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**TOWNSHIP OF LEEDS AND THE THOUSAND ISLANDS**

**Reynold's Road Waste Disposal Site  
2018 Annual Monitoring Report**





## 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.

<b>Monitoring Report and Site Information</b>	
<b>Waste Disposal Site Name</b>	Reynold's Road Waste Disposal Site
<b>Location (e.g. street address, lot, concession)</b>	Lot 18, Concession2, in the Township of Leeds and the Thousand Islands
<b>GPS Location (taken within the property boundary at front gate/ front entry)</b>	18 T 419161 m E, 4915429 m N
<b>Municipality</b>	Township of Leeds and the Thousand Islands
<b>Client and/or Site Owner</b>	The Corporation of the Township of Leeds and the Thousand Islands
<b>Monitoring Period (Year)</b>	2018
This Monitoring Report is being submitted under the following:	
<b>Environmental Compliance Approval Number:</b>	A442001
<b>Director's Order No.:</b>	NA
<b>Provincial Officer's Order No.:</b>	NA
<b>Other:</b>	NA

<b>Report Submission Frequency</b>	<input checked="" type="radio"/> Annual <input type="radio"/> Other		
<b>The site is:</b> (Operation Status)	<input type="radio"/> Open <input type="radio"/> Inactive <input checked="" type="radio"/> Closed		
<b>Does your Site have a Total Approved Capacity?</b>	<input type="radio"/> Yes <input checked="" type="radio"/> No		
<b>If yes, please specify Total Approved Capacity</b>		Units	Cubic Metres
<b>Does your Site have a Maximum Approved Fill Rate?</b>	<input type="radio"/> Yes <input checked="" type="radio"/> No		
<b>If yes, please specify Maximum Approved Fill Rate</b>	NA	Units	
<b>Total Waste Received within Monitoring Period (Year)</b>		Units	Cubic Metres
<b>Total Waste Received within Monitoring Period (Year)</b> <i>Methodology</i>			
<b>Estimated Remaining Capacity</b>		Units	Cubic Metres
<b>Estimated Remaining Capacity</b> <i>Methodology</i>			
<b>Estimated Remaining Capacity</b> <i>Date Last Determined</i>			
<b>Non-Hazardous Approved Waste Types</b>	<input type="checkbox"/> Domestic <input type="checkbox"/> Industrial, Commercial & Institutional (IC&I) <input type="checkbox"/> Source Separated Organics (Green Bin) <input type="checkbox"/> Tires	<input type="checkbox"/> Contaminated Soil <input type="checkbox"/> Wood Waste <input type="checkbox"/> Blue Box Material <input type="checkbox"/> Processed Organics <input type="checkbox"/> Leaf and Yard Waste	<input type="checkbox"/> Food Processing/Preparation Operations Waste <input type="checkbox"/> Hauled Sewage Other: <input type="text"/>
<b>Subject Waste Approved Waste Classes: Hazardous &amp; Liquid Industrial</b> <i>(separate waste classes by comma)</i>			
<b>Year Site Opened</b> <i>(enter the Calendar Year only)</i>	1970	<b>Current ECA Issue Date</b>	November 10, 2016
<b>Is your Site required to submit Financial Assurance?</b>	<input type="radio"/> Yes <input checked="" type="radio"/> No		
<b>Describe how your Landfill is designed.</b>	<input checked="" type="radio"/> Natural Attenuation only <input type="radio"/> Fully engineered Facility <input type="radio"/> Partially engineered Facility		
<b>Does your Site have an approved Contaminant Attenuation Zone?</b>	<input type="radio"/> Yes <input checked="" type="radio"/> No		

<p><b>If closed, specify C of A, control or authorizing document closure date:</b></p>	<p>Amended ECA A442001, November 10, 2016</p>
<p><b>Has the nature of the operations at the site changed during this monitoring period?</b></p>	<p> <input type="radio"/> Yes  <input checked="" type="radio"/> No         </p>
<p><b>If yes, provide details:</b></p>	<p>Type Here</p>
<p><b>Have any measurements been taken since the last reporting period that indicate landfill gas volumes have exceeded the MOE limits for subsurface or adjacent buildings? (i.e. exceeded the LEL for methane)</b></p>	<p> <input type="radio"/> Yes  <input checked="" type="radio"/> No         </p>

## Groundwater WDS Verification:

Based on all available information about the site and site knowledge, it is my opinion that:

### Sampling and Monitoring Program Status:

1) The monitoring program continues to effectively characterize site conditions and any groundwater discharges from the site. All monitoring wells are confirmed to be in good condition and are secure:

- Yes  
 No

2) All groundwater, leachate and WDS gas sampling and monitoring for the monitoring period being reported on was successfully completed as required by Certificate(s) of Approval or other relevant authorizing/control document (s):

- Yes  
 No  
 Not Applicable

If no, list exceptions below or attach information.

Groundwater Sampling Location

Description/Explanation for change  
(change in name or location, additions, deletions)

Date

Type Here

Type Here

Select Date

3) a) Is landfill gas being monitored or controlled at the site?		<input checked="" type="radio"/> Yes <input type="radio"/> No
If yes to 3(a), please answer the next two questions below.		
b) Have any measurements been taken since the last reporting period that indicate landfill gas is present in the subsurface at levels exceeding criteria established for the site?		<input type="radio"/> Yes <input checked="" type="radio"/> No
c) Has the sampling and monitoring identified under 3(a) for the monitoring period being reported on was successfully completed in accordance with established protocols, frequencies, locations, and parameters developed as per the Technical Guidance Document, or MECP concurrence.		<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Applicable
		If no, list exceptions below or attach additional information.
<b>Groundwater Sampling Location</b>	<b>Description/Explanation for change (change in name or location, additions, deletions)</b>	<b>Date</b>
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
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):		See report for details.
		<input checked="" type="radio"/> Yes <input type="radio"/> No

## Sampling and Monitoring Program Results/WDS Conditions and Assessment:

<p>5) The site has an adequate buffer, Contaminant Attenuation Zone (CAZ) and/or contingency plan in place. Design and operational measures, including the size and configuration of any CAZ, are adequate to prevent potential human health impacts and impairment of the environment.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>Buffer lands to the north were purchased in 2016.</p>	
<p>6) The site meets compliance and assessment criteria.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>See previous comment and report for details.</p>	
<p>7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>If no, list exceptions and explain reason for increase/change (Type Here):</p>	
<p>1) Is one or more of the following risk reduction practices in place at the site:</p> <p>(a) There is minimal reliance on natural attenuation of leachate due to the presence of an effective waste liner and active leachate collection/ treatment; or</p> <p>(b) There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or</p> <p>(c) The site meets the following two conditions (typically achieved after 15 years or longer of site operation):</p> <p><i>i.</i> The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and</p> <p><i>ii.</i> Seasonal and annual water levels and water quality fluctuations are well understood.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>Note which practice(s):</p>	<p><input type="checkbox"/> (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/> (c) As discussed in report.</p>
<p>9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):</p>	<p><input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Not Applicable</p>		



## Groundwater CEP Declaration:

I am a licensed professional Engineer or a registered professional geoscientist in Ontario with expertise in hydrogeology, as defined in Appendix D under Instructions. Where additional expertise was needed to evaluate the site monitoring data, I have relied on individuals who I believe to be experts in the relevant discipline, who have co-signed the compliance monitoring report or monitoring program status report, and who have provided evidence to me of their credentials.

I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed, as deemed appropriate for this Site in my professional judgement, 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 analyzed 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.


The completion of this Checklist is a requirement of the MECP. As always, we rely upon the MECP to undertake a complete review the report(s) provided regarding the waste disposal site/landfill, and provide their comments and acceptance of our interpretation, conclusions and recommendations. The Checklist should in no way supersede the MECP's responsibility to undertake their complete review of our report(s) to ensure Site compliance with environmental regulations, standards and/or approvals. 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:

Select Date

## Recommendations:

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

<p><input checked="" type="radio"/> <b>No changes to the monitoring program are recommended</b></p> <p><input type="radio"/> <b>The following change(s) to the monitoring program is/are recommended:</b></p>	<p>See report for additional information.</p>
<p><input checked="" type="radio"/> <b>No Changes to site design and operation are recommended</b></p> <p><input type="radio"/> <b>The following change(s) to the site design and operation is/are recommended:</b></p>	

<b>Name:</b>	John Pyke		
<b>Seal:</b>	Add Image		
<b>Signature:</b>		<b>Date:</b>	March 29, 2019
<b>CEP Contact Information:</b>	John Pyke		
<b>Company:</b>	Malroz Engineering Inc.		
<b>Address:</b>	308 Wellington St., 2nd Floor, Kingston ON		
<b>Telephone No.:</b>	613-548-3446 ext. 34	<b>Fax No. :</b>	Type Here
<b>E-mail Address:</b>	pyke@malroz.com		
<b>Co-signers for additional expertise provided:</b>			
<b>Signature:</b>		<b>Date:</b>	Select Date
<b>Signature:</b>		<b>Date:</b>	Select Date

## Surface Water WDS Verification:

Provide the name of surface water body/bodies potentially receiving the WDS effluent and the approximate distance to the waterbody (including the nearest surface water body/bodies to the site):

Name (s)	Unnamed creek
Distance(s)	through west portion of Site and into marsh north of Site

Based on all available information and site knowledge, it is my opinion that:

### Sampling and Monitoring Program Status:

<p>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:</p>	<input type="radio"/> Yes <input checked="" type="radio"/> No	<p>No surface water program in place.</p>
<p>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):</p>	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Not applicable (No C of A, authorizing / control document applies)	<p>If no, specify below or provide details in an attachment.</p>

Surface Water Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
Type Here	Type Here	Select Date

<p>3) a) Some or all surface water sampling and monitoring program requirements for the monitoring period have been established outside of a ministry C of A or authorizing/control document, or MECP concurrence.</p>	<p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p><input checked="" type="radio"/> Not Applicable</p>	
<p>b) If yes, all surface water sampling and monitoring identified under 3 (a) was successfully completed in accordance with the established program from the site, including sampling protocols, frequencies, locations and parameters) as developed per the Technical Guidance Document:</p>	<p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p><input checked="" type="radio"/> Not Applicable</p>	<p>If no, specify below or provide details in an attachment.</p>
<p><b>Surface Water Sampling Location</b></p>	<p><b>Description/Explanation for change (change in name or location, additions, deletions)</b></p>	<p><b>Date</b></p>
<p>Type Here</p>	<p>Type Here</p>	<p>Select Date</p>
<p>4) All field work for surface water investigations was done in accordance with standard operating procedures, including internal/external QA/QC requirements, as established/outlined as per the Technical Guidance Document, MOE 2010, or as amended. (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):</p>	<p><input checked="" type="radio"/> Yes</p> <p><input type="radio"/> No</p>	<p>No surface water program in place.</p>

## Sampling and Monitoring Program Results/WDS Conditions and Assessment:

5) The receiving water body meets surface water-related compliance criteria and assessment criteria: i.e., there are no exceedances of criteria, based on MECP 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
No surface water program in place.		
6) In my opinion, any exceedances listed in Question 5 are the result of non-WDS related influences (such as background, road salting, sampling site conditions)?	<input checked="" type="radio"/> Yes <input type="radio"/> No	No surface water program in place.



<p><b>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.</b></p>	<p><input checked="" type="radio"/> <b>Yes</b></p> <p><input type="radio"/> <b>No</b></p>	<p>No surface water program in place.</p>
<p><b>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)):</b></p>	<p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Not Known</p> <p><input checked="" type="radio"/> <b>Not Applicable</b></p>	<p>I</p>
<p><b>9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):</b></p>	<p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p><input checked="" type="radio"/> <b>Not Applicable</b></p>	<p>If yes, list value(s) that are/have been exceeded and follow-up action taken (Type Here):</p> <p>See report for discussion.</p>

## Surface Water CEP Declaration:

I, the undersigned hereby declare that I am a Competent Environmental Practitioner as defined in Appendix D under Instructions, holding the necessary level of experience and education to design surface water monitoring and sampling programs, conduct appropriate surface water investigations and interpret the related data as it pertains to the site for this monitoring period.

I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed, as deemed appropriate for this Site in my professional judgement, the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MECP, 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.

The completion of this Checklist is a requirement of the MECP. As always, we rely upon the MOE to undertake a complete review the report(s) provided regarding the waste disposal site/landfill, and provide their comments and acceptance of our interpretation, conclusions and recommendations. This Checklist should in no way supersede the MECP responsibility to undertake their complete review of our report(s) to ensure compliance with environmental regulations, standards and approvals.


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:

Select Date

## Recommendations:

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

<p><input checked="" type="radio"/> <b>No Changes to the monitoring program are recommended</b></p> <p><input type="radio"/> <b>The following change(s) to the monitoring program is/are recommended:</b></p>	
<p><input checked="" type="radio"/> <b>No changes to the site design and operation are recommended</b></p> <p><input type="radio"/> <b>The following change(s) to the site design and operation is/are recommended:</b></p>	<p>Type Here</p>

<b>CEP Signature</b>		
<b>Relevant Discipline</b>	Geoscientist with relevant experience and training.	
<b>Date:</b>	March 29, 2019	
<b>CEP Contact Information:</b>	John Pyke	
<b>Company:</b>	Malroz Engineering Inc.	
<b>Address:</b>	308 Wellington St., 2nd Floor, Kingston ON	
<b>Telephone No.:</b>	613-548-3446 ext. 34	
<b>Fax No. :</b>	Type Here	
<b>E-mail Address:</b>	pyke@malroz.com	
<b>Save As</b>		<b>Print Form</b>

### NOTICE TO READER

This document has been prepared by Malroz Engineering Inc. (*Malroz*) on behalf of the Township of Leeds and the Thousand Islands (TLTI), in fulfilment of Condition 2(3) of Amended Environmental Compliance Approval (ECA) No. A442001.

*Malroz* has relied upon TLTI staff to provide historic data and the conceptual understanding of the site. *Malroz* accepts no responsibility for the integrity of the data provided by TLTI or for missing data. Any third party use or reliance of this report, or decisions made based on this report, are the responsibilities of the third parties. *Malroz* accepts no responsibility for damages suffered by any third party as a result of decisions made or actions taken based on the contents of this report.

This document has been prepared for TLTI for submission to the Ministry of Environment, Conservation and Parks (*MECP*) as required by the ECA. Unauthorized re-use of this document for any other purpose, or by third parties without the express written consent of *Malroz* shall be at such party's sole risk.

This page is an integral part of this document and must remain with it at all times.

Respectfully Submitted,

MALROZ ENGINEERING INC.

FOR  
per:

Robert Varcoe, G.I.T.  
Environmental Scientist

and:

John Pyke, P. Geo  
Project Manager



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## 1.0 Introduction

The Reynold's Road waste disposal site (the Site) operates under Amended Environmental Compliance Approval (ECA) No. A442001 issued by the Ministry of Environment, Conservation and Parks (*MECP*), dated November 10, 2016 (see Appendix A). The Site is a closed landfill and is owned by the Corporation of the Township of Leeds and the Thousand Islands. The Site is located on Lot 18, Concession 2 in the Township of Leeds and the Thousand Islands (TLTI), Ontario (Figure 1, Appendix B). In accordance with the ECA, an annual monitoring report (AMR) is to be completed annually.

*Malroz* was retained by TLTI to conduct the semi-annual sampling and monitoring at the Site. This document presents our methodology, results and interpretation of these results with respect to the ECA. This report was prepared on behalf of the TLTI, using data collected by *Malroz* and available information provided by TLTI staff.

### 1.1 Ownership and Key Personnel

The Site is owned and maintained by the Corporation of the Township of Leeds and the Thousand Islands. Key contacts for the Site are as follows:

#### Municipal Contact

Adam Goheen

Director of Operations

1233 Prince Street, P.O. Box 280

Lansdowne, Ontario, K0E 1L0

613-659-2415 ext. 213

[agoheen@townshipleeds.on.ca](mailto:agoheen@townshipleeds.on.ca)

#### Environmental Professional Contact

John Pyke, P. Geo

Hydrogeologist

308 Wellington St.

Kingston, Ontario, K7K 7A8

613-548-3446 ext. 34

[pyke@malroz.com](mailto:pyke@malroz.com)

## 2.0 Background

The geology, hydrogeology, physiography, and hydrology of the Site are described in this section based on our review of collected data including site observations and previous reports on investigations at the Site.

## 2.1 Description of the Waste Disposal Site

The Reynolds Road Dump (the Site) consists of a one-hectare site with a fill area of approximately 0.4 hectares. *MECP* records indicate that the Site operated between 1970 and 1971. The Site is located on Lot 18, Concession 2, in the Township of Leeds and the Thousand Islands (former Township of Front of Lansdowne), United Counties of Leeds and Grenville, Ontario. The site is located approximately 1.3 km north of Highway 401 along the west side County Road 3, otherwise known as Reynold's Road (Figure 1, Appendix B). Geodetic coordinates for the centre of the Site as follows (2015 Site survey):

Zone:	NAD 83, 18T
Easting:	419161 m (+/- 0.5 m)
Northing:	4915429 m (+/- 0.5 m)

On November 17<sup>th</sup>, 2016, the property parcel north of the Site was purchased by the Township. The property is adjacent to and north of the previous boundary of the WDS. The acquisition is also part of Lot 18, Concession 2, Geographic Township of Lansdowne.

## 2.2 Geological Setting

Based on data from the Ontario Geologic Survey, the Site is underlain by Precambrian granitic gneiss (Hewitt, 1964). Exposed bedrock appears at the eastern boundary of the Site, adjacent to Reynold's Road, and bedrock ridges can be observed in areas to the north and south of the Site. Metasedimentary quartzo-feldspathic and gneissic bedrock is located approximately 500 m to the southwest of the Site (Hewitt, 1964).

According to borehole logs and water well records from adjacent properties (Appendix C), the overburden at the Site is comprised of glacio-lacustrine silts and clays that range in thickness from 0 to 5 metres.

## 2.3 Hydrogeologic Setting

Shallow groundwater is expected to follow the topography of the site, flowing north and west towards the unnamed creek. Groundwater and surface water elevations show that the groundwater elevations in both monitoring wells is higher than the water level of the creek, suggesting groundwater is discharging to the surface water.

Groundwater flow in the bedrock could not be assessed as there are no bedrock wells present at the site.

Water well records indicate that drinking water wells in the vicinity of the Site are installed in the bedrock aquifer. Overburden is not reportedly used as a source of potable or agricultural water in the vicinity of the Site. Domestic water wells located within 500

meters of the site are presented in the table below. We understand that there has been no interference reported at any of these domestic wells.

***Drinking Water Wells within 500 metres***

<b><i>Reynolds Road Address</i></b>	<b><i>Distance to Waste Fill (m)</i></b>
<i>628</i>	<i>336 south</i>
<i>755</i>	<i>337 north</i>
<i>619</i>	<i>345 south</i>
<i>612</i>	<i>430 south</i>
<i>613</i>	<i>432 south</i>

Previous AMRs for the Site, completed by others, report a bedrock spring approximately 100 m south of the waste fill area. We understand that this spring flows year-round and that it has historically been used as a source of domestic water. Because this spring is on private property and permission to access has not been granted, the spring has not been included in annual monitoring activities.

**2.4 Surface Water Features**

Surface water at the Site flows southwest. Its movement is directed past the waste pile by a culvert installed in 2016 which is meant to control erosion and sedimentation. The surface water drains from the Site via an unnamed creek into Knight’s Creek. This unnamed creek originates north of the Site and passes under Reynolds Road (Country Road 3) into a small wetland caused by a physiographic depression directly north of the waste pile (Figure 2, Appendix B).

Previous AMRs for the Site completed by others report that, prior to 2015, the creek was eroding the adjacent slope of the waste fill area causing waste material to be deposited into the creek. Waste and fill present in the creek was restricting flow, causing ponding to occur north of the Site. In November 2015, the creek was cleaned of all waste and a culvert was installed into the creek along the edge of the waste fill area to limit erosion of the waste mound and limit leachate interaction with surface waters. We understand that the culvert installation was approved by the Cataraqui Regional Conservation Authority.

**2.5 MECP Review**

The MECP provided comments on the 2016 and 2017 AMR in a memorandum dated July 9, 2018. The memo was addressed to Nathalie Matthews, who forwarded the memo to *Malroz* on July 9, 2018 (Appendix D). The reviewer provided the following recommendations:

- Low-flow sampling techniques should be employed at this site

- Future monitoring programs should include all historical monitoring data

Malroz employed Low-flow sampling methods were used during the May and November 2018 groundwater sampling events. Historical groundwater analyses are presented in Appendix F of this report.

### **3.0 Description of Monitoring Program**

Results of the environmental monitoring program are reported to the MECP on an annual basis by March 31 of the year following the reporting period.

As per the ECA, groundwater monitoring was conducted on two occasions in 2018. These events were conducted on May 30 (spring) and November 29 (fall).

#### **3.1 Well Inspections**

The general condition of each well was assessed during the monitoring program before sampling. This included inspecting the casing, piezometer and visible well seal, and noting if the well was properly secured and capped.

#### **3.2 Site Inspection**

The general condition of the site was inspected during each monitoring program. This included inspection for leachate seepage around the site and inspection of the final cover on the waste pile.

#### **3.3 Groundwater Monitoring Program**

The field work for the 2018 groundwater monitoring and sampling program included the following activities:

- i. Measuring water levels and methane concentrations in the monitoring wells.
- ii. Purging, monitoring and sampling each monitoring well. Groundwater sampling was conducted using low-flow methods. Groundwater samples submitted for metal analyses were field filtered.

There are two overburden monitoring wells at the site (MW1 and MW2). Monitoring well MW1 is located in the northern waste fill area and is screened below the waste in clay, between 5.2 and 6.7 meters below grade (refer to Appendix D). Well MW2 is located in the southwest region of the waste fill area and is screened in the clay beneath the waste between 9.1 and 10.6 meters below grade. Both wells are intended to detect leachate at the Site (Figure 2, Appendix B).



### **3.4 Surface Water Monitoring Program**

*Malroz* conducted inspections of the adjacent surface water body during the summer and fall per the ECA. Evidence of seeps within the adjacent waterbody were not observed during the inspections. No surface water sampling is required at this Site (MECP correspondence dated June 9, 2015).

### **3.5 Data Quality Evaluation**

Samples were collected using laboratory supplied sample bottles containing preservatives appropriate for each parameter. Samples were submitted to Caduceon Laboratories (*Caduceon*) for analyses. A list of analyzed parameters is presented in Table 1 (Appendix E). *Caduceon* reported additional polyaromatic hydrocarbon (PAHs) parameters in 2018 that had not been reported in previous years (see Table 1). These additional PAHs are not proposed in future monitoring programs.

*Caduceon* is a Canadian Association for Laboratory Accreditation (CALA) accredited laboratory that uses *MECP* recognized methods to conduct laboratory analyses. *Caduceon* reports that they are accredited to conduct the analyses completed for this investigation.

## **4.0 Discussion of Results**

This section discusses the results of the monitoring events that were conducted in 2018. Results of well inspections are presented in Table 2 and groundwater monitoring results are presented in Table 3 (Appendix E). Groundwater water chemistry results are presented in Tables 4, 5 and 6 (Appendix E). Results have been compared to the Ontario Drinking Water Quality Standards (ODWQS) and any observed exceedances are highlighted to allow for visual interpretation. Polyaromatic hydrocarbons have been compared to the O. Reg 153/04 Table 8 standards for use within 30m of a water body in potable water groundwater conditions. O. Reg. 153/04 pertains to brownfield sites and does not directly apply to former landfill properties, however applying these standards provide a cursory evaluation.

### **4.1 Well Inspection**

Results of the 2018 well inspection are summarized in Table 2. The condition of the on-site wells was reported as good and met the requirements of O. Reg. 903.

### **4.2 Site Inspection**

Site inspections were conducted during May and November monitoring events, as per the ECA. *Malroz* staff did not observe any seeps at the site, and the final cover on the waste pile appeared to be in good condition with no signs of erosion.

### **4.3 Landfill Gas and Water Level Monitoring**

Results from groundwater monitoring are presented in Table 3. Methane concentrations were below detectable limits at MW1 and MW2 during both monitoring events.

### **4.4 Groundwater Interpretation**

The overburden groundwater chemistry at the Site is characterized by two wells: MW1 and MW2. Since no wells are located outside of the waste area, the background water quality has not been evaluated. Thus, the chemistry will be compared to typical leachate characteristics outlined in Table 1 of the MECP Landfill Guidance Manual<sup>1</sup>.

Both wells in our opinion are suitably located to detect leachate as they are positioned directly below the waste fill area. Typical leachate indicators ammonia, boron, dissolved organic carbon (DOC), conductivity, chloride and conductivity were used to infer leachate trends at the Site. Among other parameters, ammonia, conductivity, chloride and DOC are slightly elevated in well MW1 relative to MW2. However, concentrations of the aforementioned parameters were at the low end of the range for typical leachate indicating weak leachate influence.

A comparison of the chemistry results from MW1 and MW2 indicate the following exceedances of ODWS:

- Hardness – MW1 and MW2 (May, November)

Hardness is an operational guideline and not health related. Elevated hardness is common of the region.

VOC results (Table 5) for MW1 and MW2 were below their detection limits during both 2018 sampling events.

Analyses of PAHs and PHCs (Table 6) show that methylnaphthalene and naphthalene were detected in MW1 during the November sampling event, however, levels for these parameters were below the Table 8 (as well as Table 1) O. Reg. 153/04 Site Condition Standards. Other PHC and PAH parameters were below detectable limits in MW1 and MW2 during both sampling events.

Historical groundwater analytical results and trends are provided in Appendix F.

### **4.5 Reasonable Use Policy**

Reasonable Use Limits (RULs) for the Site have not been determined as no background well is available.

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<sup>1</sup> *Guidance Manual for Landfill Sites Receiving Municipal Waste*, Ministry of Environment and Energy, November 1993.

## **5.0 Conclusions & Recommendations**

The Site was reportedly in operation starting in 1970 and closed in 1971. Two groundwater monitoring wells were installed at the Site in 2016. Comparison to typical leachate characteristics suggests weak to no leachate plume at the Site.

VOC results from MW1 and MW2 have been below detectable limits since the wells were installed in 2016.

Exceedances of the OWDQS for hardness were observed in MW1 and MW2 during both events in 2018, however, the elevated results may be related to regional geology. Concentrations of PAHs were predominately less than detection limits, with the exception of two detections that were below both the Table 1 and Table 8 O. Reg. 153/04 SCS. Historical PAH exceedances appear to correspond with high total suspended solids concentrations, which were minimized in 2018 due to the use of low-flow sampling methods.

The following recommendations are provided for the Reynold's Road WDS monitoring program:

1. Semi-annual waste disposal site inspections should be completed in compliance with condition 2.2
2. Groundwater sampling be conducted using low flow sampling techniques to avoid turbulence and subsequent elevated levels of TDS in wells during sampling.
3. Groundwater sampling and monitoring should continue twice per year (spring and fall) in 2019 (per condition 2.3).
4. Consideration should be given to eliminating or reducing the frequency of VOC analyses as no detects have been reported. Discussion of an updated monitoring program is proposed with the MECF following technical review.
5. Considering the site has been closed since 1971, evaluate feasibility and options for future reduced site monitoring.

## 6.0 References

Andrew Day. Annual Groundwater Assessment Report (ECA No. 442001), Township of Leeds and the Thousand Islands, June 2016.

Hewitt, D.F. (1964) *Geological notes for maps Nos. 2053 and 2054 Madoc-Gananoque Area*, Ministry of Natural Resources, GC 12, 33p (reprinted 1974). Accompanied by Maps 2053 and 2054, scale 1:126,720

Ontario Drinking Water Standards (ODWS) from Ontario Regulation 169/03 of the Safe Drinking Water Act (2002). Last amendment: O. Reg. 373/15.

Provincial Water Quality Objectives (PWQO) from the Ministry of Environment and Energy's Water Management Policies & Guidelines, July 1994.

Technical Guidance Document: Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water. Ministry of the Environment, November 2010.

Table 1: Summary of Typical Leachate Characteristics, from the Ministry of Environment and Energy (MOEE)'s Landfill Guidance Manual, 1993.

Reynold's Road Waste Disposal Site, 2016 Annual Monitoring Report, Malroz Engineering, (June 2017)

Reynold's Road Waste Disposal Site, 2017 Annual Monitoring Report, Malroz Engineering, (March, 2018)

**Appendix A**  
**Amended Environmental Compliance Approval No, 442001**

Content Copy Of Original



Ministry of the Environment and Climate Change  
Ministère de l'Environnement et de l'Action en matière de changement  
climatique

**AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL**

NUMBER A442001

Issue Date: November 10, 2016

The Corporation of the Township of Leeds and the Thousand Islands  
1233 Prince St Lansdowne  
Post Office Box, No. 280  
Leeds and the Thousand Islands, Ontario  
K0E 1L0

Site Location: Reynolds Road Dump (Closed)  
Reynolds Road  
Lot 18, Concession 2  
Leeds and the Thousand Islands Township, United Counties of Leeds and Grenville

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

for the use and operation of Waste Disposal Site ( landfill)

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

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

" **Director** " means any Ministry employee appointed in writing by the Minister pursuant to section 5 of the EPA as a Director for the purposes of Part II.1 of the EPA;

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

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

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

" **Owner** " means any person that is responsible for the establishment or operation of the *Site* being approved by this *Approval*, and includes The Corporation of the Township of Leeds and the Thousand Island its successors and assigns;

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

" **Regulation 232** " means Ontario Regulation 232/98 (New Landfill Standards) made under the *EPA* , as amended from time to time;

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

" **Regulation 903**" means Regulation 903, R.R.O. 1990, made under the *OWRA*, as amended;

" **Site** " means the entire waste disposal site, located at west side of Reynolds Road, Lot 18, Concession 2, Leeds and the Thousand Islands Township, United Counties of Leeds and Grenville

" **FBAL** " means Fill Beyond Approved Limits

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

## TERMS AND CONDITIONS

### 1. GENERAL

#### **Compliance**

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

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

#### **In Accordance**

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

#### **Interpretation**

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

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

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

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

#### **Other Legal Obligations**

8. The issuance of, and compliance with, this *Approval* does not:

- (a) relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement; or
- (b) limit in any way the authority of the *Ministry* to require certain steps be taken or to require the *Owner* and *Operator* to furnish any further information related to compliance with this *Approval* .

## **Adverse Effect**

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

## **Change of Ownership**

11. The *Owner* shall notify the *Director*, in writing, and forward a copy of the notification to the *District Manager*, within 30 days of the occurrence of any changes in the following information:
- (a) the ownership of the *Site*;
  - (b) the *Operator* of the *Site*;
  - (c) the address of the *Owner* or *Operator*; and
  - (d) the partners, where the *Owner* or *Operator* is or at any time becomes a partnership and a copy of the most recent declaration filed under the *Business Names Act* , R. S. O. 1990, c. B.17, shall be included in the notification.

12. No portion of this *Site* shall be transferred or encumbered prior to or after closing of the *Site* unless the *Director* is notified in advance and sufficient financial assurance is deposited with the *Ministry* to ensure that these conditions will be carried out.
13. In the event of any change in ownership of the *Site*, other than change to a successor municipality, the *Owner* shall notify the successor of and provide the successor with a copy of this *Approval*, and the *Owner* shall provide a copy of the notification to the *District Manager* and the *Director*.

## **Certificate of Requirement/Registration on Title**

### **Registration on Title Requirement**

14. Prior to dealing with the property in any way, the *Owner* shall provide a copy of this *Approval* and any amendments, to any person who will acquire an interest in the property as a result of the dealing.
- 15(a) Within thirty (30) calendar days from the date of issuance of this *Approval*, the *Owner* shall submit to the *Director* a completed Certificate of Requirement which shall include:



- (i) a plan of survey prepared, signed and sealed by an Ontario Land Surveyor, which shows the area of the *Site* where waste has been or is to be deposited at the *Site*;
- (ii) proof of ownership of the *Site*;
- (iii) a letter signed by a member of the Law Society of Upper Canada or other qualified legal practitioner acceptable to the *Director*, verifying the legal description provided in the Certificate of Requirement;
- (iv) the legal abstract of the property; and
- (v) any supporting documents including a registerable description of the *Site*.

(b) Within fifteen (15) calendar days of receiving a Certificate of Requirement authorized by the *Director*, the *Owner* shall:

- (i) register the Certificate of Requirement in the appropriate Land Registry Office on the title to the property; and
- (ii) submit to the *Director* and *District Manager*, written verification that the Certificate of Requirement has been registered on title.

## **Inspections by the Ministry**

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

- (a) to enter upon the premises where the approved works are located, or the location where the records required by the conditions of this *Approval* are kept;
- (b) to have access to, inspect, and copy any records required to be kept by the conditions of this *Approval*;
- (c) to inspect the *Site*, related equipment and appurtenances;
- (d) to inspect the practices, procedures, or operations required by the conditions of this *Approval*; and
- (e) to sample and monitor for the purposes of assessing compliance with the terms and conditions of this *Approval* or the *EPA*, the *OWRA*, the *PA*, the *SDWA* or the *NMA*.

17. The *Site* is closed and is no longer permitted to accept the waste at the *Site*.

## **2.0 LANDFILL MONITORING**

### **Compliance**

1. The *Site* shall be operated in such a way as to ensure compliance with the Provincial Water Quality Objectives included in the July 1994 publication entitled *Water Management Policies, Guidelines, Provincial Water Quality Objectives*, as amended from time to time or limits set by the *Regional Director*, for the protection of the surface water at and off the *Site*.

### **Inspection**

2. The entire Site shall be inspected by a qualified person to identify the presence of any leachate seepage; to ensure the integrity of the final cover and that the activities at the *Site* are not causing any adverse effects. Any deficiencies discovered as a result of the inspection shall be remedied immediately. The inspections required under this condition shall be conducted at least semi-annually when the Site is not covered in snow

## **Annual Report**

3. Subject to Condition 2.7 of the Approval and until such time that the Approval is amended to reflect otherwise, a written report on the monitoring of the *Site*, shall be completed annually (the "Annual Report"). The Annual Report shall be submitted to the *District Manager*, by March 31st of the year following the period being reported upon.

4. The Annual Report shall include but not be limited to the following information:

- (a) the results and an interpretive analysis of the results of all leachate, groundwater, and surface water, including an assessment of the need to amend the monitoring programs;
- (b) site plans showing the final contours of the *Site* and vegetative cover;
- (c) a discussion of any problems encountered at the *Site* and corrective action taken;
- (d) a report on the status of all monitoring wells and a statement as to compliance with *Regulation 903*;
- (e) any other information with respect to the *Site* which the *District Manager* may require from time to time; and
- (f) a summary and analysis of all hydraulic and geochemical monitoring results.
- (g) the inspection findings as per condition 2.2 and corrective actions taken to address any identified concerns at the Site

## **Groundwater Wells and Monitors**

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

5. All monitoring wells shall be inspected at least twice per year during inspections. Any groundwater monitoring well included in the on-going monitoring program that are damaged shall be assessed, repaired, replaced or decommissioned by the *Owner*, as required.

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

(b) All monitoring wells which are no longer required as part of the groundwater monitoring program, and have been approved by the *District Manager* for abandonment, shall be decommissioned by the *Owner* in accordance with *Regulation 903*. A report on the decommissioning of the well shall be included in the Annual Report for the period during which the well was decommissioned.

## **Groundwater Monitoring**

6. In addition to the monitoring conducted as per item 1 of Schedule "A", the owner shall conduct groundwater monitoring on two additional occasions in 2016. Groundwater sampling shall be conducted for all parameters listed in Table 1 of Item 1 of Schedule "A".

7. By no later than January 31, 2017, the Owner shall submit to the Director for approval and copies to the District Manager, a groundwater monitoring report on the monitoring conducted as per Condition 2.6 of Approval, which includes but not necessarily limited to the monitoring results, an interpretation of the monitoring data and recommendations regarding ongoing monitoring and ongoing reporting at the Site. Once the groundwater monitoring report is received, the Ministry will determine if further monitoring and reporting is required and amend the Approval accordingly.

### **3.0 Fill Beyond Approved Limits**

1. Within six (6) months of issuance of this Approval, the Owner shall acquire the lands for areas designated as FBAL and shall submit an application for an amendment to the Director for approval for FBAL to be added to the Site.

2.(a) Within thirty (30) calendar days after acquiring land referred in condition 3.1, the *Owner* shall submit to the *Director* a completed Certificate of Requirement which shall include:

- (i) a plan of survey prepared, signed and sealed by an Ontario Land Surveyor, which shows the area of the *Site* where waste has been or is to be deposited at the *Site*;
- (ii) proof of ownership of the *Site*;
- (iii) a letter signed by a member of the Law Society of Upper Canada or other qualified legal practitioner acceptable to the *Director*, verifying the legal description provided in the Certificate of Requirement;
- (iv) the legal abstract of the property; and
- (v) any supporting documents including a registerable description of the *Site*.

(b) Within fifteen (15) calendar days of receiving a Certificate of Requirement authorized by the *Director*, the *Owner* shall:

- (i) register the Certificate of Requirement in the appropriate Land Registry Office on the title to the property; and
- (ii) submit to the *Director* and *District Manager*, written verification that the Certificate of Requirement has been registered on title.

## **SCHEDULE "A"**

1. Report dated June 2016 titled "Groundwater Assessment", Reynold Road Dump prepared by Andrew Day, P. Geo.

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

1. *The reason for Conditions 1.3 is to ensure that the Site is designed, operated, monitored and*

*maintained in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.*

- 2. The reason for Conditions 1.1,1.2, 1. 4. 1. 5, 1.6,1.7, 1.9, 1.10 is to clarify the legal rights and responsibilities of the Owner under this ECA.*
- 3. Conditions 1.8 is included to ensure that the appropriate Ministry staff have ready access to information and the operations of the Site, which are approved under this Certificate.*
- 4. Conditions 1.14 and 1.15 are included, pursuant to subsection 197(1) of the EPA, to provide that any persons having an interest in the Site are aware that the land has been approved and used for the purposes of waste disposal.*
- 5. The reasons for Condition 1.16 is to restrict potential transfer or encumbrance of the Site without the approval of the Director and to ensure that any transfer of encumbrance can be made only on the basis that it will not endanger compliance with this ECA.*
- 6. The reasons for Conditions 1.11 and 1.12 are to ensure that the Site is operated under the corporate name which appears on the application form submitted for this approval and to ensure that the Director is informed of any changes*
- 7. Condition 2(1) is included to provide the surface water limits to prevent water pollution at the Site.*
- 8. The reasons for Condition 2( 2) and 2(3) are to ensure that regular review of site development, operations and monitoring data is documented and any possible improvements to site design, operations or monitoring programs are identified. An annual report is an important tool used in reviewing site activities and for determining the effectiveness of site design.*
- 9. Conditions 2(4) and 2(5) are included to ensure the integrity of the groundwater monitoring network so that accurate monitoring results are achieved and the natural environment is protected.*
- 10. Conditions 2 (6) and 2 (7) are included to require the Owner to demonstrate that the Site is performing as designed and the impacts on the natural environment are acceptable. Regular monitoring allows for the analysis of trends over time and ensures that there is an early warning of potential problems so that any necessary remedial/contingency action can be taken.*
- 11. Reason for condition 3(1) is to ensure the land designated as FBAL is purchased by the township and the approval is amended to reflect the correct site area*
- 12. The reason for condition 3(2) is to ensure that purchased land is registered on title.*

**Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). A442001 issued on June 23, 1971**

*In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:*

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

*Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.*

*The Notice should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

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

*This Notice must be served upon:*

The Secretary\*  
Environmental Review Tribunal  
655 Bay Street, Suite 1500  
Toronto, Ontario  
M5G 1E5

AND

The Director appointed for the  
purposes of Part II.1 of the  
Environmental Protection Act  
Ministry of the Environment and  
Climate Change  
135 St. Clair Avenue West, 1st Floor  
Toronto, Ontario  
M4V 1P5

**\* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or [www.ert.gov.on.ca](http://www.ert.gov.on.ca)**

*The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.*

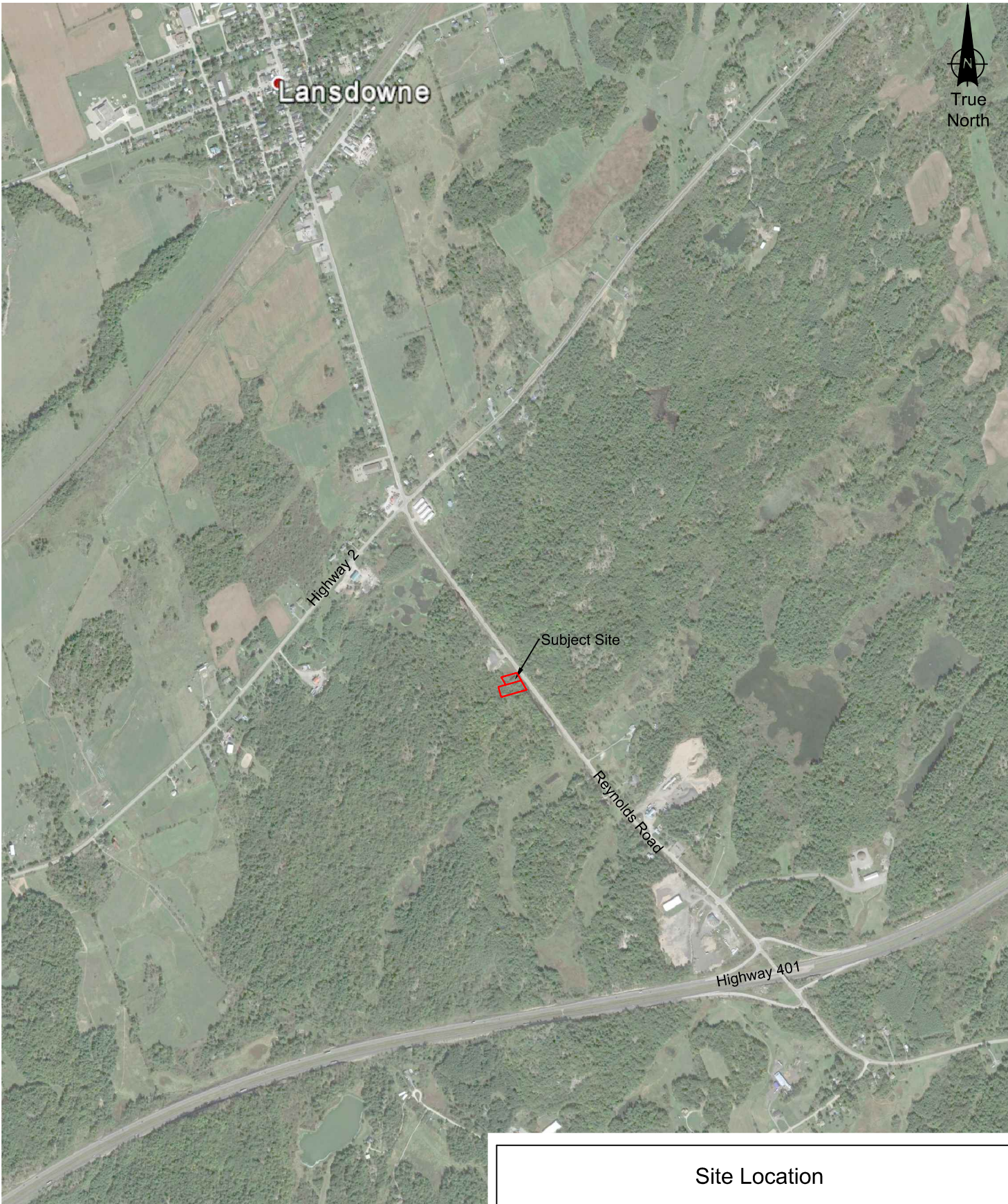
DATED AT TORONTO this 10th day of November,  
2016

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

HV/  
c: District Manager, MOECC Kingston - District  
Field Alert, The Corporation of the Township of Leeds and the Thousand Islands

**Appendix B**  
**Figures**





Lansdowne

Highway 2

Subject Site

Reynolds Road

Highway 401

### Site Location

2018 Annual Monitoring Report  
 Reynold's Road WDS  
 Township of Leeds and the Thousand Islands, Ontario

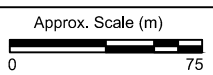
File: 1039-103.00

Figure  
**1**



Note: figure based on Malroz field observations, survey from Collett surveying and Google Earth imagery

Rev	Date	Description	By	Chkd
R0	2019/01/18	issued in final	ZL	JMP







Legend	
	approximate property boundary
	approximate property boundary for unopened right of way
	approximate extent of fill
	MW1 96.85 monitoring well location and groundwater elevation (May 30, 2018)
	surface water feature
95.0 —	topographic contour

Note: Figure based on Malroz field observations; survey from Collett Surveying; Google Earth imagery; and topographic data from Digital Raster Acquisition Project, Ministry of Natural Resources and Forestry, 2014.

### Site Plan

2018 Annual Monitoring Report  
Reynold's Road WDS  
Township of Leeds and the Thousand Islands, Ontario

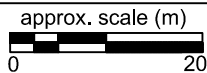
File: 1039-103.00

Figure

2



Rev	Date	Description	By	Chkd
R0	2019/03/21	issued in final	ZL	RV





**Appendix C**  
**Borehole Logs and Water Well Records from**  
**Adjacent Properties**

UTM [ ] Z [ ] E

19 R [ ] N

Elev. 9 R 0330

Basin 24

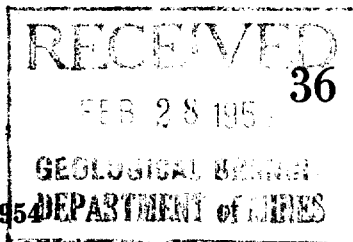
CON-1  
LOT-17



ONTARIO

The Water-well Drillers Act, 1954

Department of Mines



No. 1762

# Water-Well Record

Front of

County or Territorial District Front Line Township, Village, Town or City Lansdowne

Village, Town or City Lansdowne

Address Lansdowne Ont

(day) (month) (year)

## Pipe and Casing Record

## Pumping Test

Casing diameter(s) 6"  
Length(s) 3 ft.  
Type of screen  
Length of screen

Static level 46' 5' from top  
Pumping rate 200 gal hour 200  
Pumping level 20 ft from top  
Duration of test 1/2 hr

## Well Log

## Water Record

Overburden and Bedrock Record	From ft.	To ft.	Depth (s) at which water (s) found	No. of feet water rises	Kind of water (fresh, salty, or sulphur)
<u>Granite</u>	<u>1 ft</u>	<u>57 ft</u>	<u>48 ft</u>	<u>46 ft</u>	<u>fresh</u>

For what purpose(s) is the water to be used?

House and barn

Is water clear or cloudy? Clear

Is well on upland, in valley, or on hillside? Hillside

Drilling firm Raymond Henry

Address Lyndhurst Ont

Name of Driller J. A. Smith

Address Lyndhurst Ont

Licence Number 518

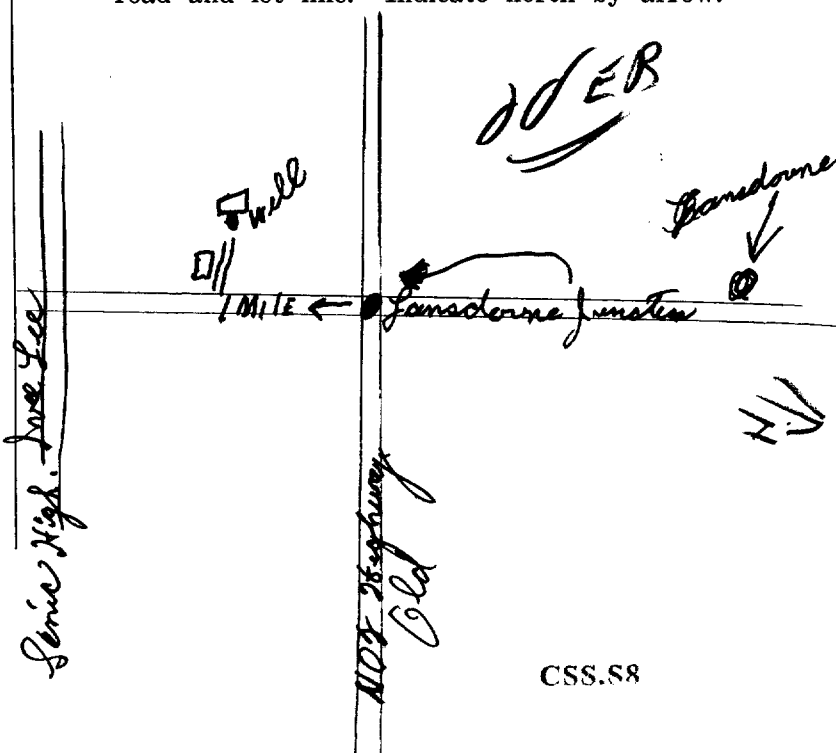
I certify that the foregoing statements of fact are true.

Date J. A. Smith

Signature of Licensee

## Location of Well

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



CSS.58



ONTARIO

# WATER WELL RECORD

31082

1. PRINT ONLY IN SPACES PROVIDED  
2. CHECK  CORRECT BOX WHERE APPLICABLE

11

3605472 | 36014 | CON | 62

COUNTY OR DISTRICT: LEEDS  
 TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Ft. of HANSLOWNE  
 CON. BLOCK, TRACT, SURVEY, ETC.: II  
 LOT: 25-27: 018  
 DATE COMPLETED: DAY 12, MO 09, YR 73  
 RR 1 Hansdowne

3605472 18 419112 4915551 4 290 4 24 MAY 05, 1975 59

### LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
Brown loam				0	5
Red Black Granite				5	125

31 0005602 0125701

32

41 WATER RECORD

WATER FOUND AT FEET	KIND OF WATER			
10-13	1 <input checked="" type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR		
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERAL		
15-18	1 <input checked="" type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR		
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERAL		
20-23	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR		
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERAL		
25-28	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR		
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERAL		
30-33	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR		
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERAL		

51 CASING & OPEN HOLE RECORD

DEPTH - FEET	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
10-11	1 <input checked="" type="checkbox"/> STEEL			
11-12	2 <input type="checkbox"/> GALVANIZED			
12-13	3 <input type="checkbox"/> CONCRETE			
13-16	4 <input type="checkbox"/> OPEN HOLE			
17-18	1 <input type="checkbox"/> STEEL			
18-19	2 <input type="checkbox"/> GALVANIZED			
19-20	3 <input type="checkbox"/> CONCRETE			
20-23	4 <input checked="" type="checkbox"/> OPEN HOLE			
24-25	1 <input type="checkbox"/> STEEL			
25-26	2 <input type="checkbox"/> GALVANIZED			
26-27	3 <input type="checkbox"/> CONCRETE			
27-30	4 <input type="checkbox"/> OPEN HOLE			

SCREEN

SIZE (S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
	INCHES	FEET
MATERIAL AND TYPE		DEPTH TO TOP OF SCREEN
		FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET	MATERIAL AND TYPE	CEMENT GROUT LEAD PACKER, ETC.
10-13		
13-17		
17-21		
21-25		
25-29		
29-33		
33-80		

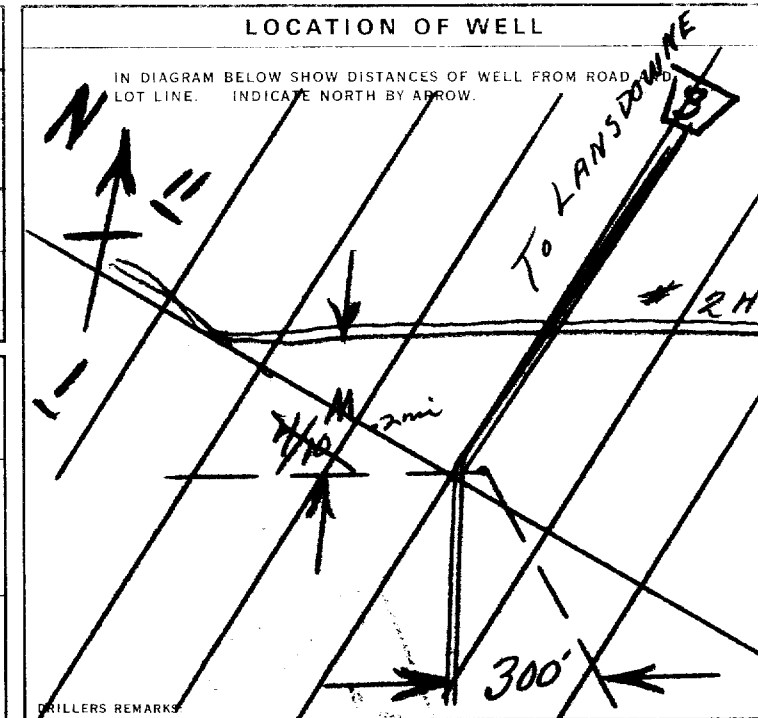
71 PUMPING TEST

PUMPING TEST METHOD: 1  PUMP, 2  BAILER

PUMPING RATE: 0007 GPM

DURATION OF PUMPING: 01 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING				1 <input checked="" type="checkbox"/> PUMPING	2 <input type="checkbox"/> RECOVERY
19-21	22-24	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES		
047	047	047	047	047	047		
FEET	FEET	FEET	FEET	FEET	FEET		
IF FLOWING GIVE RATE		PUMP INTAKE SET AT		WATER AT END OF TEST			
		125' FEET		1 <input checked="" type="checkbox"/> CLEAR 2 <input type="checkbox"/> CLOUDY			
RECOMMENDED PUMP TYPE		RECOMMENDED PUMP SETTING		RECOMMENDED PUMPING RATE			
1 <input type="checkbox"/> SHALLOW 2 <input type="checkbox"/> DEEP		115' FEET		0007 GPM			
50-53 GPM / FT. SPECIFIC CAPACITY: 014.0							



54 FINAL STATUS OF WELL: 1  WATER SUPPLY, 5  ABANDONED, INSUFFICIENT SUPPLY, 2  OBSERVATION WELL, 6  ABANDONED, POOR QUALITY, 3  TEST HOLE, 7  UNFINISHED, 4  RECHARGE WELL

55-56 WATER USE: 1  DOMESTIC, 5  COMMERCIAL, 2  STOCK, 6  MUNICIPAL, 3  IRRIGATION, 7  PUBLIC SUPPLY, 4  INDUSTRIAL, 8  COOLING OR AIR CONDITIONING, 9  NOT USED

57 METHOD OF DRILLING: 1  CABLE TOOL, 6  BORING, 2  ROTARY (CONVENTIONAL), 7  DIAMOND, 3  ROTARY (REVERSE), 8  JETTING, 4  ROTARY (AIR), 9  DRIVING, 5  AIR PERCUSSION

CONTRACTOR: BEAYER Well Drilling 2533  
 ADDRESS: RR 2 MAHORYTOWN N  
 NAME OF DRILLER OR BOPER: MURRA BLANCHER 2533  
 SIGNATURE OF CONTRACTOR: [Signature]  
 SUBMISSION DATE: DAY 8, MO 1, YR 74

OFFICE USE ONLY

DATA SOURCE: 1, CONTRACTOR: 2533, DATE RECEIVED: 1974  
 DATE OF INSPECTION: 14 01 74, INSPECTOR: [Signature]  
 REMARKS: P.K., WI



MINISTRY OF THE ENVIRONMENT  
The Ontario Water Resources Act  
**WATER WELL RECORD**

3108  
92

1. PRINT ONLY IN SPACES PROVIDED  
2. CHECK  CORRECT BOX WHERE APPLICABLE

11

3606693

MUNICIPALITY 36014

CON. C/P/N

01

COUNTY OR DISTRICT LEEDS TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE FT OF LANSDOWNE CON. BLOCK, TRACT, SURVEY, ETC. 1 LOT 018  
DATE COMPLETED 29 MO 08 YR 76  
ELEVATION 15030 4 0315 4 24

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
BROWN	SOIL			0	15
RED	GRANITE	BLACK		15	98

31 0015602 0098721  
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
10-13	1 <input checked="" type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
15-18	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
20-23	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
25-28	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
30-33	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL

51 CASING & OPEN HOLE RECORD

INCHES DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET
10-11	1 <input checked="" type="checkbox"/> STEEL		0 0025
11-17	2 <input checked="" type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE	1/88	25 98
17-18	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input checked="" type="checkbox"/> OPEN HOLE		25 98
24-25	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE		27-30

SCREEN

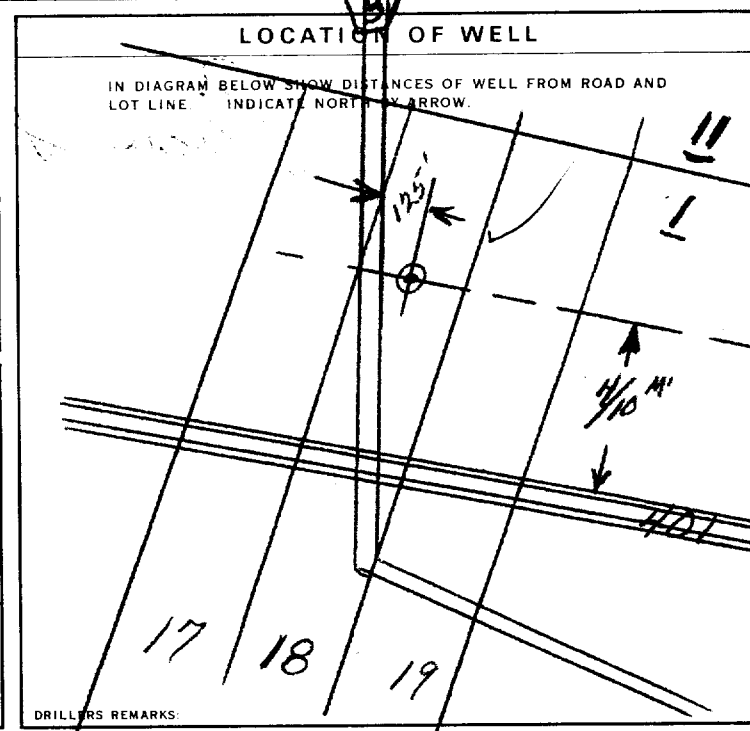
SIZE (S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
	31-33	34-38
MATERIAL AND TYPE		DEPTH TO TOP OF SCREEN 41-44 FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
FROM TO	
10-13	DRILL CUTTINGS
18-21	
22-25	
26-29	
30-33	
34-40	

71 PUMPING TEST METHOD

1 <input checked="" type="checkbox"/> PUMP	2 <input type="checkbox"/> BAILER
10 PUMPING RATE 0012 GPM	11-14 DURATION OF PUMPING 01 HOURS 10 MINS
15-18 PUMPING TEST	1 <input checked="" type="checkbox"/> PUMPING 2 <input type="checkbox"/> RECOVERY
19-21 012	25-28 023
22-24 023	26-28 023
29-31 023	32-34 023
35-37 023	
38-41 IF FLOWING GIVE RATE 98 GPM	42 WATER INTAKE SET AT 98 FEET
43-45 RECOMMENDED PUMP SETTING 060 FEET	46-49 RECOMMENDED PUMPING RATE 0012 GPM



FINAL STATUS OF WELL

1 <input checked="" type="checkbox"/> WATER SUPPLY	5 <input type="checkbox"/> ABANDONED, INSUFFICIENT SUPPLY
2 <input type="checkbox"/> OBSERVATION WELL	6 <input type="checkbox"/> ABANDONED POOR QUALITY
3 <input type="checkbox"/> TEST HOLE	7 <input type="checkbox"/> UNFINISHED
4 <input type="checkbox"/> RECHARGE WELL	

WATER USE

1 <input checked="" type="checkbox"/> DOMESTIC	5 <input type="checkbox"/> COMMERCIAL
2 <input type="checkbox"/> STOCK	6 <input type="checkbox"/> MUNICIPAL
3 <input type="checkbox"/> IRRIGATION	7 <input type="checkbox"/> PUBLIC SUPPLY
4 <input type="checkbox"/> INDUSTRIAL	8 <input type="checkbox"/> COOLING OR AIR CONDITIONING
9 <input type="checkbox"/> OTHER	9 <input type="checkbox"/> NOT USED

METHOD OF DRILLING

1 <input type="checkbox"/> CABLE TOOL	6 <input type="checkbox"/> BORING
2 <input type="checkbox"/> ROTARY (CONVENTIONAL)	7 <input type="checkbox"/> DIAMOND
3 <input type="checkbox"/> ROTARY (REVERSE)	8 <input type="checkbox"/> JETTING
4 <input type="checkbox"/> ROTARY (AIR)	9 <input type="checkbox"/> DRIVING
5 <input checked="" type="checkbox"/> AIR PERCUSSION	

CONTRACTOR

NAME OF WELL CONTRACTOR BEAVER WELL DRILLING	LICENCE NUMBER 2333
ADDRESS RR 2 MAHURDOWNS	
NAME OF DRILLER OR BORER J. GIROUX	LICENCE NUMBER 2333
SIGNATURE OF CONTRACTOR [Signature]	SUBMISSION DATE DAY 4 MO 11 YR 76

OFFICE USE ONLY

DATA SOURCE 1	CONTRACTOR 2333	DATE RECEIVED 8 11 76
DATE OF INSPECTION	INSPECTOR [Signature]	
REMARKS		



# WATER WELL RECORD

130  
313/12W

1. PRINT ONLY IN SPACES PROVIDED  
2. CHECK  CORRECT BOX WHERE APPLICABLE

11 3606699 36006 CON 01

COUNTY OR DISTRICT <b>LEEDS</b>	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE <b>ELIZABETH TOWN</b>	CON., BLOCK, TRACT, SURVEY, ETC. <b>I</b>	LOT <b>036</b>
DATE COMPLETED DAY <b>22</b> MO. <b>10</b> YR. <b>76</b>		DATE RECEIVED	
1 <b>2970</b>	2 <b>5</b>	3 <b>0270</b>	4 <b>5</b>
5 <b>25</b>	6 <b>30</b>	7 <b>25</b>	8 <b>31</b>

### LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
BROWN	SOIL	Rubble Boulders		0	17
BROWN	SANDSTONE		LAYERED	17	185

31 001760213 018561874

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
10-13 0177	<input checked="" type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
15-18	<input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
20-23	<input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
25-28	<input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
30-33	<input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. - INCHES	MATERIAL	WALL THICKNESS - INCHES	DEPTH - FEET	
			FROM	TO
06 10-11	<input checked="" type="checkbox"/> STEEL	1/8"	0	0025
06 16-17	<input checked="" type="checkbox"/> GALVANIZED	1/8"	0	25
06 17-18	<input type="checkbox"/> CONCRETE		25	0185
06 24-25	<input checked="" type="checkbox"/> OPEN HOLE			

SCREEN

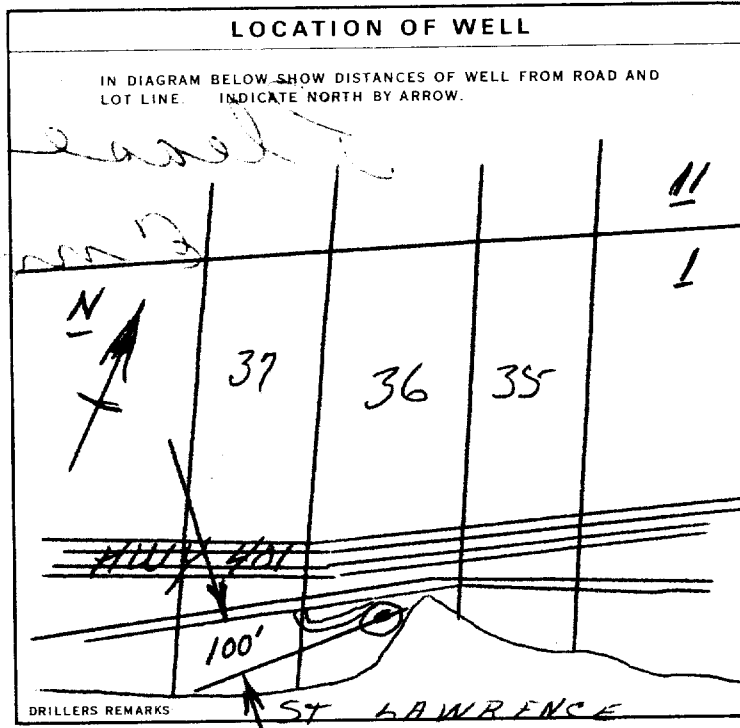
SIZE(S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
	INCHES	FEET
MATERIAL AND TYPE		DEPTH TO TOP OF SCREEN
		41-44 FEET
		80 FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
FROM TO	
0 10-13	25" TRAIL CUTTINGS
18-21	22-25
26-29	30-33

71 PUMPING TEST

PUMPING TEST METHOD <input checked="" type="checkbox"/> PUMP 2 <input type="checkbox"/> BAILER	PUMPING RATE 0008 GPM	DURATION OF PUMPING 01 15-16 HOURS 00 17-18 MINS
STATIC LEVEL 015 FEET	WATER LEVEL END OF PUMPING 035 FEET	WATER LEVELS DURING
19-21	22-24	15 MINUTES 024 FEET
25-28	29-31	30 MINUTES 035 FEET
32-34	35-37	45 MINUTES
38-41	42	60 MINUTES
IF FLOWING GIVE RATE	PUMP INTAKE SET AT 185 GPM	WATER AT END OF TEST 1 CLEAR 2 CLOUDY
RECOMMENDED PUMP TYPE <input type="checkbox"/> SHALLOW <input checked="" type="checkbox"/> DEEP	RECOMMENDED PUMP SETTING 060 FEET	RECOMMENDED PUMPING RATE 0008 GPM



54 FINAL STATUS OF WELL

1  WATER SUPPLY  
2  OBSERVATION WELL  
3  TEST HOLE  
4  RECHARGE WELL

55-56 WATER USE

01  DOMESTIC  
2  STOCK  
3  IRRIGATION  
4  INDUSTRIAL  
5  OTHER

57 METHOD OF DRILLING

5  CABLE TOOL  
2  ROTARY (CONVENTIONAL)  
3  ROTARY (REVERSE)  
4  ROTARY (AIR)  
5  AIR PERCUSSION

6  BORING  
7  DIAMOND  
8  JETTING  
9  DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR  
**BEAVER HILL DRILLING**

LICENCE NUMBER  
**2333**

ADDRESS  
**RR 1 ELIZABETH TOWN**

NAME OF DRILLER  
**J. GIBSON**

LICENCE NUMBER  
**2333**

SIGNATURE OF CONTRACTOR  
*J. Gibson*

SUBMISSION DATE  
DAY **7** MO. **11** YR. **76**

OFFICE USE ONLY

DATA SOURCE  
**1**

CONTRACTOR  
**2333**

DATE RECEIVED  
**3 11 276**

DATE OF INSPECTION

INSPECTOR  
*Vm*

REMARKS

P Th.  
WI

**Instructions for Completing Form**

- For use in the Province of Ontario only. This document is a permanent legal document. Please retain for future reference.
- All Sections must be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Management Coordinator at 416-235-6203.
- All metre measurements shall be reported to 1/10<sup>th</sup> of a metre.
- Please print clearly in blue or black ink only.

Ministry Use Only									
MUN	CON	LOT							

Address of Well Location (County/District/Municipality) **Leeds & Grenville** Township **Leeds & Thousand Island** 18-19 1

RR#/Street Number/Name **REYNOLDS R.D.** City/Town/Village Site/Compartment/Block/Tract etc.

GPS Reading NAD Zone Easting Northing Unit Make/Model Mode of Operation:  Undifferentiated  Averaged  Differentiated, specify

**8.3 18 491491 4915179 MAGELLAN**

Log of Overburden and Bedrock Materials (see instructions)					
General Colour	Most common material	Other Materials	General Description	Depth From	Metres To
Brown	Clay			0	3.4
Red	Granite			3.4	41.1
Grey	"			41.1	43
Red	Granite			43	48.8

Hole Diameter			Construction Record				Test of Well Yield					
Depth From	Metres To	Diameter Centimetres	Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Metres To	Pumping test method	Draw Down Time min	Water Level Metres	Recovery Time min	Water Level Metres
0	6	25.4	15.8	<input checked="" type="checkbox"/> Steel <input type="checkbox"/> Fibreglass	.48	0	6	Pump intake set at (metres) <b>41.5</b>	Static Level <b>-3</b>			
6	48.4	15.25		<input type="checkbox"/> Plastic <input type="checkbox"/> Concrete <input type="checkbox"/> Galvanized				Pumping rate (litres/min) <b>54</b>	1 <b>1.8</b>	1 <b>12.2</b>		
<b>Water Record</b>			<b>Screen</b>				Duration of pumping <b>2 hrs + 0 min</b>					
Water found at Metres	Kind of Water		Outside diam	<input type="checkbox"/> Steel <input type="checkbox"/> Fibreglass	Slot No.			Final water level end of pumping metres <b>3</b>	3 <b>3</b>	3 <b>9.4</b>		
<b>13.7</b>	<input type="checkbox"/> Fresh <input type="checkbox"/> Sulphur <input type="checkbox"/> Gas <input type="checkbox"/> Salty <input type="checkbox"/> Minerals <input type="checkbox"/> Other:		<input type="checkbox"/> Plastic <input type="checkbox"/> Concrete <input type="checkbox"/> Galvanized	<b>No Casing or Screen</b>				Recommended pump type <input type="checkbox"/> Shallow <input checked="" type="checkbox"/> Deep	4 <b>3.7</b>	4 <b>8.2</b>		
<b>45</b> m	<input type="checkbox"/> Fresh <input type="checkbox"/> Sulphur <input type="checkbox"/> Gas <input type="checkbox"/> Salty <input type="checkbox"/> Minerals <input type="checkbox"/> Other:		<input type="checkbox"/> Steel <input type="checkbox"/> Fibreglass	<input checked="" type="checkbox"/> Open hole				Recommended pump depth <b>46</b> metres	5 <b>4.2</b>	5 <b>7.6</b>		
After test of well yield, water was <input checked="" type="checkbox"/> Clear and sediment free <input type="checkbox"/> Other, specify							Recommended pump rate (litres/min) <b>54</b>	10 <b>7.6</b>	10 <b>5.5</b>			
Chlorinated <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No							If flowing give rate - (litres/min)	15 <b>9.7</b>	15 <b>4</b>			
							20 <b>11.2</b>	20 <b>2.7</b>				
							25 <b>12.4</b>	25 <b>1.5</b>				
							30 <b>13.1</b>	30 <b>1.6</b>				
							40 <b>13.4</b>	40 <b>.3</b>				
							50 <b>13.7</b>	50 <b>.3</b>				
							60 <b>13.7</b>	60 <b>.3</b>				

Plugging and Sealing Record			
Depth set at From	Metres To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
6	0	<b>CEMENT SLURRY</b>	<b>.2</b>
<b>Method of Construction</b>			
<input checked="" type="checkbox"/> Cable Tool	<input type="checkbox"/> Rotary (air)	<input type="checkbox"/> Diamond	<input type="checkbox"/> Digging
<input type="checkbox"/> Rotary (conventional)	<input checked="" type="checkbox"/> Air percussion	<input type="checkbox"/> Jetting	<input type="checkbox"/> Other
<input type="checkbox"/> Rotary (reverse)	<input type="checkbox"/> Boring	<input type="checkbox"/> Driving	
<b>Water Use</b>			
<input checked="" type="checkbox"/> Domestic	<input type="checkbox"/> Industrial	<input type="checkbox"/> Public Supply	<input type="checkbox"/> Other
<input type="checkbox"/> Stock	<input type="checkbox"/> Commercial	<input type="checkbox"/> Not used	
<input type="checkbox"/> Irrigation	<input type="checkbox"/> Municipal	<input type="checkbox"/> Cooling & air conditioning	
<b>Final Status of Well</b>			
<input checked="" type="checkbox"/> Water Supply	<input type="checkbox"/> Recharge well	<input type="checkbox"/> Unfinished	<input type="checkbox"/> Abandoned, (Other)
<input type="checkbox"/> Observation well	<input type="checkbox"/> Abandoned, insufficient supply	<input type="checkbox"/> Dewatering	
<input type="checkbox"/> Test Hole	<input type="checkbox"/> Abandoned, poor quality	<input type="checkbox"/> Replacement well	
<b>Well Contractor/Technician Information</b>			
Name of Well Contractor	Well Contractor's Licence No.		
<b>JACK KNOX Well Drilling Ltd</b>	<b>3202</b>		
Business Address (street name, number, city etc.)			
<b>2580 Perth Rd, Glenburnie</b>			
Name of Well Technician (last name, first name)		Well Technician's Licence No.	
<b>Knox John</b>			
Signature of Technician/Contractor		Date Submitted YYYY MM DD	
<i>[Signature]</i>			

Location of Well	
In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.	
Audit No. <b>Z 21908</b>	Date Well Completed <b>05 3 17</b>
Was the well owner's information package delivered? <input type="checkbox"/> Yes <input type="checkbox"/> No	Date Delivered <b>05 3 17</b>

Ministry Use Only	
Data Source	Contractor
Date Received <b>APR 18 2005</b>	Date of Inspection <b>3202</b>
Remarks	Well Record Number

# TOWNSHIP OF LEEDS AND THE THOUSAND ISLANDS

Project: Reynolds Road Dump

Borehole: MW1

Drilling Date: 27-Apr-2016

TOC Elevation: 99.97 mASL

Drill Method: Hollow Stem Auger

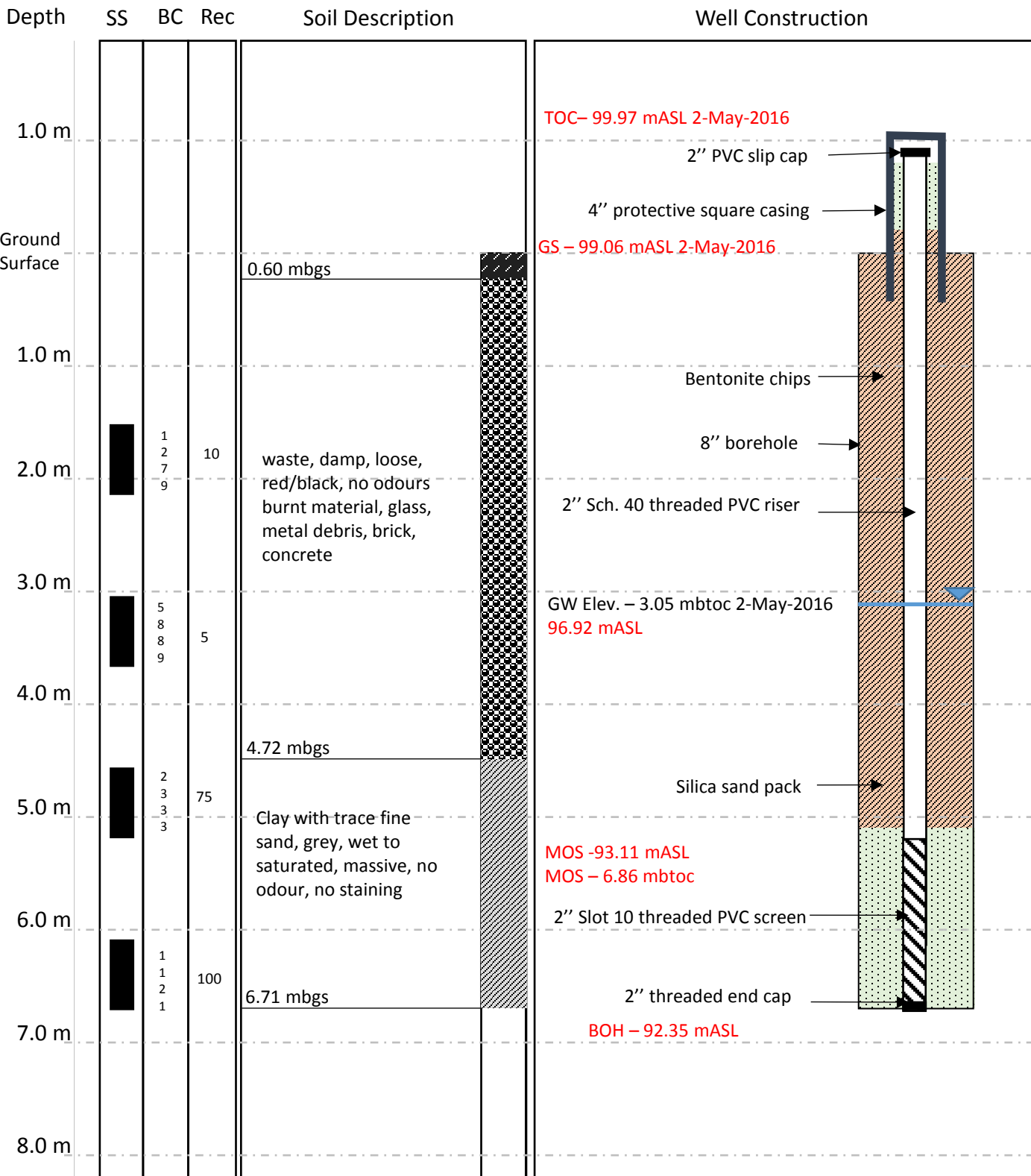
Easting: 0419160

Driller: Aardvark Drilling

Northing: 4915430

Logger: A. Day

Well Tag: A175197 (cluster C24081)



# TOWNSHIP OF LEEDS AND THE THOUSAND ISLANDS

Project: Reynolds Road Dump

Borehole: MW2

Drilling Date: 27-Apr-2016

TOC Elevation: 102.28 mASL

Drill Method: Hollow Stem Auger

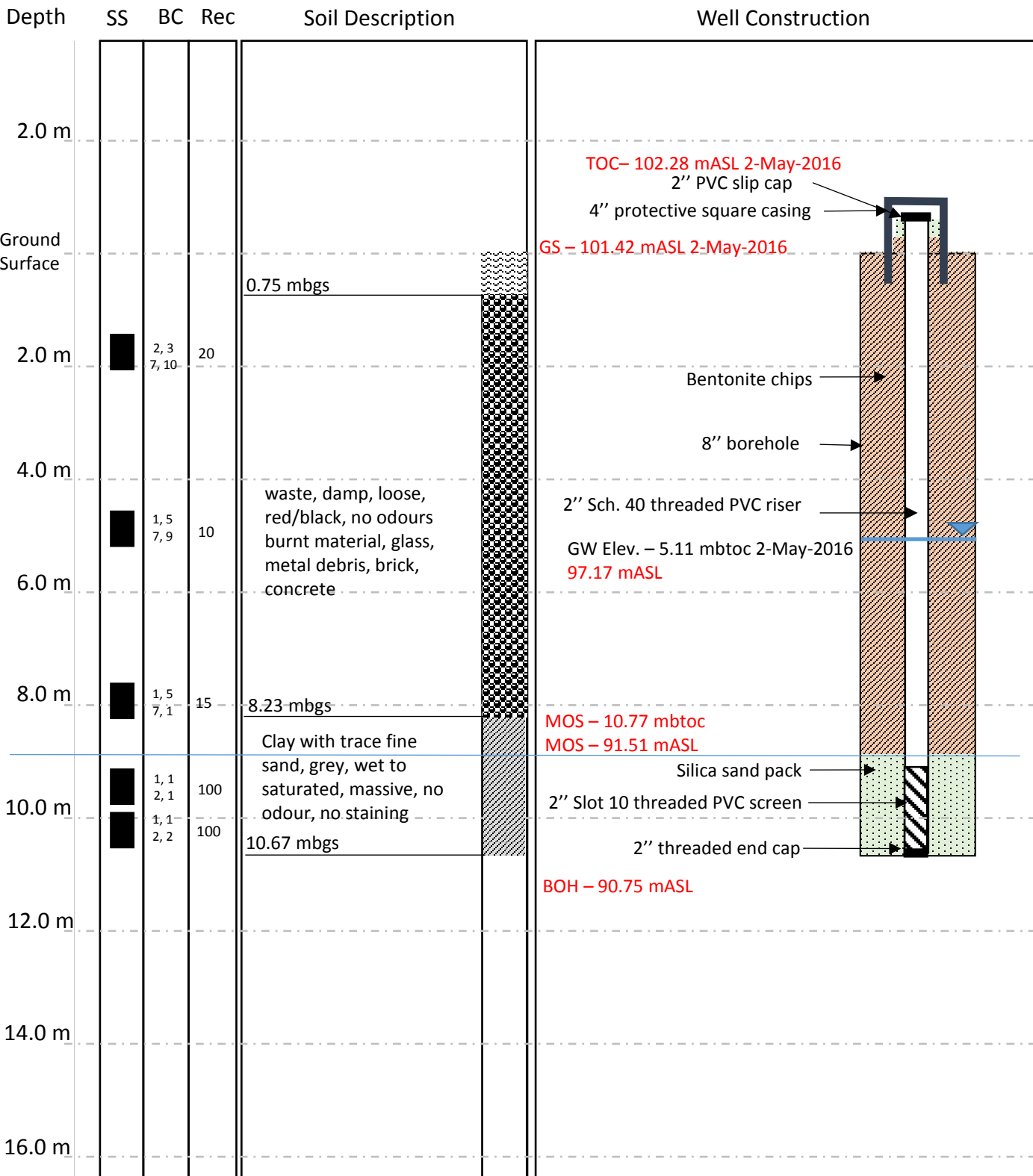
Easting: 0419143

Driller: Aardvark Drilling

Northing: 4915404

Logger: A. Day

Well Tag: A175197 (cluster C24081)





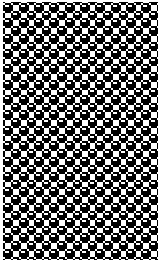
# TOWNSHIP OF LEEDS AND THE THOUSAND ISLANDS

Project: Lansdowne WDS  
Borehole: 15-1 (replace 91-2)

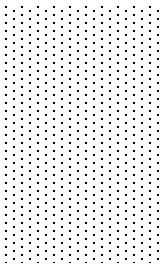
Drilling Date: 21-Sep-2015  
Drill Method: Hollow Stem Auger  
Driller: Aardvark Drilling  
Logger: A. Day

TOC Elevation:  
Easting: 0416333  
Northing: 4916429  
Well Tag: A175282 (1)

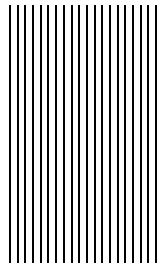
Depth	SS	BC	Rec	Soil Description	Well Construction
1.0 m	1		100%		
Ground Surface					
1.0 m					
2.0 m					
3.0 m					
4.0 m					
5.0 m					
6.0 m					
7.0 m					
8.0 m					



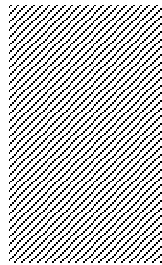
waste



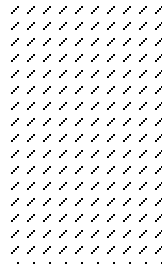
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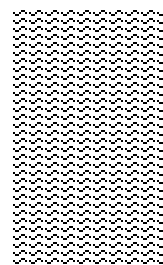
Silt



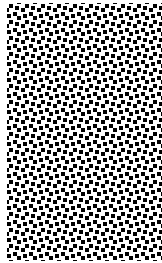
Clay



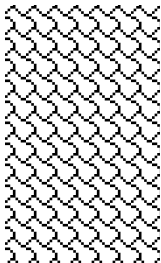
Organics



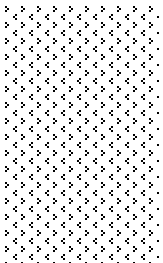
Fill



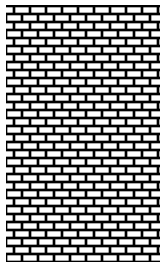
Gravels



Meta –  
Bedrock



Ign –  
Bedrock



Sedi –  
Bedrock

# Modified Unified Classification System for Soils

MAJOR DIVISION		GROUP SYMBOL	GRAPH SYMBOL	COLOR CODE	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA		
COARSE-GRAINED SOILS (MORE THAN HALF BY WEIGHT LARGER THAN 200 SIEVE)	GRAVELS MORE THAN HALF COARSE GRAINS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)	GW		RED	WELL GRADED GRAVELS, LITTLE OR NO FINES	$C_u \leq \frac{D_{60}}{D_{10}} \leq 4$ $C_c \leq \frac{(D_{10})^3}{D_{60} \Delta D_{60}} \leq 1$ or 3	
		DIRTY GRAVELS (WITH SOME FINES)	GM		YELLOW	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	CONTENT OF FINES EXCEEDS 12% ATTERBERG LIMITS BELOW "A" LINE OR P.I. LESS THAN 4 ATTERBERG LIMITS ABOVE "A" LINE P.I. MORE THAN 7	
			GC		YELLOW	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES		
		SANDS MORE THAN HALF FINE GRAINS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)	SW		RED	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	$C_u \leq \frac{D_{60}}{D_{10}} \leq 6$ $C_c \leq \frac{(D_{10})^3}{D_{60} \Delta D_{60}} \leq 1$ or 3
	DIRTY SANDS (WITH SOME FINES)		SM		YELLOW	SILTY SANDS, SAND-SILT MIXTURES	CONTENT OF FINES EXCEEDS 12% ATTERBERG LIMITS BELOW "A" LINE P.I. LESS THAN 4 ATTERBERG LIMITS ABOVE "A" LINE P.I. MORE THAN 7	
			SC		YELLOW	CLAYEY SANDS, SAND-CLAY MIXTURES		
	FINE-GRAINED SOILS (MORE THAN HALF BY WEIGHT PASSES 200 SIEVE)	SILTS BELOW "A" LINE MEASURABLE ORGANIC CONTENT	$W_L < 50\%$	ML		GREEN	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY SANDS OF SLIGHT PLASTICITY	CLASSIFICATION IS BASED UPON PLASTICITY CHART (SEE BELOW)  NOTE: WHENEVER THE NATURE OF THE FINE CONTENT HAS NOT BEEN DETERMINED IT IS DESIGNATED BY THE LETTER "P", E.G. SP IS A MIXTURE OF SAND WITH SILT OR CLAY
			$W_L > 50\%$	MH		BLUE	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SANDY OR SILTY SILTS	
		CLAYS ABOVE "A" LINE ON PLASTICITY CHART MEASURABLE ORGANIC CONTENT	$W_L < 30\%$	CL		GREEN	INORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY SANDY, OR SILTY CLAYS, LEAN CLAYS	
$30\% < W_L < 50\%$			CI		GREEN-BLUE	INORGANIC CLAYS OF MEDIUM PLASTICITY, SILTY CLAYS		
$W_L > 50\%$			CH		BLUE	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS		
ORGANIC SILTS AND CLAYS BELOW "A" LINE ON CHART		$W_L < 50\%$	OL		GREEN	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY		
		$W_L > 50\%$	OH		BLUE	ORGANIC CLAYS OF HIGH PLASTICITY		
HIGHLY ORGANIC SOILS		Pt		ORANGE	PEAT AND OTHER HIGHLY ORGANIC SOILS	STRONG COLOR OR ODOR, AND OFTEN FIBROUS TEXTURE		

### SPECIAL SYMBOLS



**BEDROCK**  
(UNDIFFERENTIATED)



**VOLCANIC ASH**

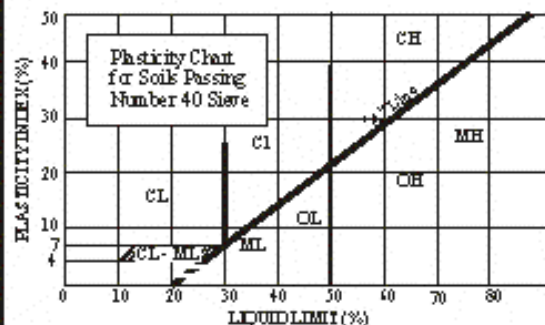
### SOIL COMPONENTS

FRACTION	U.S. STANDARD SIEVE SIZE	DEFINING RANGES OF PERCENTAGE BY WEIGHT OF MINOR COMPONENTS		
	PASSING - RETAINED	PERCENT	DESCRIPTOR	
GRAVEL	coarse	76 mm - 19 mm	and	
	fine	19 mm - #4		
SAND	coarse	35 - 20	some	
	medium			4.75 mm - 2.00 mm
	fine			2.00 mm - +25 µm +25 µm - 75 µm
SILT (nonplastic) OR CLAY (plastic)	75 µm	10 - 1	trace	

### OVERSIZE MATERIAL

**ROUNDED OR SUBROUNDED COBBLES** 76 mm to 203 mm  
**BOULDERS** > 203 mm

**NOT ROUNDED ROCK FRAGMENTS** > 76 mm  
**ROCKS** > 0.76 cubic metre



- ALL SIEVE SIZES MENTIONED ON THIS CHART ARE U.S. STANDARD, A.S.T.M. #11
- BOUNDARY CLASSIFICATIONS POSSESSING CHARACTERISTICS OF TWO GROUPS ARE GIVEN COMBINED GROUP SYMBOLS, E.G. GMGC IS A WELL-GRADED GRAVEL-SAND MIXTURE WITH CLAYEY LINE, BETWEEN 5% AND 12%.



**GREAT WHITE NORTH**  
ENVIRONMENTAL SERVICES LIMITED

**Appendix D**  
**MECP Correspondence**



MEMORANDUM

July 9, 2018

TO: Nathalie Matthews  
Senior Environmental Officer  
Kingston District Office  
Eastern Region

FROM: Shawn Trimper  
Hydrogeologist  
Technical Support Section  
Eastern Region

RE: 2016 & 2017 Annual Monitoring Reports  
Reynolds Road (closed) Waste Disposal Site  
Part of Lot 18, Concession 2  
Geographic Township of Lansdowne  
Township of Leeds and the Thousand Islands  
Environmental Compliance Approval No. A442001

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The Ministry of the Environment, Conservation and Parks (MECP) Kingston District Office provided the following documents:

- Report titled "Township of Leeds and the Thousand Islands, Reynolds Road Waste Disposal Site, 2017 Annual Monitoring Report" prepared by Malroz Engineering Inc. (Malroz) and dated March 2018.
- Report titled "Township of Leeds and the Thousand Islands, Reynolds Road Waste Disposal Site, 2016 Annual Monitoring Report" prepared by Malroz Engineering Inc. (Malroz) and dated June 2017.

I have reviewed the hydrogeological aspects of the reports and provide the following comments for your consideration.

Background / Site Description

The Reynolds Road Waste Disposal Site (WDS) is located approximately 1.3 kilometres north of Highway 401 on the west side of Reynolds Road, on part of Lot 18, Concession 18 in the Geographic Township of Lansdowne. The site is owned by the Township of Leeds and the Thousand Islands (the Township) and is licensed under Environmental Compliance Approval (ECA) No. A442001. The site has been closed since November 1971. Ministry records indicate that the waste received at the site consisted of 95 percent domestic waste and 5 percent "other" waste (i.e. brush, appliances, and car parts). The site was licensed for the operation of a 0.4 hectare landfilling area within a total site area of 0.8 hectares. The site is a natural attenuating WDS. The volume of waste in the landfill is unknown.

The site is located in a rural area and those properties immediately surrounding the site are typically undisturbed and well vegetated. The waste mound is flanked to the north by a small wetland, and to the west by a small unnamed creek.

## Site Activities

The following activities were conducted during 2016:

- Semi-annual site inspections.
- Garbage was removed from the unnamed creek.
- Additional cover was added to the waste mound and the site was re-graded and seeded.
- A culvert was installed along the western toe of the waste mound.
- Two monitoring wells were installed within the waste mound (MW1 and MW2).
- Groundwater monitoring and sampling was conducted from monitoring wells MW1 and MW2 on three occasions (May, June, and November).

The following activities were conducted at the site during 2017:

- Semi-annual site inspections.
- Test pitting was conducted to investigate the possible presence of fill beyond approved limits (FBAL) within an un-opened road allowance located to the south of the site.
- Groundwater monitoring and sampling was conducted from monitoring wells MW1 and MW2 on two occasions (August and November).

## Geology

The site is located in the geophysical area known as the Frontenac Arch. Bedrock outcrops and ridges are common in the area and are typically highly weathered due to glacial and glaciofluvial processes. Bedrock is reported to consist of granites and gneiss of Precambrian age. The site is located in a bedrock valley that is located between two northeast to southwest trending bedrock ridges. Overburden materials underlying the site are described as silts and clays of glacial-lacustrine origin with organic soils identified in low-lying wetland areas. The depth to bedrock is variably and has been found to exceed 10 metres beneath the fill area.

## Hydrogeology

Groundwater flow in the overburden unit is expected to follow surface topography with flow occurring toward the north and west toward the wetland and creek. Leachate generated from the site is expected to percolate downward through the underlying soils where it would migrate toward the north and west, and discharge to surface water. The proposed conceptual model is supported by the groundwater and surface water elevation data.

Limited information is available with respect to the bedrock unit.

## Background Water Quality

Background groundwater quality has not been assessed at the site.

### Leachate

Two (2) overburden monitoring wells (MW1 and MW2) were installed on-site during 2016 for the purpose of assessing leachate at the site. The monitoring wells were completed within the overburden materials below the waste mound

Typical leachate indicator parameters are of relatively low concentrations. Elevated concentrations of petroleum hydrocarbons (PHCs) and polycyclic aromatic hydrocarbons (PAHs) were identified in some samples collected during 2016/2017; however, the elevated concentrations may (or may not) be the result of elevated suspended solids concentrations in the samples. Volatile organic compounds have been below the method detection limits in all samples collected to date.

### Down-gradient Groundwater Quality

Down-gradient groundwater quality is not currently assessed at the site.

### Groundwater – Surface Water Interaction

Based on the physical setting of the site, leachate impacted groundwater has the potential to discharge to the wetland and creek located in low-lying areas to the north and west of the fill area.

The MECP Surface Water Unit should continue to be consulted with respect to surface water management on and surrounding this site.

### Regulatory Evaluation

Guideline B-7 applies to all operating WDS and those WDS closed after 1986. Given that the site closed prior to 1987 and compliance with Guideline B-7 is not required by the conditions of the ECA, the Reynolds Road Dump is not required to comply with Guideline B-7.

As such, the site is regulated under Guideline B-9 and general provisions of the Ontario Water Resources Act (OWRA) and Environmental Protection Act (EPA).

No complaints have been received to date, and as such, I conclude that the site is in conformance with Guideline B-9.

It is my understanding that the site has been identified as a waste disposal site on the Townships Official Plan and would restrict future development from occurring within 500 metres of the site, unless it can be demonstrated that the development would not be impacted by the site. Appropriate land use planning considerations will further reduce the potential for adverse impacts associated with the site.

### Trigger Mechanisms and Contingency Plans

Trigger mechanisms and associated contingency plans have not been developed for the site. Given that the relatively small size of this site and the fact that it has been closed for over 50 years, trigger mechanisms and contingency plans are not likely warranted at this time.

### Landfill Gas

Landfill gas is not discussed in the current reports; however, based on the small size and remote nature of the site, I conclude that the risks associated with landfill gas are expected to be negligible.

### Domestic Wells

Domestic well monitoring is not currently conducted at the site. It is reported that five residential wells are located within 500 metres of the site, with the closest located over 300 metres from the fill area. Residential wells in the vicinity of the site are expected to utilise the bedrock aquifer. No domestic wells are interpreted to be located down-gradient of the site.

### Groundwater Monitoring Program

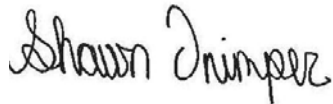
Malroz is recommending that groundwater monitoring continue to be conducted twice per year during 2018 for the same parameters assessed in 2016/2017. Malroz is recommending that the sampling be conducted using low-flow methods to reduce the influence of high concentrations of suspended solids which were present in samples and may have resulted in elevated concentrations of some parameters (i.e. PHCs and PAHs).

I support the proposed groundwater monitoring program and support the use of low-flow groundwater sampling methods. Low-flow sampling methods should improve the reliability of the groundwater quality results which appear to be heavily influenced by the presence of suspended solids.



Conclusions and Recommendations

- I support the semi-annual groundwater monitoring proposed by Malroz during 2018.
- I support the use of low-flow sampling techniques at the site.
- The MECP Surface Water Unit should be consulted with respect to surface water management on and surrounding the site.
- Future monitoring reports should include all historical monitoring data and not just data for the year being reported on.
- The 2018 annual monitoring report should provide an assessment of the groundwater monitoring data collected to date and should provide recommendations regarding ongoing monitoring at the site.



Shawn Trimper, P.Eng.  
ST

ec: Greg Faaren  
Peter Taylor  
Roberto Sacilotto

c: Sarah Baxter  
File GW LG LT 01 03 RE (Reynolds Road Dump; ECA No. A442001)  
SAT/IDS # 3115-AN9QNV / 3000-APDQLP

Ministry of the Environment  
and Climate Change  
PO Box 22032  
Kingston, Ontario  
K7M 8S5  
613-549-4000 or 1-800-267-0974  
Fax: 613-548-6911

Ministère de l'Environnement et de  
l'Action en matière de changement climatique  
C.P. 22032  
Kingston (Ontario)  
K7M 8S5  
613-549-4000 ou 1-800-267-0974  
Fax: 613-548-6911



MEMORANDUM

June 29, 2018

TO: Nathalie Matthews  
Senior Environmental Officer  
Kingston District Office  
Eastern Region

FROM: Sarah Baxter  
Environmental Scientist  
Technical Support Section  
Eastern Region

Victor Castro  
Surface Water Scientist  
Technical Support Section  
Eastern Region

RE: Reynolds Road (Closed) Waste Disposal Site  
2017 Annual Monitoring Report  
Township of Leeds and the Thousands Islands; Counties of Leeds & Grenville  
Environmental Compliance Approval #A442001  
IDS #7484-AXNP9T

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I reviewed the "*Township of Leeds and the Thousand Islands, Reynolds Road Waste Disposal Site, 2017 Annual Monitoring Report*", dated March 2018 and prepared by Malroz Environmental Scientists & Engineers. The follow comments, relative to surface water impact concerns, are provided for your consideration.

**Background**

The Reynolds Road Waste Disposal Site (WDS) is a closed natural attenuation landfill site owned by the Township. The site began operating in 1970 under Environmental Compliance Approval (ECA) #A442001. The licenced fill area was less than 0.4 hectares on a 0.8 hectare property. Ministry records estimate that the waste deposited at the WDS included 95% domestic waste and 5% other wastes (e.g. brush, appliances, car parts).

The site was closed on November 25, 1971. It is my understanding that the landfill was closed due to poor location and compliance issues (i.e. rat infestations, inappropriate open air burning). No formal closure plan was submitted to the Ministry, nor environmental monitoring program initiated.

The Ministry conducted a surface water assessment at the site in 2014/2015. It was determined that regular surface water monitoring was not required as leachate impacts near the mound were relatively minor and the Township agreed to complete several site improvements (i.e. removing waste from the creek bed, adding additional cover to the mound, installing a culvert along the toe of slope so the creek didn't come into contact with the mound).

The Township completed a groundwater assessment at the site in April/May 2016, which involved the installation of two groundwater monitoring wells, groundwater sampling, leachate characterization, and determination of monitoring needs at the site. Groundwater has been sampled on a temporary basis since this time.

The ECA for the WDS was updated on November 10, 2016. Also in November, the Township purchased the land parcel north of the mound to act as a Contaminant Attenuation Zone (CAZ).

### **Site Description**

The Reynolds Road WDS is located on Lot 18, Concession 2, in the geographic Township of Lansdowne, in the Township of Leeds and the Thousand Islands. The site is located 1.3 kilometers north of Highway 401, on the west side of Reynolds Road.

The WDS is situated in a heavily vegetated portion of the Upper St. Lawrence-Thousand Islands tertiary watershed. There is some residential development along Reynolds Road and in the nearby village of Lansdowne. The mound is located between two north-east trending bedrock ridges. Bedrock outcrops are present. An unnamed creek that originates north of Reynolds Road flows southward, into a wet area north of the waste mound, and along the toe of the waste mound through a culvert. It continues to flow southward until converging with Knights Creek, and eventually the St. Lawrence River.

According to the report, the WDS is located in an area of glacial-lacustrine deposits, with local overburden composed of silts and clays. The overburden varies in thickness from 0 to 10 meters. The bedrock geology consists of Precambrian granite and gneiss. Groundwater flow is interpreted to be towards the north and west, to the low-lying wet area and unnamed creek.

Malroz suggests the landfill leachate is of weak strength, and consists of elevated ammonia, dissolved organic carbon (DOC), conductivity, chloride, and boron. Elevated polycyclic aromatic carbons (PAHs) and petroleum hydrocarbons (PHCs) were also recorded.

### **Surface Water Monitoring Program**

There is no surface water monitoring program conducted at the Reynolds Road WDS. However, the waste mound is in close proximity to surface water and impacted groundwater is interpreted to discharge to surface, so impacts to the unnamed creek may be inferred by assessing water quality in the groundwater monitoring wells.

In 2017, Provincial Water Quality Objective (PWQO) exceedances were noted for iron (MW1), phenols (MW1), and total phosphorus (MW1, MW2). As well, the concentrations of chloride, hardness, and total Kjeldahl nitrogen (TKN) were greater than those characteristic of natural surface waters.

In November 2017, elevated concentrations of a number of PAHs and PHCs were recorded in MW1, including many that exceeded their respective PWQO:

- Anthracene (6.41 µg/L, PWQO = 0.0008 µg/L);
- Benzo(a)anthracene (8.44 µg/L, PWQO = 0.0004 µg/L);
- Benzo(g,h,i)perylene (4.42 µg/L, PWQO = 0.00002 µg/L);
- Benzo(k)fluoranthene (5.01 µg/L, PWQO = 0.0002 µg/L);
- 1-1 Biphenyl (0.28 µg/L, PWQO = 0.2 µg/L);
- Chrysene (8.64 µg/L, PWQO = 0.0001 µg/L);
- Dibenzo(a,h)anthracene (1.26 µg/L, PWQO = 0.002 µg/L);
- Fluoranthene (23.3 µg/L, PWQO = 0.0008 µg/L);
- Fluorene (3.3 µg/L, PWQO = 0.2 µg/L); and
- Phenanthrene (21.6 µg/L, PWQO = 0.03 µg/L).

For both 2017 sampling events, the total suspended solids (TSS) concentrations all samples were extremely high (780 mg/L to 146000 mg/L). As a result, it is difficult to interpret if the

PWQO exceedances and leachate parameter elevations are landfill related or due to sediment entrainment in the samples.

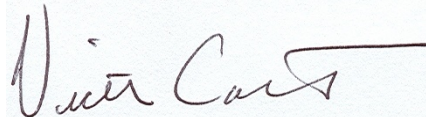
**Conclusions and Recommendations**

1. The Reynolds Road WDS has been closed to landfilling since November 1971. A number of site improvements were completed in 2016, including removal of waste from the creek bed, addition of more cover on the mound, and installation of a culvert along the toe of slope.
2. Currently, surface water monitoring is not required at the site. Groundwater is being sampled temporarily to characterize the leachate and determine long-term monitoring needs.
3. Groundwater results revealed a number of PWQO exceedances, including iron, phenols, total phosphorus, and a number of PAHs. However, the TSS concentrations of the samples were extremely high, so it is difficult to discern if the PWQO exceedances were due to leachate contamination or sediment entrainment.
4. Malroz recommends that groundwater sampling continue twice per year, and that samples are conducted using low flow sampling techniques to avoid turbid samples. I agree. Once sufficient low turbidity samples are collected, recommendations concerning future surface water monitoring can be provided.

If you have any questions regarding the above comments I would be pleased to discuss them with you.



Sarah Baxter, B.Sc.H.  
SB/sb



Victor Castro, B.Sc., M.PI.

ec: S. Trimper  
R. Orwin  
G. Faaren  
P. Taylor

c: File SW LG LT 03 06 (Reynolds Road (Closed) WDS)

**Appendix E**  
**Tables**

**Table 1**  
**Sampling Parameters**

Metals		General Parameters	PHCs and PAHs		VOCs	
Mercury	Molybdenum	Alkalinity as CaCO <sub>3</sub>	Acenaphthene	2,6-Dinitrotoluene*	Acetone	Hexane
Aluminum	Nickel	Ammonia-N	Acenaphthylene	Fluoranthene	Benzene	Methyl Ethyl Ketone
Antimony	Potassium	Biochemical Oxygen Demand	Anthracene	Fluorene	Bromodichloromethane	Methyl Isobutyl Ketone
Arsenic	Selenium	Chemical Oxygen Demand	Benzo[a]anthracene	Indeno[1,2,3-cd]pyrene	Bromoform	Methyl tert-butyl ether
Barium	Silicon	Dissolved Organic Carbon	Benzo[a]pyrene	1-Methylnaphthalene	Bromomethane	Methylene Chloride
Beryllium	Silver	Conductivity	Benzo[b]fluoranthene	2-Methylnaphthalene	Carbon Tetrachloride	Styrene
Boron	Sodium	Hardness as CaCO <sub>3</sub>	Benzo[g,h,i]perylene*	Methylnaphthalene (1&2)	Chlorobenzene	1,1,1,2-Tetrachloroethane
Cadmium	Strontium	pH	Benzo[k]fluoranthene	Naphthalene	Chloroform	1,1,2,2-Tetrachloroethane
Calcium	Thallium	Phenols	Benzo[b+k]fluoranthene*	Pentachlorophenol*	Dibromochloromethane	Tetrachloroethylene
Chromium	Tin	Total Phosphorus	1,1-Biphenyl	Phenanthrene	Dichlorodifluoromethane	Toluene
Cobalt	Titanium	Total Dissolved Solids	Bis[2-Chloroethyl]ether*	Phenol*	Ethylene Dibromide (1,2-Dibromoethane)	1,1,1-Trichloroethane
Copper	Tungsten	Total Suspended Solids	Bis[2-Chloroisopropyl]ether*	Pyrene	1,2-Dichlorobenzene	1,1,2-Trichloroethane
Iron	Uranium	Total Kjeldahl Nitrogen-N	Bis[2-ethylhexyl] Phthalate*	1,2,4-Trichlorobenzene*	1,3-Dichlorobenzene	Trichloroethylene
Lead	Vanadium	Chloride	4-Chloroaniline*	2,4,5-Trichlorophenol*	1,4-Dichlorobenzene	Trichlorofluoromethane
Magnesium	Zinc	Nitrate-N	2-Chlorophenol*	2,4,6-Trichlorophenol*	1,1-Dichloroethane	Vinyl Chloride
Manganese		Nitrite-N	Chrysene		1,2-Dichloroethane	m/p-Xylene
		Sulphate	Dibenzo[a,h]anthracene		1,1-Dichloroethylene	o-Xylene
			3,3'-Dichlorobenzidine*		cis-1,2-Dichloroethylene	Xylenes, total
			2,4-Dichlorophenol*		trans-1,2-Dichloroethylene	
			Diethyl Phthalate*		1,2-Dichloropropane	
			Dimethyl Phthalate*		cis-1,3-Dichloropropylene	
			2,4-Dimethylphenol*		trans-1,3-Dichloropropylene	
			2,4-Dinitrophenol*		1,3-Dichloropropene, total	
			2,4-Dinitrotoluene*		Ethylbenzene	

Notes: \* parameter reported by Caduceon in 2018, but has not historically been reported. Future monitoring programs will not report these parameters.

**Table 2**  
**Well Inspection Summary**

Well Type	UTM Corrdinates <sup>2</sup>		Well Construction	Well Integrity			Well Observations	
	Protective casing	Easting		Northing	Material	Locked		Capped
MW1		419160	4915430	steel monument	yes	J-Plug	good	
MW2		419143	4915404	steel monument	yes	J-Plug	good	A175197

Notes: Well inspection completed on May 30 and November 29, 2018 .

Data Input: RV

<sup>1</sup> Well conditions ranked as good (no maintenance required),  
 fair (minor maintenance required),  
 poor (requires maintenance or abandonment)

Data Check: ZL

<sup>2</sup> UTM coordinates reference NAD 83 Zone 18

na not applicable

**Table 3**  
**Groundwater Monitoring Results**

Location	Sample Date	DTW (m)	Groundwater Elev. (m)	TOP Elev. (m)	Methane Concentration (%LEL)	Observations		
						Colour	Sediment	Odour
MW-1	18-May-30	3.12	96.85	99.97	nr	clear	some	none
	18-Nov-29	2.98	96.99	99.97	nr	clear	some	none
MW-2	18-May-30	4.79	97.49	102.28	nr	clear	none	none
	18-Nov-29	4.80	97.48	102.28	nr	clear	none	none
Culvert Inflow	18-May-30		dry	96.40	-	-	-	-
	18-Nov-29	0.70	95.70	96.40	-	-	-	-

Notes:

- LEL denotes lower explosive limit
- nr indicates no response
- DTW depth to water
- denotes "not analyzed"

Data Input: ZL

Data Check: JMP



**Table 4**  
**General Chemistry Analysis**

Parameter	Units	Well ID	MW1		MW2		MOECC Ontario Drinking Water Standards	MOE Typical Leachate Characteristics
		Sample ID	18-W001	18-W003	18-W002	18-W004		
		RL	18-May-30	18-Nov-29	18-May-30	18-Nov-29		
Alkalinity as CaCO3	mg/L	5	150	141	135	133	30-500 <sup>OG</sup>	300 - 2000
Ammonia-N	mg/L	0.01	0.03	0.14	<	0.02		5 - 100
Chemical Oxygen Demand	mg/L	5	6	6	8	5		150 - 6000
Dissolved Organic Carbon	mg/L	0.2	2.9	2.7	2.6	2.2	5 <sup>AO</sup>	4 - 500
Conductivity	umho/cm	1	403	377	357	350		
Hardness as CaCO3	mg/L	1	163	131	154	143	80-100 <sup>OG</sup>	400 - 2000
pH	pH Units	-	8.22	8.00	8.24	8.02	6.5-8.5 <sup>OG</sup>	6 - 7
Phenols	mg/L	0.001	<	< 0.002	<	< 0.002		
Total Phosphorus	mg/L	0.01	0.06	0.05	0.03	0.06		
Total Dissolved Solids	mg/L	3	208	194	184	180	500 <sup>AO</sup>	
Total Suspended Solids	mg/L	3	20	20	4	<		
Total Kjeldahl Nitrogen-N	mg/L	0.1	0.2	0.2	0.1	0.1		1 - 100
Chloride	mg/L	0.5	32.2	30.1	19.6	18.2	250 <sup>AO</sup>	20 - 2500
Nitrate-N	mg/L	0.05	0.06	<	0.07	<	10.0	<1 - 0.5
Nitrite-N	mg/L	0.05	<	<	<	<	1.0	<1
Sulphate	mg/L	1	14	7	22	20	500 <sup>AO</sup>	<1 - 300
Mercury	µg/L	0.02	<	<	<	<	1	
Aluminum	µg/L	10	50	20	30	20	100 <sup>OG</sup>	<10 - 2000
Arsenic	µg/L	0.1	0.8	0.8	1.1	1.1	10 <sup>^</sup>	10-40
Barium	µg/L	1	82	59	60	55	1000	100 - 2000
Boron	µg/L	5	64	58	54	54	5000	500 - 10000
Cadmium	µg/L	0.015	<	<	<	<	5	<10
Calcium	µg/L	20	36000	28800	34200	32600		100000 - 1000000
Chromium	µg/L	1	<	<	<	<	50	<10 - 500
Cobalt	µg/L	0.1	<	<	<	<		100 - 80
Copper	µg/L	0.1	1.4	0.5	2.0	0.4	1000 <sup>AO</sup>	<8 - 1000
Iron	µg/L	5	46	10	<	<	300 <sup>AO</sup>	
Lead	µg/L	0.02	0.17	0.04	0.11	<	10	
Magnesium	µg/L	20	17700	14300	16600	15000		
Manganese	µg/L	1	19	10	<	1	50 <sup>AO</sup>	
Potassium	µg/L	100	1900	1600	1600	1400		
Silver	µg/L	0.1	<	<	<	<		
Sodium	µg/L	200	32400	30400	19700	18700	200000 <sup>AO</sup>	
Strontium	µg/L	1	551	453	878	833		
Uranium	µg/L	0.05	1.35	0.78	0.93	0.80	20	
Vanadium	µg/L	5	<	<	<	<		
Zinc	µg/L	5	<	<	<	<	5000 <sup>AO</sup>	
pH(field)	pH Units	-	7.47	8.46	8.70	7.03	6.5-8.5 <sup>OG</sup>	6 - 7
Temperature (field)	° Celcius	-	16.61	9.17	33.92	9.01	15 <sup>AO</sup>	
Dissolved Oxygen (field)	mg/L	-	1.25	0.00	1.10	0.00		
Conductivity (field)	mS/cm	-	0.420	0.389	0.300	1.510		
Un-ionized Ammonia (Calculated)1	mg/L	0.01	<	0.01	<	<		

**Notes:**

"-" denotes not analyzed  
 "RL" denotes reporting limit  
 "<" denotes results below reporting limit due to laboratory variance  
 "<##" denotes elevated RL due to laboratory variance  
 "MW###" denotes groundwater monitoring well  
 Samples taken using low flow sampling method  
 1 Un-ionized Ammonia calculated using field parameters for pH and temperature

shading indicates exceedance of Ontario Drinking Water Standards (2018)  
<sup>AO</sup> indicates aesthetic objective    <sup>OG</sup> indicates operational objective  
 groundwater samples analyzed for metals were field filtered using 0.45 micron filters  
<sup>^</sup> effective January 1, 2018 standard for Arsenic is 10µg/L, prior to January 1, 2018 standard is 25 µg/L.

Data Input: RF  
 Data Check: MW

**Table 5**  
**Groundwater VOC Analysis**

Parameter	Units	Well ID	MW1		MW2		MOECC Ontario Drinking Water Standards
		Sample ID	18-W001	18-W003	18-W002	18-W004	
		RL	18-May-30	18-Nov-29	18-May-30	18-Nov-29	
Acetone	µg/L	30	<	<	<	<	
Benzene	µg/L	0.5	<	<	<	<	1
Bromodichloromethane	µg/L	2	<	<	<	<	
Bromoform	µg/L	5	<	<	<	<	
Bromomethane	µg/L	0.5	<	<	<	<	
Carbon Tetrachloride	µg/L	0.2	<	<	<	<	2
Chlorobenzene	µg/L	0.5	<	<	<	<	80
Chloroform	µg/L	1	<	<	<	<	
Dibromochloromethane	µg/L	2	<	<	<	<	
Dichlorodifluoromethane	µg/L	2	<	<	<	<	
Ethylene Dibromide (1,2-Dibromoethane)	µg/L	0.2	<	<	<	<	
1,2-Dichlorobenzene	µg/L	0.5	<	<	<	<	200
1,3-Dichlorobenzene	µg/L	0.5	<	<	<	<	
1,4-Dichlorobenzene	µg/L	0.5	<	<	<	<	5
1,1-Dichloroethane	µg/L	0.5	<	<	<	<	
1,2-Dichloroethane	µg/L	0.5	<	<	<	<	5
1,1-Dichloroethylene	µg/L	0.5	<	<	<	<	14
cis-1,2-Dichloroethylene	µg/L	0.5	<	<	<	<	
trans-1,2-Dichloroethylene	µg/L	0.5	<	<	<	<	
1,2-Dichloropropane	µg/L	0.5	<	<	<	<	
cis-1,3-Dichloropropylene	µg/L	0.5	<	<	<	<	
trans-1,3-Dichloropropylene	µg/L	0.5	<	<	<	<	
1,3-Dichloropropene, total	µg/L	0.5	<	<	<	<	
Ethylbenzene	µg/L	0.5	<	<	<	<	140
Hexane	µg/L	5	<	<	<	<	
Methyl Ethyl Ketone	µg/L	20	<	<	<	<	
Methyl Isobutyl Ketone	µg/L	20	<	<	<	<	
Methyl tert-butyl ether	µg/L	2	<	<	<	<	
Methylene Chloride	µg/L	5	<	<	<	<	50
Styrene	µg/L	0.5	<	<	<	<	
1,1,1,2-Tetrachloroethane	µg/L	0.5	<	<	<	<	
1,1,2,2-Tetrachloroethane	µg/L	0.5	<	<	<	<	
Tetrachloroethylene	µg/L	0.5	<	<	<	<	10
Toluene	µg/L	0.5	<	<	<	<	60
1,1,1-Trichloroethane	µg/L	0.5	<	<	<	<	
1,1,2-Trichloroethane	µg/L	0.5	<	<	<	<	
Trichloroethylene	µg/L	0.5	<	<	<	<	5
Trichlorofluoromethane	µg/L	5	<	<	<	<	
Vinyl Chloride	µg/L	0.5	<	<	<	<	1
m/p-Xylene	µg/L	1.0	<	<	<	<	
o-Xylene	µg/L	0.5	<	<	<	<	
Xylenes, total	µg/L	1.1	<	<	<	<	90

**Notes:**

- "-" denotes not analyzed
- "RL" denotes reporting limit
- "<" denotes results below reporting limit
- "MW###" denotes groundwater monitoring well
- Samples taken using low flow sampling method
- shading indicates exceedance of Ontario Drinking Water Standards (2018)

Data Input: RF  
 Data Check: MW

**Table 6**  
**Groundwater PHC and PAH Analysis**

Parameter	Units	Well ID	MW1		MW2		MOECC Ontario Drinking Water Standards	O. Reg. 153/04 Table 8
		Sample ID	18-W001	18-W003	18-W002	18-W004		
		RL	18-May-30	18-Nov-29	18-May-30	18-Nov-29		
<b>Petroleum Hydrocarbons (PHC)</b>								
F1 PHCs (C6-C10)	µg/L	50	<	<	<	<		420
F2 PHCs (C10-C16)	µg/L	50	<	<	<	<		150
F3 PHCs (C16-C34)	µg/L	400	<	<	<	<		500
F4 PHCs (C34-C50)	µg/L	400	<	<	<	<		500
<b>Polycyclic Aromatic Hydrocarbons (PAH)</b>								
Acenaphthene	µg/L	0.05	<	<	<	<		4.1
Acenaphthylene	µg/L	0.05	<	<	<	<		1
Anthracene	µg/L	0.05	<	<	<	<		1
Benzo[a]anthracene	µg/L	0.05	<	<	<	<		1
Benzo[a]pyrene	µg/L	0.01	<	<	<	<	0.01	0.01
Benzo[b]fluoranthene	µg/L	0.05	<	<	<	<		0.1
Benzo[g,h,i]perylene	µg/L	0.05	<	<	<	<		0.2
Benzo[k]fluoranthene	µg/L	0.05	<	<	<	<		0.1
Benzo[b+k]fluoranthene	µg/L	0.1	<	<	<	<		
1,1-Biphenyl	µg/L	0.2	-	<	-	<		0.5
Bis[2-Chloroethyl]ether	µg/L	0.2	-	<	-	<		5
Bis[2-Chloroisopropyl]ether	µg/L	0.2	-	<	-	<		120
Bis[2-ethylhexyl] Phthalate	µg/L	5	-	<	-	<		10
4-Chloroaniline	µg/L	0.2	-	<	-	<		
2-Chlorophenol	µg/L	0.2	-	<	-	<		8.9
Chrysene	µg/L	0.05	<	<	<	<		0.1
Dibenzo[a,h]anthracene	µg/L	0.05	<	<	<	<		0.2
3,3'-Dichlorobenzidine	µg/L	0.5	-	<	-	<		0.5
2,4-Dichlorophenol	µg/L	0.2	-	<	-	<	900	20
Diethyl Phthalate	µg/L	1	-	<	-	<		30
Dimethyl Phthalate	µg/L	1	-	<	-	<		30
2,4-Dimethylphenol	µg/L	1	-	<	-	<		59
2,4-Dinitrophenol	µg/L	5	-	<	-	<		10
2,4-Dinitrotoluene	µg/L	0.2	-	<	-	<		5
2,6-Dinitrotoluene	µg/L	0.2	-	<	-	<		5
Fluoranthene	µg/L	0.05	<	<	<	<		0.41
Fluorene	µg/L	0.05	<	<	<	<		120
Indeno[1,2,3-cd]pyrene	µg/L	0.05	<	<	<	<		0.2
1-Methylnaphthalene	µg/L	0.05	<	<	<	<		3.2
2-Methylnaphthalene	µg/L	0.05	<	<	<	<		3.2
Methylnaphthalene (1&2)	µg/L	0.07	<	0.07	<	<		3.2
Naphthalene	µg/L	0.05	<	0.12	<	<		11
Pentachlorophenol	µg/L	0.2	-	<	-	<		30
Phenanthrene	µg/L	0.05	<	<	<	<		1
Phenol	µg/L	0.1	-	<	-	<		890
Pyrene	µg/L	0.05	<	<	<	<		4.1
1,2,4-Trichlorobenzene	µg/L	0.2	-	<	-	<		70
2,4,5-Trichlorophenol	µg/L	0.2	-	<	-	<		8.9
2,4,6-Trichlorophenol	µg/L	0.2	-	<	-	<		2

**Notes:**

- “-” denotes not analyzed
- “RL” denotes reporting limit
- “<” denotes results below reporting limit
- “MW###” denotes groundwater monitoring well
- Samples taken using low flow sampling method

shading indicates exceedance of Ontario Drinking Water Standards (2018)  
shading indicates exceedance of Ontario Regulation 153/04 MECP 2011 Table 8 Standards

Data Input: RF  
Data Check: MW

**Appendix F**  
**Historical Groundwater Analyses and Trends**

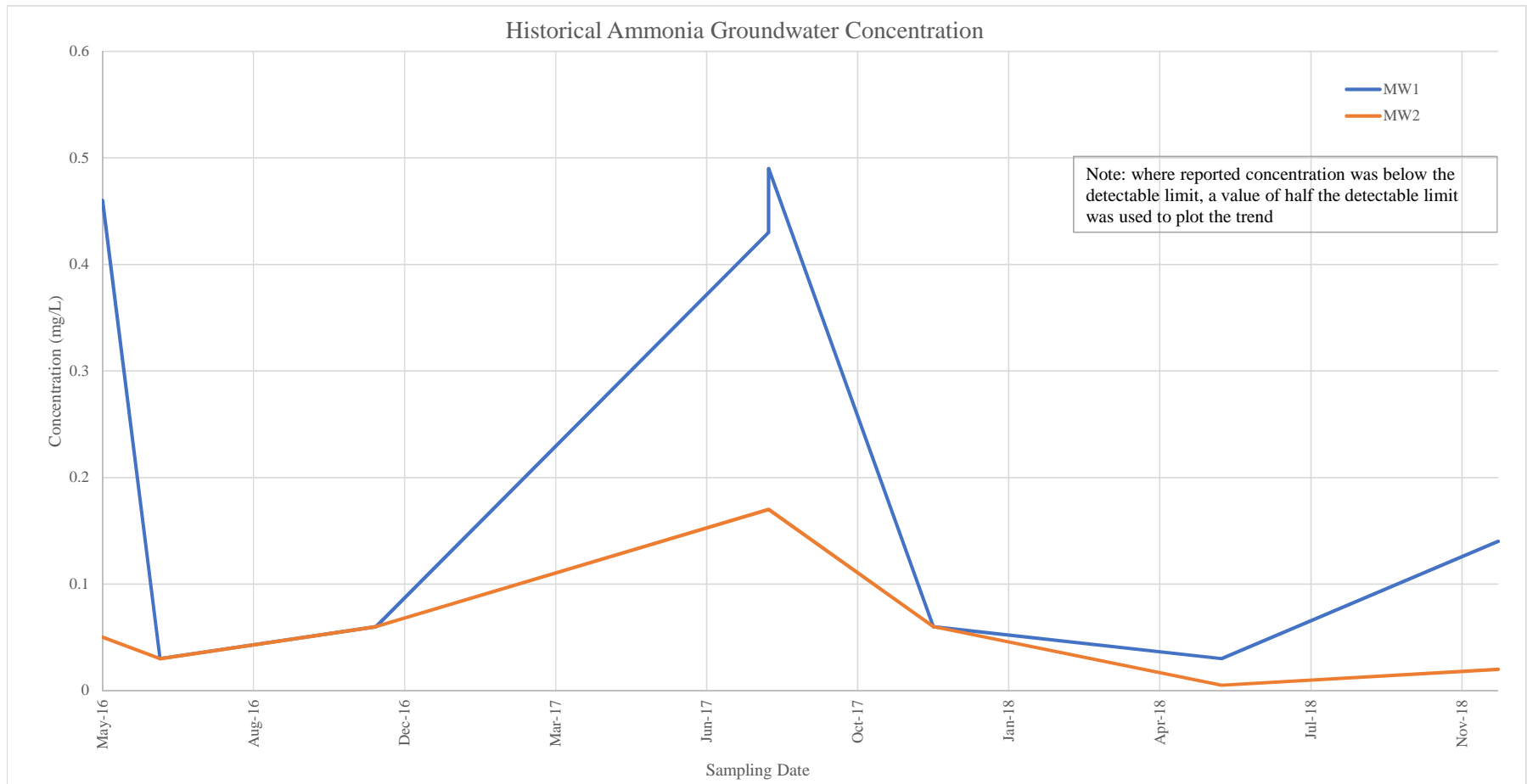
Historical Groundwater Chemistry

Location	Parameter	Ontario Drinking Water Standards																																															
		Alkalinity as CaCO3	Ammonia-N	Chemical Oxygen Demand	Dissolved Organic Carbon	Conductivity	Hardness	pH	Phenolics	Phosphorus, total	Total Dissolved Solids	Total Suspended Solids	Total Kjeldahl Nitrogen	Chloride	Nitrate as N	Nitrite as N	Sulphate	Mercury	Aluminum	Arsenite	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Molybdenum	Nickel	Potassium	Silicon	Selenium	Silver	Sodium	Strontium	Thallium	Tin	Titanium	Tungsten	Uranium	Vanadium	Zinc	
		Units	mg/L	mg/L	mg/L	mg/L	mg/L	pH units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Field Blank	2017-Nov-20	<5	<0.01	<10	<0.5	<5	0	6.1	<0.001	<0.01	20	2	<0.1	<1	<0.05	<1	<0.1	<1	<0.5	<1	<1	<0.5	<10	<0.1	<10	<1	<0.5	<0.5	<100	<0.1	<200	<5	<0.5	<1	<100	<10	<1	<0.1	<200	<10	<0.1	<5	<5	<10	<0.1	<0.5	<5		
MW1	2016-May-19	140	0.46	2940	5.4	847	202	7.6	0.012	61.9	566	26000	53.9	150	<0.1	<0.05	41	<0.1	49	-	<1	106	-	47	<0.1	54800	4	0.6	2.6	<100	1.1	15900	612	-	-	3680	-	-	<0.1	100000	443	-	-	-	-	1.4	7.2	28	
MW1	2016-Jun-26	146	0.63	42	3.2	638	182	7.7	<0.001	0.14	342	282	0.4	97	<0.1	<0.05	33	<0.1	1	-	<1	88	-	51	<0.1	43600	<1	<0.5	1.9	<100	0.3	17800	128	-	-	2190	-	-	<0.1	47700	558	-	-	-	-	3.1	<0.5	9	
MW1	2016-Nov-16	154	0.66	<10	2.4	502	162	7.8	<0.001	<0.01	274	3	<0.1	63	<0.1	<0.05	22	<0.1	3	-	1	66	-	60	<0.1	35900	<1	<0.5	<0.5	<100	<0.1	17500	<5	-	-	1940	-	-	<0.1	33000	556	-	-	-	-	1.7	<0.5	<5	
MW1	2017-Aug-03	179	0.43	207	9.5	448	171	7.8	0.002	7.56	360	9330	6	41	<0.1	<0.05	9	<0.1	16	<0.5	2	104	<0.5	49	<0.1	38700	<1	<0.5	<0.5	655	<0.1	18000	198	6.9	<1	2220	5070	<1	<0.1	35200	508	<0.1	<5	<5	<10	0.7	0.6	<5	
MW1	2017-Aug-03	180	0.49	155	7.6	457	172	7.9	0.003	3.98	342	10400	3.5	41	<0.1	<0.05	11	<0.1	3	<0.5	1	103	<0.5	48	<0.1	38900	<1	<0.5	<0.5	384	<0.1	18100	176	8.6	<1	2150	5130	<1	<0.1	35800	499	<0.1	<5	<5	<10	0.2	<0.5	<5	
MW1	2017-Nov-20	161	0.66	3640	5.8	383	164	7.7	<0.004	53.4	272	146000	59.4	27	<0.1	<0.05	5	<0.1	525	<0.5	1	59	<0.5	54	<0.1	37300	<1	<0.5	2.1	542	1.6	17300	88	9.5	1	1450	6750	<1	<0.1	23300	788	<0.1	<5	12	<10	2.6	0.9	<5	
MW1	2018-May-30	150	0.63	6	2.9	403	163	8.22	<0.001	0.06	208	20	0.2	32.2	0.06	<0.05	14	<0.02	50	-	0.8	82	-	64	<0.015	36000	<1	<0.1	1.4	46	0.17	17700	19	-	-	1900	-	-	<0.1	32400	551	-	-	-	1.35	<5	<5		
MW1	2018-Nov-29	141	0.14	6	2.7	377	131	8	<0.002	0.05	194	20	0.2	30.1	<0.05	<0.05	7	<0.02	20	-	0.8	59	-	58	<0.015	28800	<1	<0.1	0.5	10	0.04	14300	10	-	-	1600	-	-	<0.1	30400	453	-	-	-	0.78	<5	<5		
MW2	2016-May-19	189	0.05	<10	2.7	536	174	7.8	0.001	0.12	352	720	0.2	31	<0.1	<0.05	45	<0.1	3	-	<1	103	-	50	<0.1	39900	5	<0.5	1.4	<100	<0.1	18100	69	-	-	1900	-	-	<0.1	100000	677	-	-	-	3.8	11.1	<5		
MW2	2016-Jun-26	190	0.03	37	1.3	522	180	7.6	0.002	0.02	292	30	0.2	26	<0.1	<0.05	40	<0.1	<1	-	<1	88	-	59	<0.1	43200	40	<0.5	0.9	<100	<0.1	17500	42	-	-	1740	-	-	<0.1	32700	850	-	-	-	3.3	<0.5	5		
MW2	2016-Nov-16	177	0.06	11	1.7	432	141	7.8	<0.001	0.04	258	4	<0.1	20	<0.1	<0.05	31	<0.1	3	-	2	76	-	58	<0.1	31200	<1	<0.5	<0.5	<100	<0.1	15400	6	-	-	1530	-	-	<0.1	26600	819	-	-	-	2.5	<0.5	<5		
MW2	2017-Aug-03	158	0.17	32	2.5	374	162	8	<0.001	0.84	262	4160	0.4	17	<0.1	<0.05	21	<0.1	16	<0.5	1	53	<0.5	47	<0.1	37000	<1	<0.5	<0.5	<100	<0.1	16800	31	9.9	<1	1100	6740	<1	<0.1	22500	751	<0.1	<5	<5	<10	1.6	<0.5	<5	
MW2	2017-Nov-20	161	0.66	29	1.1	392	155	8	<0.001	0.15	246	780	0.2	21	0.1	<0.05	28	<0.1	2	<0.5	1	40	<0.5	53	<0.1	34900	<1	<0.5	<0.5	<100	<0.1	16500	12	10.5	<1	1320	5980	<1	<0.1	22900	741	<0.1	<5	<5	<10	1.4	<0.5	<5	
MW2	2018-May-30	135	<0.01	6	2.9	403	154	8.24	<0.001	0.03	184	4	0.1	19.6	0.07	<0.05	22	<0.02	30	-	1.1	60	-	54	<0.015	34200	<1	<0.1	2	<5	0.11	16600	<1	-	-	1600	-	-	<0.1	19700	878	-	-	-	0.93	<5	<5		
MW2	2018-Nov-29	133	0.02	6	2.7	377	143	8.02	<0.002	0.06	180	<3	0.1	18.2	<0.05	<0.05	20	<0.02	20	-	1.1	55	-	54	<0.015	32600	<1	<0.1	0.4	<5	<0.02	15000	1	-	-	1400	-	-	<0.1	18700	833	-	-	-	0.8	<5	<5		

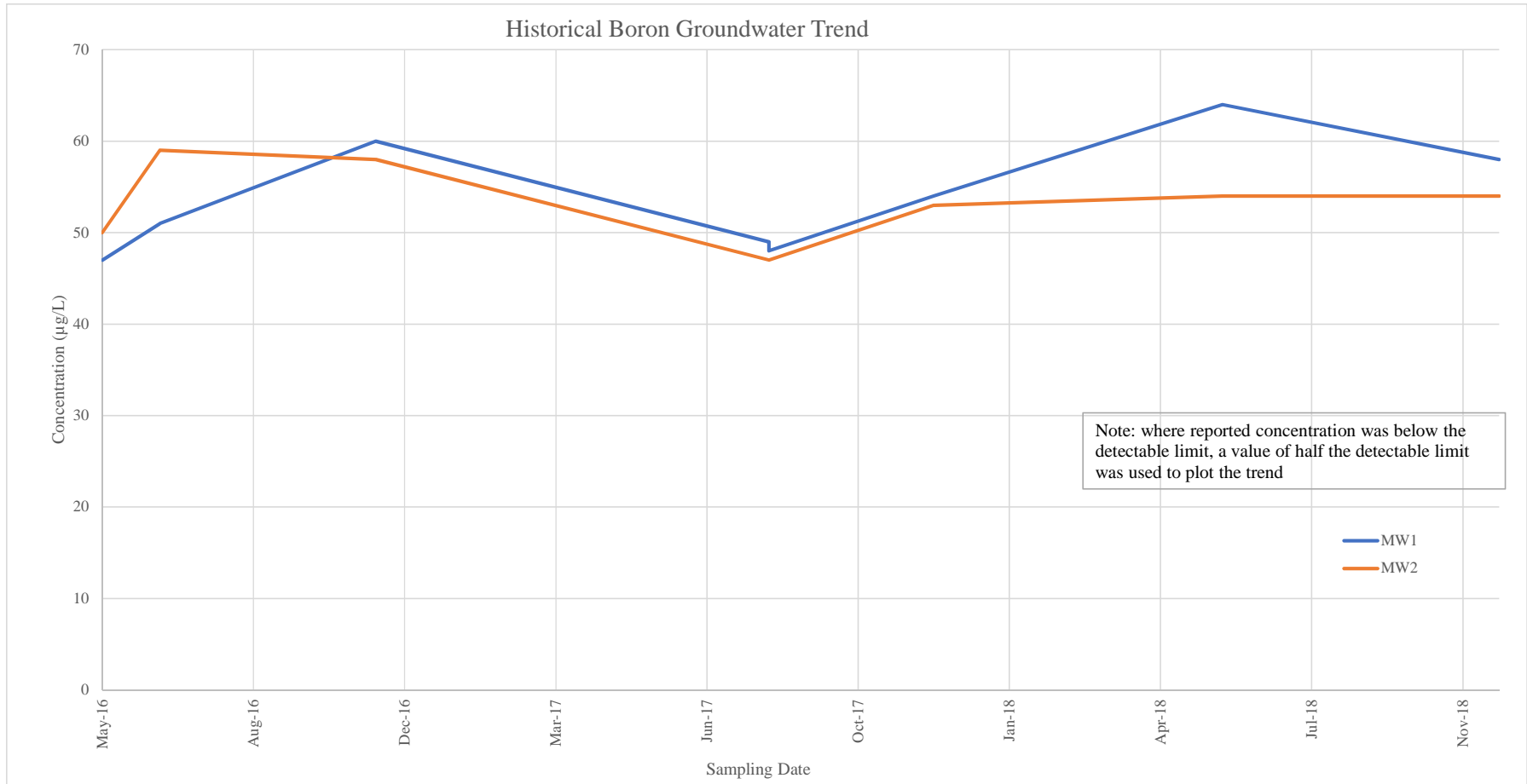


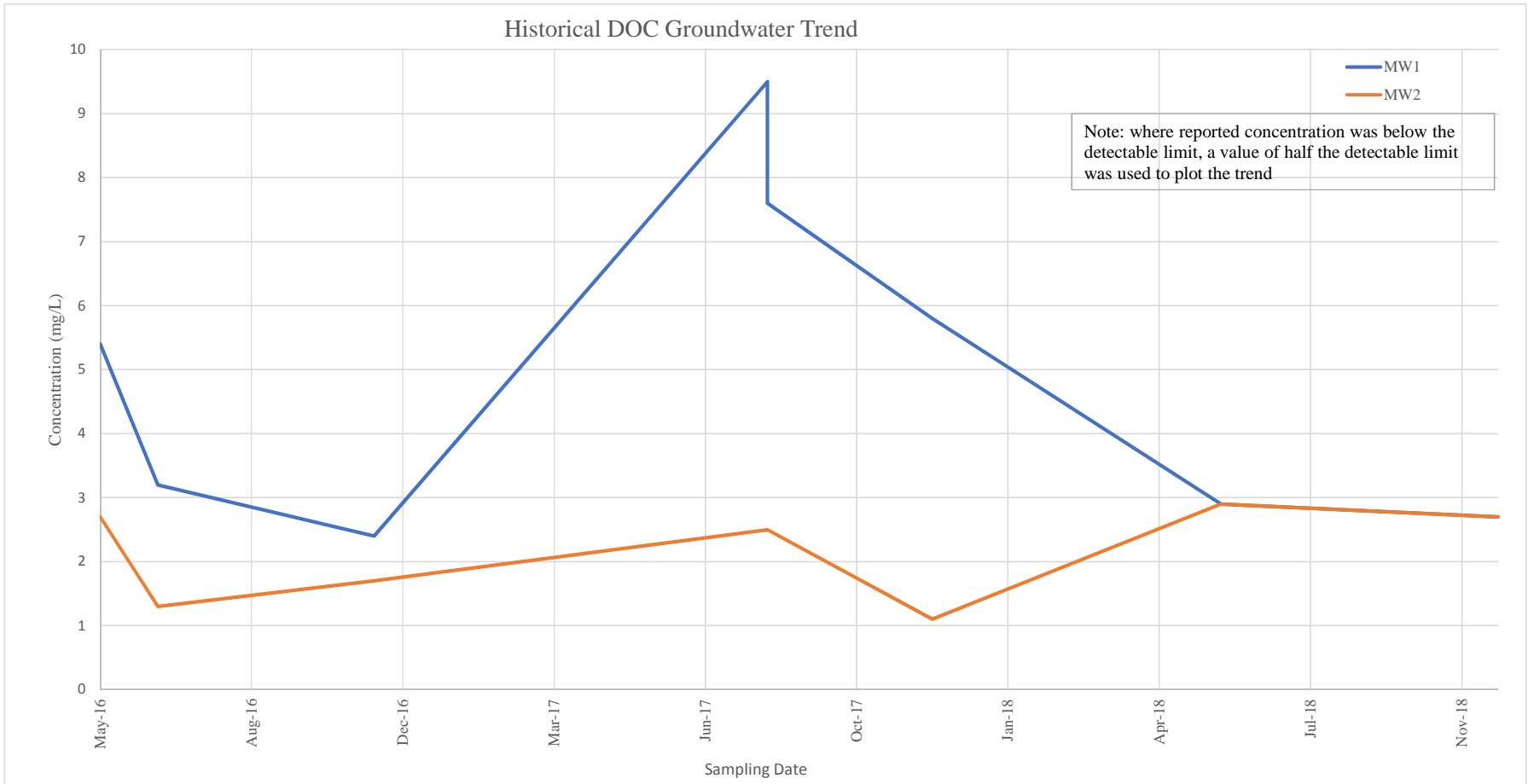
**Historical Groundwater Chemistry - PHC and PAH Analysis**

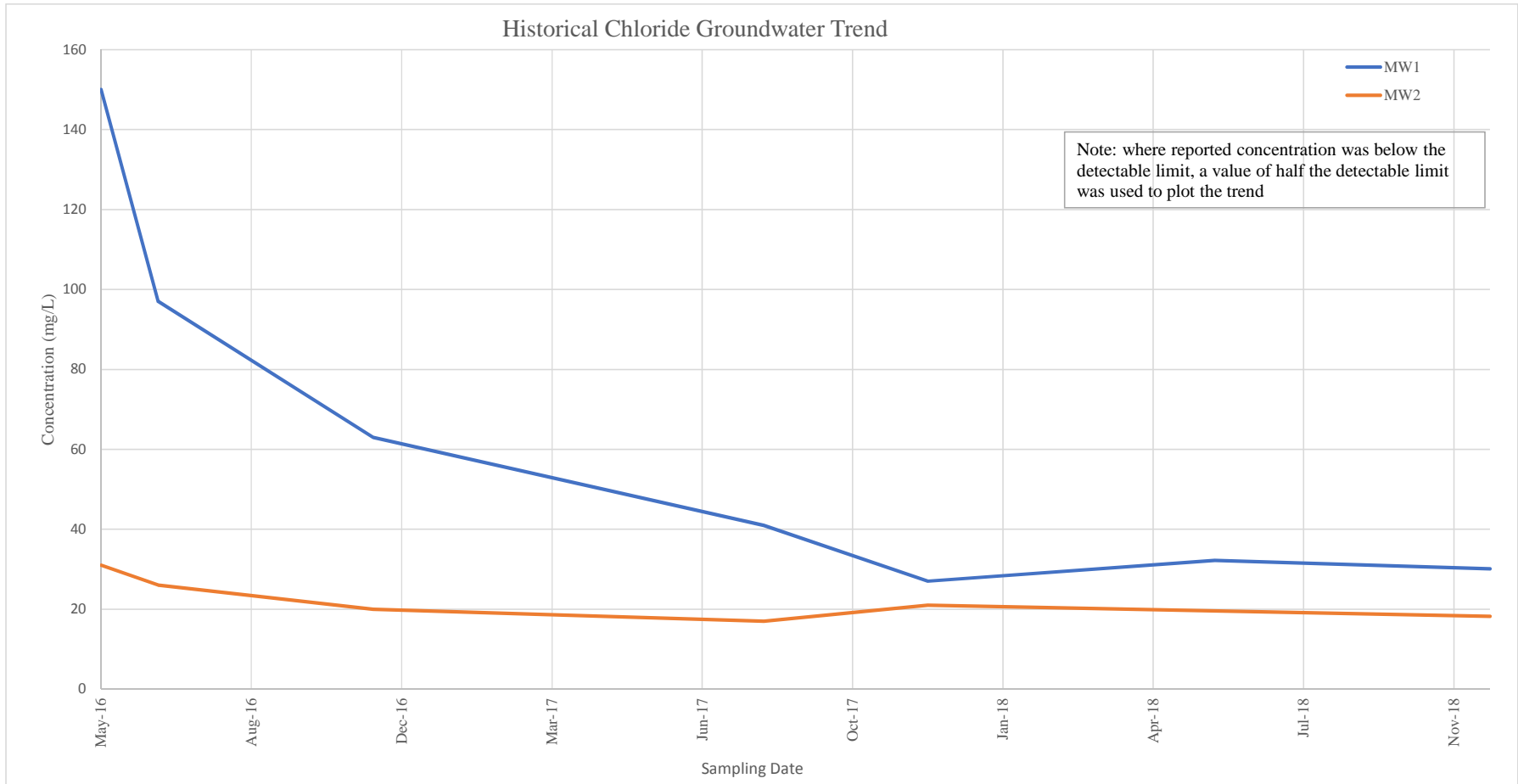
Location	Parameter	F1 PHCs (C6-C10)	F2 PHCs (C10-C16)	F3 PHCs (C16-C34)	F4 PHCs (C34-C50)	Acenaphthene	Acenaphthylene	Anthracene	Benzo[a]anthracene	Benzo[a]pyrene	Benzo[b]fluoranthene	Benzo[g,h,i]perylene	Benzo[k]fluoranthene	1,1-Biphenyl	Chrysene	Dibenzo[a,h]anthracene	Fluoranthene	Fluorene	Indeno[1,2,3-cd]pyrene	1-Methylnaphthalene	2-Methylnaphthalene	Methylnaphthalene (1&2)	Naphthalene	Phenanthrene	Pyrene	
	O.Reg 153/04 Table 8	420	150	500	500	4.1	1	1	1	0.01	0.1	0.2	0.1	0.5	0.1	0.2	0.41	120	0.2	3.2	3.2	3.2	11	1	4.1	
	Ontario Drinking Water Standards	-	-	-	-	-	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Field Blank	2017-Nov-20	<25	<100	<100	<100	<0.05	<0.05	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.10	<0.05	<0.05	<0.01	
MW1	2016-May-19	<25	219	695	322	1.18	0.91	2.83	3.33	3.2	3.61	1.89	2.16	0.55	3.19	0.53	11.2	1.65	1.78	1.04	2.04	3.08	1.92	11.1	8.75	
MW1	2016-Jun-26	<25	<100	<100	<100	<0.05	<0.05	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.10	<0.05	<0.05	<0.01	
MW1	2016-Nov-16	<25	<100	<100	<100	0.05	<0.05	0.06	0.05	0.07	0.06	0.1	0.05	<0.05	0.07	0.09	0.07	0.06	0.09	0.1	0.08	0.18	<0.05	0.06	0.07	
MW1	2017-Aug-03	<25	<100	<100	<100	<0.05	<0.05	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.10	<0.05	<0.05	<0.01	
MW1	2017-Aug-03	<25	<100	<100	<100	<0.05	<0.05	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.10	<0.05	<0.05	<0.01	
MW1	2017-Nov-20	<25	200	600	300	1.93	1.13	6.41	8.44	8.14	8.24	4.42	5.01	0.28	8.64	1.26	23.3	3.2	4.13	0.53	0.7	1.23	0.81	21.6	18.4	
MW1	2018-May-30	<50	<50	<400	<400	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.07	<0.05	<0.05	<0.05	
MW1	2018-Nov-29	<50	<50	<400	<400	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	-	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	0.12	<0.05	<0.05	
MW2	2016-May-19	<25	<100	<100	<100	<0.05	<0.05	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.19	<0.05	<0.05	0.08	0.11	0.2	0.1	0.15	0.25	
MW2	2016-Jun-26	<25	<100	<100	<100	<0.05	<0.05	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.10	<0.05	<0.05	<0.01	
MW2	2016-Nov-16	<25	<100	<100	<100	<0.05	<0.05	0.05	0.04	0.06	0.05	0.08	0.06	<0.05	0.05	0.07	0.06	0.05	0.07	0.09	0.09	0.18	<0.05	0.05	0.06	
MW2	2017-Aug-03	<25	<100	<100	<100	<0.05	<0.05	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.10	<0.05	<0.05	<0.01	
MW2	2017-Nov-20	<25	<100	<100	<100	<0.05	<0.05	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05	<0.05	<0.10	<0.05	<0.05	<0.01	
MW2	2018-May-30	<50	<50	<400	<400	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.07	<0.05	<0.05	<0.05	
MW2	2018-Nov-29	<50	<50	<400	<400	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	-	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.07	<0.05	<0.05	<0.05	

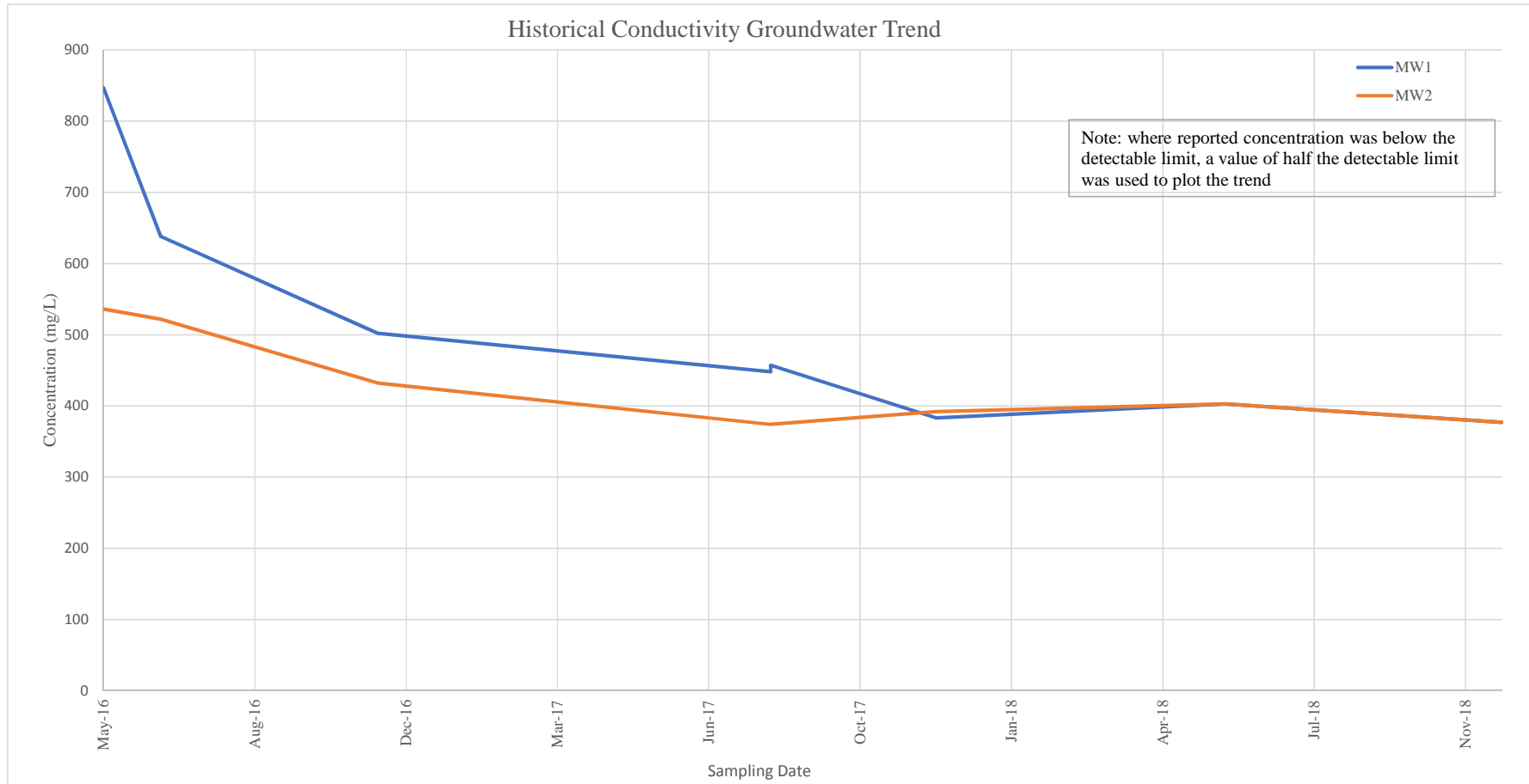


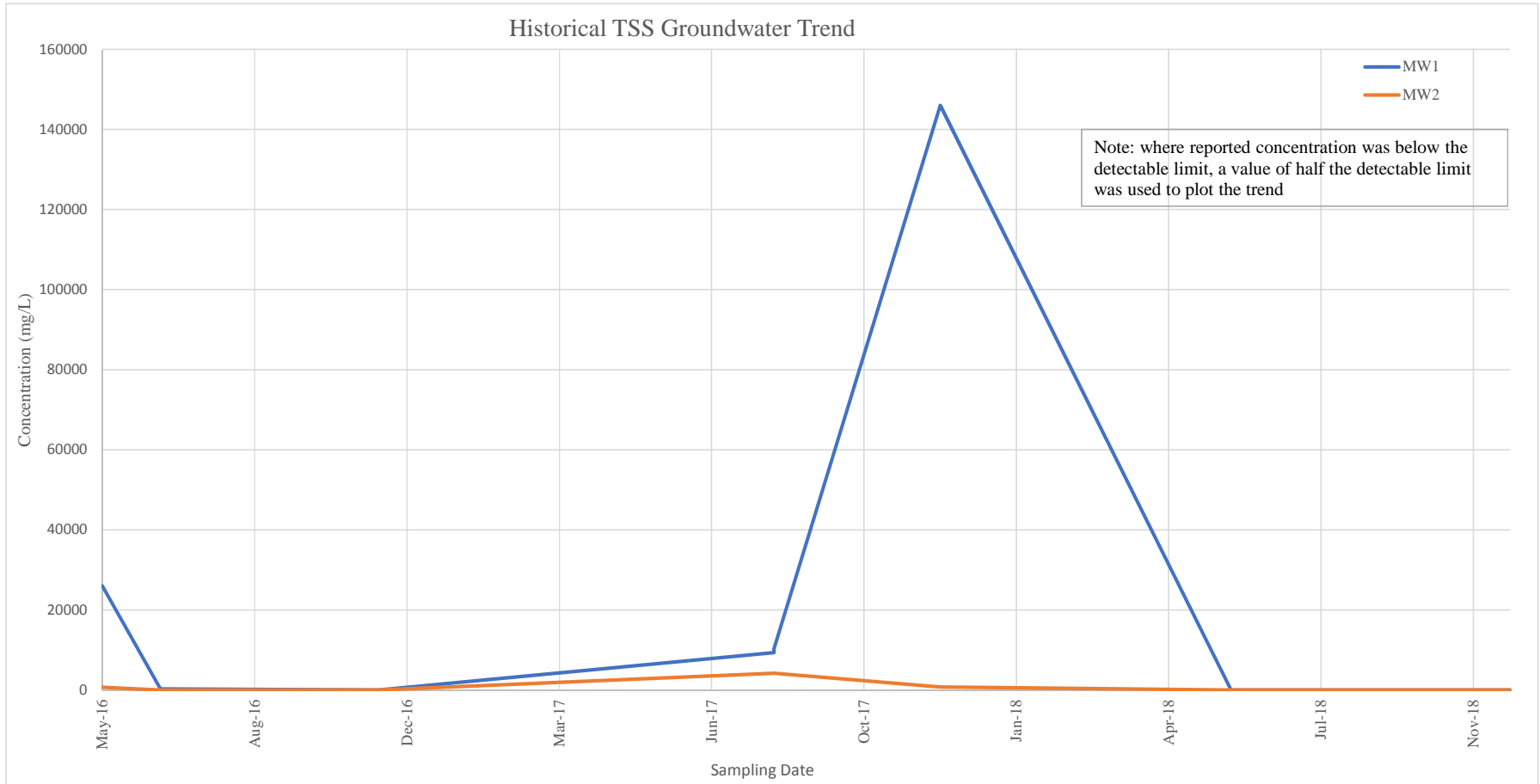


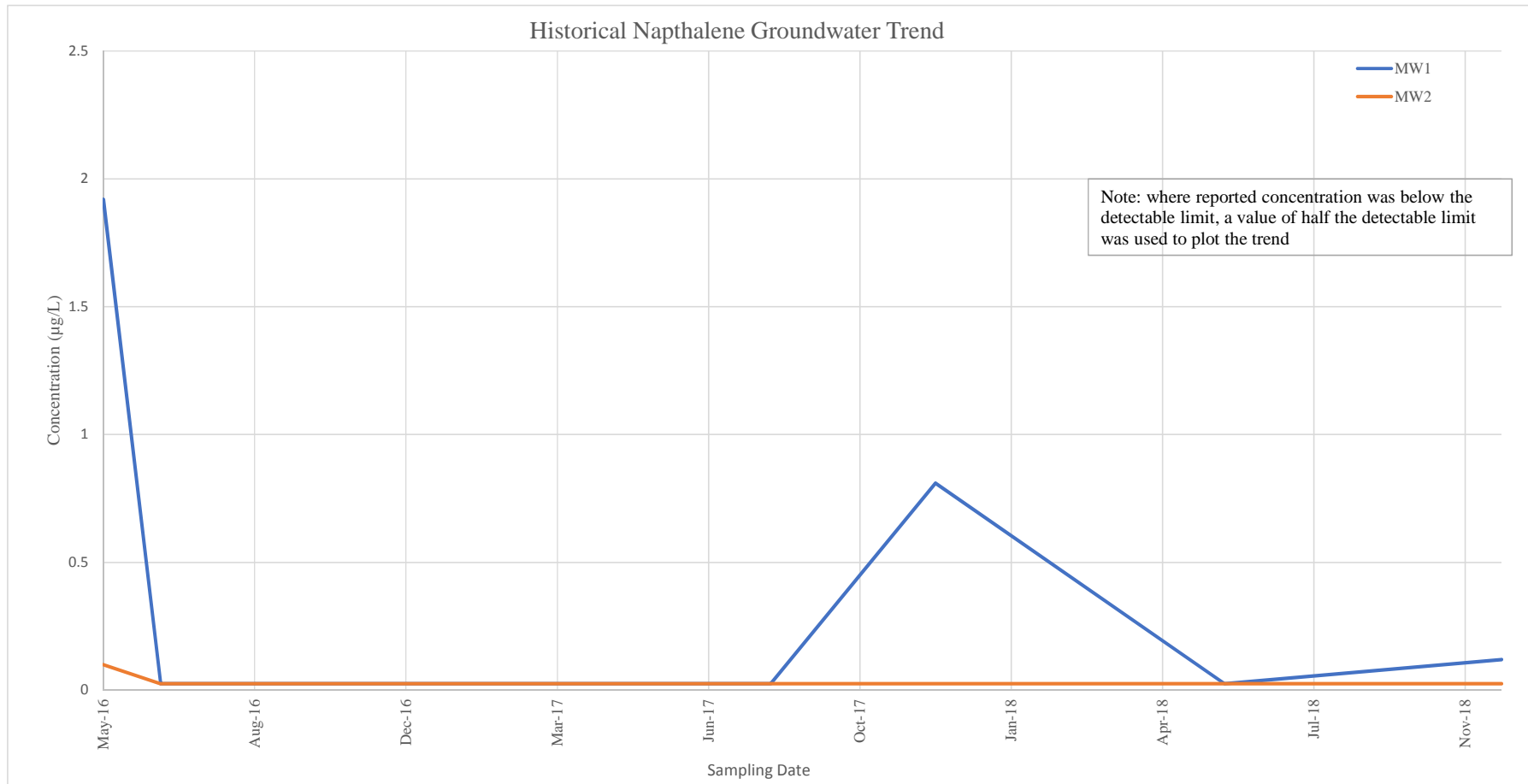


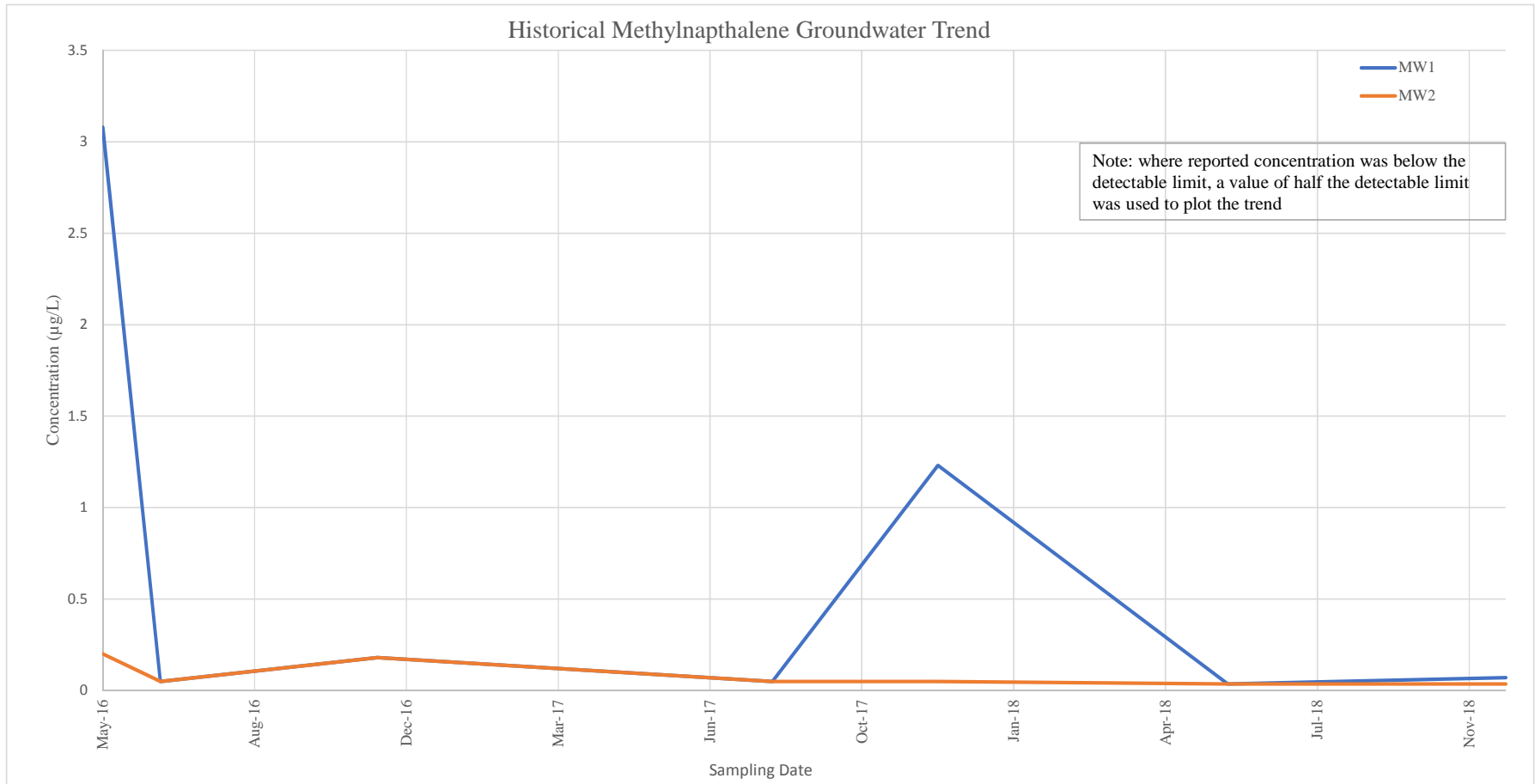


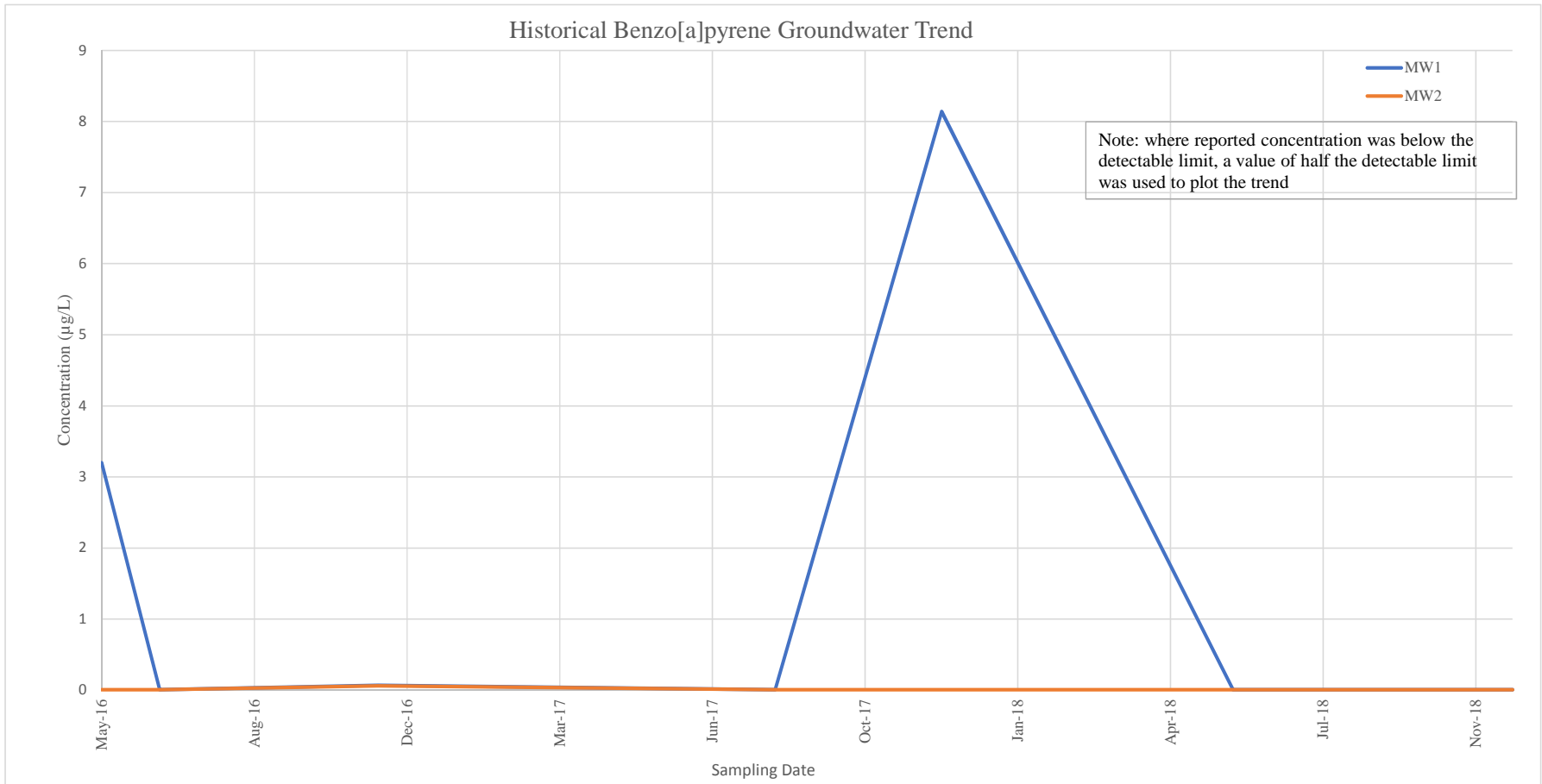




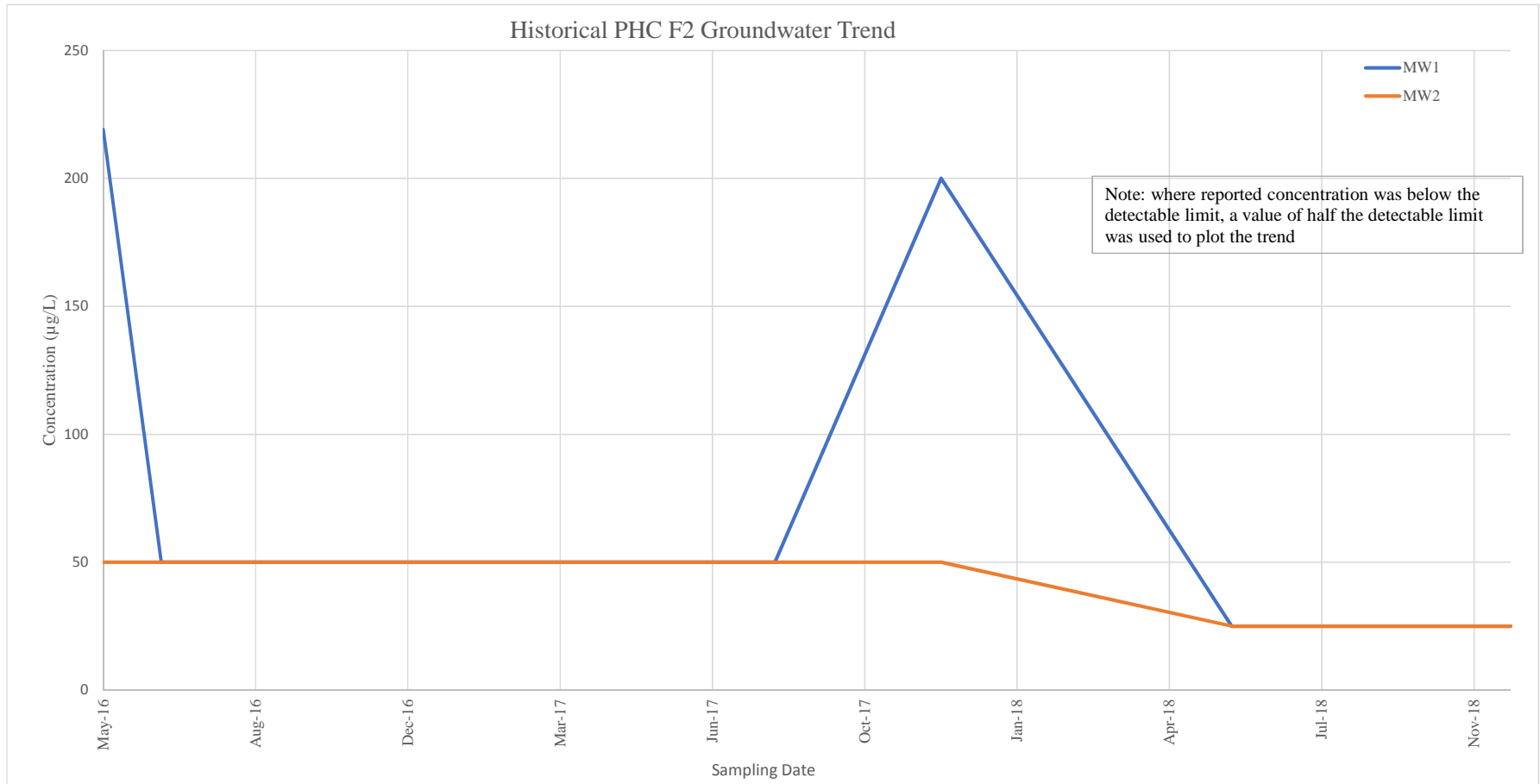


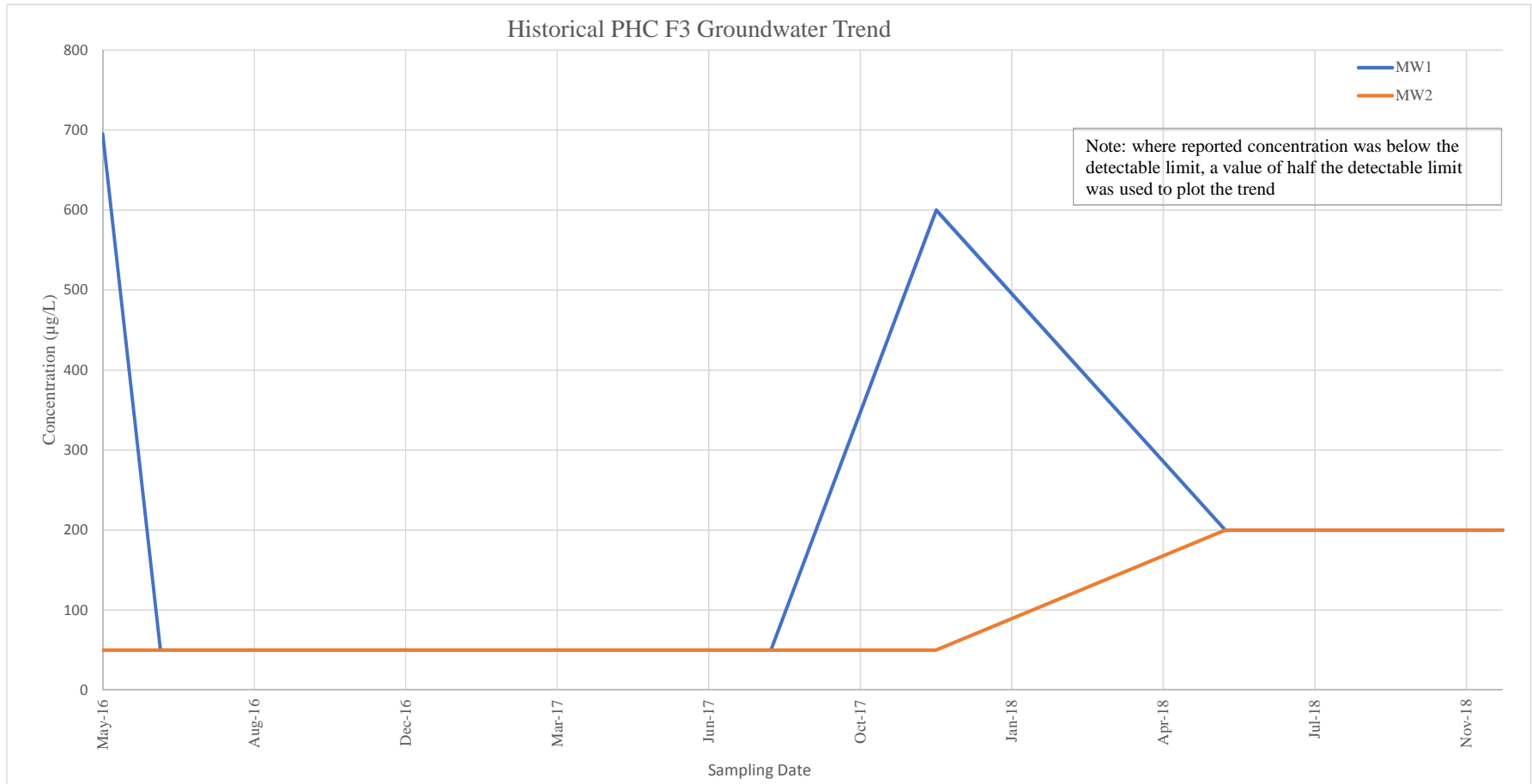


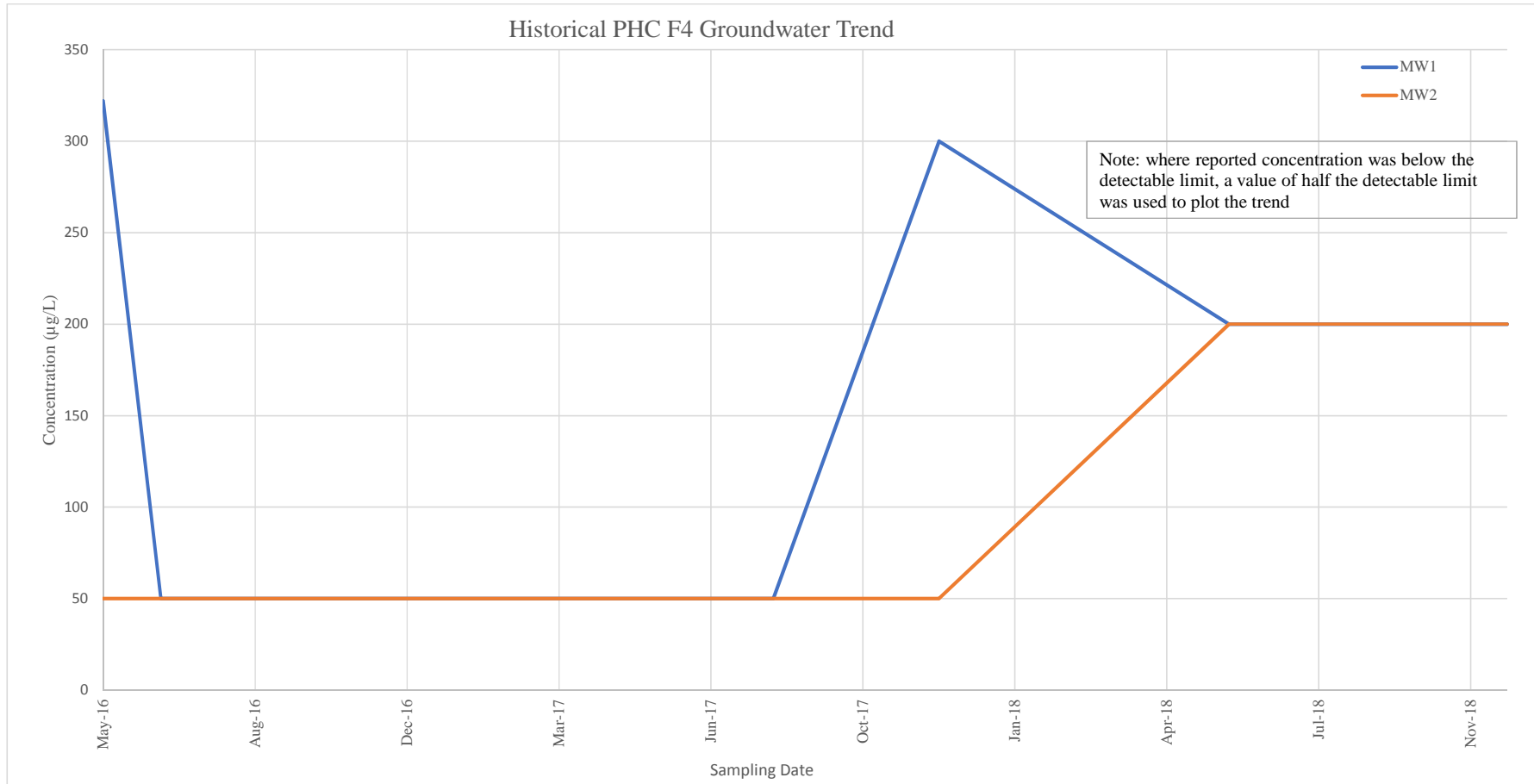












**Appendix G**  
**Site Photos**



Well ID: MW1  
29-Nov-2018



Well ID: MW2  
29-Nov-2018

**Appendix H**  
**Laboratory Certificates of Analyses**

C.O.C.: G78569

REPORT No. B18-15196 (i)

Rev. 1

**Report To:**

**Malroz Engineering Inc.**  
308 Wellington Street, 2nd Floor  
Kingston ON K7K 7A8 Canada  
**Attention:** Albert Paschkowiak

**Caduceon Environmental Laboratories**

285 Dalton Ave  
Kingston Ontario K7K 6Z1  
Tel: 613-544-2001  
Fax: 613-544-2770

DATE RECEIVED: 31-May-18  
DATE REPORTED: 21-Jun-18  
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Reynolds Road  
P.O. NUMBER:  
WATERWORKS NO.

<b>Client I.D.</b>	18-W001	18-W002		
<b>Sample I.D.</b>	B18-15196-1	B18-15196-2		
<b>Date Collected</b>	30-May-18	30-May-18		

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	06-Jun-18/O	150	135		
pH @25°C	pH Units		SM 4500H	06-Jun-18/O	8.22	8.24		
Conductivity @25°C	µmho/cm	1	SM 2510B	06-Jun-18/O	403	357		
Chloride	mg/L	0.5	SM4110C	04-Jun-18/O	32.2	19.6		
Nitrite (N)	mg/L	0.05	SM4110C	04-Jun-18/O	< 0.05	< 0.05		
Nitrate (N)	mg/L	0.05	SM4110C	04-Jun-18/O	0.06	0.07		
Sulphate	mg/L	1	SM4110C	04-Jun-18/O	14	22		
Total Suspended Solids	mg/L	3	SM 2540D	05-Jun-18/O	20	4		
Phosphorus-Total	mg/L	0.01	E3199A.1	06-Jun-18/K	0.06	0.03		
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	06-Jun-18/K	0.2	0.1		
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	04-Jun-18/K	0.03	< 0.01		
Total Dissolved Solids	mg/L	3	SM 2540D	07-Jun-18/O	208	184		
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	06-Jun-18/O	2.9	2.6		
Phenolics	mg/L	0.001	MOEE 3179	06-Jun-18/O	< 0.001	< 0.001		
COD	mg/L	5	SM 5220D	06-Jun-18/O	6	8		
Hardness (as CaCO3)	mg/L	1	SM 3120	12-Jun-18/O	163	154		
Aluminum	µg/L	10	SM 3120	12-Jun-18/O	50	30		
Arsenic	µg/L	0.1	EPA 200.8	05-Jun-18/O	0.8	1.1		
Barium	µg/L	1	SM 3120	12-Jun-18/O	82	60		
Boron	µg/L	5	SM 3120	12-Jun-18/O	64	54		
Cadmium	µg/L	0.02	EPA 200.8	05-Jun-18/O	< 0.015	< 0.015		
Calcium	µg/L	20	SM 3120	12-Jun-18/O	36000	34200		
Chromium	µg/L	1	EPA 200.8	05-Jun-18/O	< 1	< 1		
Cobalt	µg/L	0.1	EPA 200.8	19-Jun-18/O	< 0.1	< 0.1		
Copper	µg/L	0.1	EPA 200.8	05-Jun-18/O	1.4	2.0		
Iron	µg/L	5	SM 3120	12-Jun-18/O	46	< 5		
Lead	µg/L	0.02	EPA 200.8	05-Jun-18/O	0.17	0.11		



R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an \*

Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Michelle Dubien  
Lab Manager

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C.O.C.: G78569

REPORT No. B18-15196 (i)

Rev. 1

**Report To:**

**Malroz Engineering Inc.**  
 308 Wellington Street, 2nd Floor  
 Kingston ON K7K 7A8 Canada  
**Attention:** Albert Paschkowiak

**Caduceon Environmental Laboratories**

285 Dalton Ave  
 Kingston Ontario K7K 6Z1  
 Tel: 613-544-2001  
 Fax: 613-544-2770

DATE RECEIVED: 31-May-18  
 DATE REPORTED: 21-Jun-18  
 SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Reynolds Road  
 P.O. NUMBER:  
 WATERWORKS NO.

<b>Client I.D.</b>	18-W001	18-W002		
<b>Sample I.D.</b>	B18-15196-1	B18-15196-2		
<b>Date Collected</b>	30-May-18	30-May-18		

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Magnesium	µg/L	20	SM 3120	12-Jun-18/O	17700	16600		
Manganese	µg/L	1	SM 3120	12-Jun-18/O	19	< 1		
Mercury	µg/L	0.02	SM 3112 B	13-Jun-18/O	< 0.02	< 0.02		
Potassium	µg/L	100	SM 3120	12-Jun-18/O	1900	1600		
Silver	µg/L	0.1	EPA 200.8	05-Jun-18/O	< 0.1	< 0.1		
Sodium	µg/L	200	SM 3120	12-Jun-18/O	32400	19700		
Strontium	µg/L	1	SM 3120	12-Jun-18/O	551	878		
Uranium	µg/L	0.05	EPA 200.8	05-Jun-18/O	1.35	0.93		
Vanadium	µg/L	5	SM 3120	12-Jun-18/O	< 5	< 5		
Zinc	µg/L	5	SM 3120	12-Jun-18/O	< 5	< 5		

1 Revised to provide results for metals in ug/L



Michelle Dubien  
 Lab Manager

R.L. = Reporting Limit  
 Test methods may be modified from specified reference method unless indicated by an \*  
 Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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C.O.C.: G78569

REPORT No. B18-15196 (ii)

Rev. 1

**Report To:**

**Malroz Engineering Inc.**  
 308 Wellington Street, 2nd Floor  
 Kingston ON K7K 7A8 Canada  
**Attention:** Albert Paschkowiak

**Caduceon Environmental Laboratories**

285 Dalton Ave  
 Kingston Ontario K7K 6Z1  
 Tel: 613-544-2001  
 Fax: 613-544-2770

DATE RECEIVED: 31-May-18  
 DATE REPORTED: 21-Jun-18  
 SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Reynolds Road  
 P.O. NUMBER:  
 WATERWORKS NO.

<b>Client I.D.</b>	18-W001	18-W002		
<b>Sample I.D.</b>	B18-15196-1	B18-15196-2		
<b>Date Collected</b>	30-May-18	30-May-18		

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Acetone	µg/L	30	EPA 8260	04-Jun-18/R	< 30	< 30		
Benzene	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Bromodichloromethane	µg/L	2	EPA 8260	04-Jun-18/R	< 2	< 2		
Bromoform	µg/L	5	EPA 8260	04-Jun-18/R	< 5	< 5		
Bromomethane	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Carbon Tetrachloride	µg/L	0.2	EPA 8260	04-Jun-18/R	< 0.2	< 0.2		
Monochlorobenzene (Chlorobenzene)	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Chloroform	µg/L	1	EPA 8260	04-Jun-18/R	< 1	< 1		
Dibromochloromethane	µg/L	2	EPA 8260	04-Jun-18/R	< 2	< 2		
Dichlorobenzene, 1,2-	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Dichlorobenzene, 1,3-	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Dichlorobenzene, 1,4-	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Dichlorodifluoromethane	µg/L	2	EPA 8260	04-Jun-18/R	< 2	< 2		
Dichloroethane, 1,1-	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Dichloroethane, 1,2-	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Dichloroethylene, 1,1-	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Dichloroethene, cis-1,2-	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Dichloroethene, trans-1,2-	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Dichloropropane, 1,2-	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Dichloropropene, cis-1,3-	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Dichloropropene, trans-1,3-	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Dichloropropene 1,3-cis+trans	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Ethylbenzene	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Dibromoethane, 1,2- (Ethylene Dibromide)	µg/L	0.2	EPA 8260	04-Jun-18/R	< 0.2	< 0.2		
Hexane	µg/L	5	EPA 8260	04-Jun-18/R	< 5	< 5		



R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an \*

Site Analyzed=K-Kingston, W-Windsor, O-Ottawa, R-Richmond Hill, B-Barrie

Michelle Dubien  
 Lab Manager

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C.O.C.: G78569

REPORT No. B18-15196 (ii)

Rev. 1

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 Kingston ON K7K 7A8 Canada  
**Attention:** Albert Paschkowiak

**Caduceon Environmental Laboratories**

285 Dalton Ave  
 Kingston Ontario K7K 6Z1  
 Tel: 613-544-2001  
 Fax: 613-544-2770

DATE RECEIVED: 31-May-18  
 DATE REPORTED: 21-Jun-18  
 SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Reynolds Road  
 P.O. NUMBER:  
 WATERWORKS NO.

<b>Client I.D.</b>	18-W001	18-W002		
<b>Sample I.D.</b>	B18-15196-1	B18-15196-2		
<b>Date Collected</b>	30-May-18	30-May-18		

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Methyl Ethyl Ketone	µg/L	20	EPA 8260	04-Jun-18/R	< 20	< 20		
Methyl Isobutyl Ketone	µg/L	20	EPA 8260	04-Jun-18/R	< 20	< 20		
Methyl-t-butyl Ether	µg/L	2	EPA 8260	04-Jun-18/R	< 2	< 2		
Dichloromethane (Methylene Chloride)	µg/L	5	EPA 8260	04-Jun-18/R	< 5	< 5		
Styrene	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Tetrachloroethane, 1,1,1,2-	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Tetrachloroethane, 1,1,2,2-	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Tetrachloroethylene	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Toluene	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Trichloroethane, 1,1,1-	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Trichloroethane, 1,1,2-	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Trichloroethylene	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Trichlorofluoromethane	µg/L	5	EPA 8260	04-Jun-18/R	< 5	< 5		
Vinyl Chloride	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Xylene, m,p-	µg/L	1.0	EPA 8260	04-Jun-18/R	< 1.0	< 1.0		
Xylene, o-	µg/L	0.5	EPA 8260	04-Jun-18/R	< 0.5	< 0.5		
Xylene, m,p,o-	µg/L	1.1	EPA 8260	04-Jun-18/R	< 1.1	< 1.1		
PHC F1 (C6-C10)	µg/L	50	MOE E3421	04-Jun-18/R	< 50	< 50		
PHC F2 (>C10-C16)	µg/L	50	MOE E3421	01-Jun-18/K	< 50	< 50		
PHC F3 (>C16-C34)	µg/L	400	MOE E3421	01-Jun-18/K	< 400	< 400		
PHC F4 (>C34-C50)	µg/L	400	MOE E3421	01-Jun-18/K	< 400	< 400		



Michelle Dubien  
 Lab Manager

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Site Analyzed=K-Kingston, W-Windsor, O-Ottawa, R-Richmond Hill, B-Barrie

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REPORT No. B18-15196 (iii)

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**Attention:** Albert Paschkowiak

**Caduceon Environmental Laboratories**

285 Dalton Ave  
 Kingston Ontario K7K 6Z1  
 Tel: 613-544-2001  
 Fax: 613-544-2770

DATE RECEIVED: 31-May-18  
 DATE REPORTED: 21-Jun-18  
 SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Reynolds Road  
 P.O. NUMBER:  
 WATERWORKS NO.

<b>Client I.D.</b>	18-W001	18-W002		
<b>Sample I.D.</b>	B18-15196-1	B18-15196-2		
<b>Date Collected</b>	30-May-18	30-May-18		

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Acenaphthene	µg/L	0.05	EPA 8270	04-Jun-18/K	< 0.05	< 0.05		
Acenaphthylene	µg/L	0.05	EPA 8270	04-Jun-18/K	< 0.05	< 0.05		
Anthracene	µg/L	0.05	EPA 8270	04-Jun-18/K	< 0.05	< 0.05		
Benzo(a)anthracene	µg/L	0.05	EPA 8270	04-Jun-18/K	< 0.05	< 0.05		
Benzo(a)pyrene	µg/L	0.01	EPA 8270	04-Jun-18/K	< 0.01	< 0.01		
Benzo(b)fluoranthene	µg/L	0.05	EPA 8270	04-Jun-18/K	< 0.05	< 0.05		
Benzo(b+k)fluoranthene	µg/L	0.1	EPA 8270	04-Jun-18/K	< 0.1	< 0.1		
Benzo(g,h,i)perylene	µg/L	0.05	EPA 8270	04-Jun-18/K	< 0.05	< 0.05		
Benzo(k)fluoranthene	µg/L	0.05	EPA 8270	04-Jun-18/K	< 0.05	< 0.05		
Chrysene	µg/L	0.05	EPA 8270	04-Jun-18/K	< 0.05	< 0.05		
Dibenzo(a,h)anthracene	µg/L	0.05	EPA 8270	04-Jun-18/K	< 0.05	< 0.05		
Fluoranthene	µg/L	0.05	EPA 8270	04-Jun-18/K	< 0.05	< 0.05		
Fluorene	µg/L	0.05	EPA 8270	04-Jun-18/K	< 0.05	< 0.05		
Indeno(1,2,3,-cd)pyrene	µg/L	0.05	EPA 8270	04-Jun-18/K	< 0.05	< 0.05		
Methylnaphthalene,1-	µg/L	0.05	EPA 8270	04-Jun-18/K	< 0.05	< 0.05		
Methylnaphthalene,2-	µg/L	0.05	EPA 8270	04-Jun-18/K	< 0.05	< 0.05		
Methylnaphthalene 2-(1-)	µg/L	0.07	EPA 8270	04-Jun-18/K	< 0.07	< 0.07		
Naphthalene	µg/L	0.05	EPA 8270	04-Jun-18/K	< 0.05	< 0.05		
Phenanthrene	µg/L	0.05	EPA 8270	04-Jun-18/K	< 0.05	< 0.05		
Pyrene	µg/L	0.05	EPA 8270	04-Jun-18/K	< 0.05	< 0.05		



Michelle Dubien  
 Lab Manager

R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an \*

Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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C.O.C.: G82023

REPORT No. B18-36686 (i)

Rev. 1

**Report To:**

**Malroz Engineering Inc.**  
 308 Wellington Street, 2nd Floor  
 Kingston ON K7K 7A8 Canada

**Attention:** Camille Malcolm

**Caduceon Environmental Laboratories**

285 Dalton Ave  
 Kingston Ontario K7K 6Z1  
 Tel: 613-544-2001  
 Fax: 613-544-2770

DATE RECEIVED: 29-Nov-18

JOB/PROJECT NO.: 1039

DATE REPORTED: 29-Jan-19

P.O. NUMBER:

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

<b>Client I.D.</b>	18-W003	18-W004		
<b>Sample I.D.</b>	B18-36686-1	B18-36686-2		
<b>Date Collected</b>	29-Nov-18	29-Nov-18		

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	30-Nov-18/O	141	133		
pH @25°C	pH Units		SM 4500H	30-Nov-18/O	8.00	8.02		
Conductivity @25°C	µmho/cm	1	SM 2510B	30-Nov-18/O	377	350		
Chloride	mg/L	0.5	SM4110C	30-Nov-18/O	30.1	18.2		
Nitrite (N)	mg/L	0.05	SM4110C	30-Nov-18/O	< 0.05	< 0.05		
Nitrate (N)	mg/L	0.05	SM4110C	30-Nov-18/O	< 0.05	< 0.05		
Sulphate	mg/L	1	SM4110C	30-Nov-18/O	7	20		
Total Suspended Solids	mg/L	3	SM2540D	03-Dec-18/K	20	< 3		
Phosphorus-Total	mg/L	0.01	E3199A.1	03-Dec-18/K	0.05	0.06		
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	03-Dec-18/K	0.2	0.1		
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	03-Dec-18/K	0.14	0.02		
Total Dissolved Solids	mg/L	3	SM 2540D	05-Dec-18/O	194	180		
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	03-Dec-18/O	2.7	2.2		
Phenolics	mg/L	0.002	MOEE 3179	04-Dec-18/K	< 0.002	< 0.002		
COD	mg/L	5	SM 5220D	04-Dec-18/O	6	5		
Hardness (as CaCO3)	mg/L	1	SM 3120	05-Dec-18/O	131	143		
Aluminum	µg/L	10	SM 3120	05-Dec-18/O	20	20		
Arsenic	µg/L	0.1	EPA 200.8	03-Dec-18/O	0.8	1.1		
Barium	µg/L	1	SM 3120	05-Dec-18/O	59	55		
Boron	µg/L	5	SM 3120	05-Dec-18/O	58	54		
Cadmium	µg/L	0.015	EPA 200.8	03-Dec-18/O	< 0.015	< 0.015		
Calcium	µg/L	20	SM 3120	05-Dec-18/O	28800	32600		
Chromium	µg/L	1	EPA 200.8	03-Dec-18/O	< 1	< 1		
Cobalt	µg/L	0.1	EPA 200.8	03-Dec-18/O	< 0.1	< 0.1		
Copper	µg/L	0.1	EPA 200.8	03-Dec-18/O	0.5	0.4		
Iron	µg/L	5	SM 3120	05-Dec-18/O	10	< 5		
Lead	µg/L	0.02	EPA 200.8	03-Dec-18/O	0.04	< 0.02		



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Michelle Dubien  
 Lab Manager

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C.O.C.: G82023

REPORT No. B18-36686 (i)

Rev. 1

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 308 Wellington Street, 2nd Floor  
 Kingston ON K7K 7A8 Canada

**Attention:** Camille Malcolm

**Caduceon Environmental Laboratories**

285 Dalton Ave  
 Kingston Ontario K7K 6Z1  
 Tel: 613-544-2001  
 Fax: 613-544-2770

DATE RECEIVED: 29-Nov-18

JOB/PROJECT NO.: 1039

DATE REPORTED: 29-Jan-19

P.O. NUMBER:

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

<b>Client I.D.</b>	18-W003	18-W004		
<b>Sample I.D.</b>	B18-36686-1	B18-36686-2		
<b>Date Collected</b>	29-Nov-18	29-Nov-18		

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Magnesium	µg/L	20	SM 3120	05-Dec-18/O	14300	15000		
Manganese	µg/L	1	SM 3120	05-Dec-18/O	10	1		
Mercury	µg/L	0.02	SM 3112 B	05-Dec-18/O	< 0.02	< 0.02		
Potassium	µg/L	100	SM 3120	05-Dec-18/O	1600	1400		
Silver	µg/L	0.1	EPA 200.8	03-Dec-18/O	< 0.1	< 0.1		
Sodium	µg/L	200	SM 3120	05-Dec-18/O	30400	18700		
Strontium	µg/L	1	SM 3120	05-Dec-18/O	453	833		
Uranium	µg/L	0.05	EPA 200.8	03-Dec-18/O	0.78	0.80		
Vanadium	µg/L	5	SM 3120	05-Dec-18/O	< 5	< 5		
Zinc	µg/L	5	SM 3120	05-Dec-18/O	< 5	< 5		



Michelle Dubien  
 Lab Manager

R.L. = Reporting Limit

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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C.O.C.: G82023

REPORT No. B18-36686 (ii)

Rev. 1

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 308 Wellington Street, 2nd Floor  
 Kingston ON K7K 7A8 Canada

**Attention:** Camille Malcolm

**Caduceon Environmental Laboratories**

285 Dalton Ave  
 Kingston Ontario K7K 6Z1  
 Tel: 613-544-2001  
 Fax: 613-544-2770

DATE RECEIVED: 29-Nov-18

JOB/PROJECT NO.: 1039

DATE REPORTED: 29-Jan-19

P.O. NUMBER:

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

<b>Client I.D.</b>	18-W003	18-W004		
<b>Sample I.D.</b>	B18-36686-1	B18-36686-2		
<b>Date Collected</b>	29-Nov-18	29-Nov-18		

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Acetone	µg/L	30	EPA 8260	03-Dec-18/R	< 30	< 30		
Benzene	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Bromodichloromethane	µg/L	2	EPA 8260	03-Dec-18/R	< 2	< 2		
Bromoform	µg/L	5	EPA 8260	03-Dec-18/R	< 5	< 5		
Bromomethane	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Carbon Tetrachloride	µg/L	0.2	EPA 8260	03-Dec-18/R	< 0.2	< 0.2		
Chloroform	µg/L	1	EPA 8260	03-Dec-18/R	< 1	< 1		
Dibromochloromethane	µg/L	2	EPA 8260	03-Dec-18/R	< 2	< 2		
Dibromoethane, 1,2- (Ethylene Dibromide)	µg/L	0.2	EPA 8260	03-Dec-18/R	< 0.2	< 0.2		
Dichlorobenzene, 1,2-	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Dichlorobenzene, 1,3-	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Dichlorobenzene, 1,4-	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Dichlorodifluoromethane	µg/L	2	EPA 8260	03-Dec-18/R	< 2	< 2		
Dichloroethane, 1,1-	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Dichloroethane, 1,2-	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Dichloroethene, cis-1,2-	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Dichloroethene, trans-1,2-	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Dichloroethylene, 1,1-	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Dichloromethane (Methylene Chloride)	µg/L	5	EPA 8260	03-Dec-18/R	< 5	< 5		
Dichloropropane, 1,2-	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Dichloropropene 1,3- cis+trans	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Dichloropropene, cis-1,3-	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Dichloropropene, trans-1,3-	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Ethylbenzene	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Hexane	µg/L	5	EPA 8260	03-Dec-18/R	< 5	< 5		



R.L. = Reporting Limit

Test methods are modified from specified reference method unless indicated by an \*

Site Analyzed=K-Kingston, W-Windsor, O-Ottawa, R-Richmond Hill, B-Barrie

Michelle Dubien  
 Lab Manager

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C.O.C.: G82023

REPORT No. B18-36686 (ii)

Rev. 1

**Report To:**

**Malroz Engineering Inc.**  
 308 Wellington Street, 2nd Floor  
 Kingston ON K7K 7A8 Canada

**Attention:** Camille Malcolm

**Caduceon Environmental Laboratories**

285 Dalton Ave  
 Kingston Ontario K7K 6Z1  
 Tel: 613-544-2001  
 Fax: 613-544-2770

DATE RECEIVED: 29-Nov-18

JOB/PROJECT NO.: 1039

DATE REPORTED: 29-Jan-19

P.O. NUMBER:

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

<b>Client I.D.</b>	18-W003	18-W004		
<b>Sample I.D.</b>	B18-36686-1	B18-36686-2		
<b>Date Collected</b>	29-Nov-18	29-Nov-18		

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Methyl Ethyl Ketone	µg/L	20	EPA 8260	03-Dec-18/R	< 20	< 20		
Methyl Isobutyl Ketone	µg/L	20	EPA 8260	03-Dec-18/R	< 20	< 20		
Methyl-t-butyl Ether	µg/L	2	EPA 8260	03-Dec-18/R	< 2	< 2		
Monochlorobenzene (Chlorobenzene)	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Styrene	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Tetrachloroethane, 1,1,1,2-	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Tetrachloroethane, 1,1,2,2-	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Tetrachloroethylene	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Toluene	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Trichloroethane, 1,1,1-	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Trichloroethane, 1,1,2-	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Trichloroethylene	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Trichlorofluoromethane	µg/L	5	EPA 8260	03-Dec-18/R	< 5	< 5		
Vinyl Chloride	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
Xylene, m,p-	µg/L	1.0	EPA 8260	03-Dec-18/R	< 1.0	< 1.0		
Xylene, m,p,o-	µg/L	1.1	EPA 8260	03-Dec-18/R	< 1.1	< 1.1		
Xylene, o-	µg/L	0.5	EPA 8260	03-Dec-18/R	< 0.5	< 0.5		
PHC F1 (C6-C10)	µg/L	50	MOE E3421	03-Dec-18/R	< 50	< 50		
PHC F2 (>C10-C16)	µg/L	50	MOE E3421	30-Nov-18/K	< 50	< 50		
PHC F3 (>C16-C34)	µg/L	400	MOE E3421	30-Nov-18/K	< 400	< 400		
PHC F4 (>C34-C50)	µg/L	400	MOE E3421	30-Nov-18/K	< 400	< 400		



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Michelle Dubien  
 Lab Manager

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REPORT No. B18-36686 (iii)

Rev. 1

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 Kingston ON K7K 7A8 Canada

**Attention:** Camille Malcolm

**Caduceon Environmental Laboratories**

285 Dalton Ave  
 Kingston Ontario K7K 6Z1  
 Tel: 613-544-2001  
 Fax: 613-544-2770

DATE RECEIVED: 29-Nov-18

JOB/PROJECT NO.: 1039

DATE REPORTED: 29-Jan-19

P.O. NUMBER:

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

<b>Client I.D.</b>	18-W003	18-W004		
<b>Sample I.D.</b>	B18-36686-1	B18-36686-2		
<b>Date Collected</b>	29-Nov-18	29-Nov-18		

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Acenaphthene	µg/L	0.05	EPA 8270	12-Dec-18/K	< 0.05	< 0.05		
Acenaphthylene	µg/L	0.05	EPA 8270	12-Dec-18/K	< 0.05	< 0.05		
Anthracene	µg/L	0.05	EPA 8270	12-Dec-18/K	< 0.05	< 0.05		
Benzo(a)anthracene	µg/L	0.05	EPA 8270	12-Dec-18/K	< 0.05	< 0.05		
Benzo(a)pyrene	µg/L	0.01	EPA 8270	12-Dec-18/K	< 0.01	< 0.01		
Benzo(b)fluoranthene	µg/L	0.05	EPA 8270	12-Dec-18/K	< 0.05	< 0.05		
Benzo(b+k)fluoranthene	µg/L	0.1	EPA 8270	12-Dec-18/K	< 0.1	< 0.1		
Benzo(k)fluoranthene	µg/L	0.05	EPA 8270	12-Dec-18/K	< 0.05	< 0.05		
Benzo(g,h,i)perylene	µg/L	0.05	EPA 8270	12-Dec-18/K	< 0.05	< 0.05		
Biphenyl, 1, 1-	µg/L	0.2	EPA 8270	12-Dec-18/K	< 0.2	< 0.2		
Bis(2-Chloroethyl)ether	µg/L	0.2	EPA 8270	12-Dec-18/K	< 0.2	< 0.2		
Bis(2-Chloroisopropyl)ether	µg/L	0.2	EPA 8270	12-Dec-18/K	< 0.2	< 0.2		
Bis(2-ethylhexyl) Phthalate	µg/L	5	EPA 8270	12-Dec-18/K	< 5	< 5		
Chloroaniline, 4-	µg/L	0.2	EPA 8270	12-Dec-18/K	< 0.2	< 0.2		
Chlorophenol, 2-	µg/L	0.2	EPA 8270	12-Dec-18/K	< 0.2	< 0.2		
Chrysene	µg/L	0.05	EPA 8270	12-Dec-18/K	< 0.05	< 0.05		
Dibenzo(a,h)anthracene	µg/L	0.05	EPA 8270	12-Dec-18/K	< 0.05	< 0.05		
Dichlorobenzidine, 3,3'-	µg/L	0.5	EPA 8270	12-Dec-18/K	< 0.5	< 0.5		
Dichlorophenol, 2,4-	µg/L	0.2	EPA 8270	12-Dec-18/K	< 0.2	< 0.2		
Diethyl Phthalate	µg/L	1	EPA 8270	12-Dec-18/K	< 1	< 1		
Dimethyl Phthalate	µg/L	1	EPA 8270	12-Dec-18/K	< 1	< 1		
Dimethylphenol, 2,4-	µg/L	1	EPA 8270	12-Dec-18/K	< 1	< 1		
Dinitrophenol, 2,4-	µg/L	5	EPA 8270	12-Dec-18/K	< 5	< 5		
Dinitrotoluene, 2,4-	µg/L	0.2	EPA 8270	12-Dec-18/K	< 0.2	< 0.2		
Dinitrotoluene, 2,6-	µg/L	0.2	EPA 8270	12-Dec-18/K	< 0.2	< 0.2		
Fluoranthene	µg/L	0.05	EPA 8270	12-Dec-18/K	< 0.05	< 0.05		
Fluorene	µg/L	0.05	EPA 8270	12-Dec-18/K	< 0.05	< 0.05		



R.L. = Reporting Limit

Test methods are modified from specified reference method unless indicated by an \*

Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Michelle Dubien  
 Lab Manager

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C.O.C.: G82023

REPORT No. B18-36686 (iii)

Rev. 1

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**Attention:** Camille Malcolm

**Caduceon Environmental Laboratories**

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 Tel: 613-544-2001  
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DATE RECEIVED: 29-Nov-18

JOB/PROJECT NO.: 1039

DATE REPORTED: 29-Jan-19

P.O. NUMBER:

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

<b>Client I.D.</b>	18-W003	18-W004		
<b>Sample I.D.</b>	B18-36686-1	B18-36686-2		
<b>Date Collected</b>	29-Nov-18	29-Nov-18		

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Indeno(1,2,3,-cd)pyrene	µg/L	0.05	EPA 8270	12-Dec-18/K	< 0.05	< 0.05		
Methylnaphthalene,1-	µg/L	0.05	EPA 8270	12-Dec-18/K	< 0.05	< 0.05		
Methylnaphthalene,2-	µg/L	0.05	EPA 8270	12-Dec-18/K	< 0.05	< 0.05		
Methylnaphthalene 2-(1-)	µg/L	0.07	EPA 8270	12-Dec-18/K	0.07	< 0.07		
Naphthalene	µg/L	0.05	EPA 8270	12-Dec-18/K	0.12	< 0.05		
Pentachlorophenol	µg/L	0.2	EPA 8270	12-Dec-18/K	< 0.2	< 0.2		
Phenanthrene	µg/L	0.05	EPA 8270	12-Dec-18/K	< 0.05	< 0.05		
Phenol	µg/L	0.1	EPA 8270	12-Dec-18/K	< 0.1	< 0.1		
Pyrene	µg/L	0.05	EPA 8270	12-Dec-18/K	< 0.05	< 0.05		
Trichlorobenzene,1,2,4-	µg/L	0.2	EPA 8270	12-Dec-18/K	< 0.2	< 0.2		
Trichlorophenol, 2,4,5-	µg/L	0.2	EPA 8270	12-Dec-18/K	< 0.2	< 0.2		
Trichlorophenol 2,4,6-	µg/L	0.2	EPA 8270	12-Dec-18/K	< 0.2	< 0.2		

1 Revised to include calculated parameter benzo (b+K) fluoranthene



Michelle Dubien  
 Lab Manager

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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