Terraprobe

Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

HYDROGEOLOGICAL STUDY
PROPSED ADDITION (CALL UP 22-411)
J. J. O'NEILL CATHOLIC SCHOOL
240 MARILYN AVENUE
NAPANEE, ONTARIO

Prepared for: **Ontario Infrastructure and Lands Corporation (IO)**
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TABLE OF CONTENTS

SECTION **PAGE (S)**

1.0 INTRODUCTION 1

2.0 SCOPE OF WORK 2

3.0 APPLICABLE REGULATIONS AND POLICIES 3

3.1 QUINTE CONSERVATION AUTHORITY (QCA) POLICIES AND REGULATIONS (O. REG. 42/06) 3
3.2 TORONTO SOURCE PROTECTION AREA 3
3.3 PERMIT TO TAKE WATER (PTTW) SECTION 34 OF THE ONTARIO WATER RESOURCE ACT ... 4
3.4 HYDROGEOLOGICAL ASSESSMENT SUBMISSION GUIDELINES 2013 4

4.0 DESCRIPTION OF SITE CONDITIONS 5

4.1 SITE LOCATION AND DESCRIPTION 5
4.2 REGIONAL GEOLOGY AND PHYSIOGRAPHY 5
4.3 REGIONAL HYDROGEOLOGY 6
4.4 LOCAL SURFACE WATER AND NATURAL HERITAGE FEATURES 6
4.5 LOCAL GROUND WATER RESOURCES 7

5.0 RESULTS OF SUBSURFACE INVESTIGATION 8

5.1 LOCAL SITE SETTING 8
5.2 MONITORING WELL INSTALLATION 10
5.3 GROUNDWATER ELEVATIONS 10
5.4 ESTIMATION OF HYDRAULIC CONDUCTIVITY 11
5.4.1 Estimation from In-situ Hydraulic Testing 11
5.4.1 Estimation from Grain Size 12
5.4.2 Estimation from Literature 13
5.5 GROUNDWATER QUALITY ASSESSMENT 13

6.0 DISCUSSION AND ANALYSIS 14

6.1 GROUNDWATER CONTROL AND DEWATERING REQUIREMENTS 14
6.1.1 Construction Requirements and Methodology 14
6.1.2 Groundwater Extraction and Discharge 15
6.1.2.1 Short Term (During Construction) 15
6.1.3 Permitting Requirements 17
6.1.4 Zone of Influence (ZOI) 17

7.0 IMPACT ASSESSMENT 18

7.1 DISCHARGE OF PUMPED GROUNDWATER 18
7.2 DEWATERING IMPACTS TO NATURAL ENVIRONMENT 18
7.3 LOCAL WELLS AND ZONE OF INFLUENCE 18
7.4 GROUNDWATER QUALITY AND CONTAMINATION SOURCES 19
7.5 GEOTECHNICAL CONSIDERATIONS 19

8.0 CLOSURE 20

LIMITATIONS 22

FIGURES:

Figure 1 – Site Location Plan
Figure 2 – Borehole and Monitoring Well Location Plan
Figure 3 – Groundwater Elevation Contours
Figure 4 – Subsurface Profile A-A'
Figure 5 – MECP Well Records Map

APPENDICES:

Appendix A Borehole Logs
Appendix B Grain Size Analysis
Appendix C Aquifer Response Tests
Appendix D Laboratory Certificates of Analysis
Appendix E MECP Water Well Record
Appendix F Dewatering Analysis
Appendix G Site Plan
Appendix H Regulation Mapping

1.0 INTRODUCTION

Terraprobe Inc. (Terraprobe) was retained by Ontario Infrastructure and Lands Corporation (IO) to conduct a hydrogeological investigation for the proposed addition to the existing school building (J J O' Neill Catholic Elementary School) located at 240 Marilyn Avenue, in the Greater Napanee Town, the County of Lennox & Addington, hereinafter referred to as the "Property or Site". The Site is bounded by agricultural land to the north, existing residential dwellings to the east and south, and Napanee Fairgrounds sports complex to the west. The general location of the Site is shown on **Figure 1**.

The Site is currently occupied by a slab-on-grade school building with associated asphalt paved parking areas, driveways/access routes, sports field, and landscaped areas with site area of approximately 4.54 hectares (11.23 acres). Based on the review of design drawings provided by the client *"J.J. O'Neill Catholic Elementary School - Addition / Renovation",* Project No. 22026, dated January 17, 2023, prepared by Salter Pilon Architecture, it is proposed to construct a new two-story slab-on-grade building addition on the north side of the existing building.

It is understood that the proposed development will be fully serviced with municipal water and sewage.

The purpose of this report is to assess local and regional hydrogeological conditions and the potential impacts of the proposed development on the groundwater system and to provide information regarding the requirements for groundwater control for the development.

The report addresses the following areas:

- Identifying the geological and hydrogeological setting of the Site;
- Confirming shallow groundwater level and shallow groundwater flow direction beneath the Site;
- Assessing groundwater quality against applicable sewer discharge guidelines;
- Evaluate potential short-term construction dewatering needs for the Site;
- Identifying potential impacts to the nearby groundwater receptors, including water supply wells and natural heritage features pertaining to the Site;
- Providing mitigation plan on the potential impacts to the groundwater receptors associated to the Site; and,
- Providing recommendations on any needs for applying for Permit to Take Water (PTTW) or posting Environmental Activity and Sector Registry (EASR) with the Ministry of the Environment, Conservation and Parks (MECP).

2.0 SCOPE OF WORK

The scope of work for the study consisted of the following:

Review of available background information: Available background information for the Site and the project was reviewed. This included the results of geotechnical investigations of the Property and available information regarding the proposed design and construction concepts for the development. In addition, information from public sources, including geologic mapping and MECP well record was reviewed.

Borehole Drilling: As part of the current investigation, a total of thirteen (13) boreholes were advanced on December 14 & 15, 2022, to depths ranging from about 3.5 to 5.4 m below grade within the footprint of the proposed addition and parking areas and driveways/access routes.

Well Installation: To measure the groundwater level and investigate the quality of groundwater, a total of five (5) 50 mm diameter groundwater monitoring wells were installed (in BH1, BH2, BH4, BH5 and BH6) as a part of the current investigation. Upon installation, an elevation survey of the monitoring wells relative to geodetic datum was completed to assess the relative direction of groundwater flow.

Groundwater sampling and analysis: Groundwater quality was assessed in comparison with the Greater Napanee Region (Sanitary and Storm) Sewer Use By-Law limits to evaluate the potential discharge options.

Completion of hydraulic conductivity testing: Groundwater levels within the monitoring wells installed by Terraprobe were monitored to confirm groundwater levels beneath the Site. Hydraulic conductivity testing was conducted within selected four (4) installed monitoring wells to confirm the hydraulic conductivity of the sub-soil profile within the screened intervals.

Analysis of potential impacts of groundwater control: Analysis was conducted to assess the potential impacts of groundwater control on local structures, water wells, and surface water features. This also includes providing recommendations on any requirements for applying for Permit to Take Water (PTTW) or Environmental Activity and Sector Registry (EASR) posting with the Ministry of the Environment, Conservation and Parks (MECP).

The above scope of work was prepared in accordance with all of the following: Ontario Water Resources Act, and Ontario Regulation 387/04.

3.0 APPLICABLE REGULATIONS AND POLICIES

3.1 Quinte Conservation Authority (QCA) Policies and Regulations (O. Reg. 42/06)

Under Section 28 of the Conservation Authorities Act, local conservation authorities are mandated to protect the health and integrity of the regional greenspace system and to maintain or improve the hydrological and ecological functions performed by valley and stream corridors. The Quinte Conservation Authority (QCA), through its regulatory mandate, is responsible for issuing permits under Ontario Regulation (**Ont. Reg. 42/06**), Development, Interference with Wetlands and Alterations to Shorelines and Watercourses for development proposal or Site alteration work to shorelines and watercourses within the regulated areas. Under this regulation, Quinte Conservation Authority (QCA) is required to:

- Prohibit, regulate or provide permission for straightening, changing, diverting or interfering in any way with the existing channel of a river, creek, stream, watercourse or changing or interfering with a wetland; and
- Prohibit or regulate or provide permission for development if the control of flooding, erosion, dynamic beaches, pollution or the conservation of land may be affected by the development.

As per the QCA Regulation area search tool, it is indicated that the Site is not located in a regulated area hence a permit from QCA is not required.

3.2 Toronto Source Protection Area

The MECP mandates the protection of existing and future sources of drinking water under the Clean Water Act, 2006 (CWA). Initiatives under the CWA include the delineation of Wellhead Protection Areas (WHPAs), Significant Groundwater Recharge Areas (SGRAs) and Highly Vulnerable Aquifers (HVAs), as well as the assessment of drinking water quality and quantity threats within Source Protection Regions. Source Protection Plans are developed under the CWA and include the restriction and prohibition of certain types of activities and land uses within WHPAs. The objectives of source water protection are to identify areas where municipal drinking water sources may be at risk from quantity or quality threats, to assess the level of risk, and to put in place measures to eliminate or manage the threat. The Quinte Region Source Protection Area is based on the watershed boundaries of Quinte Conservation (QCA). This a broader Source Water Protection Area that includes the watersheds of the Moira, Napanee and Salmon Rivers and all of Prince Edward County, an area of 5,921 square kilometres (km^2) in eastern Ontario Quinte, which is referred to as the Quinte Source Protection Plan.

Based on the review of MECP's Source Protection Information Atlas and Quinte Conservation Authority (QCA) regulated area interactive mapping, the following information was obtained related to the subject Site:

Associated Policy Area	Applicability
Conservation Authority	Quinte Conservation Authority (QCA)
Source Protection Area	Quinte Source Protection Area (TSPA)
Watershed	Napanee River Sub-watershed, Napanee Region Watershed
QCA Regulated Area	No
Wellhead Protection Area (WHPA)	No
Significant Groundwater Recharge Area (SGRA).	No
Highly Vulnerable Aquifer (HVA)	Yes: Score 6
Event Based Area:	No
Wellhead Protection Areas (WHPA - Q) or Recharge Management Area	No
Intake Protection Zone (IPZ)	No
Intake Protection Zone Q (IPZ-Q)	No
Oak Ridges Moraine (ORM)	No
Niagara Escarpment Plan Area	No
Greenbelt Protection Act Area	No

3.3 Permit to Take Water (PTTW) Section 34 of the Ontario Water Resource Act

MECP website was reviewed for any active PTTW application records within a 1.0 km radius of the Site on February 22, 2023. Record review indicates that there are no active PTTW within 1.0 km from the Site.

3.4 Hydrogeological Assessment Submission Guidelines 2013

The Conservation Authority Guidelines for Development Applications (June 2013) was reviewed as a part of this preliminary assessment. This guidance document provides a list of recommended requirements for hydrogeological investigations. Quinte Conservation Authority (QCA) has adopted these guidelines for hydrogeological assessments. The scope of the hydrogeological investigation and reporting requirements follow this guidance document.

4.0 DESCRIPTION OF SITE CONDITIONS

4.1 Site Location and Description

The Site is bounded by agricultural land to the north, existing residential dwellings to the east and south and west, and Napanee Fairgrounds sports complex to the west. The general location of the Site is shown on **Figure 1**.

The Site is currently occupied by a slab-on-grade school building with associated asphalt paved parking areas, driveways/access routes, sports field, and landscaped areas with an approximate site area of approximately 4.54 hectares (11.23 acres). Based on the review of design drawings provided by the client *"J.J. O'Neill Catholic Elementary School - Addition / Renovation",* Project No. 22026, dated January 17, 2023, prepared by Salter Pilon Architecture, it is proposed to construct a new two-story slab-on-grade building addition on the north side of the existing building. It is understood that the proposed development will be fully serviced with municipal water and sewage.

Based on the boreholes advanced on the Site, the ground surface elevation within the property varies from 94.1 ± m to 95.5 ± m towards southeast. Regional and local groundwater flow direction is expected to flow southeast following the local topography towards Napanee River located approximately 800 m south from the Site, and ultimately drains into Bay of Quinte, located approximately 5.5 km southwest of the Property.

4.2 Regional Geology and Physiography

Based on published geological information for the area, the Site is located within the physiographic region known as the Clay Plain (12), and the Napanee Plains (39) physiographic landform. The Napanee plain is a flat-to-undulating plain of limestone from which the glacier stripped most of the overburden. Centring on the Town of Napanee it covers approximately 700 square miles. While the soil is only a few inches deep over much of the region, some deeper glacial till occurs in the stream valleys and toward the north where this region borders on the Dummer Moraines. In the south, particularly, the depressions often have shallow deposits of stratified clay which also provide better soil. Cutting the rock plain to a depth of 50 to 100 feet, the valleys of the Salmon and Napanee Rivers provide the greatest elements of relief. In these valleys are found a variety of deposits, mostly of alluvial origin. (Chapman and Putnam, 1984).

Based on the Ontario Geological Survey (OGS) mapping, the surficial geology at the Site consists of Fine-textured glaciolacustrine deposits (8a) comprised of silt and clay, minor sand and gravel Massive to well laminated on Paleozoic terrain. The Quaternary geology consists of glaciolacustrine deposits silt and clay, minor sand, basin and quiet water deposits of Pleistocene.

Bedrock was contacted between 91.5 to 89.9 masl (4.0 to 5.4 m below grade) over the current subsurface investigation. Based on the Ontario Geological Survey (OGS) mapping, the bedrock consists of Bobcaygeon Formation; Simcoe Group; Limestone, dolostone, shale, arkose, sandstone (54a). A review

of the Quinte Conservation (2004) indicates that because of the shallow overburden conditions in the area, bedrock topography is similar to topographic elevations. The bedrock surface elevation decreases southward, reaching its lowest point of 75.6 masl along the shores of Lake Ontario.

4.3 Regional Hydrogeology

Based on the review of Quinte Conservation (2004), the hydrogeology in the Quinte area is predominately influenced by the shallow bedrock, in that most wells pump from either fractured Precambrian rock or fractured limestone. Nevertheless, significant overburden aquifers exist in some localized areas where glacial landforms have produced sufficient thickness of sand and gravel deposits to provide a source of potable water.

Quinte Region Report (2006) indicated that, aquifers in the QC region are predominantly comprised of fractured bedrock with isolated overburden aquifers in areas of thick soil deposits. Overburden aquifers are not extensive throughout the study area but are present where there is sufficient depth of sand and gravel. These aquifers are relatively isolated but are interpreted as being hydraulically connected with the underlying bedrock, and serve as storage reservoirs providing recharge to the fractured bedrock. In the southern portions of the watersheds the main aquifer is found in limestone bedrock with Precambrian bedrock aquifers common in the north. In the absence of significant aquitards, these aquifers are considered to be unconfined, however in some areas, where the density of fractures in the bedrock is low, confined conditions may exist. Groundwater movement is generally in the top 10 to 30 metres of the fractured bedrock with recharge occurring through infiltrating precipitation in areas of shallow soil cover or permeable deposits of sand and gravel. In view of shallow soil conditions throughout the watershed, recharge to the ground water occurs over the majority of the Region.

Based on Quinte Region Report (2006), 95% of the wells in the Region are drilled into the bedrock aquifers with the remaining 5% in the overburden.

4.4 Local Surface Water and Natural Heritage Features

Mapping from the Ontario Ministry of Natural Resources and Forestry (MNRF) was to determine if water bodies, wetland and woodland features were present on the Property and within the Study Area. The Ontario Ministry of Natural Resources National Heritage Information Centre database for listings of Areas of Natural or Scientific Interest (ANSIs) was reviewed. The information is summarized below.

Water Bodies	**Property**	• A swale is crossing the southern portion of the Property.
	Study Area	• The nearest surface water feature is a swale located approximately adjacent north border of the Site.
Wetlands	**Property**	<u>Provincially Significant</u> • No Provincially Significant wetlands are present on the Property. <u>Non- Provincially Significant</u> • No Non- Provincially Significant wetlands are present on the Property.

		Unevaluated • No Unevaluated wetlands are present on the Property.
	Study Area	Provincially Significant • No Provincially Significant wetlands are present on the Study Area. Non- Provincially Significant • No Non-Provincially Significant wetlands are present on the Study Area. Unevaluated • Unevaluated wetland is present on the Study Area, approximately 180 m northwest the property.
Woodlands	**Property**	• No woodland area was identified on the Property.
	Study Area	• Woodland area is mapped adjacent the north and northwest border of the Property
ANSIs	**Property**	Provincially Significant Life Science ANSI • No Life Science ANSIs were identified on the Property. Provincially Significant Earth Science ANSI • No Earth Science ANSIs were identified on the Property.
	Study Area	Provincially Significant Life Science ANSI • No Life Science ANSIs were identified in the Study Area. Provincially Significant Earth Science ANSI • No Earth Science ANSIs were identified in the Study Area.

Furthermore, as indicated earlier, the Property is not located within the Niagara Escarpment Plan Area, the Oak Ridges Moraine Plan Area, or in the Greenbelt Protection Act area.

4.5 Local Ground Water Resources

MECP well record database was reviewed for well records located within a radius of 500 m from the approximate Site boundary. The locations of the well records in the Study Area are presented on **Figure 5,** with the details for each well summarized in **Appendix B.** A total of eight (8) wells were located within the 500 m radius. A summary of data obtained from record review is presented in Table below:

Number of the Well Records	**8**
Water Use (Final Status)	
Observation-Monitoring and Test holes	2 (25 %)
Water Supply - Domestic	5 (63 %)
Water Supply - Commercial	1 (12 %)

The above summary indicates that total of six (6) water supply wells were found within the study area completed in the year 1949 and 1991, with depths ranging from 16.8 mbgs to 26.5 mbgs. No municipal wells were found within the Study area. The Site is located within an area that predominantly use

groundwater for domestic water supply. However, based on the well record review and nature of the proposed development, it is unlikely that impacts from the proposed development will affect any local water resources within the vicinity of the Site.

5.0 RESULTS OF SUBSURFACE INVESTIGATION

The boreholes were advanced on December 14 to 15, 2022. The borehole elevations are provided relative to geodetic datum (NAD 83). The horizontal coordinates are reported relative to the Universal Transverse Mercator geographic coordinate system (UTM Zone 17T).

The borings were drilled by a specialist drilling contractor using a track -mounted drill rig power auger drilling techniques and sampled at regular intervals with conventional 50 mm diameter split barrel samplers when the Standard Penetration Test (SPT) was carried out (ASTM D 1586). The fieldwork (drilling, sampling, and testing) was observed full time and recorded by a Terraprobe filed staff, who logged the boring and examined the samples as they were obtained.

To measure the groundwater level and investigate the quality of groundwater, a total of five (5) 50 mm diameter groundwater monitoring wells were installed in boreholes BH1, BH2, BH4, BH5 and BH6 as part of the current investigation. The monitoring well consisted of a 50 mm diameter PVC screen with a length of PVC riser pipe, 10-ft slotted screen. Upon installation, an elevation survey of the monitoring wells relative to geodetic datum was completed so that relative groundwater flow direction can be assessed.

The borehole and monitoring well locations are outlined on **Figure 2**. The soil samples were observed and recorded by a member of our field engineering staff, who logged the borings and examined the samples as they were obtained. All samples obtained during the investigation were sealed into plastic jars and transported to our testing laboratory for detailed inspection and testing.

5.1 Local Site Setting

Based on the review of the geotechnical report **File No. 02209049.000-0105**; the subsurface soil stratigraphy is indicated below. The following stratigraphy is based on the borehole findings, as well as the geotechnical laboratory testing conducted on selected representative soil samples. The stratigraphic boundaries indicated on the Borehole Logs are inferred from non-continuous samples and observations of drilling resistance and typically represent a transition from one soil type to another. These boundaries should not be interpreted to represent exact planes of geological change. The subsurface conditions have been confirmed in a series of widely spaced boreholes and will vary between and beyond the borehole locations. In general, stratigraphic units encountered on site were as follows:

1. A surficial layer of topsoil was encountered in Boreholes 1, 2, 7, 8, 10, 11 and 12, with thickness varying from about 100 mm to150 mm. The topsoil was noted to be dark brown to black in

colour and predominantly consisted of a sandy silt matrix with organics.

2. A surficial layer of asphaltic concrete was encountered in Boreholes 5, 6 and 13, varying in thickness from 65 mm to 80 mm. A layer of aggregate was encountered in Boreholes 3 ,4, 5, 6, 9 and 13 at the ground surface or beneath the asphaltic concrete layer, varying in thickness from 65 mm to 300 mm. The aggregate material (comprising sand and gravel) was noted to be in a damp condition.

3. Earth fill was encountered in all boreholes beneath the surficial topsoil/pavement structure and extended to depths varying from about 0.8 m to 1.5 m below grade. The earth fill materials predominately consisted of mixed composition of clayey silt/silty sand with trace amounts of gravel as well as organics. The earth fill material was noted to be generally moist to locally wet condition.

4. Native cohesive native soil deposit comprising clayey silt to silty clay with trace amounts of sand and gravel was encountered in all boreholes beneath the zone of earth fill materials at depths varying from 94.7 to 93.2 (about 0.8 m to 1.5m below grade) and extended to depths varying from 92.8 to 92.1 masl (about 2.7 m to 4.0 m below existing grade). The measured moisture content of these soil samples indicated a moist condition.

5. Native cohesionless soil deposit comprising sand with some silt to silty and trace to some clay and gravel was encountered beneath the upper cohesive soil deposit at depths varying from 92.8 to 92.1 masl to (about 2.7 m to 4.0 m below grade) and extended to depths varying from 91.5 to 89.9 (4.0 m to 5.4 m below existing grade) (the full depth of the investigation). The measured moisture contents of the soil samples indicated a moist to locally wet condition

The above noted stratigraphic units at the Site are summarized as below:

Site Stratigraphy			
Stratum/Formation	**Description**	**Encountered at Elev. (masl)**	**Thickness Range (m)**
Topsoil/ Earth Fill	Mixed Clayey Silt/ Silty Sand with trace amounts of gravel as well as organics - moist	95.5 - 93.2	0 – 1.5
Native	Clayey Silt to Silty Clay with trace amounts of sand and gravel - moist	94.7 - 92.1	0.8 - 4.0
	Sand with some silt to silty and trace to some clay and gravel - moist	92.8 - 89.9	2.7 – 5.4

The detailed stratigraphic conditions are presented on the accompanying borehole logs provided in **Appendix A**. A subsurface profile of the Site is provided in **Figure 4**. Characterization of the various soil types, including grain size analysis, was conducted and is presented in **Appendix B**. Additional

information pertaining to soil stratigraphy is discussed in the geotechnical report by Terraprobe under a separate cover (**File No. 02209049.000-0105**).

5.2 Monitoring Well Installation

Monitoring wells were installed in selected Five (5) boreholes for groundwater monitoring and to investigate groundwater quality. The monitoring wells were constructed using 50-mm diameter PVC riser pipes and screens, which were installed in each of the selected geotechnical boreholes in accordance with Ontario Regulation (O. Reg.) 903. Filter sand was placed around the well screen to approximately 0.6 m above the top of the screen. The wells were then backfilled with bentonite to approximately 0.3 m below the ground surface. All monitoring wells were surveyed using an R10 Trimble GPS relative to a geodetic datum. The details are provided below:

Well ID	Well Diameter (mm)	Ground Surface Elevation (masl)	Top of Screen		Bottom of Screen		Screened Geological Units (Native)
			Depth (mbgs)	Elev. (masl)	Depth (mbgs)	Elev. (masl)	
BH 1	50	95.5	1.42	94.1	4.5	91.0	SAND, some silt to silty and trace to some clay and gravel
BH 2	50	95.5	2.44	93.1	4.0	91.5	SAND, some silt to silty and trace to some clay and gravel
BH 4	50	95.1	2.44	92.7	4.0	91.1	SAND, some silt to silty and trace to some clay and gravel
BH 5	50	95.3	2.34	93.0	5.4	89.9	SILTY CLAY, trace sand, trace gravel to SAND, some silt to silty and trace to some clay and gravel
BH 6	50	95.2	1.65	93.6	4.7	90.5	SAND, some silt to silty and trace to some clay and gravel

Note: masl: meters above sea level, mbgs: meters below ground surface

Additional details of the monitoring well installation is presented on the enclosed borehole logs provided in **Appendix A**.

5.3 Groundwater Elevations

The groundwater elevations were monitored in the installed five (5) monitoring wells as indicated below. Two (2) rounds of groundwater measurements were conducted on January 25, 2023 and on January 27, 2023 (after the well development-stabilized water levels) as a part of in-situ hydrogeological testing at the Site. The groundwater elevations in the monitoring wells are presented below:

Well ID	Ground Surface Elevation (masl)	Water Level in Well, Depth/Elev. (mbgs/masl)	
		January 25, 2023	January 27, 2023
BH 1	95.5	1.1/94.4	1.1/ 94.4
BH 2	95.5	0.8/ **94.7**	0.8/ **94.7**
BH 4	95.1	1.4/ 93.7	0.5/ 94.6
BH 5	95.3	1.4/ 93.9	1.0/ 94.3
BH 6	95.2	0.7/ 94.5	0.8/ 94.4

Note: masl: meters above sea level, mbgs: meters below ground surface

Based on the above stabilized groundwater level recordings on January 25 and 27, 2023, it is noted that groundwater level varies from 94.3 ± masl to 94.7 ± masl across the property. Regional and local groundwater flow direction in the overburden appears to be south/southeast towards Napanee River and mimics the local topography of the Site. The groundwater elevations and flow direction are shown in **Figure3.** The local groundwater flow direction may fluctuate seasonally depending on the magnitude of precipitation and surface runoff, which will affect infiltration of surface water in particular at times such as significant snowmelt and rainfall events. Therefore, groundwater elevation may fluctuate seasonally.

The monitoring wells installed at the Site need to be maintained in accordance with Ontario Water Resources Act, O. Reg. 903/90. When the wells are no longer required for monitoring or sampling, these wells will need to be appropriately decommissioned by a licensed well contractor as outlined in the Regulation.

5.4 Estimation of Hydraulic Conductivity

5.4.1 Estimation from In-situ Hydraulic Testing

The hydraulic conductivity was also determined based on single well response tests (Bail Tests), as per the hydrogeological investigation completed on January 25 and 27, 2023, on four (4) monitoring wells as mentioned below. The monitoring wells were developed in advance of the testing event, which involves the purging and removal of groundwater from the monitoring wells to remove remnants of clay, silt and other debris introduced into the monitoring well during construction and to induce the flow of formation groundwater through the well screens, thereby improving the transmissivity of the subsoil strata formation at the well screen depths. The Solinst Dataloggers (pressure transducers) were programmed to record the water levels at one (1) second of the interval throughout the tests. The data from the tests were analyzed using the Bouwer and Rice method (1976) included in the Aquifer Test V.7 software package.

The results of the analysis are presented in **Appendix C**. The hydraulic properties of the strata applicable to the Site are as follows:

Monitoring Well ID	Top of Well Screen Elevation (masl)	Bottom of Well Screen Elevation (masl)	Screened Geological Units	Hydraulic Conductivity (m/s)
BH 2	93.1	91.5	SAND, some silt to silty and trace to some clay and gravel	1.21×10^{-6}
BH 4	92.7	91.1	SAND, some silt to silty and trace to some clay and gravel	9.98×10^{-7}
BH 5	93.0	89.9	SILTY CLAY, trace sand, trace gravel to SAND, some silt to silty and trace to some clay and gravel	1.15×10^{-6}
BH 6	93.6	90.5	SAND, some silt to silty and trace to some clay and gravel	1.42×10^{-6}

Note: masl: meters above sea level, mbgs: meters below ground surface

Based on the single well response tests, the hydraulic conductivity of the native sand is estimated in order of 10^{-6} m/s indicating a moderate permeability.

5.4.1 Estimation from Grain Size

In order to estimate the hydraulic conductivity (K) from the grain size distribution curves an excel based tool/program HydrogeoSieveXL (Devlin, J.F. 2015) is used that calculates the hydraulic conductivity from grain size distribution curves using 15 different methods. HydrogeoSieveXL was found to calculate K values essentially identical to those reported in the literature, using the published grain-size distribution curves. This program is developed by J.F Devlin, Department of Geology, University of Kansas (Developed April 29, 2014, most recent update September, 2016). HydrogeoSieveXL presents the completed data table, a grain size distribution curve, an extensive list of grain size characteristics from which effective grain diameters are calculated, a histogram of grain size distribution presented in terms of conventional grain size classes and 15 estimates of K calculated from the formulas. Geometric and arithmetic means of the estimated K values are also calculated. The complete report for each sample is provided in along with the grain size results in Appendix D. The results of the estimates are summarized below:

Borehole No./Sample ID	Sampling Depth (mbgs)	Sampling Elevation (masl)	Soil Description (Native)	Estimated Hydraulic Conductivity (m/s) (Geometric Mean)
Borehole 1, Sample 3	1.8	93.7	Silty Clay, trace sand, trace gravel	4.7×10^{-10}
Borehole 2, Sample 5	3.3	92.2	Sand, some silt, some gravel, some clay	2.1×10^{-7}
Borehole 3, Sample 4B	2.6	92.5	Clayey Silt, trace sand	2.4×10^{-9}
Borehole 4, Sample 5	3.3	91.8	Sand, some silt, some gravel, some clay	1.7×10^{-7}

Borehole No./Sample ID	Sampling Depth (mbgs)	Sampling Elevation (masl)	Soil Description (Native)	Estimated Hydraulic Conductivity (m/s) (Geometric Mean)
Borehole 5, Sample 5	3.3	92	Clayey Silt, trace sand	2.4×10^{-9}
Borehole 7, Sample 2	1.1	93.8	Silty Clay, trace sand	4.5×10^{-10}
Borehole 9, Sample 3	1.8	92.4	Silty Clay, trace sand	4.9×10^{-10}
Borehole 11, Sample 2	1.2	93.1	Silty Clay, trace gravel	4.6×10^{-10}

Note: masl: meters above sea level, mbgs: meters below ground surface

Based on the grain size distribution analysis, the hydraulic conductivity of the upper cohesive clayey silt to silty clay deposit is estimated in order of 10^{-9} to 10^{-10} m/s and the cohesionless sand deposit in the order of 10^{-7} m/s.

5.4.2 Estimation from Literature

According to Freeze and Cherry (1979), the typical hydraulic conductivity of the strata investigated at the site are:

Soil Unit	Estimated Hydraulic Conductivity Range (m/s)
Earth Fill	10^{-6}
Clayey Silt/ Silty Clay	10^{-9} - 10^{-12}
Sand to Silty Sand	10^{-2} - 10^{-7}
Limestone	10^{-6} - 10^{-9}

Based on the analyses, the hydraulic conductivity calculated from the single well response testing are consistent with the published values associated with the geological material tested.

5.5 Groundwater Quality Assessment

One (1) unfiltered groundwater sample was collected by Terraprobe and analyzed by a Canadian laboratory accredited and licensed by the Standards Council of Canada and or Canadian Association for Laboratory Accreditation. The sample was collected directly from monitoring well BH 5 on January 26, 2023. The monitoring well BH 5 was developed and purged prior to samples collection. The groundwater quality test results, and the certificate of analysis are presented in **Appendix D**. The sample was compared to the Greater Napanee Region Sanitary Sewer guidelines:

- Greater Napanee Region Bylaw 2012-39 Table 1 – Limits for Discharge to Sanitary Sewer
- Greater Napanee Region Bylaw 2012-39Table 2 – Limits for Discharge to Storm Sewer

In summary, the groundwater quality results indicate the following:

- The ground water sample **meets** the Limits for **Sanitary Sewer Discharge** for all analysed parameters.
- The ground water sample **exceeds** the Limits for **Storm Sewer Discharge** for the following parameters:
    - Phenols (Limit 0.008 mg/L, Result 0.015 mg/L)
    - Total Manganese (Limit 0.05 mg/L, Result 0.079 mg/L)
    - Total Suspended Solids (Limit 15 mg/L, Result 161 mg/L)

A true copy of the Certificate of Analysis and the chain of custody record for the sample are included Appendix D.

6.0 DISCUSSION AND ANALYSIS

6.1 Groundwater Control and Dewatering Requirements

6.1.1 Construction Requirements and Methodology

The following drawing set was provided to Terraprobe and reviewed in preparation of this engineering report:

- *"Drawing No. A101, titled "J.J. O'Neill Catholic Elementary School - Addition / Renovation, 240 Marilyn Ave., Napanee, ON K7R 2L4", prepared by Salter Pilon Architecture, Project No. 22026, dated January 17, 2023.*

It is understood that the proposed development comprised of a new two-story slab-on-grade building addition on the northwest side of the existing building.

Based on the geotechnical investigation report by Terraprobe **File No. 02209049.000-0105** (February 8, 2023), The proposed addition would be constructed with a similar finished floor elevation to that of the existing building. The underside of footing elevations must be designed to provide a minimum of 1.5 m of soil cover or equivalent insulation to the foundation subgrade for frost protection considerations, and all footings must be designed to bear at least 0.3 m into the undisturbed native soil stratum.

Based on the review of the geotechnical investigation report prepared by Terraprobe **File No. 02209049.000-0105**, proposed buildings will be supported on conventional spread footing foundations on the native, undisturbed stiff to very stiff silty clay deposit. The minimum width of the continuous strip footings must be 500 mm and the minimum size of isolated footings must be 900 mm x 900 mm in conjunction. The minimum foundation depth below existing grade ranges between approximately 1.1 to

1.8 m below grade, with highest bottom-elevation of foundation ranges from Elev. 94.4 to 93.5 ± m. Based on the above stabilized groundwater level recordings on January 27, 2023, it is noted that groundwater level varies from 94.3 ± m to 94.7 ± m (0.5 to 1.1 m below grade) across the property. The highest groundwater level that will be used in the FEM is 94.7 masl. This indicates that the the foundation excavations will extend below the prevailing groundwater table at the Site. It will be necessary to positively depressurize the wet native soil prior to construction for any excavations extending below Elev. 94.7 ± m. Excavations for foundations will extend Elev. 93.5 ± m, and the design dewatering target will be set 1.0 m below the lowest excavation level.

It is further understood that the finish floor level of the slab-on-grade building will be at least 200 mm above the outside design grade, and the site is graded to promote drainage away from the building, subfloor drainage provisions are not required except for nominal drainage.

The Site development details as discussed above are summarized as below:

Proposed Development						
Structure	**Above Grade Levels**	**Below Grade Levels**				**Design Groundwater Level (masl)**
		Level #	**Lowest Finished Floor**		**Approximate Foundation Elevation (masl)**	
			Depth (mbgs)	**Elevation (masl)***		
Proposed two-story slab-on-grade building addition	2-Story	Slab-on-Grade	± 0.2 above grade	± 95.7	± 93.5 (Min.)	± 94.7

Note: masl: meters above sea level, mbgs: meters below ground surface
* 0.2 m above the outside existing grade (based on ground elevation at BH1 and BH2)

Note: For further details on the geotechnical design considerations and constructability please refer to geotechnical report prepared by Terraprobe under a separate cover (**File No. 02209049.000-0105**)

6.1.2 Groundwater Extraction and Discharge

6.1.2.1 Short Term (During Construction)

A finite element numerical analysis utilizing computer software (Slide 7.014, developed by Rocscience Inc.) was conducted to assess the water taking requirements (short term and long term) in support of the proposed development. The hydraulic parametrization of the generalized numerical model is based on the grain size analyses, field hydraulic testing and published data that incorporates the permeability of different strata encountered during the investigation. The final shoring system and construction method were unknown at this stage. As such, a permeable shoring was assessed for preliminary estimate. The finite element model results are presented in **Appendix F**. For the purpose of accessing groundwater seepage rates, following considerations were made:

- Underside of the foundations set to Elev. 93.5 ± m (1.8 m below the existing grade);
- Excavation of 20 m stretch of trench in a day for continuous strip footing of 500 mm.
- Design water level of Elev. 94.7 ± m, the highest observed water table elevation;
- Design dewatering target set 1.0 m below the foundation's underside;
- Safety factor S.F of 1.5 is applied on the groundwater flow with the inclusion of 25.9 mm design rainfall event based on of Intensity-duration-frequency (IDF) curves (Ontario Ministry of Transportation) for 2-hour period for a 2-year event;
- Steady State simulation was performed for dewatering assessment; and
- Hydraulic conductivity for earth fill, native glacial till, sandy silt and sand assigned as 1 x 10^{-6} m/s, 2.4 x 10^{-9} m/s, and 1.42 x 10^{-6} m/s, respectively.

Based on the above, it is noted that excavation will be completed approximately 1.2 ± m below the groundwater table, and groundwater seepage is expected into the excavation and/or flow from perched groundwater conditions, if present on Site. It is further anticipated that the primary source of water into the excavation (during construction activities) will be from precipitation and surface water runoff. Groundwater control may be required in the initial stages of the excavation to accommodate for any perched groundwater conditions if present. The short-term control of ground water should take into account stormwater management from rainfall events. A dewatering system should take into account the removal of rainfall from the excavation. A value of 25.9 mm rainfall over a 2-hour period for a 2-year event was used to determine the incidental precipitation volumes to the proposed excavations based on the review of Intensity-duration-frequency (IDF) curves (Ontario Ministry of Transportation). The water taking requirements at the Property are as follows:

Conventional Drained Foundations - Construction (Short Term) – F.S. 2.0						
Scenario	**Groundwater Seepage S.F. 1.5 Used**		**25.9 mm Design Rainfall Event**		**Total Volume (1)**	
	L/day	**L/min**	**L/day**	**L/min**	**L/day**	**L/min**
Short Term (Permeable Shoring)	1,500	1.0	2,500	1.7	**4,000**	**2.8**

Notes:
(1) – Total volume is rounded up to the nearest thousand

As required by Ontario Regulation 63/16, a plan for discharge must consider the conveyance of stormwater from a 100-year storm. The additional volume based on the excavation area that will be generated in the occurrence of a 100-year storm event (100 mm) is approximately 8,500 L/day (5.9 L/min).

The finite element model results are presented in **Appendix F**.

6.1.3 Permitting Requirements

The Ministry of Environment, Conservation and Parks (MECP) regulates construction water taking over 50,000 L/day and less than 400,000 L/day to obtain an Environmental Activity Sector Registry (EASR) Posting the MECP prior to any construction dewatering activities. Based on the maximum estimated dewatering volumes of 4,000 L/day, a short-term permit to take water PTTW will not be required from the MECP prior to the dewatering activities for the proposed works. However, a Sewer Discharge Agreement must be obtained to permit discharge into the City's sewers prior to any temporary construction dewatering discharge.

Groundwater taking estimates are based on the assumed excavation dimensions and methodology. The groundwater seepage rate is estimated assuming excavation of 20 m stretch of trench in a day for continuous strip footing (500 mm width). Therefore, should longer stretches of trench are excavated or complete foundation is installed in a day (multiple sections simultaneously), higher seepage rates can be expected. It is contractor's responsibility to determine the type and extent of the dewatering system required. It should be noted that the actual required dewatering effort will depend on several factors, including excavation depth, sequencing, season and weather conditions and the length of time the excavation is left open. It should be noted that the interpretation of the dewatering estimates presented in this report and selection of an appropriate dewatering program is the responsibility of contractor.

6.1.4 Zone of Influence (ZOI)

The Zone of Influence (ZOI) for dewatering, also known as Radius of Influence (R_o) with respect to maximum drawdown required was calculated based on the estimated groundwater taking rate and the hydraulic conductivity of the unit from which the groundwater will be taken at the Property. The ZOI was calculated using the Sichart's equation below:

Equation: $R_o = 3000 * dH * \sqrt{K}$

Where:

dH is the dewatering thickness (m) = Highest Observed Water level (m) - Dewatering Target (m)

K is the hydraulic conductivity (m/s) of water bearing deposit

The ZOI for the proposed building excavation with respect to groundwater at the Property is estimated as ± 0.32 m for short term dewatering.

The above ZOI is estimated by considering the hydraulic conductivity of 2.4 x 10^{-9} m/sec for the native silty clay deposit.

If an impermeable shoring system is considered for the proposed excavation and construction, the ZOI will be limited to the excavation box.

Based on section 6.1.2, the slab-on-grade building is recommended to be at least 200 mm above the outside design grade. As such, subfloor drainage from groundwater seepage is not expected in the Long Term (Post Construction).

7.0 IMPACT ASSESSMENT

7.1 Discharge of Pumped Groundwater

This report provided the estimated quantity of water to be discharged during and after construction, however does not speak about the available capacities of the receiving sewer. The sewer capacity analysis will be provided under a separate cover by the civil consultant. As noted in **Section 5.5**, the groundwater sample meets the Limits for Greater Napanee Region Bylaw 2012-39 Table 1 – Sanitary Sewer Discharge and exceeds Greater Napanee Region Bylaw 2012-39 Table 2 – Limits for Storm Sewer Discharge for Total Manganese and Total Suspended Solids. As such, no additional treatment will be required before the groundwater can be discharged to the Sanitary Sewer. However, treatment of exceeded parameters is required before the groundwater can be discharged to the Greater Napanee Region Storm Sewer. An appropriate treatment (if required) needs be considered by the dewatering contractor prior to discharge to natural environment. The final design for any dewatering effluent is the responsibility of the retained contractor undertaking construction and a team designing the pre-treatment system.

7.2 Dewatering Impacts to Natural Environment

There are no provincially significant, evaluated, surface water features and/or unevaluated wetlands within the close proximity of the Site or within the estimated zone of influence. Furthermore, any groundwater that will be taken from the site will be discharged (if required) into the Town's sewer systems and not into any natural water body. As such, there will be no impact to the natural environment caused by the water takings at the Property

7.3 Local Wells and Zone of Influence

The Site is located in a developed area of the Town of Greater Napanee. The Site and surrounding area are provided with municipal water and sewer supply. As indicated previously, there will be no significant seepage of groundwater into the excavation that requires active dewatering. There will be limited zone of influence. Furthermore, based on the well record search no domestic and municipal water supply wells were found within the estimated zone of influence. As such, it is expected that there would be no impact to local groundwater resources in the area.

7.4 Groundwater Quality and Contamination Sources

The area of the proposed development is located in the Highly Vulnerable Aquifer (HVA). HVAs are those areas where an aquifer may be more prone to contamination. The infiltration of rooftop runoff and vegetated surfaces may be permitted if current site conditions demonstrate no existing contamination. Depending on the land use, runoff from urban developments may contain a variety of dilute contaminants such as suspended solids, chloride from road salt, oil and grease, metals, pesticide residues, bacteria and viruses. For groundwater, generally with the exception of the dissolved constituents such as nitrogen and salt, most contaminants are attenuated by filtration during groundwater flow through the soils. Under proposed development, the quality of water directed to pervious areas for infiltration is not expected to contain any contaminant of concerns.

Considering the nature of the proposed development, it is anticipated that there will not be any contributing contaminants that may affect the background groundwater quality in the area and/or cause a deterioration of the water quality at a surface water intake.

However, Terraprobe completed the Phase One Environmental Site Assessment (ESA) on February 9, 2023 in accordance with Ontario Regulation 153/04, as amended, as a condition for site plan approval process and filing of the Record of Site Condition (RSC), if required, for the Property. Based on the findings of the Phase One ESA, three (3) Areas of Potential Environmental Concern (APECs) were identified on the Property. A Phase Two ESA was conducted to investigate the APECs at the Site. Based on the findings of Phase Two ESA, soil and groundwater quality at the Site meet the applicable Table 2 site condition standards. As such, there are no contaminant sources at the Site.

7.5 Geotechnical Considerations

A special attention should be made along the proposed excavation shoring sections adjacent to the limits of the existing buildings. It is recommended that a professional geotechnical engineer is contacted in advance of earthwork, and the shoring requirements for the site will have to be examined in detail with respect to the site boundary constraints. The shoring requirements for the site will have to be examined in detail with respect to the proximity of existing structures and site boundary constraints.

For further details on the geotechnical design considerations and constructability, please refer to the geotechnical report by Terraprobe under a separate cover (**File No. 02209049.000-0105**).

8.0 CLOSURE

We trust this report meets with your requirements. Should you have any questions regarding the information presented, please do not hesitate to contact our office.

Yours truly,

Terraprobe Inc.

2023-04-05
M.S.

Muna MO Mirghani, P.Eng.
Project Manager

Muhammad I. Shahid, P.Geo., QP$_{ESA}$
Senior Project Manager

Shama Qureshi, P.Eng. P.Geo. QP$_{ESA-RA}$
Principal

REFERENCES

1. Chapman, L.J. and D.F. Putnam, 1984. The Physiography of Southern Ontario. Ontario.

2. Devlin, J.F. 2015. HydrogeoSieveXL: an Excel-based tool to estimate hydraulic conductivity from grain-size analysis. Hydrogeology Journal.

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4. Geological Survey. Ontario Geological Survey (OGS), 2003. Surficial Geology of Southern Ontario.

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6. Ministry of Natural Resources and Forestry, 2019. Natural Heritage Interactive Map.

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10. Quinte Region, 2006, Quinte Region Conceptual Water Budget, December 8, 2006.

11. Source Water Protection Atlas interactive mapping: https://www.gisapplication.lrc.gov.on.ca/SourceWaterProtection/

12. Terraprobe Inc., (February 2023) Geotechnical Investigation Report "Proposed addition to the existing school building (J J O' Neill Catholic Elementary School), 240 Marilyn Avenue, Napanee, Ontario, File No. 02209049.000-0105

13. Terraprobe Inc., (April 2023) Phase One Environmental Site Assessment (ESA) Report "Proposed addition to the existing school building (J J O' Neill Catholic Elementary School), 240 Marilyn Avenue, Napanee, Ontario, File No. 02209049.000-0101

LIMITATIONS

This report was prepared by **Terraprobe Inc**., for the use of **Ontario Infrastructure and Lands Corporation (IO)**, and is intended to provide an assessment of the hydrogeological condition for the property located at 240 Marilyn Avenue, Napanee, Ontario. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Terraprobe accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report, including consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

The assessment should not be considered a comprehensive audit that eliminates all risks. The information presented in this report is based on information collected during the completion of the subsurface investigation conducted by Terraprobe Inc. It is based on conditions at the property at the time of the site inspection. The subsurface conditions were assessed based on information collected at specific borehole and monitoring well locations. The actual subsurface conditions between the sampling points may vary.

There is no warranty expressed or implied by this report regarding the condition of the property. Professional judgment was exercised in gathering and analyzing information collected by our staff, as well as that submitted by others. The conclusions presented are the product of professional care and competence, and cannot be construed as an absolute guarantee.

In the event that during future work new information regarding the condition of the property is encountered, or the proposed development is changed from that which was provided to Terraprobe with respect to the property, Terraprobe should be notified in order that we may re-evaluate the findings of this assessment and provide amendments, as required.

FIGURES

TERRAPROBE INC.

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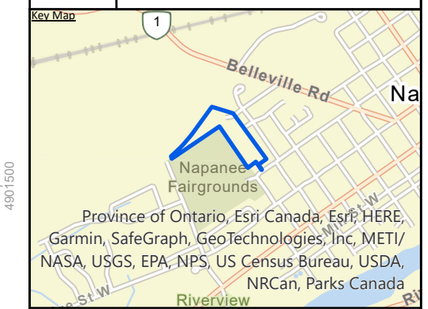
References:

ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/ Airbus Ds, USDA, USGS, AeroGRID, IGN, and the GIS User Community Basemaps

Key Map



Notes:

Legend:

Approximate Site Location

Project Title:
Hydrogeological Assessment

Site Location:
240 Marilyn Avenue
Napanee, Ontario

Figure Title:
Site Location Plan

Designed By: MM	*File No.:* 02209049.000.0104
Drawn By: HK	*Scale:* As Shown
Reviewed By: SO	*Figure No.:* 1
Date: Feb 2023	

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N W E S

References:

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Key Map

Notes:

Legend:

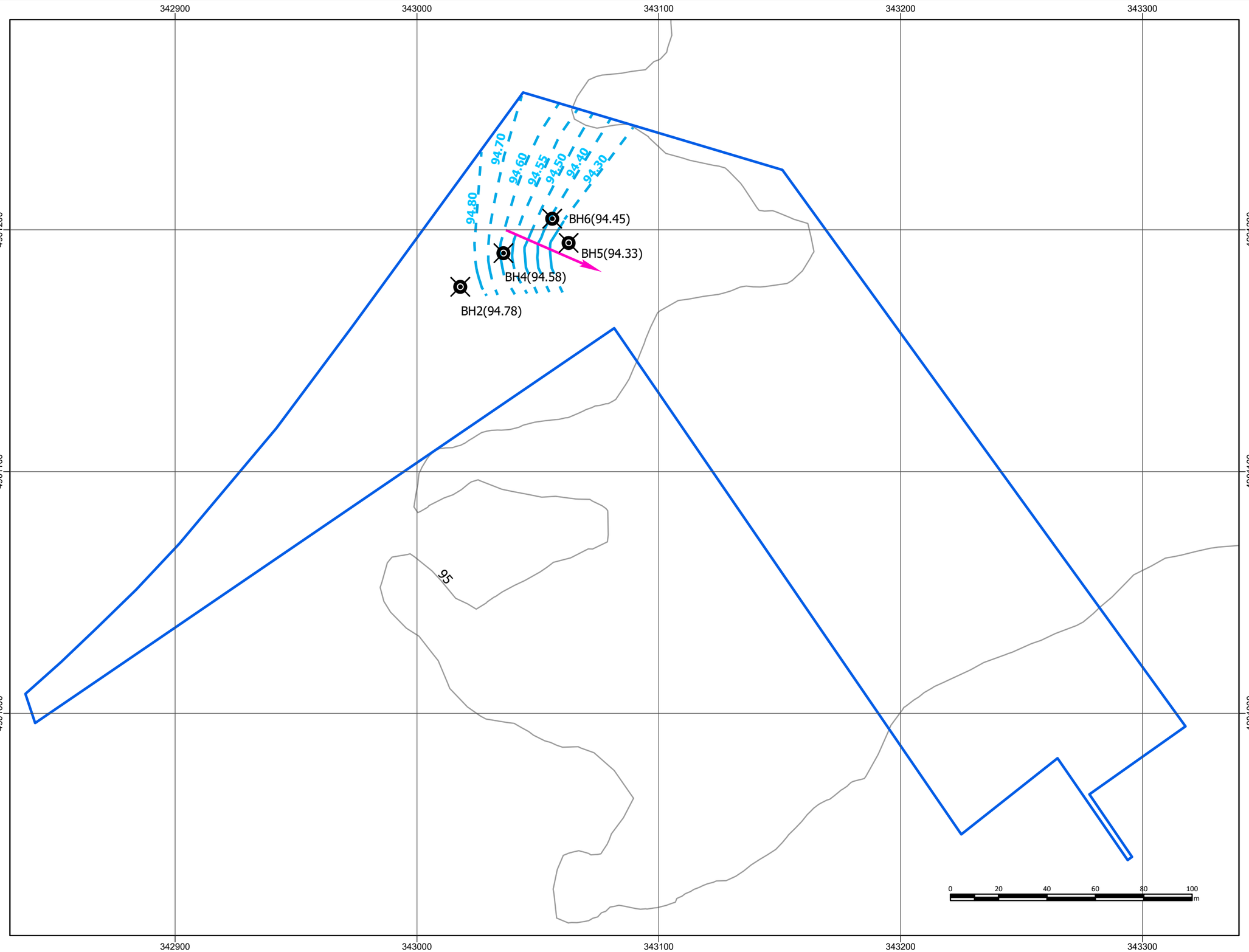
- Approximate Site Location
- Boreholes
- Boreholes with Monitoring Wells
- Test Pits

Project Title:
Hydrogeological Investigation

Site Location:
240 Marilyn Avenue
Napanee, Ontario

Figure Title:
Borehole and Monitoring Well Plan

Designed By: MM	*File No.:* 02209049.000-0104
Drawn By: HK	*Scale:* As Shown
Reviewed By: SO	*Figure No.:* 2
Date: Feb 2023	



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References:

Service Layer Credits: © Topography, Water Body and Watercourse Map was Produced by Englobe Corp. under license from the Ministry of Ministry of Natural Resources and Forestry (MNRF). Copyright (c) is hold by the Queen's Printer for Ontario 2015.

Notes:

Legend:

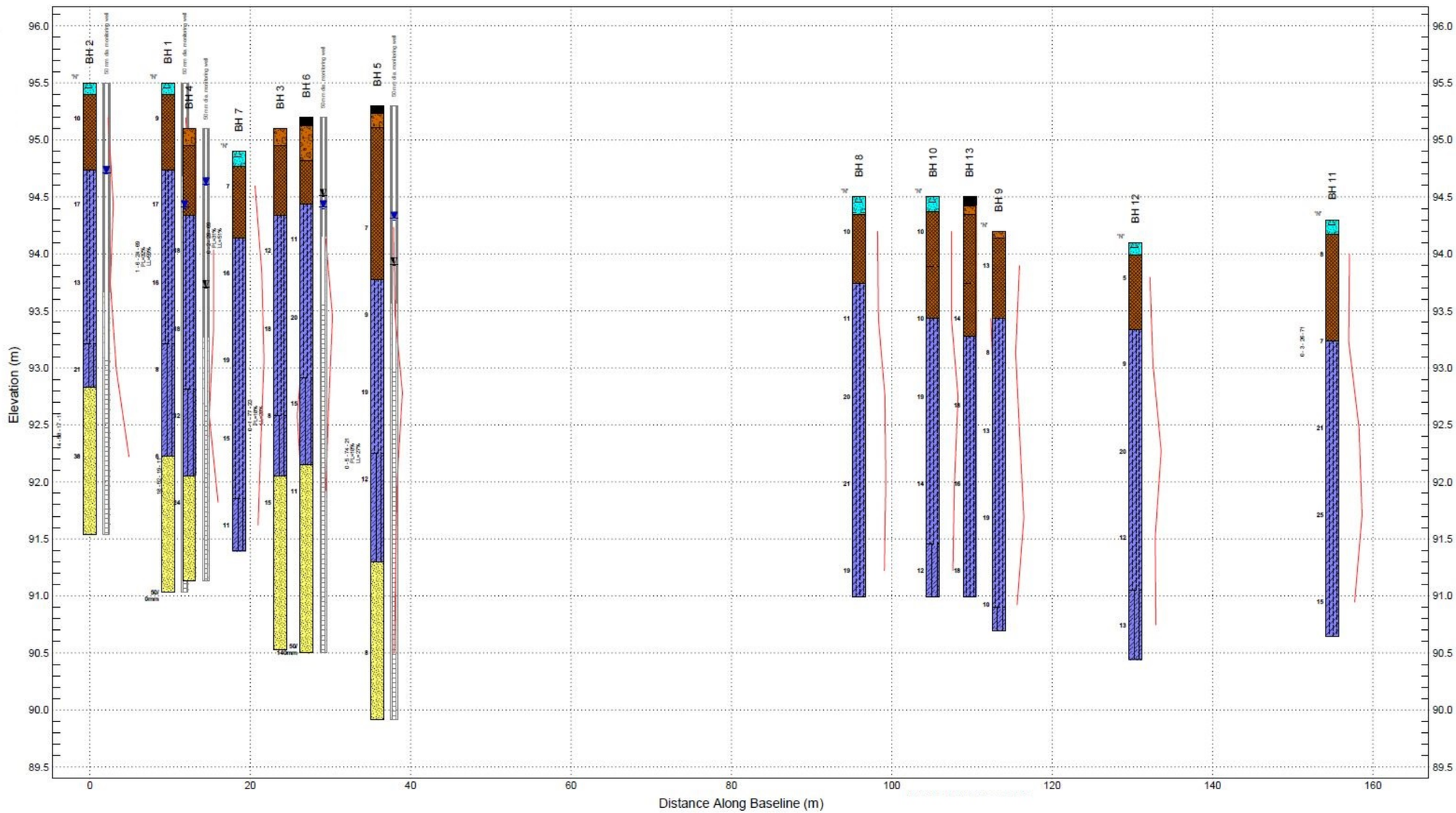
- Approximate Site Location
- Interpreted Groundwater Contours
- Inferred Groundwater Contours
- Interpreted Groundwater Flow Direction
- Town of Napanee, Topographic Contours

Project Title:
Hydrogeological Assessment

Site Location:
240 Marilyn Avenue
Napanee, Ontario

Figure Title:
Groundwater Flow Direction

Designed By: MM	*File No.:* 02209049.000.0104
Drawn By: HK	*Scale:* As Shown
Reviewed By: SO	*Figure No.:* 3
Date: Feb 2023	



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References:

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Key Map

Notes:

Legend:

Approximate Site Location

LITHOLOGY GRAPHIC LEGEND

Topsoil, Sand, Fill, Aggregate, Silty Clay, Asphalt, Clayey Silt

INTERPRETIVE LEGEND

WL on completion of drilling

Stabilized WL, most recent

FILL

GRAVELS (gravel to gravelly sand)

SILT TO SAND (not till)

COHESIONLESS TILLS

COHESIVE SOILS (clayey silt to clay, incl. tills)

DISTURBED/REWORKED SOILS

Project Title:
Hydrogeological Investigation

Site Location:
240 Marilyn Avenue
Napanee, Ontario

Figure Title:
Sub Surface Profile

Designed By: MM	*File No.:* 02209049.000.0104
Drawn By: HK	*Scale:* As Shown
Reviewed By: SO	*Figure No.:* 4
Date: Feb 2023	

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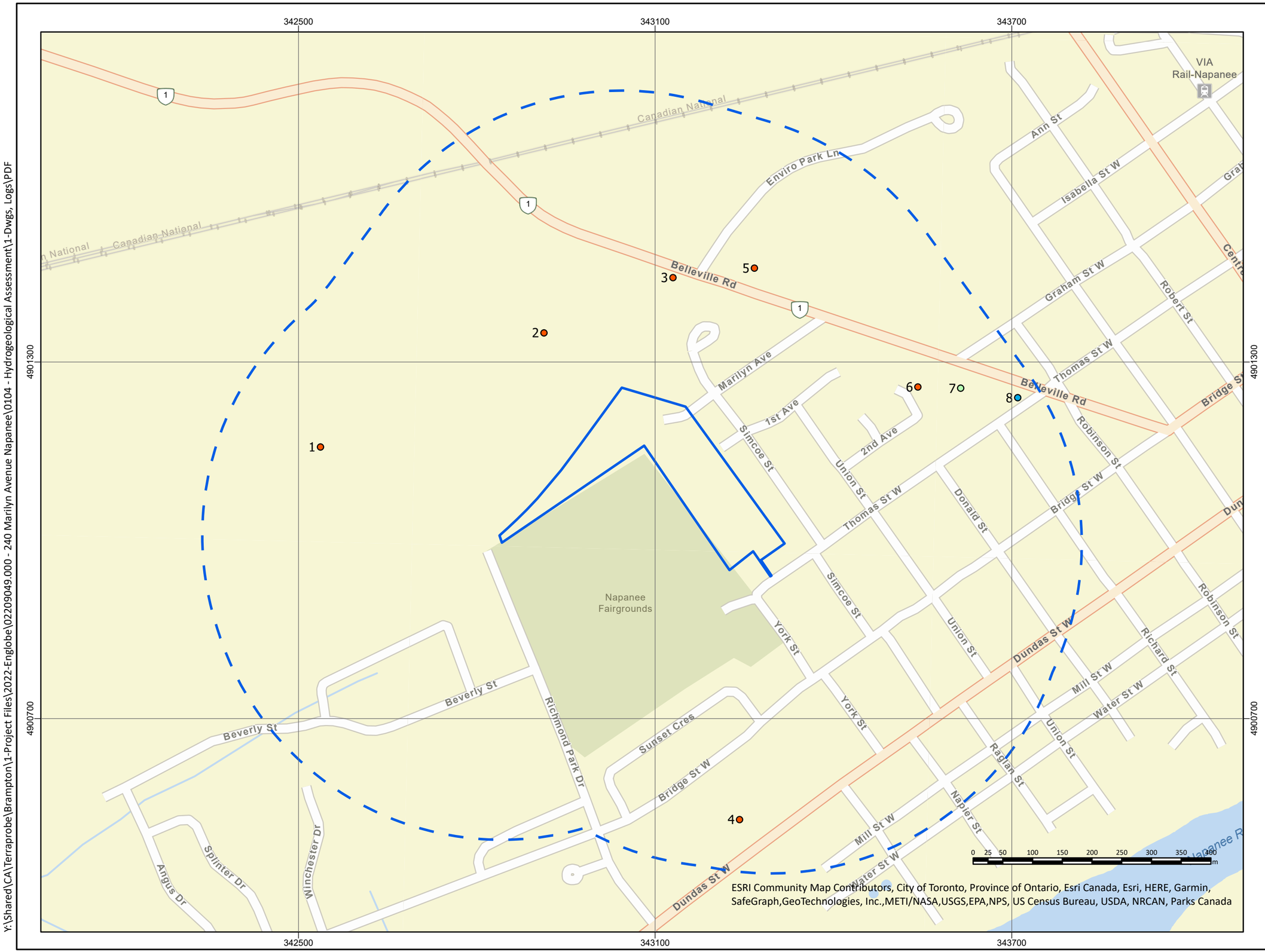

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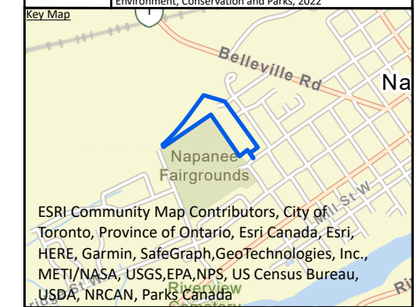
References:
ESRI, DigitalGlobe, GeoEye, EarthstarGeographics, CNES/Airbus Ds, USDA,USGS, AeroGRID, IGN and the GIS User Community produced by Englobe Corp. Copyright (c) King's Printer of Ontario. Water Well Information System Ministry of the Environment, Conservation and Parks, 2022

Key Map



Notes:

Legend:

- Approximate Site Location
- 500 m Study Area

MECP Wells-Final Status

- Unknown
- Monitoring & Test Hole
- Water Supply

Project Title: Hydrogeological Assessment

Site Location: 240 Marilyn Avenue, Napanee, Ontario

Figure Title: MECP Well Records Map

Designed By: MM	*File No.:* 02209049.000.0104
Drawn By: HK	*Scale:* As Shown
Reviewed By: SO	*Figure No.:* 5
Date: Feb 2023	

APPENDIX A

TERRAPROBE INC.

LOG OF BOREHOLE 1

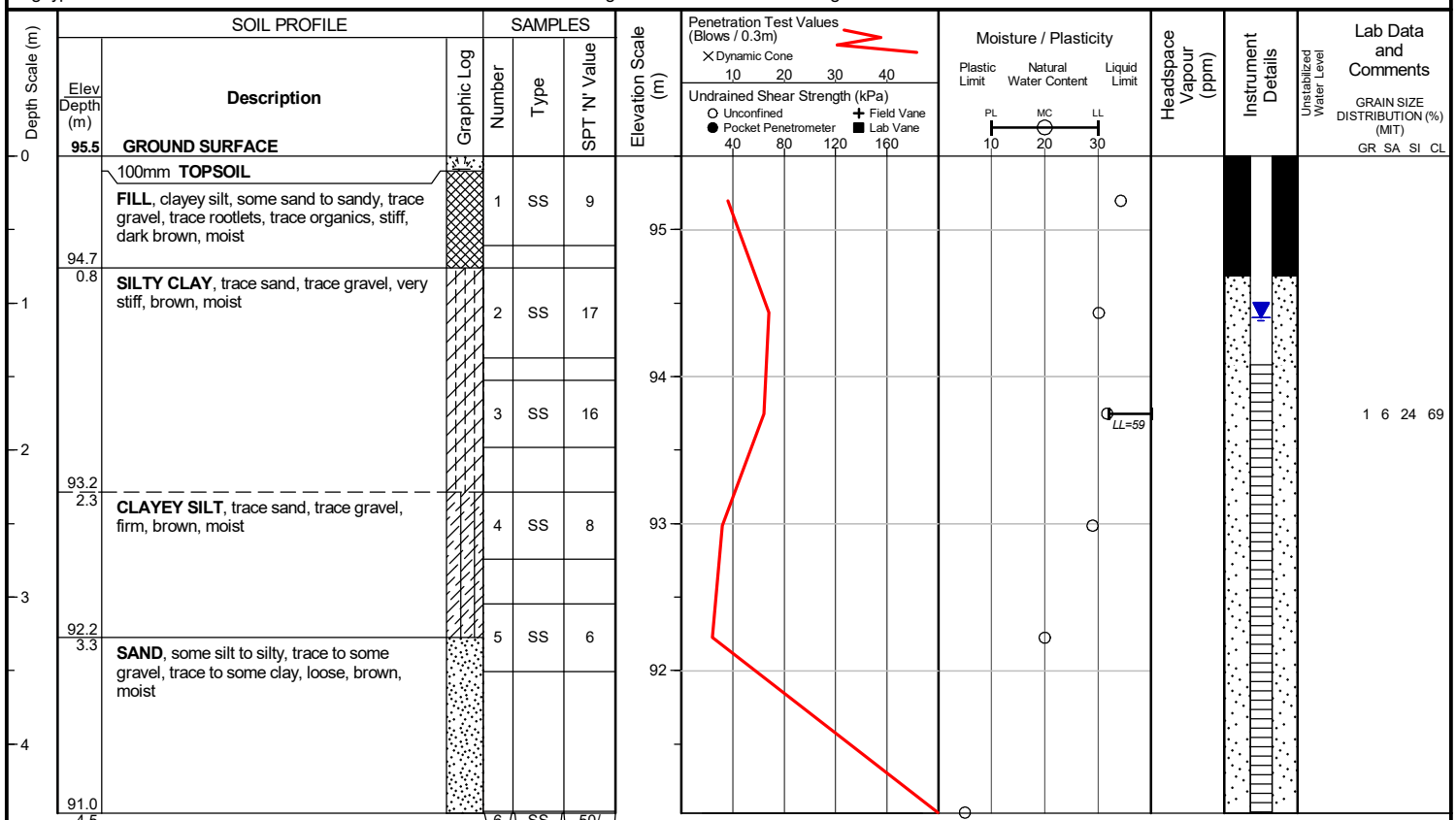
Terraprobe

Project No.	: 02209049.000	Client	: Infrastructure Ontario	Originated by	: OH
Date started	: December 15, 2022	Project	: 240 Marilyn Avenue	Compiled by	: MR
Sheet No.	: 1 of 1	Location	: Napanee, Ontario	Checked by	: MMT

Position : E: 343025, N: 4901165 (UTM 18T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Elev Depth (m)	Description	Number	Type	SPT 'N' Value
95.5	**GROUND SURFACE**			
	100mm **TOPSOIL**			
	FILL, clayey silt, some sand to sandy, trace gravel, trace rootlets, trace organics, stiff, dark brown, moist	1	SS	9
94.7 / 0.8	**SILTY CLAY**, trace sand, trace gravel, very stiff, brown, moist	2	SS	17
		3	SS	16
93.2 / 2.3	**CLAYEY SILT**, trace sand, trace gravel, firm, brown, moist	4	SS	8
		5	SS	6
92.2 / 3.3	**SAND**, some silt to silty, trace to some gravel, trace to some clay, loose, brown, moist			
91.0 / 4.5		6	SS	50/ 0mm



END OF BOREHOLE
Auger refusal on inferred bedrock

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jan 25, 2023	1.1	94.4
Jan 27, 2023	1.1	94.4

file: 02209049.000 bh logs.gpj

LOG OF BOREHOLE 2

Terraprobe

Project No.	: 02209049.000	Client	: Infrastructure Ontario	Originated by	: OH
Date started	: December 15, 2022	Project	: 240 Marilyn Avenue	Compiled by	: MR
Sheet No.	: 1 of 1	Location	: Napanee, Ontario	Checked by	: MMT

Position : E: 343018, N: 4901175 (UTM 18T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Elev Depth (m)	Description	Number	Type	SPT 'N' Value
95.5	**GROUND SURFACE**			
	100mm **TOPSOIL**			
	FILL, clayey silt, some sand to sandy, trace gravel, trace rootlets, trace organics, stiff, dark brown, moist	1	SS	10
94.7 / 0.8	**SILTY CLAY**, trace sand, trace gravel, stiff to very stiff, brown, moist	2	SS	17
		3	SS	13
93.2 / 2.3	**CLAYEY SILT**, trace sand, trace gravel, stone pieces, very stiff, brown, moist	4	SS	21
92.8 / 2.7	**SAND**, some silt to silty, trace to some gravel, trace to some clay, stone pieces, compact to dense, brown, moist	5	SS	38
91.5 / 4.0				

Depth Scale (m): 0, 1, 2, 3

Elevation Scale (m): 95, 94, 93, 92

Penetration Test Values (Blows / 0.3m): Dynamic Cone; Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane

Moisture / Plasticity: Plastic Limit (PL), Natural Water Content (MC), Liquid Limit (LL)

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments — GRAIN SIZE DISTRIBUTION (%) (MIT): GR SA SI CL

Number	GR	SA	SI	CL
5	14	58	17	11

END OF BOREHOLE
Auger refusal on inferred bedrock

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jan 25, 2023	0.8	94.7
Jan 27, 2023	0.8	94.7

file: 02209049.000 bh logs.gpj

LOG OF BOREHOLE 3

Terraprobe

Project No.	: 02209049.000	Client	: Infrastructure Ontario	Originated by	: OH
Date started	: December 15, 2022	Project	: 240 Marilyn Avenue	Compiled by	: MR
Sheet No.	: 1 of 1	Location	: Napanee, Ontario	Checked by	: MMT

Position : E: 343044, N: 4901178 (UTM 18T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Elev Depth (m)	Description	Number	Type	SPT 'N' Value
95.1	**GROUND SURFACE**			
94.9 / 0.2	150mm **AGGREGATE**			
	FILL, clayey silt, some sand to sandy, trace gravel, trace rootlets, trace organics, dark brown, moist	1	AS	
94.3 / 0.8	**SILTY CLAY**, trace sand, trace gravel, stiff to very stiff, brown, moist	2	SS	12
		3	SS	18
92.6 / 2.5	**CLAYEY SILT**, trace sand, trace gravel, stiff, brown, moist	4A, 4B	SS	8
92.1 / 3.0	**SAND**, some silt to silty, trace to some gravel, trace to some clay, compact, brown, moist	5	SS	15
90.5 / 4.6				

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) 10, Natural Water Content (MC) 20, Liquid Limit (LL) 30

Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Number	GR	SA	SI	CL
4A, 4B	0	1	77	22

END OF BOREHOLE
Auger refusal on inferred bedrock

Borehole was dry and open upon completion of drilling.

LOG OF BOREHOLE 4

Terraprobe

Project No.	: 02209049.000	Client	: Infrastructure Ontario	Originated by	: OH
Date started	: December 15, 2022	Project	: 240 Marilyn Avenue	Compiled by	: MR
Sheet No.	: 1 of 1	Location	: Napanee, Ontario	Checked by	: MMT

Position : E: 343036, N: 4901190 (UTM 18T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
0	95.1	**GROUND SURFACE**					
	94.9 / 0.2	150mm **AGGREGATE**					
		FILL, clayey silt, some sand to sandy, trace gravel, trace rootlets, trace organics, dark brown, moist		1	AS		
	94.3 / 0.8	**SILTY CLAY**, trace sand, trace gravel, very stiff, brown, moist		2	SS	18	
1				3	SS	18	
2	92.8 / 2.3	**CLAYEY SILT**, trace sand, trace gravel, stiff, brown, moist		4	SS	12	
3	92.1 / 3.0	**SAND**, some silt to silty, trace to some gravel, trace to some clay, compact, brown, moist		5	SS	24	18 52 19 11
	91.1 / 4.0						

Elevation Scale (m): 95, 94, 93, 92

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) 10, Natural Water Content (MC) 20, Liquid Limit (LL) 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

END OF BOREHOLE
Auger refusal on inferred bedrock

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jan 25, 2023	1.4	93.7
Jan 27, 2023	0.5	94.6

file: 02209049.000 bh logs.gpj

Terraprobe

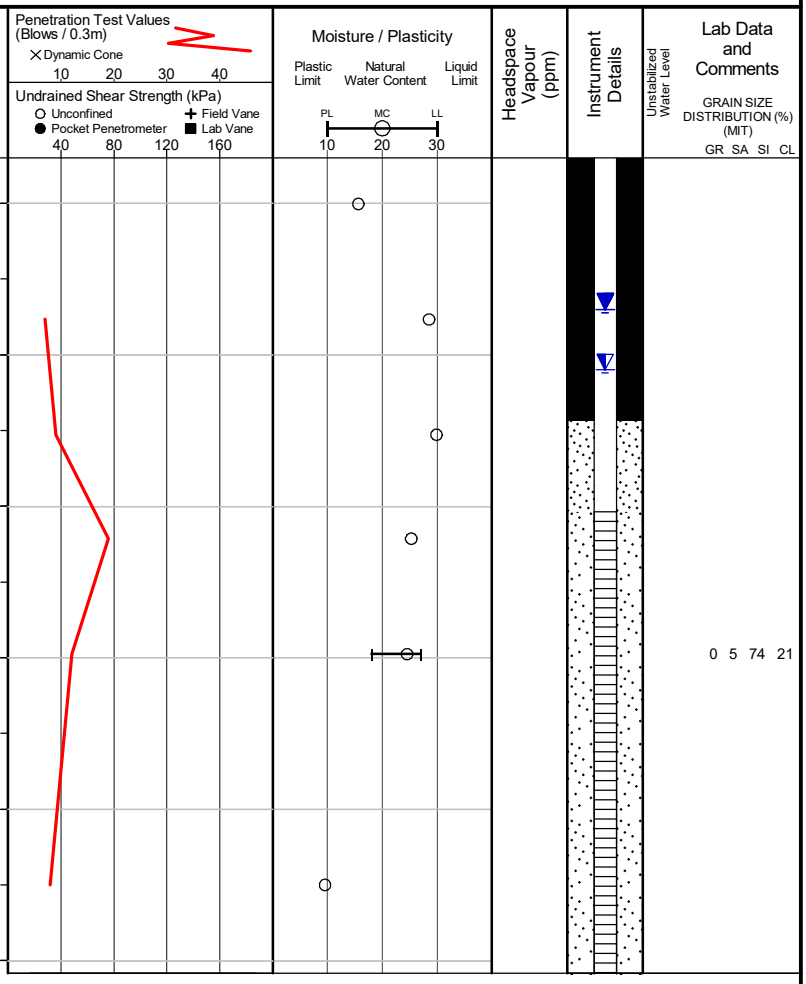
LOG OF BOREHOLE 5

Project No.	: 02209049.000	Client	: Infrastructure Ontario	Originated by	: OH
Date started	: December 15, 2022	Project	: 240 Marilyn Avenue	Compiled by	: MR
Sheet No.	: 1 of 1	Location	: Napanee, Ontario	Checked by	: MMT

Position : E: 343062, N: 4901194 (UTM 18T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Elev Depth (m)	Description	Number	Type	SPT 'N' Value
95.3	**GROUND SURFACE**			
95.1 / 0.2	65mm **ASPHALTIC CONCRETE** / 125mm **AGGREGATE**			
	FILL, clayey silt, some sand to sandy, trace gravel, trace rootlets, trace organics, firm, dark brown, moist	1	AS	
		2	SS	7
93.8 / 1.5	**SILTY CLAY**, trace sand, trace gravel, stiff to very stiff, brown, moist	3	SS	9
		4	SS	19
92.3 / 3.0	**CLAYEY SILT**, trace sand, trace gravel, stiff, brown, moist	5	SS	12
91.3 / 4.0	**SAND**, some silt to silty, trace to some gravel, trace to some clay, stone pieces, loose, brown, wet	6	SS	8
89.9 / 5.4				



END OF BOREHOLE
Auger refusal on inferred bedrock

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jan 25, 2023	1.4	93.9
Jan 27, 2023	1.0	94.3

file: 02209049.000 bh logs.gpj

LOG OF BOREHOLE 6

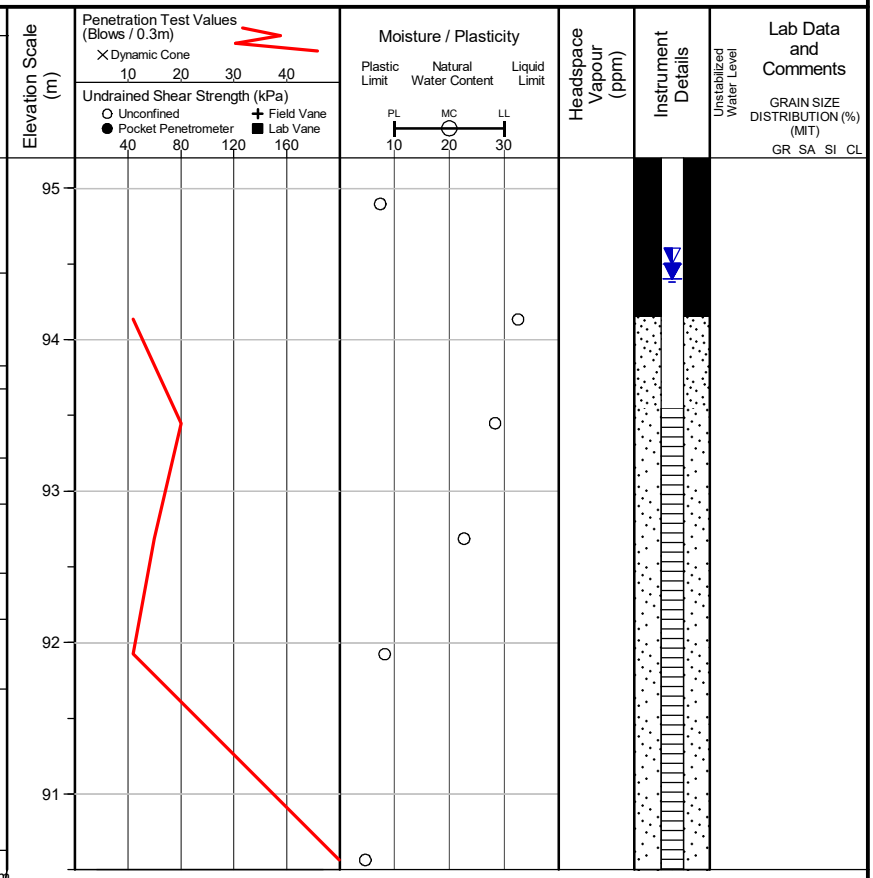
Terraprobe

Project No.	: 02209049.000	Client	: Infrastructure Ontario	Originated by	: OH
Date started	: December 15, 2022	Project	: 240 Marilyn Avenue	Compiled by	: MR
Sheet No.	: 1 of 1	Location	: Napanee, Ontario	Checked by	: MMT

Position : E: 343056, N: 4901204 (UTM 18T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
95.2	**GROUND SURFACE**				
	80mm **ASPHALTIC CONCRETE**				
94.8	300mm **AGGREGATE**		1	AS	
0.4 / 94.4	**FILL**, silty sand, trace to some clay, trace gravel, trace organics, dark brown, moist				
0.8	**SILTY CLAY**, trace sand, trace gravel, stiff to very stiff, brown, moist		2	SS	11
			3	SS	20
92.9					
2.3	**CLAYEY SILT**, trace sand, trace gravel, stiff, brown, moist		4	SS	15
92.2					
3.0	**SAND**, some silt to silty, trace to some gravel, trace to some clay, compact, brown, moist		5	SS	11
90.5	...lime stone pieces inclusion, very dense		6	SS	50/140mm
4.7					



END OF BOREHOLE
Auger refusal on inferred bedrock

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jan 25, 2023	0.7	94.5
Jan 27, 2023	0.8	94.4

file: 02209049.000 bh logs.gpj

Terraprobe

LOG OF BOREHOLE 7

Project No.	: 02209049.000	Client	: Infrastructure Ontario	Originated by	: OH
Date started	: December 14, 2022	Project	: 240 Marilyn Avenue	Compiled by	: MR
Sheet No.	: 1 of 1	Location	: Napanee, Ontario	Checked by	: MMT

Position : E: 343055, N: 4901228 (UTM 18T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity (PL, MC, LL)	Headspace Vapour (ppm)	Instrument Details	Unstabilized Water Level	Lab Data and Comments / GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
0	94.9	**GROUND SURFACE**											
		125mm **TOPSOIL**											
		FILL, clayey silt, some sand to sandy, trace gravel, trace rootlets, trace organics, firm, dark brown, moist		1	SS	7			41				
	94.1 / 0.8	**SILTY CLAY**, trace sand, trace gravel, very stiff, brown, moist		2	SS	16	94		LL=51				0 2 29 69
1				3	SS	19	93						
2				4	SS	15	92						
3	91.9 / 3.0	**CLAYEY SILT**, trace sand, trace gravel, stiff, brown, moist		5	SS	11							
	91.4 / 3.5	**END OF BOREHOLE**											

Penetration Test Values (Blows / 0.3m): × Dynamic Cone; 10 20 30 40

Undrained Shear Strength (kPa): ○ Unconfined, ● Pocket Penetrometer, + Field Vane, ■ Lab Vane; 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) 10, Natural Water Content (MC) 20, Liquid Limit (LL) 30

Borehole was dry and open upon completion of drilling.

file: 02209049.000 bh logs.gpj

LOG OF BOREHOLE 8

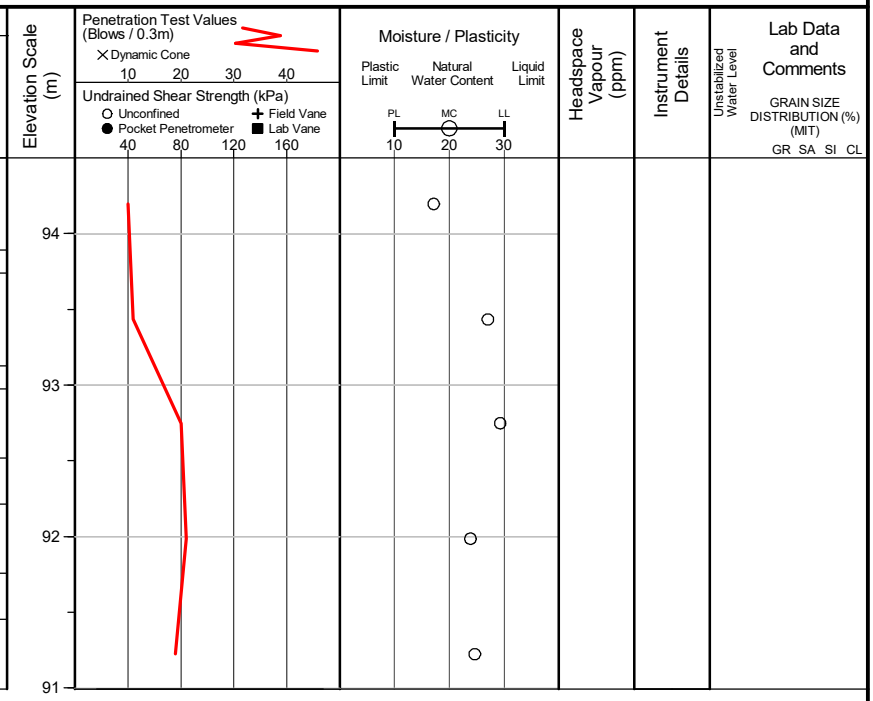
Terraprobe

Project No.	: 02209049.000	Client	: Infrastructure Ontario	Originated by	: OH
Date started	: December 14, 2022	Project	: 240 Marilyn Avenue	Compiled by	: MR
Sheet No.	: 1 of 1	Location	: Napanee, Ontario	Checked by	: MMT

Position : E: 343119, N: 4901175 (UTM 18T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Sample Number	Type	SPT 'N' Value
0	94.5	**GROUND SURFACE**				
	94.3 / 0.2	150mm **TOPSOIL**				
		FILL, clayey silt, some sand to sandy, trace gravel, trace rootlets, trace organics, stiff, dark brown, moist		1	SS	10
	93.7 / 0.8	**SILTY CLAY**, trace sand, trace gravel, stiff to very stiff, brown, moist		2	SS	11
1				3	SS	20
2				4	SS	21
3				5	SS	19
	91.0 / 3.5					



END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

file: 02209049.000 bh logs.gpj

LOG OF BOREHOLE 9

Terraprobe

Project No.	: 02209049.000	Client	: Infrastructure Ontario	Originated by	: OH
Date started	: December 14, 2022	Project	: 240 Marilyn Avenue	Compiled by	: MR
Sheet No.	: 1 of 1	Location	: Napanee, Ontario	Checked by	: MMT

Position : E: 343136, N: 4901171 (UTM 18T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)	Lab Data and Comments (GR SA SI CL)
0	94.2	**GROUND SURFACE**					94	
		65mm **AGGREGATE**						
		FILL, clayey silt, some sand to sandy, trace gravel, trace rootlets, trace organics, stiff, dark brown, moist		1	SS	13		
	93.4 / 0.8	**SILTY CLAY**, trace sand, trace gravel, stiff to very stiff, brown, moist		2	SS	8	93	
1				3	SS	13		0 7 33 60
2				4	SS	19	92	
3	90.9 / 3.3			5	SS	10	91	
	90.7 / 3.5	**CLAYEY SILT**, trace sand, trace gravel, stiff, brown, moist						

Penetration Test Values (Blows / 0.3m): × Dynamic Cone; 10 20 30 40

Undrained Shear Strength (kPa): ○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane; 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) 10; Natural Water Content (MC) 20; Liquid Limit (LL) 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT)

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

Terraprobe

LOG OF BOREHOLE 10

Project No.	: 02209049.000	Client	: Infrastructure Ontario	Originated by	: OH
Date started	: December 14, 2022	Project	: 240 Marilyn Avenue	Compiled by	: MR
Sheet No.	: 1 of 1	Location	: Napanee, Ontario	Checked by	: MMT

Position : E: 343130, N: 4901179 (UTM 18T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0	94.5	**GROUND SURFACE**				
		125mm **TOPSOIL**				
	93.9 / 0.6	**FILL**, silty sand, trace to some clay, trace gravel, trace organics, loose, dark brown, moist		1	SS	10
1	93.4 / 1.1	**FILL**, clayey silt, some sand to sandy, trace gravel, trace rootlets, trace organics, stiff, dark brown, moist		2	SS	10
		SILTY CLAY, trace sand, trace gravel, stiff to very stiff, brown, moist		3	SS	19
2				4	SS	14
3	91.5 / 3.0	**CLAYEY SILT**, trace sand, trace gravel, stiff, brown, moist		5	SS	12
	91.0 / 3.5	**END OF BOREHOLE**				

Elevation Scale (m): 94, 93, 92, 91

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) 10, Natural Water Content (MC) 20, Liquid Limit (LL) 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT): GR SA SI CL

Borehole was dry and open upon completion of drilling.

file: 02209049.000 bh logs.gpj

Terraprobe

LOG OF BOREHOLE 11

Project No.	: 02209049.000	Client	: Infrastructure Ontario	Originated by	: OH
Date started	: December 14, 2022	Project	: 240 Marilyn Avenue	Compiled by	: MR
Sheet No.	: 1 of 1	Location	: Napanee, Ontario	Checked by	: MMT

Position : E: 343167, N: 4901132 (UTM 18T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Sample Number	Type	SPT 'N' Value	Elevation Scale (m)	Lab Data and Comments (GR SA SI CL)
0	94.3	**GROUND SURFACE**						
		125mm **TOPSOIL**						
		FILL, clayey silt, some sand to sandy, trace gravel, trace rootlets, trace organics, firm, dark brown, moist		1	SS	8	94	
1	93.2 / 1.1			2A	SS	7		
		SILTY CLAY, trace sand, trace gravel, firm to very stiff, brown, moist		2B			93	0 3 26 71
2				3	AS	21		
							92	
3				4	AS	25		
				5	SS	15	91	
	90.6 / 3.7							

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) 10, Natural Water Content (MC) 20, Liquid Limit (LL) 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

GRAIN SIZE DISTRIBUTION (%) (MIT)

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

file: 02209049.000 bh logs.gpj

Terraprobe

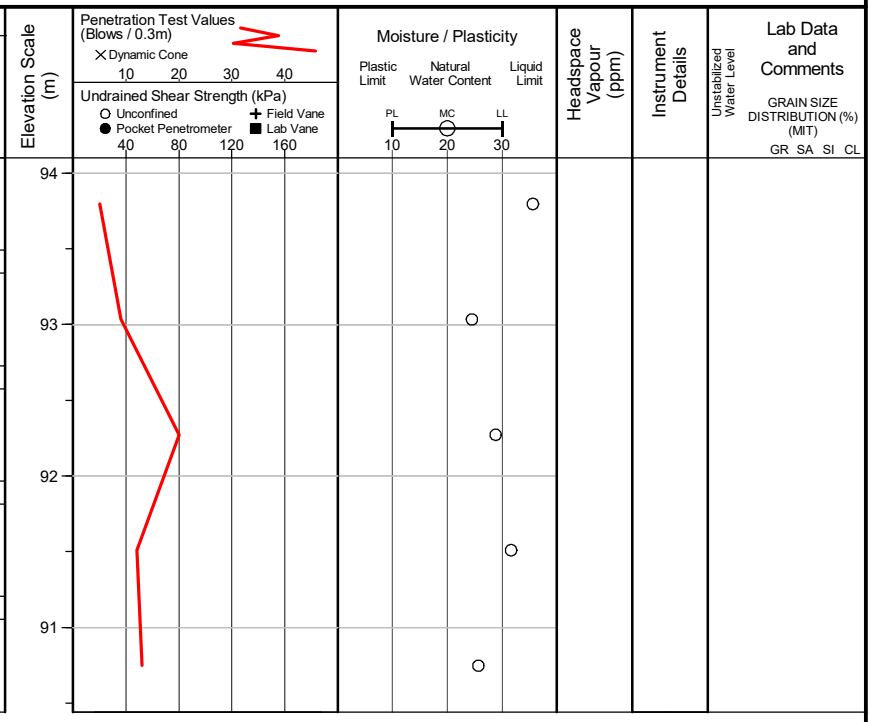
LOG OF BOREHOLE 12

Project No.	: 02209049.000	Client	: Infrastructure Ontario	Originated by	: OH
Date started	: December 14, 2022	Project	: 240 Marilyn Avenue	Compiled by	: MR
Sheet No.	: 1 of 1	Location	: Napanee, Ontario	Checked by	: MMT

Position : E: 343149, N: 4901156 (UTM 18T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0	94.1	**GROUND SURFACE**				
		115mm **TOPSOIL**				
		FILL, clayey silt, some sand to sandy, trace gravel, trace rootlets, trace organics, firm, dark brown, moist		1	SS	5
	93.3 / 0.8	**SILTY CLAY**, trace sand, trace gravel, stiff to very stiff, brown, moist		2	SS	9
1				3	SS	20
2				4	SS	12
3	91.1 / 3.0	**CLAYEY SILT**, trace sand, trace gravel, stiff, brown, moist		5	SS	13
	90.4 / 3.7	**END OF BOREHOLE**				



Borehole was dry and open upon completion of drilling.

file: 02209049.000 bh logs.gpj

LOG OF BOREHOLE 13

Terraprobe

Project No.	: 02209049.000	Client	: Infrastructure Ontario	Originated by	: OH
Date started	: December 14, 2022	Project	: 240 Marilyn Avenue	Compiled by	: MR
Sheet No.	: 1 of 1	Location	: Napanee, Ontario	Checked by	: MMT

Position : E: 343144, N: 4901207 (UTM 18T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0	94.5	**GROUND SURFACE**				
	94.3 / 0.2	75mm **ASPHALTIC CONCRETE**				
		75mm **AGGREGATE**		1	AS	
	93.7 / 0.8	**FILL**, silty sand, trace to some clay, trace gravel, trace organics, dark brown, moist				
1	93.3 / 1.2	**FILL**, clayey silt, some sand to sandy, trace gravel, trace rootlets, trace organics, stiff, dark brown, moist		2	SS	14
		SILTY CLAY, trace sand, trace gravel, stiff to very stiff, brown, moist		3	SS	18
2				4	SS	16
3	91.0 / 3.5			5	SS	18

Elevation Scale (m): 94, 93, 92, 91

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) 10, Natural Water Content (MC) 20, Liquid Limit (LL) 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

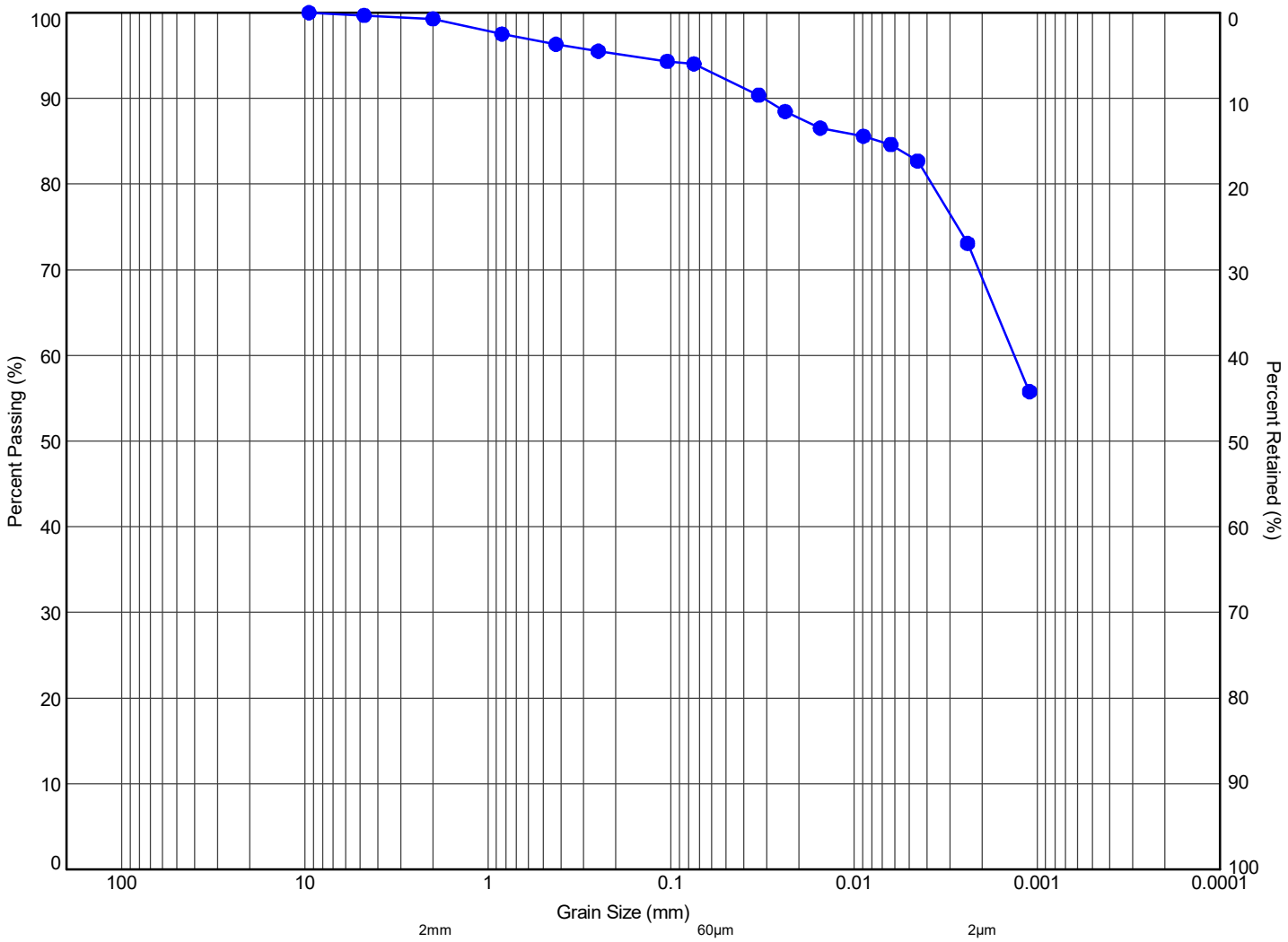
END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

file: 02209049.000 bh logs.gpj

APPENDIX B

TERRAPROBE INC.



MIT SYSTEM	COBBLES	GRAVEL			SAND			SILT	CLAY
		COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

MIT SYSTEM

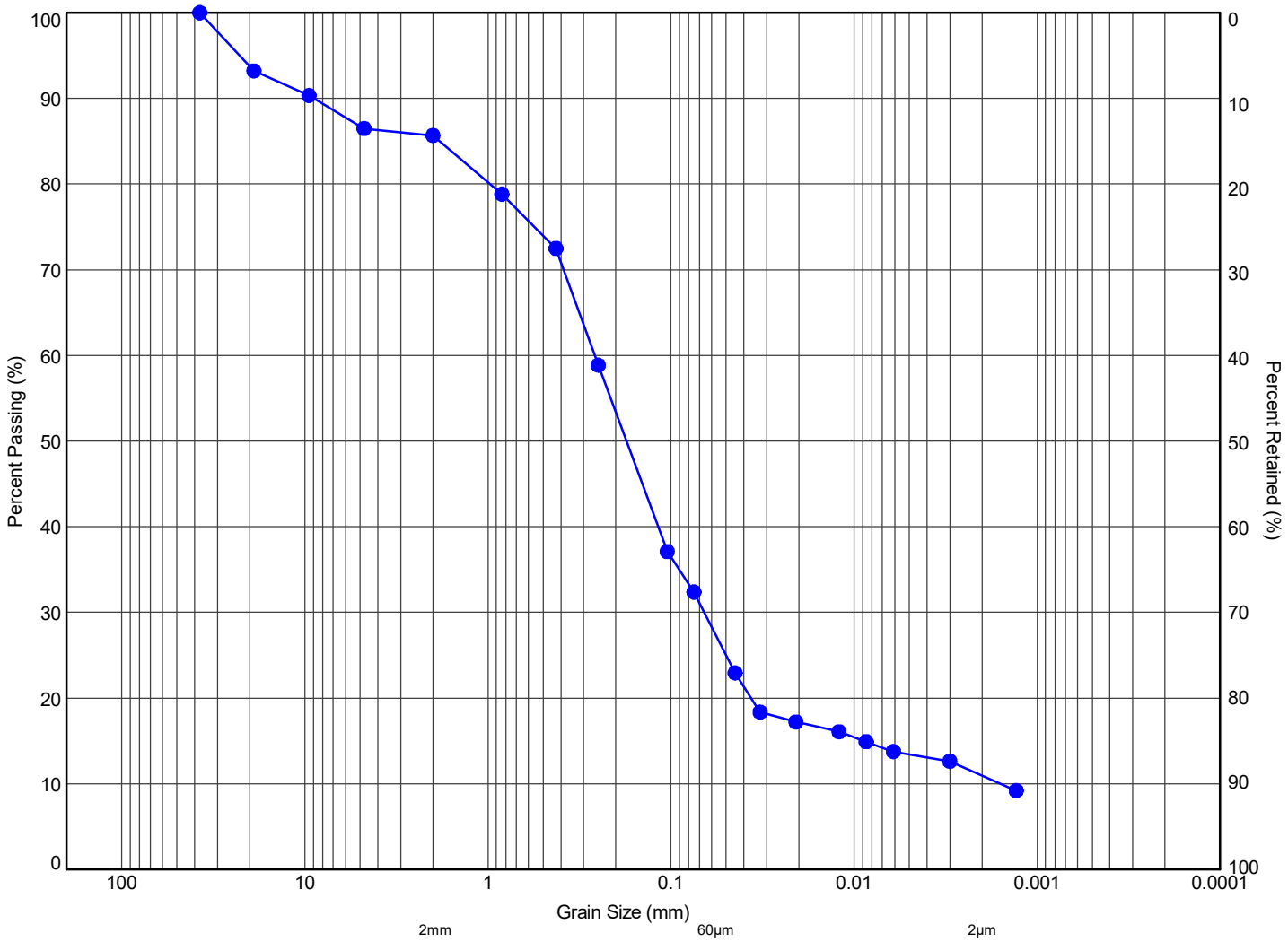
	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**1**	SS3	1.8	93.7	1	6	24	69	

Terraprobe
11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title:

GRAIN SIZE DISTRIBUTION
SILTY CLAY, TRACE SAND, TRACE GRAVEL

File No.: **02209049.000**



MIT SYSTEM	COBBLES	GRAVEL			SAND			SILT	CLAY
		COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

MIT SYSTEM

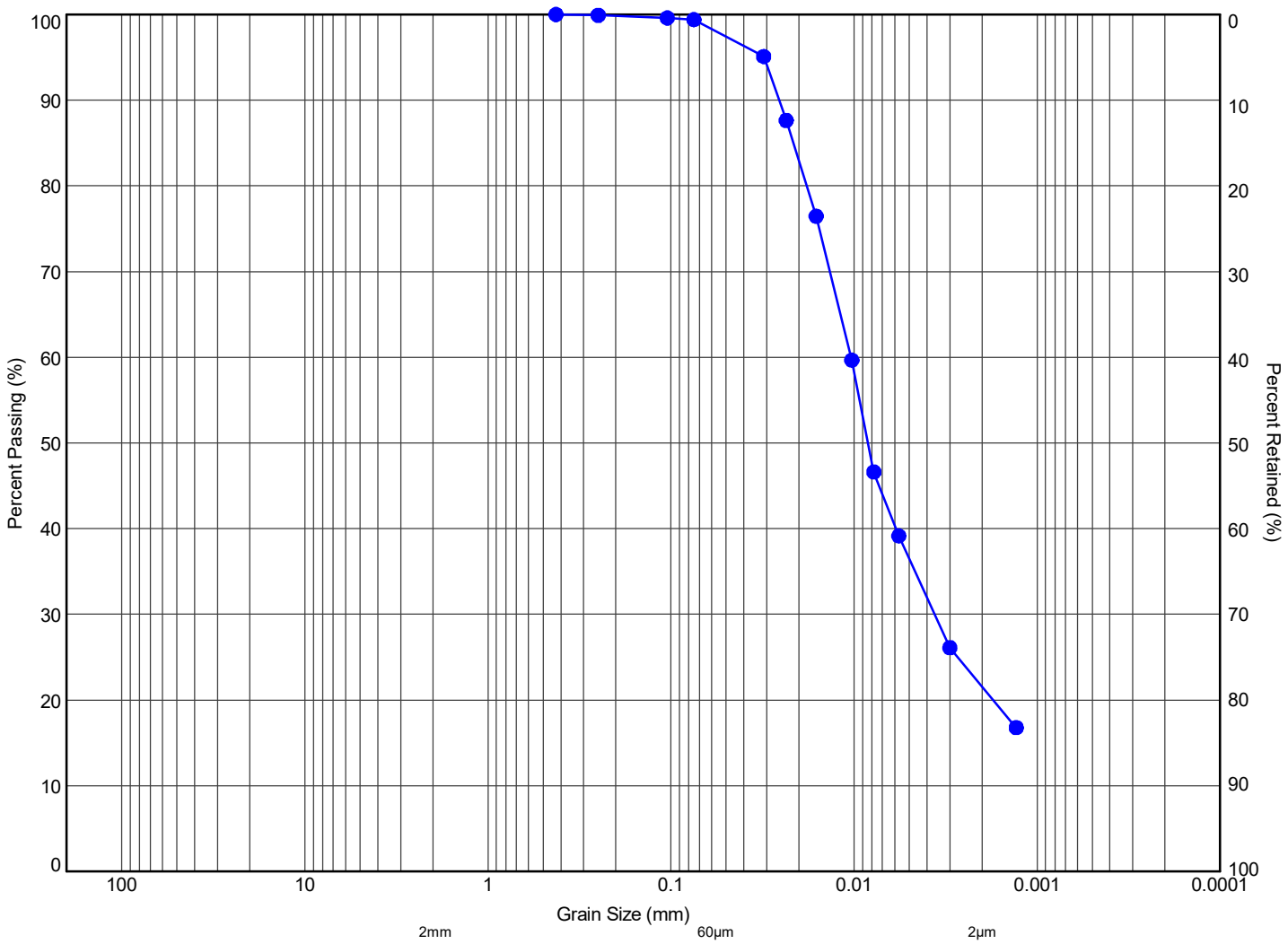
	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**2**	SS5	3.3	92.2	14	58	17	11	

Terraprobe
11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title:

GRAIN SIZE DISTRIBUTION
SAND, SOME SILT, SOME GRAVEL, SOME CLAY

File No.: **02209049.000**



MIT SYSTEM

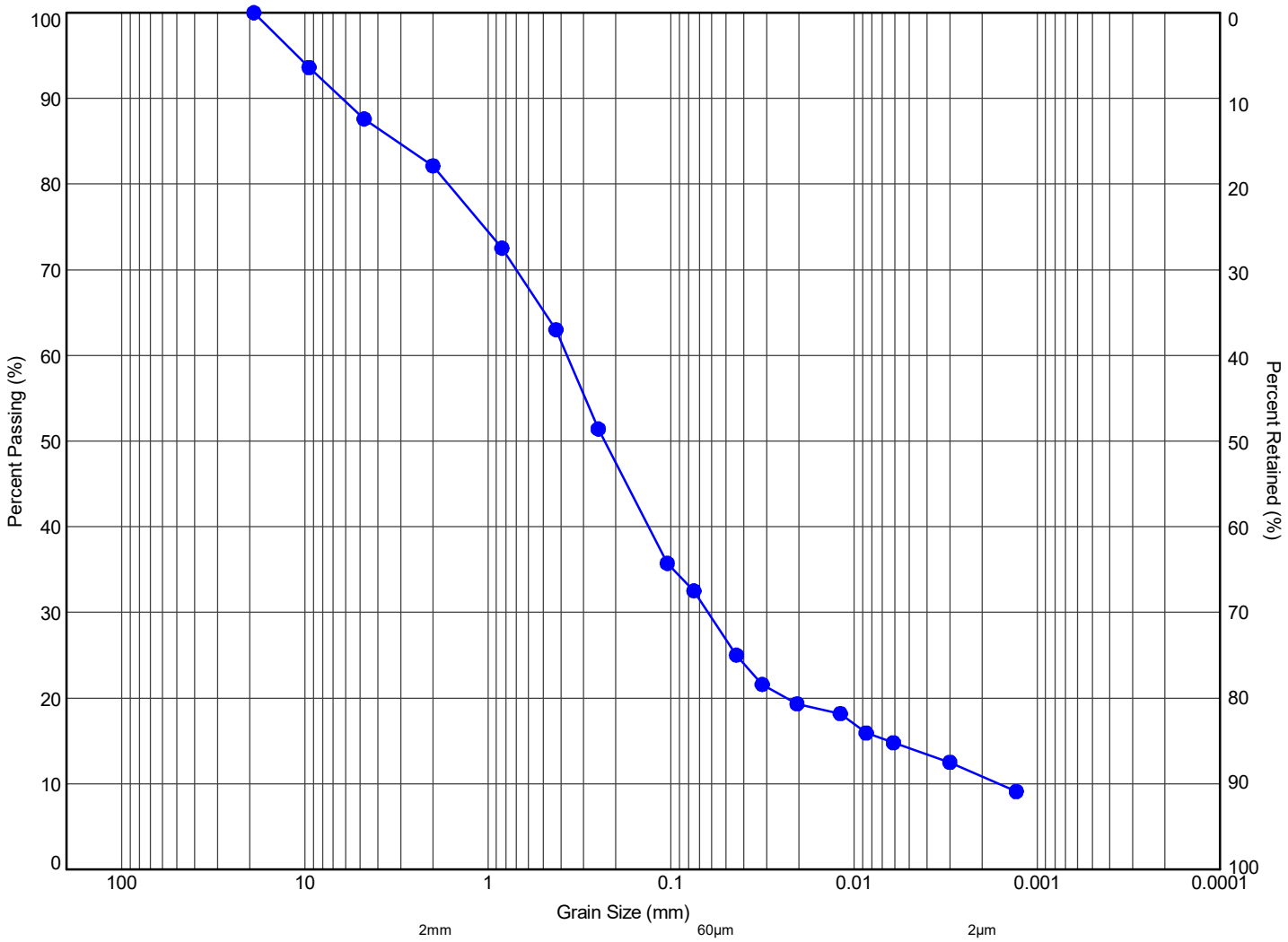
	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**3**	4B	2.6	92.5	0	1	77	22	

Terraprobe
11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title:

GRAIN SIZE DISTRIBUTION
CLAYEY SILT, TRACE SAND

File No.: **02209049.000**



MIT SYSTEM	COBBLES	GRAVEL			SAND			SILT	CLAY
		COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

MIT SYSTEM

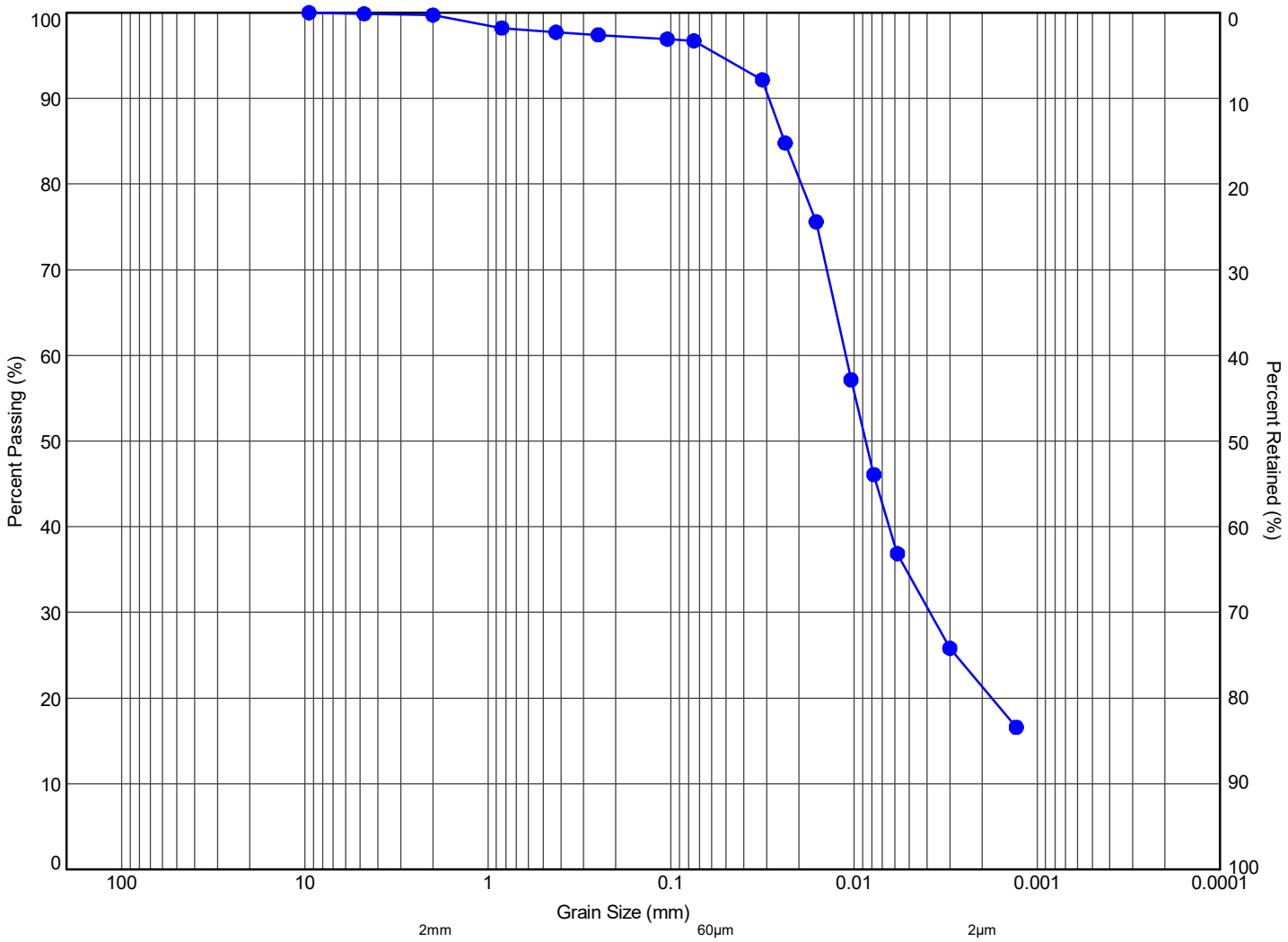
	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**4**	SS5	3.3	91.8	18	52	19	11	

Terraprobe
11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title:

GRAIN SIZE DISTRIBUTION
SAND, SOME SILT, SOME GRAVEL, SOME CLAY

File No.: **02209049.000**



MIT SYSTEM	COBBLES	GRAVEL			SAND			SILT	CLAY
		COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

MIT SYSTEM

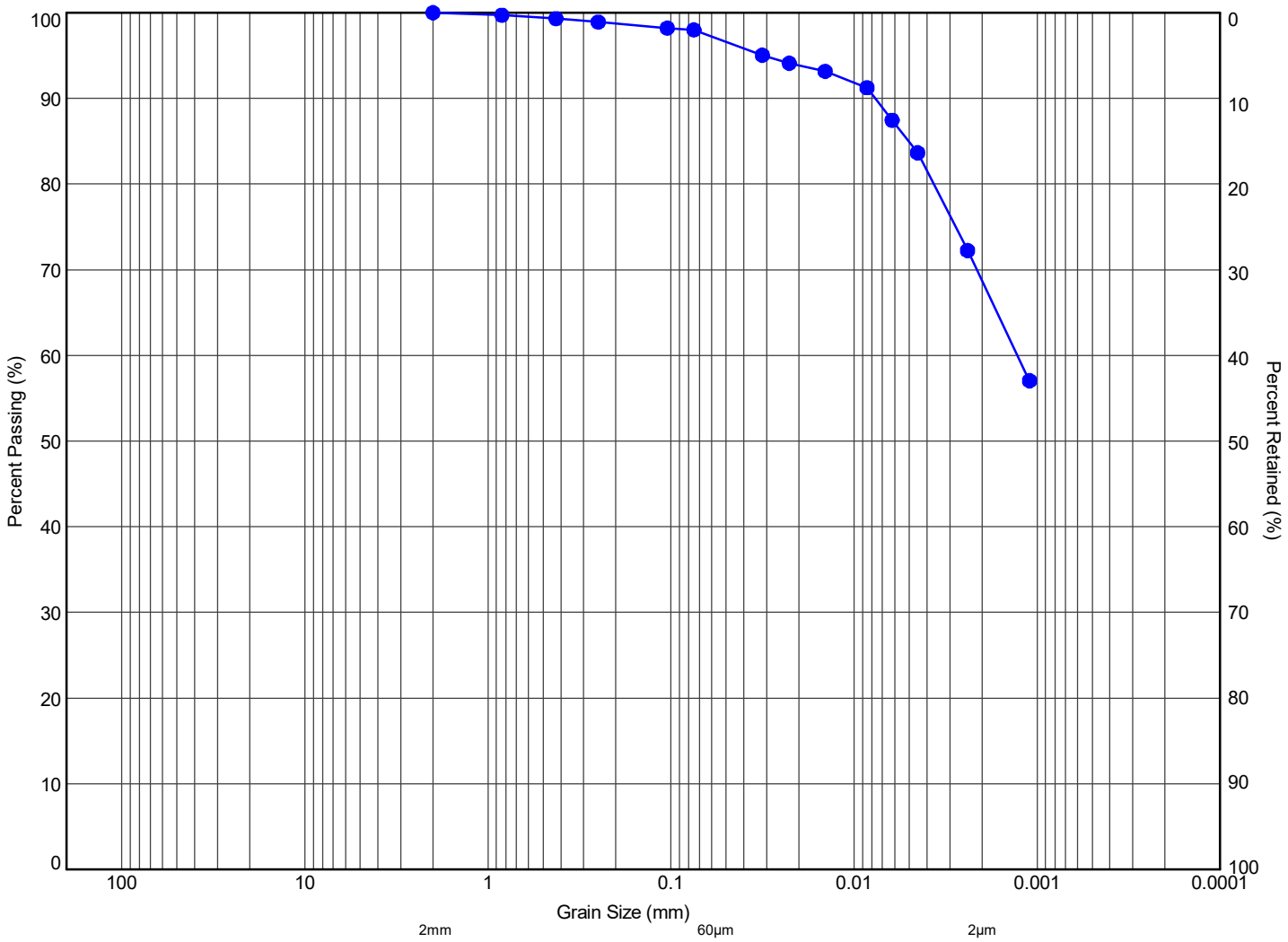
	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**5**	SS5	3.3	92.0	0	5	74	21	

Terraprobe
11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title:

GRAIN SIZE DISTRIBUTION
CLAYEY SILT, TRACE SAND

File No.: **02209049.000**



MIT SYSTEM	COBBLES	GRAVEL			SAND			SILT	CLAY
		COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

MIT SYSTEM

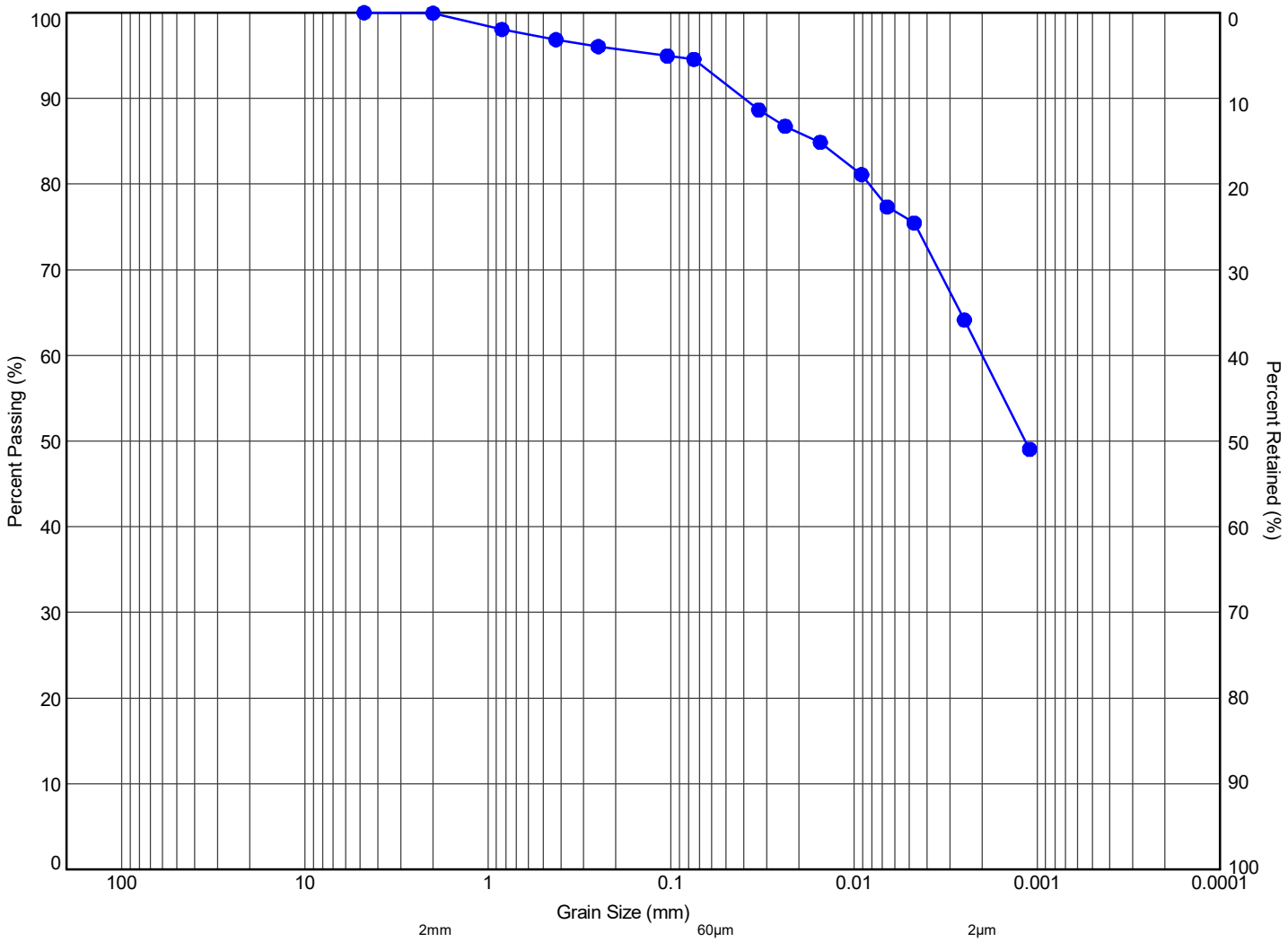
	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**7**	SS2	1.1	93.8	0	2	29	69	

Terraprobe
11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title:

GRAIN SIZE DISTRIBUTION
SILTY CLAY, TRACE SAND

File No.: **02209049.000**



MIT SYSTEM	COBBLES	GRAVEL			SAND			SILT	CLAY
		COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

MIT SYSTEM

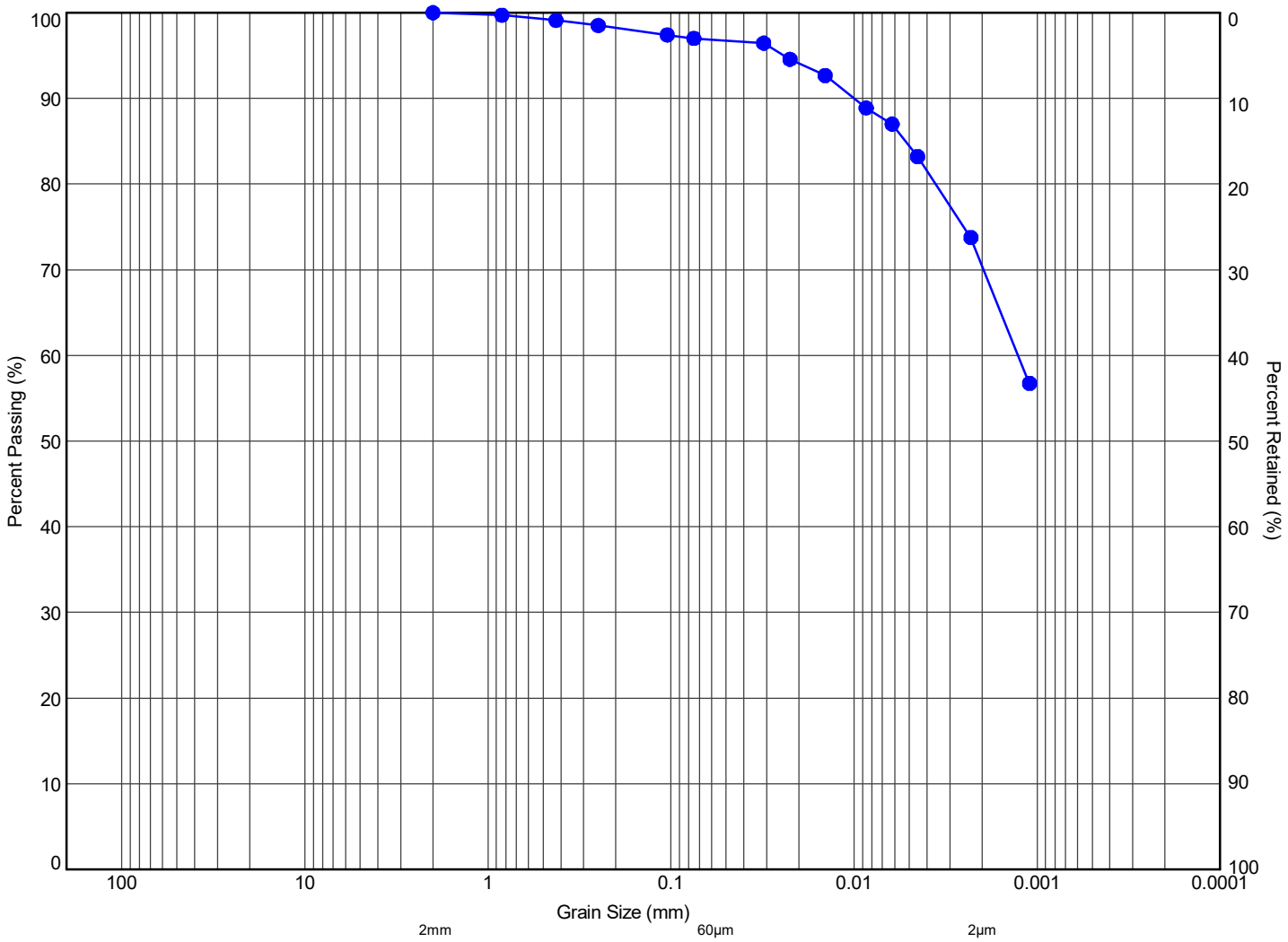
	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**9**	SS3	1.8	92.4	0	7	33	60	

Terraprobe
11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title:

GRAIN SIZE DISTRIBUTION
SILTY CLAY, TRACE SAND

File No.: **02209049.000**



MIT SYSTEM	COBBLES	GRAVEL			SAND			SILT	CLAY
		COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

MIT SYSTEM

	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**11**	2B	1.2	93.1	0	3	26	71	

Terraprobe
11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title:

GRAIN SIZE DISTRIBUTION
SILTY CLAY, TRACE GRAVEL

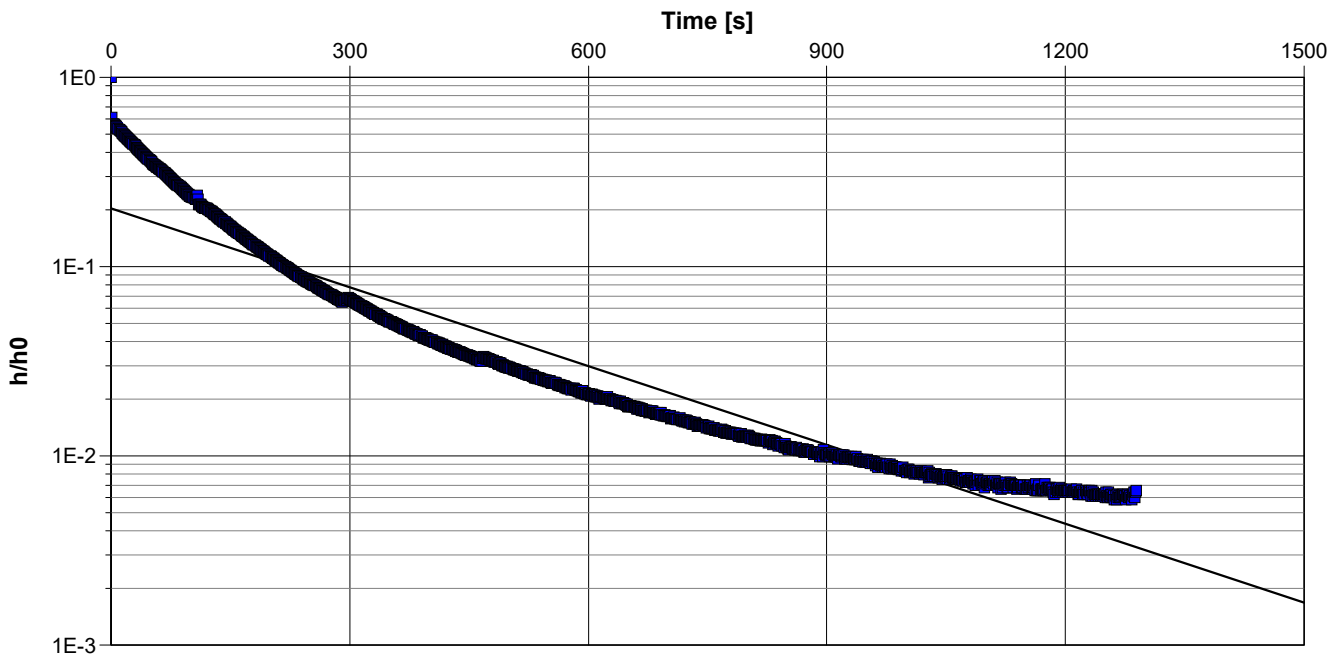
File No.: **02209049.000**

APPENDIX C

TERRAPROBE INC.

Terraprobe Consulting Geotechnical & Environmental Engineering Construction Materials Engineering, Inspection & Testing	**Falling Head Test Analysis Result**
	Project: Hydrogeological Study
	Number: 02209049.0104
	Client: IO

Location: 240 Marilyn Avenue Napanee	Slug Test: BH2	Test Well: BH2
Test Conducted by: OH		Test Date: 2023-01-26
Analysis Performed by: MM	Slug Test	Analysis Date: 2023-02-09
Aquifer Thickness: 3.90 m		

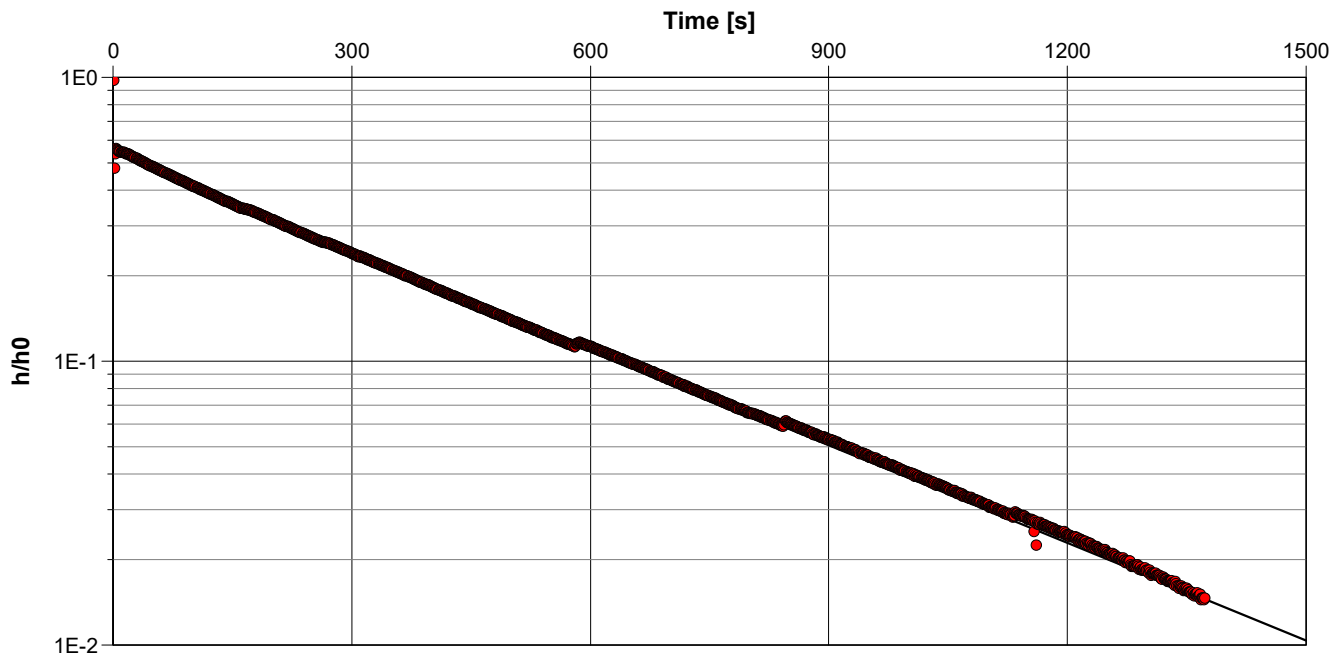


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH2	1.21×10^{-6}	

Terraprobe Consulting Geotechnical & Environmental Engineering Construction Materials Engineering, Inspection & Testing	**Falling Head Test Analysis Result**
	Project: Hydrogeological Study
	Number: 02209049.0104
	Client: IO

Location: 240 Marilyn Avenue Napanee	Slug Test: BH4	Test Well: BH4
Test Conducted by:		Test Date: 2023-01-26
Analysis Performed by: MM	Slug Test	Analysis Date: 2023-02-09
Aquifer Thickness: 3.90 m		

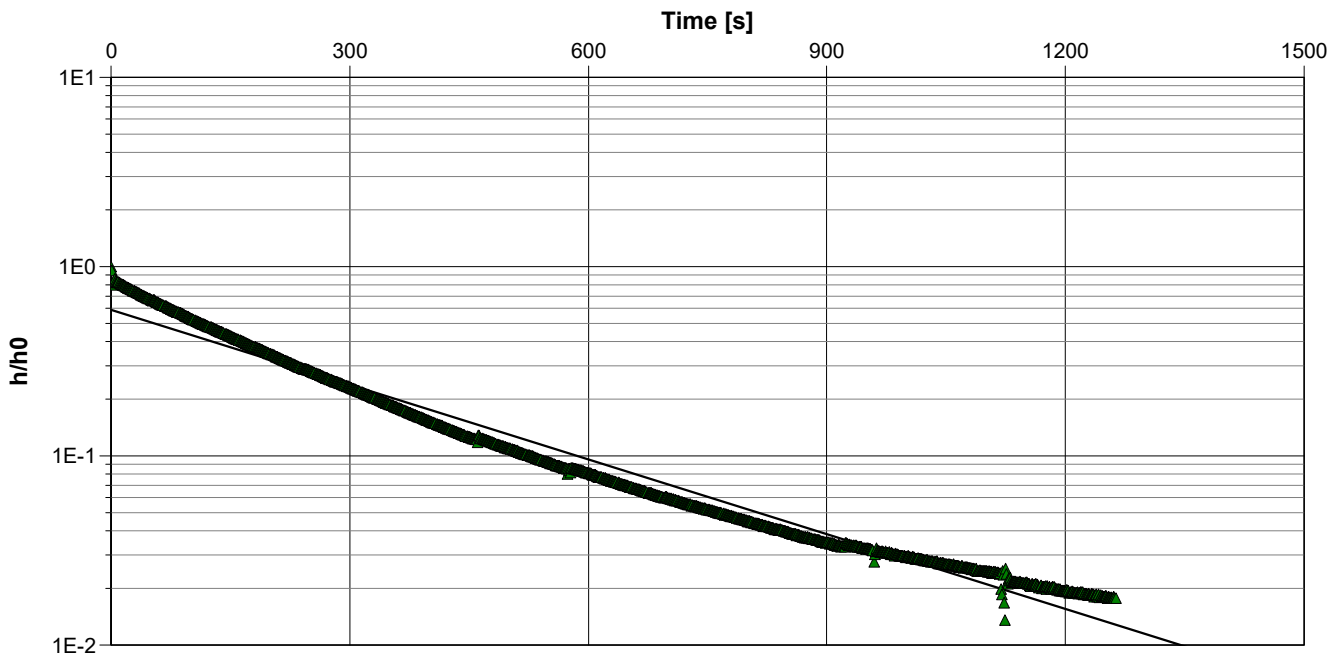


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH4	9.98×10^{-7}	

Terraprobe Consulting Geotechnical & Environmental Engineering Construction Materials Engineering, Inspection & Testing	**Falling Head Test Analysis Report**
	Project: Hydrogeological Study
	Number: 02209049.0104
	Client: IO

Location: 240 Marilyn Avenue Napanee	Slug Test: BH5	Test Well: BH5
Test Conducted by:		Test Date: 2023-01-26
Analysis Performed by: Mm	Slug Test	Analysis Date: 2023-02-09
Aquifer Thickness: 5.20 m		

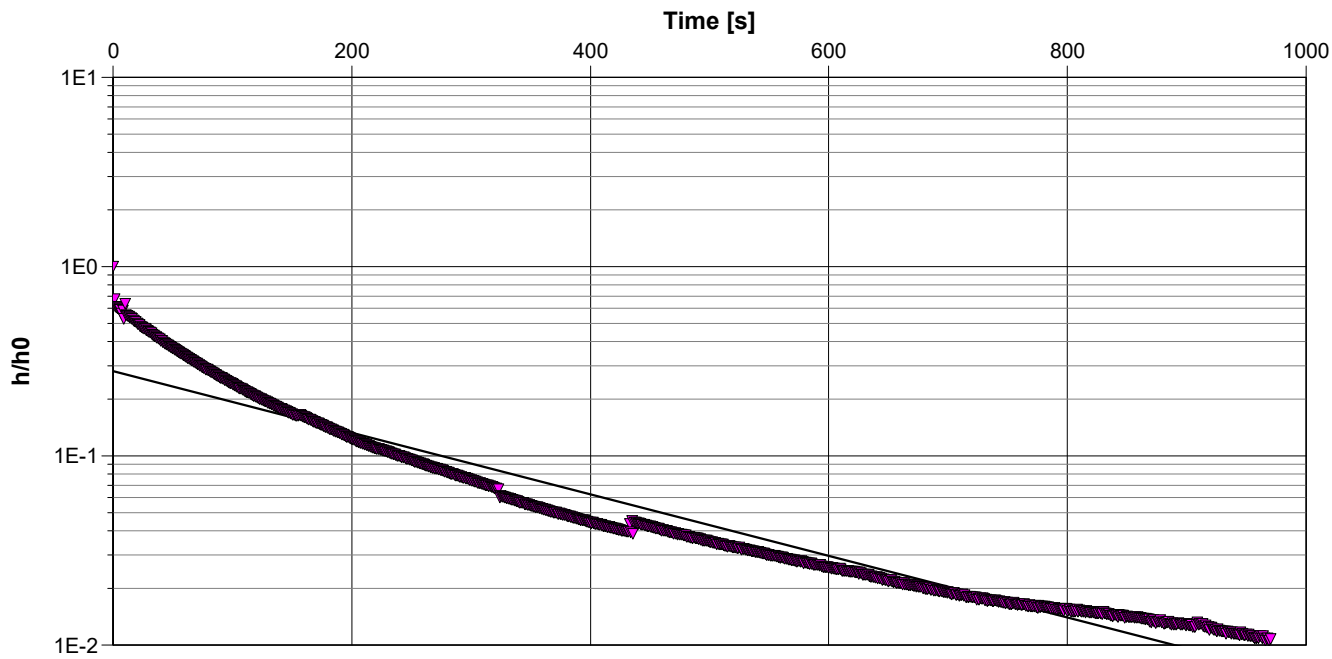


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH5	1.15×10^{-6}	

Terraprobe Consulting Geotechnical & Environmental Engineering Construction Materials Engineering, Inspection & Testing	**Falling Head Test Analysis Report**
	Project: Hydrogeological Study
	Number: 02209049.0104
	Client: IO

Location: 240 Marilyn Avenue Napanee	Slug Test: BH6	Test Well: BH6
Test Conducted by:		Test Date: 2023-01-26
Analysis Performed by: MM	Slug Test	Analysis Date: 2023-02-09
Aquifer Thickness: 4.30 m		



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH6	1.42×10^{-6}	

K from Grain Size Analysis Report

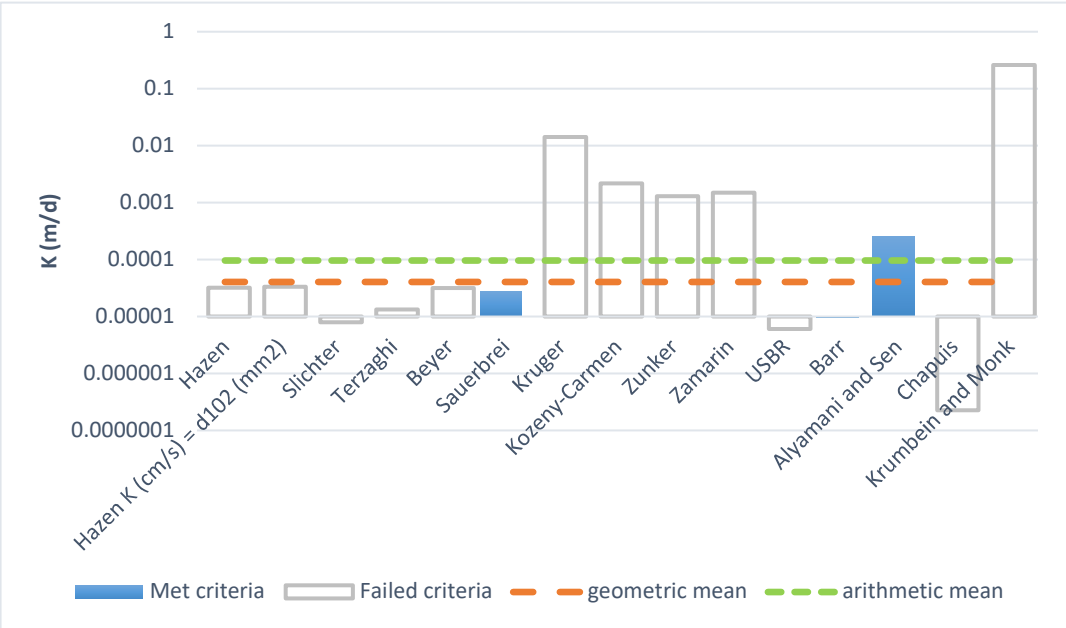
Date: 10-Feb-23

Sample Name: BH1 SS3

Mass Sample (g): 100

T (oC) 20

Poorly sorted clay with fines



Estimation of Hydraulic Conductivity	cm/s	m/s	m/d	de
Hazen	3.7E-08	3.7E-10	0.00	
Hazen K (cm/s) = d_{10} (mm)	3.8E-08	3.8E-10	0.00	
Slichter	9.2E-09	9.2E-11	0.00	
Terzaghi	1.5E-08	1.5E-10	0.00	
Beyer	3.6E-08	3.6E-10	0.00	
Sauerbrei	3.2E-08	3.2E-10	0.00	
Kruger	1.6E-05	1.6E-07	0.01	
Kozeny-Carmen	2.5E-06	2.5E-08	0.00	
Zunker	1.5E-06	1.5E-08	0.00	
Zamarin	1.7E-06	1.7E-08	0.00	
USBR	6.9E-09	6.9E-11	0.00	
Barr	1.1E-08	1.1E-10	0.00	
Alyamani and Sen	2.9E-07	2.9E-09	0.00	
Chapuis	2.6E-10	2.6E-12	0.00	
Krumbein and Monk	3.0E-04	3.0E-06	0.26	
geometric mean	4.7E-08	4.7E-10	0.00	
arithmetic mean	1.1E-07	1.1E-09	0.00	

K from Grain Size Analysis Report

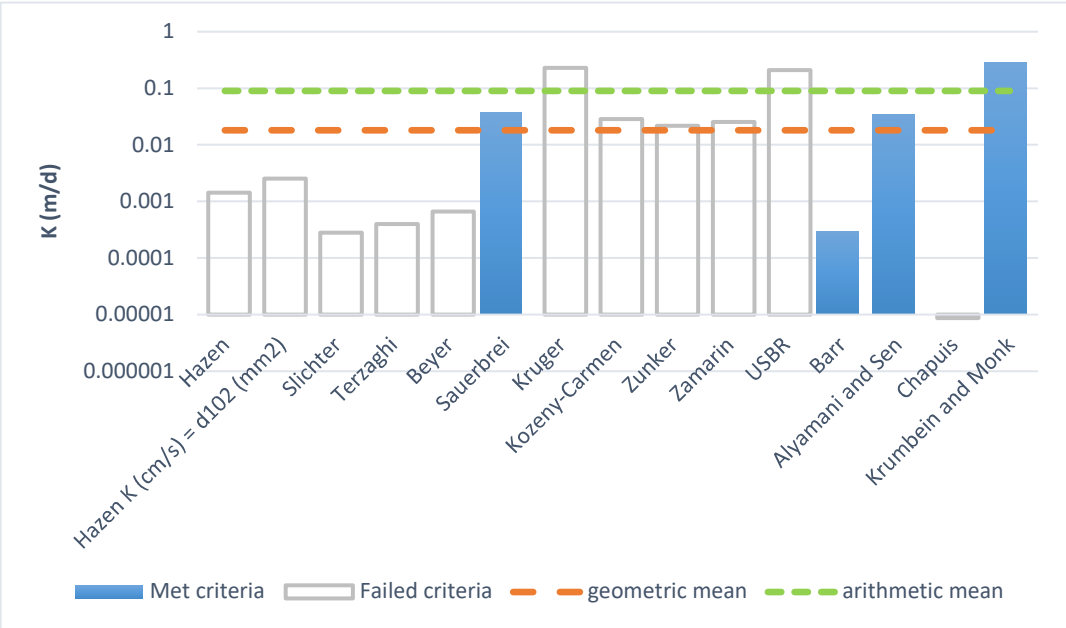
Date: 10-Feb-23

Sample Name: BH2 SS5

Mass Sample (g): 100

T (oC) 20

Poorly sorted gravelly sand with fines



Estimation of Hydraulic Conductivity	cm/s	m/s	m/d	de
Hazen	1.7E-06	1.7E-08	0.00	
Hazen K (cm/s) = d_{10} (mm)	2.9E-06	2.9E-08	0.00	
Slichter	3.2E-07	3.2E-09	0.00	
Terzaghi	4.6E-07	4.6E-09	0.00	
Beyer	7.7E-07	7.7E-09	0.00	
Sauerbrei	4.3E-05	4.3E-07	0.04	
Kruger	2.7E-04	2.7E-06	0.23	
Kozeny-Carmen	3.3E-05	3.3E-07	0.03	
Zunker	2.5E-05	2.5E-07	0.02	
Zamarin	2.9E-05	2.9E-07	0.03	
USBR	2.4E-04	2.4E-06	0.21	
Barr	3.5E-07	3.5E-09	0.00	
Alyamani and Sen	4.0E-05	4.0E-07	0.03	
Chapuis	1.0E-08	1.0E-10	0.00	
Krumbein and Monk	3.3E-04	3.3E-06	0.29	
geometric mean	2.1E-05	2.1E-07	0.02	
arithmetic mean	1.0E-04	1.0E-06	0.09	

K from Grain Size Analysis Report

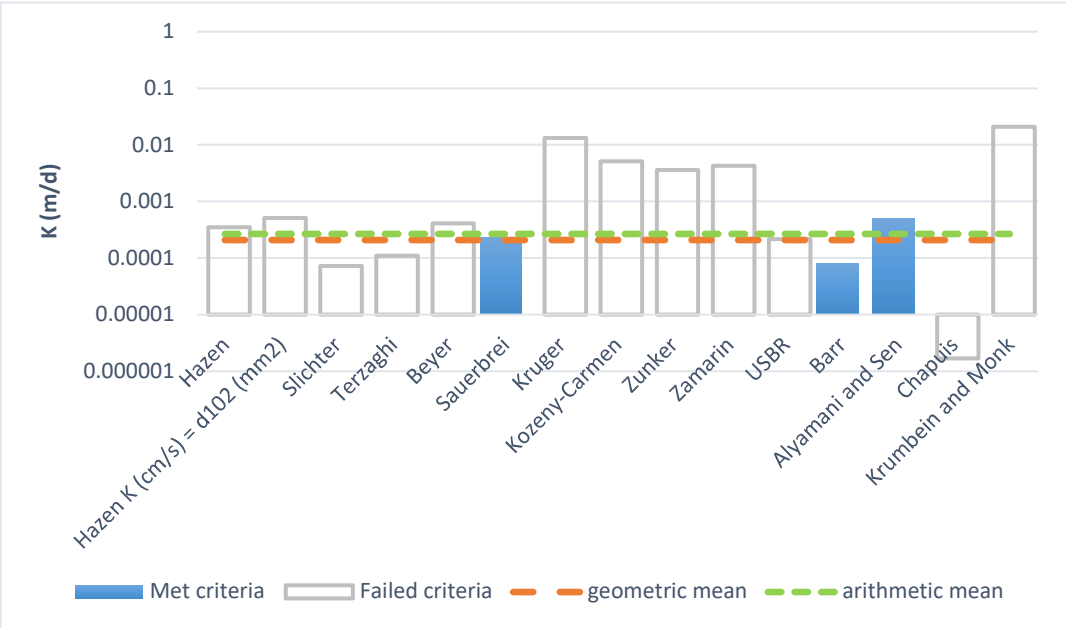
Date: 10-Feb-23

Sample Name: BH3 SS4B

Mass Sample (g): 100

T (oC) 20

Poorly sorted clay with fines



Estimation of Hydraulic Conductivity	cm/s	m/s	m/d	de
Hazen	4.0E-07	4.0E-09	0.00	
Hazen K (cm/s) = d_{10} (mm)	5.9E-07	5.9E-09	0.00	
Slichter	8.4E-08	8.4E-10	0.00	
Terzaghi	1.3E-07	1.3E-09	0.00	
Beyer	4.7E-07	4.7E-09	0.00	
Sauerbrei	2.7E-07	2.7E-09	0.00	
Kruger	1.5E-05	1.5E-07	0.01	
Kozeny-Carmen	5.9E-06	5.9E-08	0.01	
Zunker	4.2E-06	4.2E-08	0.00	
Zamarin	4.9E-06	4.9E-08	0.00	
USBR	2.5E-07	2.5E-09	0.00	
Barr	9.3E-08	9.3E-10	0.00	
Alyamani and Sen	5.7E-07	5.7E-09	0.00	
Chapuis	1.9E-09	1.9E-11	0.00	
Krumbein and Monk	2.4E-05	2.4E-07	0.02	
geometric mean	2.4E-07	2.4E-09	0.00	
arithmetic mean	3.1E-07	3.1E-09	0.00	

K from Grain Size Analysis Report

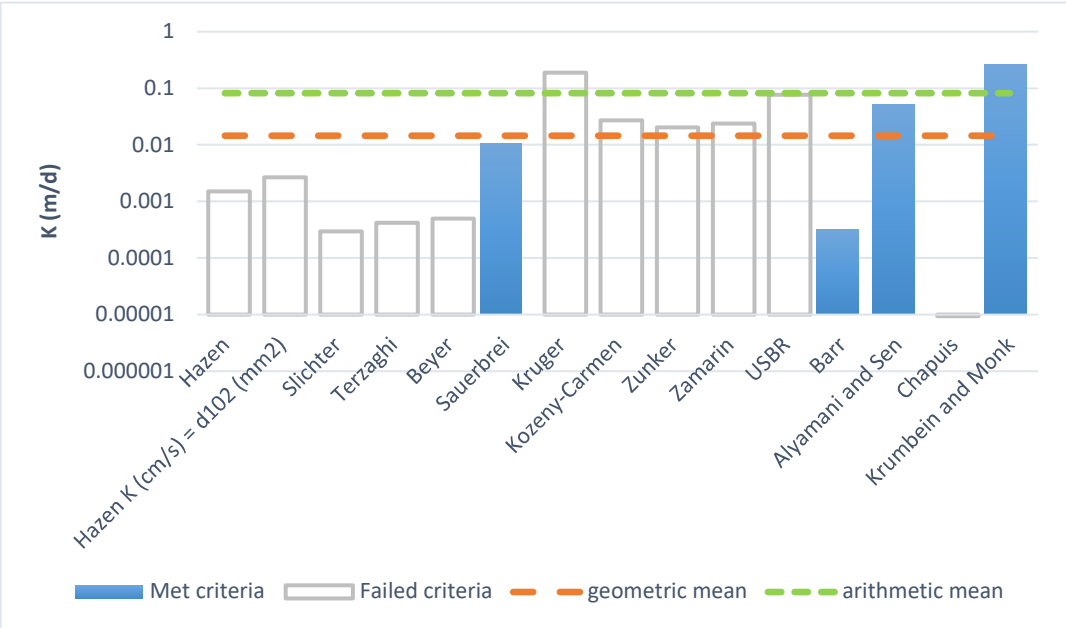
Date: 10-Feb-23

Sample Name: BH4 SS5

Mass Sample (g): 100

T (oC) 20

Poorly sorted gravelly sand with fines



Estimation of Hydraulic Conductivity	cm/s	m/s	m/d	de
Hazen	1.7E-06	1.7E-08	0.00	
Hazen K (cm/s) = d_{10} (mm)	3.1E-06	3.1E-08	0.00	
Slichter	3.4E-07	3.4E-09	0.00	
Terzaghi	4.9E-07	4.9E-09	0.00	
Beyer	5.8E-07	5.8E-09	0.00	
Sauerbrei	1.2E-05	1.2E-07	0.01	
Kruger	2.2E-04	2.2E-06	0.19	
Kozeny-Carmen	3.1E-05	3.1E-07	0.03	
Zunker	2.4E-05	2.4E-07	0.02	
Zamarin	2.8E-05	2.8E-07	0.02	
USBR	8.8E-05	8.8E-07	0.08	
Barr	3.7E-07	3.7E-09	0.00	
Alyamani and Sen	6.0E-05	6.0E-07	0.05	
Chapuis	1.1E-08	1.1E-10	0.00	
Krumbein and Monk	3.1E-04	3.1E-06	0.27	
geometric mean	1.7E-05	1.7E-07	0.01	
arithmetic mean	9.5E-05	9.5E-07	0.08	

K from Grain Size Analysis Report

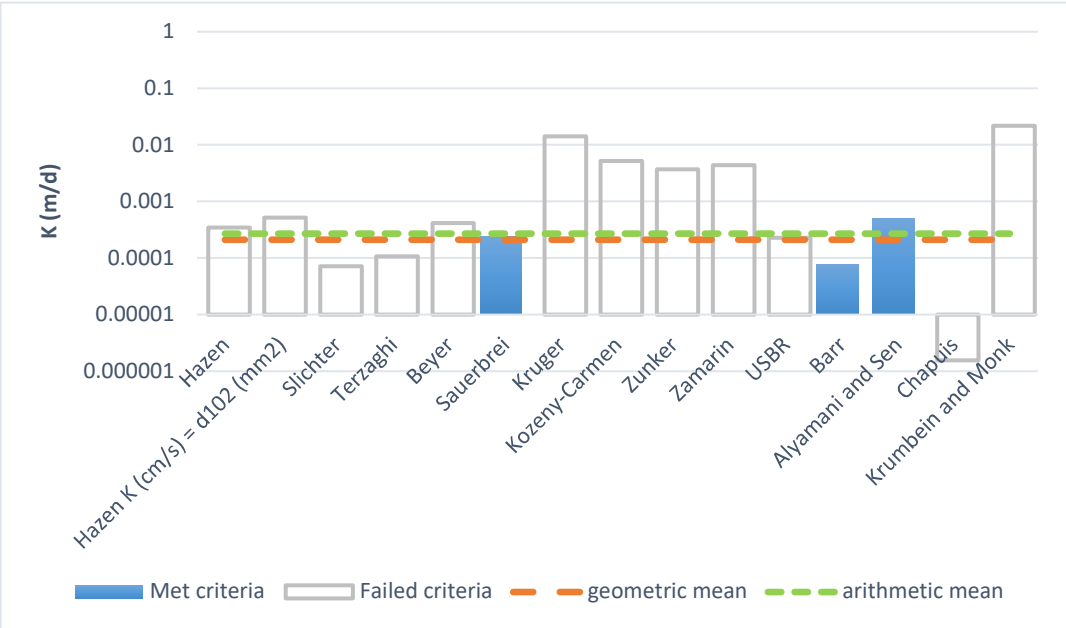
Date: 10-Feb-23

Sample Name: BH5 SS5

Mass Sample (g): 100

T (oC) 20

Poorly sorted clay with fines



Estimation of Hydraulic Conductivity	cm/s	m/s	m/d	de
Hazen	4.0E-07	4.0E-09	0.00	
Hazen K (cm/s) = d_{10} (mm)	6.0E-07	6.0E-09	0.00	
Slichter	8.2E-08	8.2E-10	0.00	
Terzaghi	1.2E-07	1.2E-09	0.00	
Beyer	4.8E-07	4.8E-09	0.00	
Sauerbrei	2.7E-07	2.7E-09	0.00	
Kruger	1.6E-05	1.6E-07	0.01	
Kozeny-Carmen	6.0E-06	6.0E-08	0.01	
Zunker	4.3E-06	4.3E-08	0.00	
Zamarin	5.1E-06	5.1E-08	0.00	
USBR	2.6E-07	2.6E-09	0.00	
Barr	9.1E-08	9.1E-10	0.00	
Alyamani and Sen	5.8E-07	5.8E-09	0.00	
Chapuis	1.8E-09	1.8E-11	0.00	
Krumbein and Monk	2.5E-05	2.5E-07	0.02	
geometric mean	2.4E-07	2.4E-09	0.00	
arithmetic mean	3.1E-07	3.1E-09	0.00	

K from Grain Size Analysis Report

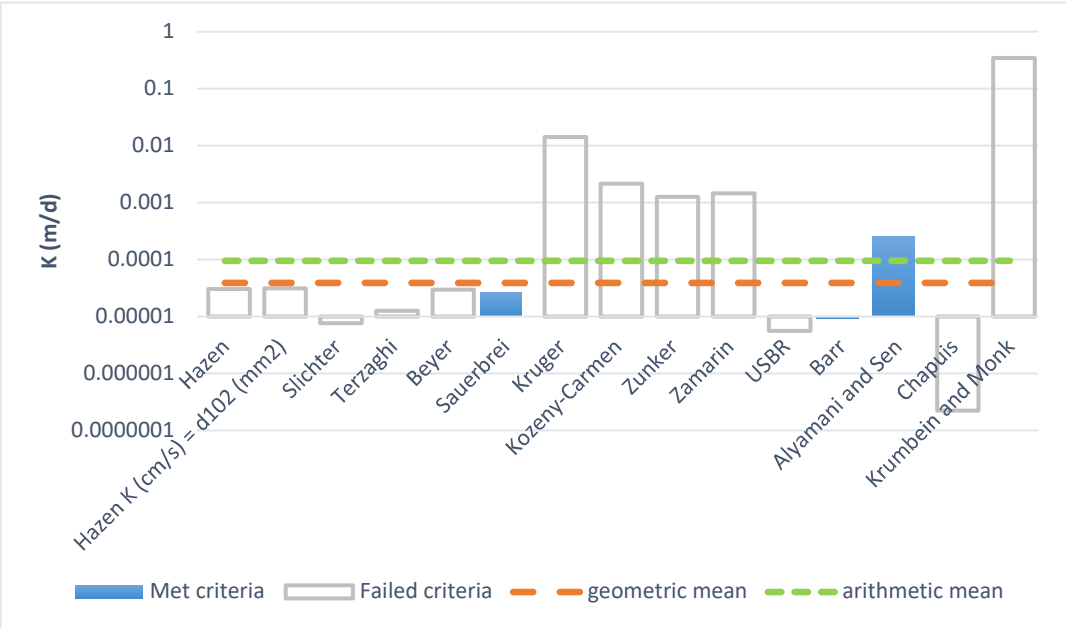
Date: 10-Feb-23

Sample Name: BH7 SS2

Mass Sample (g): 100

T (oC) 20

Poorly sorted clay with fines



Estimation of Hydraulic Conductivity	cm/s	m/s	m/d	de
Hazen	3.5E-08	3.5E-10	0.00	
Hazen K (cm/s) = d_{10} (mm)	3.6E-08	3.6E-10	0.00	
Slichter	8.8E-09	8.8E-11	0.00	
Terzaghi	1.5E-08	1.5E-10	0.00	
Beyer	3.4E-08	3.4E-10	0.00	
Sauerbrei	3.0E-08	3.0E-10	0.00	
Kruger	1.6E-05	1.6E-07	0.01	
Kozeny-Carmen	2.5E-06	2.5E-08	0.00	
Zunker	1.5E-06	1.5E-08	0.00	
Zamarin	1.7E-06	1.7E-08	0.00	
USBR	6.4E-09	6.4E-11	0.00	
Barr	1.1E-08	1.1E-10	0.00	
Alyamani and Sen	2.9E-07	2.9E-09	0.00	
Chapuis	2.6E-10	2.6E-12	0.00	
Krumbein and Monk	4.0E-04	4.0E-06	0.34	
geometric mean	4.5E-08	4.5E-10	0.00	
arithmetic mean	1.1E-07	1.1E-09	0.00	

K from Grain Size Analysis Report

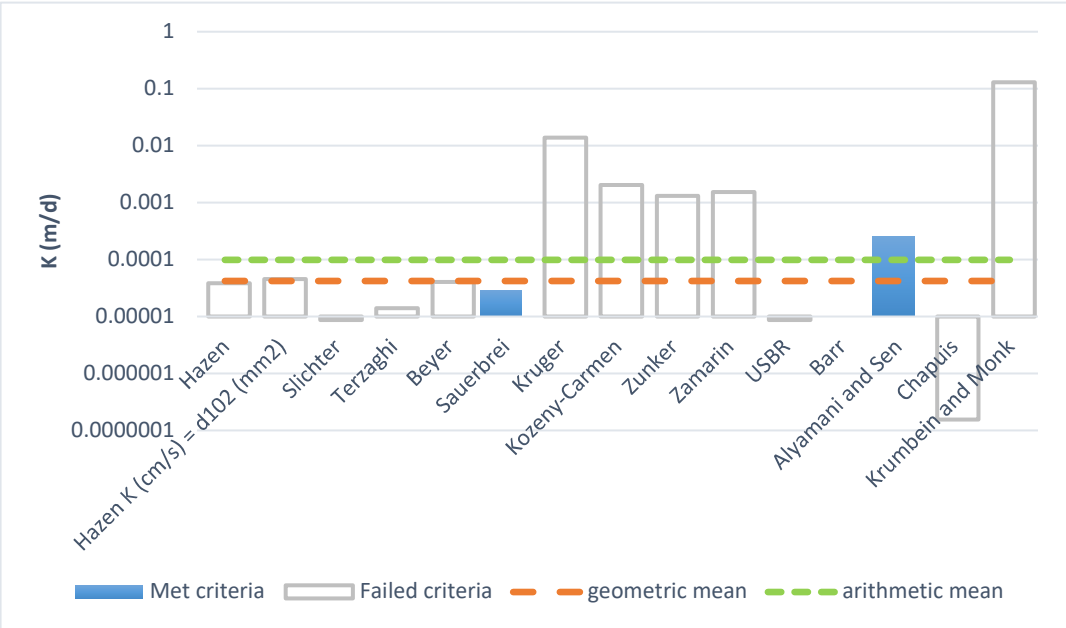
Date: 10-Feb-23

Sample Name: BH9 SS3

Mass Sample (g): 100

T (oC) 20

Poorly sorted clay with fines



Estimation of Hydraulic Conductivity	cm/s	m/s	m/d	de
Hazen	4.4E-08	4.4E-10	0.00	
Hazen K (cm/s) = d_{10} (mm)	5.2E-08	5.2E-10	0.00	
Slichter	1.0E-08	1.0E-10	0.00	
Terzaghi	1.6E-08	1.6E-10	0.00	
Beyer	4.7E-08	4.7E-10	0.00	
Sauerbrei	3.3E-08	3.3E-10	0.00	
Kruger	1.6E-05	1.6E-07	0.01	
Kozeny-Carmen	2.4E-06	2.4E-08	0.00	
Zunker	1.5E-06	1.5E-08	0.00	
Zamarin	1.8E-06	1.8E-08	0.00	
USBR	9.9E-09	9.9E-11	0.00	
Barr	1.2E-08	1.2E-10	0.00	
Alyamani and Sen	3.0E-07	3.0E-09	0.00	
Chapuis	1.8E-10	1.8E-12	0.00	
Krumbein and Monk	1.5E-04	1.5E-06	0.13	
geometric mean	4.9E-08	4.9E-10	0.00	
arithmetic mean	1.1E-07	1.1E-09	0.00	

K from Grain Size Analysis Report

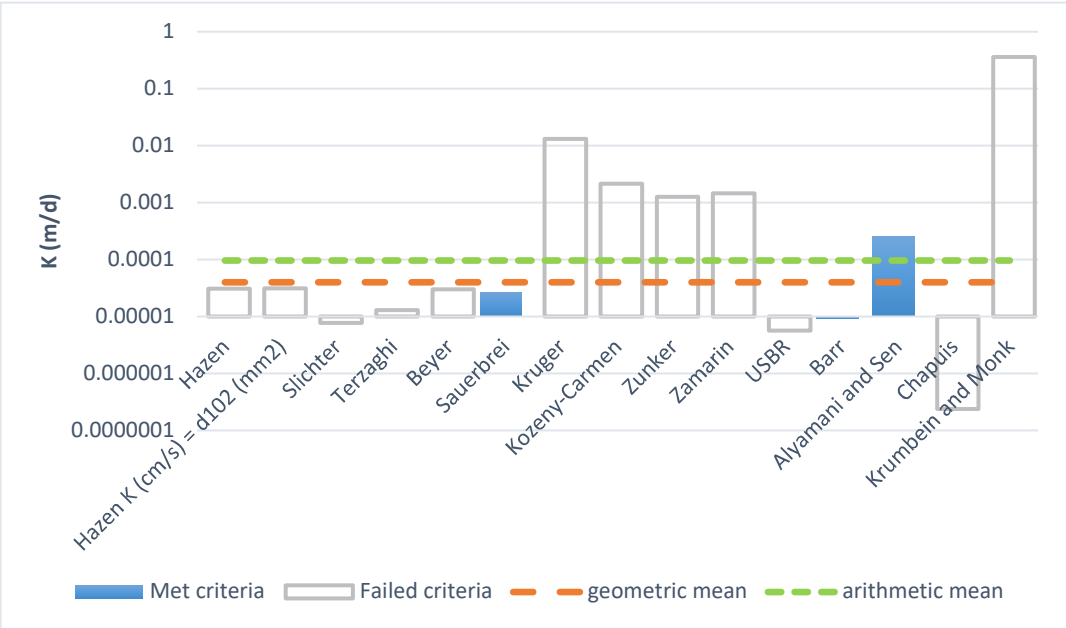
Date: 10-Feb-23

Sample Name: BH11 SS2

Mass Sample (g): 100

T (oC) 20

Poorly sorted clay with fines



Estimation of Hydraulic Conductivity	cm/s	m/s	m/d	de
Hazen	3.6E-08	3.6E-10	0.00	
Hazen K (cm/s) = d_{10} (mm)	3.6E-08	3.6E-10	0.00	
Slichter	9.0E-09	9.0E-11	0.00	
Terzaghi	1.5E-08	1.5E-10	0.00	
Beyer	3.5E-08	3.5E-10	0.00	
Sauerbrei	3.1E-08	3.1E-10	0.00	
Kruger	1.5E-05	1.5E-07	0.01	
Kozeny-Carmen	2.5E-06	2.5E-08	0.00	
Zunker	1.5E-06	1.5E-08	0.00	
Zamarin	1.7E-06	1.7E-08	0.00	
USBR	6.5E-09	6.5E-11	0.00	
Barr	1.1E-08	1.1E-10	0.00	
Alyamani and Sen	2.9E-07	2.9E-09	0.00	
Chapuis	2.7E-10	2.7E-12	0.00	
Krumbein and Monk	4.1E-04	4.1E-06	0.36	
geometric mean	4.6E-08	4.6E-10	0.00	
arithmetic mean	1.1E-07	1.1E-09	0.00	

APPENDIX D

TERRAPROBE INC.

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

CLIENT NAME: TERRAPROBE INC.
11 INDELL LANE
BRAMPTON, ON L6T3Y3
(905) 796-2650

ATTENTION TO: Muna Mirghani

PROJECT: 02209049.000.0104

AGAT WORK ORDER: 23T992198

TRACE ORGANICS REVIEWED BY: Radhika Chakraberty, Trace Organics Lab Manager

WATER ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Lab Manager

DATE REPORTED: Feb 07, 2023

PAGES (INCLUDING COVER): 12

VERSION*: 1

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

*Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*

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

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AGAT Laboratories

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

Certificate of Analysis

AGAT WORK ORDER: 23T992198

PROJECT: 02209049.000.0104

CLIENT NAME: TERRAPROBE INC.

ATTENTION TO: Muna Mirghani

SAMPLING SITE:

SAMPLED BY:

Greater Napanee Region Sanitary Sewer Use By-law - Organic

DATE RECEIVED: 2023-01-27

DATE REPORTED: 2023-02-07

				SAMPLE DESCRIPTION:	BH5
				SAMPLE TYPE:	Water
				DATE SAMPLED:	2023-01-26 16:00
Parameter	**Unit**	**G / S: A**	**G / S: B**	**RDL**	**4724199**
Oil and Grease (animal/vegetable) in water	mg/L	150		0.5	0.99[<A]
Oil and Grease (mineral) in water	mg/L	15		0.5	0.52[<A]
Methylene Chloride	mg/L	2	0.0052	0.0003	<0.0003[<B]
TRANS-1,3-Dichloropropylene	mg/L	0.14	0.0056	0.0003	<0.0003[<B]
cis- 1,2-Dichloroethylene	mg/L	4	0.0056	0.0002	<0.0002[<B]
Chloroform	mg/L	0.04	0.002	0.0002	<0.0002[<B]
Benzene	mg/L		0.002	0.0002	<0.0002[<B]
Trichloroethylene	mg/L		0.0076	0.0002	<0.0002[<B]
Toluene	mg/L	0.016	0.002	0.0002	<0.0002[<B]
Tetrachloroethylene	mg/L	1	0.0044	0.0001	<0.0001[<B]
Ethylbenzene	mg/L	0.16	0.002	0.0002	<0.0002[<B]
1,1,2,2-Tetrachloroethane	mg/L	1.0	0.017	0.0002	<0.0002[<B]
1,2-Dichlorobenzene	mg/L	0.05	0.0056	0.0002	<0.0002[<B]
1,4-Dichlorobenzene	mg/L	0.08	0.0068	0.0002	<0.0002[<B]
Xylenes (Total)	mg/L	1.4	0.0044	0.0002	<0.0002[<B]
PCBs	mg/L	0.001	0.0004	0.0002	<0.0002[<B]
Pentachlorophenol	mg/L	0.005	0.002	0.0005	<0.0005[<B]
Di-n-butyl phthalate	mg/L	0.08	0.015	0.0005	<0.0005[<B]
3,3'-Dichlorobenzidine	mg/L	0.0008	0.0008	0.0001	<0.0001[<A]
Bis(2-Ethylhexyl)phthalate	mg/L	0.012	0.0088	0.0005	<0.0005[<B]
Total PAHs	mg/L	0.005	0.002	0.0003	<0.0003[<B]
Nonylphenols	mg/L	0.02	0.001	0.001	<0.001[<B]
Nonylphenol Ethoxylates	mg/L	0.2	0.01	0.01	<0.01[<B]
Aldrin	mg/L	0.0002	0.00008	0.00005	<0.00005[<B]
Dieldrin	mg/L	0.0002	0.00008	0.00005	<0.00005[<B]
Chlordane (Total)	mg/L	0.1	0.04	0.0007	<0.0007[<B]
DDT (o,p' + p,p')	mg/L	0.0001	0.00004	0.00004	<0.00004[<B]
Mirex	mg/L	0.1	0.04	0.00005	<0.00005[<B]
Hexachlorobenzene	mg/L	0.0001	0.00004	0.00001	<0.00001[<B]

Certified By: R. Chakraberty

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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23T992198

PROJECT: 02209049.000.0104

CLIENT NAME: TERRAPROBE INC.

ATTENTION TO: Muna Mirghani

SAMPLING SITE:

SAMPLED BY:

Greater Napanee Region Sanitary Sewer Use By-law - Organic

DATE RECEIVED: 2023-01-27

DATE REPORTED: 2023-02-07

				SAMPLE DESCRIPTION:	**BH5**
				SAMPLE TYPE:	**Water**
				DATE SAMPLED:	**2023-01-26 16:00**
Parameter	**Unit**	**G / S: A**	**G / S: B**	**RDL**	**4724199**
Hexachlorocyclohexane	mg/L	0.0001	0.04	0.0001	<0.0001[<A]

Surrogate	**Unit**	**Acceptable Limits**	
Toluene-d8	% Recovery	50-140	104
4-Bromofluorobenzene	% Recovery	50-140	86
Decachlorobiphenyl	%	50-140	70
2,4,6-Tribromophenol	%	50-140	77
2-Fluorophenol	%	50-140	98
Chrysene-d12	%	50-140	83
phenol-d6 surrogate	%	50-140	60
TCMX	%	50-140	70

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to ON Greater Napanee Region SN, B Refers to ON Napanee SM
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

4724199 Oil and Grease animal/vegetable is a calculated parameter. The calculated value is the difference between Total O&G and Mineral O&G.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.
Note: The result for Benzo(b+j)Flouranthene is the total of the Benzo(b)&(j)Flouranthene isomers because the isomers co-elute on the GC column.
Total PAHs is calculated as sum of Anthracene, Benzo(a)pyrene, Benzo(a)anthracene, Benzo(e)pyrene*, Benzo(b+j)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Chrysene, Dibenz(a,h)anthracene, Dibenzo(a,i)pyrene*, Dibenzo(a,j) Acridine*, 7H-Dibenzo(c,g)carbazole*, Fluoranthene, Indeno(1,2,3-cd)pyrene, Perylene, Phenanthrene and Pyrene.
*-not accredited parameters.
Nonylphenols is a calculated parameter. The calculated value is the sum of Nonylphenol (NP) and 4n-Nonylphenol (4n-NP).
Nonylphenol Ethoxylates is a calculated parameter. The calculated value is the sum of Nonylphenol Monoethoxylate (NP1EO) and Nonylphenol Diethoxylate (NP2EO).
The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: R. Chakraberty

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Certificate of Analysis

AGAT WORK ORDER: 23T992198

PROJECT: 02209049.000.0104

CLIENT NAME: TERRAPROBE INC.

ATTENTION TO: Muna Mirghani

SAMPLING SITE:

SAMPLED BY:

Greater Napanee Region Sanitary Sewer Use By-law - Inorganics

DATE RECEIVED: 2023-01-27

DATE REPORTED: 2023-02-07

				SAMPLE DESCRIPTION:	BH5
				SAMPLE TYPE:	Water
				DATE SAMPLED:	2023-01-26 16:00
Parameter	**Unit**	**G / S: A**	**G / S: B**	**RDL**	**4724199**
pH	pH Units	6.0-9.5		NA	7.52
BOD (5)	mg/L	15	300	2	<2[<A]
Chemical Oxygen Demand	mg/L	40	800	5	<5[<A]
Total Suspended Solids	mg/L	15	350	10	161[A-B]
Cyanide, SAD	mg/L	0.02	2.0	0.002	<0.002[<A]
Fluoride	mg/L		10	0.05	<0.05[<B]
Phenols	mg/L	0.008	1.0	0.002	0.015[A-B]
Total Phosphorus	mg/L	0.3	10	0.02	<0.02[<A]
Total Kjeldahl Nitrogen	mg/L		100	0.10	0.11[<B]
Total Aluminum	mg/L		50	0.010	2.77[<B]
Total Antimony	mg/L		5	0.020	<0.020[<B]
Total Arsenic	mg/L	0.02	1.0	0.015	<0.015[<A]
Total Cadmium	mg/L	0.008	0.7	0.005	<0.005[<A]
Total Chromium	mg/L	0.04	4	0.020	<0.020[<A]
Chromium VI	mg/L	0.08	2	0.002	<0.002[<A]
Total Cobalt	mg/L		5	0.010	<0.010[<B]
Total Copper	mg/L	0.04	2	0.020	<0.020[<A]
Total Lead	mg/L	0.12	1	0.020	<0.020[<A]
Total Manganese	mg/L	0.05	5	0.020	0.079[A-B]
Total Mercury	mg/L	0.0004	0.01	0.0002	<0.0002[<A]
Total Molybdenum	mg/L		5	0.020	<0.020[<B]
Total Nickel	mg/L	0.08	2	0.030	<0.030[<A]
Total Selenium	mg/L	0.02	1	0.002	<0.002[<A]
Total Silver	mg/L	0.12	5	0.020	<0.020[<A]
Total Titanium	mg/L		5	0.010	0.119[<B]
Total Tin	mg/L		5	0.020	<0.020[<B]
Total Zinc	mg/L	0.04	2	0.020	<0.020[<A]

Certified By:

Amanjot Bhela

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
AMANJOT BHELA
CHEMIST

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Certificate of Analysis

AGAT WORK ORDER: 23T992198

PROJECT: 02209049.000.0104

CLIENT NAME: TERRAPROBE INC.

ATTENTION TO: Muna Mirghani

SAMPLING SITE:

SAMPLED BY:

Greater Napanee Region Sanitary Sewer Use By-law - Inorganics

DATE RECEIVED: 2023-01-27

DATE REPORTED: 2023-02-07

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to ON Napanee SM, B Refers to ON Greater Napanee Region SN
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Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

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Exceedance Summary

AGAT WORK ORDER: 23T992198

PROJECT: 02209049.000.0104

CLIENT NAME: TERRAPROBE INC.

ATTENTION TO: Muna Mirghani

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
4724199	BH5	ON Napanee SM	Greater Napanee Region Sanitary Sewer Use By-law - Inorganics	Phenols	mg/L	0.008	0.015
4724199	BH5	ON Napanee SM	Greater Napanee Region Sanitary Sewer Use By-law - Inorganics	Total Manganese	mg/L	0.05	0.079
4724199	BH5	ON Napanee SM	Greater Napanee Region Sanitary Sewer Use By-law - Inorganics	Total Suspended Solids	mg/L	15	161

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Quality Assurance

CLIENT NAME: TERRAPROBE INC.

AGAT WORK ORDER: 23T992198

PROJECT: 02209049.000.0104

ATTENTION TO: Muna Mirghani

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Feb 07, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Greater Napanee Region Sanitary Sewer Use By-law - Organic															
Oil and Grease (animal/vegetable) in water	4716374		0.63	0.57	NA	< 0.5	100%	70%	130%	112%	70%	130%	103%	70%	130%
Oil and Grease (mineral) in water	4716374		< 0.5	< 0.5	0.0%	< 0.5	90%	70%	130%	84%	70%	130%	86%	70%	130%
Methylene Chloride	4723834		<0.0003	<0.0003	NA	< 0.0003	77%	50%	140%	73%	60%	130%	76%	50%	140%
TRANS-1,3-Dichloropropylene	4723834		<0.0003	<0.0003	NA	< 0.0003	88%	50%	140%	91%	60%	130%	74%	50%	140%
cis- 1,2-Dichloroethylene	4723834		<0.0002	<0.0002	NA	< 0.0002	86%	60%	130%	109%	60%	130%	74%	60%	130%
Chloroform	4723834		<0.0002	<0.0002	NA	< 0.0002	91%	50%	140%	73%	60%	130%	75%	50%	140%
Benzene	4723834		<0.0002	<0.0002	NA	< 0.0002	81%	50%	140%	96%	60%	130%	83%	50%	140%
Trichloroethylene	4723834		<0.0002	<0.0002	NA	< 0.0002	97%	50%	140%	95%	60%	130%	113%	50%	140%
Toluene	4723834		<0.0002	<0.0002	NA	< 0.0002	104%	50%	140%	80%	60%	130%	87%	50%	140%
Ethylbenzene	4723834		<0.0002	<0.0002	NA	< 0.0002	105%	50%	140%	99%	60%	130%	102%	50%	140%
1,1,2,2-Tetrachloroethane	4723834		<0.0002	<0.0002	NA	< 0.0002	96%	50%	140%	71%	60%	130%	84%	50%	140%
1,2-Dichlorobenzene	4723834		<0.0002	<0.0002	NA	< 0.0002	115%	50%	140%	90%	60%	130%	105%	50%	140%
1,4-Dichlorobenzene	4723834		<0.0002	<0.0002	NA	< 0.0002	92%	50%	140%	79%	60%	130%	91%	50%	140%
PCBs	4696378		< 0.0002	< 0.0002	0.0%	< 0.0002	103%	50%	140%	108%	50%	140%	82%	50%	140%
Pentachlorophenol	4468334		< 0.0005	< 0.0005	NA	< 0.0005	77%	50%	140%	107%	50%	140%	65%	50%	140%
Di-n-butyl phthalate	4468334		< 0.0005	< 0.0005	NA	< 0.0005	98%	50%	140%	68%	50%	140%	71%	50%	140%
3,3'-Dichlorobenzidine	4468334		< 0.0001	< 0.0001	NA	< 0.0001	102%	30%	130%	113%	30%	130%	91%	30%	130%
Bis(2-Ethylhexyl)phthalate	4468334		< 0.0005	< 0.0005	NA	< 0.0005	77%	50%	140%	71%	50%	140%	66%	50%	140%
Aldrin	4696378		< 0.01	< 0.01	NA	< 0.00005	98%	50%	140%	88%	50%	140%	93%	50%	140%
Dieldrin	4696378		< 0.02	< 0.02	NA	< 0.00005	94%	50%	140%	89%	50%	140%	82%	50%	140%
Mirex	4696378		< 0.05	< 0.05	NA	< 0.00005	113%	50%	140%	82%	50%	140%	101%	50%	140%
Hexachlorobenzene	4696378		< 0.00001	< 0.00001	NA	< 0.00001	98%	50%	140%	96%	50%	140%	110%	50%	140%
Hexachlorocyclohexane	4696378		< 0.0001	< 0.0001	NA	< 0.0001	98%	50%	140%	82%	50%	140%	87%	50%	140%

Comments: Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By: R. Chakraberty

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Quality Assurance

CLIENT NAME: TERRAPROBE INC.

AGAT WORK ORDER: 23T992198

PROJECT: 02209049.000.0104

ATTENTION TO: Muna Mirghani

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Feb 07, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Greater Napanee Region Sanitary Sewer Use By-law - Inorganics															
pH	4721917		7.64	7.76	1.6%	NA	99%	90%	110%	NA			NA		
BOD (5)	4724199	4724199	<2	<2	NA	< 2	101%	75%	125%	NA			NA		
Chemical Oxygen Demand	4724199	4724199	< 5	< 5	NA	< 5	97%	80%	120%	99%	90%	110%	99%	70%	130%
Total Suspended Solids	4712799		62	64	3.2%	< 10	102%	80%	120%	NA			NA		
Cyanide, SAD	4721897		< 0.002	< 0.002	NA	< 0.002	102%	70%	130%	100%	80%	120%	104%	70%	130%
Fluoride	4722042		<0.05	<0.05	NA	< 0.05	105%	70%	130%	99%	80%	120%	93%	70%	130%
Phenols	4726895		0.002	0.003	NA	< 0.001	94%	90%	110%	99%	90%	110%	91%	80%	120%
Total Phosphorus	4718937		0.43	<0.06	NA	< 0.02	100%	70%	130%	97%	80%	120%	108%	70%	130%
Total Kjeldahl Nitrogen	4717461		12.0	12.0	0.0%	< 0.10	103%	70%	130%	100%	80%	120%	105%	70%	130%
Total Aluminum	4721917		1.20	1.42	16.8%	< 0.010	94%	70%	130%	93%	80%	120%	96%	70%	130%
Total Antimony	4721917		<0.020	<0.020	NA	< 0.020	101%	70%	130%	97%	80%	120%	115%	70%	130%
Total Arsenic	4721917		<0.015	<0.015	NA	< 0.015	101%	70%	130%	100%	80%	120%	104%	70%	130%
Total Cadmium	4721917		<0.005	<0.005	NA	< 0.005	103%	70%	130%	98%	80%	120%	111%	70%	130%
Total Chromium	4721917		<0.020	<0.020	NA	< 0.020	95%	70%	130%	99%	80%	120%	113%	70%	130%
Chromium VI	4723829		<0.002	<0.002	NA	< 0.002	102%	70%	130%	107%	80%	120%	104%	70%	130%
Total Cobalt	4721917		<0.010	<0.010	NA	< 0.010	96%	70%	130%	98%	80%	120%	110%	70%	130%
Total Copper	4721917		<0.020	<0.020	NA	< 0.020	95%	70%	130%	95%	80%	120%	102%	70%	130%
Total Lead	4721917		<0.020	<0.020	NA	< 0.020	97%	70%	130%	93%	80%	120%	100%	70%	130%
Total Manganese	4721917		0.147	0.165	11.5%	< 0.020	98%	70%	130%	99%	80%	120%	117%	70%	130%
Total Mercury	4721917		<0.0002	<0.0002	NA	< 0.0002	102%	70%	130%	101%	80%	120%	96%	70%	130%
Total Molybdenum	4721917		<0.020	<0.020	NA	< 0.020	99%	70%	130%	103%	80%	120%	117%	70%	130%
Total Nickel	4721917		<0.030	<0.030	NA	< 0.030	96%	70%	130%	98%	80%	120%	106%	70%	130%
Total Selenium	4721917		<0.002	<0.002	NA	< 0.002	112%	70%	130%	106%	80%	120%	109%	70%	130%
Total Silver	4721917		<0.020	<0.020	NA	< 0.020	92%	70%	130%	90%	80%	120%	93%	70%	130%
Total Titanium	4721917		0.075	0.072	4.1%	< 0.010	101%	70%	130%	108%	80%	120%	114%	70%	130%
Total Tin	4721917		<0.020	<0.020	NA	< 0.020	99%	70%	130%	98%	80%	120%	112%	70%	130%
Total Zinc	4721917		<0.020	<0.020	NA	< 0.020	100%	70%	130%	97%	80%	120%	111%	70%	130%

Comments: NA Signifies Not Applicable
Duplicate NA: results are under 5X the RDL and will not be calculated.

Certified By: Amanjot Bhela

CHARTERED CHEMIST AMANJOT BHELA — ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO

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Method Summary

CLIENT NAME: TERRAPROBE INC.

AGAT WORK ORDER: 23T992198

PROJECT: 02209049.000.0104

ATTENTION TO: Muna Mirghani

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Oil and Grease (animal/vegetable) in water	VOL-91-5011	EPA SW-846 1664A & SM 5520	GRAVIMETRIC
Oil and Grease (mineral) in water	VOL-91-5011	EPA SW-846 1664A & SM 5520	GRAVIMETRIC
Methylene Chloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
TRANS-1,3-Dichloropropylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
cis- 1,2-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Toluene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5001	modified from EPA 5030B & EPA 8260D	CALCULATION
Toluene-d8	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
PCBs	ORG-91-5112	modified from EPA SW-846 3510C & 8082A	GC/ECD
Decachlorobiphenyl	ORG-91-5112	modified from EPA SW846 3510C & 8082A	GC/ECD
Pentachlorophenol	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
Di-n-butyl phthalate	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
3,3'-Dichlorobenzidine	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
Bis(2-Ethylhexyl)phthalate	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
Total PAHs	ORG-91-5114	modified from EPA 3510C and EPA 8270E	CALCULATION
2,4,6-Tribromophenol	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
2-Fluorophenol	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
Chrysene-d12	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
phenol-d6 surrogate	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
Nonylphenols	ORG-91-5122	modified ASTM D7485-16	CALCULATION

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

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

Method Summary

CLIENT NAME: TERRAPROBE INC.

AGAT WORK ORDER: 23T992198

PROJECT: 02209049.000.0104

ATTENTION TO: Muna Mirghani

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Nonylphenol Ethoxylates	ORG-91-5122	modified ASTM D7485-16	CALCULATION
Aldrin	ORG-91-5112	modified from EPA SW846 3510C & 8081B	GC/ECD
Dieldrin	ORG-91-5112	modified from EPA SW846 3510C & 8081B	GC/ECD
Chlordane (Total)	ORG-91-5112	modified from EPA SW846 3510C & 8081B	CALCULATION
DDT (o,p' + p,p')	ORG-91-5112	modified from EPA SW846 3510C & 8081B	CALCULATION
Mirex	ORG-91-5112	modified from EPA SW846 3510C & 8081B	GC/ECD
Hexachlorobenzene	ORG-91-5112	EPA SW846 3510C & 8081B	GC/ECD
Hexachlorocyclohexane	ORG-91-5112	modified from EPA SW846 3510C & 8081B	GC/ECD
TCMX	ORG-91-5112	modified from EPA SW-846 3510C & 8081B	GC/ECD

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

AGAT Laboratories

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

CLIENT NAME: TERRAPROBE INC.

AGAT WORK ORDER: 23T992198

PROJECT: 02209049.000.0104

ATTENTION TO: Muna Mirghani

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
BOD (5)	INOR-93-6006	Modified from SM 5210 B	DO METER
Chemical Oxygen Demand	INOR-93-6042	modified from SM 5220 A and SM 5220 D	SPECTROPHOTOMETER
Total Suspended Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Cyanide, SAD	INOR-93-6051	modified from MOECC E3015; SM 4500-CN- A, B, & C	TECHNICON AUTO ANALYZER
Fluoride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Phenols	INOR-93-6072	modified from SM 5530 D	LACHAT FIA
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER
Total Kjeldahl Nitrogen	INOR-93-6048	modified from EPA 351.2 and SM 4500-NORG D	LACHAT FIA
Total Aluminum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Antimony	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Arsenic	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cadmium	MET -93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Chromium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Chromium VI	INOR-93-6073	modified from SM 3500-CR B	LACHAT FIA
Total Cobalt	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Copper	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Lead	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Manganese	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Total Molybdenum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Nickel	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Selenium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silver	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Titanium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tin	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zinc	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

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

AGAT Laboratories

ASAP

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

Laboratory Use Only

Work Order #: 23T992198

Cooler Quantity: 1 large

Arrival Temperatures: 1.8 | 2.1 | 1.7

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes: Loose ice

Chain of Custody Record

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

Report Information:

Company: Terraprobe
Contact: Muna Mirghani
Address: 11 Indel Ln, Brampton, ON, L6T 3Y3
Phone: 9057962650 Fax:
Reports to be sent to:
1. Email: mmirghani@terraprobe.ca
2. Email:

Project Information:

Project: 02209049.000.004
Site Location:
Sampled By:
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐

Company:
Contact:
Address:
Email:

Regulatory Requirements:

(Please check all applicable boxes)

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

☐ Excess Soils R406
Table (Indicate One)

☐ Regulation 558

☐ CCME

☑ Sewer Use ☑Sanitary ☑Storm
Greater Napanee region (Region)

☐ Prov. Water Quality Objectives (PWQO)

☐ Other (Indicate One)

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

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

Turnaround Time (TAT) Required:

Regular TAT ☐ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

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

OR Date Required (Rush Surcharges May Apply):

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

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

Sample Matrix Legend

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

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC (Y/N)	O. Reg 153: Metals & Inorganics	Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	BTEX, F1-F4 PHCs	PAHs	PCBs	VOC	Aroclors	O. Reg 558: Landfill Disposal Characterization TCLP: TCLP: ☐M&I ☐VOCs ☐ABNs ☐B(a)P ☐PCBs	O. Reg 406: Excess Soils SPLP Rainwater Leach SPLP: ☐Metals ☐VOCs ☐SVOCs	Excess Soils Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Corrosivity: Include Moisture ☐ Sulphide ☐						Potentially Hazardous or High Concentration (Y/N)
BH5	26/01/2023	9:00 AM PM	30	GW		N											X	sewer use, storm + sanitary, Greater Napanee region					
		AM PM																					
		AM PM																					
		AM PM																					
		AM PM																					
		AM PM																					
		AM PM																					
		AM PM																					
		AM PM																					
		AM PM																					
		AM PM																					

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
OMAR HAMAD	27/01/23	2:33 pm	NTAL	Jan/23	4:35 pm
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

Page ____ of ____

N°: T - 142863

APPENDIX E

TERRAPROBE INC.

MECP Well Records Summary										
WELL ID	MECP* WWR ID	Construction Method	Well Depth (m)	Well Usage		Water Found (mbgs)**	Static Water Level (mbgs)**	Top of Screen Depth (mbgs)**	Bottom of Screen Depth (mbgs)**	Date Completed
				Final Status	First Use					
1	3706485	Cable Tool	19.8	Water Supply	Domestic	10.7	5.5	6.4	15.8	4/24/1987
2	3706643	Cable Tool	17.7	Water Supply	Domestic	16.5	4.3			10/17/1987
3	3705110	Rotary (Air)	26.5	Water Supply	Commerical	25.0	3.7			11/18/1977
4	3701390	Cable Tool	16.8	Water Supply	Domestic	12.2	6.1			2/1/1949
5	3707970	Cable Tool	18.3	Water Supply	Domestic	5.5	4.6			11/4/1991
6	3701402	Cable Tool	25.9	Water Supply	Domestic	25.0	6.1	21.0	25.0	3/21/1957
7	7313983	Boring	3.0	Monitoring & Test Hole	Monitoring & Test Hole			1.4	9.0	6/12/2018
8	7313984	Boring	9.2	Monitoring & Test Hole	Monitoring & Test Hole			6.1	9.2	6/11/2018

**mbgs: meter below ground surface

UTM | | Z | | | | | | | | E
| 9 | R | | | | | | | | N
Elev. | 9 | R | 0305 |
Basin | 24 | | | | |

2

UNPLOTTED RECORDS

37 No. 1390

RECEIVED
APR 1 1949
GEOLOGICAL BRANCH
DEPARTMENT OF MINES

ONTARIO

The Well Drillers Act

Department of Mines, Province of Ontario

Water Well Record

[redacted] Con. 8 Lot 8 Pt. Lot
Nayanze Acres 4
(including pump) 126

Pipe and Casing Record

Casing diameter(s) 6 in
Length(s) of casing(s) 19 ft
Length of screen
Type of screen
Type of pump
Capacity of pump
Depth of pump setting

Pumping Test

Date
Developed Capacity 1000 gals per hour
Duration of Test
Pumping Rate
Drawdown none
Static level of completed well 20 ft
Is well a gravel-wall type? no

Water Record

Kind (fresh or mineral) fresh
Quality (hard, soft, contains iron, sulphur etc.) X
Appearance (clear, cloudy, coloured) Clear
For what purpose(s) is the water to be used? Domestic
How far is well from possible source of contamination? 80 ft
What is source of contamination? Septic Tank
Enclose a copy of any mineral analysis that has been made of water

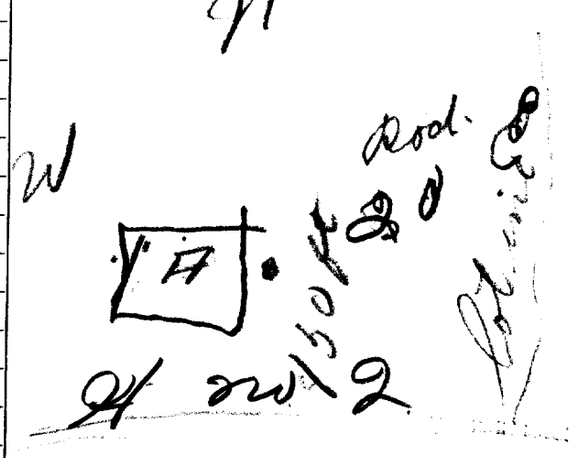
Depth(s) to Water Horizon(s)	Kind of Water	No. of Feet Water Rises
40 ft	fresh	20

Well Log

Drift and Bedrock Record	From	To
	0 ft.	ft.
17 ft. hard pan		
28 " limestone		
55 ft.		

Location of Well

In diagram below show distances of well from road and lot line



Situation: Is well on upland, in valley, or on hillside? upland
Drilling Firm Geo Chalk
Address Nayanze
Recorded by W N Miller Address Newburgh
Date April 1st 1949 Licence Number

CSS.58

UTM | | Z | | | | | | | E
| 9 | R | | | | | | | | N

Elev. | 9 | R | 0 | 3 | 1 | 0 |

Basin | 2 | 4 | | | | |

ONTARIO

The Water-well Drillers Act, 1954
Department of Mines

37 № 1402

SEP 30 1954
ONTARIO WATER RESOURCES COMMISSION

Water-Well Record

[redacted] Township, Village, Town or City Napanee
[redacted] Village, Town or City)
[redacted] Address Belleville Rd. Napanee

Date completed 21 (day) March (month) 1954 (year)

Pipe and Casing Record

Casing diameter(s) 6¼"
Length(s) 16 ft.
Type of screen —
Length of screen —

Pumping Test

Static level 20'
Pumping rate 900 G.P.H.
Pumping level 50'
Duration of test 1 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)
Clay	0	14			
Limestone	14	85	82'	62'	sulphur

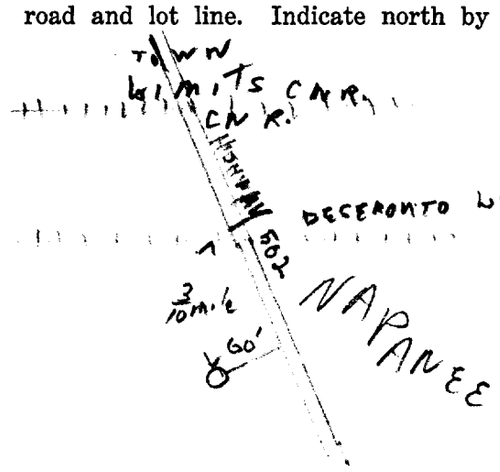
For what purpose(s) is the water to be used? domestic
Is water clear or cloudy? cloudy
Is well on upland, in valley, or on hillside? upland
Drilling firm Gorgett & Clark Jr.
Address R.R. #6 Napanee
Name of Driller James Lambert
Address R.R. #7 Napanee
Licence Number 1034

I certify that the foregoing statements of fact are true.

Date Mar 30/57 Jas Lambert
Signature of Licensee

Location of Well

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



Form 5

CSS.S8

Ministry of the Environment
Ontario

The Ontario Water Resources Act 31C/2e

WATER WELL RECORD

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

11 | 3705110 | MUNICIP 37013 | CON. CON | 01

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT	19
Lennox & Addington	Richmond	~~7~~ ~~E~~ 1	020	Pt. 20

[redacted] R.R.#6 Napanee

DATE COMPLETED: DAY 18 MO. 11 YR. 77

01220 | RC 4 | ELEVATION 0320 | RC 4 | BASIN CODE 24

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
brown	clay		packed	0	15
grey	limestone		hard	15	87

31 0015560579 | 0087821573

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0082	1 ☐ ~~FRESH~~ 3 ☒ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
06⅝	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	0020
06⅝	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		20	0087
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

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

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☐ PUMP 2 ☒ BAILER	0004 GPM	02 HOURS 00 MINS

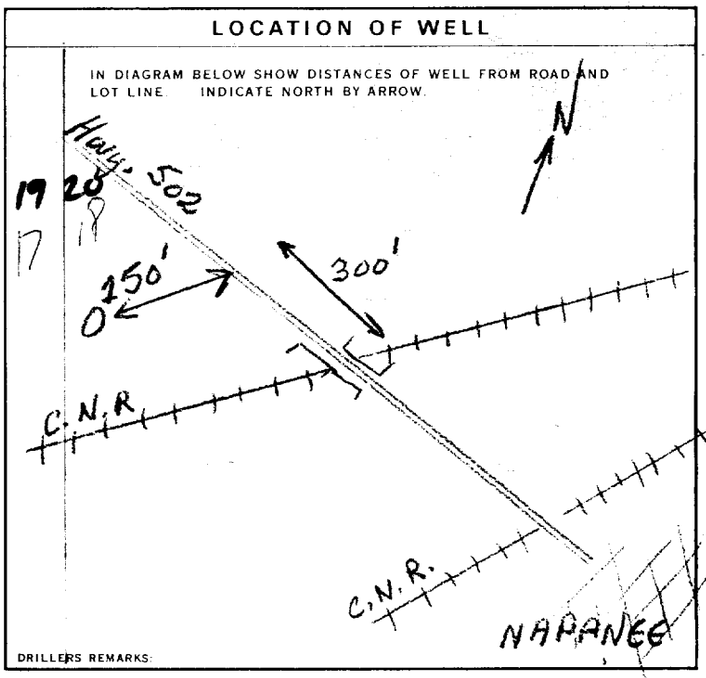
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (1 ☐ PUMPING 2 ☒ RECOVERY) 15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
012 FEET	087 FEET	048 FEET	021 FEET	014 FEET	012 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	FEET	1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	084 FEET	0004 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL 1	1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED
WATER USE 05	1 ☐ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☒ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED
METHOD OF DRILLING 4	1 ☐ 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	LICENCE NUMBER
CHALK WELL DRILLING LTD.	1507
ADDRESS: R.R.#6 Napanee	
NAME OF DRILLER OR BORER: George R. Chalk	LICENCE NUMBER: 1559
SIGNATURE OF CONTRACTOR: CHALK WELL DRILLING LTD.	SUBMISSION DATE: DAY 18 MO. 11 YR. 77

OFFICE USE ONLY

DATA SOURCE	CONTRACTOR	DATE RECEIVED
1	1507	190178
DATE OF INSPECTION	INSPECTOR	
	P/R7	

REMARKS: George R. Chalk. CSS.88

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506—4—77

Ministry of the Environment
Ontario

22

The Ontario Water Resources Act

WATER WELL RECORD

3706485

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

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC	LOT
[redacted]	Richmond	I	18
	5 Second Ave Napanee		DATE COMPLETED DAY 24 MO 8 YR 87
	84-2252		

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
	Soil			0	19
	Limestone			19	52
	Limestone			52	65

WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
35-45	1 ☐ FRESH 2 ☐ SALTY 3 ☒ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
6	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	21
6	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		21	52
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

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

PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)
10-13	14	
18-21	22-25	
26-29	30-33	

PUMPING TEST

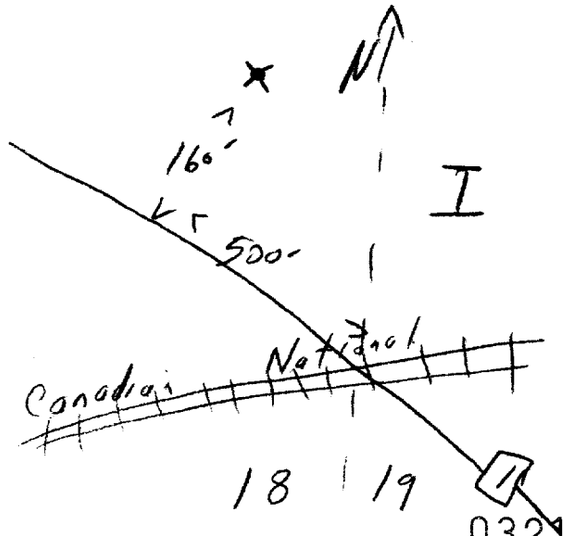
PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☐ PUMP 2 ☒ BAILER	5 GPM	1 HOURS ___ MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (1 ☒ PUMPING 2 ☐ RECOVERY) 15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
18 FEET	48 FEET	48 FEET	48 FEET	48 FEET	48 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	48 FEET	1 ☐ CLEAR 2 ☒ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP	RECOMMENDED PUMP SETTING FEET	RECOMMENDED PUMPING RATE 5 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS

03216

FINAL STATUS OF WELL	1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED
WATER USE	1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED
METHOD OF DRILLING	1 ☒ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

1506

CONTRACTOR

NAME OF WELL CONTRACTOR: L Campbell	LICENCE NUMBER: 1506
ADDRESS: Newburgh	
NAME OF DRILLER OR BORER: L Campbell	LICENCE NUMBER:
SIGNATURE OF CONTRACTOR	SUBMISSION DATE DAY 27 MO 5 YR 87

OFFICE USE ONLY

DATA SOURCE	CONTRACTOR	DATE RECEIVED
		JUN 11 1987
DATE OF INSPECTION	INSPECTOR	
REMARKS		

CSS.ES

FORM NO. 0506—4—77 FORM 7

MINISTRY OF THE ENVIRONMENT COPY

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

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

11 3706643

MUNICIP. CON.

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
[redacted]	Richmond	1 (Plan 434 Lot 32-33)	19
[redacted]	Robert st. Napanee, Ont. K7R 2M7	DATE COMPLETED DAY 17 MO 10 YR 87	

ING RC ELEVATION RC BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Clay			0	4
Brown	Sand - Gravel - Boulders		mixed	4	49
Brown	Gravel			49	54

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
54	1 ☑ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6 1/4	1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	3/16	0	58
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☑ PUMP 2 ☐ BAILER	5 GPM	3 HOURS ___ MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (1 ☐ PUMPING 2 ☐ RECOVERY) 15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
14 FEET	29 FEET	21 FEET	23 FEET	25 FEET	26 FEET

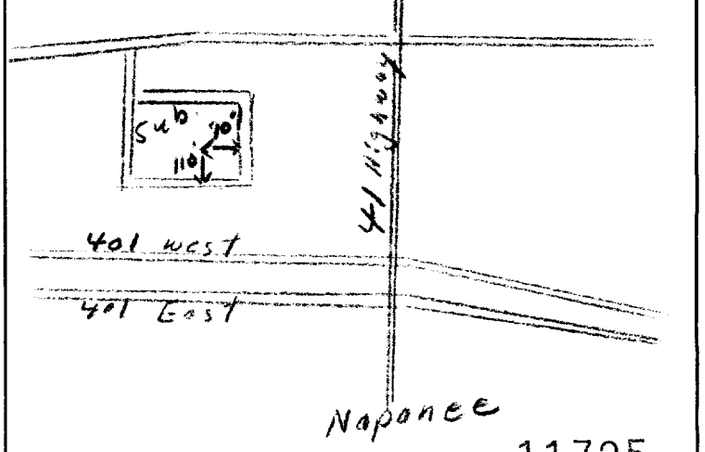
IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	52 FEET	1 ☑ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☑ DEEP	50 FEET	5+ GPM

LOCATION OF WELL

N

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS 11725

FINAL STATUS OF WELL	1 ☑ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED 9 ☐ DEWATERING
WATER USE	1 ☑ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED
METHOD OF CONSTRUCTION	1 ☑ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☑ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING ☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: Jack Knox — WELL CONTRACTOR'S LICENCE NUMBER: 3202

ADDRESS: Glenburnie, Ontario

NAME OF WELL TECHNICIAN: Ron Knox — WELL TECHNICIAN'S LICENCE NUMBER: T-0041

SIGNATURE OF TECHNICIAN/CONTRACTOR: Jack Knox — SUBMISSION DATE: DAY ___ MO ___ YR ___

OFFICE USE ONLY

DATA SOURCE	CONTRACTOR	DATE RECEIVED
		FEB 25 1988

DATE OF INSPECTION | INSPECTOR

REMARKS

CSS.ES

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

3707970

MUNICIP 3 7 0 1 3 CON. CON 0 1

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11

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON. BLOCK, TRACT, SURVEY, ETC.	LOT 25-27
[redacted]	Richmond	I	20
	Napanee, Ontario		DATE COMPLETED 48-53 DAY 04 MO 11 YR 91

RC ELEVATION RC BASIN CODE II III IV

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Sand		Loose	0	4
Brown	Clay	Sand	Packed	4	16
Brown	Gravel	Sand	Coarse	16	19
Grey	Clay		Packed	19	20
Brown	Limestone		Hard	20	60

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
18	☑ FRESH ☐ SALTY ☐ SULPHUR ☐ MINERALS ☐ GAS
34	☑ FRESH ☐ SALTY ☐ SULPHUR ☐ MINERALS ☐ GAS
	☐ FRESH ☐ SALTY ☐ SULPHUR ☐ MINERALS ☐ GAS
	☐ FRESH ☐ SALTY ☐ SULPHUR ☐ MINERALS ☐ GAS
	☐ FRESH ☐ SALTY ☐ SULPHUR ☐ MINERALS ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼"	☑ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE ☐ PLASTIC	.188	0	22
6"	☐ STEEL ☐ GALVANIZED ☐ CONCRETE ☑ OPEN HOLE ☐ PLASTIC		22	60
	☐ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE ☐ PLASTIC			

SCREEN

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

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)
0	6	Cuttings
6	10	Cement
10	20	Gravel

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
☐ PUMP ☑ BAILER	6 GPM	2 HOURS 0 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING ☐ PUMPING ☑ RECOVERY			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
15 FEET	60 FEET	18 FEET	15 FEET	15 FEET	15 FEET

IF FLOWING, GIVE RATE: GPM

PUMP INTAKE SET AT: FEET

WATER AT END OF TEST: ☑ CLEAR ☐ CLOUDY

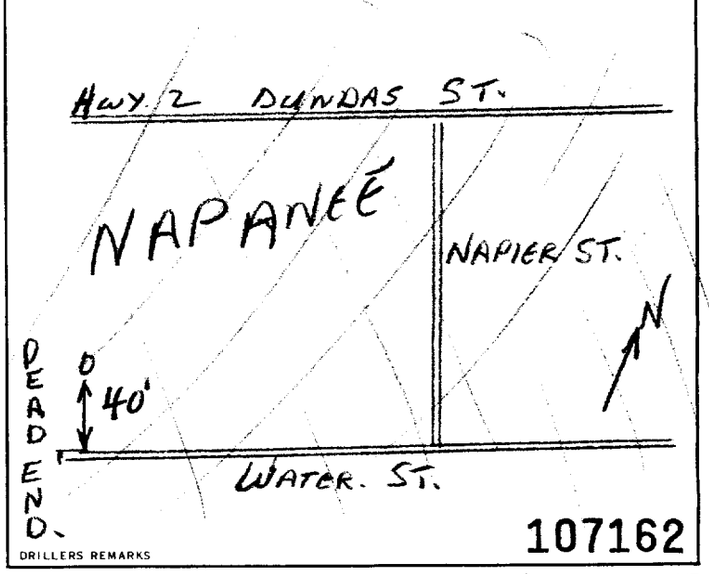
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☑ DEEP

RECOMMENDED PUMP SETTING: 57 FEET

RECOMMENDED PUMPING RATE: 6 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS: 107162

FINAL STATUS OF WELL

☑ WATER SUPPLY ☐ OBSERVATION WELL ☐ TEST HOLE ☐ RECHARGE WELL ☐ ABANDONED, INSUFFICIENT SUPPLY ☐ ABANDONED, POOR QUALITY ☐ UNFINISHED ☐ DEWATERING

WATER USE

☑ DOMESTIC ☐ STOCK ☐ IRRIGATION ☐ INDUSTRIAL ☐ OTHER ☐ COMMERCIAL ☐ MUNICIPAL ☐ PUBLIC SUPPLY ☐ COOLING OR AIR CONDITIONING ☐ NOT USED

METHOD OF CONSTRUCTION

☑ CABLE TOOL ☐ ROTARY (CONVENTIONAL) ☐ ROTARY (REVERSE) ☐ ROTARY (AIR) ☐ AIR PERCUSSION ☐ BORING ☐ DIAMOND ☐ JETTING ☐ DRIVING ☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: CHALK WELL DRILLING LTD.
WELL CONTRACTOR'S LICENCE NUMBER: 1507
ADDRESS: R. R. # 6, Napanee, Ontario
NAME OF WELL TECHNICIAN: R. Ian Chalk
WELL TECHNICIAN'S LICENCE NUMBER: T-0047
SIGNATURE OF TECHNICIAN/CONTRACTOR: CHALK WELL DRILLING LTD.
SUBMISSION DATE: DAY 04 MO 11 YR 91

OFFICE USE ONLY

DATA SOURCE: 58 CONTRACTOR: 1507 DATE RECEIVED: MAY 21 1992
DATE OF INSPECTION: INSPECTOR:
REMARKS: CSS.ES

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☒ Imperial

Well Tag No. (Place Sticker and/or Print Below)

Tag#: A145701

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
216 Belleville Road			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Napanee	Ontario	K7R2R5

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18T	343614	4901256		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	To
Brown	Top Soil	Sand	Loose	0	4'
Brown	Clay	Sand/Silt	Dense	4'	9'9"

3 MW set on site in Cluster.

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	3'6"	3/8" Bentonite Chips	
3'6"	9'9"	#2 Silica Sand	

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☑ Boring ☐ Digging
☐ Air percussion
☐ Other, specify

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☑ Test Hole ☑ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	To
2"	Plastic	.25"	0	4'9"

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	To
2.25"	Plastic	.10	4.9'	9.9'

Status of Well

☐ Water Supply
☐ Replacement Well
☑ Test Hole
☐ Recharge Well
☐ Dewatering Well
☑ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Water Details

Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify
Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify
Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	9.9'	8"

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

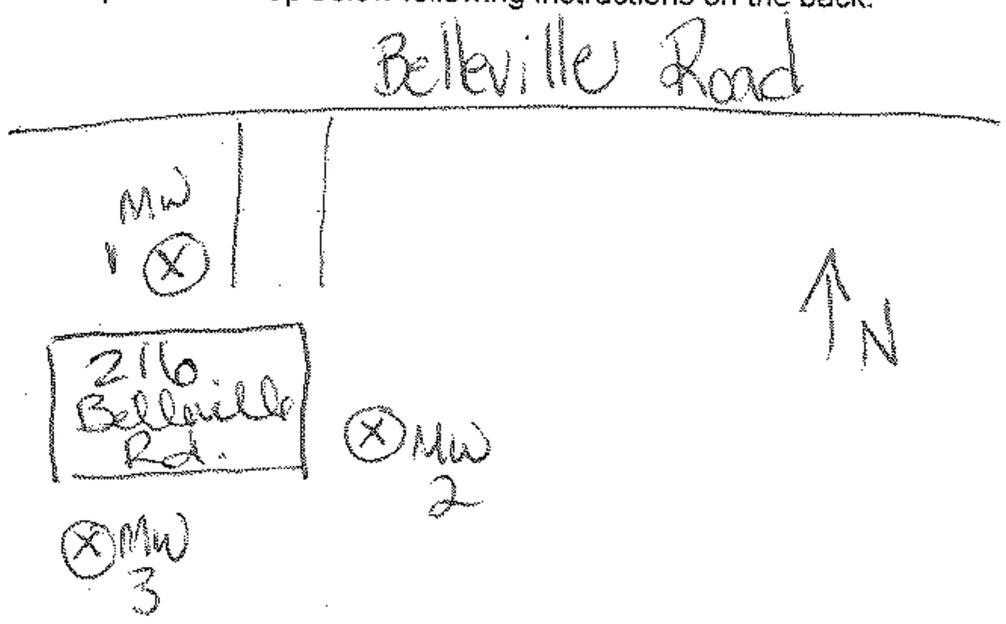
Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

Draw Down Time (min)	Water Level (m/ft)	Recovery Time (min)	Water Level (m/ft)
Static Level			
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
50		50	
60		60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Canadian Environmental Drilling & Contracting Inc.	7123

Business Address (Street Number/Name)	Municipality
4102 Perth Rd. Inverary	South Frontenac

Province	Postal Code	Business E-mail Address
ON	K0H1X0	info@cafedc.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
613 353 2231	Asselstine Lucas

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3315	Luke Asselstine	2018/06/12

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☒ No	Y Y Y Y M M D D	2018/06/12

Ministry Use Only

Audit No. Z271864

Received JUL 6 3 2018

506E (2014/11)

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Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☒ Imperial

Well Tag No. *(Place Sticker and/or Print Below)*

Tag#: A 241964

Well Record

Regulation 903 Ontario Water Resources Act

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
200 Belleville Road			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Napanee	Ontario	K7R 2R5

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18T	343710	4910240		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	To
Brown	Sand	Silt	Loose	0	3'
Grey	Clay	silt	Loose	3'	8.5'
Grey	Limestone		Dense	8.5'	30'

3MW's set on site in Cluster

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	14'	3/8" Bentonite Chips	
14'	30'	#2 Silica Sand	

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☑ Boring ☐ Digging
☐ Air percussion
☐ Other, *specify* _____

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☑ Test Hole ☑ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, *specify* _____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	To
1.5"	Plastic	.25"	0	20'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	To
1.75"	Plastic	.10	20'	30'

Status of Well

☐ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, *specify* _____
☐ Other, *specify* _____

Water Details

Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, *specify*
Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, *specify*
Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, *specify*

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	8.5'	8"
8.5'	30'	4"

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, *specify* _____

If pumping discontinued, give reason:

Pump intake set at *(m/ft)*

Pumping rate *(l/min / GPM)*

Duration of pumping _____ hrs + _____ min

Final water level end of pumping *(m/ft)*

If flowing give rate *(l/min / GPM)*

Recommended pump depth *(m/ft)*

Recommended pump rate *(l/min / GPM)*

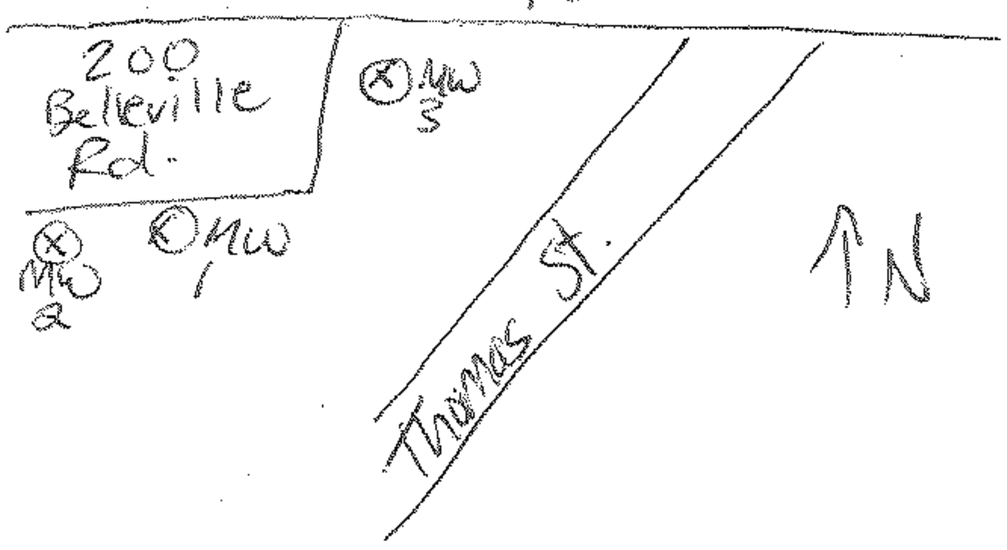
Well production *(l/min / GPM)*

Disinfected? ☐ Yes ☐ No

Draw Down Time (min)	Water Level (m/ft)	Recovery Time (min)	Water Level (m/ft)
Static Level			
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
50		50	
60		60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Gen-Envir. Drilling & Contractors Inc	7323

Business Address (Street Number/Name)	Municipality
4102 Perth Rd. Inverary	South Frontenac

Province	Postal Code	Business E-mail Address
ON	K0H 1X0	info@gamedc.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
613 353 2231	Asselstine Lucas

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3315	Luke Asselstine	2018/06/27

Well owner's information package delivered: ☐ Yes ☑ No

Date Package Delivered: Y Y Y Y M M D D

Date Work Completed: 2018/06/11

Ministry Use Only

Audit No. Z271863

Received JUL 03 2018

506E (2014/11)

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APPENDIX F

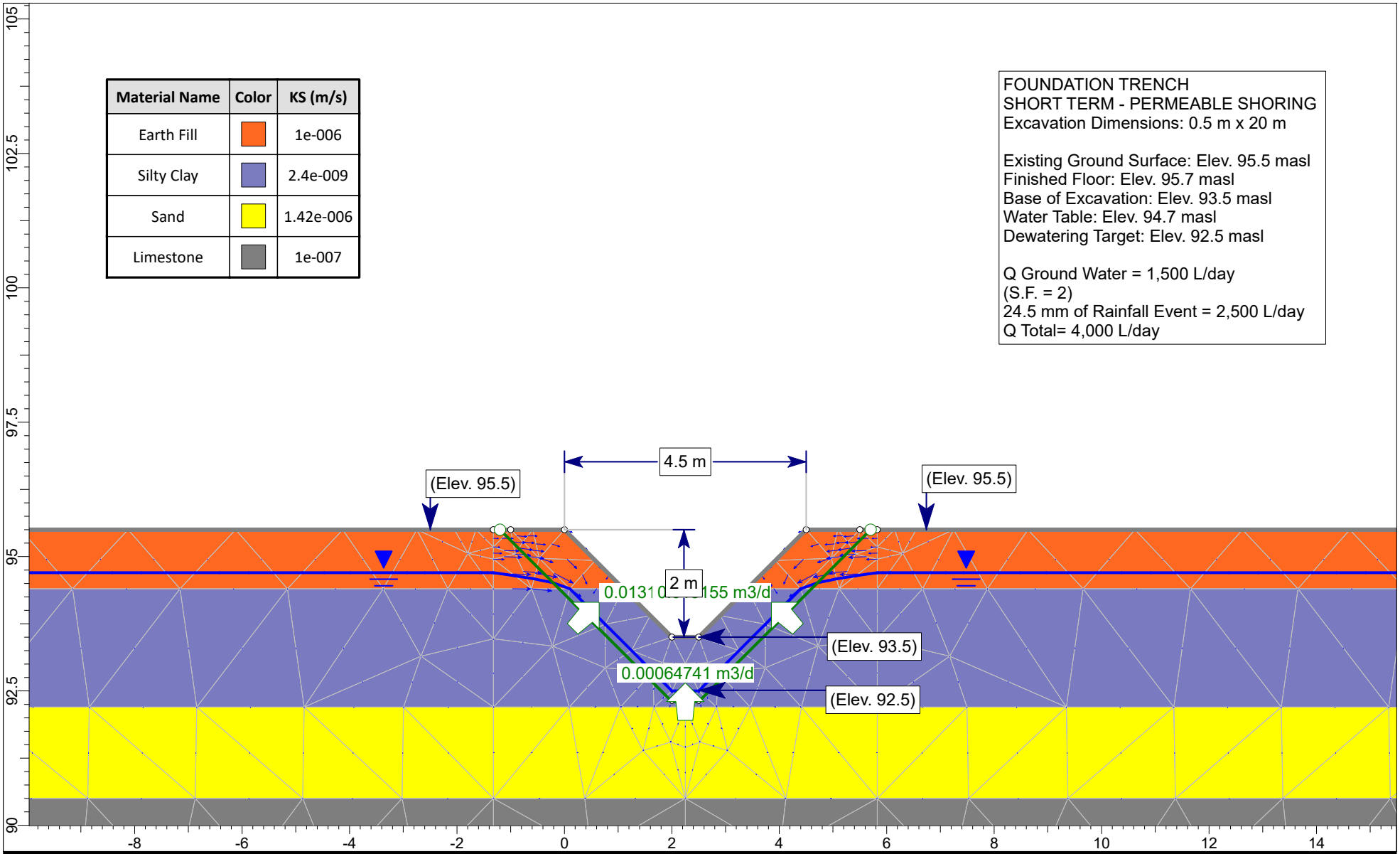
TERRAPROBE INC.

Material Name	Color	KS (m/s)
Earth Fill		1e-006
Silty Clay		2.4e-009
Sand		1.42e-006
Limestone		1e-007

FOUNDATION TRENCH
SHORT TERM - PERMEABLE SHORING
Excavation Dimensions: 0.5 m x 20 m

Existing Ground Surface: Elev. 95.5 masl
Finished Floor: Elev. 95.7 masl
Base of Excavation: Elev. 93.5 masl
Water Table: Elev. 94.7 masl
Dewatering Target: Elev. 92.5 masl

Q Ground Water = 1,500 L/day
(S.F. = 2)
24.5 mm of Rainfall Event = 2,500 L/day
Q Total= 4,000 L/day



Terraprobe
an Englobe Company

SLIDEINTERPRET 7.038

Project	02209037.0104 - 205 Limoges Road, Limoges		
Analysis Description	Construction Dewatering (Short Term) - Permeable Shoring Trench		
Drawn By	MM	Scale 1:100	Company Terraprobe Inc.
Date	2023-02-12, 2:32:41 PM		File Name 02209049-0104_trench.slmd

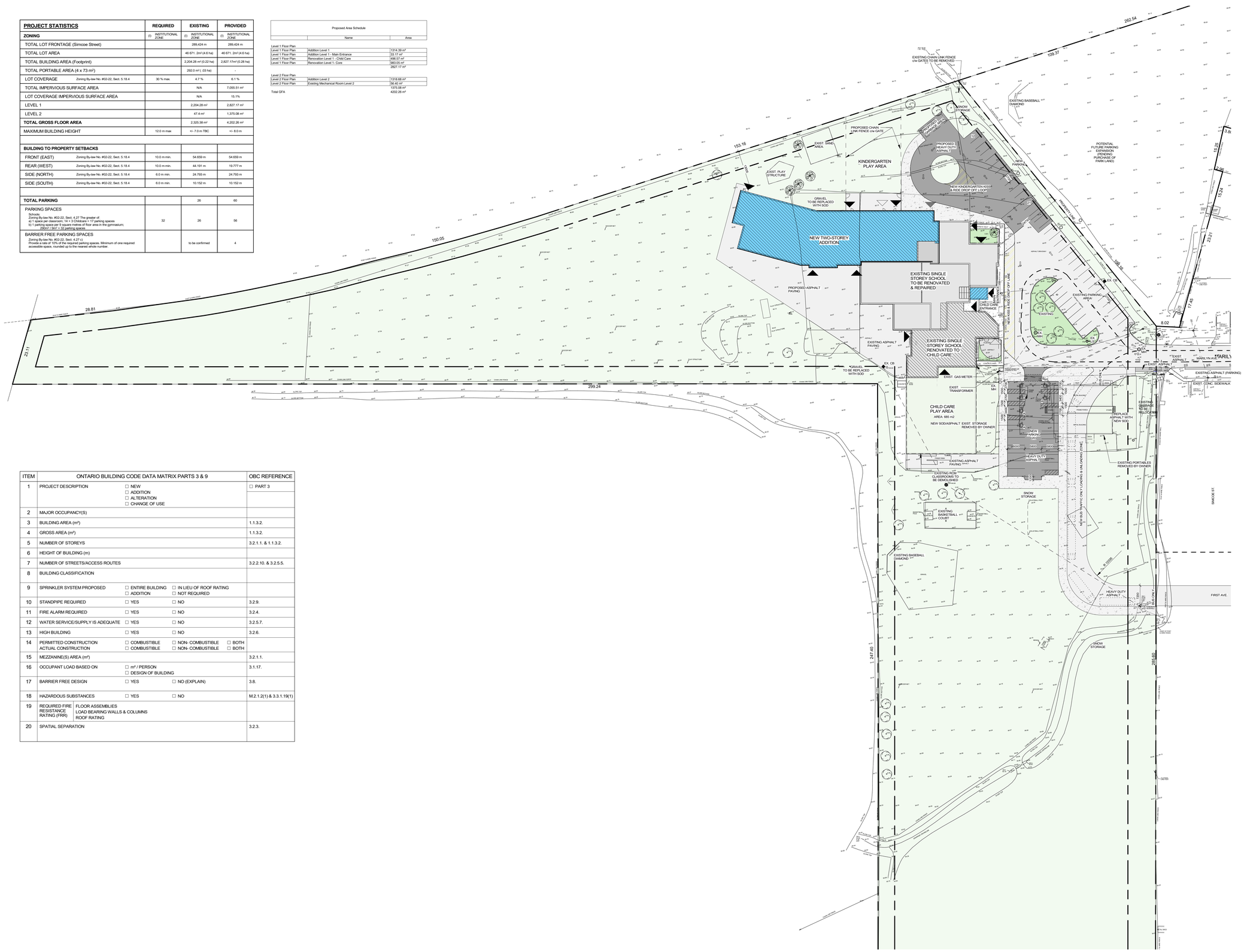
APPENDIX G

TERRAPROBE INC.

PROJECT STATISTICS		REQUIRED	EXISTING	PROVIDED
ZONING		(I) INSTITUTIONAL ZONE	(I) INSTITUTIONAL ZONE	(I) INSTITUTIONAL ZONE
TOTAL LOT FRONTAGE (Simcoe Street)			289.424 m	289.424 m
TOTAL LOT AREA			46 671. 2m² (4.6 ha)	46 671. 2m² (4.6 ha)
TOTAL BUILDING AREA (Footprint)			2,204.28 m² (0.22 ha)	2,827.17m² (0.28 ha)
TOTAL PORTABLE AREA (4 x 73 m²)			292.0 m² (.03 ha)	-
LOT COVERAGE	Zoning By-law No. #02-22, Sect. 5.18.4	30 % max.	4.7 %	6.1 %
TOTAL IMPERVIOUS SURFACE AREA			N/A	7,055.51 m²
LOT COVERAGE IMPERVIOUS SURFACE AREA			N/A	15.1%
LEVEL 1			2,204.28 m²	2,827.17 m²
LEVEL 2			47.4 m²	1,375.08 m²
TOTAL GROSS FLOOR AREA			2,325.38 m²	4,202.26 m²
MAXIMUM BUILDING HEIGHT		12.0 m max	+/- 7.0 m TBC	+/- 8.0 m
BUILDING TO PROPERTY SETBACKS				
FRONT (EAST)	Zoning By-law No. #02-22, Sect. 5.18.4	10.0 m min.	54.659 m	54.659 m
REAR (WEST)	Zoning By-law No. #02-22, Sect. 5.18.4	10.0 m min.	44.191 m	19.777 m
SIDE (NORTH)	Zoning By-law No. #02-22, Sect. 5.18.4	6.0 m min.	24.793 m	24.793 m
SIDE (SOUTH)	Zoning By-law No. #02-22, Sect. 5.18.4	6.0 m min.	10.152 m	10.152 m
TOTAL PARKING			26	60
PARKING SPACES Schools: Zoning By-law No. #02-22, Sect. 4.27 The greater of: a) 1 space per classroom; 14 × 3 Childcare = 17 parking spaces b) 1 parking space per 9 square metres of floor area in the gymnasium; 290m² / 9m² = 32 parking spaces		32	26	56
BARRIER FREE PARKING SPACES Zoning By-law No. #02-22, Sect. 4.27 c) Provide a rate of 10% of the required parking spaces. Minimum of one required accessible space, rounded up to the nearest whole number.			to be confirmed	4

Proposed Area Schedule			
	Name	Area	
Level 1 Floor Plan			
Level 1 Floor Plan	Addition Level 1	1314.39 m²	
Level 1 Floor Plan	Addition Level 1 - Main Entrance	33.17 m²	
Level 1 Floor Plan	Renovation Level 1 - Child Care	696.57 m²	
Level 1 Floor Plan	Renovation Level 1 - Core	783.05 m²	
		2827.17 m²	
Level 2 Floor Plan			
Level 2 Floor Plan	Addition Level 2	1318.68 m²	
Level 2 Floor Plan	Existing Mechanical Room Level 2	56.40 m²	
		1375.08 m²	
Total GFA		4202.26 m²	

ITEM	ONTARIO BUILDING CODE DATA MATRIX PARTS 3 & 9				OBC REFERENCE
1	PROJECT DESCRIPTION	☐ NEW ☐ ADDITION ☐ ALTERATION ☐ CHANGE OF USE			☐ PART 3
2	MAJOR OCCUPANCY(S)				
3	BUILDING AREA (m²)				1.1.3.2.
4	GROSS AREA (m²)				1.1.3.2.
5	NUMBER OF STOREYS				3.2.1.1. & 1.1.3.2.
6	HEIGHT OF BUILDING (m)				
7	NUMBER OF STREETS/ACCESS ROUTES				3.2.2.10. & 3.2.5.5.
8	BUILDING CLASSIFICATION				
9	SPRINKLER SYSTEM PROPOSED	☐ ENTIRE BUILDING ☐ ADDITION	☐ IN LIEU OF ROOF RATING ☐ NOT REQUIRED		
10	STANDPIPE REQUIRED	☐ YES	☐ NO		3.2.9.
11	FIRE ALARM REQUIRED	☐ YES	☐ NO		3.2.4.
12	WATER SERVICE/SUPPLY IS ADEQUATE	☐ YES	☐ NO		3.2.5.7.
13	HIGH BUILDING	☐ YES	☐ NO		3.2.6.
14	PERMITTED CONSTRUCTION ACTUAL CONSTRUCTION	☐ COMBUSTIBLE ☐ COMBUSTIBLE	☐ NON- COMBUSTIBLE ☐ NON- COMBUSTIBLE	☐ BOTH ☐ BOTH	
15	MEZZANINE(S) AREA (m²)				3.2.1.1.
16	OCCUPANT LOAD BASED ON	☐ m² / PERSON ☐ DESIGN OF BUILDING			3.1.17.
17	BARRIER FREE DESIGN	☐ YES	☐ NO (EXPLAIN)		3.8.
18	HAZARDOUS SUBSTANCES	☐ YES	☐ NO		M.2.1.2(1) & 3.3.1.19(1)
19	REQUIRED FIRE RESISTANCE RATING (FRR)	FLOOR ASSEMBLIES LOAD BEARING WALLS & COLUMNS ROOF RATING			
20	SPATIAL SEPARATION				3.2.3.



SITE PLAN LEGEND:

- POLE MOUNTED LIGHT STANDARD AS PER ELEC. DWGs
- PROPERTY LINE / EXTENT OF CONTRACT
- PART LOT / EASEMENT LINE
- FIRE ACCESS ROUTE
- BENCH AS PER LANDSCAPE DWGs
- BIKE RACK AS PER LANDSCAPE DWGs
- PICNIC TABLE AS PER LANDSCAPE DWGs
- MANHOLE AS PER CIVIL DWGs
- CATCH BASIN AS PER CIVIL DWGs
- CATCH BASIN / MANHOLE AS PER CIVIL DWGs
- FIRE HYDRANT AS PER CIVIL DWGs
- METAL BOLLARD
- POST MOUNTED SIGN
- BOREHOLE LOCATION
- IB / SIB PER SURVEY
- BARRIER FREE CUT CURB
- TRAFFIC CALMING BUMP
- ASPHALT PAVEMENT
- CONCRETE PAVING / SIDEWALK
- GRAVEL PATH
- LANDSCAPE PAVERS
- HEAVY-DUTY PAVERS
- HEAVY-DUTY ASPHALT
- GRASS / SOD

SITE PLAN GENERAL NOTES:

1. THE CONTRACT CONSISTS OF ALL WORK WITHIN THE 'EXTENT OF CONTRACT' LINE INDICATED ON THE SITE PLAN PLUS ANY WORK REQUIRED TO BE DONE BEYOND THE 'EXTENT OF CONTRACT' LINE. WORK OUTSIDE OF THESE LIMITS MUST BE EXECUTED IN STRICT ACCORDANCE WITH THE STANDARDS OF THE MUNICIPALITY AND ALL OTHER AUTHORITIES HAVING JURISDICTION. MAKE GOOD AT NO ADDITIONAL COST TO THE OWNER OR MUNICIPALITY ANY DAMAGE CAUSED BY THIS CONSTRUCTION TO MATERIALS OR FINISHES BEYOND THE EXTENT OF CONTRACT LINE.
2. CONTRACTOR IS TO RESTRICT ALL WORK, EQUIPMENT, AND MATERIALS STORAGE TO AREA WITHIN 'EXTENT OF CONTRACT' LINE EXCEPT WHERE NOTED OTHERWISE. PRIMARY SITE ACCESS POINT & CONSTRUCTION PARKING IS TO BE CONFIRMED WITH BUILDER. NO PARKING IN MUNICIPALITY RIGHT-OF-WAY.
3. LOCATE EXCAVATED MATERIALS & TOPSOIL PILES AS DIRECTED. AT COMPLETION OF PROJECT ANY EXCESS MATERIAL IS TO BE REMOVED AND AREA MADE GOOD TO ARCHITECT'S SATISFACTION.
4. FOR TRENCHING & BACKFILLING OF ALL SERVICE LINES AND DIVISION OF RESPONSIBILITY, REFER TO APPROPRIATE SECTIONS IN SPECIFICATIONS.
5. SUPPLY AND PLACE TOPSOIL TO THICKNESS SPECIFIED OVER ALL SODDED AND PLANTER AREAS INDICATED ON DRAWINGS. PROVIDE ADDITIONAL TOPSOIL AS REQUIRED ABOVE TOPSOIL TAKEN FROM SITE. PROVIDE SODDING TO AREAS INDICATED AND TERMINATE AT 'EXTENT OF CONTRACT' LINE. EXTEND SODDING BEYOND PROPERTY LINES TO ROADWAYS WHERE INDICATED.
6. NOTE THAT EXACT LOCATIONS OF ALL NEW MECHANICAL & ELECTRICAL ITEMS ARE APPROXIMATE UNLESS DIMENSION GIVEN. ADJUST LOCATION AS REQUIRED AND AS APPROVED BY CONSULTANT TO SUIT SITE CONDITIONS.
7. NOTE THAT ALL MECHANICAL AND ELECTRICAL UNDERGROUND SERVICE LINES INDICATED ON DRAWINGS ARE APPROXIMATE ONLY AND ARE SHOWN ONLY TO INDICATE THE GENERAL ZONE IN WHICH THEY ARE APPLIED. CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING EXACT TYPES, LOCATIONS AND DEPTHS OF ALL UNDERGROUND SERVICES IN AREA OF NEW CONSTRUCTION INCLUDING GAS LINES, TELEPHONE, CABLE TV, ETC. AND VERIFY THEIR LOCATION WITH THE APPROPRIATE AUTHORITIES BEFORE EXCAVATING.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ADEQUATE RECORDS OF CONSTRUCTION TO FACILITATE AS-CONSTRUCTED DRAWINGS.
9. REFER TO CIVIL DRAWINGS FOR SITE SERVICING AND GRADING, EROSION AND SEDIMENT CONTROL, STORM WATER MANAGEMENT AND DRAINAGE, AND ANY OTHER RELATED WORKS.
10. REFER TO LANDSCAPE DRAWINGS FOR PLANTING, SODDING, TREE AND SHRUB LAYOUT / SCHEDULE (INCLUDING PRESERVATION AND REMOVALS), PAVER LAYOUTS, SITE AMENITIES, AND ANY OTHER RELATED WORKS.
11. REFER TO M&E DRAWINGS FOR SITE LIGHTING / POWER, CISTERNS, AND ANY OTHER RELATED WORKS.
12. CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF ALL DRAWINGS FROM ALL DISCIPLINES. ALL DIMENSIONS ARE TO BE CHECKED AND VERIFIED ON THE JOB. ANY DISCREPANCIES ARE TO BE REPORTED TO THE CONSULTANT. ALL DRAWINGS REMAIN THE PROPERTY OF THE CONSULTANT. ONLY LATEST APPROVED DRAWINGS ARE TO BE USED FOR CONSTRUCTION.

No.	Revision	Date
2	Issued for Client Review	01-17-2023
1	Issued for Pre-Consultation Review	12-01-2022

Orientation

PROJECT NORTH

Seal

All dimensions to be checked and verified on the job by the Contractor. Any discrepancies are to be reported to the Consultant prior to action. Only the latest approved drawings to be used for construction in conformance with all applicable codes, by-laws and regulations. All drawings remain the property of the Consultant.

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salterpilon architecture

151 Ferris Lane, Suite 400 Barrie, Ontario L4M 6C1
salterpilon.com t: 705.737.3530

Project Information

J.J. O'Neill Catholic Elementary School - Addition / Renovation
240 Marilyn Ave., Napanee, ON K7R 2L4

For

Algonquin and Lakeshore Catholic District School Board

Drawing Title

Site Plan

Date	Project No	Drawing No
01-17-2023	22026	A101
Drawn by: AB, JJ		
Scale: As indicated		

C:\Users\abagjione\Documents\22026 - Central_abagjioneW69Nb.rvt
2023-01-20 8:40:03 AM

APPENDIX H

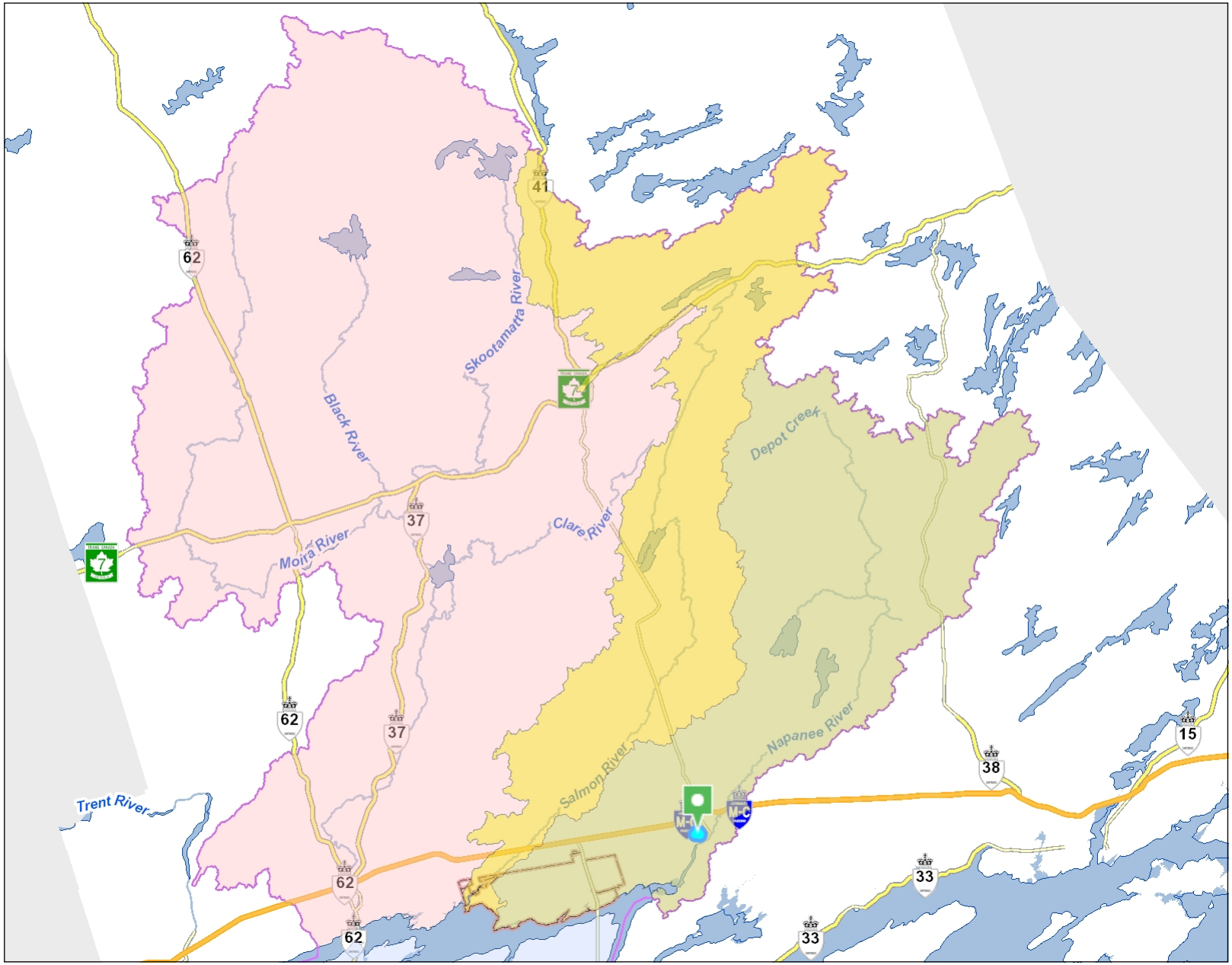
TERRAPROBE INC.

Quinte CONSERVATION

SCREENING LIMIT GIS VIEWER

O. REG. 319/09

240 Marilyn Avenue, Napanee, Ontario



Key Map

Legend

- Moira River Watershed
- Salmon River Watershed
- Napanee River Watershed
- Napanee Region Watershed
- Prince Edward Region Watershed
- Quinte Conservation Jurisdiction
- Shoreline 600k
- River - Primary 600k
- Waterbody 600k
- Lake Ontario 600k

Air Photo Capture Year(s):

Notes

Napanee River Watershed

28,868.8 0 14,434.40 28,868.8 Meters

Projection: NAD_1983_UTM_Zone_18N
Generated: February 22, 2023 @ 9:31 PM

1: 568,284
Original Document: 8.5" x 11"

NORTH

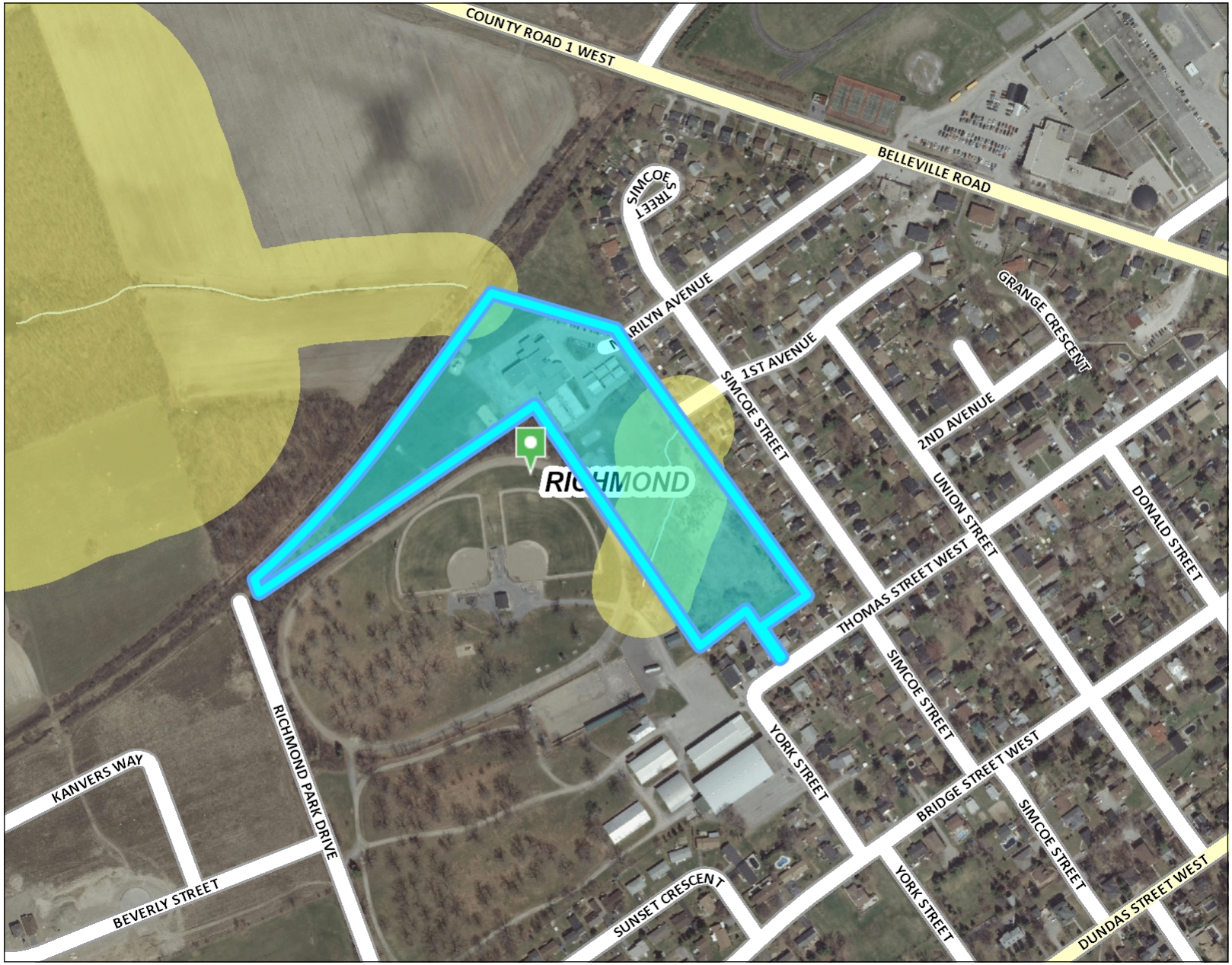
Moira River, Napanee Region and Prince Edward Region Watersheds. RR2 2061 Old Highway 2, Belleville ON K8N 4Z2. www.quinteconservation.ca, 613-968-3434. Produced by Quinte Conservation 2017 under license with the OMNRF. Copyright Quinte Conservation and the Queen's Printer for Ontario, 2017. This map is for illustrative purposes only. Quinte Conservation makes no warranties and assumes no liability whatsoever regarding the truth, accuracy, currency, or completeness of this map and its associated data. DRAPE 2008 Copyright of Aéro-Photo (1961) Inc. - All Rights Reserved. This map is a user generated static output from an Internet mapping site and is for reference only. This map is not to be used for navigation.

Quinte CONSERVATION

SCREENING LIMIT GIS VIEWER

O. REG. 319/09

240 Marilyn Avenue, Napanee, Ontario



254.0 0 127.00 254.0 Meters

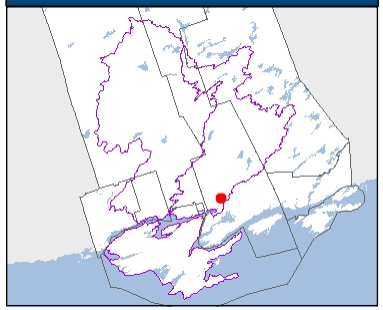
Projection: NAD_1983_UTM_Zone_18N 1: 5,000

Generated: February 22, 2023 @ 11:40 AM Original Document: 8.5" x 11"

NORTH

Moira River, Napanee Region and Prince Edward Region Watersheds. RR2 2061 Old Highway 2, Belleville ON K8N 4Z2. www.quinteconservation.ca, 613-968-3434. Produced by Quinte Conservation 2017 under license with the OMNRF. Copyright Quinte Conservation and the Queen's Printer for Ontario, 2017. This map is for illustrative purposes only. Quinte Conservation makes no warranties and assumes no liability whatsoever regarding the truth, accuracy, currency, or completeness of this map and its associated data. DRAPE 2008 Copyright of Aéro-Photo (1961) Inc. - All Rights Reserved. This map is a user generated static output from an Internet mapping site and is for reference only. This map is not to be used for navigation.

Key Map



Legend

Adjacent CA Boundary

- Cataraqui Region Conservation Aut
- Crowe Valley Conservation Authorit
- Lower Trent Conservation
- Mississippi Valley Conservation
- Rideau Valley Conservation Authori

- Conceptual Regulated Area
- Quinte Conservation Jurisdiction
- Lower and Single Tier Municipality
- Watercourse

Air Photo Capture Year(s):

2008

Notes

Regulation Map

Searched By:
Address
Value:
240 Marilyn Avenue, NAPANEE, ONTARIO

Water Quality | Policy Search by SPA | PTTW

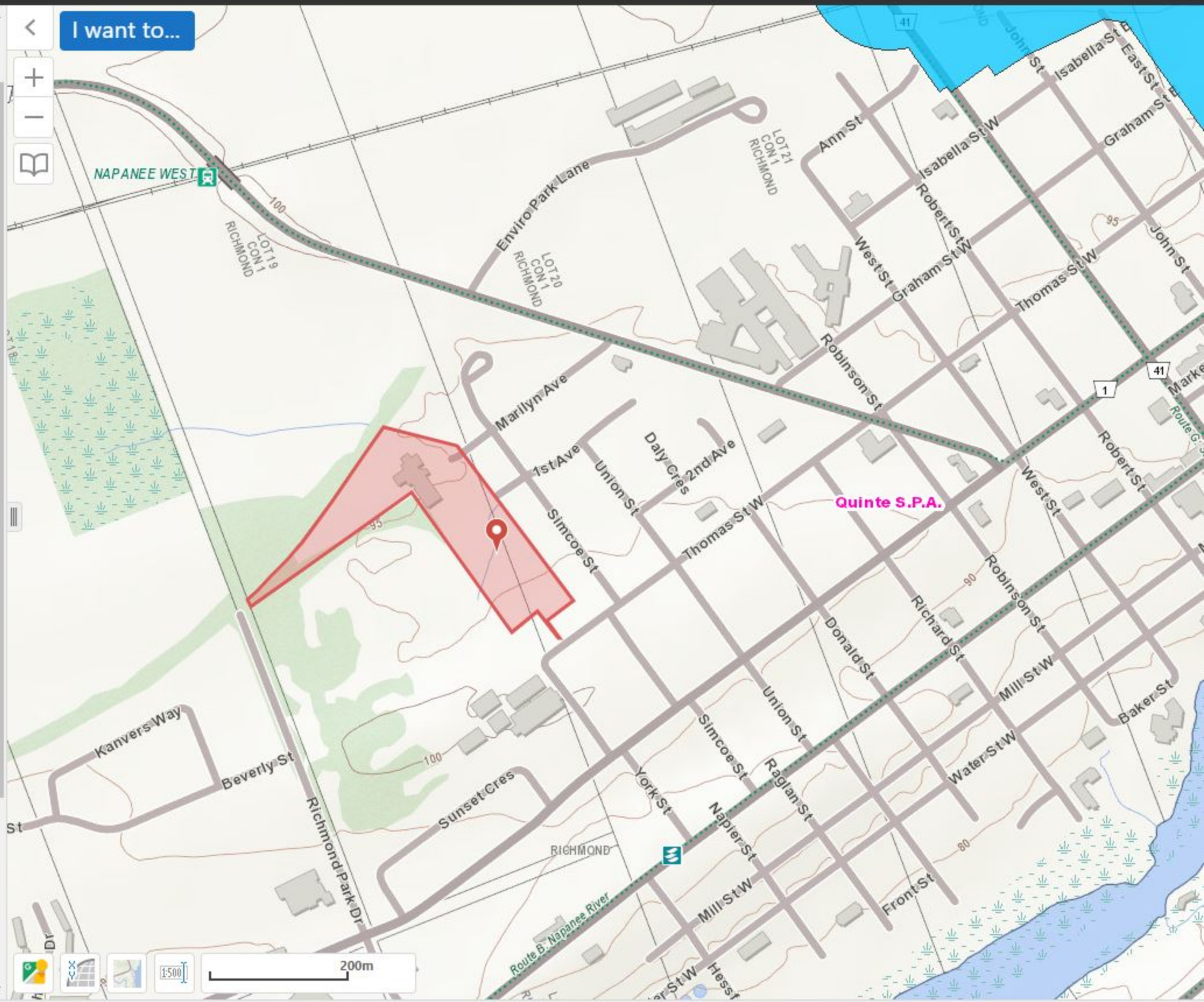
Location Information

Zoom in to confirm your location and results

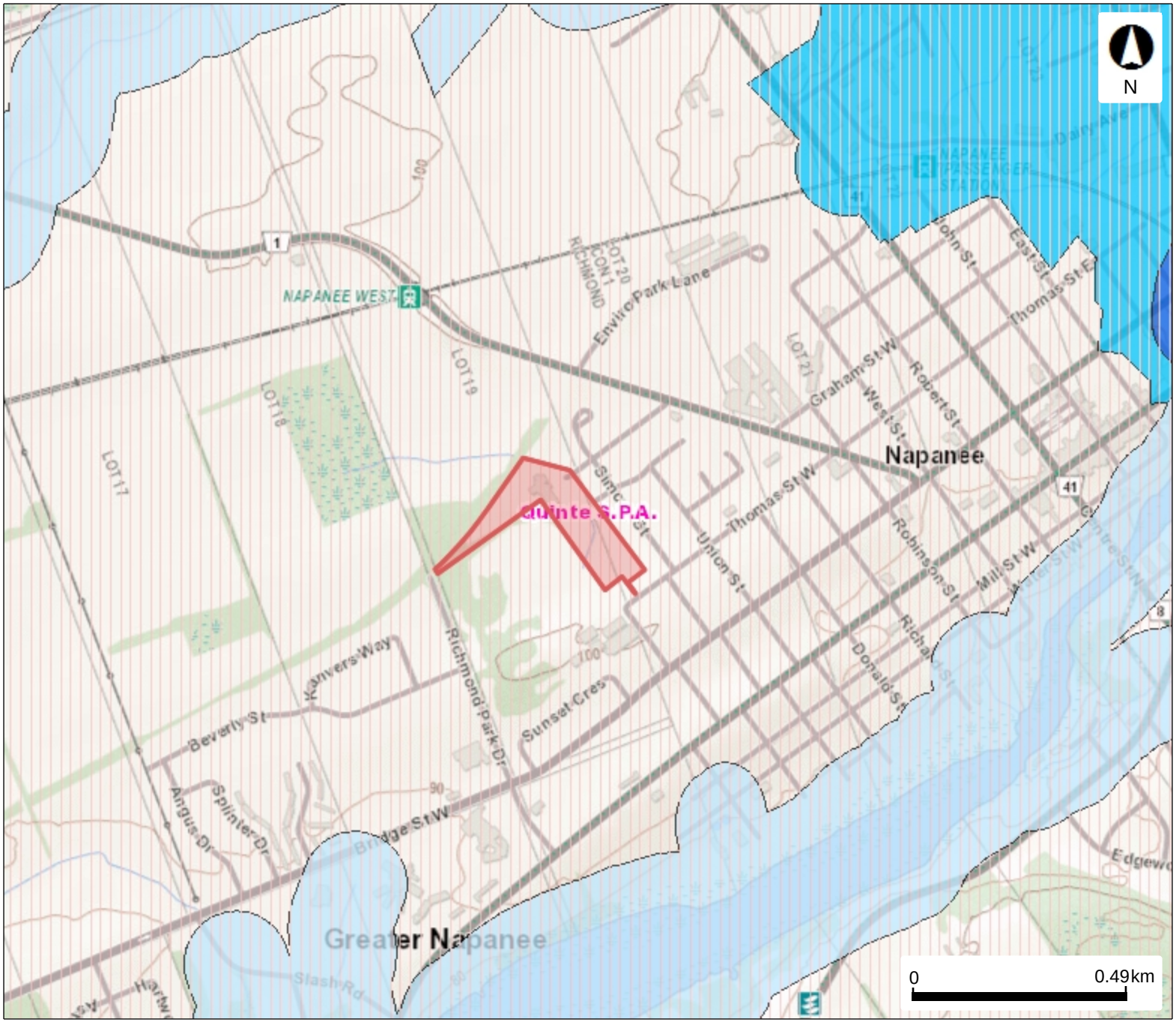
Latitude: **44.24593** Longitude: **-76.96378**
UTM Zone: **18**
Easting: **343206.34** Northing: **4901063.92**
Upper Tier Municipality: **COUNTY OF LENNOX AND ADDINGTON**
Lower Tier Municipality: **TOWN OF GREATER NAPANEE**
Township Concession and Lot: **RICHMOND CON 1 LOT 19**
Assessment Parcel Address: **240 MARILYN AVE**
Assessment Roll #: **11210600202660100000**
MECP District: **Kingston**
MECP Region: **Eastern Region**

Source Protection Details for Location

Source Protection Area: **Quinte**
View Source Protection Plan
Wellhead Protection Area: **No**
Wellhead Protection Area E (GUDI): **No**
Intake Protection Zone: **No**
Issue Contributing Area: **No**
Significant Groundwater Recharge Area: **No**
Highly Vulnerable Aquifer: **Yes** ; score is **6**
Event Based Area: **No**
Wellhead Protection Area Q1: **No**
Wellhead Protection Area Q2: **No**
Intake Protection Zone Q: **No**
Information is current as of: **January 24, 2023**



240 Marilyn Avenue, NAPANEE, ONTARIO



Legend

- Highly Vulnerable Aquifers
- Wellhead Protection Area
  - A
  - B
  - C
  - C1
  - D
  - F
- Intake Protection Zone 1
- Intake Protection Zone 2
- Intake Protection Zone 3
- Source Protection Areas

This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Environment, Conservation and Parks (MECP) shall not be liable in any way for the use or any information on this map. of, or reliance upon, this map.

Ontario

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Map Created: 2/22/2023
Map Center: 44.24654 N, -76.964 W

Ontario

Ministry of Natural Resources and Forestry

Make-a-Map: Natural Heritage Areas

240 Marilyn Avenue, Napanee, Ontario

Map created:2/22/2023

Notes:

Legend

ANSI

- Earth Science Provincially Significant/sciences de la terre d'importance provinciale
- Earth Science Regionally Significant/sciences de la terre d'importance régionale
- Life Science Provincially Significant/sciences de la vie d'importance provinciale
- Life Science Regionally Significant/sciences de la vie d'importance régionale

Evaluated Wetland

- Provincially Significant/considérée d'importance provinciale
- Non-Provincially Significant/non considérée d'importance provinciale
- Unevaluated Wetland
- Woodland
- Conservation Reserve
- Provincial Park
- Natural Heritage System

0.7 0 0.33 0.7 Kilometres

Absence of a feature in the map does not mean they do not exist in this area.

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GTA 2005 / SWOOP 2006 / Simcoe-Muskoka-Dufferin © FirstBase Solutions, 2005 / 2006 / 2008
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240 Marilyn Avenue, Napanee, Ontario

Search

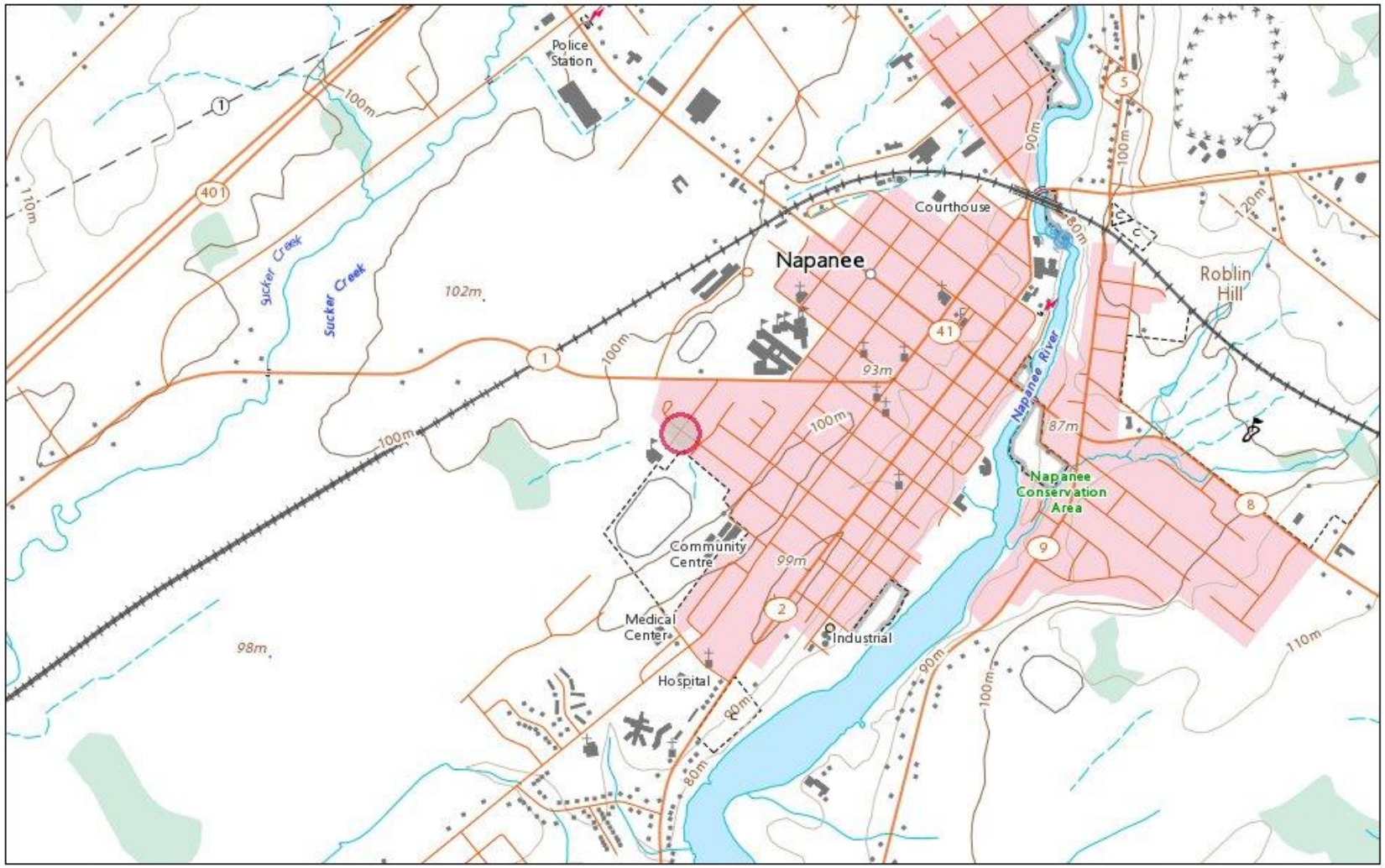
- ○ Watershed
- ○ Permit Holder Name
- ● Address with Radius of

1 km

Your search returned no result in Ontario. Please refine your search.

Latitude:44.23318, Longitude:-76.98044 (UTM Zone:18, Easting:341842, Northing:4899679)

Toporama



February 22, 2023

pointLayer

Override 1

1:19,490

0 0.15 0.3 0.6 mi

0 0.25 0.5 1 km

Natural Resources Canada Ressources naturelles Canada

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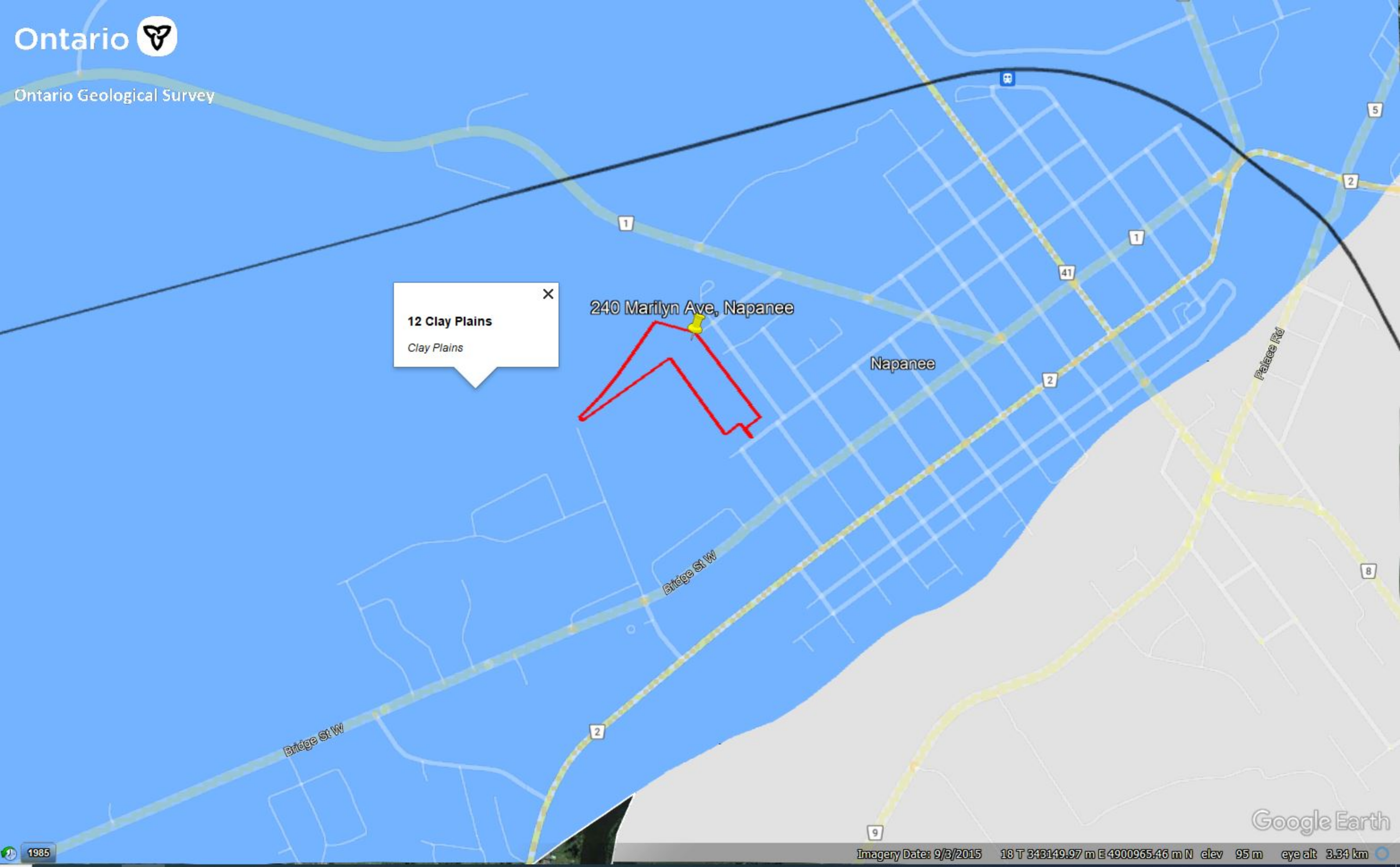
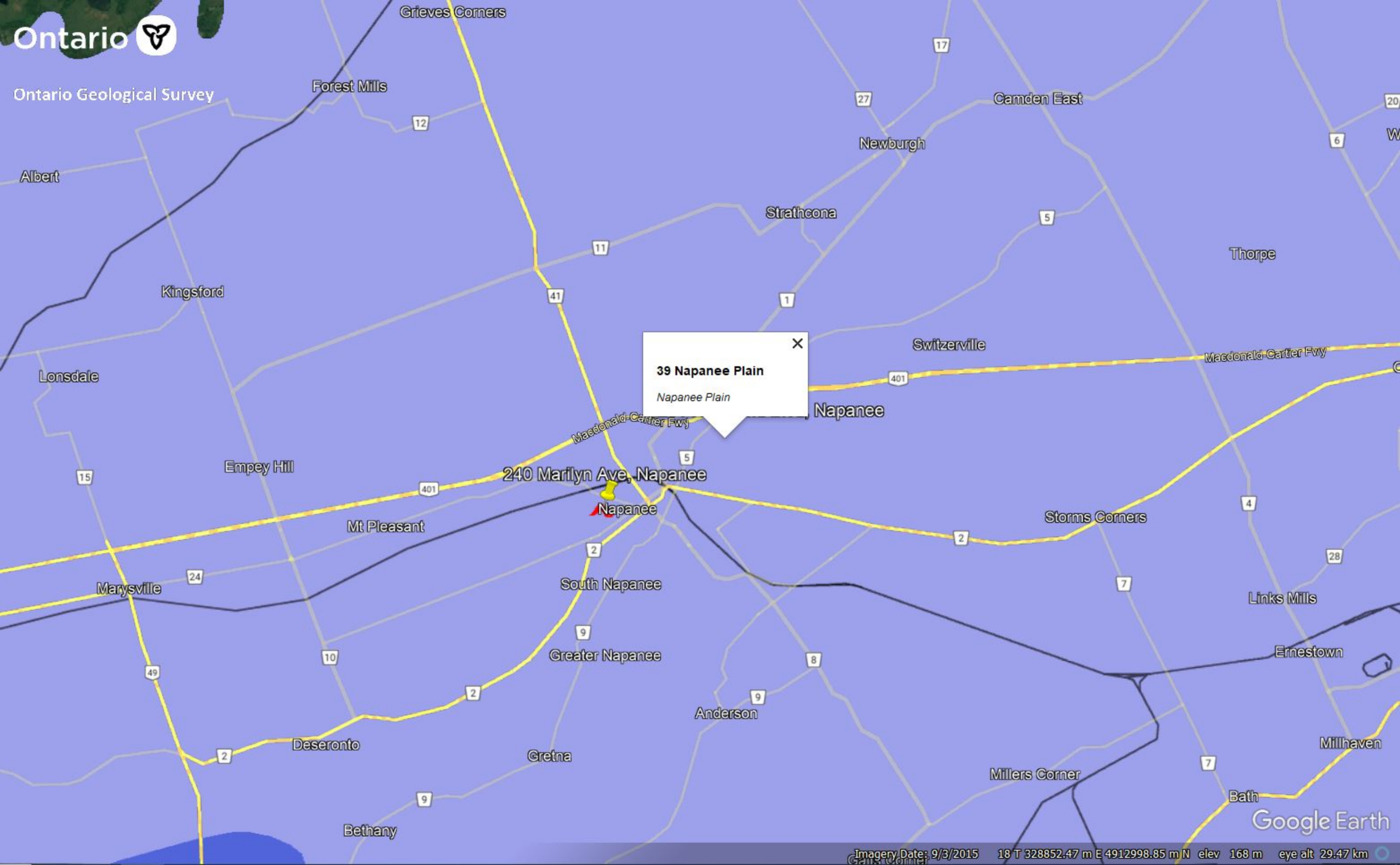
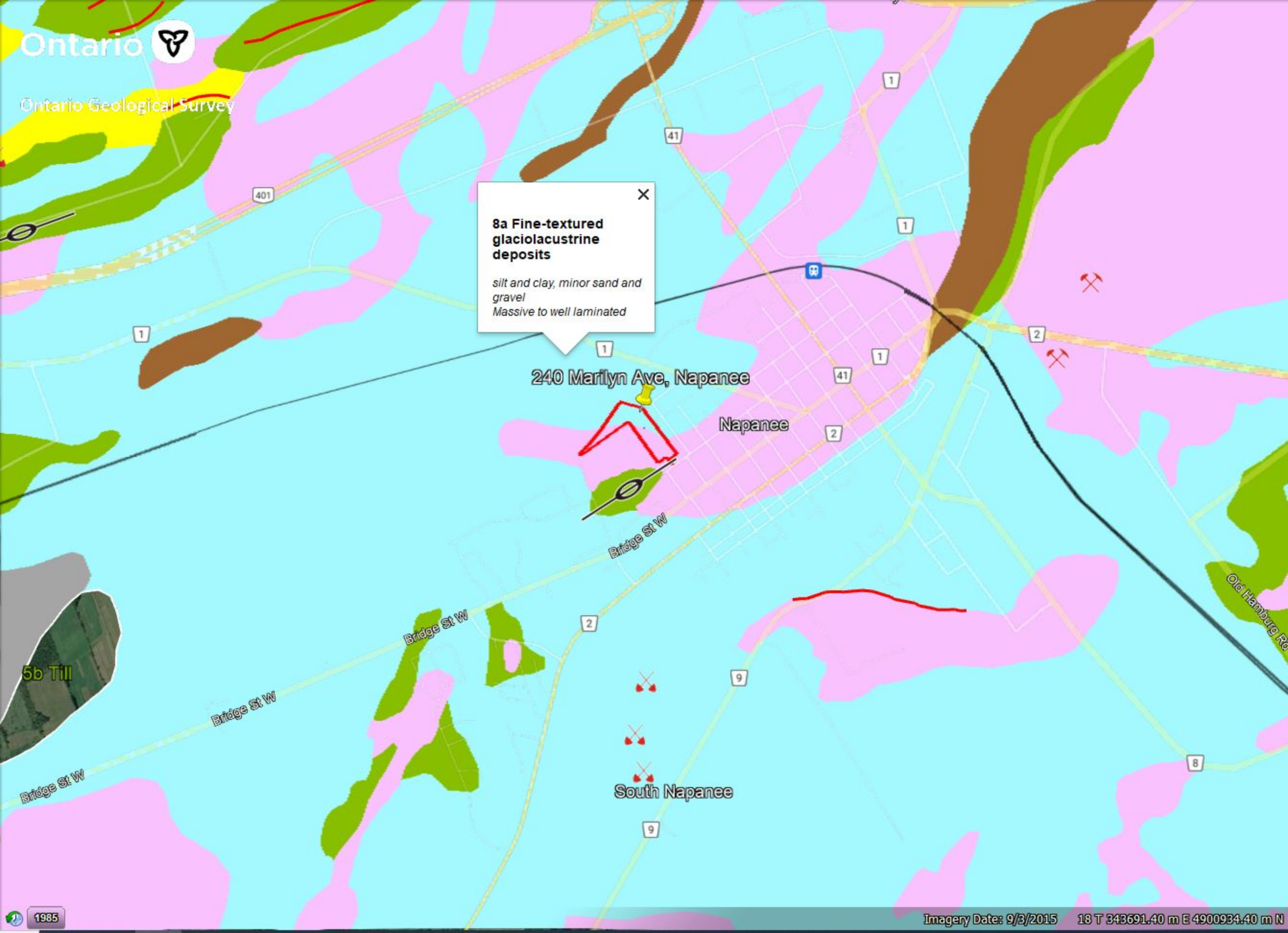
© Sa Majesté le Roi du chef du Canada, représentée par le ministre de Ressources naturelles Canada, 2023.

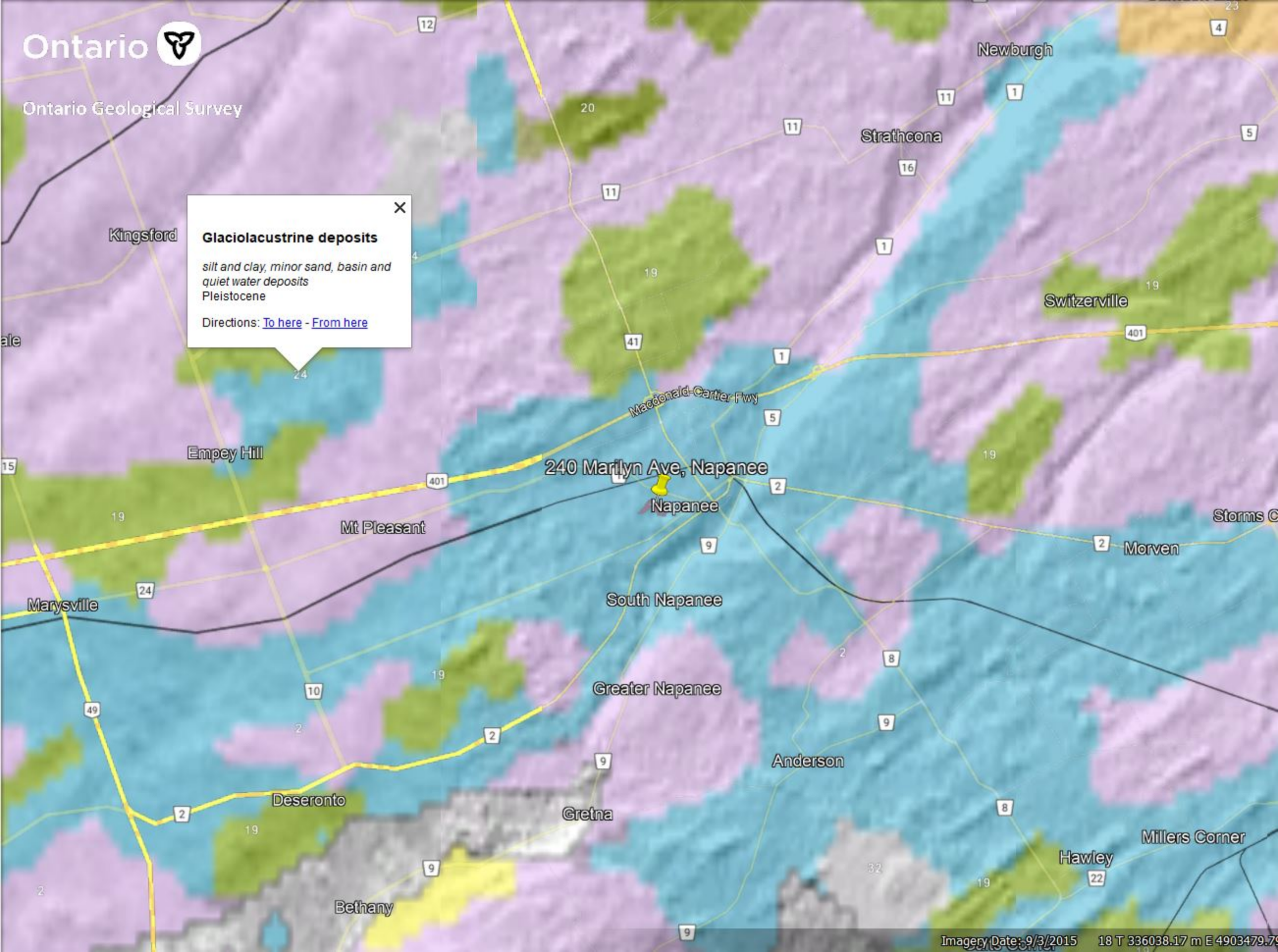
Canada


Ontario
Ontario Geological Survey
12 Clay Plains
Clay Plains
240 Marilyn Ave, Napanee
Napanee
Bridge St W
Bridge St W
Palace Rd
Google Earth
1985
Imagery Date: 9/3/2015 18 T 343149.97 m E 4900965.46 m N elev 95 m eye alt 3.34 km


Ontario
Ontario Geological Survey
Grieves Corners
Forest Mills
Albert
Kingsford
Lonsdale
Empey Hill
Mt Pleasant
Marysville
Deseronto
Bethany
Gretna
Greater Napanee
South Napanee
Napanee
240 Marilyn Ave, Napanee
39 Napanee Plain
Napanee Plain
Macdonald-Carter Fwy
Anderson
Strathcona
Newburgh
Switzerville
Camden East
Thorpe
Storms Corners
Millers Corner
Links Mills
Ernestown
Millhaven
Bath
Google Earth
Imagery Date: 9/3/2015 18 T 328852.47 m E 4912998.85 m N elev 168 m eye alt 29.47 km

Ontario
Ontario Geological Survey
Arden
Kaladar
Madoc
Marmora
Tweed
Tamworth
Verona
Havelock
Sydenham
Roslin
Campbellford
Stirling
240 Marilyn Ave, Napanee
Odessa
Greater Napanee
Shannonville
Bath
Belleville
Amherst Island
Quinte West
Brighton
Colborne
Prince Edward
Image NOAA
Image Landsat / Copernicus
54a
Limestone, dolostone, shale, arkose, sandstone
Ottawa Group; Simcoe Group; Shadow Lake Formation
18 T 331038.59 m E 4912510.62 m N


Ontario
Ontario Geological Survey
8a Fine-textured glaciolacustrine deposits
silt and clay, minor sand and gravel
Massive to well laminated
240 Marilyn Ave, Napanee
Napanee
South Napanee
Bridge St W
Bridge St W
Bridge St W
Bridge St W
Old Hamburg Ro
5b Till
401
41
1
2
9
8
1985
Imagery Date: 9/3/2015
18 T 343691.40 m E 4900934.40 m N


Ontario
Ontario Geological Survey
Glaciolacustrine deposits
silt and clay, minor sand, basin and quiet water deposits
Pleistocene
Directions: To here - From here
Newburgh
Strathcona
Kingsford
Switzerville
Macdonald-Cartier Fwy
Empey Hill
240 Marilyn Ave, Napanee
Napanee
Mt Pleasant
Morven
Marysville
South Napanee
Greater Napanee
Anderson
Deseronto
Gretna
Millers Corner
Hawley
Bethany
Imagery Date: 9/3/2015
18 T 336038.17 m E 4903479.79

Ontario IDF CURVE LOOKUP

Active coordinate

44° 14' 45" N, 76° 57' 45" W (44.245833,-76.962500)

Retrieved: Sat, 25 Feb 2023 15:35:02 GMT

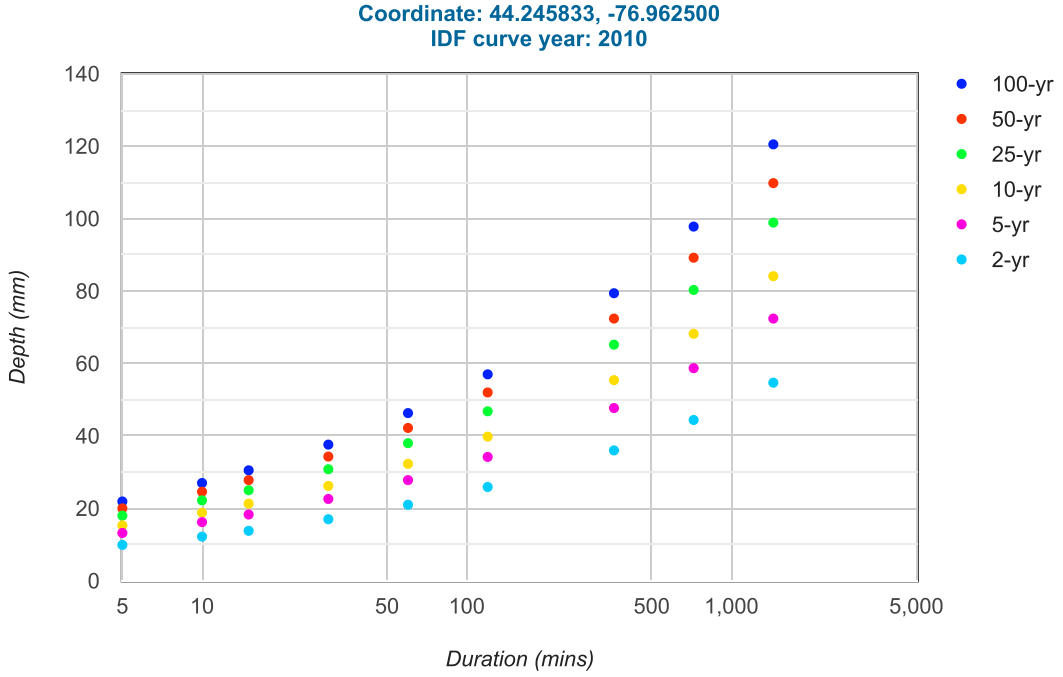
Location summary

These are the locations in the selection.

IDF Curve: 44° 14' 45" N, 76° 57' 45" W (44.245833,-76.962500)

Results

An IDF curve was found.



Coefficient summary

IDF Curve: 44° 14' 45" N, 76° 57' 45" W (44.245833,-76.962500)

Retrieved: Sat, 25 Feb 2023 15:35:02 GMT

Data year: 2010
IDF curve year: 2010

Return period	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
A	21.0	27.8	32.3	38.0	42.2	46.3
B	-0.699	-0.699	-0.699	-0.699	-0.699	-0.699

Statistics

Rainfall intensity (mm hr^{-1})

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	119.3	73.5	55.3	34.1	21.0	12.9	6.0	3.7	2.3
5-yr	157.9	97.3	73.3	45.1	27.8	17.1	7.9	4.9	3.0
10-yr	183.5	113.0	85.1	52.4	32.3	19.9	9.2	5.7	3.5
25-yr	215.8	133.0	100.1	61.7	38.0	23.4	10.9	6.7	4.1
50-yr	239.7	147.7	111.2	68.5	42.2	26.0	12.1	7.4	4.6
100-yr	263.0	162.0	122.0	75.2	46.3	28.5	13.2	8.2	5.0

Rainfall depth (mm)

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	9.9	12.2	13.8	17.0	21.0	25.9	36.0	44.4	54.7
5-yr	13.2	16.2	18.3	22.6	27.8	34.2	47.7	58.7	72.4
10-yr	15.3	18.8	21.3	26.2	32.3	39.8	55.4	68.2	84.1
25-yr	18.0	22.2	25.0	30.8	38.0	46.8	65.2	80.3	98.9
50-yr	20.0	24.6	27.8	34.3	42.2	52.0	72.4	89.2	109.8
100-yr	21.9	27.0	30.5	37.6	46.3	57.0	79.4	97.8	120.5

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