloride	mg/L	250 AO [3]	2.44	2.68	9.80	2.67	2.76	2.72	2.29	2.33	3.09	2.50	2.86	2.59	3.02	3.12	2.60
Dissolved Organic Carbon	mg/L	5 AO	1.5	1.9	1.8	1.5	1.5	1.4	1.5	1.8	2.1	2.8	3.3	2.3	2.2	2.3	1.3
Fluoride	mg/L	1.5 MAC [4]	1.22	1.19	1.44	0.15	1.19	1.34	0.97	1.18	1.04	1.07	1.24	1.01	1.10	1.16	1.08
Sulphate	mg/L	500 AO	68.8	70.7	83.7	83.9	71.1	64.9	61.7	59.3	60.1	69.8	66.5	64.8	69.9	66.8	66.4
Hardness	mg/L	80-100 OG	**226**	**222**	**134**	**224**	**216**	**213**	**218**	**206**	**207**	**225**	**218**	**223**	**223**	**220**	**215**
Nitrate	mg/L	10 MAC	<0.10	<0.10	0.14	<0.10	0.11	0.08	0.06	0.10	<0.10	0.06	0.08	<0.10	<0.10	0.13	<0.10
Nitrite	mg/L	1 MAC	<0.10	<0.10	<0.05	<0.10	<0.10	<0.05	<0.05	<0.05	<0.10	<0.05	<0.05	<0.10	<0.10	<0.10	<0.10
Organic Nitrogen	mg/L	0.15 OG	<0.10	<0.10	0.12	<0.10	0.15	<0.10	<0.10	<0.10	**0.21**	<0.10	**0.21**	0.12	<0.10	0.12	<0.10
Orthophosphate	mg/L		<0.20	<0.20	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	<0.20	<0.20	<0.20	<0.20
pH	pH Units		8.37	8.25	8.13	8.16	8.00	8.37	8.34	8.46	8.27	8.11	8.08	7.94	7.93	7.96	7.85
Electrical Conductivity	µS/cm		673	706	628	628	697	677	608	637	660	632	651	621	620	700	701
Total Ammonia	mg/L		<0.02	0.08	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05	<0.02	0.03	<0.02
Total Dissolved Solids	mg/L	500 AO	348	368	336	346	368	352	320	348	322	332	346	366	320	362	336
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.10	<0.10	0.12	<0.10	0.15	<0.10	<0.10	<0.10	0.21	<0.10	0.21	0.17	<0.10	0.15	<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
Metals																	
Aluminum	mg/L	0.1 OG	0.004	<0.004	<0.004	0.014	0.025	0.016	0.007	0.005	0.020	0.008	0.005	0.006	<0.004	0.005	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	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.045	0.040	0.026	0.048	0.042	0.048	0.046	0.042	0.048	0.045	0.045	0.051	0.047	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 [5]	0.128	0.117	0.338	0.154	0.121	0.149	0.138	0.118	0.161	0.139	0.140	0.155	0.152	0.144	0.152
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		38.4	36.8	21.6	36.3	36.2	35.8	35.3	33.2	34.4	36.9	35.9	36.7	37.3	36.2	36.2
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	<0.003	<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	0.016	<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	0.017	<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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		31.7	31.7	19.5	32.3	30.5	29.9	31.6	29.8	29.5	32.3	31.1	31.9	31.5	31.4	30.3
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	0.014	0.033	0.014	0.013	0.013	0.012	0.012	0.012	0.012	0.011	0.012	0.013	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		4.78	4.39	4.20	4.41	4.74	4.59	4.36	4.06	3.95	3.96	4.14	4.43	4.17	4.21	4.31
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		4.02	3.16	3.04	3.79	3.83	4.02	3.91	4.28	4.05	2.86	4.62	3.61	4.84	3.03	4.10
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	55.3	66.8	86.8	52.4	60.3	53.7	46.8	54.0	47.0	44.1	53.0	52.2	47.9	56.6	53.6
Strontium	mg/L		2.80	2.99	0.725	3.13	3.01	3.20	3.10	3.16	3.09	2.65	3.02	3.10	3.22	3.13	3.19
Sulphur	mg/L		25.5	22.5	32.3	23.0	22.2	20.5	21.2	19.3	19.3	22.3	20.9	23.5	23.9	22.2	22.2
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	<0.002	<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	<0.002	0.004	0.004	0.004	0.003	0.004	0.004	0.004	0.004	0.004	0.005	0.003	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	<0.005	0.005	0.006	<0.005	<0.005	<0.005	0.025	0.006	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-17-III

Parameters	Units	ODWS [1]	2010		2011		2012		2013			2014			2015		
General Chemistry			**Jun**	**Nov**	**Jun**	**Nov**	**Jun**	**Nov**	**May**	**July**	**Sep**	**June**	**July**	**Sep**	**May**	**July**	**Sep**
Alkalinity	mg/L	30-500 OG [2]	333	409	269	356	300	240	168	308	**DRY**	183	**Insufficient Water to Sample**	387	175	319	**DRY**
Chloride	mg/L	250 AO [3]	2.0	2.0	2.0	3.0	2.0	2.0	1.35	2.02		1.56		2.2	1.41	2.66	
Dissolved Organic Carbon	mg/L	5 AO	1.5	2.1	1.5	1.7	1.6	2.4	2.5	1.8		2.3		2.7	2.2	3.0	
Fluoride	mg/L	1.5 MAC [4]	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	0.06		<0.05		<0.10	<0.05	<0.20	
Sulphate	mg/L	500 AO	6.0	9.0	5.0	9.0	5.0	7.0	3.68	9.28		3.51		6.81	2.82	3.81	
Hardness	mg/L	80-100 OG	**350**	**420**	**290**	**360**	**310**	**210**	**167**	**314**		**163**		**356**	**172**	**340**	
Nitrate	mg/L	10 MAC	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05		<0.05		<0.10	<0.05	<0.20	
Nitrite	mg/L	1 MAC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05		<0.05		<0.10	<0.05	<0.20	
Organic Nitrogen	mg/L	0.15 OG	**0.175**	**0.175**	**0.58**	**0.175**	0.105	**0.835**	**0.36**	**0.86**		**0.65**		**0.62**	<0.10	**0.39**	
Orthophosphate	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.10	<0.10		<0.10		<0.20	<0.10	<0.40	
pH	pH Units								7.65	7.16		8		7.64	7.88	8.13	
Electrical Conductivity	µS/cm								335	620		354		709	354	605	
Total Ammonia	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02		0.08		0.04	<0.02	<0.02	
Total Dissolved Solids	mg/L	500 AO	352	424	287	368	318	248	176	382		196		368	178	320	
Total Kjeldahl Nitrogen (TKN)	mg/L		0.2	0.2	0.6	0.2	0.13	0.86	0.36	0.86		0.73		0.66	<0.10	0.39	
Total Phosphorus	mg/L		0.15						<0.05	<0.05		<0.05		<0.05	<0.05	<0.05	
Metals																	
Aluminum	mg/L	0.1 OG	<0.005	<0.005	<0.005	0.008	<0.005	<0.005	0.028	0.008		0.011		0.008	0.012	0.010	
Arsenic	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003		<0.003		<0.003	<0.003	<0.003	
Barium	mg/L	1 MAC	0.014	0.018	0.014	0.013	0.021	0.021	0.016	0.016		0.014		0.024	0.015	0.015	
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001		<0.001		<0.001	<0.001	<0.001	
Bismuth	mg/L		<0.001			<0.001	<0.001	<0.001	<0.002	<0.002		<0.002		<0.002	<0.002	<0.002	
Boron	mg/l	5 IMAC [5]	<0.01	<0.01	<0.01	<0.01	0.011	<0.01	0.012	<0.010		0.011		<0.010	<0.010	0.014	
Cadmium	mg/L	0.005 MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002		<0.002		<0.002	<0.002	<0.002	
Calcium	mg/L		96	110	76	92	83	55	46.5	84.0		44.0		97.4	46.2	91.4	
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003		<0.003		<0.003	<0.003	0.003	
Cobalt	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001		<0.001		<0.001	<0.001	<0.001	
Copper	mg/L	1 AO	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003		<0.003		<0.003	<0.003	<0.003	
Iron	mg/L	0.3 AO	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.010	<0.010		<0.010		0.011	<0.010	<0.010	
Lead	mg/L	0.01 MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002		<0.002		<0.002	<0.002	<0.002	
Magnesium	mg/L		28	32	24	31	26	17	12.3	25.2		12.8		27.3	13.7	27.2	
Manganese	mg/L	0.05 AO	0.009	<0.002	<0.002	<0.002	0.0074	0.015	0.013	0.007		0.012		0.004	0.009	0.024	
Molybdenum	mg/L		<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.002	<0.002		<0.002		<0.002	<0.002	<0.002	
Nickel	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	0.0035	<0.003	<0.003		<0.003		<0.003	<0.003	<0.003	
Potassium	mg/L		<0.2	0.32	0.26	0.21	0.37	0.58	0.90	0.47		1.05		0.94	0.83	0.66	
Selenium	mg/L	0.05 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004		<0.004		<0.004	<0.004	<0.004	
Silicon	mg/L								5.41	6.56		5.86		6.48	5.6	5.36	
Silver	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002		<0.002		<0.002	<0.002	<0.002	
Sodium	mg/L	200 AO	4.7	5.4	4.6	5	5.0	9.3	4.18	4.81		4.57		5.29	3.85	5.85	
Strontium	mg/L		0.11	0.14	0.11	0.11	0.13	0.1	0.082	0.111		0.079		0.14	0.084	0.122	
Sulphur	mg/L								1.40	3.09		0.81		2.69	1.19	0.97	
Thallium	mg/L		<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.006	<0.006		<0.006		<0.006	<0.006	<0.006	
Tin	mg/L		<0.001			<0.001	<0.001	<0.001	<0.002	<0.002		<0.002		<0.002	<0.002	<0.002	
Titanium	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002		<0.002		<0.002	<0.002	<0.002	
Uranium	mg/L	0.02 MAC	0.0002	0.0004	0.0003	0.0004	0.00035	0.00036	<0.002	<0.002		<0.002		<0.002	<0.002	<0.002	
Vanadium	mg/L		<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<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	0.081	<0.005	0.005	<0.005		0.006		0.008	0.007	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 [1]	2016			2017			2018			2019		
General Chemistry			**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	143	340	**DRY**	134	349	**DRY**	187	**DRY**	**DRY**	126	**DRY**	**DRY**
Chloride	mg/L	250 AO [3]	1.42	2.58		1.0	1.23		1.54			0.94		
Dissolved Organic Carbon	mg/L	5 AO	2.8	4.7		2.7	2.5		2.7			3.4		
Fluoride	mg/L	1.5 MAC [4]	<0.05	<0.10		<0.05	<0.05		<0.05			<0.05		
Sulphate	mg/L	500 AO	5.68	4.20		4.75	7.46		3.97			3.36		
Hardness	mg/L	80-100 OG	**126**	**332**		**117**	**338**		**167**			**123**		
Nitrate	mg/L	10 MAC	<0.05	<0.10		<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		
Organic Nitrogen	mg/L	0.15 OG	**0.42**	**1.39**		<0.10	<0.10		<0.10			<0.10		
Orthophosphate	mg/L		<0.10	<0.20		<0.10	<0.10		<0.10			<0.10		
pH	pH Units		7.75	8.02		7.99	8.28		7.61			7.44		
Electrical Conductivity	µS/cm		263	656		250	614		332			236		
Total Ammonia	mg/L		<0.02	0.07		<0.02	<0.02		<0.02			<0.02		
Total Dissolved Solids	mg/L	500 AO	148			134	350		172			132		
Total Kjeldahl Nitrogen (TKN)	mg/L		0.42	1.46		<0.10	<0.10		<0.10			<0.10		
Total Phosphorus	mg/L		<0.05	<0.05		<0.05	<0.05		<0.05			<0.05		
Metals														
Aluminum	mg/L	0.1 OG	0.019	0.014		0.012	0.007		0.007			0.006		
Arsenic	mg/L	0.01 MAC	<0.003	<0.003		<0.003	<0.003		<0.003			<0.003		
Barium	mg/L	1 MAC	0.016	0.053		0.012	0.020		0.013			0.011		
Beryllium	mg/L		<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		
Boron	mg/l	5 IMAC [5]	<0.010	<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		
Calcium	mg/L		33.6	89.4		30.8	89.4		45.0			33.3		
Chromium	mg/L	0.05 MAC	<0.003	<0.003		<0.003	<0.003		<0.003			<0.003		
Cobalt	mg/L		<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		
Iron	mg/L	0.3 AO	<0.010	<0.010		<0.010	**1.83**		<0.010			<0.010		
Lead	mg/L	0.01 MAC	<0.002	<0.002		<0.002	<0.002		<0.001			<0.001		
Magnesium	mg/L		10.2	26.4		9.64	27.9		13.3			9.79		
Manganese	mg/L	0.05 AO	0.026	**0.254**		0.008	**0.912**		0.030			0.013		
Molybdenum	mg/L		<0.002	<0.002		<0.002	<0.002		<0.002			<0.002		
Nickel	mg/L		<0.003	0.007		<0.003	<0.003		<0.003			<0.003		
Potassium	mg/L		0.81	1.07		0.85	0.43		0.80			1.02		
Selenium	mg/L	0.05 MAC	<0.004	<0.004		<0.004	<0.004		<0.004			<0.004		
Silicon	mg/L		4.85	6.19		4.8	7.28		4.11			5.43		
Silver	mg/L		<0.002	<0.002		<0.002	<0.002		<0.002			<0.002		
Sodium	mg/L	200 AO	4.64	7.67		2.95	5.02		3.0			3.2		
Strontium	mg/L		0.067	0.222		0.063	0.139		0.077			0.062		
Sulphur	mg/L		1.54	1.64		1.83	3.31		1.43			1.96		
Thallium	mg/L		<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		
Titanium	mg/L		<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		
Vanadium	mg/L		<0.002	<0.002		<0.002	<0.002		<0.002			<0.002		
Zinc	mg/L	5 AO	<0.005	0.006		<0.005	0.006		<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-23-I

Parameters	Units	ODWS [1]	2010			2011			2012			2013			2014		
General Chemistry			**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**May**	**July**	**Sep**	**June**	**July**	**Sep**
Alkalinity	mg/L	30-500 OG [2]	238	225	237	222	225	234	240	230	240	220	219	271	221	214	220
Chloride	mg/L	250 AO [3]	2.0	2.0	1.0	3.0	2.0	2.0	2.0	2.0	2.0	2.11	2.06	1.72	1.89	1.96	2.04
Dissolved Organic Carbon	mg/L	5 AO	2.1	2.9	2.3	2.2	2.3	2.3	1.9	2.1	2.2	2.1	2.6	3.0	2.7	2.1	2.4
Fluoride	mg/L	1.5 MAC [4]	1	1.2	0.9	1.4	1.5	1.3	1.22	1.33	1.35	1.33	1.11	1.24	1.17	1.38	1.25
Sulphate	mg/L	500 AO	7	4	7	3	6	4	5.0	4.0	3.0	5.01	4.65	5.26	5.16	4.3	4.76
Hardness	mg/L	80-100 OG	**120**	**140**	**150**	100	84	**180**	**160**	**180**	**140**	**103**	85	**127**	96	97	99.1
Nitrate	mg/L	10 MAC	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.05	0.12	<0.10	<0.05	<0.05	<0.05
Nitrite	mg/L	1 MAC	0.01	0.01	0.08	0.06	0.07	0.02	<0.01	<0.01	0.014	<0.05	<0.05	<0.10	<0.05	<0.05	<0.05
Organic Nitrogen	mg/L	0.15 OG	**1.18**	**1.5**	**3.03**	**0.36**	**1.25**	**28.7**			**1.27**	**0.42**	<0.10	**0.41**	**0.62**	**0.33**	**0.51**
Orthophosphate	mg/L		<0.01	0.02	<0.01	0.02	<0.01	0.01	0.012	<0.01	0.018	<0.10	<0.10	<0.20	<0.10	<0.10	<0.10
pH	pH Units											8.24	7.89	7.29	8.43	8.11	8.32
Electrical Conductivity	µS/cm											439	398	448	422	428	439
Total Ammonia	mg/L		0.8	0.80	0.97	0.64	0.75	1.3	0.81	0.88	0.73	0.50	0.39	0.35	0.62	0.65	0.5
Total Dissolved Solids	mg/L	500 AO	259	246	266	241	251	261	258	247	256	224	234	230	226	240	216
Total Kjeldahl Nitrogen (TKN)	mg/L		2	2.3	4	1	2	30	<1	0.76	2	0.92	<0.20	0.76	1.24	0.98	1.01
Total Phosphorus	mg/L		3.3									<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals																	
Aluminum	mg/L	0.1 OG	0.005	0.039	<0.005	<0.005	<0.005	0.008	<0.005	0.006	<0.005	0.005	0.008	<0.004	0.006	<0.004	<0.004
Arsenic	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.034	0.04	0.049	0.032	0.027	0.052	0.041	0.049	0.039	0.023	0.020	0.027	0.025	0.023	0.027
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC [5]	0.3	0.25	0.25	0.33	0.4	0.22	0.24	0.18	0.27	0.388	0.310	0.291	0.316	0.325	0.307
Cadmium	mg/L	0.005 MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		19	23	25	15	11	28	28	31	22	16.2	14.4	20.8	14.5	14.1	14.8
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.010	<0.010	<0.010	<0.010	0.057	0.048
Lead	mg/L	0.01 MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Magnesium	mg/L		17	20	22	16	14	27	23	24	20	15.2	12.0	18.2	14.5	14.9	15.1
Manganese	mg/L	0.05 AO	0.008	0.01	0.01	0.009	0.007	0.012	0.01	0.012	0.011	0.009	0.007	0.009	0.009	0.009	0.008
Molybdenum	mg/L		0.009	0.008	0.007	0.01	0.012	0.0045	0.0057	0.0031	0.0073	0.012	0.011	0.01	0.009	0.01	0.009
Nickel	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		3.30	3.30	3.80	3.1	2.9	3.8	3.7	3.5	3.3	3.22	2.74	3.34	2.99	3.16	3.2
Selenium	mg/L	0.05 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L											4.55	3.84	4.48	4.63	4.54	4.5
Silver	mg/L		<0.0001	<0.0001	0.0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	56	45	50	56	68	39	41	26	49	53.7	52.6	49.6	60.0	63.0	59.1
Strontium	mg/L		0.52	0.64	0.71	0.48	0.39	0.79	0.77	0.9	0.62	0.390	0.292	0.493	0.442	0.453	0.432
Sulphur	mg/L											1.79	1.70	2.08	1.71	2.2	4.01
Thallium	mg/L		<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	mg/L		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium	mg/L		<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	<0.002
Uranium	mg/L	0.02 MAC	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/L		<0.001	<0.001	0.001	<0.001	<0.0005	0.0024	0.00097	0.00055	0.0023	<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	0.0051	<0.005	<0.005	<0.005	<0.005	0.006	<0.005

Notes:
(1) MECP Ontario Drinking Water Standards.
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(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 [1]	2015			2016			2017			2018			2019		
General Chemistry			**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	228	219	220	229	226	223	228	239	239	244	220	205	227	221	212
Chloride	mg/L	250 AO [3]	1.34	2.03	1.85	2.19	1.94	1.89	1.63	1.55	1.75	1.77	1.55	1.79	1.58	2.02	1.63
Dissolved Organic Carbon	mg/L	5 AO	2.7	3.1	2.7	2.5	2.4	2.3	2.4	3.0	3.4	2.2	3.6	3.3	3.1	**5.7**	2.3
Fluoride	mg/L	1.5 MAC [4]	0.89	1.41	1.26	1.25	1.27	1.31	1.02	1.2	1.19	1.06	1.08	1.35	1.30	1.49	1.28
Sulphate	mg/L	500 AO	5.40	5.24	6.50	5.90	4.82	4.22	4.15	4.31	4.36	4.96	4.79	6.74	4.92	5.11	5.53
Hardness	mg/L	80-100 OG	**153**	99.5	**139**	**114**	**105**	90.4	97.5	**101**	**125**	**121**	**130**	93.3	**101**	89.8	**117**
Nitrate	mg/L	10 MAC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.27	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	<0.05
Nitrite	mg/L	1 MAC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.09	<0.05
Organic Nitrogen	mg/L	0.15 OG	**0.26**	**0.20**	**1.04**	**0.24**	<0.10	0.15	0.13	<0.10	**0.24**	<0.10	0.10	**0.30**	**0.44**	**0.24**	**0.22**
Orthophosphate	mg/L		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
pH	pH Units		8.39	8.17	8.2	8.23	8.05	8.45	8.39	8.28	8.25	8.04	8.04	7.92	8.00	8.07	8.01
Electrical Conductivity	µS/cm		457	441	443	423	448	440	417	434	454	434	436	410	409	451	472
Total Ammonia	mg/L		0.5	0.63	0.46	0.45	0.68	0.61	0.55	0.72	0.64	0.61	0.54	0.44	0.27	0.47	0.49
Total Dissolved Solids	mg/L	500 AO	218	226	236	228	240	220	218	230	224	210	234	252	214	228	218
Total Kjeldahl Nitrogen (TKN)	mg/L		0.76	0.83	1.5	0.69	0.74	0.76	0.68	0.71	0.88	0.66	0.64	0.74	0.71	0.71	0.71
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
Metals																	
Aluminum	mg/L	0.1 OG	<0.004	0.005	<0.004	0.011	0.013	0.017	0.011	0.004	0.006	0.007	<0.004	0.012	<0.004	0.006	<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	0.029	0.022	0.031	0.028	0.027	0.027	0.027	0.027	0.046	0.041	0.033	0.028	0.030	0.022	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	<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 [5]	0.272	0.298	0.310	0.347	0.269	0.310	0.304	0.258	0.262	0.294	0.292	0.349	0.355	0.351	0.303
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	15.1	24.3	17.4	16.7	13.6	14.8	15.4	20.9	20.1	21.9	14.1	15.5	13.2	19.3
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	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	0.028	0.014	<0.010	0.046	0.063	0.063	0.034	0.058	0.029	<0.010	0.012	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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		20.9	15.0	18.9	17.2	15.3	13.7	14.7	15.1	17.6	17.3	18.2	14.1	15.1	13.8	16.6
Manganese	mg/L	0.05 AO	0.009	0.008	0.008	0.010	0.009	0.008	0.009	0.009	0.008	0.007	0.011	0.010	0.011	0.009	0.010
Molybdenum	mg/L		0.009	0.013	0.009	0.009	0.009	0.010	0.010	0.009	0.006	0.008	0.008	0.010	0.010	0.010	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	<0.003	<0.003	<0.003
Potassium	mg/L		3.50	3.0	4.16	3.29	3.31	3.06	3.17	3.09	3.17	3.26	3.19	2.97	3.07	2.83	3.11
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		4.59	3.66	4.38	4.64	4.85	4.55	4.55	5.19	5.41	3.6	5.85	3.82	4.99	3.76	5.05
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	35.0	57.2	50.1	57.0	58.9	60.5	57.5	49.9	42.1	43.6	42.5	58.2	54.2	58.4	47.9
Strontium	mg/L		0.433	0.535	0.438	0.479	0.536	0.495	0.483	0.54	0.721	0.537	0.596	0.465	0.474	0.442	0.609
Sulphur	mg/L		2.25	5.29	2.23	1.91	2.05	2.90	1.91	2.07	1.64	1.45	2.09	2.88	2.19	2.44	2.34
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	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	0.006	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-23-II

Parameters	Units	ODWS [1]	2010			2011		2012			2013			2014		
General Chemistry			**Jun**	**Sep**	**Nov**	**Jul**	**Sep**	**Jun**	**Sep**	**Nov**	**May**	**July**	**Sep**	**June**	**July**	**Sep**
Alkalinity	mg/L	30-500 OG [2]	222	217	222	222	226	230	230	240	228	237	261	224	218	214
Chloride	mg/L	250 AO [3]	14.0	13.0	11.0	12.0	10.0	12.0	10.0	8.0	11.7	9.5	9.47	10.6	10.3	9.99
Dissolved Organic Carbon	mg/L	5 AO	1.6	1.7	2	1.6	1.7	1.5	1.6	1.5	2.0	1.7	1.6	1.8	1.4	1.6
Fluoride	mg/L	1.5 MAC [4]	1.1	1.1	1.1	1.1	1.1	1.16	1.13	1.08	0.52	1.05	**1.51**	0.96	0.69	1.05
Sulphate	mg/L	500 AO	150	140	130	130	130	140	120	130	155	122	117	120	113	102
Hardness	mg/L	80-100 OG	**190**	**170**	**170**	**180**	**180**	**180**	**160**	**180**	**184**	**165**	**164**	**160**	**158**	**145**
Nitrate	mg/L	10 MAC	<0.1	0.1	0.2	<0.1	0.1	<0.1	<0.1	<0.1	<0.25	<0.10	<0.25	0.10	<0.25	<0.10
Nitrite	mg/L	1 MAC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.25	<0.10	<0.25	<0.05	<0.25	<0.10
Organic Nitrogen	mg/L	0.15 OG	**0.175**	**0.375**	**0.175**	**0.38**	**1.28**	**0.515**	**0.185**	**0.494**	**0.82**	<0.10	0.14	**0.47**	<0.10	0.150
Orthophosphate	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.50	<0.20	<0.50	<0.10	<0.50	<0.20
pH	pH Units										8.21	7.81	7.46	8.36	8.24	8.23
Electrical Conductivity	µS/cm										792	708	718	694	688	678
Total Ammonia	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.076	<0.02	<0.02	<0.02	0.06	0.07	0.03
Total Dissolved Solids	mg/L	500 AO	471	445	438	451	444	452	417	444	440	418	400	364	400	358
Total Kjeldahl Nitrogen (TKN)	mg/L		0.2	0.4	0.2	0.4	1.3	0.54	0.21	0.57	0.82	<0.10	0.14	0.53	<0.10	0.18
Total Phosphorus	mg/L		0.05								<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals																
Aluminum	mg/L	0.1 OG	<0.005	0.006	0.01	0.01	0.006	<0.005	0.0059	0.0053	0.006	0.019	<0.004	<0.004	<0.004	<0.004
Arsenic	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.026	0.03	0.032	0.032	0.035	0.032	0.033	0.036	0.032	0.028	0.024	0.027	0.025	0.024
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC [5]	0.36	0.34	0.36	0.37	0.37	0.38	0.37	0.36	0.398	0.383	0.304	0.327	0.346	0.360
Cadmium	mg/L	0.005 MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		30	26	25	27	27	30	25	28	30.4	27.0	26.6	26.2	25.7	23.1
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Magnesium	mg/L		28	26	26	27	26	27	23	26	26.3	23.7	23.6	22.9	22.9	21.3
Manganese	mg/L	0.05 AO	0.005	0.004	<0.002	0.002	0.006	0.0022	<0.002	<0.002	<0.002	0.002	0.005	0.003	0.003	0.007
Molybdenum	mg/L		0.046	0.041	0.037	0.045	0.043	0.044	0.039	0.038	0.043	0.042	0.033	0.034	0.042	0.036
Nickel	mg/L		<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	0.0015	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		5.10	4.70	4.70	4.9	4.8	5.1	4.3	4.7	4.74	4.49	4.49	4.59	4.52	4.37
Selenium	mg/L	0.05 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L										3.17	3.07	3.02	2.97	3.06	2.95
Silver	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	100	96	97	100	97	98	91	93	89.8	87.0	90.1	92.4	92.7	90.7
Strontium	mg/L		0.96	0.94	0.91	0.95	0.95	0.97	0.92	0.97	0.982	0.856	0.911	0.817	0.831	0.744
Sulphur	mg/L										51.2	40.7	43.2	35.4	38.3	38.1
Thallium	mg/L		<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	mg/L		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium	mg/L		<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	<0.002
Uranium	mg/L	0.02 MAC	0.0021	0.0018	0.0018	0.0019	0.0019	0.0021	0.0019	0.0021	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/L		<0.001	<0.001	<0.001	0.001	0.0006	<0.0005	0.00068	0.00093	<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	0.006	<0.005	<0.005	0.0068	0.008	0.006	<0.005	0.007	<0.005	<0.005

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-23-II

Parameters	Units	ODWS [1]	2015			2016			2017			2018			2019		
General Chemistry			**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	220	221	277	224	222	212	231	232	224	240	209	201	223	205	206
Chloride	mg/L	250 AO [3]	11.2	10.2	2.78	11.0	9.55	9.37	9.25	8.44	7.71	8.92	8.24	7.09	8.44	8.40	7.75
Dissolved Organic Carbon	mg/L	5 AO	1.6	2.3	1.4	1.7	2.0	1.5	1.4	2.0	2.0	2.1	2.5	2.3	2.1	2.0	1.4
Fluoride	mg/L	1.5 MAC [4]	1.02	1.13	1.38	1.05	1.13	1.05	0.98	1.20	1.14	1.13	1.26	1.06	1.17	1.24	1.12
Sulphate	mg/L	500 AO	104	97.2	71.2	101	91.1	80	83.6	78.0	72.8	88.2	81.0	74.8	86.9	81.0	75.5
Hardness	mg/L	80-100 OG	**143**	**142**	**229**	**142**	**131**	**122**	**125**	**119**	**116**	**132**	**125**	**123**	**128**	**125**	**115**
Nitrate	mg/L	10 MAC	0.08	0.17	<0.25	<0.10	<0.10	0.18	<0.05	0.06	0.14	<0.05	0.13	0.11	0.06	<0.10	<0.10
Nitrite	mg/L	1 MAC	<0.05	<0.10	<0.25	<0.10	<0.10	<0.05	<0.05	<0.05	<0.10	<0.05	<0.05	<0.10	<0.05	<0.10	<0.10
Organic Nitrogen	mg/L	0.15 OG	0.10	**0.21**	**0.20**	<0.10	**0.27**	0.12	<0.10	<0.10	**0.20**	<0.10	<0.10	0.10	<0.10	0.13	<0.10
Orthophosphate	mg/L		<0.10	<0.20	<0.50	<0.20	<0.20	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	<0.20	<0.10	<0.20	<0.20
pH	pH Units		8.41	8.2	8.19	8.16	8.08	8.40	8.34	8.35	8.31	7.98	8.04	7.92	7.95	8.04	7.80
Electrical Conductivity	µS/cm		675	666	672	632	656	635	608	606	604	625	602	573	593	639	644
Total Ammonia	mg/L		<0.02	<0.02	<0.02	<0.02	0.040	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05	<0.02	0.05	<0.02
Total Dissolved Solids	mg/L	500 AO	362	352	342	352	360	338	334	320	314	344	338	374	304	328	322
Total Kjeldahl Nitrogen (TKN)	mg/L		0.10	0.21	0.20	<0.10	0.31	0.12	<0.10	<0.10	0.20	<0.10	<0.10	0.15	<0.10	0.18	<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
Metals																	
Aluminum	mg/L	0.1 OG	0.009	0.018	<0.004	0.005	0.022	0.021	0.008	0.018	0.008	0.008	0.011	0.010	<0.004	0.007	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	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.024	0.023	0.047	0.029	0.025	0.029	0.032	0.026	0.028	0.032	0.032	0.032	0.032	0.028	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 [5]	0.285	0.309	0.142	0.387	0.291	0.333	0.351	0.315	0.388	0.380	0.371	0.397	0.400	0.384	0.376
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		23.0	22.5	38.2	22.6	21.1	19.7	19.4	18.7	18.3	20.9	19.8	19.4	20.6	19.8	18.7
Chromium	mg/L	0.05 MAC	<0.003	0.009	<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	0.017	<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	0.015	<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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		20.7	20.9	32.4	20.8	18.9	17.8	18.6	17.6	17.0	19.5	18.3	18.1	18.6	18.3	16.7
Manganese	mg/L	0.05 AO	0.007	0.003	<0.002	0.011	0.021	<0.002	0.004	0.004	0.002	0.002	<0.002	<0.002	<0.002	0.003	0.002
Molybdenum	mg/L		0.038	0.035	0.013	0.040	0.035	0.035	0.036	0.037	0.033	0.037	0.034	0.033	0.035	0.034	0.035
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		4.36	4.15	4.86	4.16	4.31	4.04	3.96	3.76	3.48	3.68	3.83	3.86	3.78	3.78	3.73
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		2.86	2.41	3.99	2.99	2.96	2.94	3.22	3.21	3.20	2.43	3.73	2.87	3.81	2.23	3.03
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	91.1	86.0	61.5	93.1	86.3	85.8	85.0	78.9	74.0	77.3	77.8	80.8	80.0	82.6	81.4
Strontium	mg/L		0.674	0.75	3.15	0.758	0.698	0.788	0.793	0.702	0.688	0.705	0.749	0.812	0.746	0.732	0.688
Sulphur	mg/L		38.6	31.6	24.6	32.1	28.5	25.4	29.4	26.2	23.5	30.7	25.2	26.6	29.3	26.7	25.2
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	<0.002	<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	0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
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	0.009	<0.005	0.010	0.005	<0.005	0.026	0.006	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-24-I

Parameters	Units	ODWS [1]	2010			2011			2012			2013			2014		
General Chemistry			**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**May**	**July**	**Sep**	**June**	**July**	**Sep**
Alkalinity	mg/L	30-500 OG [2]	228	226	229	226	235	235	230	240	250	221	242	253			176
Chloride	mg/L	250 AO [3]	1.0	<1	<1	1.0	1.0	<1	<1	<1	<1	0.85	0.91	1.05			12.5
Dissolved Organic Carbon	mg/L	5 AO	2.0	1.9	2.2	1.9	1.9	2.0	2.1	2.1	2.0	2.2	2.1	2.4			**6.6**
Fluoride	mg/L	1.5 MAC [4]	0.4	0.4	0.4	0.4	0.39	0.4	0.4	0.38	0.35	0.23	0.32	0.29			0.36
Sulphate	mg/L	500 AO	19	17	19	17	17	18	18	17	16	18.4	17.8	17.1			82.1
Hardness	mg/L	80-100 OG	**240**	**240**	**230**	**230**	**230**	**240**	**240**	**220**	**240**	**230**	**226**	**230**			**225**
Nitrate	mg/L	10 MAC	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	0.11			<0.05
Nitrite	mg/L	1 MAC	0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.011	<0.01	<0.01	<0.05	<0.05	<0.10			<0.05
Organic Nitrogen	mg/L	0.15 OG		**1.83**	**0.87**	**0.58**		**0.175**	**0.47**		**0.20**	**0.89**	**0.55**	<0.10			**0.30**
Orthophosphate	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.011	<0.01	<0.01	<0.10	<0.10	<0.20			<0.10
pH	pH Units											8.07	7.65	7.47			8.13
Electrical Conductivity	µS/cm											465	454	466			558
Total Ammonia	mg/L		0.1	0.17	0.13	<0.05	0.05	<0.05	<0.05	<0.05	0.11	0.02	0.07	<0.02			0.29
Total Dissolved Solids	mg/L	500 AO	267	262	261	262	266	272	270	262	273	226	252	262			314
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.5	2.0	1.0	0.6	<1	0.2	0.49	<0.2	0.31	0.91	0.62	<0.10			0.59
Total Phosphorus	mg/L		1.8						9	8		<0.05	<0.05	<0.05			<0.05
Metals																	
Aluminum	mg/L	0.1 OG	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	0.0065	<0.005	0.005	0.006	<0.004			<0.004
Arsenic	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003			<0.003
Barium	mg/L	1 MAC	0.035	0.042	0.036	0.041	0.036	0.035	0.037	0.048	0.044	0.037	0.032	0.028			0.04
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001			<0.001
Bismuth	mg/L		<0.001	<0.001				<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002			<0.002
Boron	mg/l	5 IMAC [5]	0.039	0.035	0.038	0.039	0.043	0.042	0.046	0.036	0.032	0.065	0.046	0.032			0.071
Cadmium	mg/L	0.005 MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	**DESTROYED**		<0.002
Calcium	mg/L		63	62	59	61	61	64	64	59	64	61.7	61.3	62.7			53
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003			<0.003
Cobalt	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001			<0.001
Copper	mg/L	1 AO	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003			<0.003
Iron	mg/L	0.3 AO	<0.1	0.14	<0.1	<0.1	<0.1	0.11	0.28	<0.1	<0.1	**0.314**	**0.354**	<0.010			**0.772**
Lead	mg/L	0.01 MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002			<0.002
Magnesium	mg/L		20	20	19	19	19	20	19	18	20	18.5	17.6	17.8			22.5
Manganese	mg/L	0.05 AO	**0.051**	**0.053**	0.048	0.042	**0.052**	**0.054**	**0.051**	**0.052**	**0.061**	0.033	0.047	0.015			**0.054**
Molybdenum	mg/L		0.002	0.001	0.002	0.002	0.0014	0.0014	0.0015	0.0022	0.0013	<0.002	<0.002	<0.002			0.011
Nickel	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	0.003			<0.003
Potassium	mg/L		4.20	4.10	3.80	4.2	3.7	4	4.1	3.8	3.5	3.89	3.40	3.19			6.44
Selenium	mg/L	0.05 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004			<0.004
Silicon	mg/L											7.16	6.61	6.52			5.64
Silver	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002			<0.002
Sodium	mg/L	200 AO	6.7	6.3	6.7	6.4	6.5	7.3	7.0	5.9	5.3	5.55	5.40	5.82			17.1
Strontium	mg/L		0.48	0.49	0.46	0.5	0.47	0.47	0.49	0.48	0.49	0.448	0.436	0.488			0.448
Sulphur	mg/L											6.40	6.28	3.96			29.5
Thallium	mg/L		<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.006	<0.006	<0.006			<0.006
Tin	mg/L		<0.001	<0.001				<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002			<0.002
Titanium	mg/L		<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
Uranium	mg/L	0.02 MAC	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	0.00047	0.00015	<0.002	<0.002	<0.002			<0.002
Vanadium	mg/L		<0.001	<0.001	<0.001	0.001	0.0015	0.0006	<0.0005	0.0014	0.001	<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	0.0057	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-24-I

Parameters	Units	ODWS [1]	2015			2016			2017			2018			2019		
General Chemistry			**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	213	241	235	247	239	232	253	222	244	248	218	208	227	207	217
Chloride	mg/L	250 AO [3]	1.63	2.73	2.11	1.54	1.77	1.73	1.73	1.26	2.31	1.87	0.77	1.18	1.22	3.57	1.34
Dissolved Organic Carbon	mg/L	5 AO	2.2	3.3	2.0	2.4	2.5	3.1	1.7	2.8	3.4	2.1	2.9	2.5	2.8	2.4	2.2
Fluoride	mg/L	1.5 MAC [4]	0.37	0.28	0.33	0.25	0.30	0.36	0.30	0.31	0.38	0.19	0.31	0.36	0.21	0.61	0.39
Sulphate	mg/L	500 AO	16.9	21.2	20.8	23.4	19.8	17.5	18.1	17.9	17.6	20.9	19.8	18.9	19.6	16.7	20.1
Hardness	mg/L	80-100 OG	**206**	**227**	**234**	**239**	**223**	**211**	**229**	**214**	**217**	**226**	**224**	**220**	**225**	**197**	**210**
Nitrate	mg/L	10 MAC	<0.05	<0.10	<0.05	<0.05	<0.05	<0.05	0.11	<0.05	<0.10	<0.05	<0.05	<0.05	<0.05	0.06	<0.05
Nitrite	mg/L	1 MAC	<0.05	<0.10	<0.05	<0.05	<0.05	<0.05	<0.10	<0.05	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Organic Nitrogen	mg/L	0.15 OG	**0.33**	**0.31**	**0.25**	**0.22**	**0.22**	**0.21**	0.13	0.12	**0.23**	<0.10	<0.10	**0.22**	<0.10	0.12	**0.23**
Orthophosphate	mg/L		<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
pH	pH Units		8.32	8.17	8.06	8.11	8.07	8.25	8.19	8.11	8.12	7.91	8.01	7.88	7.82	7.86	7.75
Electrical Conductivity	µS/cm		455	501	497	467	490	491	490	431	492	463	459	448	437	473	505
Total Ammonia	mg/L		0.04	0.09	0.03	0.03	0.07	0.16	<0.02	0.17	0.12	0.07	0.08	0.06	0.02	0.06	0.11
Total Dissolved Solids	mg/L	500 AO	226	242	256	264	256	250	266	256	244	248	252	252	244	238	236
Total Kjeldahl Nitrogen (TKN)	mg/L		0.37	0.40	0.28	0.25	0.29	0.37	0.13	0.29	0.35	0.12	<0.10	0.28	0.10	0.18	0.34
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
Metals																	
Aluminum	mg/L	0.1 OG	<0.004	0.027	0.051	0.022	**0.207**	0.017	0.007	0.004	0.006	0.008	0.011	<0.004	<0.004	0.006	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	0.038	0.024	0.044	0.040	0.044	0.036	0.034	0.032	0.037	0.035	0.034	0.033	0.031	0.028	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	<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 [5]	0.044	0.039	0.046	0.052	0.044	0.049	0.042	0.036	0.062	0.048	0.061	0.061	0.045	0.093	0.072
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		50.6	57.1	60.5	64.5	59.9	55.7	61.2	56.3	56.6	60.7	59.7	58.4	63.2	49.9	56.1
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	0.002	<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	**1.03**	**0.802**	**1.56**	**0.887**	**0.890**	**1.06**	0.032	**0.327**	**0.381**	0.164	0.267	**0.710**	0.044	0.068	**0.386**
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		19.3	20.6	20.1	18.9	17.8	17.5	18.4	17.9	18.4	18.0	18.3	18.1	16.4	17.6	17.0
Manganese	mg/L	0.05 AO	0.039	**0.061**	**0.062**	**0.082**	**0.078**	**0.053**	0.038	**0.071**	**0.063**	0.047	**0.051**	**0.051**	**0.073**	0.022	**0.072**
Molybdenum	mg/L		0.005	0.009	0.006	0.004	0.004	0.003	0.003	0.003	0.003	0.002	<0.002	0.003	0.004	0.01	0.004
Nickel	mg/L		<0.003	<0.003	0.004	<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		4.79	4.01	4.29	2.86	3.10	3.22	2.58	2.94	3.14	2.49	2.70	2.89	2.82	3.68	3.00
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		6.88	5.39	7.02	6.59	7.60	6.57	6.38	7.37	6.86	4.83	8.57	6.09	6.28	4.63	6.41
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	9.55	16.7	13.4	9.07	11.6	11.8	11.7	9.05	13.1	7.61	7.18	9.32	6.83	18.5	9.71
Strontium	mg/L		0.396	0.321	0.403	0.395	0.398	0.479	0.323	0.414	0.448	0.356	0.447	0.489	0.271	0.323	0.423
Sulphur	mg/L		5.57	6.01	6.74	6.11	5.95	8.19	6.11	6.24	6.74	6.53	7.48	7.93	8.08	6.18	6.62
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	0.003	<0.002	0.009	<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	<0.005	<0.005	0.009	<0.005	<0.005	<0.005	0.006	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-24-II

Parameters	Units	ODWS [1]	2010			2011			2012			2013			2014		
General Chemistry			**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**May**	**July**	**Sep**	**June**	**July**	**Sep**
Alkalinity	mg/L	30-500 OG [2]	405	382	359	382	396	385	370	360	380	348	384	409			204
Chloride	mg/L	250 AO [3]	4.0	12.0	1.0	5.0	3.0	2.0	3.0	4.0	1.0	1.73	1.93	2.02			36.2
Dissolved Organic Carbon	mg/L	5 AO	1.0	1.8	1.4	1.1	1.1	1.0	1.2	1.2	1.1	1.1	1.2	2.5			**31.7**
Fluoride	mg/L	1.5 MAC [4]	0.9	1.2	0.6	1	1.1	0.9	0.98	1.18	0.81	<0.25	0.7	0.89			0.34
Sulphate	mg/L	500 AO	44	250	29	120	72	66	82	93	140	75.3	82.3	76.9			74.1
Hardness	mg/L	80-100 OG	**240**	**480**	**280**	**290**	**280**	**360**	**330**	**370**	**400**	**317**	**331**	**345**			**275**
Nitrate	mg/L	10 MAC	0.2	0.1	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	0.67	<0.25	<0.25	<0.05			<0.10
Nitrite	mg/L	1 MAC	0.01	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.25	<0.25	<0.05			<0.10
Organic Nitrogen	mg/L	0.15 OG	**0.275**	**1.84**	**0.375**		**0.275**	**1.9**	**0.637**		**4.15**	**0.92**	0.13	**0.18**			**0.19**
Orthophosphate	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.50	<0.50	<0.10			<0.20
pH	pH Units											8.17	7.64	7.56			8.18
Electrical Conductivity	µS/cm											795	800	825			721
Total Ammonia	mg/L		<0.05	0.16	<0.05	<0.05	<0.05	0.1	0.083	0.19	0.15	<0.02	<0.02	<0.02			0.13
Total Dissolved Solids	mg/L	500 AO	**503**	**764**	408	**535**	**508**	**521**	479	**511**	**577**	400	470	464			418
Total Kjeldahl Nitrogen (TKN)	mg/L		0.3	2.0	0.4	<0.5	0.3	2.0	0.72	<0.5	4.3	0.92	0.13	0.18			0.32
Total Phosphorus	mg/L		0.1									<0.05	<0.05	<0.05			<0.05
Metals																	
Aluminum	mg/L	0.1 OG	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	0.007	0.007	<0.004			0.007
Arsenic	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003			<0.003
Barium	mg/L	1 MAC	0.019	0.021	0.032	0.027	0.028	0.036	0.026	0.038	0.04	0.037	0.029	0.031			0.037
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001			<0.001
Bismuth	mg/L		<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002			<0.002
Boron	mg/l	5 IMAC [5]	0.047	0.12	0.024	0.036	0.052	0.066	0.048	0.091	0.046	0.044	0.044	0.034			0.083
Cadmium	mg/L	0.005 MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	**DESTROYED**		<0.002
Calcium	mg/L		49	70	65	61	58	69	64	60	83	70.2	70.7	73.5			55.2
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003			<0.003
Cobalt	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001			<0.001
Copper	mg/L	1 AO	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003			<0.003
Iron	mg/L	0.3 AO	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.010	<0.010	<0.010			0.019
Lead	mg/L	0.01 MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002			<0.002
Magnesium	mg/L		28	73	29	33	33	46	41	55	46	34.4	37.6	39.1			33.2
Manganese	mg/L	0.05 AO	0.014	0.022	0.012	0.018	0.003	0.004	0.015	0.015	<0.002	0.012	0.006	0.005			**0.093**
Molybdenum	mg/L		0.029	0.062	0.009	0.017	0.022	0.025	0.016	0.032	0.015	0.010	0.013	0.011			0.019
Nickel	mg/L		<0.001	0.001	<0.001	0.001	0.001	0.002	0.0011	0.0012	0.0025	<0.003	<0.003	<0.003			<0.003
Potassium	mg/L		4.4	9.9	2.6	4.0	4.9	5.8	4.3	7.5	5.2	3.73	4.61	4.75			9.33
Selenium	mg/L	0.05 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004			<0.004
Silicon	mg/L											6.07	4.86	5.12			4.62
Silver	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002			<0.002
Sodium	mg/L	200 AO	120	100	48	65	86	86	50	62	58	43.4	43.1	45.3			28.6
Strontium	mg/L		0.59	3.2	0.53	0.98	1.0	1.5	1.5	2.7	1.9	0.955	1.13	1.46			0.617
Sulphur	mg/L											24.5	27.5	22.3			27.1
Thallium	mg/L		<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.006	<0.006	<0.006			<0.006
Tin	mg/L		<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002			<0.002
Titanium	mg/L		<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
Uranium	mg/L	0.02 MAC	0.0071	0.0047	0.0047	0.0047	0.0057	0.0062	0.0037	0.0039	0.0073	0.004	0.005	0.005			<0.002
Vanadium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.0005	0.0005	0.00068	0.0011	0.00075	<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	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-24-II

Parameters	Units	ODWS [1]	2015			2016			2017			2018			2019		
General Chemistry			**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	263	282	292	300	307	306	328	302	349	351	302	324	347	320	340
Chloride	mg/L	250 AO [3]	15.0	12.6	7.4	6.67	5.32	4.70	3.56	3.74	4.07	4.12	3.74	3.33	3.25	3.45	3.08
Dissolved Organic Carbon	mg/L	5 AO	1.9	3.2	1.2	1.4	1.6	1.9	0.9	1.6	2.1	1.5	1.6	1.4	1.7	1.5	1.4
Fluoride	mg/L	1.5 MAC [4]	0.92	0.79	0.74	0.67	0.66	0.70	0.57	0.73	0.64	0.65	0.73	0.58	0.62	0.58	0.62
Sulphate	mg/L	500 AO	10.4	18.7	14.2	11.6	10.8	13.2	14.5	14.8	16.8	17.3	14.8	20.8	18.9	21.1	21.5
Hardness	mg/L	80-100 OG	**231**	**266**	**277**	**261**	**271**	**277**	**281**	**287**	**316**	**301**	**287**	**330**	**324**	**275**	**325**
Nitrate	mg/L	10 MAC	<0.05	0.13	<0.05	<0.10	<0.10	<0.05	<0.10	<0.05	<0.10	0.12	<0.05	<0.10	<0.10	0.12	0.12
Nitrite	mg/L	1 MAC	<0.05	<0.10	<0.05	<0.10	<0.10	<0.05	<0.10	<0.05	<0.10	<0.05	<0.05	<0.10	<0.10	<0.10	<0.10
Organic Nitrogen	mg/L	0.15 OG	0.14	0.10	**0.16**	<0.10	**0.18**	0.13	0.10	<0.10	**0.40**	0.14	<0.10	**0.26**	<0.10	0.12	**0.23**
Orthophosphate	mg/L		<0.10	<0.20	<0.10	<0.20	<0.20	<0.10	<0.20	<0.10	<0.20	<0.10	<0.10	<0.20	<0.20	<0.20	<0.20
pH	pH Units		8.36	8.24	8.15	8.16	8.09	8.31	8.28	8.2	8.17	8.07	8.20	8.02	7.99	7.84	7.90
Electrical Conductivity	µS/cm		571	605	602	552	604	634	609	566	675	614	566	651	631	733	746
Total Ammonia	mg/L		<0.02	0.06	<0.02	<0.02	<0.02	<0.02	<0.02	0.16	0.02	0.06	0.16	0.07	<0.02	0.03	0.07
Total Dissolved Solids	mg/L	500 AO	276	302	298	288	298	304	306	312	322	316	312	366	344	348	338
Total Kjeldahl Nitrogen (TKN)	mg/L		0.14	0.16	0.16	<0.10	0.18	0.13	0.10	<0.10	0.42	0.20	<0.10	0.33	<0.10	0.15	0.30
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
Metals																	
Aluminum	mg/L	0.1 OG	0.004	0.005	<0.004	<0.004	**0.337**	0.057	0.007	<0.004	0.006	0.009	<0.004	0.009	<0.004	<0.004	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	0.049	0.046	0.052	0.046	0.047	0.051	0.048	0.054	0.057	0.056	0.054	0.059	0.053	0.026	0.053
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 [5]	0.068	0.075	0.064	0.077	0.063	0.065	0.053	0.055	0.079	0.070	0.055	0.060	0.060	0.056	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	<0.002	<0.002	<0.002
Calcium	mg/L		42.4	49.3	55.1	49.1	53.4	55.5	56.4	53.7	63.6	56.9	53.7	65.7	65.8	50.4	69.4
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	<0.003	<0.003
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<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	0.013	<0.003	<0.003	0.013	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.010	0.148	0.09	0.070	**0.319**	0.079	<0.010	0.073	0.045	<0.010	0.073	<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	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		30.3	34.7	33.9	33.7	33.4	33.6	34.0	37.1	38.1	38.7	37.1	40.3	38.9	36.2	36.9
Manganese	mg/L	0.05 AO	**0.083**	**0.126**	**0.107**	**0.067**	**0.110**	**0.109**	0.043	0.047	**0.126**	**0.112**	0.047	**0.126**	**0.075**	0.017	**0.122**
Molybdenum	mg/L		0.018	0.018	0.014	0.010	0.010	0.011	0.007	0.008	0.010	0.009	0.008	0.009	0.008	0.007	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		9.5	9.56	8.05	7.12	7.26	7.28	6.17	7.16	6.63	6.47	7.16	6.60	6.10	4.57	5.68
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		6.15	5.41	5.85	5.47	6.90	5.76	5.69	6.35	6.02	4.84	6.35	5.00	5.92	2.78	5.43
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	21.9	21.4	17.2	17.5	16.5	15.6	15.8	15.1	14.1	15.4	15.1	15.0	16.2	14.3	14.3
Strontium	mg/L		0.616	0.754	0.735	0.735	0.777	0.877	0.807	1.06	1.07	1.11	1.06	1.35	1.21	1.03	1.17
Sulphur	mg/L		2.83	4.69	4.5	2.75	3.58	4.63	4.76	4.64	5.0	5.01	4.64	9.43	7.79	10.2	7.60
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	0.013	0.003	<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	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	0.024	0.005	<0.005	0.024	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-24-III

Parameters	Units	ODWS [1]	2010		2011		2012		2013			2014			2015		
General Chemistry			**Jun**	**Nov**	**Jun**	**Nov**	**Jun**	**Nov**	**May**	**July**	**Sep**	**June**	**July**	**Sep**	**May**	**July**	**Sep**
Alkalinity	mg/L	30-500 OG [2]	315	316	304	308	310	320	289	317	373	352	309	307	227	252	211
Chloride	mg/L	250 AO [3]	2.0	<1	<1	<1	<1	<1	1.25	1.0	1.14	3.88	4.08	3.84	3.55	3.70	4.52
Dissolved Organic Carbon	mg/L	5 AO	1.2	1.4	1	1.1	1.1	1.1	1.4	1.3	1.6	1.5	2.7	2.0	1.9	2.6	3.7
Fluoride	mg/L	1.5 MAC [4]	0.1	0.1	0.1	0.1	0.13	0.12	<0.10	0.1	<0.10	0.07	<0.25	<0.10	<0.05	0.15	0.11
Sulphate	mg/L	500 AO	5.0	5.0	4.0	5.0	4.0	3.0	4.05	3.41	3.53	15.5	20.8	13.0	14.1	9.61	21.6
Hardness	mg/L	80-100 OG	**330**	**320**	**320**	**290**	**310**	**280**	**285**	**290**	**318**	**335**	**335**	**303**	**224**	**300**	**249**
Nitrate	mg/L	10 MAC	0.4	0.4	0.2	0.1	0.18	0.14	0.13	0.12	0.16	0.59	0.49	0.78	1.20	1.37	0.22
Nitrite	mg/L	1 MAC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.10	<0.05	<0.10	<0.05	<0.25	<0.10	<0.05	<0.10	<0.05
Organic Nitrogen	mg/L	0.15 OG	**0.675**	**0.175**		**0.175**	**0.615**	**0.265**	**0.88**	<0.10	<0.10	**0.46**	**0.39**	**0.23**	**0.77**	**0.91**	**1.19**
Orthophosphate	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.20	<0.10	<0.20	<0.10	<0.50	<0.20	<0.10	<0.20	<0.10
pH	pH Units								8.02	7.47	7.23	8.08	7.95	7.75	8.25	8.17	7.97
Electrical Conductivity	µS/cm								554	563	599	655	628	637	470	519	469
Total Ammonia	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.02	0.07	0.09	0.6	0.45	0.37	0.1
Total Dissolved Solids	mg/L	500 AO	336	332	321	315	323	314	280	318	310	352	372	352	252	316	260
Total Kjeldahl Nitrogen (TKN)	mg/L		0.7	0.2	<1	0.2	0.64	0.29	0.88	<0.10	<0.10	0.53	0.48	0.83	1.22	1.28	1.29
Total Phosphorus	mg/L		0.1						<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals																	
Aluminum	mg/L	0.1 OG	<0.005	<0.005	<0.005	<0.005	0.0056	<0.005	0.007	0.018	<0.004	<0.004	<0.004	<0.004	<0.004	0.004	<0.004
Arsenic	mg/L	0.01 MAC	<0.001	<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
Barium	mg/L	1 MAC	0.015	0.017	0.017	0.018	0.016	0.017	0.015	0.014	0.016	0.032	0.03	0.03	0.019	0.023	0.023
Beryllium	mg/L		<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
Bismuth	mg/L		<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
Boron	mg/l	5 IMAC [5]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.015	0.010	<0.010	0.01	0.012	0.021	0.011	0.011	0.018
Cadmium	mg/L	0.005 MAC	<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
Calcium	mg/L		89	84	85	77	84	75	77.2	78.2	86.8	91.0	93.9	86.0	66.9	85.5	74.9
Chromium	mg/L	0.05 MAC	<0.005	<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
Cobalt	mg/L		<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
Copper	mg/L	1 AO	<0.001	<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
Iron	mg/L	0.3 AO	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	0.018	0.156	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Magnesium	mg/L		26	27	26	25	25	22	22.4	22.9	24.5	26.2	24.4	21.4	13.9	21.0	15.1
Manganese	mg/L	0.05 AO	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	**0.161**	**0.364**	0.037	**0.091**
Molybdenum	mg/L		<0.001	<0.001	<0.001	<0.0005	<0.0005	0.00085	<0.002	<0.002	<0.002	<0.002	<0.002	0.004	<0.002	<0.002	<0.002
Nickel	mg/L		<0.001	<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
Potassium	mg/L		0.68	0.65	0.7	0.61	0.73	0.65	0.71	0.71	0.69	0.8	1.23	1.6	1.77	1.15	5.78
Selenium	mg/L	0.05 MAC	<0.002	<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
Silicon	mg/L								6.88	6.87	7.8	6.68	6.8	6.45	3.8	4.58	3.86
Silver	mg/L		<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
Sodium	mg/L	200 AO	5.7	6.1	5.4	5.8	5.5	7.1	6.25	5.35	5.64	13.4	9.64	8.99	6.67	6.54	7.82
Strontium	mg/L		0.12	0.12	0.12	0.11	0.12	0.12	0.109	0.109	0.131	0.139	0.15	0.345	0.129	0.137	0.119
Sulphur	mg/L								1.59	1.23	<0.05	4.56	8.3	6.65	6.26	2.75	7.32
Thallium	mg/L		<0.00005	<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
Tin	mg/L		<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
Titanium	mg/L		<0.005	<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	<0.002
Uranium	mg/L	0.02 MAC	0.0005	0.0004	0.0005	0.0004	0.00051	0.00054	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/L		<0.001	<0.001	<0.001	0.0011	0.00072	0.00072	<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	0.0064	0.007	<0.005	<0.005	0.006	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-24-III

Parameters	Units	ODWS [1]	2016			2017			2018			2019		
General Chemistry			**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	294	359	357	348	366	375	280	326	312	276	361	339
Chloride	mg/L	250 AO [3]	4.29	3.76	3.22	3.85	3.56	3.51	4.92	4.17	3.06	2.91	4.28	3.16
Dissolved Organic Carbon	mg/L	5 AO	2.7	2.2	4.6	1.8	2.2	2.7	2.1	3.0	2.0	2.4	**7.2**	4.9
Fluoride	mg/L	1.5 MAC [4]	<0.10	<0.10	<0.05	<0.25	<0.05	<0.10	<0.05	<0.05	<0.10	<0.05	<0.10	<0.10
Sulphate	mg/L	500 AO	19.9	11.0	7.89	18.4	11.9	12.9	14.4	12.7	15.2	14.3	12.5	16.0
Hardness	mg/L	80-100 OG	**297**	**357**	**335**	**333**	**352**	**352**	**257**	**339**	**346**	**280**	**358**	**345**
Nitrate	mg/L	10 MAC	1.09	2.45	1.85	2.33	2.10	1.59	0.56	0.94	0.90	0.38	<0.10	0.79
Nitrite	mg/L	1 MAC	<0.10	<0.10	<0.05	<0.25	<0.05	<0.10	<0.05	<0.05	<0.10	<0.05	<0.10	0.14
Organic Nitrogen	mg/L	0.15 OG	**0.37**	**0.52**	**0.56**	**0.37**	**0.23**	**0.27**	**0.23**	**0.25**	**0.17**	**0.26**	**1.05**	**1.07**
Orthophosphate	mg/L		<0.20	<0.20	<0.10	<0.50	<0.10	<0.20	<0.10	<0.10	<0.20	<0.10	<0.20	<0.20
pH	pH Units		7.94	7.91	8.03	8.16	8.32	8.08	7.78	7.94	7.81	7.69	7.46	7.67
Electrical Conductivity	µS/cm		554	701	710	668	666	726	518	657	646	521	784	748
Total Ammonia	mg/L		0.03	0.04	0.14	0.07	1.14	0.11	0.15	0.31	0.04	<0.02	4.10	0.32
Total Dissolved Solids	mg/L	500 AO	312	358	362	330	386	356	270	364	392	280	330	356
Total Kjeldahl Nitrogen (TKN)	mg/L		0.40	0.56	0.70	0.44	1.37	0.38	0.38	0.56	0.21	0.26	5.15	1.39
Total Phosphorus	mg/L		<0.05	<0.05	0.21	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals														
Aluminum	mg/L	0.1 OG	**0.403**	**0.240**	0.007	0.008	0.006	0.005	0.007	<0.004	0.007	0.011	<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
Barium	mg/L	1 MAC	0.036	0.028	0.029	0.029	0.025	0.025	0.027	0.042	0.034	0.026	0.030	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
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 [5]	0.010	<0.010	0.013	0.012	0.012	0.026	0.018	0.020	0.015	<0.010	0.014	0.016
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		85.4	100	94.1	92.8	95.6	97.1	73.1	94.3	95.4	77.7	98.4	95.7
Chromium	mg/L	0.05 MAC	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	0.003	<0.001	<0.001	<0.001	0.001	0.001	0.001	<0.001	<0.001	0.001	0.003
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	0.014	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	**0.334**	0.142	<0.010	<0.010	0.075	0.012	**0.72**	**2.73**	<0.010	<0.010	<0.010	**0.444**
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		20.4	26.0	24.2	24.5	27.5	26.5	18.2	25.1	26.1	20.8	27.2	25.8
Manganese	mg/L	0.05 AO	0.026	0.050	0.019	0.005	0.030	0.010	**0.280**	**0.423**	0.008	0.005	**0.268**	**0.216**
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
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		1.21	1.11	1.13	1.17	1.0	0.95	2.40	2.13	1.39	0.91	2.61	1.18
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
Silicon	mg/L		5.51	8.25	7.48	6.23	8.21	8.22	3.89	7.91	6.34	5.73	8.32	7.97
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	6.91	6.27	6.23	7.03	6.07	6.17	6.00	5.88	7.50	5.86	6.48	6.27
Strontium	mg/L		0.158	0.146	0.163	0.153	0.155	0.158	0.116	0.142	0.157	0.110	0.139	0.142
Sulphur	mg/L		6.99	3.10	4.0	6.23	4.43	4.62	4.55	6.18	7.53	6.69	7.23	5.29
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		0.011	0.008	<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
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	0.012	<0.005	<0.005	0.006	0.027	<0.005	0.009	<0.005	0.011	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-25-I

Parameters	Units	ODWS [1]	2010			2011			2012			2013			2014		
General Chemistry			**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**May**	**July**	**Sep**	**June**	**July**	**Sep**
Alkalinity	mg/L	30-500 OG [2]	237	227	228	225	239	231	230	240	230	228	241	262	230	227	223
Chloride	mg/L	250 AO [3]	2.0	2.0	1.0	2.0	2.0	2.0	2.0	1.0	<1	1.44	1.28	1.56	1.68	1.27	1.32
Dissolved Organic Carbon	mg/L	5 AO	2.3	2.7	2.9	2.3	2.3	2.4	2.5	2.4	2.3	1.2	3.1	2.9	2.5	2.5	2.4
Fluoride	mg/L	1.5 MAC [4]	0.6	0.6	0.6	0.6	0.71	0.7	0.69	0.63	0.67	0.54	0.55	0.71	0.54	0.55	0.59
Sulphate	mg/L	500 AO	5.0	3.0	3.0	4.0	7.0	5.0	5.0	<1	4.0	1.64	1.6	3.88	5.3	0.89	1.38
Hardness	mg/L	80-100 OG	**180**	**170**	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**166**	**159**	**164**	**164**	**181**	**165**
Nitrate	mg/L	10 MAC	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	<0.10	0.16	<0.05	<0.10
Nitrite	mg/L	1 MAC	0.02	<0.01	<0.01	0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.10	<0.05	<0.05	<0.10
Organic Nitrogen	mg/L	0.15 OG		**0.83**	**0.21**	**0.61**	**0.37**	**0.22**	**0.35**	0.12	**1.53**	**0.91**	<0.10	<0.10	**0.44**	<0.10	**0.18**
Orthophosphate	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.012	0.014	<0.01	<0.10	<0.10	<0.20	<0.10	<0.10	<0.20
pH	pH Units											8.13	7.81	7.34	8.32	8.19	8.06
Electrical Conductivity	µS/cm											441	432	450	433	432	444
Total Ammonia	mg/L		0.2	0.27	0.29	0.29	0.23	0.18	0.16	0.42	0.37	0.28	0.41	0.25	0.33	0.39	0.34
Total Dissolved Solids	mg/L	500 AO	264	250	248	246	262	249	255	247	247	218	252	236	240	246	228
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.5	1.1	0.5	0.9	0.6	0.4	0.51	0.54	1.9	1.19	0.17	0.23	0.77	0.46	0.52
Total Phosphorus	mg/L		0.26									<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals																	
Aluminum	mg/L	0.1 OG	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0051	0.005	0.006	<0.004	<0.004	<0.004	<0.004
Arsenic	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.037	0.04	0.039	0.047	0.041	0.039	0.041	0.042	0.039	0.042	0.04	0.035	0.04	0.036	0.034
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L		<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC [5]	0.15	0.13	0.14	0.15	0.15	0.14	0.14	0.14	0.14	0.146	0.124	0.109	0.136	0.131	0.123
Cadmium	mg/L	0.005 MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		37	35	33	34	35	33	33	33	34	36	34.2	35.5	34.5	39.8	34.9
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	0.14	0.15	0.22	0.15	0.24	<0.1	<0.1	0.19	0.23	0.141	0.164	0.115	0.102	0.17	0.163
Lead	mg/L	0.01 MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Magnesium	mg/L		20	19	19	19	19	18	20	19	19	18.6	17.8	18.4	19.0	19.8	18.8
Manganese	mg/L	0.05 AO	0.007	0.009	0.009	0.008	0.011	0.011	0.0067	0.0095	0.011	0.009	0.008	0.009	0.007	0.011	0.011
Molybdenum	mg/L		0.016	0.011	0.011	0.007	0.01	0.0069	0.0095	0.0072	0.0063	0.003	0.003	<0.002	0.004	<0.002	<0.002
Nickel	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		4.30	3.80	3.80	3.8	4	3.6	3.8	3.7	3.6	3.79	3.66	3.67	3.94	4.32	4.01
Selenium	mg/L	0.05 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L											7.59	7.54	6.88	7.56	7.43	7.37
Silver	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	36	33	34	31	34	33	35	32	32	28	27	31.5	33.1	29.3	29.2
Strontium	mg/L		0.72	0.75	0.7	0.78	0.76	0.69	0.79	0.76	0.72	0.703	0.786	0.744	0.745	0.744	0.657
Sulphur	mg/L											0.69	0.62	<0.05	1.28	0.9	1.88
Thallium	mg/L		<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	mg/L		<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium	mg/L		<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	<0.002
Uranium	mg/L	0.02 MAC	0.0001	<0.0001	0.0003	<0.0001	0.0001	<0.0001	0.00024	<0.0001	0.00011	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	0.00063	<0.0005	<0.0005	<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	0.0051	0.006	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-25-I

Parameters	Units	ODWS [1]	2015			2016			2017			2018			2019		
General Chemistry			**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	221	231	225	234	235	239	236	243	239	252	222	211	234	217	223
Chloride	mg/L	250 AO [3]	1.27	1.48	1.32	1.43	1.23	1.22	1.41	1.21	1.26	1.21	1.24	1.04	1.11	1.44	1.13
Dissolved Organic Carbon	mg/L	5 AO	2.7	3.2	2.8	2.7	3.1	2.4	2.5	3.0	3.0	2.7	2.3	2.6	3.0	3.1	2.2
Fluoride	mg/L	1.5 MAC [4]	0.60	0.46	0.60	0.16	0.58	0.53	0.51	0.56	0.52	0.52	0.59	0.53	0.50	0.60	0.57
Sulphate	mg/L	500 AO	0.90	6.11	1.24	2.53	1.42	0.77	2.62	1.88	0.82	2.25	2.33	0.90	1.53	2.64	1.31
Hardness	mg/L	80-100 OG	**163**	**177**	**166**	**161**	**159**	**160**	**153**	**157**	**166**	**167**	**166**	**168**	**167**	**169**	**156**
Nitrate	mg/L	10 MAC	<0.05	<0.10	<0.05	<0.10	<0.05	<0.05	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrite	mg/L	1 MAC	<0.05	<0.10	<0.05	<0.10	<0.05	<0.05	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Organic Nitrogen	mg/L	0.15 OG	**0.17**	**0.39**	**0.21**	<0.10	**0.21**	**0.16**	**0.17**	<0.10	**0.23**	**0.25**	<0.10	**0.19**	**0.16**	**0.25**	**0.37**
Orthophosphate	mg/L		0.55	<0.20	<0.10	<0.20	<0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
pH	pH Units		8.39	8.15	8.13	8.08	8.17	8.33	8.23	8.34	8.18	7.92	7.96	7.8	7.83	7.86	7.70
Electrical Conductivity	µS/cm		432	454	438	414	444	449	422	427	449	429	432	418	414	463	468
Total Ammonia	mg/L		0.31	0.22	0.33	0.30	0.31	0.36	0.22	0.33	0.30	0.35	0.34	0.34	0.16	0.29	0.36
Total Dissolved Solids	mg/L	500 AO	220	240	230	224	228	224	220	232	220	222	224	286	226	220	232
Total Kjeldahl Nitrogen (TKN)	mg/L		0.48	0.61	0.54	0.39	0.52	0.52	0.39	0.38	0.53	0.60	0.37	0.53	0.32	0.54	0.73
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
Metals																	
Aluminum	mg/L	0.1 OG	<0.004	0.005	<0.004	0.007	**0.236**	0.016	<0.004	0.005	0.007	0.005	<0.004	0.012	<0.004	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	0.040	0.041	0.040	0.040	0.043	0.042	0.041	0.04	0.045	0.043	0.040	0.041	0.040	0.039	0.040
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 [5]	0.113	0.127	0.130	0.141	0.127	0.127	0.118	0.131	0.142	0.128	0.132	0.139	0.142	0.147	0.145
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		34.8	39.0	35.7	33.4	33.8	35.2	32.0	32.5	36.6	36.0	35.7	36.7	36.6	36.3	33.9
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	0.157	0.151	0.137	0.141	0.283	0.137	0.081	0.162	0.142	<0.010	0.124	0.146	0.046	<0.010	0.069
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		18.4	19.3	18.6	18.8	18.1	17.6	17.8	18.3	18.0	18.7	18.7	18.5	18.4	19.1	17.3
Manganese	mg/L	0.05 AO	0.009	0.024	0.012	0.012	0.015	0.011	0.011	0.014	0.011	0.011	0.010	0.014	0.012	0.020	0.016
Molybdenum	mg/L		<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	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		3.92	3.87	4.01	3.81	3.85	3.84	3.67	3.46	3.45	3.69	3.51	3.61	3.79	3.72	3.60
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	<0.004	<0.004	<0.004
Silicon	mg/L		6.94	6.35	7.43	7.25	8.53	7.45	7.69	7.99	7.45	5.48	8.92	6.56	7.57	6.93	7.38
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	29.1	27.5	29.4	32.5	30.0	27.9	29.5	27.5	24.8	28.8	27.6	27.3	28.7	31.2	28.5
Strontium	mg/L		0.654	0.730	0.722	0.732	0.728	0.77	0.764	0.751	0.737	0.714	0.709	0.802	0.733	0.74	0.738
Sulphur	mg/L		0.55	0.54	0.83	0.77	1.32	1.14	1.01	1.14	0.86	0.76	1.63	1.20	1.57	1.83	1.31
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	0.010	<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	0.007	0.006	<0.005	<0.005	<0.005	0.009	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Notes:
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2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-25-II

Parameters	Units	ODWS [1]	2010			2011			2012			2013			2014		
General Chemistry			**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**May**	**July**	**Sep**	**June**	**July**	**Sep**
Alkalinity	mg/L	30-500 OG [2]	144	145	145	147	150	150	150	160	170	149	158	173	152	142	139
Chloride	mg/L	250 AO [3]	18	19	18	17	18	16	14.0	14.0	14.0	12.2	11.9	11.8	11.2	10.4	10.8
Dissolved Organic Carbon	mg/L	5 AO	1.7	1.6	1.7	1.4	1.3	1.3	1.4	1.7	1.3	2.3	1.7	1.7	1.4	1.1	1.3
Fluoride	mg/L	1.5 MAC [4]	0.9	0.8	0.9	0.9	0.98	1	1.04	1.06	1.04	0.89	0.89	1.16	1.00	0.43	0.96
Sulphate	mg/L	500 AO	340	320	300	280	280	250	250	240	240	252	238	235	232	230	212
Hardness	mg/L	80-100 OG	**210**	**190**	**190**	**170**	**170**	**180**	**170**	**160**	**150**	**151**	**144**	**152**	**141**	**149**	**135**
Nitrate	mg/L	10 MAC	0.2	0.2	0.2	0.2	0.2	0.1	0.19	0.18	0.17	<0.25	<0.25	<0.25	0.25	<0.25	0.27
Nitrite	mg/L	1 MAC	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.012	<0.01	<0.25	<0.25	<0.25	<0.05	<0.25	<0.10
Organic Nitrogen	mg/L	0.15 OG		**0.375**	**0.275**	**0.975**	**0.375**	**0.275**	0.105	**0.655**	**0.455**	**0.79**	<0.10	<0.10	**0.38**	<0.10	**0.20**
Orthophosphate	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.012	<0.50	<0.50	<0.50	<0.10	<0.50	<0.20
pH	pH Units											8.07	7.88	7.15	8.29	8.26	8.29
Electrical Conductivity	µS/cm											866	837	789	808	806	795
Total Ammonia	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	0.03	0.06	0.05	0.03
Total Dissolved Solids	mg/L	500 AO	**671**	**647**	**623**	**582**	**589**	**574**	**553**	**531**	**533**	490	**514**	**542**	474	**514**	440
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.5	0.4	0.3	1.0	0.4	0.3	0.13	0.68	0.48	0.79	<0.10	<0.10	0.44	<0.10	0.23
Total Phosphorus	mg/L		0.06									<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals																	
Aluminum	mg/L	0.1 OG	0.011	0.007	0.006	0.011	0.007	0.01	0.006	0.005	0.0053	0.011	0.009	0.005	0.009	0.008	0.005
Arsenic	mg/L	0.01 MAC	0.001	0.001	0.001	0.001	0.001	<0.001	0.0014	<0.001	0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.021	0.025	0.025	0.023	0.025	0.025	0.023	0.025	0.025	0.025	0.023	0.023	0.019	0.02	0.021
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L		<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC [5]	0.21	0.19	0.22	0.21	0.21	0.23	0.21	0.22	0.22	0.234	0.213	0.197	0.18	0.192	0.195
Cadmium	mg/L	0.005 MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		39	35	34	32	32	33	32	30	28	28.8	27.3	28.9	26.6	28.1	25.4
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	0.001	<0.001	<0.001	0.001	0.001	0.002	0.0011	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Magnesium	mg/L		28	26	26	23	22	24	22	19	20	19.3	18.4	19.3	18.2	19.2	17.5
Manganese	mg/L	0.05 AO	0.003	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	0.0057	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002
Molybdenum	mg/L		0.17	0.16	0.13	0.13	0.12	0.11	0.11	0.099	0.093	0.090	0.092	0.084	0.066	0.079	0.072
Nickel	mg/L		<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		10.00	9.80	9.60	9.1	9.1	9.5	9.2	8.2	8.4	8.29	7.96	8.58	8.08	8.55	8.37
Selenium	mg/L	0.05 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L											3.13	3.26	3.65	2.89	3.11	3.17
Silver	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	140	140	140	130	130	140	130	110	120	110	109	119	116	117	116
Strontium	mg/L		0.75	0.78	0.71	0.72	0.7	0.66	0.66	0.66	0.63	0.582	0.672	0.583	0.552	0.595	0.521
Sulphur	mg/L											82.7	81.6	87	66.9	76.7	80.9
Thallium	mg/L		<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	mg/L		<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.002	<0.002	0.004	0.002	<0.002	<0.002
Uranium	mg/L	0.02 MAC	0.003	0.0028	0.003	0.0031	0.0028	0.0028	0.0032	0.0028	0.0029	0.003	0.003	0.003	0.003	0.003	0.003
Vanadium	mg/L		<0.001	<0.001	0.001	<0.001	0.0011	0.0012	0.00096	0.001	0.0013	<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	0.027	<0.005	0.005	<0.005	0.005	0.010	0.005

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New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-25-II

Parameters	Units	ODWS [1]	2015			2016			2017			2018			2019		
General Chemistry			**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	145	147	143	155	152	142	155	160	156	169	143	137	158	141	144
Chloride	mg/L	250 AO [3]	8.82	10.2	9.64	9.87	8.69	8.31	7.16	7.92	7.7	7.48	6.87	6.26	5.93	6.54	5.80
Dissolved Organic Carbon	mg/L	5 AO	1.5	**5.3**	1.5	1.5	1.6	1.2	1.0	1.7	1.7	1.9	1.8	2.2	1.6	1.4	1.2
Fluoride	mg/L	1.5 MAC [4]	1.16	0.65	1.11	0.29	0.9	1.0	0.62	1.09	0.96	1.30	0.61	0.90	0.91	1.03	0.58
Sulphate	mg/L	500 AO	218	237	223	257	236	210	213	214	199	211	212	196	199	218	203
Hardness	mg/L	80-100 OG	**141**	**145**	**142**	**137**	**129**	**124**	**128**	**125**	**119**	**125**	**128**	**124**	**123**	**127**	**117**
Nitrate	mg/L	10 MAC	<0.25	<0.25	0.35	<0.25	0.19	<0.25	<0.25	0.13	0.14	0.16	<0.25	0.11	0.12	<0.10	<0.25
Nitrite	mg/L	1 MAC	<0.25	<0.25	<0.25	<0.25	<0.10	<0.25	<0.25	<0.05	<0.10	<0.05	<0.25	<0.10	<0.10	<0.10	<0.25
Organic Nitrogen	mg/L	0.15 OG	**0.32**	**0.86**	**0.33**	<0.10	**0.25**	<0.10	<0.10	<0.10	**0.26**	**0.37**	**0.16**	**0.18**	<0.10	<0.10	<0.10
Orthophosphate	mg/L		<0.50	<0.50	<0.50	<0.50	<0.20	<0.50	<0.50	<0.10	<0.20	<0.10	<0.50	<0.20	<0.20	<0.20	<0.50
pH	pH Units		8.33	8.04	8.13	8.14	8.21	8.37	8.17	8.17	8.08	7.76	7.89	7.75	7.97	8.03	7.64
Electrical Conductivity	µS/cm		798	836	793	769	791	795	740	770	784	749	746	722	716	795	810
Total Ammonia	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.10	<0.02	0.05	<0.02
Total Dissolved Solids	mg/L	500 AO	408	462	476	452	456	454	420	448	450	452	448	454	440	416	420
Total Kjeldahl Nitrogen (TKN)	mg/L		0.32	0.86	0.33	<0.10	0.25	<0.10	<0.10	<0.10	0.26	0.37	0.16	0.28	<0.10	0.12	<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
Metals																	
Aluminum	mg/L	0.1 OG	0.024	**0.151**	0.006	0.026	**0.181**	0.011	0.016	0.009	0.011	**0.366**	0.005	0.013	0.008	0.006	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	0.024	0.023	0.025	0.027	0.023	0.027	0.023	0.023	0.024	0.024	0.023	0.025	0.025	0.024	0.027
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	<0.010	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC [5]	0.204	0.176	0.198	0.226	0.196	0.198	0.193	0.218	0.219	0.134	0.186	0.214	0.220	0.220	0.197
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		26.3	27.1	27.1	25.2	24.2	23.8	23.8	23.1	22.4	23.5	23.7	23.3	23.2	23.8	22.1
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	0.052	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.010	0.217	<0.010	<0.010	0.125	<0.010	<0.010	<0.010	<0.010	0.193	<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	0.003	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		18.2	18.7	18.1	17.9	16.6	15.8	16.7	16.4	15.2	16.1	16.6	16.0	15.8	16.5	15.1
Manganese	mg/L	0.05 AO	<0.002	0.010	<0.002	<0.002	0.005	<0.002	<0.002	<0.002	<0.002	0.016	<0.002	<0.002	<0.002	<0.002	<0.002
Molybdenum	mg/L		0.067	0.068	0.063	0.058	0.059	0.06	0.061	0.061	0.063	0.031	0.049	0.053	0.048	0.050	0.048
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.013	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		8.37	8.11	8.5	8.12	8.65	8.10	7.99	7.27	6.67	6.87	6.87	7.46	7.04	7.26	7.54
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		3.24	2.79	3.2	3.06	3.65	3.06	3.2	3.36	3.6	2.42	3.22	2.75	3.68	2.10	3.14
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	115	110	115	122	118	110	108	103	97	95.7	98.9	104	99.0	105	105
Strontium	mg/L		0.55	0.595	0.559	0.540	0.538	0.566	0.571	0.562	0.537	0.348	0.507	0.531	0.548	0.557	0.536
Sulphur	mg/L		82	81.4	82	71.7	67.9	65.9	72.7	67.4	65.6	45.0	64.4	68.8	67.7	69.1	66.3
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		0.005	0.011	0.004	0.004	0.011	0.003	0.003	0.005	<0.002	0.007	0.002	0.003	0.004	0.003	0.003
Uranium	mg/L	0.02 MAC	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.004	0.003	0.004	0.004	0.005	0.003	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	0.005	<0.005	0.009	<0.005	<0.005	0.006	0.008	0.005	0.078	<0.005	<0.005	<0.005	<0.005	0.009

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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-25-III

Parameters	Units	ODWS [1]	2010			2011			2012			2013			2014		
General Chemistry			**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**Jun**	**Sep**	**Nov**	**May**	**July**	**Sep**	**June**	**July**	**Sep**
Alkalinity	mg/L	30-500 OG [2]	353	356	363	383	381	401	390	380	410	416	416	426	356	364	348
Chloride	mg/L	250 AO [3]	2.0	1.0	1.0	2.0	1.0	1.0	1.0	1.0	<1	1.33	1.48	1.45	1.79	1.63	2.02
Dissolved Organic Carbon	mg/L	5 AO	1.0	1.4	1.5	1.0	1.1	1.2	1.3	1.2	0.99	2.1	1.1	1.6	1.0	1.0	1.1
Fluoride	mg/L	1.5 MAC [4]	1.0	1.1	0.8	0.9	1.03	0.9	1.02	1.14	0.79	0.83	0.97	0.89	0.54	0.51	1.24
Sulphate	mg/L	500 AO	68	120	58	110	120	210	210	190	76	117	127	157	132	140	161
Hardness	mg/L	80-100 OG	**400**	**350**	**350**	**370**	**410**	**580**	**500**	**460**	**370**	**418**	**430**	**455**	**403**	**432**	**417**
Nitrate	mg/L	10 MAC	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Nitrite	mg/L	1 MAC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.014	<0.01	<0.01	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Organic Nitrogen	mg/L	0.15 OG		**0.875**	**0.24**	**0.78**	**0.975**	**0.38**	**0.695**	**0.88**	**1.325**	**0.76**	**0.18**	0.11	**0.61**	<0.10	**0.19**
Orthophosphate	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
pH	pH Units											8.15	7.68	7.47	8.22	8.15	8.01
Electrical Conductivity	µS/cm											951	923	983	865	900	950
Total Ammonia	mg/L		<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	0.12	0.075	<0.02	0.03	<0.02	0.07	0.08	0.04
Total Dissolved Solids	mg/L	500 AO	451	**517**	452	**533**	**556**	**718**	**685**	**632**	**508**	**520**	**574**	**592**	**536**	**550**	**532**
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.5	0.9	0.3	0.8	1.0	0.4	0.72	1.0	1.4	0.76	0.21	0.11	0.68	0.14	0.23
Total Phosphorus	mg/L		0.24									<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals																	
Aluminum	mg/L	0.1 OG	<0.005	<0.005	<0.005	<0.005	0.009	0.006	<0.005	<0.005	<0.005	0.004	0.044	<0.004	<0.004	<0.004	0.024
Arsenic	mg/L	0.01 MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.03	0.038	0.036	0.041	0.045	0.055	0.043	0.05	0.04	0.045	0.042	0.037	0.039	0.037	0.036
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L		<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC [5]	0.049	0.025	0.023	0.041	0.062	0.062	0.053	0.067	0.025	0.037	0.058	0.049	0.035	0.049	0.056
Cadmium	mg/L	0.005 MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		87	81	81	79	81	120	110	92	86	94.3	91.1	96.5	87.4	90.8	86.8
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00065	<0.0005	<0.0005	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	1 AO	0.001	<0.001	<0.001	0.001	0.001	0.002	0.001	0.0011	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.019	<0.010	<0.010	<0.010	<0.010	0.018
Lead	mg/L	0.01 MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Magnesium	mg/L		46	36	36	41	50	69	57	55	39	44.4	49.1	52	44.9	49.9	48.7
Manganese	mg/L	0.05 AO	0.036	0.005	0.003	0.014	0.022	0.002	0.033	0.017	0.0034	0.029	0.021	<0.002	<0.002	0.005	0.003
Molybdenum	mg/L		0.009	0.01	0.008	0.01	0.011	0.012	0.011	0.012	0.006	0.008	0.010	0.009	0.007	0.011	0.009
Nickel	mg/L		0.001	<0.001	<0.001	0.002	0.002	0.003	0.0021	0.0015	0.0018	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		5.50	4.70	4.10	5.5	7.6	8.1	7.1	7.8	3.6	4.87	6.74	7.07	5.21	6.89	6.95
Selenium	mg/L	0.05 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L											5.52	5.32	5.31	4.96	4.69	4.86
Silver	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	16	46	40	58	55	60	53	42	42	41.3	40.0	39.3	34.8	36.1	36.5
Strontium	mg/L		2.0	1.5	1.3	2.1	2.8	3.2	3.0	3.7	1.4	1.99	3.44	2.79	2.22	2.77	3.06
Sulphur	mg/L											39.1	41.9	54.7	37.5	46.8	60.1
Thallium	mg/L		<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Tin	mg/L		<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium	mg/L		<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	<0.002	<0.002
Uranium	mg/L	0.02 MAC	0.0029	0.0049	0.0038	0.0056	0.0048	0.0082	0.006	0.0056	0.0042	0.005	0.005	0.005	0.005	0.004	0.004
Vanadium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.0005	0.0005	<0.0005	<0.0005	0.0005	<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	<0.005	<0.005	<0.005	<0.005	0.022	<0.005	<0.005	0.006	<0.005

Notes:
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(4) Maximum Acceptable Concentration (MAC) within ODWS.
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(6) ODWS exceedances indicated by **bold** entries.

Groundwater Geochemical Results OW-25-III

Parameters	Units	ODWS [1]	2015			2016			2017			2018			2019		
General Chemistry			**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Sep**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	307	332	314	340	364	**Insufficient**	378	347	353	352	No data	298	383	348	294
Chloride	mg/L	250 AO [3]	1.36	1.03	1.33	1.26	1.28	**volume**	2.03	0.77	2.47	1.60	available	1.84	2.06	2.54	3.01
Dissolved Organic Carbon	mg/L	5 AO	1.0	1.5	1.2	1.3	1.3	**to sample**	1.1	1.4	1.9	1.5		1.7	1.8	1.9	1.3
Fluoride	mg/L	1.5 MAC [4]	1.14	0.66	0.81	<0.25	0.59		1.04	1.31	1.02	1.24		0.92	0.60	0.90	0.52
Sulphate	mg/L	500 AO	130	96.6	116	93.9	127		76.3	125	242	137		112	44.5	150	95.1
Hardness	mg/L	80-100 OG	**341**	**364**	**365**	**328**	**361**		**305**	**334**	**477**	**373**		**378**	**375**	**478**	**319**
Nitrate	mg/L	10 MAC	<0.25	<0.25	<0.25	<0.25	<0.25		<0.25	<0.25	<0.25	<0.05		<0.10	<0.10	<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	<0.05		<0.10	<0.10	<0.25	<0.25
Organic Nitrogen	mg/L	0.15 OG	<0.10	**0.23**	**0.16**	0.15	**0.41**		<0.10	<0.10	**0.24**	**0.19**		<0.10	<0.10	**0.16**	<0.10
Orthophosphate	mg/L		<0.50	<0.50	<0.50	<0.50	<0.50		<0.50	<0.50	<0.50	<0.10		<0.20	<0.20	<0.50	<0.50
pH	pH Units		8.15	8.20	8.15	8.22	8.17		8.35	8.26	8.26	8.09		7.99	7.86	7.69	7.82
Electrical Conductivity	µS/cm		818	792	779	720	856		710	838	1070	812		777	734	974	813
Total Ammonia	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02	<0.02	<0.02		0.09	<0.02	<0.02	<0.02
Total Dissolved Solids	mg/L	500 AO	450	432	418	426	472		394	**516**	**662**	492		**532**	398	**522**	410
Total Kjeldahl Nitrogen (TKN)	mg/L		<0.10	0.23	0.16	0.15	0.41		<0.10	<0.10	0.24	0.19		<0.10	<0.10	0.16	<0.10
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	0.16	<0.05		<0.05	<0.05	<0.05	<0.05		<0.05	<0.05	<0.05	<0.05
Metals																	
Aluminum	mg/L	0.1 OG	0.005	<0.004	0.010	**2.58**	0.008		0.018	0.004	0.010	0.006		0.011	0.016	<0.004	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		<0.003	0.005	<0.003	<0.003
Barium	mg/L	1 MAC	0.031	0.036	0.042	0.077	0.036		0.042	0.045	0.047	0.042		0.047	0.061	0.051	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
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 [5]	0.050	0.027	0.033	0.027	0.050		0.021	0.023	0.071	0.019		0.030	0.012	0.051	0.013
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		65.3	83.3	81.8	74.3	74.3		71.5	78.2	100	82.6		88.0	91.5	104	80.3
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	0.007	0.006		<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	0.004	<0.001		<0.001	<0.001	0.002	<0.001		0.001	0.004	0.002	<0.001
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	0.005	<0.003		<0.003	<0.003	<0.003	0.070		<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.010	<0.010	<0.010	**1.96**	<0.010		<0.010	0.028	0.012	<0.010		<0.010	**2.57**	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.002	<0.002	<0.002	0.006	<0.002		<0.002	<0.002	<0.002	0.004		<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		43.2	38.0	39.1	34.5	42.5		30.8	33.8	55.1	40.6		38.5	35.6	52.9	28.8
Manganese	mg/L	0.05 AO	0.005	<0.002	<0.002	**0.288**	0.022		0.039	0.015	0.032	<0.002		0.026	**0.296**	**0.060**	<0.002
Molybdenum	mg/L		0.008	0.007	0.008	0.003	0.009		0.008	0.008	0.011	0.007		0.008	0.006	0.009	0.008
Nickel	mg/L		<0.003	<0.003	0.004	0.005	<0.003		<0.003	<0.003	<0.003	<0.003		<0.003	<0.003	0.003	<0.003
Potassium	mg/L		5.56	4.89	5.36	3.61	6.39		3.17	4.66	7.06	4.03		5.51	2.76	6.23	3.28
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		4.42	4.89	6.29	7.20	5.31		5.18	6.37	4.96	3.79		5.11	8.13	4.34	5.67
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	29.7	32.4	36.3	33.2		32.2	31.0	31.5	25.1		25.3	21.3	26.8	15.9
Strontium	mg/L		2.54	1.76	1.57	1.41	2.69		1.97	1.56	3.9	1.56		1.88	0.926	2.94	1.32
Sulphur	mg/L		47.1	28.2	31.8	21.5	35.4		45.8	28.2	81.3	30.3		41.3	11.2	51.6	24.3
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	0.027	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	0.005	0.004	0.004		0.005	0.005	0.006	0.006		0.004	0.006	0.005	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	<0.005	0.012	0.013	0.006		<0.005	0.008	0.007	0.087		0.007	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-25-IV

Parameters	Units	ODWS [1]	2017	2018			2019		
General Chemistry			**Sept**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	229	206	179	174	189	184	179
Chloride	mg/L	250 AO [3]	10.4	12.0	8.94	8.00	7.89	8.03	6.96
Dissolved Organic Carbon	mg/L	5 AO	**6.0**	**5.4**	**7.5**	**5.7**	4.6	4.0	2.6
Fluoride	mg/L	1.5 MAC [4]	0.85	**1.52**	**1.82**	**1.70**	**1.72**	**2.01**	**1.72**
Sulphate	mg/L	500 AO	55.1	45.8	35.8	32.3	23.7	24.8	22.0
Hardness	mg/L	80-100 OG	**177**	92.4	**66.5**	**64.1**	**61.8**	**60.8**	**326**
Nitrate	mg/L	10 MAC	0.78	<0.05	<0.05	<0.05	<0.05	0.05	<0.05
Nitrite	mg/L	1 MAC	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Organic Nitrogen	mg/L	0.15 OG	**0.18**	<0.10	0.11	0.11	<0.10	<0.10	<0.10
Orthophosphate	mg/L		<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
pH	pH Units		8.11	7.83	8.06	7.79	7.90	8.00	7.94
Electrical Conductivity	µS/cm		581	494	453	436	415	458	440
Total Ammonia	mg/L		0.06	0.06	0.05	0.10	0.03	0.04	0.05
Total Dissolved Solids	mg/L	500 AO	296	272	268	276	246	250	226
Total Kjeldahl Nitrogen (TKN)	mg/L		0.24	0.10	0.16	0.21	<0.10	0.13	0.13
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals									
Aluminum	mg/L	0.1 OG	0.010	0.009	0.016	0.015	<0.004	<0.004	0.012
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.040	0.027	0.022	0.021	0.016	0.015	0.015
Beryllium	mg/L		<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
Boron	mg/l	5 IMAC [5]	0.175	0.299	0.301	0.358	0.355	0.334	0.322
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		41.4	20.8	14.6	14.0	13.6	13.3	69.1
Chromium	mg/L	0.05 MAC	<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
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	0.118	<0.010	<0.010	<0.010	<0.010	<0.010	0.037
Lead	mg/L	0.01 MAC	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		17.8	9.83	7.3	7.07	6.77	6.69	37.2
Manganese	mg/L	0.05 AO	0.042	0.012	0.026	0.018	0.013	0.023	0.019
Molybdenum	mg/L		0.021	0.036	0.036	0.042	0.041	0.037	0.041
Nickel	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		2.57	2.98	2.71	2.70	2.89	2.61	5.76
Selenium	mg/L		<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		3.82	3.10	4.31	3.83	5.02	3.58	4.32
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	41.5	69.5	70.2	74.5	67.5	70.0	14.4
Strontium	mg/L		0.685	0.516	0.474	0.491	0.445	0.445	0.438
Sulphur	mg/L		17.2	15.3	11.6	11.8	8.55	8.39	7.56
Thallium	mg/L		<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
Titanium	mg/L		<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
Vanadium	mg/L		<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	<0.005	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-30-I

Parameters	Units	ODWS (1)	2014	2015			2016			2017			2018			2019		
General Chemistry			Sep	May	July	Sept	May	July	Sept	May	July	Sept	May	July	Oct	May	July	Sept
Alkalinity	mg/L	30-500 OG (2)	118	137	124	123	190	163	145	143	145	152	146	125	126	141	127	129
Chloride	mg/L	250 AO (3)	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	4.28	3.92	3.14
Dissolved Organic Carbon	mg/L	5 AO	**8.0**	2.7	2.9	2.0	2.1	2.3	1.7	1.3	1.9	3.0	2.3	3.2	2.1	2.3	1.9	1.0
Fluoride	mg/L	1.5 MAC (4)	1.08	**1.53**	1.31	1.42	0.45	1.34	**1.62**	1.45	**2.04**	**1.85**	**2.7**	**1.9**	**1.69**	**1.57**	**1.74**	**1.56**
Sulphate	mg/L	500 AO	339	225	245	222	203	183	163	175	170	193	177	200	186	196	205	197
Hardness	mg/L	80-100 OG	**264**	**145**	**146**	**132**	**141**	**115**	88.2	**102**	90.5	**128**	92.6	**109**	**109**	**110**	**111**	**112**
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	<0.10	<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	<0.10	<0.10	<0.10
Organic Nitrogen	mg/L	0.15 OG	**0.65**	**0.39**	**0.65**	**0.61**	**0.16**	**0.40**	**0.17**	0.14	<0.10	0.13	<0.10	<0.10	<0.10	<0.10	<0.10	0.15
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	<0.20	<0.20	<0.20
pH	pH Units		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	7.66	8.10	7.57
Electrical Conductivity	µS/cm		1070	869	812	810	737	734	713	670	667	750	656	685	673	680	741	764
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	<0.02	0.04	<0.02
Total Dissolved Solids	mg/L	500 AO	**652**	480	490	452	428	410	386	372	388	410	360	402	418	416	424	388
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	<0.10	0.12	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	<0.05
Metals																		
Aluminum	mg/L	0.1 OG	0.006	**0.129**	0.010	0.017	0.010	0.016	0.015	0.005	0.008	0.012	0.010	0.009	0.016	<0.004	0.010	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	<0.003	<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	0.025	0.024	0.026
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	<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	<0.002
Boron	mg/l	5 IMAC (5)	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	0.498	0.471	0.427
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	<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	17.4	17.1	17.6
Chromium	mg/L	0.05 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	<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	<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	<0.003	<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	<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	<0.001	<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	16.1	16.5	16.5
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	0.004	0.006	0.007
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	0.044	0.043	0.042
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	<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	5.91	5.99	6.14
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	<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	2.86	1.16	2.29
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	<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	97.1	99.2	100
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	0.803	0.823	0.85
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	65.2	65.0	64.6
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	<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	<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	0.004	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	<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	<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	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Groundwater Geochemical Results OW-30-II

Parameters	Units	ODWS [1]	2014	2015			2016			2017			2018			2019		
General Chemistry			Sep	May	July	Sept	May	July	Sept	May	July	Sept	May	July	Oct	May	July	Sept
Alkalinity	mg/L	30-500 OG [2]	224	192	168	174	246	219	207	255	260	241	248	247	219	244	228	212
Chloride	mg/L	250 AO [3]	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	1.42	2.36	2.20
Dissolved Organic Carbon	mg/L	5 AO	**6.1**	2.5	3.1	2.2	2.4	2.4	2.0	1.8	2.9	3.5	2.5	**5.1**	3.0	2.9	4.3	1.6
Fluoride	mg/L	1.5 MAC [4]	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	0.29	0.57	0.51
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	28.3	64.2	91.0
Hardness	mg/L	80-100 OG	**54.8**	93.6	**102**	**107**	**146**	**121**	**124**	**141**	**129**	**123**	**130**	**160**	**150**	**182**	**153**	**136**
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	<0.05	<0.10	<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	<0.05	<0.10	<0.10
Organic Nitrogen	mg/L	0.15 OG	**0.82**	**0.38**	**0.54**	**0.39**	**0.25**	**0.29**	**0.23**	<0.10	<0.10	**0.39**	**0.20**	<0.10	0.13	<0.10	<0.10	0.15
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	<0.10	<0.20	<0.20
pH	pH Units		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	7.95	7.92	7.90
Electrical Conductivity	µS/cm		1080	718	685	726	578	683	710	596	616	643	620	637	641	483	615	676
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	<0.02	0.03	<0.02
Total Dissolved Solids	mg/L	500 AO	**1300**	410	466	434	344	388	398	326	340	346	340	350	400	284	308	346
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	<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	<0.05
Metals																		
Aluminum	mg/L	0.1 OG	**0.21**	0.006	0.007	0.008	0.029	0.014	0.022	<0.004	0.007	0.009	0.007	<0.004	0.007	<0.004	0.005	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	<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	0.034	0.031	0.031
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	<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	<0.002
Boron	mg/l	5 IMAC [5]	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	0.062	0.146	0.172
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	<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	40.2	28.4	22.0
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	<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	<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	<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	<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	<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	19.9	19.9	19.7
Manganese	mg/L	0.05 AO	0.013	0.029	0.027	0.026	**0.072**	0.031	0.023	0.004	0.015	**0.066**	0.016	0.003	0.017	0.009	0.015	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	0.007	0.018	0.023
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	<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	3.64	5.26	6.26
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	<0.004	<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	3.93	2.76	3.94
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	<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	38.0	64.3	77.3
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	0.36	0.43	0.476
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	8.74	21.5	29.5
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	<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	<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	<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	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	<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	<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-III

Parameters	Units	ODWS [1]	2017	2018			2019		
General Chemistry			**Sept**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	284	275	251	178	213	202	197
Chloride	mg/L	250 AO [3]	22.6	9.01	10.7	0.68	0.78	0.93	0.69
Dissolved Organic Carbon	mg/L	5 AO	**22.6**	**8.0**	**12.7**	2.7	4.2	3.6	2.2
Fluoride	mg/L	1.5 MAC [4]	0.79	0.55	0.46	0.17	0.23	0.25	0.21
Sulphate	mg/L	500 AO	339	123	142	18.6	21.1	21.5	21.2
Hardness	mg/L	80-100 OG	**306**	**212**	**234**	**178**	**189**	**205**	**188**
Nitrate	mg/L	10 MAC	<0.25	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05
Nitrite	mg/L	1 MAC	<0.25	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05
Organic Nitrogen	mg/L	0.15 OG	0.15	<0.10	0.13	0.14	<0.10	0.10	<0.10
Orthophosphate	mg/L		<0.50	<0.10	<0.50	<0.10	<0.10	<0.10	<0.10
pH	pH Units		8.22	8.00	8.02	7.73	7.80	7.77	7.69
Electrical Conductivity	µS/cm		1280	723	784	390	420	458	474
Total Ammonia	mg/L		0.07	0.03	0.12	0.10	0.05	0.08	0.03
Total Dissolved Solids	mg/L	500 AO	**732**	402	440	230	222	204	224
Total Kjeldahl Nitrogen (TKN)	mg/L		0.22	<0.10	0.25	0.24	<0.10	0.18	<0.10
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals									
Aluminum	mg/L	0.1 OG	0.009	0.007	0.006	0.008	<0.004	0.005	0.007
Arsenic	mg/L	0.01 MAC	<0.003	0.005	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.107	0.062	0.036	0.059	0.103	0.042	0.052
Beryllium	mg/L		<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
Boron	mg/l	5 IMAC [5]	0.152	0.123	0.067	0.041	0.054	0.071	0.068
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		75.9	52.5	57.3	46.9	48.5	52.2	48.1
Chromium	mg/L	0.05 MAC	<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
Copper	mg/L	1 AO	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	**0.607**	**1.17**	**0.432**	**1.31**	**1.12**	0.037	**0.658**
Lead	mg/L	0.01 MAC	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		28.3	19.6	22.1	14.8	16.6	18.1	16.5
Manganese	mg/L	0.05 AO	**0.829**	**0.545**	**0.090**	**0.096**	**0.271**	**0.095**	**0.126**
Molybdenum	mg/L		0.025	0.018	<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
Potassium	mg/L		6.16	4.85	5.25	3.21	3.84	3.95	3.92
Selenium	mg/L		<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		5.77	4.41	6.32	5.03	6.35	5.51	5.95
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	136	62.2	72.6	12.8	14.1	10.7	10.7
Strontium	mg/L		3.82	2.81	1.25	1.22	1.47	1.17	1.21
Sulphur	mg/L		102	60.9	44.9	7.53	7.71	8.20	7.30
Thallium	mg/L		<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
Titanium	mg/L		0.002	0.003	<0.002	<0.002	<0.002	<0.002	<0.002
Uranium	mg/L	0.02 MAC	0.003	0.003	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc	mg/L	5 AO	0.012	0.006	<0.005	<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-31-I

Parameters	Units	ODWS [1]	2017	2018			2019		
General Chemistry			**Sept**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	164	146	132	Insufficient	140	128	140
Chloride	mg/L	250 AO [3]	13.8	5.97	4.67	volume	2.75	2.85	2.08
Dissolved Organic Carbon	mg/L	5 AO	2.1	1.3	3.3		1.5	2.8	1.0
Fluoride	mg/L	1.5 MAC [4]	0.73	0.82	0.40		0.58	0.75	<0.25
Sulphate	mg/L	500 AO	111	213	272		282	292	313
Hardness	mg/L	80-100 OG	**154**	**177**	**227**		**240**	**245**	**256**
Nitrate	mg/L	10 MAC	<0.10	0.37	0.62		0.64	0.58	0.82
Nitrite	mg/L	1 MAC	<0.10	<0.05	<0.25		<0.25	<0.25	<0.25
Organic Nitrogen	mg/L	0.15 OG	**0.18**	0.11	0.14		<0.10	**1.28**	0.11
Orthophosphate	mg/L		<0.20	<0.10	<0.50		<0.50	<0.50	<0.50
pH	pH Units		8.29	7.66	7.85		7.81	7.97	7.66
Electrical Conductivity	µS/cm		605	689	805		808	886	958
Total Ammonia	mg/L		0.17	0.07	<0.02		<0.02	0.09	<0.02
Total Dissolved Solids	mg/L	500 AO	338	432	478		498	**528**	**518**
Total Kjeldahl Nitrogen (TKN)	mg/L		0.35	0.18	0.14		<0.10	1.37	0.11
Total Phosphorus	mg/L		<0.05	<0.05	<0.05		<0.05	<0.05	<0.05
Metals									
Aluminum	mg/L	0.1 OG	0.009	0.030	<0.004		**0.230**	0.008	0.008
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003		<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.045	0.038	0.052		0.043	0.042	0.051
Beryllium	mg/L		<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
Boron	mg/l	5 IMAC [5]	0.202	0.192	0.190		0.220	0.212	0.220
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002
Calcium	mg/L		24.5	29.4	38.0		40.4	41.7	44.1
Chromium	mg/L	0.05 MAC	<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
Copper	mg/L	1 AO	<0.003	<0.003	<0.003		0.007	<0.003	0.004
Iron	mg/L	0.3 AO	0.062	<0.010	<0.010		**0.337**	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.002	<0.001	<0.001		<0.001	<0.001	<0.001
Magnesium	mg/L		22.5	25.1	32.1		33.8	34.1	35.4
Manganese	mg/L	0.05 AO	**0.053**	0.020	0.018		0.023	0.003	0.004
Molybdenum	mg/L		0.014	0.014	0.013		0.013	0.012	0.013
Nickel	mg/L		<0.003	<0.003	0.003		0.003	<0.003	<0.003
Potassium	mg/L		6.45	7.24	8.57		8.73	8.89	9.93
Selenium	mg/L		<0.004	<0.004	<0.004		<0.004	<0.004	<0.004
Silicon	mg/L		4.35	2.55	3.35		3.80	2.29	3.32
Silver	mg/L		<0.002	<0.002	<0.002		<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	48.8	62.4	72.2		74.9	76.9	81.9
Strontium	mg/L		1.94	0.983	1.25		1.19	1.20	1.30
Sulphur	mg/L		35.1	66.6	82.0		93.2	95.1	101
Thallium	mg/L		<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
Titanium	mg/L		<0.002	0.005	0.003		0.015	0.004	0.004
Uranium	mg/L	0.02 MAC	<0.002	0.002	0.004		0.004	0.002	0.003
Vanadium	mg/L		<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	<0.005	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-31-II

Parameters	Units	ODWS [1]	2017	2018			2019		
General Chemistry			**Sept**	**May**	**July**	**Oct**	**May**	**July**	**Sept**
Alkalinity	mg/L	30-500 OG [2]	169	155	129	124	140	139	126
Chloride	mg/L	250 AO [3]	18.8	9.62	6.80	4.58	3.47	3.36	2.60
Dissolved Organic Carbon	mg/L	5 AO	**6.6**	**6.4**	**8.4**	**5.1**	4.4	4.2	2.7
Fluoride	mg/L	1.5 MAC [4]	1.0	1.27	1.13	0.98	0.93	1.11	0.94
Sulphate	mg/L	500 AO	166	232	241	218	206	223	211
Hardness	mg/L	80-100 OG	**137**	**145**	**135**	**125**	**117**	**115**	**109**
Nitrate	mg/L	10 MAC	<0.10	<0.05	<0.05	<0.10	<0.10	<0.10	<0.10
Nitrite	mg/L	1 MAC	<0.10	<0.05	<0.05	<0.10	<0.10	<0.10	<0.10
Organic Nitrogen	mg/L	0.15 OG	**0.28**	0.12	**0.26**	<0.10	<0.10	0.14	<0.10
Orthophosphate	mg/L		<0.20	<0.10	<0.10	<0.20	<0.20	<0.20	<0.20
pH	pH Units		8.21	7.80	7.99	7.72	7.88	8.04	7.72
Electrical Conductivity	µS/cm		752	763	758	726	688	768	764
Total Ammonia	mg/L		0.08	0.14	0.06	0.13	0.04	0.10	0.08
Total Dissolved Solids	mg/L	500 AO	392	444	468	456	422	412	408
Total Kjeldahl Nitrogen (TKN)	mg/L		0.36	0.26	0.32	0.20	<0.10	0.24	0.12
Total Phosphorus	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Metals									
Aluminum	mg/L	0.1 OG	0.008	0.011	0.007	0.010	0.008	0.016	0.009
Arsenic	mg/L	0.01 MAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.077	0.064	0.059	0.059	0.047	0.044	0.046
Beryllium	mg/L		<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
Boron	mg/l	5 IMAC [5]	0.213	0.213	0.229	0.231	0.241	0.224	0.222
Cadmium	mg/L	0.005 MAC	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium	mg/L		20.9	25.0	23.3	21.4	20.2	19.7	18.8
Chromium	mg/L	0.05 MAC	<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
Copper	mg/L	1 AO	<0.003	0.054	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3 AO	<0.010	0.013	<0.010	<0.010	<0.010	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.002	0.003	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L		20.5	20.1	18.7	17.3	16.2	16.0	15.1
Manganese	mg/L	0.05 AO	**0.053**	**0.051**	0.045	0.045	0.023	0.028	0.023
Molybdenum	mg/L		0.014	0.017	0.016	0.016	0.016	0.015	0.016
Nickel	mg/L		0.004	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Potassium	mg/L		5.43	6.11	5.66	5.74	5.50	5.46	5.63
Selenium	mg/L		<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Silicon	mg/L		3.4	2.48	3.25	2.68	3.77	2.22	3.21
Silver	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	84	104	99.3	106	96.7	99.4	103
Strontium	mg/L		1.99	1.03	1.07	0.984	0.833	0.825	0.82
Sulphur	mg/L		52.6	72.2	71.1	74.5	70.2	69.1	68.4
Thallium	mg/L		<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
Titanium	mg/L		<0.002	0.004	0.003	0.003	0.005	0.002	0.003
Uranium	mg/L	0.02 MAC	<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
Zinc	mg/L	5 AO	<0.005	0.080	<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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Summary of Residential Geochemical Results WS-7

Parameters	Units	ODWS [1]	2002	2003	2004	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
General Chemistry			**Oct**	**Dec**	**June**	**Sept**	**Aug**	**June**	**July**	**June**	**June**	**July**	**June**	**June**	**May**	**June**	**May**	**May**	**May**	**May**	**May**
Alkalinity	mg/L	30-500 OG [2]	321	308	304	315	307	305	304	324	341	328	295	320	316	306	309	326	329	330	329
Total Dissolved Solids	mg/L	500 AO [3]	439	392	428	396	362	364	406	**898**	462	394	377	406	384	364	354	368	354	352	354
Chloride	mg/L	250 AO	15.6	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
Dissolved Organic Carbon	mg/L	5 AO	1.4	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
Potassium	mg/L		<1	<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
Sulphate	mg/L	500 AO	39.9	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
Fluoride	mg/L	1.5 MAC [4]							0.13			0.1	0.1	0.13	<0.10	<0.10	0.07	<0.05	<0.10	<0.05	<0.10
Hardness	mg/L	80 - 100 OG	**0.7**	**50.5**	**6.9**	**342**	**310**	**327**	**<10**	**<1**	**<1**	**340**	**310**	**370**	**332**	**340**	**323**	**341**	**326**	**327**	**319**
Nitrate	mg/L	10 MAC	<0.2	<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
Nitrite	mg/L	1 MAC	<0.2	<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
Organic Nitrogen	mg/L	0.15 OG	0.01	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
Total Ammonia	mg/L		0.07	<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
Total Kjeldahl Nitrogen (TKN)	mg/L		0.08	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
Orthophosphate	mg/L		<0.3	<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
pH	pH Units	6.5 - 8.5 OG													8.43	8.17	7.94	7.75	8.03	7.91	7.94
Conductivity	µS/cm														716	638	671	663	667	624	691
Elements																					
Aluminum	mg/L	0.1 OG	<0.03	**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
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
Barium	mg/L	1 MAC	<0.005	<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
Beryllium	mg/L		<0.0005	<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
Bismuth	mg/L		<0.2	<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
Boron	mg/l	5 IMAC [5]	<0.01	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
Cadmium	mg/L	0.005 MAC	<0.005	<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
Calcium	mg/L		0.2	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
Chromium	mg/L	0.05 MAC	<0.005	<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
Cobalt	mg/L		<0.005	<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
Copper	mg/L	1 AO	0.006	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
Iron	mg/L	0.3 AO	0.03	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
Lead	mg/L	0.01 MAC	<0.001	<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
Magnesium	mg/L		<0.05	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
Manganese	mg/L	0.05 AO	<0.005	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
Molybdenum	mg/L		<0.02	<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
Nickel	mg/L		<0.02	<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
Phosphorus	mg/L														<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
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
Silicon	mg/L														6.61	6.72	7.14	6.69	6.94	6.49	6.33
Silver	mg/L		<0.005	<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
Sodium	mg/L	200 AO	175	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
Strontium	mg/L		<0.001	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
Sulphur	mg/L														10.4	9.36	9.74	9.48	9.67	32.6	10.7
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
Tin	mg/L		<0.05	<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
Titanium	mg/L		<0.005	<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
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
Vanadium	mg/L		<0.005	<0.005	<0.005	<0.005	<0.001	<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	<0.002
Zinc	mg/L	5 AO	<0.005	0.231	0.026	<0.005	<0.004	0.022	0.01	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	0.023	0.037	0.012	0.017	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.

Summary of Residential Geochemical Results WS-8

Parameters	Units	ODWS [1]	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
General Chemistry			**Oct**	**Dec**	**June**	**Nov**	**June**	**July**	**June**	**June**	**June**	**June**	**June**	**May**	**June**	**May**	**May**	**May**	**May**	**May**
Alkalinity	mg/L	30-500 OG [2]	285	296	296	306	305	296	302	299	299	305	310	313	312	297	317	360	346	319
Total Dissolved Solids	mg/L	500 AO [3]	367	376	409	392	350	406	373	383	391	384	385	382	380	378	366	342	356	346
Chloride	mg/L	250 AO	21.2	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
Dissolved Organic Carbon	mg/L	5 AO	1.4	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
Potassium	mg/L		2.0	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
Sulphate	mg/L	500 AO	28.3	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
Fluoride	mg/L	1.5 MAC [4]						0.26			0.2	0.2	0.25	<0.10	<0.10	0.16	0.27	<0.10	<0.05	0.14
Hardness	mg/L	80 - 100 OG	**354**	**358**	**401**	**318**	**336**	**351**	**330**	**340**	**370**	**360**	**360**	**372**	**360**	**342**	**365**	**351**	**347**	**306**
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
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
Organic Nitrogen	mg/L	0.15 OG	0.13	<0.01	0.12	0.10	**0.24**		**0.17**	**0.19**	**0.25**	**0.17**	**0.265**	<0.10	<0.10	<0.10	**0.17**	0.10	<0.10	<0.10
Total Ammonia	mg/L		<0.03	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
Total Kjeldahl Nitrogen (TKN)	mg/L		0.16	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
Orthophosphate	mg/L		<0.3	<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
pH	pH Units	6.5 - 8.5 OG												8.41	8.25	7.88	7.92	7.88	7.87	7.85
Conductivity	µS/cm													691	675	692	678	675	635	654
Elements																				
Aluminum	mg/L	0.1 OG	<0.03	0.05	0.06	0.027	<0.004	<0.004	<0.005	0.016	<0.005	**5.1**	<0.005	<0.004	<0.004	<0.004	0.010	0.004	0.099	<0.004
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
Barium	mg/L	1 MAC	0.05	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
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
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
Boron	mg/l	5 IMAC [5]	0.02	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
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
Calcium	mg/L		82.7	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
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
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
Copper	mg/L	1 AO	<0.005	<0.005	<0.005	<0.002	0.003	<0.002	0.002	0.006	0.003	0.003	0.0019	<0.003	<0.003	<0.003	0.005	<0.003	0.005	<0.003
Iron	mg/L	0.3 AO	**1.77**	**2.7**	**2.42**	**1.57**	**2.33**	**1.26**	**1.9**	**1.9**	**1.7**	**1.6**	**1.4**	**1.37**	**1.47**	**1.27**	**1.50**	**1.31**	**2.4**	<0.010
Lead	mg/L	0.01 MAC	<0.001	<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
Magnesium	mg/L		35.7	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
Manganese	mg/L	0.05 AO	0.026	0.047	0.05	0.038	0.03	0.02	0.03	0.026	0.024	**0.056**	0.026	0.026	0.030	0.027	0.028	0.027	**0.052**	**0.057**
Molybdenum	mg/L		<0.02	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
Nickel	mg/L													<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Phosphorus	mg/L													<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
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
Silicon	mg/L													8.86	9.27	9.61	9.11	9.12	8.34	8.57
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
Sodium	mg/L	200 AO	5.6	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
Strontium	mg/L		0.165	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
Sulphur	mg/L													7.7	7.80	9.94	9.09	9.74	26.3	9.39
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
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
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
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
Vanadium	mg/L		<0.005	<0.005	<0.005	<0.001	<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
Zinc	mg/L	5 AO	<0.005	0.072	0.179	0.066	0.009	0.01	<0.005	<0.005	<0.005	<0.005	0.0056	<0.005	<0.005	<0.005	0.010	0.006	0.015	<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.

Summary of Residential Geochemical Results WS-9

Parameters	Units	ODWS (1)	2002	2003	2004	2005	2006	2007	2008	2009	2013	2014	2015	2016	2017	2018	2019
General Chemistry			**Oct**	**Dec**	**June**	**June**	**Aug**	**July**	**June**	**June**	**May**	**June**	**May**	**May**	**May**	**May**	**May**
Alkalinity	mg/L	30-500 OG (2)	279	272	272	270	269	259	271	274	271	275	**No Sample**	**No Sample**	292	307	291
Total Dissolved Solids	mg/L	500 AO (3)	412	394	423	366	398	394	412	413	386	424	**Obtained**	**Obtained**	416	348	422
Chloride	mg/L	250 AO	8.2	7.4	8.4	7.65	8.99	9.78	9.0	8.0	9.72	8.25			7.81	8.06	7.54
Dissolved Organic Carbon	mg/L	5 AO	1.2	0.9	0.6	0.9	1.2	1.1	1.2	1.1	1.2	1.5			1.3	1.9	1.8
Potassium	mg/L		4.0	4.0	4.0	4.0	3.71	4.31	3.9	4.0	3.86	1.09			0.18	0.18	0.14
Sulphate	mg/L	500 AO	85.2	89.8	93.0	69.8	90.3	89.3	101	88.0	81.4	87.9			85.3	86.1	85.4
Fluoride	mg/L	1.5 MAC (4)						0.94			0.68	0.68			0.61	1.29	0.76
Hardness	mg/L	80 - 100 OG	**322**	**309**	**336**	**270**	**282**	**300**	**290**	**320**	**297**	**31**			**<0.5**	**<0.5**	**<0.5**
Nitrate	mg/L	10 MAC	<0.2	<0.2	<0.2	<0.1	<0.05	<0.05	<0.1	<0.1	<0.10	<0.10			<0.10	<0.05	<0.10
Nitrite	mg/L	1 MAC	<0.2	<0.2	<0.2	<0.1	<0.05	<0.05	<0.01	<0.01	<0.10	<0.10			<0.10	<0.05	<0.10
Organic Nitrogen	mg/L	0.15 OG	0.12	0.09	0.09	**0.17**	<0.38		**0.34**	0.09	<0.10	<0.10			<0.10	<0.10	<0.10
Total Ammonia	mg/L		0.18	0.19	0.21	0.23	0.18	0.11	0.36	0.21	0.23	0.04			<0.02	<0.02	<0.02
Total Kjeldahl Nitrogen (TKN)	mg/L		0.3	0.28	0.3	0.4	<0.5	0.13	0.7	0.3	0.28	<0.10			<0.10	<0.10	<0.10
Orthophosphate	mg/L		<0.3	<0.3	<0.3	<0.3			<0.01	<0.01	<0.20	<0.20			<0.20	<0.10	<0.20
pH	pH Units	6.5 - 8.5 OG									8.41	8.36			7.96	7.91	7.96
Conductivity	µS/cm										697	735			729	717	741
Elements																	
Aluminum	mg/L	0.1 OG	<0.03	<0.05	<0.05	<0.1	0.006	<0.004	<0.005	<0.005	0.010	<0.004			<0.004	0.004	0.005
Arsenic	mg/L	0.01 MAC							<0.001	<0.001	<0.003	<0.003			<0.003	<0.003	<0.003
Barium	mg/L	1 MAC	0.05	0.052	0.054	0.05	0.03	0.05	0.053	0.053	0.056	0.005			0.003	<0.002	<0.002
Beryllium	mg/L		<0.0005	<0.0005	<0.0005	<0.005	<0.002	<0.001	<0.0005	<0.0005	<0.001	<0.001			<0.001	<0.001	<0.001
Bismuth	mg/L		<0.2	<0.2	<0.2	<0.2	<0.002	<0.002	<0.001	<0.001	<0.002	<0.002			<0.002	<0.002	<0.002
Boron	mg/l	5 IMAC (5)	0.37	0.36	0.36		0.29	0.36	0.40	0.37	0.347	0.358			0.304	0.343	0.322
Cadmium	mg/L	0.005 MAC	<0.005	<0.005	<0.005	<0.005	<0.002	<0.0001	<0.0001	<0.0001	<0.002	<0.002			<0.002	<0.002	<0.002
Calcium	mg/L		71.7	68.5	77.5	58.1	61.9	66.6	64.0	66.0	66.0	6.94			0.09	0.08	0.10
Chromium	mg/L	0.05 MAC	<0.005	<0.005	<0.005	<0.01	<0.003	<0.003	<0.005	<0.005	<0.003	<0.003			<0.003	<0.003	<0.003
Cobalt	mg/L		<0.005	<0.005	<0.005	<0.02	<0.002	<0.0005	<0.0005	<0.0005	<0.001	<0.001			<0.001	<0.001	<0.001
Copper	mg/L	1 AO	<0.005	<0.005	<0.005	<0.02	<0.003	<0.002	<0.001	0.002	0.003	<0.003			0.011	0.007	0.010
Iron	mg/L	0.3 AO	**0.49**	**0.54**	**0.44**	**0.41**	**0.566**	**0.34**	**0.44**	**0.50**	**0.574**	0.036			<0.010	<0.010	<0.010
Lead	mg/L	0.01 MAC	<0.001	0.006	<0.001	<0.05	<0.002	<0.001	<0.0005	<0.0005	0.002	<0.002			<0.002	<0.002	0.004
Magnesium	mg/L		34.8	33.5	34.6	31.1	30.9	32.4	31.0	32.0	32.2	3.43			<0.05	<0.05	<0.05
Manganese	mg/L	0.05 AO	0.019	0.02	0.024	0.02	0.014	0.02	0.016	0.016	0.019	0.003			<0.002	<0.002	<0.002
Molybdenum	mg/L		<0.02	<0.02	<0.02		0.004	0.01	0.005	0.005	0.005	0.004			0.004	0.004	0.004
Nickel	mg/L		<0.02	<0.02	<0.02		<0.003	<0.003	<0.001	<0.001	<0.003	<0.003			<0.003	<0.003	0.008
Phosphorus	mg/L										<0.05	<0.05			<0.05	<0.05	<0.05
Selenium	mg/L	0.01 MAC							<0.002	<0.002	<0.004	<0.004			<0.004	<0.004	<0.004
Silicon	mg/L										6.56	5.84			5.99	5.61	5.80
Silver	mg/L		<0.005	<0.005	<0.005		<0.002	<0.0001	<0.0001	<0.0001	<0.002	<0.002			<0.002	<0.002	<0.002
Sodium	mg/L	200 AO	27.6	27.4	28.8	32.1	28.2	31.3	27.0	27.0	26.9	160			178	173	164
Strontium	mg/L		4.92	5.5	5.47		6.06	5.36	5.6	5.4	5.6	0.558			<0.005	0.005	<0.005
Sulphur	mg/L										27.6	25.6			29.0	86.1	27.4
Thallium	mg/L								<0.00005	<0.00005	<0.006	<0.006			<0.006	<0.006	<0.006
Tin	mg/L		<0.05	<0.05	<0.05		<0.002	<0.002		<0.001	0.052	<0.002			<0.002	<0.002	<0.002
Titanium	mg/L		<0.005	<0.005	<0.005		<0.002	<0.002		<0.005	0.002	<0.002			<0.002	<0.002	<0.002
Uranium	mg/L	0.02 MAC							0.0002	0.0002	<0.002	<0.002			<0.002	<0.002	<0.002
Vanadium	mg/L		<0.005	<0.005	<0.005		<0.002	<0.002	<0.001	<0.001	0.002	<0.002			<0.002	<0.002	<0.002
Zinc	mg/L	5 AO	0.034	0.018	0.083	<0.01	0.011	0.01	<0.005	0.006	0.271	<0.005			0.011	0.011	0.083

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 ODW
(6) ODWS exceedances indicated by **bold** entries

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Summary of Residential Geochemical Results WS-13

Parameters	Units	ODWS [1]	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
General Chemistry			**Nov**	**Dec**	**Dec**	**Nov**	**June**	**Oct**	**June**	**June**	**June**	**June**	**June**	**May**	**June**	**May**	**May**	**May**	**May**	**May**
Alkalinity	mg/L	30-500 OG [2]	289	261	280	247	288	249	280	294	298	284	290	264	271	265	**No Sample**	235	283	300
Total Dissolved Solids	mg/L	500 AO [3]	379	278	320	388	294	264	301	305	327	311	326	270	274	280	**Obtained**	244	274	242
Chloride	mg/L	250 AO	6.0	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
Dissolved Organic Carbon	mg/L	5 AO	3.8	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
Potassium	mg/L		<1	<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
Sulphate	mg/L	500 AO	29.8	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
Fluoride	mg/L	1.5 MAC [4]			0.34			0.09			<0.1	<0.1	<0.1	<0.05	<0.10	<0.05		<0.05	<0.05	<0.05
Hardness	mg/L	80 - 100 OG	**14**	**29**	**280**	**270**	**282**	**268**	**260**	**290**	**320**	**300**	**310**	**291**	**277**	**265**		**232**	**269**	**225**
Nitrate	mg/L	10 MAC	<0.2	<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
Nitrite	mg/L	1 MAC	<0.2	<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
Organic Nitrogen	mg/L	0.15 OG		0.14	**0.2**	**0.2**	**0.19**		**0.19**	**0.18**	**0.18**	**0.18**	**0.34**	<0.10	<0.10	<0.10		0.13	**0.24**	<0.10
Total Ammonia	mg/L		0.03	<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
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
Orthophosphate	mg/L		<0.3	<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
pH	pH Units	6.5 - 8.5 OG												8.20	8.13	7.76		7.88	7.74	7.67
Conductivity	µS/cm													530	520	525		457	494	464
Elements																				
Aluminum	mg/L	0.1 OG	<0.03	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
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
Barium	mg/L	1 MAC	<0.005	<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
Beryllium	mg/L		<0.0005	<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
Bismuth	mg/L		<0.2	<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
Boron	mg/l	5 IMAC [5]	1.07	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
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
Calcium	mg/L		3.44	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
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
Cobalt	mg/L		<0.005	<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
Copper	mg/L	1 AO	0.431	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
Iron	mg/L	0.3 AO	0.03	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
Lead	mg/L	0.01 MAC	0.007	<0.001	**0.021**	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
Magnesium	mg/L		1.3	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
Manganese	mg/L	0.05 AO	0.008	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
Molybdenum	mg/L		<0.02	<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
Nickel	mg/L		<0.02	<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
Phosphorus	mg/L													<0.05	<0.05	<0.05		<0.05	<0.05	<0.05
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
Silicon	mg/L													4.73	4.42	4.78		3.96	3.89	4.06
Silver	mg/L		<0.005	<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
Sodium	mg/L	200 AO	149	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
Strontium	mg/L		0.004	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
Sulphur	mg/L													3.53	2.59	3.04		5.67	12.2	6.09
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
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
Titanium	mg/L		<0.005	<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
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
Vanadium	mg/L		<0.005		<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
Zinc	mg/L	5 AO	0.021	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

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 [1]	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
General Chemistry			**Nov**	**Dec**	**Sept**	**June**	**Aug**	**July**	**June**	**June**	**June**	**June**	**June**	**May**	**June**	**May**	**May**	**May**	**May**	**May**
Alkalinity	mg/L	30-500 OG [2]	325	329	333	337	328	313	325	325	327	316	330	319	351	310	342	330	344	325
Total Dissolved Solids	mg/L	500 AO [3]	337	356	345	321	294	288	329	328	341	324	335	294	304	302	294	296	292	290
Chloride	mg/L	250 AO	0.5	<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
Dissolved Organic Carbon	mg/L	5 AO	1.0	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
Potassium	mg/L		2.0	<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
Sulphate	mg/L	500 AO	8.1	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
Fluoride	mg/L	1.5 MAC [4]						0.44			0.4	0.4	0.44	0.32	0.27	0.37	0.42	0.19	0.48	0.35
Hardness	mg/L	80 - 100 OG	**326**	**1.4**	**331**	**290**	**285**	**301**	**290**	**300**	**330**	**300**	**310**	**303**	**306**	**291**	**305**	**293**	**297**	**254**
Nitrate	mg/L	10 MAC	<0.2	<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
Nitrite	mg/L	1 MAC	<0.2	<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
Organic Nitrogen	mg/L	0.15 OG		0.05	0.01	0.07	<0.26		0.14	**2.51**	**0.16**		**0.22**	<0.10	0.10	<0.10	0.13	<0.10	**0.17**	0.13
Total Ammonia	mg/L		0.26	<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
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
Orthophosphate	mg/L		<0.3	<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
pH	pH Units	6.5 - 8.5 OG												8.31	8.19	7.83	7.85	7.94	7.91	7.80
Conductivity	µS/cm													611	594	596	595	587	584	568
Elements																				
Aluminum	mg/L	0.1 OG	<0.03	<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
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
Barium	mg/L	1 MAC	0.087	<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
Beryllium	mg/L		<0.0005	<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	<0.001
Bismuth	mg/L		<0.2	<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
Boron	mg/l	5 IMAC [5]	0.07	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
Cadmium	mg/L	0.005 MAC	<0.005	<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
Calcium	mg/L		72.6	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
Chromium	mg/L	0.05 MAC	<0.005	<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
Cobalt	mg/L		<0.005	<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
Copper	mg/L	1 AO	0.015	<0.005	<0.005	<0.02	<0.003	0.02	0.011	0.13	0.001	0.02	0.03	0.005	0.064	<0.003	<0.003	0.003	0.004	<0.003
Iron	mg/L	0.3 AO	**1.81**	0.01	**1.6**	**1.44**	**1.55**	**1.33**	**1.9**	**1.6**	**1.6**	**2.6**	**1.9**	**1.46**	**1.36**	**1.55**	**1.36**	**1.39**	**1.51**	<0.010
Lead	mg/L	0.01 MAC	0.001	<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
Magnesium	mg/L		35.2	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
Manganese	mg/L	0.05 AO	0.013	<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
Molybdenum	mg/L		<0.02	<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
Nickel	mg/L													<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Phosphorus	mg/L													<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
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
Silicon	mg/L													4.93	4.74	4.92	4.63	4.59	4.43	4.41
Silver	mg/L		<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
Sodium	mg/L	200 AO	11.8	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
Strontium	mg/L		1.19	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
Sulphur	mg/L													2.99	2.38	3.02	3.07	3.41	9.58	4.16
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
Tin	mg/L		<0.05	<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
Titanium	mg/L		<0.005	<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
Uranium	mg/L	0.02 MAC							0.0008	0.0007	0.0008	0.0008	0.00080	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/L		<0.005	<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
Zinc	mg/L	5 AO	0.021	<0.005	0.038	<0.01	0.012	0.02	0.007	0.009	0.01	0.011	0.02	0.016	0.034	0.019	0.014	0.019	0.016	0.058

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-15

Parameters	**Units**	**ODWS [1]**	**2002**	**2003**	**2004**	**2005**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
General Chemistry			**Oct**	**Dec**	**June**	**June**	**July**	**June**	**June**	**June**	**June**	**June**	**May**	**June**	**May**	**May**	**May**	**May**	**May**
Alkalinity	mg/L	30-500 OG [2]	278	258	273	280	261	269	271	270	261	270	270	271	264	279	285	299	281
Total Dissolved Solids	mg/L	500 AO [3]	405	394	412	377	380	409	404	393	379	396	378	392	384	364	346	378	354
Chloride	mg/L	250 AO	7.8	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
Dissolved Organic Carbon	mg/L	5 AO	1.0	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
Potassium	mg/L		4.0	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
Sulphate	mg/L	500 AO	80.4	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
Fluoride	mg/L	1.5 MAC [4]					0.9			0.9	1.0	0.94	0.70	0.63	0.79	0.97	0.59	1.21	0.75
Hardness	mg/L	80 - 100 OG	**320**	**329**	**322**	**270**	**294**	**290**	**290**	**300**	**280**	**290**	**295**	**297**	**287**	**301**	**297**	**298**	**266**
Nitrate	mg/L	10 MAC	<0.2	<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
Nitrite	mg/L	1 MAC	<0.2	<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
Organic Nitrogen	mg/L	0.15 OG	0.10	0.05	0.05	0.05		0.13	0.06	**0.17**	0.09	**0.33**	0.10	<0.10	<0.10	0.14	<0.10	**0.17**	**0.22**
Total Ammonia	mg/L		0.19	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
Total Kjeldahl Nitrogen (TKN)	mg/L		0.29	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
Orthophosphate	mg/L		<0.3	<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
pH	pH Units	6.5 - 8.5 OG											8.20	8.16	7.95	7.90	7.93	7.86	7.78
Conductivity	µS/cm												698	676	680	678	668	663	674
Elements																			
Aluminum	mg/L	0.1 OG	0.05	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
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
Barium	mg/L	1 MAC	0.049	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
Beryllium	mg/L		<0.0005	<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
Bismuth	mg/L		<0.2	<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
Boron	mg/l	5 IMAC [5]	0.360	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
Cadmium	mg/L	0.005 MAC	<0.005	<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
Calcium	mg/L		70.8	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
Chromium	mg/L	0.05 MAC	<0.005	<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
Cobalt	mg/L		<0.005	<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
Copper	mg/L	1 AO	<0.005	<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
Iron	mg/L	0.3 AO	**2.69**	**2.88**	**2.83**	**3.53**	**5.77**	**2.3**	**1.4**	**1.1**	**1.5**	**0.95**	**0.808**	**0.722**	**1.06**	**1.04**	**0.577**	**0.584**	<0.010
Lead	mg/L	0.01 MAC	<0.001	<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
Magnesium	mg/L		34.9	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
Manganese	mg/L	0.05 AO	0.043	**0.054**	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
Molybdenum	mg/L		<0.02	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
Nickel	mg/L												<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Phosphorus	mg/L												<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
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
Silicon	mg/L												5.85	5.64	5.89	5.58	5.71	5.28	5.74
Silver	mg/L		<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
Sodium	mg/L	200 AO	28.2	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
Strontium	mg/L		4.76	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
Sulphur	mg/L												26.3	24.8	28.2	28.3	28.6	85.4	26.8
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
Tin	mg/L		<0.05	<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
Titanium	mg/L		<0.005	<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
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
Vanadium	mg/L		<0.005	<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
Zinc	mg/L	5 AO	0.133	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

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 ODW
(6) ODWS exceedances indicated by **bold** entries

Summary of Residential Geochemical Results WS-16

Parameters	**Units**	**ODWS [1]**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
General Chemistry			**Nov**	**Dec**	**Sept**	**June**	**June**	**July**	**June**	**June**	**July**	**June**	**June**	**May**	**June**	**May**	**May**	**May**	**May**	**May**
Alkalinity	mg/L	30-500 OG [2]	355	350	361	349	346	337	339	350	347	333	360	358	**No sample**	341	356	349	375	351
Total Dissolved Solids	mg/L	500 AO [3]	371	360	374	340	316	328	345	373	366	350	372	344	**obtained**	328	344	316	362	384
Chloride	mg/L	250 AO	0.8	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
Dissolved Organic Carbon	mg/L	5 AO	0.8	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
Potassium	mg/L		1.0	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
Sulphate	mg/L	500 AO	12.8	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
Fluoride	mg/L	1.5 MAC [4]						0.22			0.2	0.3	0.24	0.12		0.18	0.22	<0.10	0.83	0.17
Hardness	mg/L	80 - 100 OG	**368**	**349**	**362**	**320**	**341**	**346**	**310**	**370**	**360**	**340**	**360**	**360**		**334**	**354**	**328**	**343**	**8.4**
Nitrate	mg/L	10 MAC	<0.2	<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
Nitrite	mg/L	1 MAC	<0.2	<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
Organic Nitrogen	mg/L	0.15 OG		0.04	0.05	0.08	**0.55**		**0.16**	**0.22**	**0.19**			<0.10		<0.10	**0.16**	<0.10	0.10	<0.10
Total Ammonia	mg/L		0.06	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
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
Orthophosphate	mg/L		<0.3	<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
pH	pH Units	6.5 - 8.5 OG												8.23		7.78	7.86	7.87	7.92	7.86
Conductivity	µS/cm													679		661	654	631	626	663
Elements																				
Aluminum	mg/L	0.1 OG	<0.03	<0.05	**0.2**	<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
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
Barium	mg/L	1 MAC	0.09	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
Beryllium	mg/L		<0.0005	<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
Bismuth	mg/L		<0.2	<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
Boron	mg/l	5 IMAC [5]	0.02	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
Cadmium	mg/L	0.005 MAC	<0.005	<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
Calcium	mg/L		88.5	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
Chromium	mg/L	0.05 MAC	<0.005	<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
Cobalt	mg/L		<0.005	<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
Copper	mg/L	1 AO	0.017	<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
Iron	mg/L	0.3 AO	**1.87**	**2.34**	**1.95**	**1.55**	**1.97**	<0.005	**1.9**	**1.7**	**2.2**	**2.1**	**1.7**	**2.11**		**1.30**	**1.35**	**1.22**	**1.47**	<0.010
Lead	mg/L	0.01 MAC	0.004	<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
Magnesium	mg/L		35.6	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
Manganese	mg/L	0.05 AO	0.019	0.023	**0.056**	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
Molybdenum	mg/L		<0.02	<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
Nickel	mg/L													<0.003		<0.003	<0.003	<0.003	<0.003	<0.003
Phosphorus	mg/L													<0.05		<0.05	<0.05	<0.05	<0.05	<0.05
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
Silicon	mg/L													5.21		5.32	4.92	4.95	4.71	4.96
Silver	mg/L		<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
Sodium	mg/L	200 AO	7.2	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
Strontium	mg/L		0.336	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
Sulphur	mg/L													4.54		4.52	4.80	5.0	14.7	4.53
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
Tin	mg/L		<0.05	<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
Titanium	mg/L		<0.005	<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
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
Vanadium	mg/L		<0.005	<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
Zinc	mg/L	5 AO	0.156	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

Notes:
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The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

May 2019 Groundwater Duplicate Data

Parameters	Units	May-19								
		OW-10-I	NL GW DUP-1	Relative Percent Difference (%)	OW-16-I	NL GW DUP-2	Relative Percent Difference (%)	OW-25-IV	NL GW DUP-3	Relative Percent Difference (%)
General Chemistry										
Alkalinity	mg/L	261	264	(1.143)	338	346	(2.339)	189	190	(0.528)
Chloride	mg/L	2.46	2.39	2.887	4.97	4.55	8.824	7.9	7.84	0.636
Dissolved Organic Carbon	mg/L	1.7	1.7	0.000	12.1	10.5	14.159	4.6	4.0	13.953
Fluoride	mg/L	0.21	0.21	0.000	1.49	1.52	(1.993)	1.72	1.70	1.170
Sulphate	mg/L	152	152	0.000	2.60	1.39	**60.652**	23.7	23.0	2.998
Hardness	mg/L	401	395	1.508	82.8	82.7	0.121	61.8	64.1	(3.654)
Nitrate	mg/L	<0.10	<0.10	**NC**	<0.05	<0.05	**NC**	<0.05	<0.05	**NC**
Nitrite	mg/L	<0.10	<0.10	**NC**	<0.05	<0.05	**NC**	<0.05	<0.05	**NC**
Organic Nitrogen	mg/L	<0.10	<0.10	**NC**	1.31	1.26	3.891	<0.10	<0.10	**NC**
Orthophosphate	mg/L	<0.20	<0.20	**NC**	<0.10	<0.10	**NC**	<0.10	<0.10	**NC**
pH	pH Units	7.53	7.91	(4.922)	7.89	8.04	(1.883)	7.90	7.80	1.274
Electrical Conductivity	µS/cm	730	724	0.825	568	566	0.353	415	409	1.456
Total Ammonia	mg/L	<0.02	<0.02	**NC**	0.46	0.48	(4.255)	0.03	0.04	(28.571)
Total Dissolved Solids	mg/L	476	434	9.231	426	360	16.794	246	256	(3.984)
Total Kjeldahl Nitrogen (TKN)	mg/L	<0.10	<0.10	**NC**	1.77	1.74	1.709	<0.10	0.13	**NC**
Total Phosphorus	mg/L	<0.05	<0.05	**NC**	<0.05	<0.05	**NC**	<0.05	<0.05	**NC**
Metals										
Aluminum	mg/L	<0.004	<0.004	**NC**	0.006	0.008	(28.571)	<0.004	0.005	**NC**
Arsenic	mg/L	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**
Barium	mg/L	0.034	0.034	0.000	0.051	0.048	6.061	0.016	0.016	0.000
Beryllium	mg/L	<0.001	<0.001	**NC**	<0.001	<0.001	**NC**	<0.001	<0.001	**NC**
Bismuth	mg/L	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**
Boron	mg/l	0.162	0.177	(8.850)	0.492	0.504	(2.410)	0.355	0.345	2.857
Cadmium	mg/L	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**
Calcium	mg/L	104	103	0.966	13.7	13.5	1.471	13.6	14.1	(3.610)
Chromium	mg/L	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**
Cobalt	mg/L	<0.001	<0.001	**NC**	<0.001	<0.001	**NC**	<0.001	<0.001	**NC**
Copper	mg/L	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**
Iron	mg/L	0.097	0.080	19.209	<0.010	<0.010	**NC**	<0.010	<0.010	**NC**
Lead	mg/L	<0.001	<0.001	**NC**	<0.001	<0.001	**NC**	<0.001	<0.001	**NC**
Magnesium	mg/L	34.2	33.5	2.068	11.8	11.9	(0.844)	6.77	7.02	(3.626)
Manganese	mg/L	0.021	0.021	0.000	0.014	0.014	0.000	0.013	0.012	8.000
Molybdenum	mg/L	<0.002	<0.002	**NC**	0.008	0.008	0.000	0.041	0.040	2.469
Nickel	mg/L	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**
Potassium	mg/L	4.95	4.73	4.545	4.49	4.48	0.223	2.89	3.07	(6.040)
Selenium	mg/L	<0.004	<0.004	**NC**	<0.004	<0.004	**NC**	<0.004	<0.004	**NC**
Silicon	mg/L	3.81	3.62	5.114	7.91	7.59	4.129	5.02	4.81	4.273
Silver	mg/L	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**
Sodium	mg/L	4.04	4.02	0.496	98.9	100	(1.106)	67.5	69.0	(2.198)
Strontium	mg/L	1.17	1.23	(5.000)	0.545	0.563	(3.249)	0.445	0.442	0.676
Sulphur	mg/L	50.5	50.4	0.198	1.06	1.10	(3.704)	8.55	8.77	(2.540)
Thallium	mg/L	<0.006	<0.006	**NC**	<0.006	<0.006	**NC**	<0.006	<0.006	**NC**
Tin	mg/L	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**
Titanium	mg/L	0.003	0.003	0.000	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**
Uranium	mg/L	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**
Vanadium	mg/L	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**
Zinc	mg/L	<0.005	<0.005	**NC**	<0.005	<0.005	**NC**	<0.005	<0.005	**NC**

Notes:
(1) NC - not calculable as one or both concentrations are below the laboratory method detection limit.

Wood Project No.: **TY131010**

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

July 2019 Groundwater Duplicate Data

Parameters	Units	Jul-19								
		OW-30-I	NL GW DUP-1	Relative Percent Difference (%)	OW-24-II	NL GW DUP-2	Relative Percent Difference (%)	OW-25-II	NL GW DUP-3	Relative Percent Difference (%)
General Chemistry										
Alkalinity	mg/L	127	131	(3.101)	320	337	(5.175)	141	140	0.712
Chloride	mg/L	3.92	3.87	1.284	3.45	3.40	1.460	6.54	6.91	(5.502)
Dissolved Organic Carbon	mg/L	1.9	1.7	11.111	1.5	2.1	(33.333)	1.4	2.1	(40.000)
Fluoride	mg/L	1.74	1.78	(2.273)	0.58	0.58	0.000	1.03	1.02	0.976
Sulphate	mg/L	205	204	0.489	21.1	21.6	(2.342)	218	211	3.263
Hardness	mg/L	111	111	0.000	275	332	(18.781)	127	127	0.000
Nitrate	mg/L	<0.10	<0.10	**NC**	0.12	0.13	(8.000)	<0.10	<0.25	**NC**
Nitrite	mg/L	<0.10	<0.10	**NC**	<0.10	<0.10	**NC**	<0.10	<0.25	**NC**
Organic Nitrogen	mg/L	<0.10	0.1	**NC**	0.12	<0.10	**NC**	<0.10	<0.10	**NC**
Orthophosphate	mg/L	<0.20	<0.20	**NC**	<0.20	<0.20	**NC**	<0.20	<0.50	**NC**
pH	pH Units	8.10	8.13	(0.370)	7.84	7.76	1.026	8.03	8.05	(0.249)
Electrical Conductivity	µS/cm	741	744	(0.404)	733	732	0.137	795	800	(0.627)
Total Ammonia	mg/L	0.04	0.03	28.571	0.03	<0.02	**NC**	0.05	0.03	50.000
Total Dissolved Solids	mg/L	424	394	7.335	348	346	0.576	416	422	(1.432)
Total Kjeldahl Nitrogen (TKN)	mg/L	0.12	0.13	(8.000)	0.15	<0.10	**NC**	0.12	<0.10	**NC**
Total Phosphorus	mg/L	<0.05	<0.05	**NC**	<0.05	<0.05	**NC**	<0.05	<0.05	**NC**
Metals										
Aluminum	mg/L	0.010	0.037	**(114.894)**	<0.004	<0.004	**NC**	0.006	0.006	0.000
Arsenic	mg/L	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**
Barium	mg/L	0.024	0.024	0.000	0.026	0.047	**(57.534)**	0.024	0.024	0.000
Beryllium	mg/L	<0.001	<0.001	**NC**	<0.001	<0.001	**NC**	<0.001	<0.001	**NC**
Bismuth	mg/L	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**
Boron	mg/l	0.471	0.470	0.213	0.056	0.06	(6.897)	0.22	0.214	2.765
Cadmium	mg/L	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**
Calcium	mg/L	17.1	17.1	0.000	50.4	77.6	(42.500)	23.8	23.7	0.421
Chromium	mg/L	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**
Cobalt	mg/L	<0.001	<0.001	**NC**	<0.001	<0.001	**NC**	<0.001	<0.001	**NC**
Copper	mg/L	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**
Iron	mg/L	<0.010	<0.010	**NC**	<0.010	<0.010	**NC**	<0.010	<0.010	**NC**
Lead	mg/L	<0.001	<0.001	**NC**	<0.001	<0.001	**NC**	<0.001	<0.001	**NC**
Magnesium	mg/L	16.5	16.6	(0.604)	36.2	33.6	7.450	16.5	16.5	0.000
Manganese	mg/L	0.006	0.005	18.182	0.017	0.016	6.061	<0.002	<0.002	**NC**
Molybdenum	mg/L	0.043	0.043	0.000	0.007	0.007	0.000	0.050	0.050	0.000
Nickel	mg/L	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**
Potassium	mg/L	5.99	5.98	0.167	4.57	5.59	(20.079)	7.26	7.28	(0.275)
Selenium	mg/L	<0.004	<0.004	**NC**	<0.004	<0.004	**NC**	<0.004	<0.004	**NC**
Silicon	mg/L	1.16	1.19	(2.553)	2.78	4.83	**(53.876)**	2.10	2.02	3.883
Silver	mg/L	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**
Sodium	mg/L	99.2	98.8	0.404	14.3	15.6	(8.696)	105	104	0.957
Strontium	mg/L	0.823	0.813	1.222	1.03	1.03	0.000	0.557	0.548	1.629
Sulphur	mg/L	65.0	65.3	(0.460)	10.2	9.2	10.309	69.1	68.2	1.311
Thallium	mg/L	<0.006	<0.006	**NC**	<0.006	<0.006	**NC**	<0.006	<0.006	**NC**
Tin	mg/L	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**
Titanium	mg/L	0.002	0.002	0.000	<0.002	<0.002	**NC**	0.003	0.002	40.000
Uranium	mg/L	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**	0.003	0.003	0.000
Vanadium	mg/L	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**
Zinc	mg/L	<0.005	<0.005	**NC**	<0.005	<0.005	**NC**	<0.005	<0.005	**NC**

Notes:
(1) NC - not calculable as one or both concentrations are below the laboratory method detection limit.

Wood Project No.: **TY131010**

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

September 2019 Groundwater Duplicate Data

Parameters	Units	Sep-19								
		OW-24-III	NL GW DUP-1	Relative Percent Difference (%)	OW-24-II	NL GW DUP-2	Relative Percent Difference (%)	OW-23-I	NL GW DUP-3	Relative Percent Difference (%)
General Chemistry										
Alkalinity	mg/L	339	338	0.295	340	339	0.295	212	216	(1.869)
Chloride	mg/L	3.16	3.24	(2.500)	3.08	3.05	0.979	1.63	1.58	3.115
Dissolved Organic Carbon	mg/L	4.9	4.0	20.225	1.4	1.3	7.407	2.3	2.2	4.444
Fluoride	mg/L	<0.10	<0.10	**NC**	0.62	0.55	11.966	1.28	1.32	(3.077)
Sulphate	mg/L	16.0	16.3	(1.858)	21.5	21.3	0.935	5.53	5.40	2.379
Hardness	mg/L	345	343	0.581	325	326	(0.307)	117	117	0.000
Nitrate	mg/L	0.79	0.78	1.274	0.12	0.14	(15.385)	<0.05	<0.05	**NC**
Nitrite	mg/L	0.14	0.18	(25.000)	<0.10	<0.10	**NC**	<0.05	<0.05	**NC**
Organic Nitrogen	mg/L	1.07	0.33	**105.714**	0.23	0.16	35.897	0.22	0.25	(12.766)
Orthophosphate	mg/L	<0.20	<0.20	**NC**	<0.20	<0.20	**NC**	<0.10	<0.10	**NC**
pH	pH Units	7.67	7.71	(0.520)	7.90	7.82	1.018	8.01	7.71	3.817
Electrical Conductivity	µS/cm	748	738	1.346	746	741	0.672	472	459	2.793
Total Ammonia	mg/L	0.32	0.49	(41.975)	0.07	0.04	**54.545**	0.49	0.47	4.167
Total Dissolved Solids	mg/L	356	348	2.273	338	362	(6.857)	218	212	2.791
Total Kjeldahl Nitrogen (TKN)	mg/L	1.39	0.82	**51.584**	0.30	0.20	40.000	0.71	0.72	(1.399)
Total Phosphorus	mg/L	<0.05	0.06	**NC**	<0.05	<0.05	**NC**	<0.05	<0.05	**NC**
Metals										
Aluminum	mg/L	0.011	0.009	20.000	0.006	0.014	**(80.000)**	<0.004	0.007	**NC**
Arsenic	mg/L	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**
Barium	mg/L	0.028	0.029	(3.509)	0.053	0.052	1.905	0.033	0.031	6.250
Beryllium	mg/L	<0.001	<0.001	**NC**	<0.001	<0.001	**NC**	<0.001	<0.001	**NC**
Bismuth	mg/L	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**
Boron	mg/l	0.016	0.023	(35.897)	0.06	0.046	26.415	0.303	0.277	8.966
Cadmium	mg/L	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**
Calcium	mg/L	95.7	95.6	0.105	69.4	69.1	0.433	19.3	19.4	(0.517)
Chromium	mg/L	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**
Cobalt	mg/L	0.003	0.003	0.000	<0.001	<0.001	**NC**	<0.001	<0.001	**NC**
Copper	mg/L	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**
Iron	mg/L	0.444	0.660	(39.130)	<0.010	<0.010	**NC**	<0.010	<0.010	**NC**
Lead	mg/L	<0.001	<0.001	**NC**	<0.001	<0.001	**NC**	<0.001	<0.001	**NC**
Magnesium	mg/L	25.8	25.4	1.563	36.9	37.3	(1.078)	16.6	16.7	(0.601)
Manganese	mg/L	0.216	0.264	(20.000)	0.122	0.121	0.823	0.010	0.01	0.000
Molybdenum	mg/L	<0.002	<0.002	**NC**	0.008	0.007	13.333	0.009	0.008	11.765
Nickel	mg/L	<0.003	<0.003	**NC**	<0.003	0.003	**NC**	<0.003	<0.003	**NC**
Potassium	mg/L	1.18	1.17	0.851	5.68	5.79	(1.918)	3.11	3.15	(1.278)
Selenium	mg/L	<0.004	<0.004	**NC**	<0.004	<0.004	**NC**	<0.004	<0.004	**NC**
Silicon	mg/L	7.97	7.82	1.900	5.43	5.50	(1.281)	5.05	5.14	(1.766)
Silver	mg/L	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**
Sodium	mg/L	6.27	6.15	1.932	14.3	14.4	(0.697)	47.9	48.1	(0.417)
Strontium	mg/L	0.142	0.142	0.000	1.17	1.20	(2.532)	0.609	0.605	0.659
Sulphur	mg/L	5.29	5.24	0.950	7.60	7.73	(1.696)	2.34	2.32	0.858
Thallium	mg/L	<0.006	<0.006	**NC**	<0.006	<0.006	**NC**	<0.006	<0.006	**NC**
Tin	mg/L	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**
Titanium	mg/L	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**
Uranium	mg/L	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**
Vanadium	mg/L	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**
Zinc	mg/L	0.005	<0.005	**NC**	<0.005	<0.005	**NC**	<0.005	<0.005	**NC**

Notes:
(1) NC - not calculable as one or both concentrations are below the laboratory method detection limit.

Wood Project No.: **TY131010**

2019 Residential Supply Well Duplicate Data

Parameters	Units	May-19		
		WS-16	WS DUP	Relative Percent Difference (%)
General Chemistry				
Alkalinity	mg/L	351	351	0.000
Total Dissolved Solids	mg/L	384	384	0.000
Chloride	mg/L	1.81	1.75	3.371
Dissolved Organic Carbon	mg/L	2.1	1.9	10.000
Potassium	mg/L	0.30	0.34	(12.500)
Sulphate	mg/L	13.3	13.5	(1.493)
Fluoride	mg/L	0.17	0.18	(5.714)
Hardness	mg/L	8.4	9.0	(6.897)
Nitrate	mg/L	<0.10	<0.10	**NC**
Nitrite	mg/L	<0.10	<0.10	**NC**
Organic Nitrogen	mg/L	<0.10	<0.10	**NC**
Total Ammonia	mg/L	<0.02	<0.02	**NC**
Total Kjeldahl Nitrogen (TKN)	mg/L	<0.10	<0.10	**NC**
Orthophosphate	mg/L	<0.20	<0.20	**NC**
pH	pH Units	7.86	7.79	0.895
Conductivity	µS/cm	663	663	0.000
Elements				
Aluminum	mg/L	<0.004	<0.004	**NC**
Arsenic	mg/L	0.003	0.003	0.000
Barium	mg/L	0.004	0.003	28.571
Beryllium	mg/L	<0.001	<0.001	**NC**
Bismuth	mg/L	<0.002	<0.002	**NC**
Boron	mg/l	0.038	0.033	14.085
Cadmium	mg/L	<0.002	<0.002	**NC**
Calcium	mg/L	2.21	2.35	(6.140)
Chromium	mg/L	<0.003	<0.003	**NC**
Cobalt	mg/L	<0.001	<0.001	**NC**
Copper	mg/L	<0.003	<0.003	**NC**
Iron	mg/L	<0.010	<0.010	**NC**
Lead	mg/L	<0.001	<0.001	**NC**
Magnesium	mg/L	0.71	0.77	(8.108)
Manganese	mg/L	<0.002	<0.002	**NC**
Molybdenum	mg/L	<0.002	<0.002	**NC**
Nickel	mg/L	<0.003	<0.003	**NC**
Phosphorus	mg/L	<0.05	<0.05	**NC**
Selenium	mg/L	<0.004	<0.004	**NC**
Silicon	mg/L	4.96	4.96	0.000
Silver	mg/L	<0.002	<0.002	**NC**
Sodium	mg/L	143	150	(4.778)
Strontium	mg/L	0.016	0.014	13.333
Sulphur	mg/L	4.53	5.43	(18.072)
Thallium	mg/L	<0.006	<0.006	**NC**
Tin	mg/L	<0.002	<0.002	**NC**
Titanium	mg/L	<0.002	<0.002	**NC**
Uranium	mg/L	<0.002	<0.002	**NC**
Vanadium	mg/L	<0.002	<0.002	**NC**
Zinc	mg/L	0.045	0.040	11.76

Notes:
(1) NC - not calculable as one or both concentrations are below the laboratory method detection limit.

APPENDIX G

SUMMARY OF SURFACE WATER GEOCHEMICAL ANALYSES

Summary of Surface Water Geochemical Results SW-1

Parameters	Units	PWQO[1]	APV[2]	CWQG[3]	2017								2018								2019							
General Chemistry					**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**	**25-Apr**	**26-May**	**26-Jun**	**25-Jul**	**25-Aug**	**24-Sep**	**23-Oct**	**22-Nov**
Alkalinity (as CaCO3)	mg/L				50	70	75	86	97	98	115	**Frozen**	63	75	71	**Unsafe to sample**	71	76	**Frozen**	**Frozen**	60	63	64	65	75	88	100	92
BOD (5)	mg/L				<5	<5	<5	<5	<5	<5	<5		<5	<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			30	22	23	11	12	<5	20	6
Total Dissolved Solids	mg/L				68	94	90	122	130	136	150		80	104	92		104	124			128	98	122	102	86	126	156	116
Total Suspended Solids	mg/L				25	21	18	26	16	<10	23		146	43	26		44	10			237	41	144	14	32	18	38	55
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			<0.02	0.08	0.04	0.19	0.12	0.08	0.06	<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			0.48	0.2	0.06	<0.05	<0.05	<0.05	0.42	0.43
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	<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			<0.10	0.42	0.38	0.51	0.48	0.40	0.22	0.21
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			10.6	4.33	3.94	2.94	3.33	7.42	10.3	5.89
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			12.6	2.98	3.46	4.22	5.72	4.96	6.97	5.70
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	**0.002**	***0.007***	<0.001	<0.001	0.001	**0.002**	<0.001
Total Phosphorus	mg/L				0.05	0.05	0.05	0.05	0.05	0.03	0.05		0.12	0.06	0.06		0.11	0.03			0.21	0.04	0.10	0.06	0.06	0.05	0.05	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			7.27	6.94	7.47	7.79	7.73	7.28	7.75	7.45
Electrical Conductivity	uS/cm				124	166	156	197	211	209	219		150	158	166		200	213			183	124	142	166	219	232	226	197
Metals																												
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			<0.003	
Barium	mg/L		2.3		0.011		0.010						0.025		0.016						0.02	0.014	0.014	0.011			0.016	
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			<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			<0.0001	
Chromium	mg/L	0.0089	0.064		<0.003		<0.003						0.003		<0.003						<0.003	<0.003	0.003	<0.003			<0.003	
Copper	mg/L	0.005	0.0069		<0.002		<0.002						0.004		0.003						0.003	0.002	<0.002	<0.002			0.003	
Iron	mg/L	0.3			**0.34**	**0.39**	**0.36**	0.29	0.28	0.26	**0.37**		**1.07**	**0.53**	**0.46**		**0.92**	0.25			**0.60**	**0.49**	**0.42**	**0.53**	**0.32**	**0.34**	**0.37**	**0.34**
Lead	mg/L	0.005	0.002		<0.001		<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			<0.0001	
Zinc	mg/L	0.03	0.089	0.03	<0.005		0.006						0.007		<0.005						0.007	<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 Soil and Groundwater Standards for use at Contaminated Site in Ontaric*, 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.

Summary of Surface Water Geochemical Results SW-2

Parameters	Units	PWQO[1]	APV[2]	CWQG[3]	2017								2018								2019							
General Chemistry					**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**	**25-Apr**	**26-May**	**26-Jun**	**25-Jul**	**25-Aug**	**24-Sep**	**23-Oct**	**22-Nov**
Alkalinity (as CaCO3)	mg/L				185	303	397	363	362	355	290	**Frozen**	124	275	**Dry**	**Dry**	294	315	266	**Frozen**	136	257	275	**Dry**	292	287	**Dry**	234
BOD (5)	mg/L				<5	<5	<5	7	<5	<5	<5		<5	<5			<5	<5	<5		<5	<5	<5		<5	<5		<5
Chemical Oxygen Demand	mg/L				9	8	28	26	31	20	<5		17	<5			14	6	15		12	8	22		21	101		<5
Total Dissolved Solids	mg/L				220	306	1270	398	384	386	326		132	308			470	538	302		188	224	286		402	446		358
Total Suspended Solids	mg/L				10	<10	<10	182	<10	161	<10		249	<10			57	<10	24		<10	26	152		50	23		37
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		<0.02	<0.02	<0.02		0.08	0.15		<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		0.27	<0.05	<0.05		<0.10	<0.25		0.17
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		<0.05	<0.05	<0.05		<0.10	<0.25		<0.10
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		<0.10	<0.10	0.27		0.71	1.67		0.17
Chloride	mg/L		180	120	28.8	20.9	*559*	29.6	48.1	25.7	27.5		12.6	29.3			80.9	68.8	31.1		12.3	8.41	5.9		61.5	54.6		73.3
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		3.47	3.43	7.10		7.87	8.41		16.8
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	<0.001	<0.001		**0.003**	**0.003**		<0.001
Total Phosphorus	mg/L				0.02	0.02	0.03	0.06	0.50	0.14	0.02		0.19	0.04			0.19	0.03	0.02		0.03	<0.02	0.09		0.03	0.32		0.03
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		7.82	7.88	7.94		8.10	8.09		7.98
Electrical Conductivity	uS/cm				459	649	2330	753	793	679	545		272	547			850	884	543		302	416	515		809	757		637
Metals																												
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		0.017		0.024						0.029								0.015	0.016	0.026					
Boron	mg/L	0.2	3.55	1.5	<0.010		0.017						<0.010								<0.010	0.013	0.018					
Cadmium	mg/L	0.0002	0.00021		**0.0007**		<0.0001						<0.0001								<0.0001	<0.0001	<0.0001					
Chromium	mg/L	0.0089	0.064		<0.003		0.004						0.003								<0.003	<0.003	0.005					
Copper	mg/L	0.005	0.0069		0.003		<0.002						0.004								<0.002	<0.002	<0.002					
Iron	mg/L	0.3			0.12	0.04	0.06	**0.41**	0.04	**0.63**	0.08		**0.75**	0.19			**0.75**	0.05	0.18		0.18	0.07	0.30		0.06	0.07		0.24
Lead	mg/L	0.005	0.002		<0.001		<0.001						0.002								<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	0.019		0.012						0.012								0.007	<0.005	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 Ontaric*, 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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Summary of Surface Water Geochemical Results SW-3

Parameters	Units	PWQO[1]	APV[2]	CWQG[3]	2017								2018								2019							
General Chemistry					**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**	**25-Apr**	**26-May**	**26-Jun**	**25-Jul**	**25-Aug**	**24-Sep**	**23-Oct**	**22-Nov**
Alkalinity (as CaCO3)	mg/L				214	300	Dry	Dry	Dry	Dry	Dry	Frozen	157	305	Dry	Dry	Dry	Dry	293	Frozen	159	268	337	Dry	Dry	Dry	325	260
BOD (5)	mg/L				<5	<5							<5	<5					<5		<5	<5	<5				<5	<5
Chemical Oxygen Demand	mg/L				6	12							12	<5					16		14	7	19				<5	<5
Total Dissolved Solids	mg/L				330	318							156	358					346		198	254	402				454	438
Total Suspended Solids	mg/L				<10	<10							221	<10					20		<10	<10	61				112	<10
Ammonia as N	mg/L				<0.02	<0.02							<0.02	<0.02					<0.02		<0.02	0.04	<0.02				<0.02	<0.02
Nitrate as N	mg/L				<0.10	<0.05							0.08	<0.10					<0.25		0.31	<0.05	<0.10				<0.25	<0.10
Nitrite as N	mg/L				<0.10	<0.05							<0.05	<0.10					<0.25		<0.05	<0.05	<0.10				<0.25	<0.10
Total Kjeldahl Nitrogen	mg/L				0.17	0.20							0.15	0.20					0.17		<0.10	0.14	0.63				0.17	0.16
Chloride	mg/L		180	120	71.6	49.6							38.8	59.4					54.4		30.1	32.8	62.5				81.3	103
Sulphate	mg/L				9.26	6.52							3.32	6.14					9.9		4.64	4.44	2.94				11.5	14.0
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
Total Phosphorus	mg/L				0.01	0.04							0.14	<0.02					0.04		0.03	<0.02	0.08				0.09	0.04
pH	pH Units	6.5 - 8.5		6.5 - 9.0	8.11	8.39							7.77	7.90					7.81		7.82	7.89	7.95				8.06	7.89
Electrical Conductivity	uS/cm				665	746							410	665					663		402	507	778				808	764
Metals																												
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		0.021								0.032								0.02	0.019	0.025				0.035	
Boron	mg/L	0.2	3.55	1.5	<0.010								<0.010								<0.010	0.011	0.013				0.012	
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		0.004								0.003								<0.003	<0.003	**0.010**				<0.003	
Copper	mg/L	0.005	0.0069		<0.002								0.004								<0.002	<0.002	<0.002				0.004	
Iron	mg/L	0.3			0.10	0.08							**0.74**	0.14					0.21		**0.35**	0.07	0.06				0.14	0.04
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	0.008								0.013								0.007	<0.005	0.006				0.006	

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 Ontaric*, 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.

Summary of Surface Water Geochemical Results SW-4

Parameters	Units	PWQO[1]	APV[2]	CWQG[3]	2017								2018								2019							
General Chemistry					**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**	**25-Apr**	**26-May**	**26-Jun**	**25-Jul**	**25-Aug**	**24-Sep**	**23-Oct**	**22-Nov**
Alkalinity (as CaCO3)	mg/L				283	333	385	389	392	355	321	**Frozen**	234	329	**Dry**	347	281	313	366	**Frozen**	230	327	330	**Dry**	**Dry**	323	289	276
BOD (5)	mg/L				<5	<5	<5	<5	<5	<5	<5		<5	<5		<5	<5	<5	<5		<5	<5	<5			<5	<5	<5
Chemical Oxygen Demand	mg/L				9	24	47	48	38	30	7		6	<5		24	21	8	18		16	9	17			23	32	<5
Total Dissolved Solids	mg/L				1100	1020	1100	1110	1080	912	1090		896	1090		1770	1450	1200	1090		906	874	1110			1190	858	892
Total Suspended Solids	mg/L				<10	118	43	18	351	728	11		<10	<10		26	10	24	48		<10	<10	14			35	307	21
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		<0.02	<0.02	<0.02			0.03	0.03	0.04
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		2.1	2.3	1.1			<0.5	<0.25	0.71
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		<0.5	<0.5	<0.5			<0.5	<0.25	<0.25
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		<0.10	0.3	0.56			0.69	0.38	0.27
Chloride	mg/L		180	120	*533*	*480*	*456*	*482*	*517*	*368*	*525*		*456*	*533*		*885*	*734*	*547*	*463*		*425*	*436*	*561*			*637*	*344*	*378*
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		19	17.0	11.10			27.5	27.8	21.4
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		<0.001	<0.001	<0.001			**0.002**	**0.002**	<0.001
Total Phosphorus	mg/L				0.02	0.06	0.22	0.08	0.13	0.08	0.03		0.03	0.02		0.24	0.08	0.15	0.04		<0.02	<0.02	0.06			0.11	0.22	0.06
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		7.92	7.91	7.93			7.97	8.00	7.92
Electrical Conductivity	uS/cm				2230	2190	2050	2120	2040	1670	1930		1830	1940		3330	2650	2300	1980		1780	1770	2200			2520	1510	1630
Metals																												
Arsenic	mg/L	0.1	0.15	0.005	<0.003		0.004						<0.003								<0.003	<0.003	0.004				<0.003	
Barium	mg/L		2.3		0.064		0.115						0.069								0.062	0.061	0.074				0.045	
Boron	mg/L	0.2	3.55	1.5	<0.010		0.015						<0.010								<0.010	0.014	0.015				0.017	
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		**0.010**		**0.009**						<0.003								0.005	<0.003	0.007				<0.003	
Copper	mg/L	0.005	0.0069		0.002		**0.010**						0.002								0.003	0.004	0.003				**0.012**	
Iron	mg/L	0.3			<0.01	0.26	**4.34**	0.23	**0.90**	**0.52**	0.19		0.17	0.04		**4.36**	**0.68**	**0.86**	**0.36**		0.11	0.04	0.26			**0.49**	**0.49**	0.19
Lead	mg/L	0.005	0.002		<0.001		0.004						<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	
Zinc	mg/L	0.03	0.089	0.03	<0.005		0.026						<0.005								<0.005	<0.005	0.009				0.006	

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 Ontaric*, 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.

The City of Temiskaming Shores
2019 Annual Groundwater and Surface Water Monitoring Report
New Liskeard Waste Disposal Site
New Liskeard, Ontario
March 2020

Summary of Surface Water Geochemical Results SW-5

Parameters	Units	PWQO[1]	APV[2]	CWQG[3]	2017								2018								2019							
General Chemistry					**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**	**25-Apr**	**26-May**	**26-Jun**	**25-Jul**	**25-Aug**	**24-Sep**	**23-Oct**	**22-Nov**
Alkalinity (as CaCO3)	mg/L				101	111	112	107	40	158	189	**Frozen**	**Frozen**	139	72	29	85	110	**Frozen**	**Frozen**	**Frozen**	132	83	31	77	50	138	**Frozen**
BOD (5)	mg/L				<5	<5	<5	<5	<5	<5	<5			<5	<5	<5	<5	<5				<5	<5	<5	<5	<5	<5	
Chemical Oxygen Demand	mg/L				24	56	36	32	23	16	16			18	30	18	8	13				22	35	21	21	16	33	
Total Dissolved Solids	mg/L				150	130	152	148	82	192	232			204	112	66	152	190				234	136	48	138	104	278	
Total Suspended Solids	mg/L				70	17	14	<10	13	23	30			102	48	11	16	15				62	26	20	560	20	66	
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				0.10	0.02	0.18	0.19	0.07	0.04	
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				0.78	0.24	0.05	<0.05	<0.05	1.4	
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				<0.05	<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				0.49	0.44	0.55	1.30	0.57	0.44	
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				7.61	8.07	2.36	8.42	8.89	24.2	
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				5.36	6.38	4.39	8.09	6.95	11.9	
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				**0.002**	**0.002**	**0.002**	**0.002**	**0.002**	**0.004**	
Total Phosphorus	mg/L				0.06	0.06	0.08	0.04	0.09	0.06	0.07			0.13	0.07	0.04	0.11	0.08				0.08	0.07	0.07	0.27	0.07	0.08	
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				7.51	7.37	7.50	7.19	7.08	7.68	
Electrical Conductivity	uS/cm				248	258	271	243	112	321	366			314	195	87	253	316				244	195	95	195	159	343	
Metals																												
Arsenic	mg/L	0.1	0.15	0.005	<0.003		<0.003								<0.003							<0.003	<0.003	<0.003			<0.003	
Barium	mg/L		2.3		0.024		0.017								0.026							0.024	0.023	0.012			0.033	
Boron	mg/L	0.2	3.55	1.5	<0.010		0.015								0.016							<0.010	<0.010	<0.010			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		<0.003		<0.003								<0.003							<0.003	<0.003	<0.003			<0.003	
Copper	mg/L	0.005	0.0069		0.003		0.002								0.005							0.003	<0.002	0.003			**0.0060**	
Iron	mg/L	0.3			**0.70**	**0.49**	0.25	0.24	0.21	**0.39**	**0.37**			**1.17**	**0.8**	0.24	**0.47**	**0.34**				**0.55**	0.21	**0.45**	**2.39**	**0.36**	**0.54**	
Lead	mg/L	0.005	0.002		<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	
Zinc	mg/L	0.03	0.089	0.03	0.007		0.011								0.010							<0.005	0.009	<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 Standards for use at Contaminated Site in Ontaric*, 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.

Summary of Surface Water Geochemical Results SW-6

Parameters	Units	PWQO[1]	APV[2]	CWQG[3]	2017								2018								2019							
General Chemistry					**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**	**25-Apr**	**26-May**	**26-Jun**	**25-Jul**	**25-Aug**	**24-Sep**	**23-Oct**	**22-Nov**
Alkalinity (as CaCO3)	mg/L				102	98	108	78	38	135	190	**Frozen**	**Frozen**	140	71	27	78	106	**Frozen**	**Frozen**	**Frozen**	135	83	28	72	48	132	**Frozen**
BOD (5)	mg/L				<5	<5	<5	<5	<5	<5	<5			<5	<5	<5	<5	<5				<5	<5	<5	<5	<5	<5	
Chemical Oxygen Demand	mg/L				22	47	31	29	31	23	17			21	19	14	7	11				21	29	22	21	13	26	
Total Dissolved Solids	mg/L				140	146	152	108	76	162	242			192	92	70	142	184				160	134	64	108	98	214	
Total Suspended Solids	mg/L				40	11	17	11	11	20	49			81	26	<10	10	13				55	20	12	93	26	24	
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				0.07	0.05	0.16	0.13	0.03	0.04	
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				0.76	0.3	0.05	<0.05	<0.05	1.39	
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	<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				<0.10	0.44	0.62	0.90	0.69	0.37	
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				8.36	8.13	2.05	9.52	8.82	10.6	
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				5.36	6.49	4.51	7.98	7.43	11.0	
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				**0.002**	**0.002**	**0.002**	**0.002**	**0.002**	**0.004**	
Total Phosphorus	mg/L				0.07	0.06	0.07	0.05	0.07	0.10	0.07			0.12	0.05	0.04	0.07	0.08				0.09	0.09	0.06	0.15	0.13	0.10	
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				7.66	7.59	7.39	7.64	7.29	7.81	
Electrical Conductivity	uS/cm				249	256	258	183	111	275	363			286	166	81	237	306				251	197	85	240	158	292	
Metals																												
Arsenic	mg/L	0.1	0.15	0.005	<0.003		<0.003								<0.003							<0.003	<0.003	<0.003			<0.003	
Barium	mg/L		2.3		0.022		0.015								0.015							0.027	0.026	0.010			0.031	
Boron	mg/L	0.2	3.55	1.5	<0.010		0.011								<0.010							<0.010	0.010	<0.010			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		<0.003		0.004								<0.003							<0.003	<0.003	<0.003			<0.003	
Copper	mg/L	0.005	0.0069		0.003		0.002								0.003							0.004	<0.002	0.002			0.004	
Iron	mg/L	0.3			**0.71**	**0.42**	0.24	0.21	0.21	**0.41**	**0.53**			**0.96**	**0.39**	0.29	**0.37**	**0.35**				**0.59**	0.26	**0.38**	**1.02**	**0.52**	**0.56**	
Lead	mg/L	0.005	0.002		<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	
Zinc	mg/L	0.03	0.089	0.03	<0.005		0.007								0.008							0.006	0.010	<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 Standards for use at Contaminated Site in Ontaric*, 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.

2019 Surface Water Duplicate Data

Parameters	Units	25 April 2019			26 May 2019			26 June 2019			25 July 2019		
		SW-1	NL SW DUP	Relative Percent Difference (%)	SW-1	NL SW DUP	Relative Percent Difference (%)	SW-5	NL SW DUP	Relative Percent Difference (%)	SW-1	NL SW DUP	Relative Percent Difference (%)
General Chemistry													
Alkalinity (as CaCO3)	mg/L	60	56	6.897	63	65	(3.125)	83	81	2.439	65	72	(10.219)
BOD (5)	mg/L	<5	<5	**NC**	<5	<5	**NC**	<5	<5	**NC**	<5	<5	**NC**
Chemical Oxygen Demand	mg/L	30	28	6.897	22	23	(4.444)	35	32	8.955	11	13	(16.667)
Total Dissolved Solids	mg/L	128	128	0.000	98	104	(5.941)	136	126	7.634	102	96	6.061
Total Suspended Solids	mg/L	237	133	**56.216**	41	39	5.000	26	21	21.277	14	16	(13.333)
Ammonia as N	mg/L	<0.02	<0.02	**NC**	0.08	0.08	0.000	0.02	<0.02	**NC**	0.19	0.16	17.143
Nitrate as N	mg/L	0.48	0.48	0.000	0.18	0.17	5.714	0.24	0.25	(4.082)	<0.05	<0.05	**NC**
Nitrite as N	mg/L	<0.05	<0.05	**NC**	<0.05	<0.05	**NC**	<0.05	<0.05	**NC**	<0.05	<0.05	**NC**
Total Kjeldahl Nitrogen	mg/L	<0.10	0.13	**NC**	0.42	0.39	7.407	0.44	0.48	(8.696)	0.51	0.48	6.061
Chloride	mg/L	10.6	7.23	37.801	4.33	4.30	0.695	8.07	8.11	(0.494)	2.94	2.86	2.759
Sulphate	mg/L	12.6	3.27	**117.580**	2.98	2.97	0.336	6.38	7.03	(9.694)	4.22	4.11	2.641
Phenols	mg/L	0.001	<0.001	**NC**	0.002	0.002	0.000	0.002	0.00	0.000	<0.001	0.001	**NC**
Total Phosphorus	mg/L	0.21	0.14	40.000	0.04	0.04	0.000	0.07	0.09	(25.000)	0.06	0.08	(28.571)
pH	pH Units	7.27	7.24	0.414	6.94	7.23	(4.093)	7.37	7.61	(3.204)	7.79	7.80	(0.128)
Electrical Conductivity	uS/cm	183	143	24.540	124	124	0.000	195	196	(0.512)	166	166	0.000
Metals													
Arsenic	mg/L	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**
Barium	mg/L	0.020	0.017	16.216	0.014	0.014	0.000	0.023	0.022	4.444	0.011	0.010	9.524
Boron	mg/L	<0.010	<0.010	**NC**	<0.010	<0.010	**NC**	<0.010	0.010	**NC**	<0.010	<0.010	**NC**
Cadmium	mg/L	<0.0001	<0.0001	**NC**	<0.0001	<0.0001	**NC**	<0.0001	<0.0001	**NC**	<0.0001	<0.0001	**NC**
Chromium	mg/L	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**	<0.003	<0.003	**NC**
Copper	mg/L	0.003	0.003	0.000	0.002	0.002	0.000	<0.002	<0.002	**NC**	<0.002	<0.002	**NC**
Iron	mg/L	0.60	0.61	(1.653)	0.49	0.49	0.000	0.21	0.24	(13.333)	0.53	0.48	9.901
Lead	mg/L	<0.001	<0.001	**NC**	<0.001	<0.001	**NC**	<0.001	<0.001	**NC**	<0.001	<0.001	**NC**
Dissolved Mercury	mg/L	<0.0001	<0.0001	**NC**	<0.0001	<0.0001	**NC**	<0.0001	<0.0001	**NC**	<0.0001	<0.0001	**NC**
Zinc	mg/L	0.007	0.005	33.333	<0.005	<0.005	**NC**	0.009	0.007	25.000	<0.005	<0.005	**NC**

Notes:
(1) NC - not calculable as one or both concentrations are below the laboratory method detection limit.

2019 Surface Water Duplicate Data

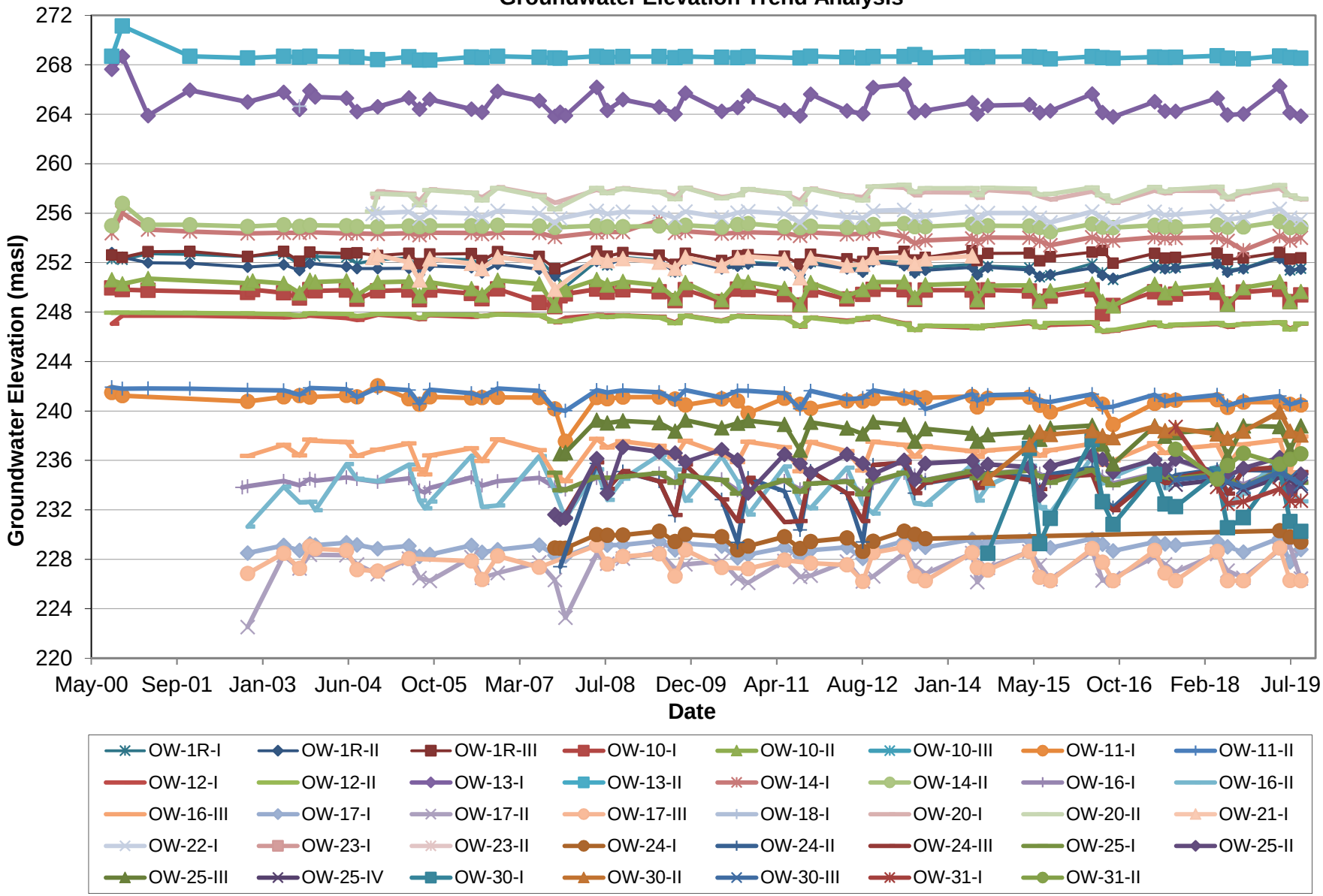
Parameters	Units	25 August 2019			24 Sept 2019			23 Oct 2019			22 Nov 2019		
		SW-1	NL SW DUP	Relative Percent Difference (%)	SW-5	NL SW DUP	Relative Percent Difference (%)	SW-1	NL SW DUP	Relative Percent Difference (%)	SW-4	NL SW DUP	Relative Percent Difference (%)
General Chemistry													
Alkalinity (as CaCO3)	mg/L	75	75	0.000	50	50	0.000	100	100	0.000	276	269	2.569
BOD (5)	mg/L	<5	<5	**NC**	<5	<5	**NC**	<5	<5	**NC**	<5	<5	**NC**
Chemical Oxygen Demand	mg/L	12	13	(8.000)	16	10	46.154	20	12	50.000	<5	<5	**NC**
Total Dissolved Solids	mg/L	86	78	9.756	104	108	(3.774)	156	154	1.290	892	906	(1.557)
Total Suspended Solids	mg/L	32	22	37.037	20	21	(4.878)	38	22	**53.333**	21	23	(9.091)
Ammonia as N	mg/L	0.12	0.14	(15.385)	0.07	0.06	15.385	0.06	<0.02	**NC**	0.04	0.04	0.000
Nitrate as N	mg/L	<0.05	<0.05	**NC**	<0.05	<0.05	**NC**	0.42	0.40	4.878	0.71	0.70	1.418
Nitrite as N	mg/L	<0.05	<0.05	**NC**	<0.05	<0.05	**NC**	<0.05	<0.05	**NC**	<0.25	<0.25	**NC**
Total Kjeldahl Nitrogen	mg/L	0.48	0.51	(6.061)	0.57	0.58	(1.739)	0.22	0.20	9.524	0.27	0.29	(7.143)
Chloride	mg/L	3.33	3.25	2.432	8.89	8.9	(0.112)	10.3	10.9	(5.660)	378	402	(6.154)
Sulphate	mg/L	5.72	5.36	6.498	6.95	7.07	(1.712)	6.97	7.06	(1.283)	21.4	21.8	(1.852)
Phenols	mg/L	<0.001	0.002	**NC**	0.002	0.002	0.000	0.002	0.002	0.000	<0.001	<0.001	**NC**
Total Phosphorus	mg/L	0.06	0.04	40.000	0.07	0.07	0.000	0.05	0.05	0.000	0.06	0.04	40.000
pH	pH Units	7.73	7.78	(0.645)	7.08	7.36	(3.878)	7.75	7.7	0.647	7.92	7.96	(0.504)
Electrical Conductivity	uS/cm	219	214	2.309	159	158	0.631	226	224	0.889	1630	1630	0.000
Metals													
Arsenic	mg/L							<0.003	<0.003	**NC**			
Barium	mg/L							0.016	0.018	(11.765)			
Boron	mg/L							<0.010	<0.010	**NC**			
Cadmium	mg/L							<0.0001	<0.0001	**NC**			
Chromium	mg/L							<0.003	<0.003	**NC**			
Copper	mg/L							0.003	0.002	40.000			
Iron	mg/L	0.32	0.30	6.452	0.36	0.34	5.714	0.37	0.38	(2.667)	0.19	0.21	(10.000)
Lead	mg/L							<0.001	<0.001	**NC**			
Dissolved Mercury	mg/L							<0.0001	<0.0001	**NC**			
Zinc	mg/L							<0.005	<0.005	**NC**			

Notes:
(1) NC - not calculable as one or both concentrations are below the laboratory method detection limit.

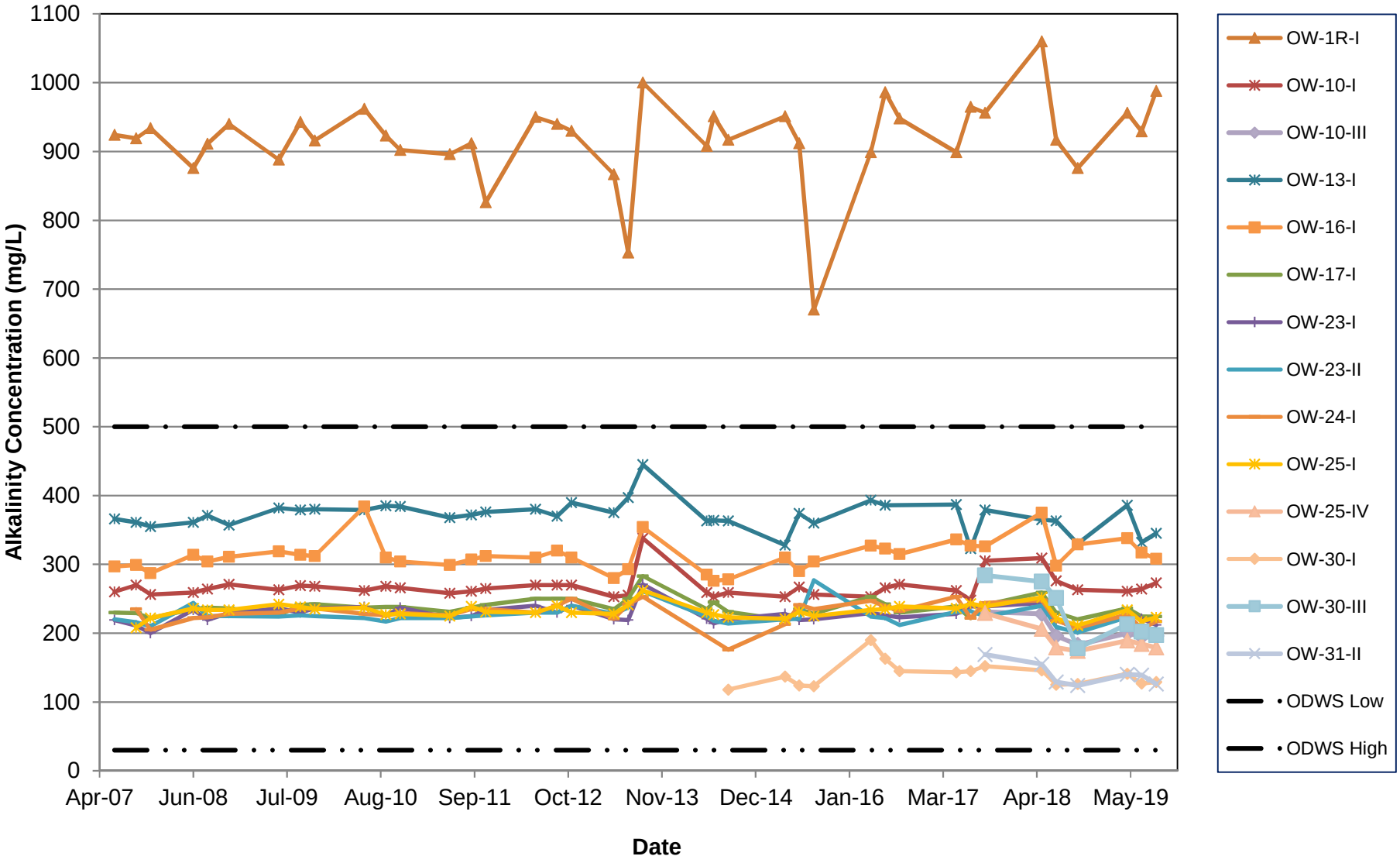
APPENDIX H

TREND ANALYSIS

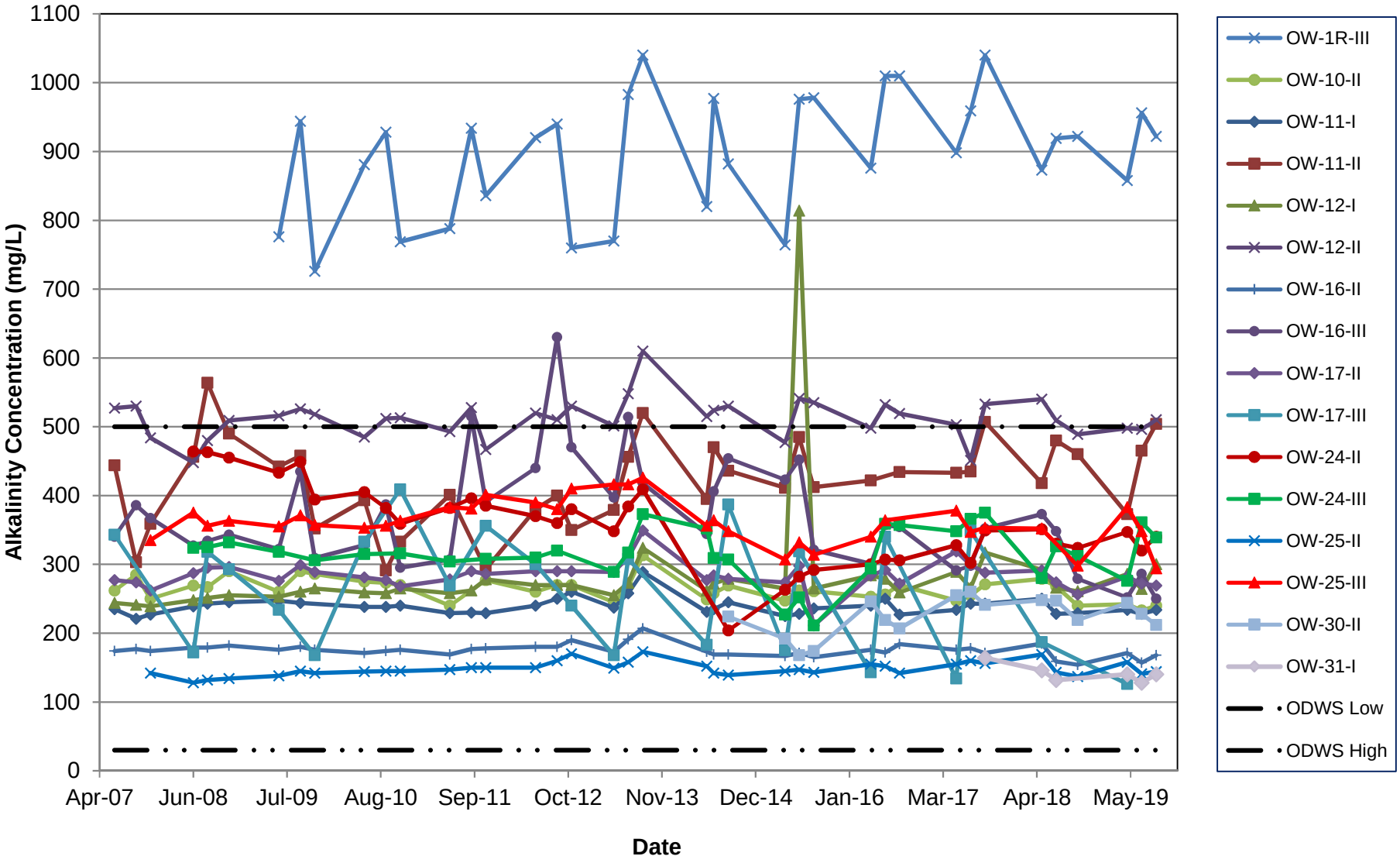
Groundwater Elevation Trend Analysis



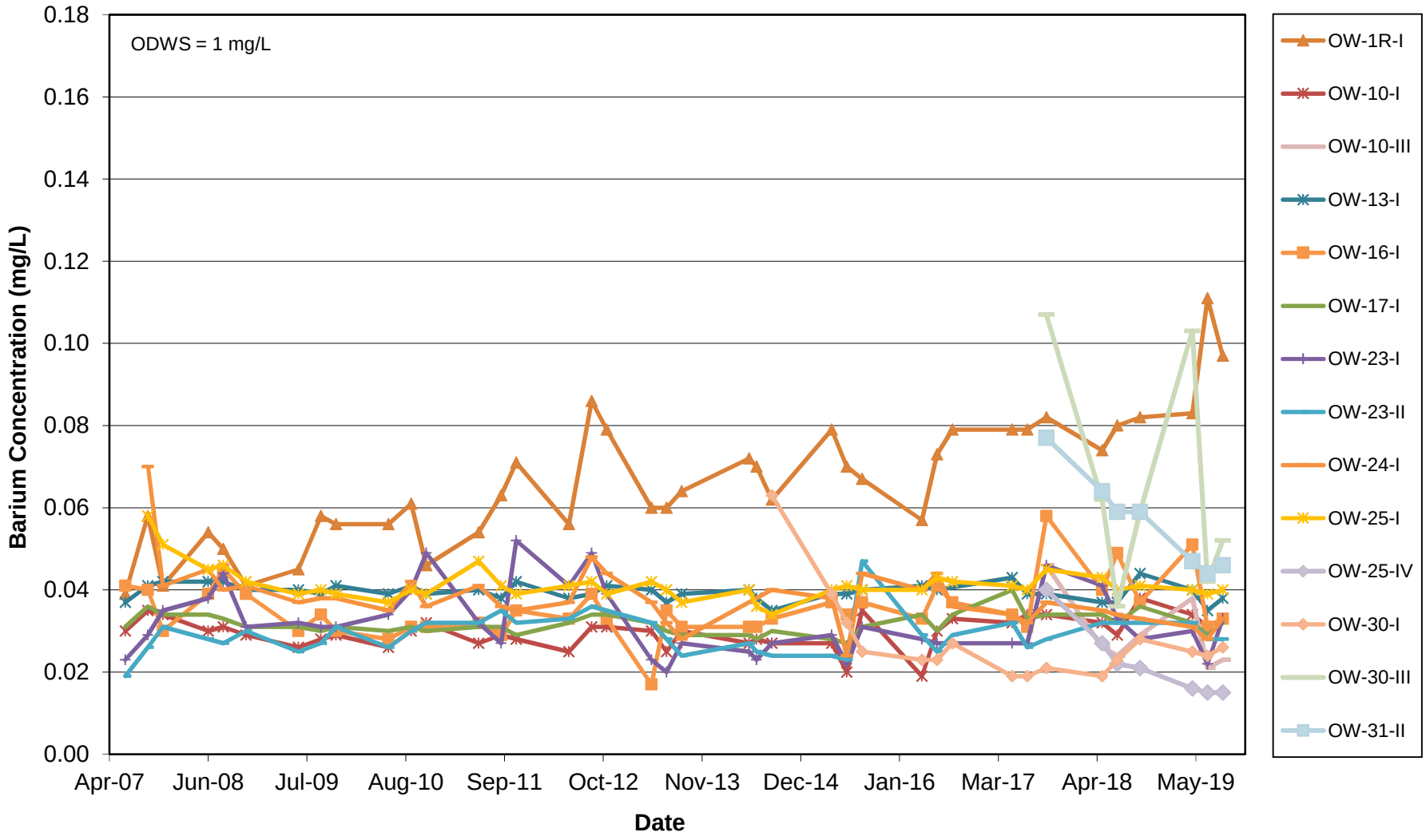
Alkalinity Trend Analysis - Deep Groundwater



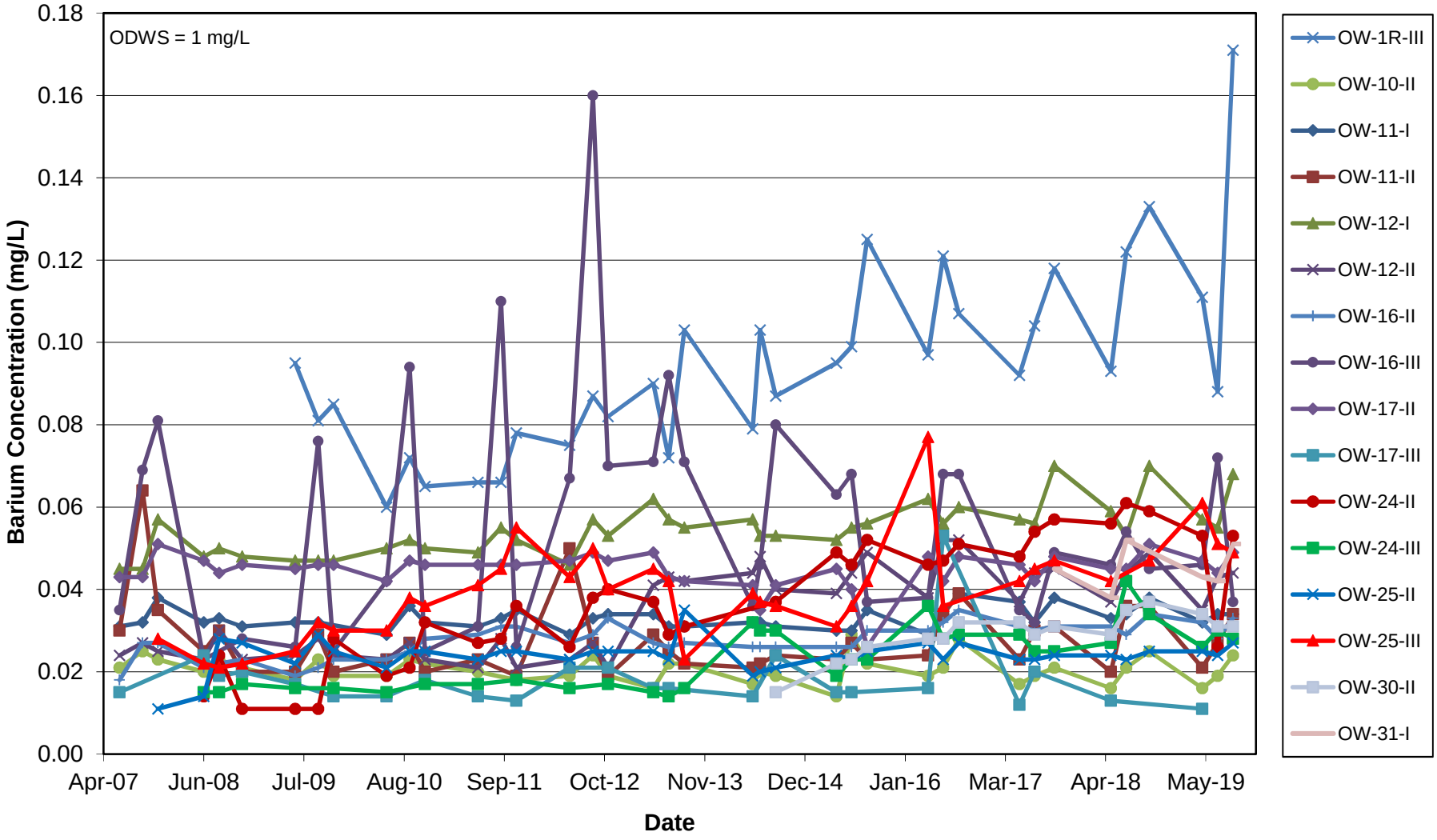
Alkalinity Trend Analysis - Shallow Groundwater



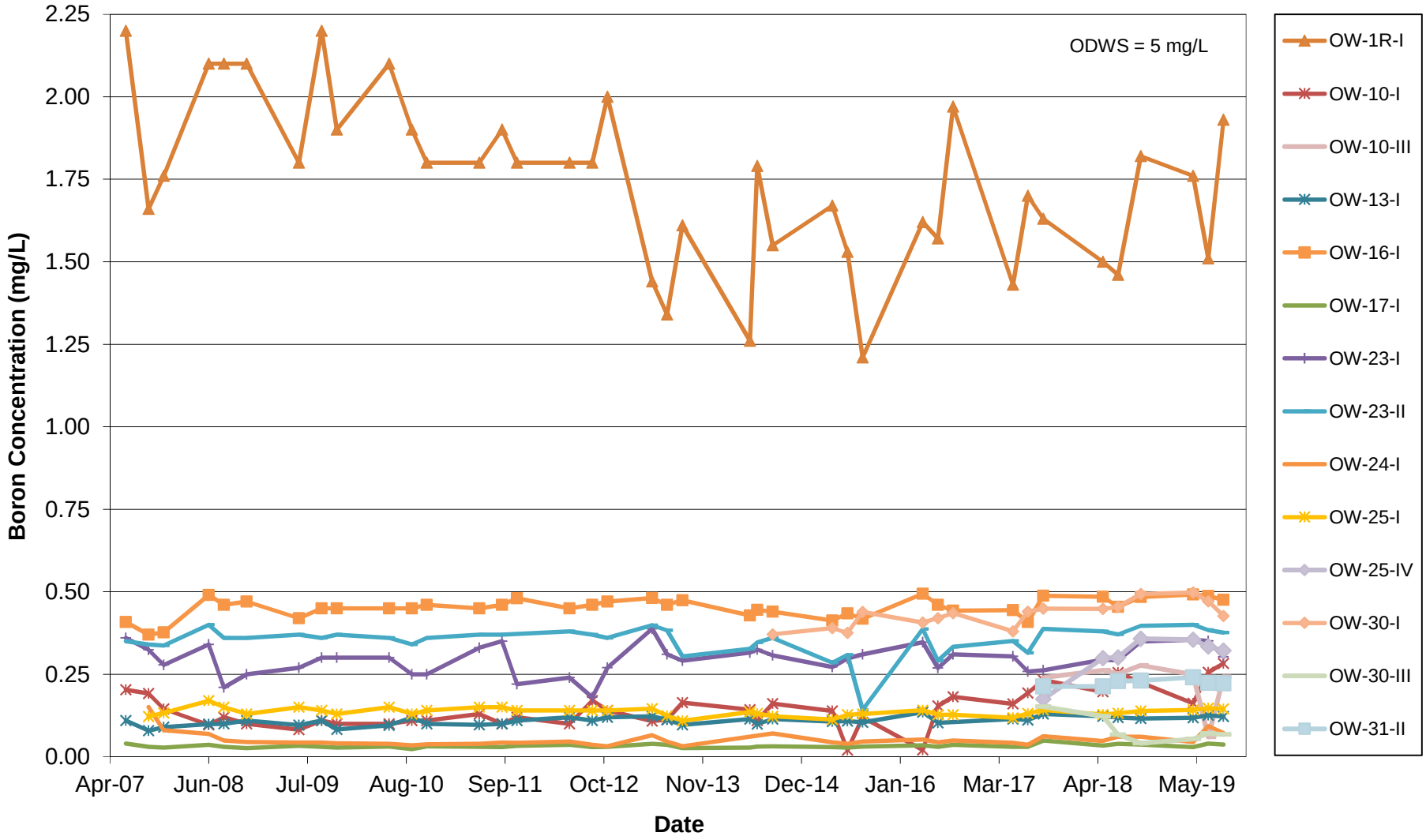
Barium Trend Analysis - Deep Groundwater



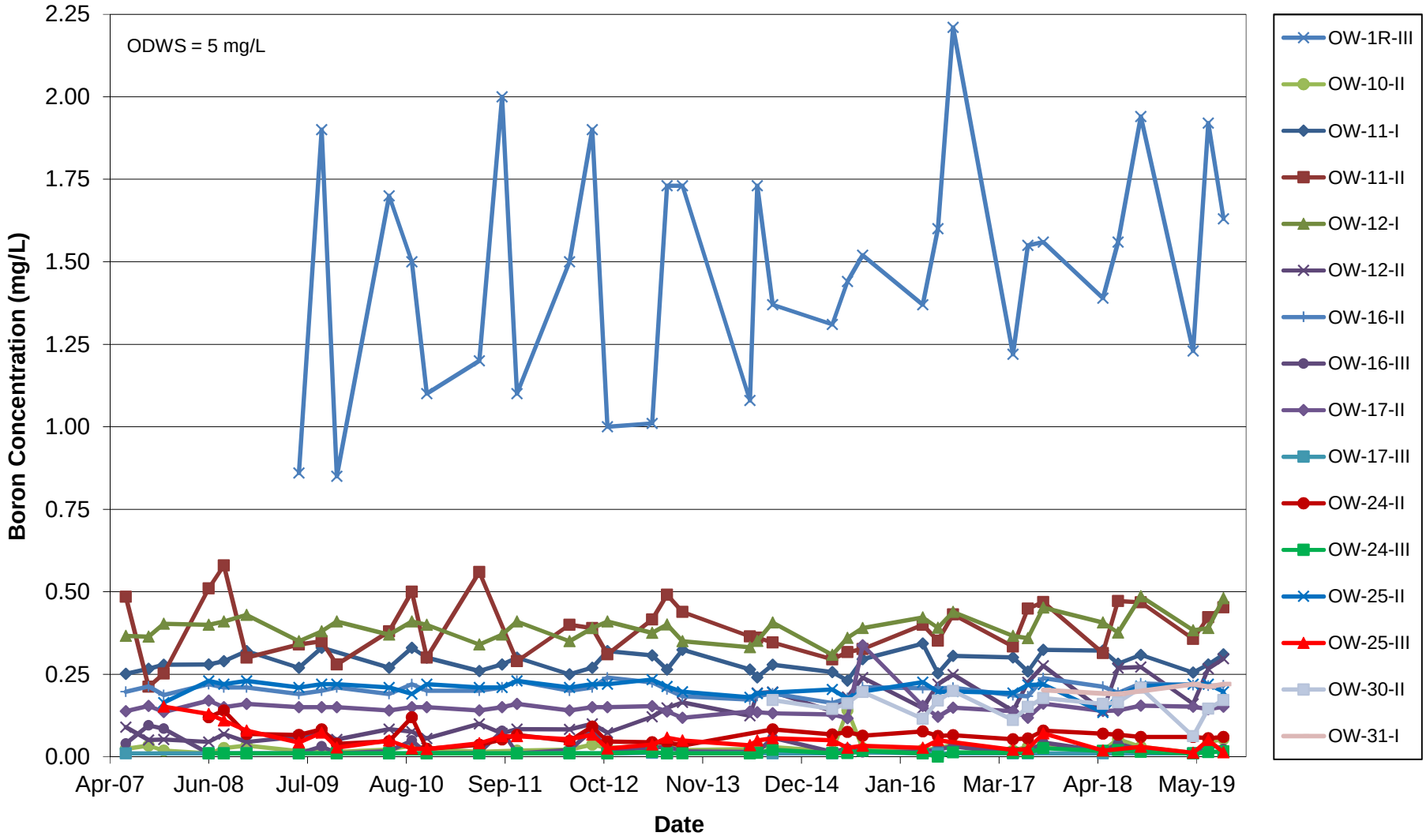
Barium Trend Analysis - Shallow Groundwater



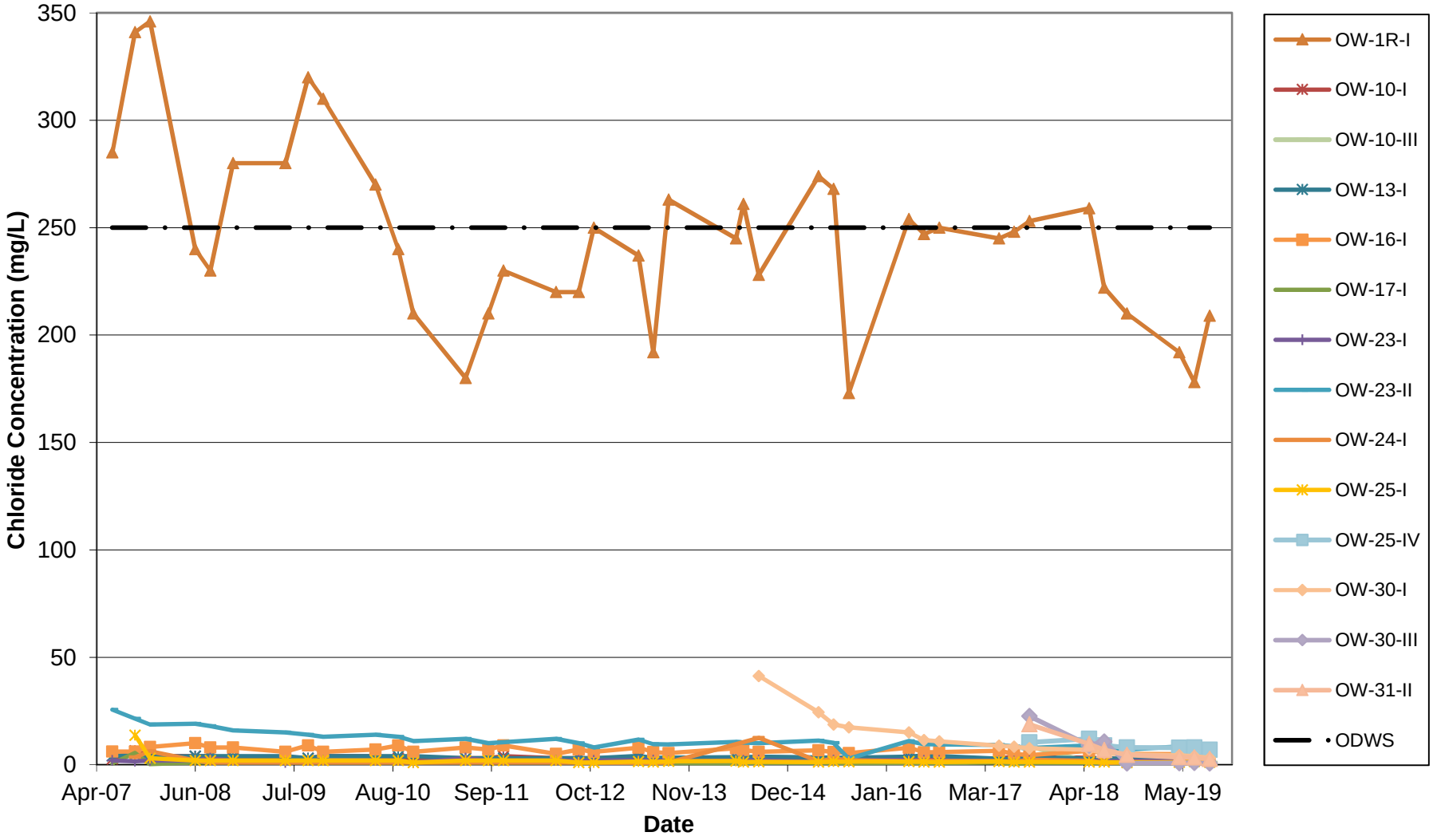
Boron Trend Analysis - Deep Groundwater



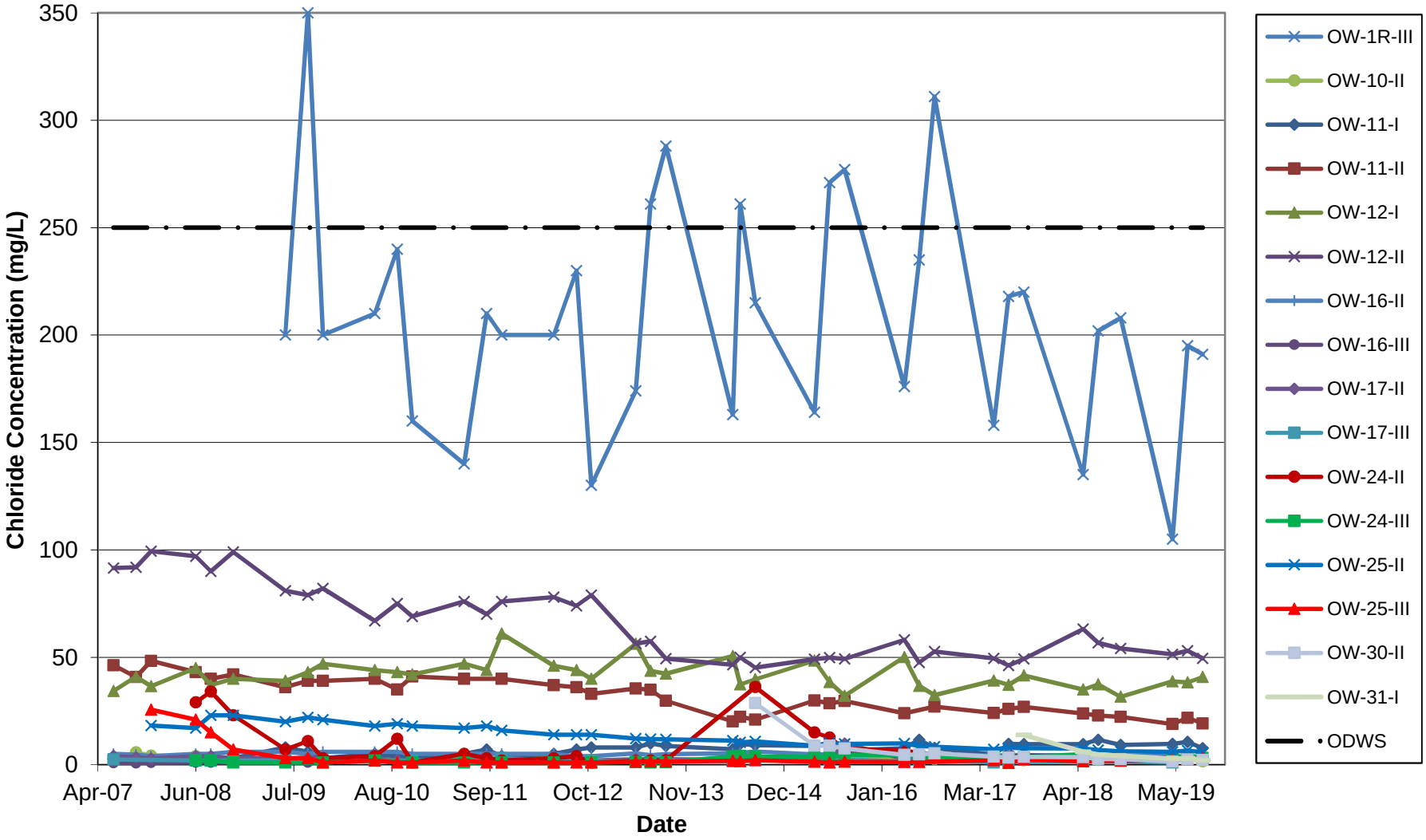
Boron Trend Analysis - Shallow Groundwater



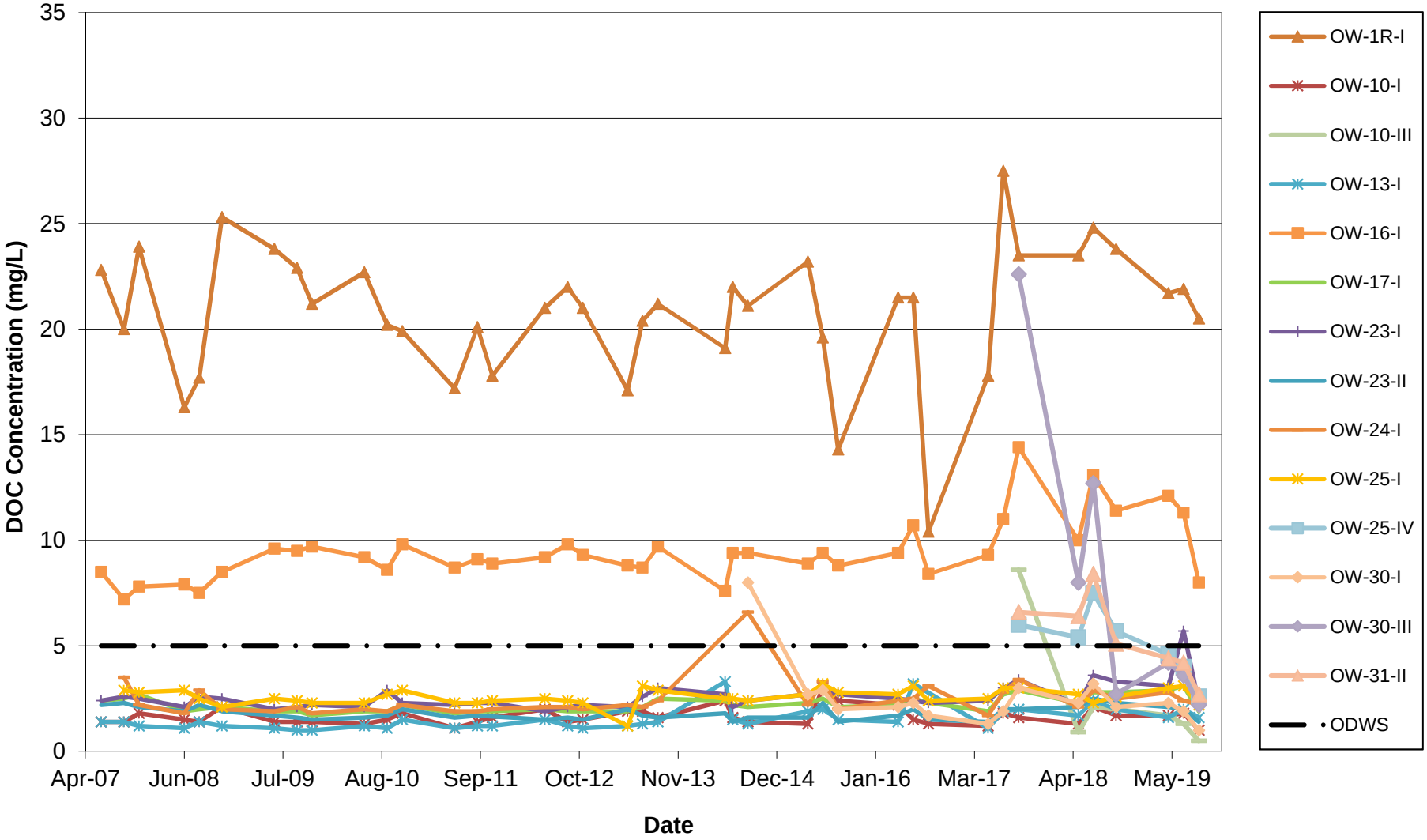
Chloride Trend Analysis - Deep Groundwater



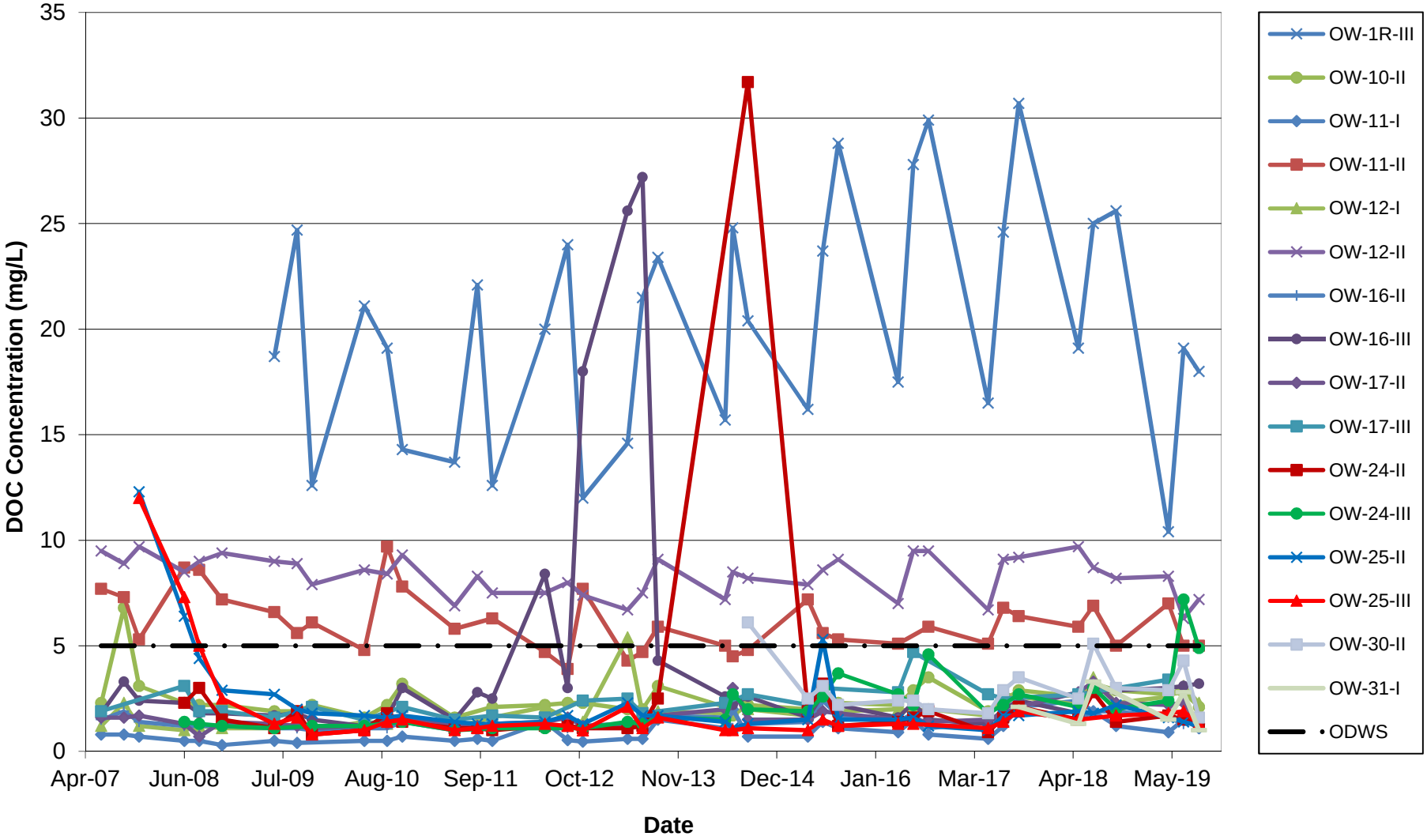
Chloride Trend Analysis - Shallow Groundwater



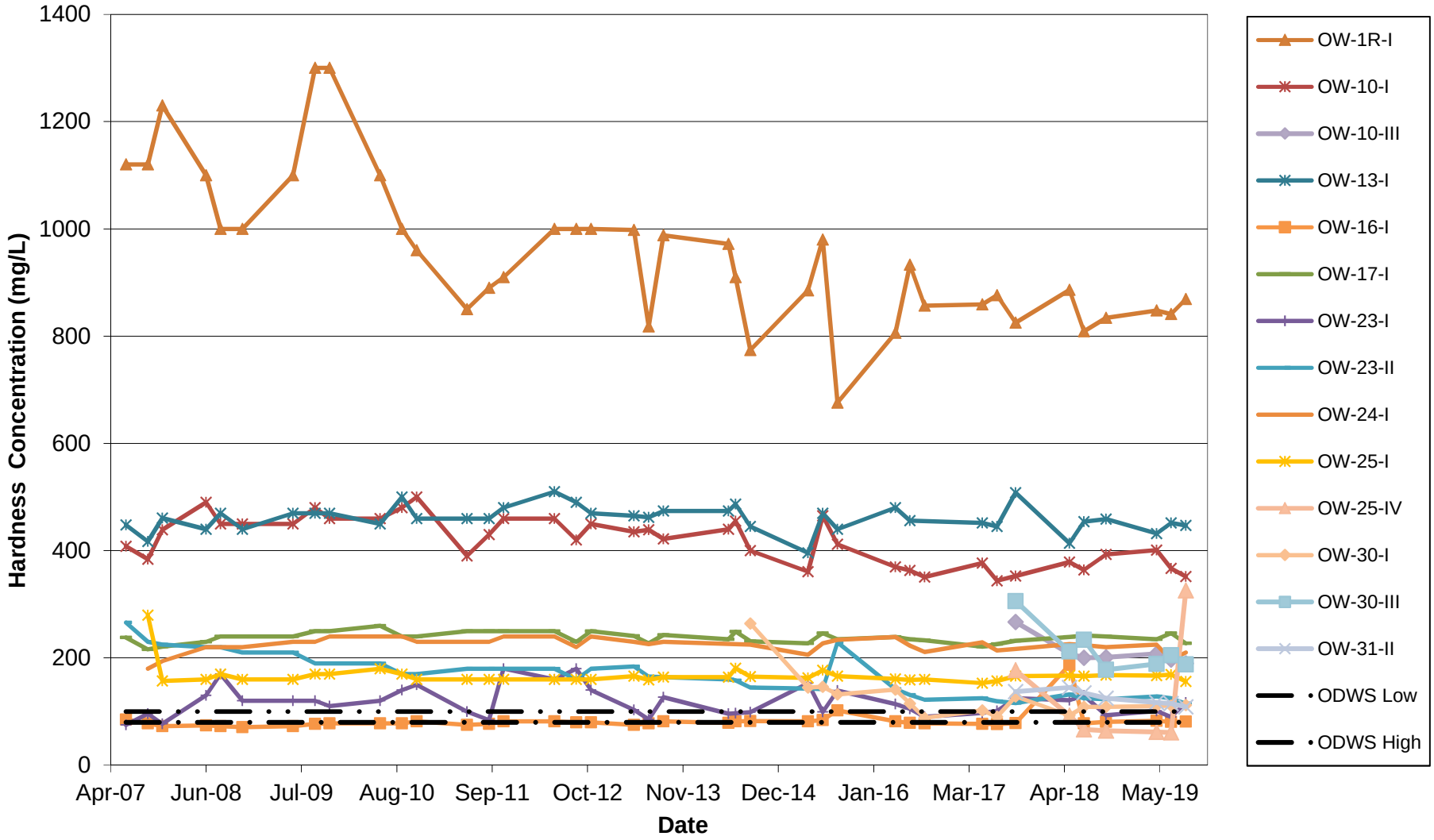
Dissolved Organic Carbon Trend Analysis - Deep Groundwater



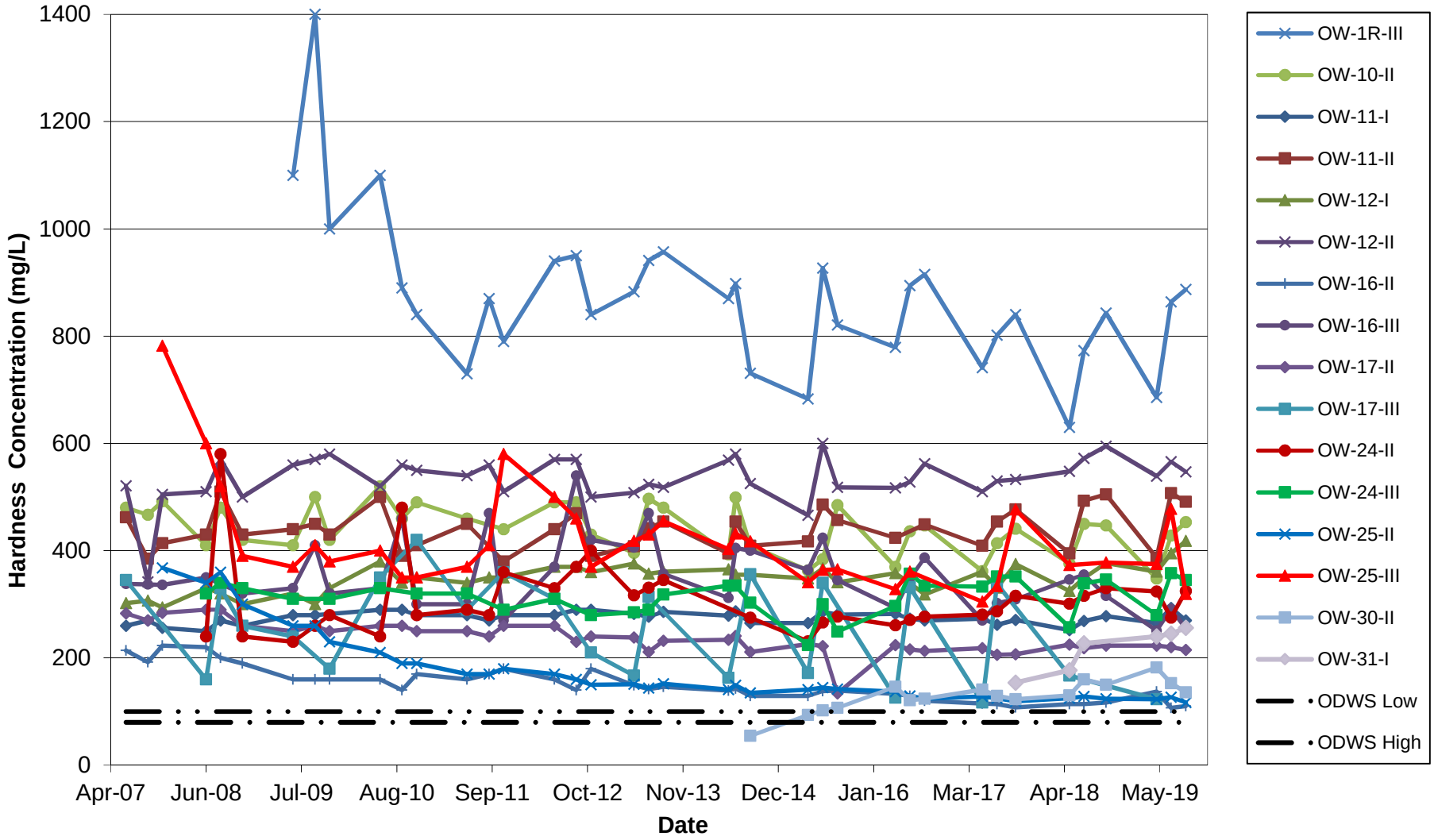
Dissolved Organic Carbon Trend Analysis - Shallow Groundwater



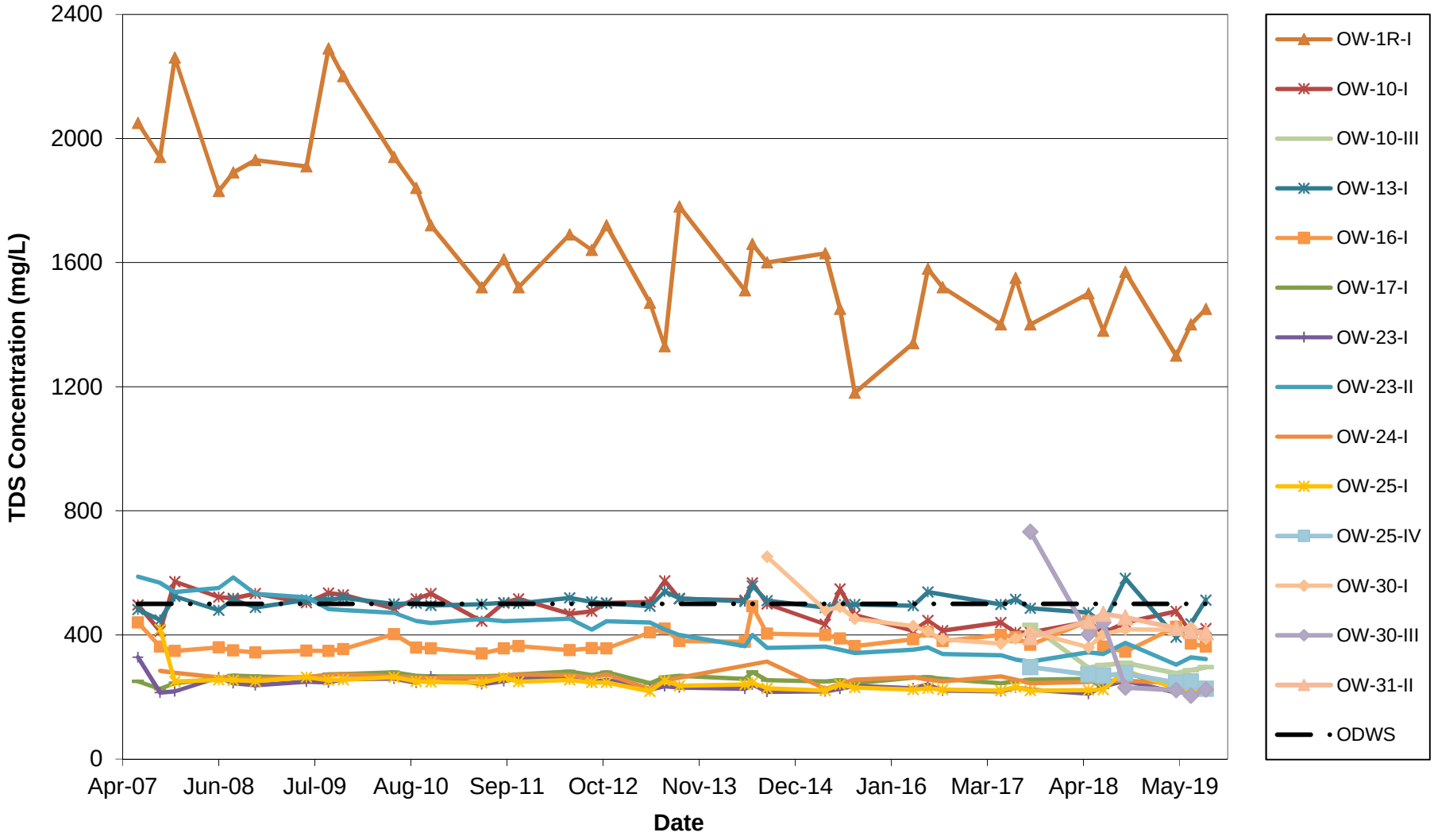
Hardness Trend Analysis - Deep Groundwater



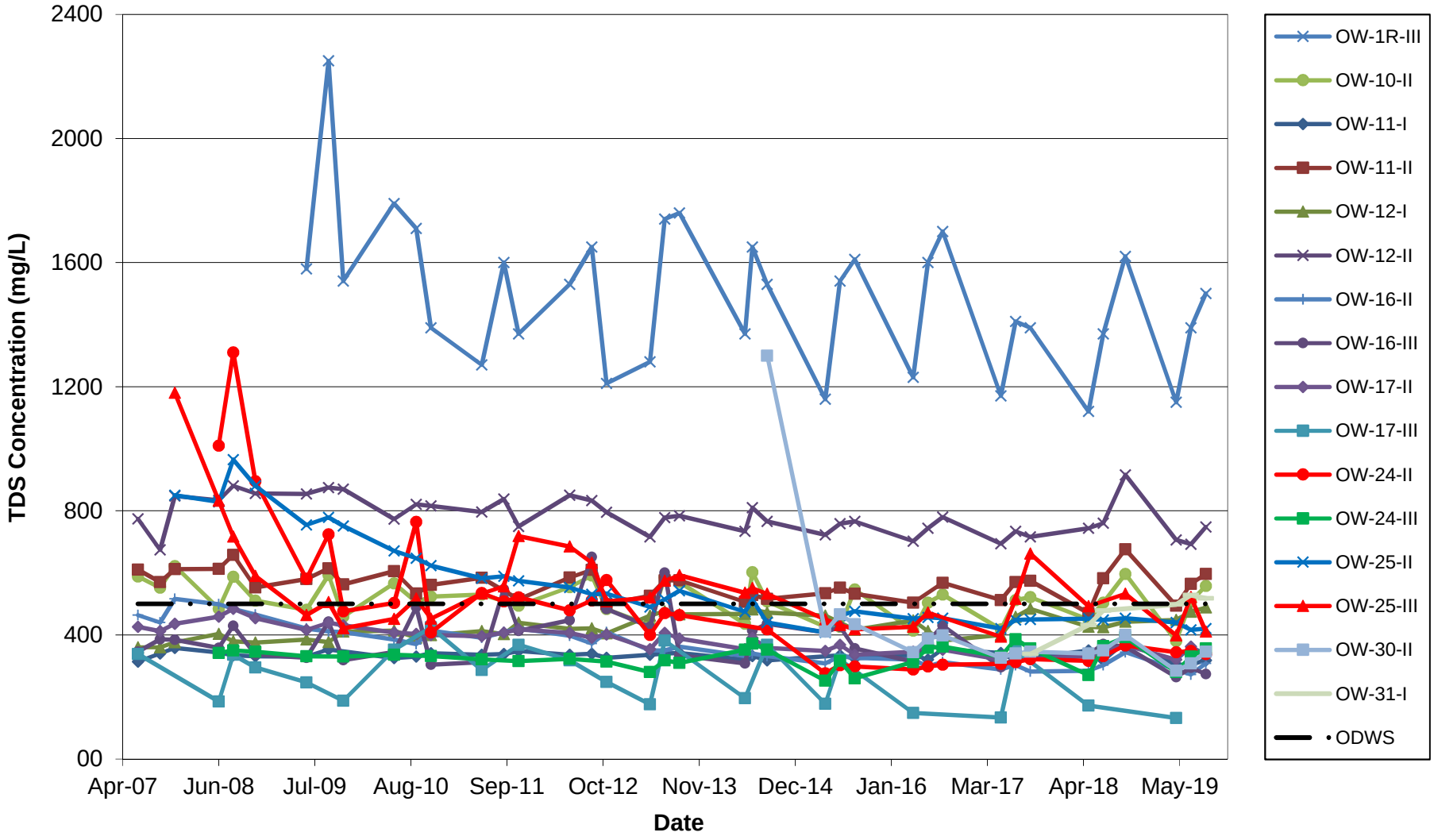
Hardness Trend Analysis - Shallow Groundwater



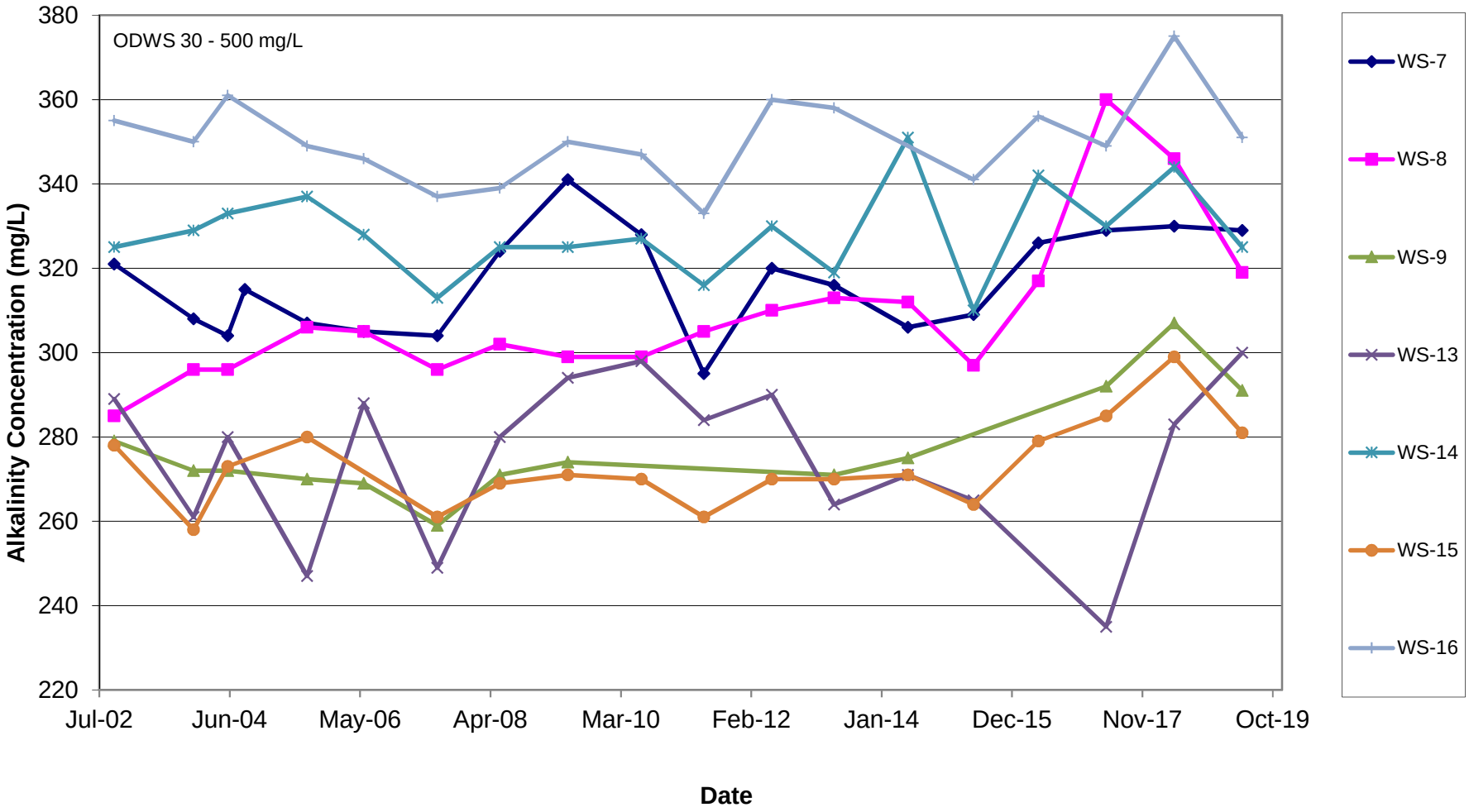
Total Dissolved Solids Trend Analysis - Deep Groundwater



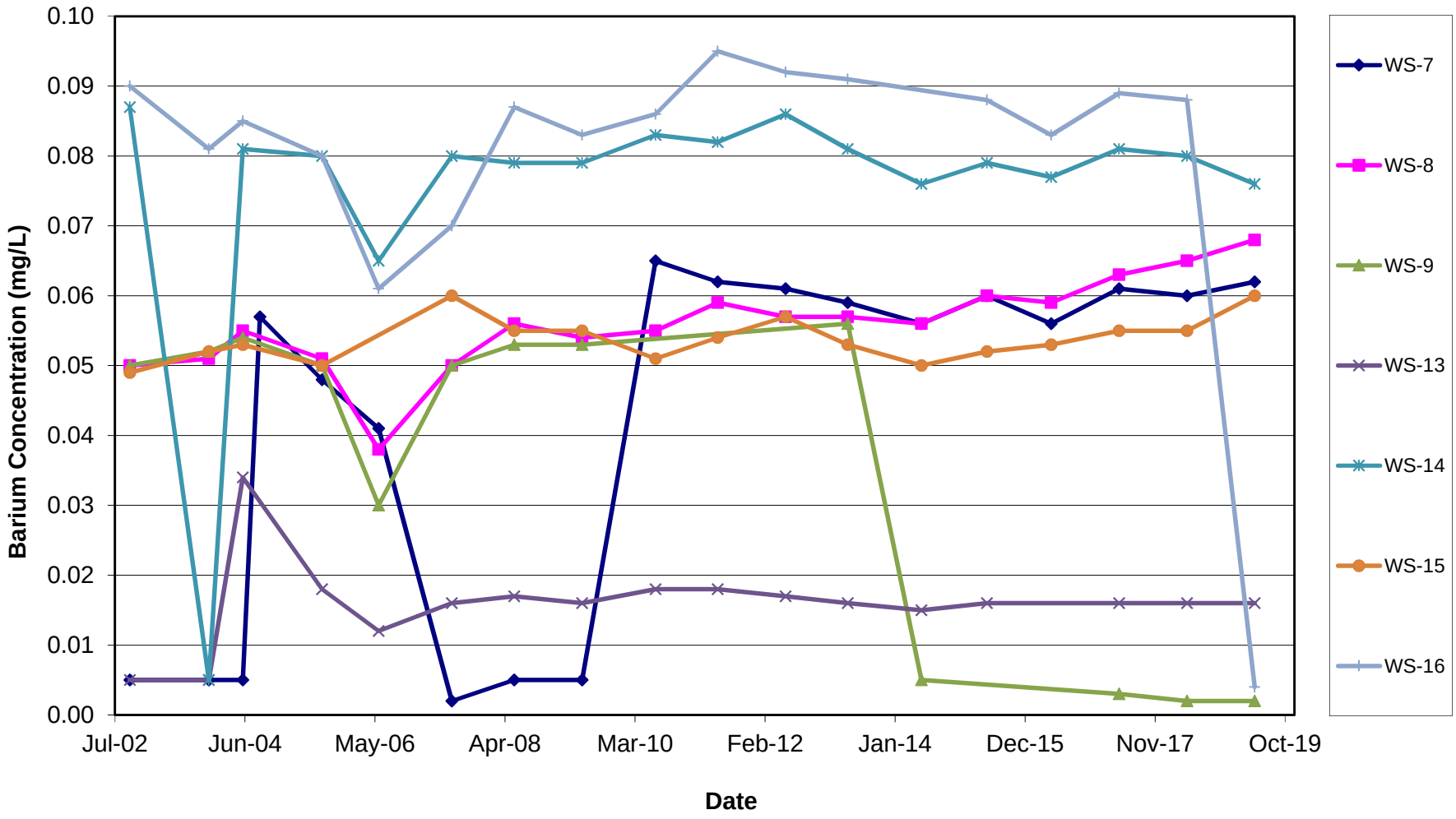
Total Dissolved Solids Trend Analysis - Shallow Groundwater



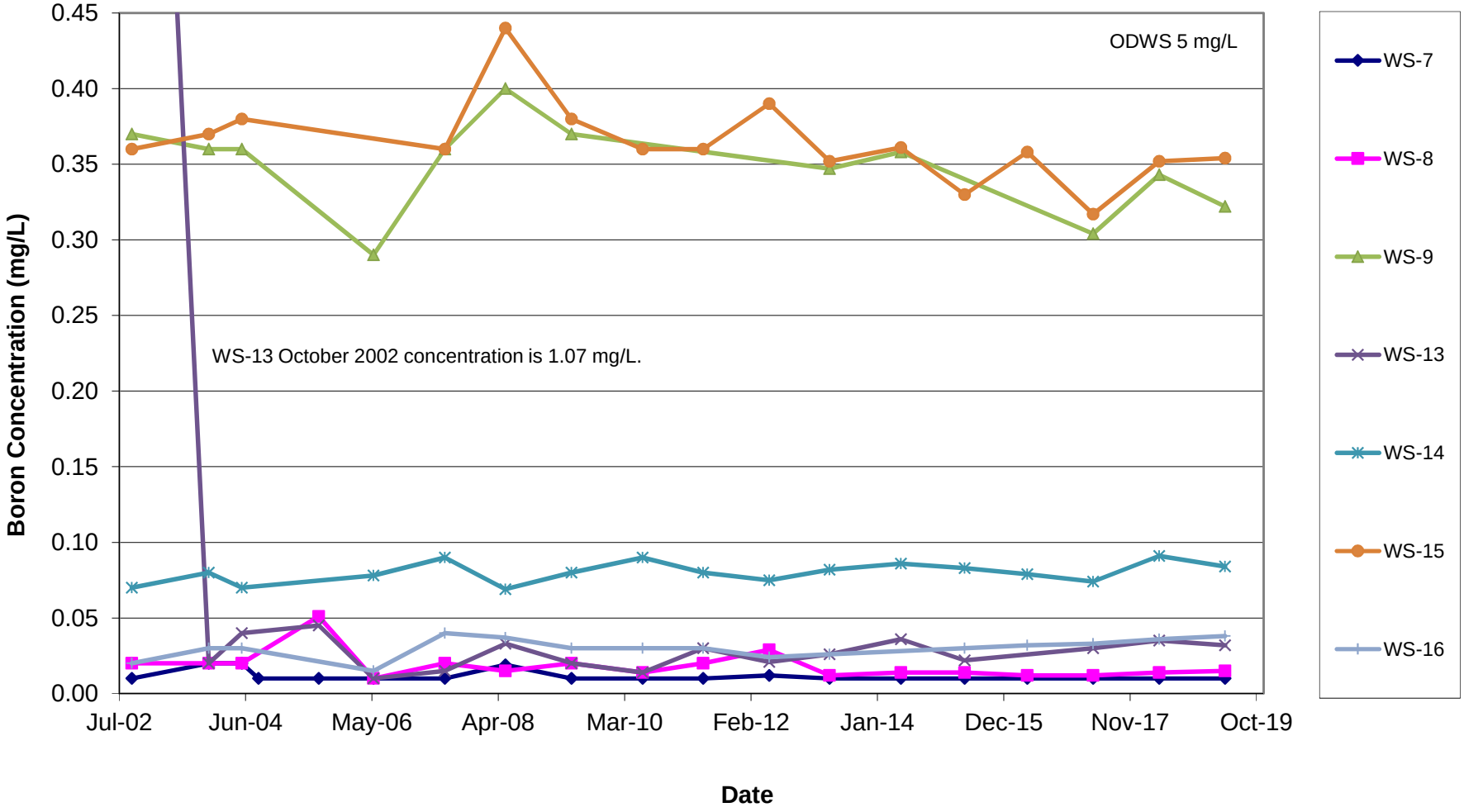
Alkalinity Trend Analysis - Groundwater



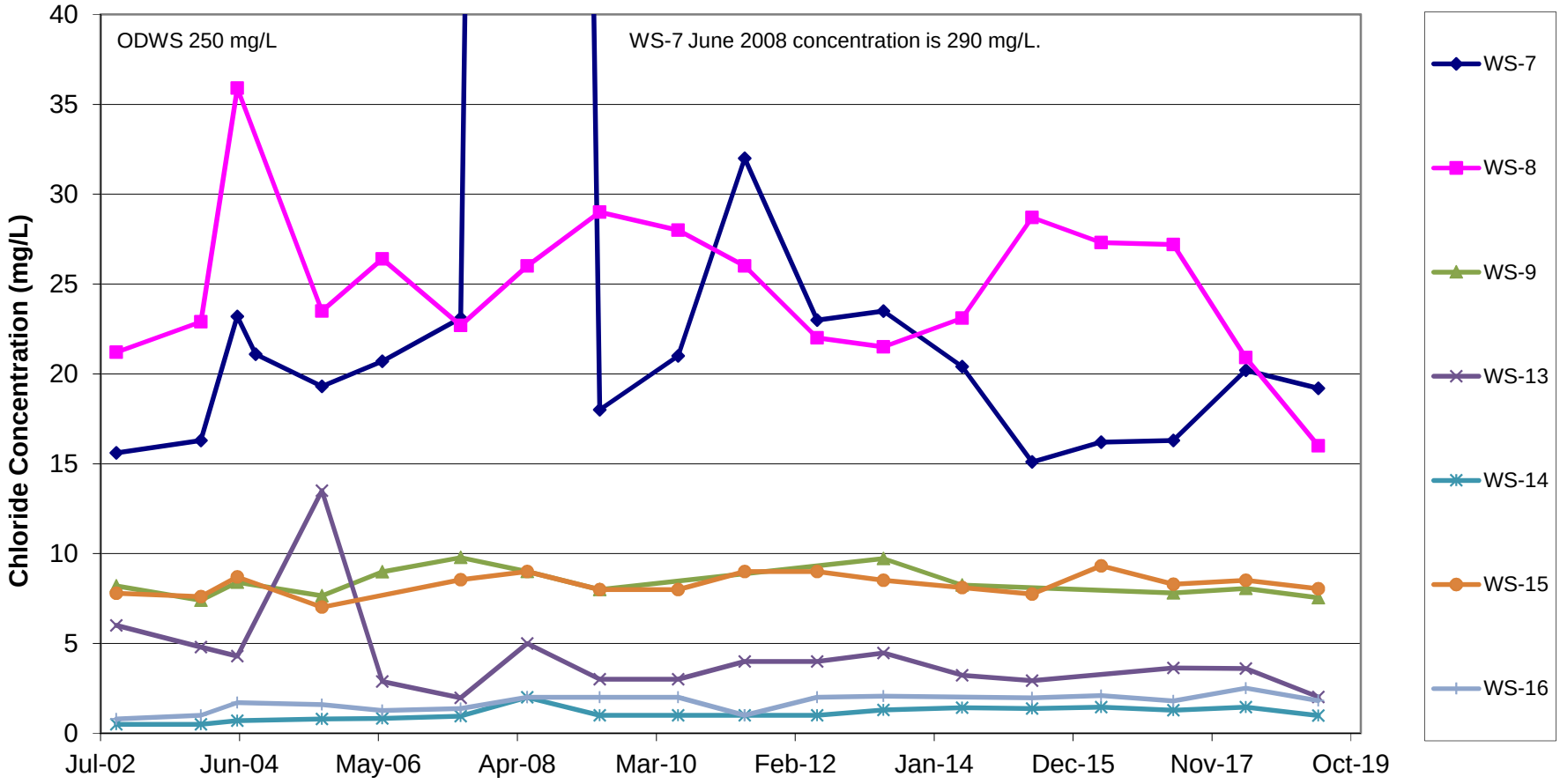
Barium Trend Analysis - Groundwater



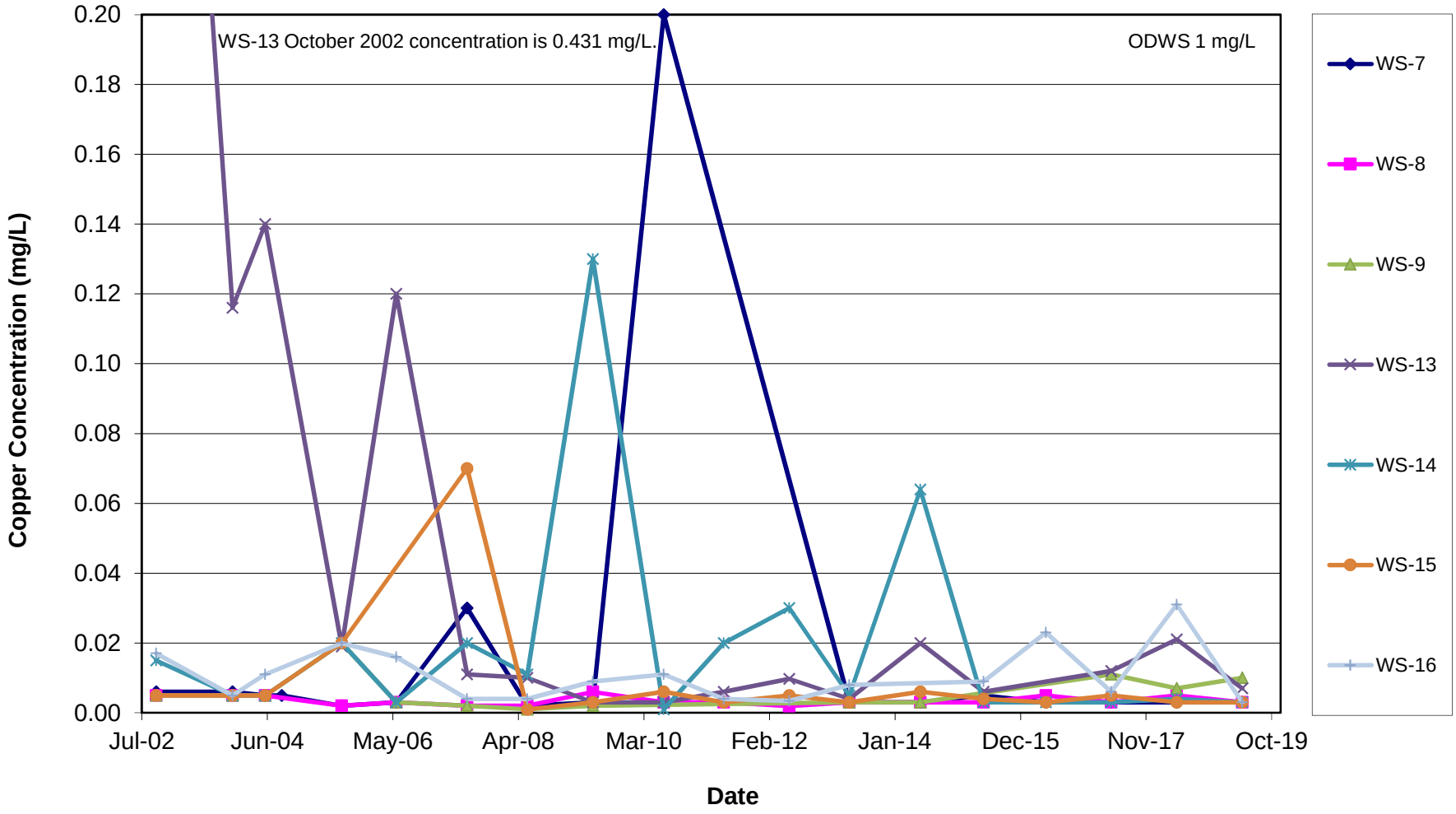
Boron Trend Analysis - Groundwater



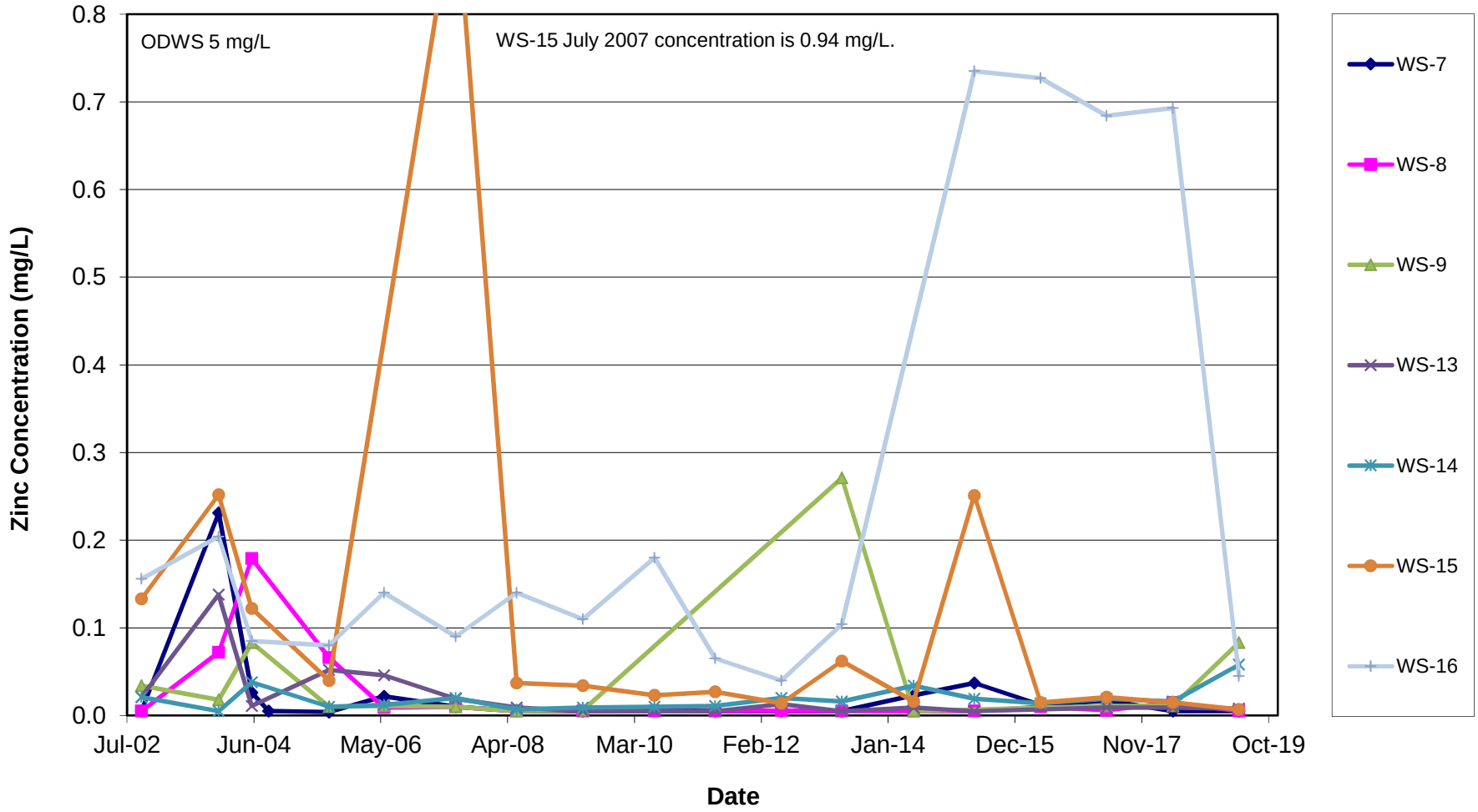
Chloride Trend Analysis - Groundwater



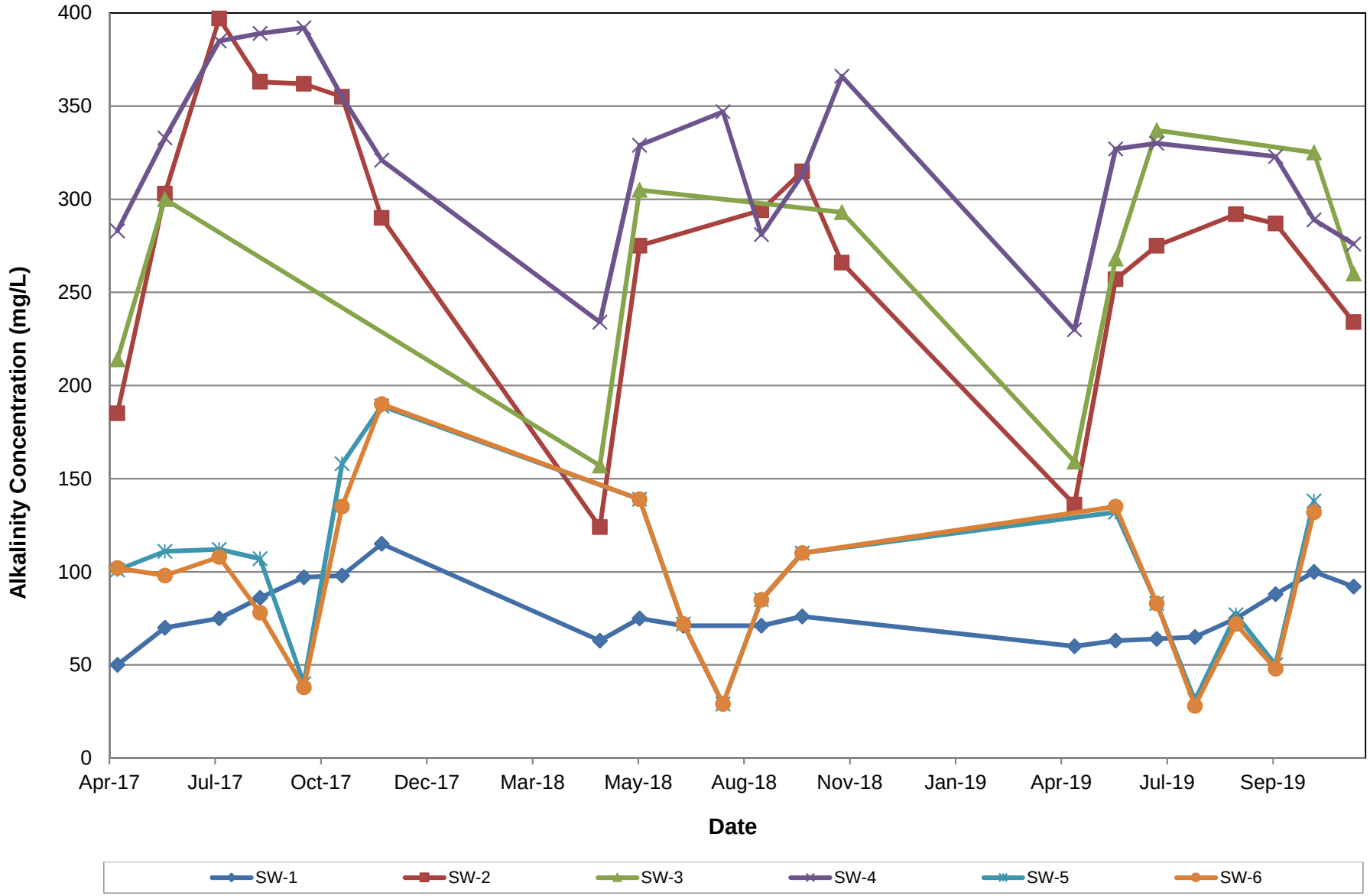
Copper Trend Analysis - Groundwater



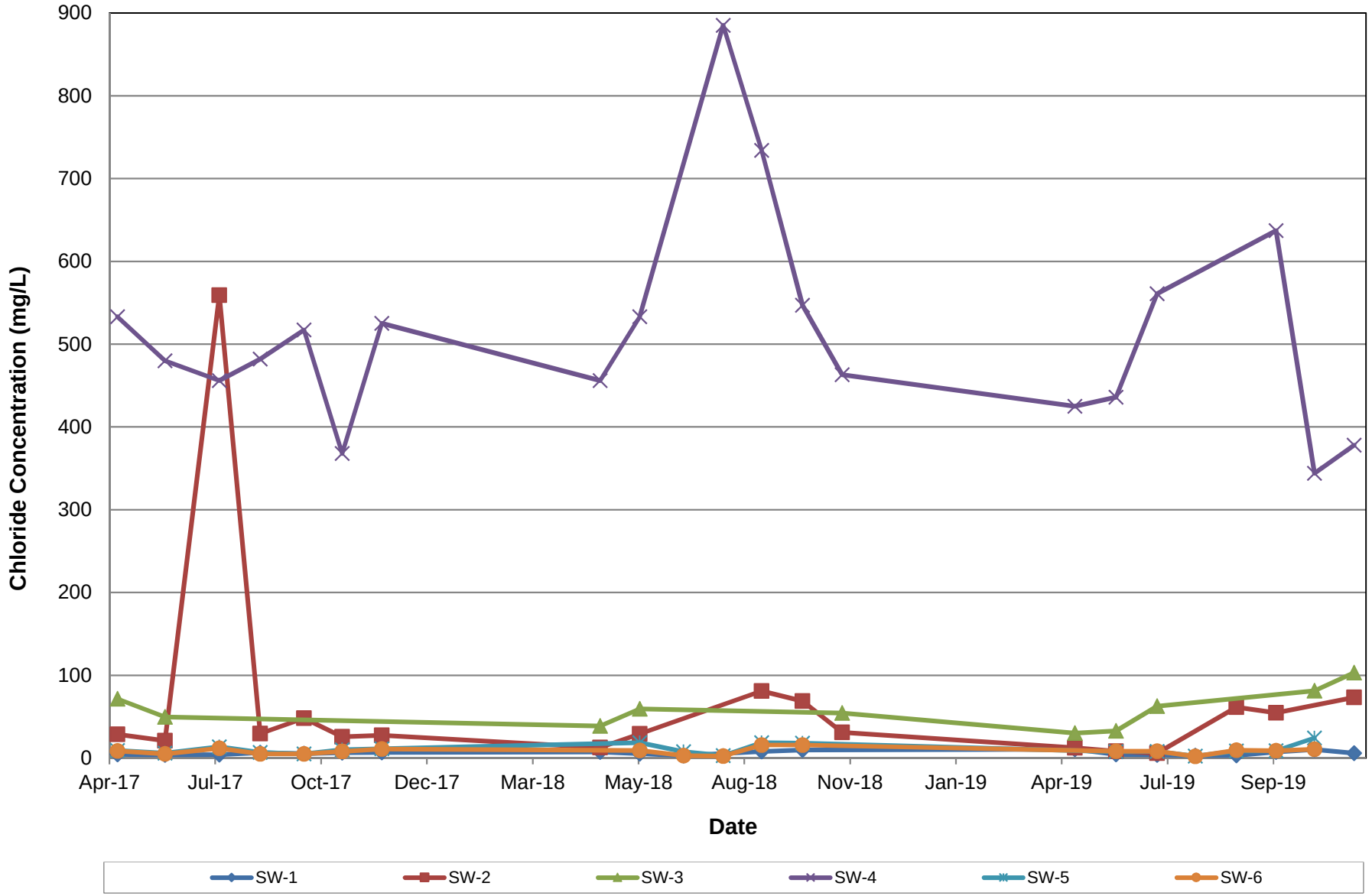
Zinc Trend Analysis - Groundwater



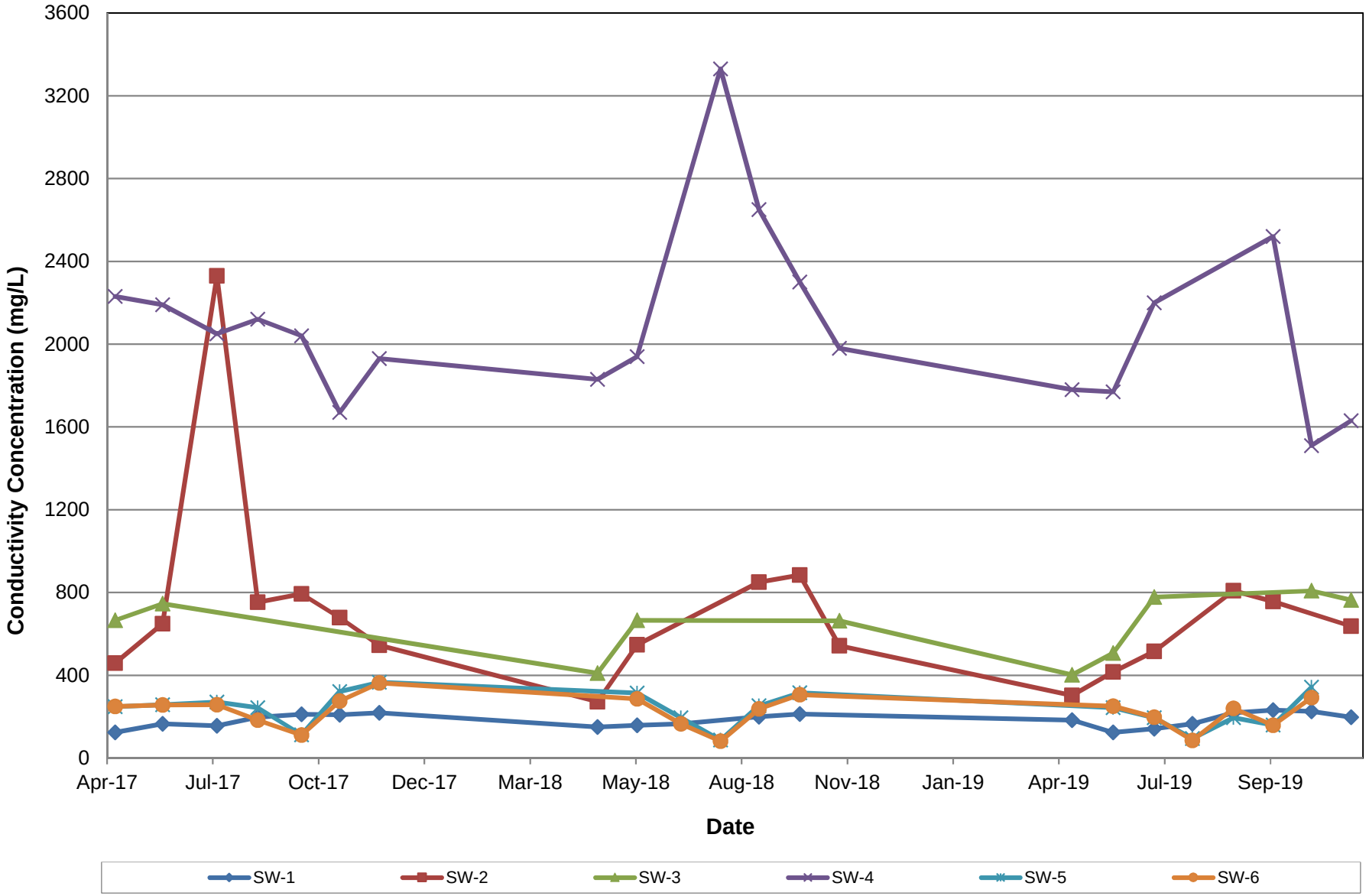
Alkalinity Trend Analysis - Surface Water



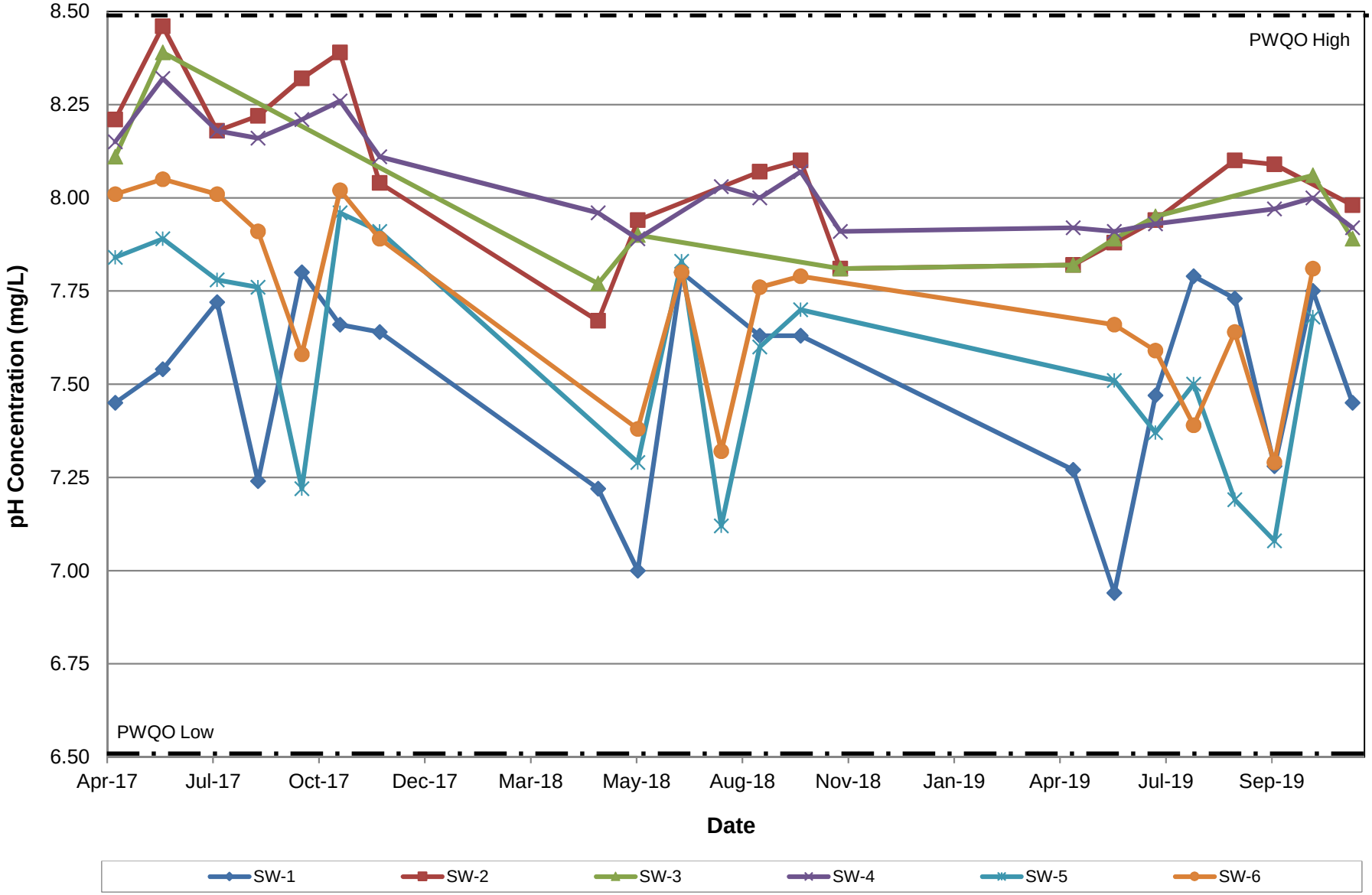
Chloride Trend Analysis - Surface Water



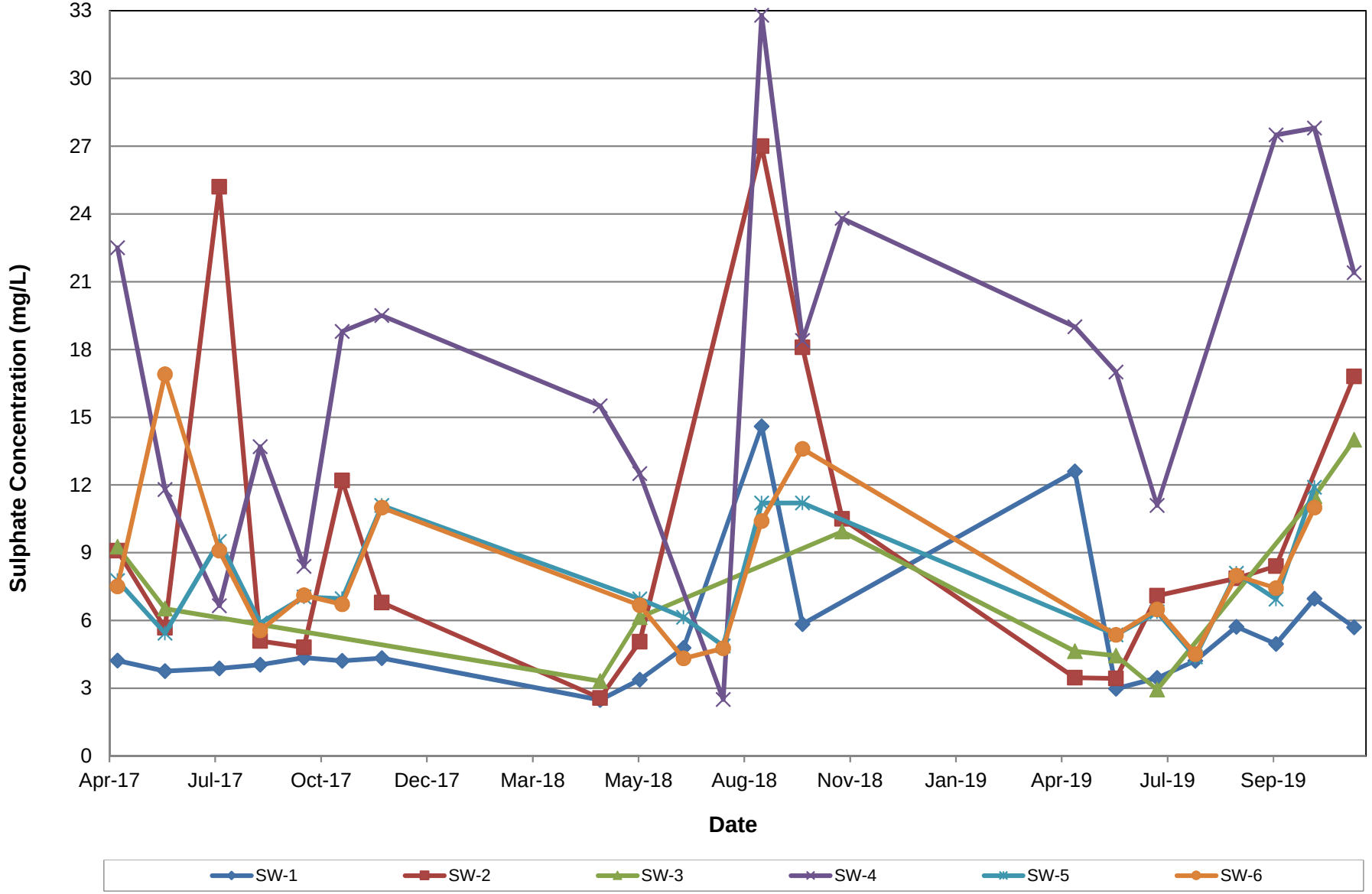
Conductivity Trend Analysis - Surface Water



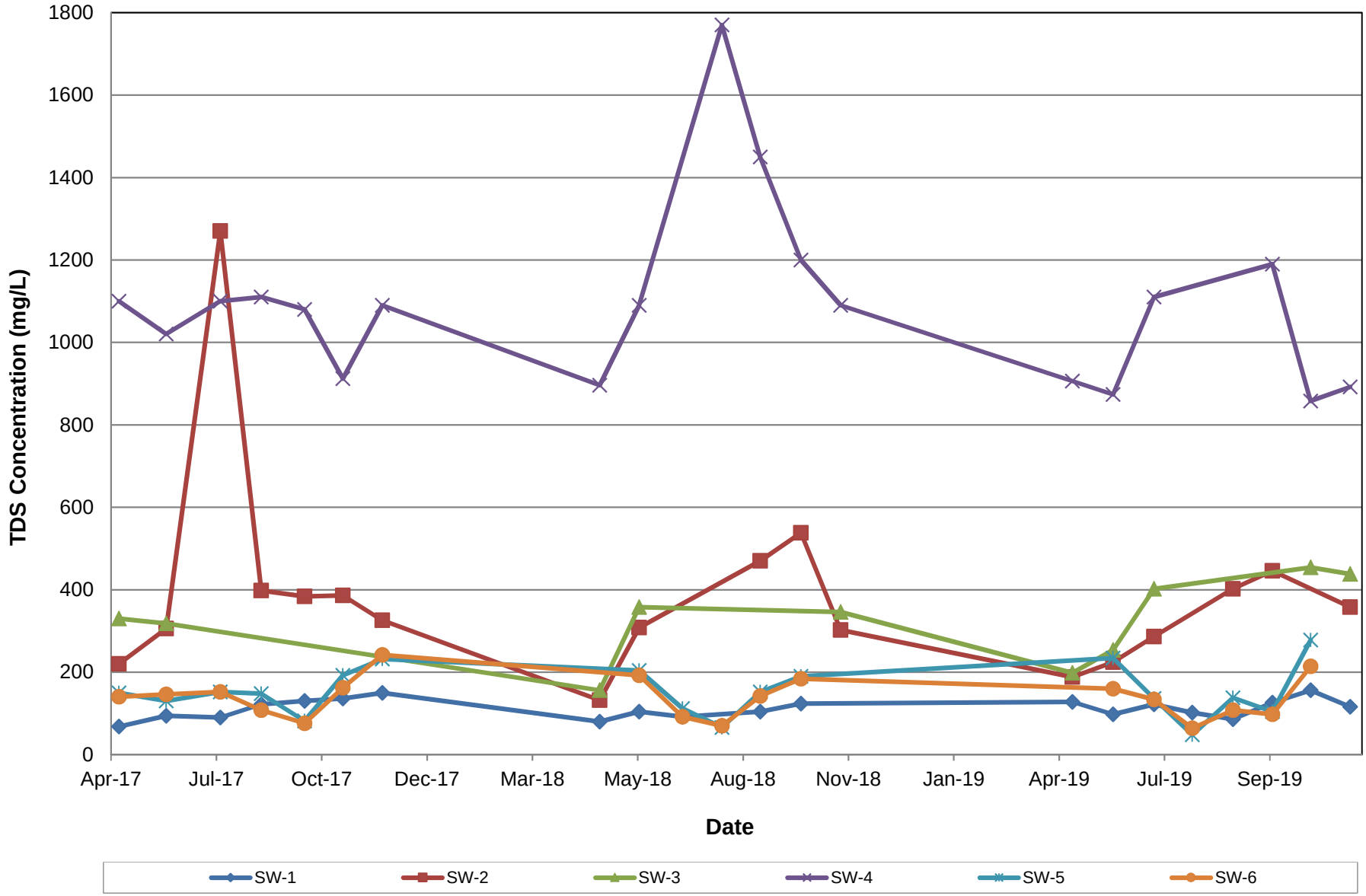
pH Trend Analysis - Surface Water



Sulphate Trend Analysis - Surface Water



TDS Trend Analysis - Surface Water



APPENDIX I

PHOTOGRAPHIC INVENTORY OF GROUNDWATER MONITORING LOCATIONS



OW-1R-I
2019



OW-1R-II
2019



OW-1R-III
2019



OW-1R
Well Nest
2019



OW-10-I
2019



OW-10-II
2019



OW-10-III
2019



OW-10
Well Nest
2019



OW-11-I
2019



OW-11-II
2019



OW-11
Well Nest
2019



OW-12-I
2019



OW-12-II
2019



OW-12
Well Nest
2019



OW-13-I
2019



OW-13-II
2019



OW-13
Well Nest
2019



OW-14-I
2019



OW-14-II
2019



OW-14
Well Nest
2019



OW-16-I
2019



OW-16-II
2019



OW-16-III 2019



OW-16-Well Nest 2019



OW-17-I
2019



OW-17-II
2019



OW-17-III
2019



OW-17
Well Nest
2019



OW-18-I
2019



OW-18-I
2019



OW-20-I
2019



OW-20-II
2019



OW-20
Well Nest
2019



OW-21
2016



OW-21
2016



OW-22-I
2019



OW-22-I
2019



OW-23-I
2019



OW-23-II
2019



OW-23
Well Nest
2019



OW-24-I
2019



OW-24-II
2019



OW-24-III
2019



OW-24
Well Nest
2019



OW-25-I
2019



OW-25-II
2019



OW-25-III
2019



OW-25-IV
2019



OW-25
Well Nest
2019



OW-30-I
2019



OW-30-II
2019



OW-30-III
2019



OW-30
Well Nest
2019



OW-31-I
2019



OW-31-II
2019



OW-31
Well Nest
2019



SW-1
2019



SW-1
2019



SW-2
2019



SW-2
2019



SW-3
2019



SW-3
2019



SW-4
2019



SW-4
2019



SW-5
2019



SW-5
2019



SW-6
2019

APPENDIX J

FIELD PARAMETER MEASUREMENTS

2019 Groundwater Field Chemistry Data

Well ID	Date Sampled	Temp (°C)	pH	Conductivity (uS/cm)	TDS (mg/L)
OW-1R-I	26-27 May 2019	13.3	7.61	2264	1132
OW-1R-III		9.5	6.71	1719	860
OW-10-I		5.6	7.15	561	281
OW-10-II		5.7	7.22	497	249
OW-10-III		10.3	7.66	463	232
OW-11-I		Insufficient volume			
OW-11-II		8.9	7.29	735	368
OW-12-I		Insufficient volume			
OW-12-II		6.8	7.06	920	460
OW-13-I		11.6	7.17	741	371
OW-16-I		9.8	7.88	489	245
OW-16-II		8.3	7.7	422	211
OW-16-III		7.7	7.52	397	199
OW-17-I		7.6	7.26	366	183
OW-17-II		6.6	7.29	490	245
OW-17-III		7.5	7.04	207	104
OW-23-I		8.3	7.53	365	183
OW-23-II		8.8	7.88	503	252
OW-24-I		8.0	7.35	367	184
OW-24-II		8.4	7.64	525	263
OW-24-III		5.4	7.07	397	199
OW-25-I		8.2	7.28	344	172
OW-25-II		9.5	8.02	601	301
OW-25-III		8.0	7.11	609	305
OW-25-IV		7.8	7.93	338	169
OW-30-I		11.4	7.92	606	303
OW-30-II		8.4	7.74	490	245
OW-30-III		10.7	7.34	377	189
OW-31-I		10.8	7.62	713	357
OW-31-II		11.3	7.90	616	308

2019 Groundwater Field Chemistry Data

Well ID	Date Sampled	Temp (°C)	pH	Conductivity (uS/cm)	TDS (mg/L)
OW-1R-I	24-25 July 2019	11.3	6.81	1849	925
OW-1R-III		13.7	6.80	2019	1010
OW-10-I		8.3	7.33	467	234
OW-10-II		10.9	7.40	552	276
OW-10-III		15.4	7.64	427	214
OW-11-I		Insufficient volume			
OW-11-II		20.2	7.34	932	466
OW-12-I		Insufficient volume			
OW-12-II		15.9	6.91	1116	558
OW-13-I		Insufficient volume			
OW-16-I		9.5	8.24	393	197
OW-16-II		9.6	8.32	428	214
OW-16-III		22.3	7.57	290	145
OW-17-I		10.7	7.69	446	223
OW-17-II		15.0	7.28	601	301
OW-17-III		Insufficient volume			
OW-23-I		8.9	8.00	403	202
OW-23-II		11.5	7.83	567	284
OW-24-I		12.4	7.48	447	224
OW-24-II		11.0	7.51	642	321
OW-24-III		13.7	7.46	650	325
OW-25-I		10.2	7.66	318	159
OW-25-II		12.9	8.22	552	276
OW-25-III		15.0	7.44	721	361
OW-25-IV		11.1	8.30	308	154
OW-30-I		11.6	8.17	503	252
OW-30-II		11.4	7.91	410	205
OW-30-III		8.8	7.31	284	142
OW-31-I		Insufficient volume			
OW-31-II		11.3	8.09	498	249

2019 Groundwater Field Chemistry Data

Well ID	Date Sampled	Temp (°C)	pH	Conductivity (uS/cm)	TDS (mg/L)
OW-1R-I	25 Sept 2019	10.0	6.55	2918	1459
OW-1R-III		14.1	6.54	2789	1395
OW-10-I		9.3	7.32	739	370
OW-10-II		10.8	7.16	878	439
OW-10-III		7.9	7.64	586	293
OW-11-I		12.6	7.62	619	310
OW-11-II		13.6	7.25	1136	568
OW-12-I		12.9	7.44	880	440
OW-12-II		13.5	6.88	1335	668
OW-13-I		Insufficient volume			
OW-16-I		9.2	8.17	616	308
OW-16-II		10.0	7.95	568	284
OW-16-III		13.7	7.14	560	280
OW-17-I		9.5	7.59	499	250
OW-17-II		9.8	7.63	700	350
OW-17-III		Dry			
OW-23-I		9.9	8.14	471	236
OW-23-II		11.4	8.06	656	328
OW-24-I		8.8	7.54	483	242
OW-24-II		9.7	7.71	727	364
OW-24-III		8.9	7.07	710	355
OW-25-I		9.3	7.71	460	230
OW-25-II		13.7	7.25	777	389
OW-25-III		11.1	8.18	776	388
OW-25-IV		9.2	8.28	446	223
OW-30-I		9.8	8.25	750	375
OW-30-II		10.2	7.83	644	322
OW-30-III		9.0	7.27	455	228
OW-31-I		12.0	7.91	921	461
OW-31-II		9.5	8.11	755	378

2019 Surface Water Field Chemistry Data

Station ID	Date Sampled	Temp (°C)	pH	Conductivity (uS/cm)	TDS (mg/L)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Flow Rate (m^3/sec)
SW-1	25 April 2019	2.1	7.72	120	60		14.68	0.005
SW-2		1.8	7.90	176	88		14.92	0.019
SW-3		3.2	7.81	245	123		15.01	0.031
SW-4		4.7	7.78	1136	568		12.90	0.044
SW-5		Frozen						
SW-6		Frozen						
SW-1	26 May 2019	13.0	7.97	133	67	85.2	8.59	0.720
SW-2		10.9	7.59	367	184	75.7	8.10	0.0002
SW-3		10.8	7.91	438	219	110.5	11.93	0.013
SW-4		9.3	7.45	1406	703	104.7	10.96	0.002
SW-5		12.7	7.28	247	124	83.3	8.74	N/A
SW-6		12.9	7.85	242	121	83.9	8.59	N/A
SW-1	26 June 2019	20.7	7.41	145	72.5		6.80	0.010
SW-2		20.3	7.52	560	280		5.93	0.000
SW-3		19.8	7.57	801	401		5.62	0.0002
SW-4		15.0	7.87	1892	946		8.31	0.0008
SW-5		21.9	8.57	260	130		9.14	N/A
SW-6		22.3	8.43	196	98		7.90	N/A
SW-1	24 July 2019	23.9	7.89	149	75	79.7	6.59	0.045
SW-2		Dry						
SW-3		Dry						
SW-4		Dry						
SW-5		24.4	8.14	85	43	67.2	5.50	N/A
SW-6		24.5	7.97	78	39	69.3	5.57	N/A
SW-1	25 August 2019	17.3	6.87	173	87	69.3	6.94	0.227
SW-2		18.3	7.54	73	37	99.4	9.74	0.000
SW-3		Dry						
SW-4		Dry						
SW-5		22.9	7.61	200	100	97.0	8.66	N/A
SW-6		21.8	7.85	231	116	86.6	7.76	N/A
SW-1	24 Sept 2019	17.7	7.17	221	111	3.1	0.28	0.293
SW-2		14.0	7.02	1760	880	2.6	0.26	0.00003
SW-3		Dry						
SW-4		13.6	7.57	1803	902	2.1	0.21	0.0008
SW-5		18.8	8.3	149	75	3.1	0.28	N/A
SW-6		19.8	8.05	139	70	1.2	0.11	N/A
SW-1	23 Oct 2019	7.5	7.52	182	91	105.9	12.67	0.034
SW-2		Dry						
SW-3		8.1	7.45	628	314	73.0	8.47	0.000
SW-4		8.1	7.95	1208	604	114.9	13.07	0.004
SW-5		7.5	7.89	106	53	101.5	12.20	N/A
SW-6		7.2	7.87	228	114	103.4	12.40	N/A
SW-1	22 Nov 2019	0.0	6.44	123	62	113.6	16.03	0.014
SW-2		-0.1	7.23	403	202	107.7	15.31	0.001
SW-3		0.0	7.09	452	226	85.4	12.12	0.008
SW-4		0.4	7.66	1049	525	97.6	13.67	0.013
SW-5		Frozen						
SW-6		Frozen						

APPENDIX K

PIPER PLOT TABLES

Groundwater Ionic Balance and Piper Plot Data - May 2019

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-16-III	OW-24-I	OW-24-II	OW-24-III	OW-17-I	OW-17-II	OW-17-III	OW-30-I	OW-30-II	OW-30-III	OW-31-I	OW-31-II
Ca	163	137	104	109	50.0	36.6	23.2	91.5	13.6	13.7	26.4	71.6	63.2	65.8	77.7	63.8	37.3	33.3	17.4	40.2	48.5	40.4	20.2
Mg	107	83.4	34.2	18.5	20.1	18.4	15.8	35.6	6.77	11.8	17.2	17.6	16.4	38.9	20.8	18.3	31.5	9.79	16.1	19.9	16.6	33.8	16.2
Na	165	134	4.04	2.06	36.1	28.7	99.0	21.3	67.5	98.9	73.0	4.50	6.83	16.2	5.86	3.83	47.9	3.18	97.1	38.0	14.1	74.9	96.7
K	93.2	82.2	4.95	0.88	6.95	3.79	7.04	2.76	2.89	4.49	8.03	2.33	2.82	6.10	0.91	3.16	4.17	1.02	5.91	3.64	3.84	8.73	5.50
Cl	192	105	2.46	1.69	0.98	1.11	5.93	2.06	7.89	4.97	4.18	2.09	1.22	3.25	2.91	0.76	3.02	0.94	4.28	1.42	0.78	2.75	3.47
SO4	153	126	152	120	88.3	1.53	199	44.5	23.7	2.60	89.5	13.0	19.6	18.9	14.3	15.6	69.9	3.36	196	28.3	21.1	282	206
ALK	956	858	261	242	200	234	158	383	189	338	171	252	227	347	276	236	282	126	141	244	213	140	140
pH	7.72	7.62	7.53	7.83	7.82	7.83	7.97	7.86	7.90	7.89	7.75	7.83	7.82	7.99	7.69	7.84	7.93	7.44	7.66	7.95	7.80	7.81	7.88
Ion Balance Data and Piper Plot (%)																							
Cations:	26.50	21.63	8.31	7.07	5.90	4.69	6.94	8.49	4.25	6.07	6.11	5.28	4.87	7.35	5.87	4.94	6.64	2.63	6.57	5.39	4.50	8.28	6.69
Anions:	27.70	22.73	8.45	7.38	5.86	4.74	7.47	8.64	4.49	6.95	5.40	5.36	4.98	7.42	5.89	5.06	7.17	2.61	7.02	5.50	4.72	8.75	7.18
CBE (%):	-2.22	-2.48	-0.85	-2.13	0.30	-0.56	-3.62	-0.84	-2.82	-6.73	6.22	-0.83	-1.07	-0.49	-0.23	-1.25	-3.84	0.34	-3.32	-1.05	-2.38	-2.74	-3.57
Mg:	33.2	31.7	33.9	21.5	28.0	32.3	18.7	34.5	13.1	16.0	23.2	27.4	27.7	43.6	29.2	30.5	39.0	30.6	20.2	30.4	30.4	33.6	19.9
Ca:	30.7	31.6	62.5	76.9	42.3	39.0	16.7	53.8	16.0	11.3	21.5	67.7	64.7	44.7	66.1	64.5	28.0	63.1	13.2	37.2	53.8	24.4	15.1
Na+K:	36.1	36.7	3.6	1.6	29.6	28.7	64.6	11.7	70.9	72.7	55.3	4.8	7.6	11.7	4.7	5.0	33.0	6.2	66.6	32.4	15.8	42.1	65.0
Cl:	19.6	13.0	0.8	0.6	0.5	0.7	2.2	0.7	5.0	2.0	2.2	1.1	0.7	1.2	1.4	0.4	1.2	1.0	1.7	0.7	0.5	0.9	1.4
SO4:	11.5	11.5	37.5	33.8	31.4	0.7	55.5	10.7	11.0	0.8	34.5	5.0	8.2	5.3	5.1	6.4	20.3	2.7	58.1	10.7	9.3	67.1	59.7
HCO3+CO3:	69.0	75.4	61.7	65.5	68.2	98.7	42.3	88.6	84.1	97.2	63.3	93.9	91.1	93.5	93.6	93.2	78.5	96.3	40.1	88.6	90.2	32.0	38.9

wood.

Groundwater Ionic Balance and Piper Plot Data - July 2019

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-16-III	OW-24-I	OW-24-II	OW-24-III	OW-17-I	OW-17-II	OW-30-I	OW-30-II	OW-30-III	OW-31-I	OW-31-II
Ca	157	163	93.7	132	46.6	36.3	23.8	104	13.3	13.2	20.5	75.6	49.9	50.4	98.4	66.1	36.2	17.1	28.4	52.2	41.7	19.7
Mg	109	111	32.2	24.0	19.5	19.1	16.5	52.9	6.69	11.6	13.5	24.8	17.6	36.2	27.2	19.7	31.4	16.5	19.9	18.1	34.1	16.0
Na	173	180	4.76	2.14	35.2	31.2	105	26.8	70.0	99.2	63.3	8.94	18.5	14.3	6.48	3.98	56.6	99.2	64.3	10.7	76.9	99.4
K	112	101	4.80	1.19	5.45	3.72	7.26	6.23	2.61	4.05	6.69	4.26	3.68	4.57	2.61	3.23	4.21	5.99	5.26	3.95	8.89	5.46
Cl	178	195	2.93	2.64	0.89	1.44	6.54	2.54	8.03	5.06	3.66	2.95	3.57	3.45	4.28	0.78	3.12	3.92	2.36	0.93	2.85	3.36
SO4	159	147	110	187	83.7	2.64	218	150	24.8	1.51	90.3	16.5	16.7	21.1	12.5	16.2	66.8	205	64.2	21.5	292	223
ALK	929	956	264	233	195	217	141	348	184	317	157	286	207	320	361	224	272	127	228	202	128	139
pH	7.18	7.19	7.65	7.57	7.93	7.86	8.03	7.69	8.00	7.93	8.02	7.70	7.86	7.84	7.46	7.81	7.96	8.10	7.92	7.77	7.97	8.04
Ion Balance Data and Piper Plot (%)																						
Cations:	27.19	27.68	7.66	8.69	5.60	4.84	7.30	10.87	4.33	6.03	5.06	6.31	4.84	6.23	7.50	5.18	6.96	6.68	5.99	4.66	8.46	6.76
Anions:	26.90	27.66	7.65	8.62	5.66	4.43	7.54	10.15	4.42	6.51	5.12	6.14	4.58	6.93	7.59	4.83	6.91	6.92	5.96	4.51	8.72	7.51
CBE (%):	0.55	0.03	0.05	0.36	-0.56	4.36	-1.63	3.42	-1.06	-3.79	-0.60	1.36	2.69	-5.30	-0.65	3.40	0.34	-1.73	0.23	1.65	-1.50	-5.26
Mg:	33.0	33.0	34.6	22.7	28.7	32.5	18.6	40.1	12.7	15.8	22.0	32.3	29.9	47.8	29.9	31.3	37.1	20.3	27.4	32.0	33.2	19.5
Ca:	28.8	29.4	61.1	75.8	41.5	37.5	16.3	47.8	15.3	10.9	20.2	59.8	51.5	40.4	65.5	63.7	26.0	12.8	23.7	55.9	24.6	14.5
Na+K:	38.2	37.6	4.3	1.4	29.8	30.0	65.1	12.2	71.9	73.3	57.8	7.9	18.6	11.9	4.7	4.9	36.9	66.9	49.0	12.2	42.2	66.0
Cl:	18.7	19.9	1.1	0.9	0.4	0.9	2.4	0.7	5.1	2.2	2.0	1.4	2.2	1.4	1.6	0.5	1.3	1.6	1.1	0.6	0.9	1.3
SO4:	12.3	11.1	29.9	45.1	30.8	1.2	60.2	30.8	11.7	0.5	36.7	5.6	7.6	6.3	3.4	7.0	20.1	61.7	22.4	9.9	69.7	61.8
HCO3+CO3:	69.0	69.1	69.0	54.0	68.8	97.8	37.4	68.5	83.2	97.3	61.3	93.1	90.2	92.3	95.0	92.6	78.6	36.7	76.4	89.5	29.3	37.0

wood.

Groundwater Ionic Balance and Piper Plot Data - September 2019

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-16-III	OW-24-I	OW-24-II	OW-24-III	OW-17-I	OW-17-II	OW-30-I	OW-30-II	OW-30-III	OW-31-I	OW-31-II
Ca	165	187	92.1	140	45.0	33.9	22.1	80.3	69.1	13.6	21.3	73.9	56.1	69.4	95.7	61.0	36.2	17.6	22.0	48.1	44.1	18.8
Mg	111	102	29.7	25.0	18.9	17.3	15.1	28.8	37.2	11.5	13.8	17.0	17.0	36.9	25.8	18.2	30.3	16.5	19.7	16.5	35.4	15.1
Na	188	150	4.93	2.17	35.8	28.5	105	15.9	14.4	103	65.1	5.42	9.71	14.3	6.27	3.96	53.6	100	77.3	10.7	81.9	103
K	109	100	4.96	1.18	5.66	3.60	7.54	3.28	5.76	4.21	7.57	1.99	3.00	5.68	1.18	3.15	4.31	6.14	6.26	3.92	9.93	5.63
Cl	209	191	2.65	1.64	0.78	1.13	5.80	3.01	6.96	4.12	3.99	1.90	1.34	3.08	3.16	0.70	2.60	3.14	2.20	0.69	2.08	2.60
SO4	172	213	96.7	231	83.4	1.31	203	95.1	22.0	1.07	88.4	21.4	20.1	21.5	16.0	16.3	66.4	197	91.0	21.2	313	211
ALK	988	922	273	240	196	223	144	294	179	308	168	250	217	340	339	224	269	129	212	197	140	126
pH	7.57	7.47	7.44	7.57	7.78	7.70	7.64	7.82	7.94	7.81	7.59	7.70	7.75	7.90	7.67	7.72	7.85	7.57	7.90	7.69	7.66	7.72
Ion Balance Data and Piper Plot (%)																						
Cations:	28.33	26.80	7.38	9.17	5.50	4.45	7.11	7.15	7.28	6.21	5.22	5.37	4.70	7.27	7.20	4.79	6.74	6.74	6.24	4.32	8.93	6.81
Anions:	29.22	28.25	7.54	9.65	5.67	4.51	7.27	7.94	4.23	6.29	5.31	5.49	4.79	7.33	7.20	4.83	6.83	6.77	6.19	4.40	9.37	6.98
CBE (%):	-1.54	-2.64	-1.08	-2.57	-1.53	-0.76	-1.12	-5.21	26.51	-0.63	-0.81	-1.11	-1.00	-0.42	0.04	-0.42	-0.65	-0.18	0.40	-0.84	-2.42	-1.29
Mg:	32.2	31.3	33.1	22.4	28.3	32.0	17.5	33.1	42.0	15.2	21.7	26.0	29.8	41.8	29.5	31.2	37.0	20.1	26.0	31.4	32.6	18.3
Ca:	29.1	34.8	62.3	76.2	40.8	38.0	15.5	56.0	47.3	10.9	20.3	68.6	59.6	47.7	66.3	63.5	26.8	13.0	17.6	55.5	24.6	13.8
Na+K:	38.7	33.9	4.6	1.4	30.9	29.9	67.0	10.8	10.6	73.8	57.9	5.3	10.6	10.6	4.2	5.3	36.2	66.8	56.4	13.1	42.7	68.0
Cl:	20.2	19.1	1.0	0.5	0.4	0.7	2.3	1.1	4.6	1.8	2.1	1.0	0.8	1.2	1.2	0.4	1.1	1.3	1.0	0.4	0.6	1.1
SO4:	12.3	15.7	26.7	49.8	30.6	0.6	58.2	24.9	10.8	0.4	34.7	8.1	8.7	6.1	4.6	7.0	20.2	60.6	30.6	10.0	69.5	62.9
HCO3+CO3:	67.6	65.2	72.3	49.7	69.0	98.7	39.6	74.0	84.5	97.8	63.2	90.9	90.5	92.7	94.1	92.6	78.7	38.1	68.4	89.5	29.8	36.0

Residential Groundwater Ionic Balance and Piper Plot Data - May 2019

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-15	WS-16
Ca	163	137	104	109	50.0	83.0	74.1	0.10	60.3	57.0	58.4	2.21
Mg	107	83.4	34.2	18.5	20.1	27.2	29.4	<0.05	18.1	27.1	29.2	0.71
Na	165	134	4.04	2.06	36.1	15.5	6.00	164	4.34	10.2	26.2	143
K	93.2	82.2	4.95	0.88	6.95	1.67	1.96	0.14	0.88	2.68	3.58	0.30
Cl	192	105	2.46	1.69	0.98	19.2	16.0	7.54	2.02	0.99	8.04	1.81
SO4	153	126	152	120	88.3	29.2	23.8	85.4	9.04	8.85	85.6	13.3
ALK	956	858	261	242	200	329	319	291	300	325	281	351
pH	7.72	7.62	7.53	7.83	7.82	7.94	7.85	7.96	7.67	7.80	7.78	7.86
Ion Balance Data and Piper Plot (%)												
Cations:	26.50	21.63	8.31	7.07	5.90	7.10	6.43	7.19	4.71	5.59	6.55	6.40
Anions:	27.70	22.73	8.45	7.38	5.86	7.72	7.3	7.80	6.24	6.71	7.62	7.34
CBE (%):	-2.22	-2.48	-0.85	-2.13	0.30	-4.22	-6.49	-4.08	-13.97	-9.11	-7.59	-6.87
Mg:	33.2	31.7	33.9	21.5	28.0	31.5	37.6	0.7	31.6	39.9	36.7	0.9
Ca:	30.7	31.6	62.5	76.9	42.3	58.4	57.5	0.1	63.9	50.9	44.5	1.7
Na+K:	36.1	36.7	3.6	1.6	29.6	10.1	4.8	99.2	4	9.2	18.8	97.4
Cl:	19.6	13.0	0.8	0.6	0.5	7.0	6.2	2.7	0.9	0.4	3.0	0.7
SO4:	11.5	11.5	37.5	33.8	31.4	7.9	6.8	23	3.0	2.7	23.4	3.8
HCO3+CO3:	69.0	75.4	61.7	65.5	68.2	85.1	87.1	74.5	96.1	96.8	73.6	95.5

APPENDIX L

REASONABLE USE CALCULATIONS (GUIDELINE B-7)

wood.

Guideline B-7
Spring 2019 Monitoring Event Shallow Aquifer

Reasonable Use Calculation (Guideline B-7)				Downgradient Well Concentrations			
Parameter	**ODWS [3] C_r (mg/L)**	**Background Concentration $C_{b\ (1)}$ (mg/L)**	**Maximum Concentration $C_m=C_b+x(C_r-C_b)$ (mg/L)**	**OW-25-III (mg/L)**	**OW-16-III (mg/L)**	**OW-24-III (mg/L)**	**OW-17-III (mg/L)**
Health Related			x=0.25 [2]				
Arsenic	0.01	0.0010	0.003	**0.005**	<0.003	<0.003	<0.003
Barium	1	0.020	0.265	0.061	0.046	0.026	0.011
Boron	5	0.025	1.27	0.012	<0.010	<0.010	<0.010
Cadmium	0.005	0.0003	0.0014	<0.002	<0.002	<0.002	<0.002
Chromium	0.05	0.0022	0.014	<0.003	<0.003	<0.003	<0.003
Lead	0.01	0.0005	0.003	<0.001	<0.001	<0.001	<0.003
Nitrate-N	10	0.060	2.5	<0.10	0.29	0.38	<0.05
Nitrite-N	1	0.021	0.27	<0.10	<0.05	<0.05	<0.05
Non-Health Related			x=0.50 [2]				
Chloride	250	2.54	126	2.06	2.09	2.91	0.94
Copper	1	0.0011	0.50	<0.003	<0.003	<0.003	<0.003
DOC	5	2.40	3.7	1.8	3.0	2.4	3.4
Sodium	200	2.52	101.3	21.3	4.50	5.86	3.18
Sulphate	500	177	338	44.5	13.0	14.3	3.36
TDS	500	510	510 [4]	398	264	280	132
Zinc	5	0.004	2.50	<0.005	<0.005	<0.005	<0.005

Notes:
(1) Average of valid sampling rounds at 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.

wood.

Guideline B-7
Spring 2019 Monitoring Event Moderate Depth Aquifer

Reasonable Use Calculation (Guideline B-7)				Downgradient Well Concentrations					
Parameter	**ODWS [3] C_r (mg/L)**	**Background Concentration $C_{b\,(1)}$ (mg/L)**	**Maximum Concentration $C_m=C_b+x(C_r-C_b)$ (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 [2]						
Arsenic	0.01	0.0010	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	1	0.029	0.272	0.025	0.032	0.053	0.047	0.034	0.043
Boron	5	0.125	1.34	0.220	0.217	0.060	0.152	0.062	0.220
Cadmium	0.005	0.0003	0.0014	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Chromium	0.05	0.0021	0.014	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Lead	0.01	0.0005	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nitrate-N	10	0.053	2.5	0.12	0.11	<0.10	<0.10	<0.05	0.64
Nitrite-N	1	0.021	0.27	<0.10	<0.05	<0.10	<0.10	<0.05	<0.25
Non-Health Related			x=0.50 [2]						
Chloride	250	3.20	127	5.93	4.18	3.25	3.02	1.42	2.75
Copper	1	0.0010	0.50	<0.003	<0.003	<0.003	<0.003	<0.003	0.007
DOC	5	1.62	3.3	1.6	1.6	1.7	2.2	2.9	1.5
Sodium	200	3.76	101.9	99.0	73.0	16.2	47.9	38.0	74.9
Sulphate	500	155	328	199	89.5	18.9	69.9	28.3	282
TDS	500	483	492	440	288	344	320	284	**498**
Zinc	5	0.005	2.50	<0.005	<0.005	<0.005	<0.005	<0.005	0.008

Notes:
(1) Average of valid sampling rounds at OW-10-I.
(2) Defined according to Guideline B-7 (MECP, 1994).
(3) ODWS - Ontario Drinking Water Standards (MECP, 2001).
(4) **BOLD and shaded** indicates an exceedance of the Maximum Concentration.

Guideline B-7
Spring 2019 Monitoring Event Deep Aquifer

Reasonable Use Calculation (Guideline B-7)													
Parameter	**ODWS [3] C_r (mg/L)**	**Background Concentration $C_{b\,(1)}$ (mg/L)**	**Maximum Concentration $C_m=C_b+x(C_r-C_b)$ (mg/L)**	**OW-25-I [5] (mg/L)**	**OW-25-IV [5] (mg/L)**	**OW-16-I [5] (mg/L)**	**OW-24-I [5] (mg/L)**	**OW-17-I (mg/L)**	**OW-23-I (mg/L)**	**OW-23-II (mg/L)**	**OW-30-I [5] (mg/L)**	**OW-30-III [5] (mg/L)**	**OW-31-II [5] (mg/L)**
Health Related			x=0.25 [2]										
Arsenic	0.01	0.0015	0.004	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	1	0.029	0.272	0.040	0.016	0.051	0.031	0.032	0.030	0.032	0.025	0.103	0.047
Boron	5	0.260	1.44	0.142	0.355	0.492	0.045	0.029	0.355	0.400	0.498	0.054	0.241
Cadmium	0.005	0.0010	0.0020	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Chromium	0.05	0.0015	0.014	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Lead	0.01	0.0005	0.003	<0.001	<0.001	<0.001	<0.001	<0.003	<0.001	<0.001	<0.001	<0.001	<0.001
Nitrate-N	10	0.025	2.5	<0.05	<0.05	<0.05	<0.05	0.05	0.06	0.06	<0.10	<0.05	<0.10
Nitrite-N	1	0.025	0.27	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.10	<0.05	<0.10
Non-Health Related			x=0.50 [2]										
Chloride	250	1.01	126	1.11	7.89	4.97	1.22	0.76	1.58	8.44	4.28	0.78	3.47
Copper	1	0.0015	0.50	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
DOC	5	1.59	3.3	3.0	**4.6**	**12.1**	2.8	2.9	3.1	2.1	2.3	**4.2**	**4.4**
Sodium	200	35.7	117.8	28.7	67.5	98.9	6.83	3.83	54.2	80.0	97.1	14.1	96.7
Sulphate	500	83	292	1.53	23.7	2.60	19.6	15.6	4.92	86.9	196	21.1	206
TDS	500	295	398	226	246	**426**	244	230	214	304	**416**	222	**422**
Zinc	5	0.003	2.50	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	<0.005

Notes:
(1) Average of 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) **BOLD and shaded** indicates an exceedance of the Maximum Concentration.
(5) Downgradient property boundary well (i.e., compliance point).

wood.

Guideline B-7
Summer 2019 Monitoring Event Shallow Aquifer

Reasonable Use Calculation (Guideline B-7)				Downgradient Well Concentrations		
Parameter	**ODWS [3] C_r (mg/L)**	**Background Concentration $C_{b\,(1)}$ (mg/L)**	**Maximum Concentration $C_m=C_b+x(C_r-C_b)$ (mg/L)**	**OW-25-III (mg/L)**	**OW-16-III (mg/L)**	**OW-24-III (mg/L)**
Health Related			x=0.25 [2]			
Arsenic	0.01	0.0010	0.003	<0.003	<0.003	<0.003
Barium	1	0.020	0.265	0.051	0.072	0.030
Boron	5	0.025	1.27	0.051	0.038	0.014
Cadmium	0.005	0.0003	0.0015	<0.002	<0.002	<0.002
Chromium	0.05	0.0021	0.014	<0.003	<0.003	<0.003
Lead	0.01	0.0005	0.003	<0.001	<0.001	<0.001
Nitrate-N	10	0.061	2.5	<0.25	0.13	<0.10
Nitrite-N	1	0.022	0.27	<0.25	<0.10	<0.10
Non-Health Related			x=0.50 [2]			
Chloride	250	2.54	126	2.54	2.95	4.28
Copper	1	0.0011	0.50	<0.003	<0.003	<0.003
DOC	5	2.41	3.7	1.9	3.1	**7.2**
Sodium	200	2.51	101.3	26.8	8.9	6.48
Sulphate	500	177	338	150	16.5	12.5
TDS	500	509	509 [4]	**522**	294	330
Zinc	5	0.022	2.51	<0.005	<0.005	<0.005

Notes:
(1) Average of valid sampling rounds at 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.

wood.

Guideline B-7
Summer 2019 Monitoring Event Moderate Depth Aquifer

Reasonable Use Calculation (Guideline B-7)				Downgradient Well Concentrations					
Parameter	**ODWS [3] C_r (mg/L)**	**Background Concentration $C_{b\,(1)}$ (mg/L)**	**Maximum Concentration $C_m=C_b+x(C_r-C_b)$ (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 [2]						
Arsenic	0.01	0.0010	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	1	0.029	0.272	0.024	0.028	0.026	0.044	0.031	0.042
Boron	5	0.127	1.35	0.220	0.215	0.056	0.144	0.146	0.212
Cadmium	0.005	0.0003	0.0014	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Chromium	0.05	0.0021	0.014	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Lead	0.01	0.0005	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nitrate-N	10	0.053	2.5	<0.10	0.05	0.12	0.13	<0.10	0.58
Nitrite-N	1	0.021	0.27	<0.10	<0.05	<0.10	<0.10	<0.10	<0.25
Non-Health Related			x=0.50 [2]						
Chloride	250	3.20	127	6.54	3.66	3.45	3.12	2.36	2.85
Copper	1	0.0010	0.50	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
DOC	5	1.62	3.3	1.4	1.3	1.5	2.3	**4.3**	2.8
Sodium	200	3.78	101.9	**105**	63.3	14.3	56.6	64.3	76.9
Sulphate	500	154	327	218	90.3	21.1	66.8	64.2	292
TDS	500	481	491	416	272	348	362	308	**528**
Zinc	5	0.005	2.50	<0.005	0.006	<0.005	<0.005	<0.005	<0.005

Notes:
(1) Average of valid sampling rounds at OW-10-I.
(2) Defined according to Guideline B-7 (MECP, 1994).
(3) ODWS - Ontario Drinking Water Standards (MECP, 2001).
(4) **BOLD and shaded** indicates an exceedance of the Maximum Concentration.

Guideline B-7
Summer 2019 Monitoring Event Deep Aquifer

Reasonable Use Calculation (Guideline B-7)													
Parameter	**ODWS [3] C_r (mg/L)**	**Background Concentration $C_{b\,(1)}$ (mg/L)**	**Maximum Concentration $C_m=C_b+x(C_r-C_b)$ (mg/L)**	**OW-25-I [5] (mg/L)**	**OW-25-IV [5] (mg/L)**	**OW-16-I [5] (mg/L)**	**OW-24-I [5] (mg/L)**	**OW-17-I (mg/L)**	**OW-23-I (mg/L)**	**OW-23-II (mg/L)**	**OW-30-I [5] (mg/L)**	**OW-30-III [5] (mg/L)**	**OW-31-II [5] (mg/L)**
Health Related			x=0.25 [2]										
Arsenic	0.01	0.0015	0.004	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	1	0.027	0.270	0.039	0.015	0.031	0.028	0.029	0.022	0.028	0.024	0.042	0.044
Boron	5	0.194	1.40	0.147	0.334	0.487	0.093	0.040	0.351	0.384	0.471	0.071	0.224
Cadmium	0.005	0.0010	0.0020	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Chromium	0.05	0.0015	0.014	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Lead	0.01	0.0005	0.003	<0.001	<0.001	<0.001	<0.001	<0.003	<0.001	<0.001	<0.001	<0.001	<0.001
Nitrate-N	10	0.025	2.5	<0.05	0.05	0.11	0.06	<0.05	<0.05	<0.10	<0.10	<0.05	<0.10
Nitrite-N	1	0.025	0.27	<0.05	<0.05	<0.10	<0.05	<0.05	0.09	<0.10	<0.10	<0.05	<0.10
Non-Health Related			x=0.50 [2]										
Chloride	250	0.99	125	1.44	8.03	5.06	3.57	0.78	2.02	8.40	3.92	0.93	3.36
Copper	1	0.0015	0.50	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
DOC	5	1.53	3.3	3.1	**4.0**	**11.3**	2.4	3.1	**5.7**	2.0	1.9	**3.6**	**4.2**
Sodium	200	35.6	117.8	31.2	70.0	99.2	18.5	3.98	58.4	82.6	99.2	10.7	99.4
Sulphate	500	83	292	2.64	24.8	1.51	16.7	16.2	5.11	81.0	205	21.5	223
TDS	500	293	397	220	250	372	238	246	228	328	**424**	204	**412**
Zinc	5	0.003	2.50	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Notes:
(1) Average of 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) **BOLD and shaded** indicates an exceedance of the Maximum Concentration.
(5) Downgradient property boundary well (i.e., compliance point).

wood.

Guideline B-7
Fall 2019 Monitoring Event Shallow Aquifer

Reasonable Use Calculation (Guideline B-7)				Downgradient Well Concentrations		
Parameter	**ODWS [3] C_r (mg/L)**	**Background Concentration $C_{b\,(1)}$ (mg/L)**	**Maximum Concentration $C_m=C_b+x(C_r-C_b)$ (mg/L)**	**OW-25-III (mg/L)**	**OW-16-III (mg/L)**	**OW-24-III (mg/L)**
Health Related			x=0.25 [2]			
Arsenic	0.01	0.0010	0.003	<0.003	<0.003	<0.003
Barium	1	0.020	0.265	0.049	0.037	0.028
Boron	5	0.026	1.27	0.013	0.023	0.016
Cadmium	0.005	0.0003	0.0015	<0.002	<0.002	<0.002
Chromium	0.05	0.0021	0.014	<0.003	<0.003	<0.003
Lead	0.01	0.0005	0.003	<0.001	<0.001	<0.001
Nitrate-N	10	0.062	2.5	<0.25	0.05	0.79
Nitrite-N	1	0.023	0.27	<0.25	<0.05	0.14
Non-Health Related			x=0.50 [2]			
Chloride	250	2.51	126	3.01	1.90	3.16
Copper	1	0.0012	0.50	<0.003	<0.003	<0.003
DOC	5	2.40	3.7	1.3	3.2	**4.9**
Sodium	200	2.50	101.2	15.9	5.42	6.27
Sulphate	500	178	339	95.1	21.4	16.0
TDS	500	511	511 [4]	410	274	356
Zinc	5	0.004	2.50	<0.005	<0.005	0.005

Notes:
(1) Average of valid sampling rounds at 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.

Guideline B-7
Fall 2019 Monitoring Event Moderate Depth Aquifer

Reasonable Use Calculation (Guideline B-7)				Downgradient Boundary Well Concentrations					
Parameter	**ODWS [3] C_r (mg/L)**	**Background Concentration $C_{b\,(1)}$ (mg/L)**	**Maximum Concentration $C_m=C_b+x(C_r-C_b)$ (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 [2]						
Arsenic	0.01	0.0010	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	1	0.029	0.272	0.027	0.033	0.053	0.049	0.031	0.051
Boron	5	0.130	1.35	0.197	0.216	0.060	0.152	0.172	0.220
Cadmium	0.005	0.0003	0.0015	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Chromium	0.05	0.0020	0.014	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Lead	0.01	0.0005	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nitrate-N	10	0.053	2.5	<0.25	0.30	0.12	<0.10	<0.10	0.82
Nitrite-N	1	0.022	0.27	<0.25	<0.05	<0.10	<0.10	<0.10	<0.25
Non-Health Related			x=0.50 [2]						
Chloride	250	3.18	127	5.80	3.99	3.08	2.60	2.20	2.08
Copper	1	0.0010	0.50	<0.003	<0.003	<0.003	<0.003	<0.003	0.004
DOC	5	1.60	3.3	1.2	1.4	1.4	1.3	1.6	1.0
Sodium	200	3.81	101.9	**105**	65.1	14.3	53.6	77.3	81.9
Sulphate	500	152	326	203	88.4	21.5	66.4	91.0	313
TDS	500	480	490	420	308	338	336	346	**518**
Zinc	5	0.004	2.50	0.009	<0.005	<0.005	<0.005	<0.005	0.005

Notes:
(1) Average of valid sampling rounds at OW-10-I.
(2) Defined according to Guideline B-7 (MECP, 1994).
(3) ODWS - Ontario Drinking Water Standards (MECP, 2001).
(4) **BOLD and shaded** indicates an exceedance of the Maximum Concentration.

Guideline B-7
Fall 2019 Monitoring Event Deep Aquifer

Reasonable Use Calculation (Guideline B-7)													
Parameter	**ODWS [3] C_r (mg/L)**	**Background Concentration $C_{b\,(1)}$ (mg/L)**	**Maximum Concentration $C_m=C_b+x(C_r-C_b)$ (mg/L)**	**OW-25-I [5] (mg/L)**	**OW-25-IV [5] (mg/L)**	**OW-16-I [5] (mg/L)**	**OW-24-I [5] (mg/L)**	**OW-17-I (mg/L)**	**OW-23-I (mg/L)**	**OW-23-II (mg/L)**	**OW-30-I [5] (mg/L)**	**OW-30-III [5] (mg/L)**	**OW-31-II [5] (mg/L)**
Health Related			x=0.25 [2]										
Arsenic	0.01	0.0015	0.004	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	1	0.026	0.270	0.040	0.015	0.033	0.033	0.032	0.033	0.028	0.026	0.052	0.046
Boron	5	0.201	1.40	0.145	0.322	0.476	0.072	0.037	0.303	0.376	0.427	0.068	0.222
Cadmium	0.005	0.0010	0.0020	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Chromium	0.05	0.0015	0.014	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Lead	0.01	0.0005	0.003	<0.001	<0.001	<0.001	<0.001	<0.003	<0.001	<0.001	<0.001	<0.001	<0.001
Nitrate-N	10	0.028	2.5	<0.05	<0.05	<0.10	<0.05	<0.05	<0.05	<0.10	<0.10	<0.05	<0.10
Nitrite-N	1	0.028	0.27	<0.05	<0.05	<0.10	<0.05	<0.05	<0.05	<0.10	<0.10	<0.05	<0.10
Non-Health Related			x=0.50 [2]										
Chloride	250	0.95	125	1.13	6.96	4.12	1.34	0.70	1.63	7.75	3.14	0.69	2.60
Copper	1	0.0015	0.50	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
DOC	5	1.27	3.1	2.2	2.6	**8.0**	2.2	1.9	2.3	1.4	1.0	2.2	2.7
Sodium	200	35.6	117.8	28.5	14.4	103	9.71	3.96	47.9	81.4	100	10.7	103
Sulphate	500	83	292	1.31	22.0	1.07	20.1	16.3	5.53	75.5	197	21.2	211
TDS	500	294	397	232	226	362	236	244	218	322	388	224	**408**
Zinc	5	0.003	2.50	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.011	<0.005	<0.005

Notes:
(1) Average of 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) **BOLD and shaded** indicates an exceedance of the Maximum Concentration.
(5) Downgradient property boundary well (i.e., compliance point).

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	
Waste Disposal Site Name	New Liskeard Waste Disposal Site
Location (e.g. street address, lot, concession)	~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
GPS Location (taken within the property boundary at front gate/ front entry)	596760 Easting and 5262520 Northing, Zone 17
Municipality	City of Temiskaming Shores
Client and/or Site Owner	City of Temiskaming Shores
Monitoring Period (Year)	2019
This Monitoring Report is being submitted under the following:	
Certificate of Approval No.:	A571505
Director's Order No.:	
Provincial Officer's Order No.:	
Other:	

Report Submission Frequency	◉ **Annual** ○ **Other**	Specify (Type Here):
The site is:	○ **Active** ◉ **Inactive** ○ **Closed**	
If closed, specify C of A, control or authorizing document closure date:		
Has the nature of the operations at the site changed during this monitoring period?	○ **Yes** ◉ **No**	
If yes, provide details:		
Have any measurements been taken since the last reporting period that indicate landfill gas volumes have exceeded the MOE limits for subsurface or adjacent buildings? (i. e. exceeded the LEL for methane)	○ Yes ◉ No	

Groundwater WDS Verification:

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

Sampling and Monitoring Program Status:

1) The monitoring program continues to effectively characterize site conditions and any groundwater discharges from the site. All monitoring wells are confirmed to be in good condition and are secure:	(●) **Yes** ( ) **No**	If no, list exceptions (Type Here):
2) All groundwater, leachate and WDS gas sampling and monitoring for the monitoring period being reported on was successfully completed as required by Certificate(s) of Approval or other relevant authorizing/control document(s):	( ) **Yes** (●) **No** ( ) **Not Applicable**	If no, list exceptions below or attach information.

Groundwater Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**
OW-17-III	Dry during the summer and fall monitoring events.	25-Sep-2019
Type Here	Type Here	Select Date

3) a) Some or all groundwater, leachate and WDS gas sampling and monitoring requirements have been established or defined outside of a ministry C of A, authorizing, or control document.	◯ **Yes** ◉ **No** ◯ **Not Applicable**	
b) If yes, the sampling and monitoring identified under 3(a) for the monitoring period being reported on was successfully completed in accordance with established protocols, frequencies, locations, and parameters developed as per the Technical Guidance Document:	◯ **Yes** ◯ **No** ◉ **Not Applicable**	If no, list exceptions below or attach additional information.

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

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

Sampling and Monitoring Program Results/WDS Conditions and Assessment:

5) The site has an adequate buffer, Contaminant Attenuation Zone (CAZ) and/or contingency plan in place. Design and operational measures, including the size and configuration of any CAZ, are adequate to prevent potential human health impacts and impairment of the environment.	(●) **Yes** ( ) **No**	If no, the potential design and operational concerns/ exceptions are as follows (Type Here):	
6) The site meets compliance and assessment criteria.	( ) **Yes** (●) **No**	Exceedances of Guideline B-7 were reported at downgradient well nests OW-30, OW-31, OW-24, OW-25 and OW-16. These exceedances are not interpreted to be indicative of a landfill-derived impact to groundwater quality.	
7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.	(●) **Yes** ( ) **No**	If no, list exceptions and explain reason for increase/change (Type Here):	
1) Is one or more of the following risk reduction practices in place at the site: ***(a)*** **There is minimal reliance on natural attenuation of leachate due to the presence of an effective waste liner and active leachate collection/treatment; or** ***(b)*** **There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or** ***(c)*** **The site meets the following two conditions (typically achieved after 15 years or longer of site operation):** ***i.*** **The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and** ***ii.*** **Seasonal and annual water levels and water quality fluctuations are well understood.**	(●) **Yes** ( ) **No**	**Note which practice(s):**	☐ **(a)** ☐ **(b)** ☒ **(c)**
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	( ) **Yes** ( ) **No** (●) **Not Applicable**	If yes, list value(s) that are/have been exceeded and follow-up action taken (Type Here):	

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

Name:	Brian Grant		
Seal:	Add Image		
Signature:	brian.grant Digitally signed by brian.grant Date: 2020.03.02 14:36:07 -05'00'	**Date:**	2-Mar-2020
CEP Contact Information:	Brian Grant, P.Eng.		
Company:	Wood Environment & Infrastructure Solutions		
Address:	131 Fielding Road, Lively, Ontario, P3Y 1L7		
Telephone No.:	705-682-2632 x 235	Fax No. :	705-682-2260
E-mail Address:	brian.grant@woodplc.com		
Co-signers for additional expertise provided:			
Signature:		**Date:**	Select Date
Signature:		**Date:**	Select Date

Surface Water WDS Verification:

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

Name (s)	South Wabi Creek Unnamed Tributary to the Wabi River Wabi River
Distance(s)	~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:

1) The current surface water monitoring program continues to effectively characterize the surface water conditions, and includes data that relates upstream/background and downstream receiving water conditions:	(●) Yes ( ) No	If no, identify issues (Type Here):
2) All surface water sampling for the monitoring period being reported was successfully completed in accordance with the Certificate(s) of Approval or relevant authorizing/control document(s) (if applicable):	( ) Yes (●) No ( ) **Not applicable (No C of A, authorizing / control document applies)**	If no, specify below or provide details in an attachment.

Surface Water Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
SW-5 and SW-6	Frozen during April and November events.	22-Nov-2019
SW-2, SW-3, SW-4	Dry on various occasions.	25-Jul-2019
Type Here	Type Here	Select Date

3) a) Some or all surface water sampling and monitoring program requirements for the monitoring period have been established outside of a ministry C of A or authorizing/control document.	◯ **Yes** ◉ **No** ◯ **Not Applicable**	
b) If yes, all surface water sampling and monitoring identified under 3 (a) was successfully completed in accordance with the established program from the site, including sampling protocols, frequencies, locations and parameters) as developed per the Technical Guidance Document:	◯ **Yes** ◯ **No** ◉ **Not Applicable**	If no, specify below or provide details in an attachment.

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

4) All field work for surface water investigations was done in accordance with standard operating procedures, including internal/external QA/QC requirements, as established/ outlined as per the Technical Guidance Document, MOE 2010, or as amended. (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):	◉ **Yes** ◯ **No**	If no, specify (Type Here):

Sampling and Monitoring Program Results/WDS Conditions and Assessment:

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

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

Parameter	Compliance or Assessment Criteria or Background	Amount by which Compliance or Assessment Criteria or Background Exceeded
e.g. Nickel	e.g. C of A limit, PWQO, background	e.g. X% above PWQO
Phenols, chromium, iron, copper	PWQO	
Chloride	CWQG, APV	
Copper	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)?	◉ **Yes** ○ **No**	Elevated concentrations of indicator parameters at SW-4 are not interpreted to be landfill-related; the results at all other receiver stations are interpreted to be the result of background conditions.

7) All monitoring program surface water parameter concentrations fall within a stable or decreasing trend. The site is not characterized by historical ranges of concentrations above assessment and compliance criteria.	◉ **Yes** ◯ **No**	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)
8) For the monitoring program parameters, does the water quality in the groundwater zones adjacent to surface water receivers exceed assessment or compliance criteria (e.g. , PWQOs, CWQGs, or toxicity values for aquatic biota (APVs)):	◯ Yes ◉ No ◯ Not Known ◯ Not Applicable	No remedial measures necessary.
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	◯ **Yes** ◯ **No** ◉ **Not Applicable**	If yes, list value(s) that are/have been exceeded and follow-up action taken (Type Here)

Surface Water CEP Declaration:

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

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

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

Recommendations:

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

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

CEP Signature	brian.grant Digitally signed by brian.grant Date: 2020.03.02 14:37:18 -05'00'
Relevant Discipline	Hydrogeologist
Date:	2-Mar-2020
CEP Contact Information:	Brian Grant
Company:	Wood Environment & Infrastructure Solutions
Address:	131 Fielding Road, Lively, Ontario, P3Y 1L7
Telephone No.:	705-682-2632 x 235
Fax No. :	705-682-2260
E-mail Address:	brian.grant@woodplc.com

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