



Milton Link Phase Two, Milton, Ontario

Preliminary Hydrogeological Investigation and Water Balance Assessment

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1 Executive Summary

The Proponent, Tribal Development Management Services Inc. (doing business as "Matthews"), is advancing the development of lands located adjacent to the CN Logistics Hub in the Town of Milton. Official Plan and Zoning By-law Amendments are being pursued to designate the subject lands as Industrial Area to be included within the Sustainable Halton Plan (SHP) Urban Area Boundary. The site will seek the entitlements associated with the Employment Zone, with site-specific provisions to support the intended development.

A Preliminary Hydrogeological Investigation and Water Balance Assessment was completed in support of the proposed Phase Two industrial development at Milton Link, Ontario. The study evaluates groundwater conditions, construction dewatering requirements, potential environmental impacts, and compliance with municipal, conservation authority, and provincial requirements.

The site is located within the Peel Plain, underlain primarily by clayey silt till to silty clay till, which is generally low permeability. Groundwater levels are shallow and seasonally variable, with depths typically ranging from approximately 0.4 mbgs (183.62 masl) to 3.3 mbgs (178.74 masl). Groundwater flow is directed southeast toward Sixteen Mile Creek, consistent with regional drainage patterns. The site is located within the Halton Region Source Protection Area but not located within a Wellhead Protection Area, Significant Groundwater Recharge Area, or other vulnerable source protection zones.

The following parameters exceeded the PWQO parameters: Dissolved and Total Boron (B), Dissolved and Total Cobalt (Co), Total Iron (Fe), Total Phosphorus, Total Sulphide, Sulphide (as H₂S), Dissolved and Total Uranium (U) and based on the water quality test results, a suitable pre-treatment and conservation authority approval will be required for the short-term dewatering discharge (natural environment).

Based on water balance assessment for the Site there will be an infiltration deficit in post-development. To fully mitigate the infiltration deficit of approximately 8,140 m³/yr in post-development conditions the feasible LIDs measures should be implemented. The LID area is based on the estimated design infiltration rate of 8 mm/hr, on the assumption that precipitation is evenly distributed during the year over two-week intervals, and bi-weekly volumes from roof will be infiltrated in 48-hour. The area of feasible LID that is required to offset the water balance deficit is approximately 1,325 m². The infiltration system will need to have a minimum storage of 509 m³ to store two weeks of precipitation to meet the pre-development infiltration levels. The water balance assessment will be updated once the site plan is finalized.

Based on the assumptions outlined in this report, the estimated peak dewatering rate for proposed construction activities is approximately 36,130 L/day and 36,700 L/day for the industrial building (one at a time) and utility trench (services) respectively at any given time and does not occur concurrently. This is the rate which will be required to be discharged to the natural environment system. As the dewatering flow rate estimate is less than 50,000 L/day, EASR will not be required to facilitate the construction dewatering program for the Site.

Based on the geotechnical report dated June 17, 2026, section 5.4, it is our understanding that the underfloor drains will not be required since the proposed buildings are slab-on-grade. As such, there will be no long-term (post construction) dewatering.

2 Introduction

2.1 Project Description

EXP Services Inc. (EXP) was retained by Tribal Development Management Services Inc. (TDMSI) to prepare a Preliminary Hydrogeological Investigation and Water Balance Assessment Report associated with the proposed development located at Milton Link Phase Two, Milton, Ontario (hereinafter referred to as the 'Site').

The Proponent, Tribal Development Management Services Inc. (doing business as "Matthews"), is advancing the development of lands located adjacent to the CN Logistics Hub in the Town of Milton. Official Plan and Zoning By-law Amendments are being pursued to designate the subject lands as Industrial Area to be included within the Sustainable Halton Plan (SHP) Urban Area Boundary. The site will seek the entitlements associated with the Employment Zone, with site-specific provisions to support the intended development. The Site is currently occupied by an agricultural land. It is our understanding that the proposed development plan is to construct three (3) industrial slab on grade buildings (Buildings 2A, 2B and 2C) without basement, associated access roads, loading and parking areas. The Site location plan is shown in Figure 1.

EXP conducted a Preliminary Geotechnical Investigation in conjunction with this investigation. The pertinent information gathered from the noted investigations is utilized for this report.

2.2 Project Objectives

The main objectives of the Preliminary Hydrogeological Investigation and Water Balance Assessment are as follows:

- Establish the local hydrogeological settings within the Site;
- Provide Preliminary recommendations on construction and long-term dewatering;
- Assess groundwater quality; and
- Prepare a Preliminary Hydrogeological Investigation and Water Balance Assessment Report.

2.3 Scope of Work

To achieve the investigation objectives, EXP has completed the following scope of work:

- Reviewed available geological and hydrogeological information for the Site;
- Drilled and installed nine (9) monitoring wells and three (3) piezometers to an approximate depth ranging from 5.13 meter below ground surface (mbgs) to 8.01 mbgs;
- Installed 50 mm diameter monitoring wells in the geotechnical boreholes;
- Developed and conducted Single Well Response Tests (SWRT) on monitoring wells to assess hydraulic conductivities of the saturated soils at the Site;
- Completed eight (8) rounds of groundwater level measurements at all monitoring wells and piezometers for seasonal monitoring;
- Collected one (1) groundwater sample for analyses of parameters for the routine comprehensive analysis package (RCMP) and compare results to Provincial Water Quality Objectives (PWQO);
- Completed one (1) shallow infiltration test by hand auguring to assess the percolation rate;

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- Evaluated the information collected during the field investigation program, including borehole geological information, Water Well Records (WWR), SWRT results, groundwater level measurements and groundwater water quality;
- Prepared site plans, cross sections, geological mapping and groundwater contour mapping for the Site;
- Provided preliminary recommendations on the requirements for construction (short-term) dewatering;
- Provided recommendations on the Ministry of Environment, Conservation and Parks (MECP) Water Taking Permits and Halton Region Sewer Discharge Agreements (SDA) for the construction phases;
- Conducted pre- and post-development water balance and conduct preliminary sizing of LIDs; and
- Prepared a Preliminary Hydrogeological Investigation and Water Balance Assessment Report.

The Preliminary Hydrogeological Investigation and Water Balance Assessment was prepared in accordance with the Ontario Water Resources Act and Ontario Regulation 387/04. The scope of work outlined above was made to assess dewatering and did not include a review of Environmental Site Assessments (ESA).

2.4 Review of Previous Reports

The following reports were reviewed as part of this Preliminary Hydrogeological Investigation and Water Balance Assessment:

- EXP Services Inc. (June 17, 2026), Preliminary Geotechnical Investigation, Britannia Road and First Line, Phase Two Land, Milton, ON, prepared for Tribal Development Management Services Inc.
- EXP Services Inc. (November 1, 2024), Preliminary Hydrogeological Investigation (Draft), Britannia Road and First Line, Phase Two Land, Milton, ON, prepared for Tribal Development Management Services Inc.

Any past and/or future geotechnical, hydrogeological, environmental and risk assessments, and updated development/architectural plans should be provided to update this hydrogeological report prior to submission of permits and approvals by the municipalities and agencies.

3 Hydrogeological Setting

3.1 Regional Setting

3.1.1 Regional Physiography

The Site is within a physiographic region known as the Peel Plain, and the physiographic landform is named Bevelled Till Plains as shown in Figures 2B and 2C.

The plain is the lake bottom of former glacial Lake Peel, which was created between the front of the ice-lobe and the Niagara Escarpment. The Peel Plain is a level-to-undulating area of clay soils. The topography of the Plain gradually slopes down southeast, toward Lake Ontario, following the topography of the underlying till. A calm lake environment resulted in the deposition of silts and clays, particularly in depressions of the till. These sediments are quite thin, which suggests Lake Peel had a brief existence (Chapman & Putnam, 2007).

3.1.2 Regional Geology and Hydrogeology

The surficial geology can be described as fine-textured glaciolacustrine deposits consisting of silt and clay, minor sand and gravel interbedded silt and clay and gritty pebbly flow till and rainout deposits (Ministry of Northern Development and Mines, 2012). The surficial geology of the Site and surrounding areas is shown in Figure 2A. Figure 2D shows the bedrock geology of the Site.

Based on the available regional geology maps, the subsurface stratigraphy of the Site from top to bottom is summarized in Table 3-1 (TRCA, 2008 and Oak Ridge Moraine Groundwater Program, 2023). The overburden thickness is approximately 18 m.

Table 3-1: Summary of Subsurface Stratigraphy

Stratigraphic Unit	General Description	Top Elevation of Stratigraphic Unit
Undifferentiated Upper Sediments	Fine-textured glaciolacustrine deposits consisting of silt and clay.	181
Halton Till or Equivalent (Aquitard)	This lithologic unit typically consists of sandy silt to clayey silt till interbedded with silt, clay, sand and gravel.	180
Oak Ridges Moraine or Equivalent (Aquifer)	This geology unit mainly consists of interbedded fine-grained sand and silt deposits where coarse-grained sand and gravel along with clay laminae are locally reported.	173
Newmarket Till (Aquitard)	This lithologic unit mainly consist of a massive and dense silty sand unit.	168
Queenston Formation	Bedrock primarily consists of shale, limestone, dolostone and siltstone (Ministry of Northern Development and Mines, 2012).	163

Regional groundwater across the area flows southeast, towards Lake Ontario (Oak Ridge Moraine Groundwater Program, 2023). Local deviation from the regional groundwater flow pattern may occur in response to changes in topography and/or soils, as well as the presence of surface water features and/or existing subsurface infrastructure.

3.1.3 Existing Water Well Survey

Water Well Records (WWRs) were compiled from the database maintained by the Ministry of the Environment, Conservation and Parks (MECP) and reviewed to determine the number of water wells documented within a 500-m radius of the Site boundaries. The locations of the MECP WWRs within 500 m of the Site are shown on Figure 3. A summary of the WWR is included in Appendix A.

The MECP WWR database indicates that forty-one (41) records within a 500 m radius from the Site centroid where two (2) well records are identified onsite (Figure 3 and Appendix A). Well distances are calculated relative to the Site centroid, therefore some distances in Appendix A exceed 500 m.

All offsite wells were reportedly identified as monitoring wells/test holes (5), water supply wells (10), abandoned wells (24) and/or listed with unknown use (2).

The Well Identification Numbers (Well ID No.) of the water supply wells (10) are 2802463, 2802476, 2802479, 2803312, 2804074, 2805663, 2806273, 2806309, 2807195 and 2807804 located between 495 m to 1,187 m from the Site centroid. It is recommended to complete a baseline residential well survey to verify results of the MECP WWR searches and to confirm current conditions and use of wells in 500 m zone around the Site.

The reported water levels ranged from depths of 0.5 m to 25.6 meters below ground surface (mbgs).

The Site is located within Halton Region Source Protection Area and Conservation Halton. The Site is not located within Wellhead Protection Area (WHPA), Intake Protection Area (IPA), Issue Contributing Area (ICA), Significant Groundwater Recharge Area (SGRA), Highly Vulnerable Area (HVA) and Event Based Area (EBA).

3.2 Site Setting

3.2.1 Site Topography

The Site is in an agricultural land use setting. The topography is considered relatively flat with a regional gradual southeast slope towards Sixteen Miles Creek and Lake Ontario. The surface elevation of the Site ranges between approximately 181.66 to 184.16 meters above sea level (masl).

3.2.2 Local Surface Water Features

The Site is within the Bronte Creek watershed. The nearest surface water feature is a tributary of Bronte Creek, approximately located 1.2 kilometers south of the Site boundary. Lake Ontario is approximately 15.3 km from the Site boundary to the south.

3.2.3 Local Geology and Hydrogeology

A summary of subsurface soil stratigraphy is provided in the following paragraphs. The soil descriptions are based on the geotechnical investigation report (June 17, 2026). They are summarized for the hydrogeological interpretations. As such, the information provided in this section shall not be used for construction design purposes.

The detailed soil profiles encountered in each borehole and the results of moisture content determinations are presented on the attached borehole logs (Appendix B). The soil boundaries indicated on the borehole logs are inferred from non-continuous sampling and observations during drilling. These boundaries are intended to reflect approximate transition zones for the Preliminary Hydrogeological Investigation and Water Balance Assessment and shall not be interpreted as exact planes of geological change.

The "Notes on Sample Description" preceding the borehole logs form an integral part of and should be read in conjunction with this report. The following is a brief description of the soil conditions encountered during the investigation.

Based on the results of the geotechnical investigation, the general subsurface soil stratigraphy consists of the following units from top to bottom:

Topsoil

Topsoil with thicknesses ranging from 75 mm to 175 mm was encountered surficially in all boreholes. The thickness of the topsoil in each borehole is shown on the borehole log.

It should be noted that topsoil measurements were carried out at the borehole locations only and could differ at other locations on the site. If required, a more detailed test pit program should be carried out to more accurately quantify the amount of topsoil to be removed for construction purposes.

Reworked Till

Reworked till was encountered in all boreholes below the topsoil. The reworked till is considered to be disturbed parent material. The reworked till was fully penetrated at depth of ~0.7 m. This material generally comprises brown silty clay with trace gravel and trace sand. Moisture contents in the reworked native soil varied between approximately 11 and 34 percent.

Clayey Silt Till to Silty Clay Till

Deposits of clayey silt till to silty clay till (clayey till) were encountered in all boreholes below the topsoil or reworked till. All boreholes were terminated in this stratum at approximately 5.0 to 8.2 m depth (~Elevation 173.4 to 179.0 m). The clayey till contains silty sand layers/seams, trace gravel, some sand and occasional cobbles and boulders. Localized wet sand and gravel layers were encountered in Boreholes 2-4 and 2-9. The clayey till is brown in colour with oxidized pockets, changing to grey with depth. The consistency of the clayey till was assessed as stiff to hard, but generally very stiff to hard. Moisture content of the clayey till ranges from approximately 7 to 20 percent.

Grain size analyses on two (2) clayey till samples from Borehole 2-10 indicated 3% to 4% gravel, 21% to 31% sand, 44% silt and 22% to 31% clay.

The Atterberg Limits testing carried out on the same samples from Borehole 2-10 yield 13 to 15% Plastic Limits (PL), 24 to 32% Liquid Limit (LL) and corresponding Plastic Index (PI) 11 to 17. The measured moisture content of these samples is below the Plastic Limits of the samples, indicating an over consolidated state.

The borehole and monitoring well locations are shown in Figure 4. Geological cross-sections were generated based on the available borehole logs completed as part of the previous and current investigations and shown in Figure 5A and 5B (Cross sections A-A' and B-B'). The cross section shows a simplified representation of soil conditions and soil deposits may be interconnected differently than represented. Borehole logs used to generate both cross-sections are provided in Appendix B.

4 Results

4.1 Monitoring Well Details

The monitoring well network was installed as part of the Geotechnical Investigation at the Site. It consists of the following:

- Nine (9) monitoring wells (BH2-5, BH2-6, BH2-7, BH2-8, BH2-11, BH2-13, BH2-14, BH2-15 and BH2-16) were installed;
- Three (3) piezometers (Piezo 2-3, Piezo 2-4 and Piezo 2-17) were installed.

The diameter of all monitoring wells is 50 mm. All wells were installed with monument protective casings (stick-ups). Borehole logs and monitoring well installation details are provided in Appendix B. The monitoring well locations are shown in Figure 4.

4.2 Water Level Monitoring

As part of the Preliminary Hydrogeological Investigation and Water Balance Assessment, static water levels in the monitoring wells were recorded in eight (8) monitoring events between July 5, 2024 and November 13 of 2025. A summary of all static water level data as it relates to the elevation survey is given in Table 4-1 appended in the List of Tables at the end of this report below including water level hydrographs.

The groundwater elevation recorded in the intermediate wells ranged from 178.74 masl (3.28 mbgs at BH2-11 on July 12, 2024) to 183.62 masl (0.39 mbgs at Piezo 2-4 on July 5, 2024).

During the seasonal groundwater monitoring from July 5, 2024 to November 13, 2025, the water level fluctuated from 0.68 m (Piezometer 2-4) to 2.73 m (BH2-7). It is interpreted that seasonal high groundwater elevations were observed during the July 5 of 2024 monitoring event.

One (1) map was created for the Site to show groundwater contours of the intermediate water-bearing zone (Figures 6). Accordingly, the groundwater flow direction in the intermediate zone is interpreted to be southeast of the Site, towards Sixteen Miles Creek.

Groundwater levels are expected to show seasonal fluctuations and vary in response to prevailing climate conditions. This may also affect the direction and rate of flow.

4.3 Hydraulic Conductivity Testing

Nine (9) Single Well Response Tests (SWRT's) were completed on monitoring wells (BH2-5, BH2-6, BH2-7, BH2-8, BH2-11, BH2-13, BH2-14, BH2-15 and BH2-16) on July 12, 2024. The tests were completed to estimate the saturated hydraulic conductivity (K) of the soils at the well screen depths utilizing data loggers, preprogramed to take measurement on one second intervals.

The static water level within each monitoring well was measured prior to the start of testing. In advance of performing SWRTs, each monitoring well underwent development to remove fines introduced into the screens following construction. The development process involved purging of the monitoring wells to induce the flow of fresh formation water through the screen. Each monitoring well was permitted to fully recover prior to performing SWRTs.

Hydraulic conductivity values were calculated from the SWRT and constant rate test data as per Hvorslev's solution included in the Aqtesolv Pro. V.4.5 software package. The semi-log plots for normalized drawdown versus time are included in Appendix C.

A summary of the hydraulic conductivities (K-values) estimated from the SWRTs are provided in List of Tables (Table 4-2) at the end of the report below.

SWRTs provide K-estimates of the geological formation surrounding the well screens and may not be representative of bulk formation hydraulic conductivity. As shown in Table 4-2, the highest K-value of the tested water-bearing zone is 1.1×10^{-7} m/s, and the arithmetic and geometric mean of the K-values are 3.3×10^{-8} m/s and 1.8×10^{-8} m/s respectively.

4.4 Groundwater Quality

To assess the suitability for discharging pumped groundwater into the natural environment during dewatering activities, one (1) groundwater sample was collected from selected monitoring well (BH2-11) using a peristaltic pump. Prior to collecting the noted water sample, approximately three (3) standing well volumes of groundwater were purged from the referred well. The samples were collected filtered and placed into pre-cleaned laboratory-supplied vials and/or bottles provided with analytical test group specific preservatives, as required. Dedicated nitrile gloves were used during sample handling. The groundwater samples were submitted for analysis to Bureau Veritas Laboratory, a CALA certified independent laboratory in Mississauga, Ontario. Analytical results are provided in Appendix D.

Table 4-3 summarizes exceedance(s) of the Provincial Water Quality Objectives (PWQO) parameters.

The following parameters exceeded the PWQO parameters: Dissolved and Total Boron (B), Dissolved and Total Cobalt (Co), Total Iron (Fe), Total Phosphorus, Total Sulphide, Sulphide (as H₂S), Dissolved and Total Uranium (U).

Reporting detection limits (RDLs) were below the PWQO criteria.

Table 4-3: Summary of Analytical Results

Parameter	Units	Provincial Water Quality Objectives (PWQO) Limit	Concentration BH2-11 12- July-24
Dissolved Boron (B)	µg/L	200	1200
Total Boron (B)	µg/L	200	1100
Total Cobalt (Co)	µg/L	0.9	1.1
Dissolved Cobalt (Co)	µg/L	0.9	0.92
Total Iron (Fe)	µg/L	300	420
Total Phosphorous (P)	mg/L	0.01	0.025
Total Sulphide	mg/L	0.002	0.0084
Sulphide (as H ₂ S)	mg/L	0.002	0.0089
Dissolved Uranium (U)	µg/L	5	5.4
Total Uranium (U)	µg/L	5	5.4

Bold – Exceeds PWQO Limit.

For the short-term dewatering system (construction phase), it is anticipated that TSS levels and some other parameters (for example, Total Metals) in the pumped groundwater may become elevated and exceed PWQO limit. To control the concentration of TSS and associated metals, it is recommended that a suitable treatment method be implemented (filtration or decantation facilities and/ or any other applicable treatment system) during construction dewatering activities to discharge to the applicable sewer system. The specifications of the treatment system will need to be adjusted to the reported water quality results by the treatment contractor/process engineer.

For the short-term dewatering discharge (natural environment) and based on the water quality test results, it is recommended to implement a suitable pre-treatment, as required.

For discharge to the natural environment (e.g.: surface water, drainage feature), the treatment systems will require Environmental Compliance Approvals (ECA) for construction and post construction phases.

The Environmental Site Assessment Report(s) shall be reviewed for more information on the groundwater quality conditions at the Site.

4.5 Infiltration Testing

EXP completed one (1) infiltration rate test (INF 2-7) within the Site area on July 5, 2024. This test was conducted in proximity of selected monitoring well: BH2-7.

The Infiltration test was conducted at a depth of 0.81 mbgs, depending on the measured groundwater elevation at the testing location. The reported water level at BH2-7 are 1.80 and 4.53 mbgs on July 5 and 12, 2024.

The stratigraphy of the shallow subsurface comprises a clayey silt till matrix. Table 4.4 below shows a summary of field saturated hydraulic conductivity (K_{fs}) testing and a design infiltration rate, as per the Low Impact Development (LID) Stormwater Management Planning and Design Guide, CVC – TRCA, 2010, Appendix G. The estimated field saturated hydraulic conductivity was correlated to infiltration rates based on the relationship provided in Appendix D of the guideline.

The Infiltration test location is shown in Figure 4 and the infiltration rate analysis is provided in Appendix E.

Table 4.4: Summary of Infiltration Testing Results

Infiltration Test Location/ MW ID	Depth of Hole (mbgs)	Formation tested	Field Saturated Hydraulic Conductivity, K_{fs} (cm/s)	Infiltration Rates (mm/hr)
INF 2-7 (BH 2-7)	0.81	Clayey Silt to Silty Clay	5.2×10^{-6}	21
Design Infiltration Rate*				8 (21/2.5)

Notes:

*Safety Factor of 2.5 was applied to calculate the design infiltration rate (Low Impact Development (LID) Stormwater Management Planning and Design Guide, CVC – TRCA, 2010, Appendix D).

The estimated design infiltration rate based on percolation rate testing for the Site is 8 mm/hr.

5 Water Balance Assessment (Site Specific)

5.1 Methodology

The Thornthwaite water balance (Thornthwaite, 1948; Mather, 1978; 1979) is a counting method used to analyze the allocation of water among various components of the hydrologic cycle. This methodology was used to complete the pre-construction (existing conditions) and post-development water balance. Inputs to the model are monthly temperature, precipitation, and Site latitude. Outputs include monthly potential and actual evapotranspiration, soil moisture storage, soil moisture storage change, surplus, infiltration, and runoff.

When precipitation (P) occurs, it can either runoff (R) through the surface water system, infiltrate (I) to the water table including an interflow component, or evapo-transpire (ET) from the earth's surface and vegetation. The difference between total precipitation (P) and the total of evaporation and evapotranspiration (ET) is defined to be the water surplus (S) which is available for both infiltration (recharge to the groundwater system including interflow) and for runoff. When long-term averages of P, R, I and ET are used, no net change in groundwater storage (ST) is assumed. Annually, however, there is a potential for small changes in ST. The annual water budget can be stated as follows:

$$P = ET + R + I + ST$$

Where:

P = precipitation
ET = evapotranspiration
R = surface water runoff
I = infiltration
ST = change in groundwater storage

For this assessment, the Thornthwaite and Mather method was used to estimate average annual infiltration rates.

Infiltration is governed by the surficial soil types, topography, and land cover. If the water table is at surface, as measured in shallow monitoring wells, then the percolation rate of precipitation into the shallow soils is considered negligible.

For ease of calculation, a spreadsheet was used for the computation. A graphical user interface (Thornthwaite Monthly Water-Balance program, 2007) developed by the United States Geological Survey (USGS) was applied for the Thornthwaite and Mather Model.

5.2 Meteorological Data

Meteorological data including average monthly precipitation and average temperatures were obtained from the National Climate Data and Information Archive (Environment Canada) for the Georgetown WWTP (Station ID No. 6152695) climatic station (elevation 221.0 masl).

Meteorological data of 30 years from 1981 to 2010 was utilized for the assessment. Summary of input data is provided in Appendix F-1.

5.3 Pre- and Post-Development Site Characteristics

5.3.1 Pre-Development Site Characteristics

The property occupies an area of approximately 62.7771 hectares (155.13 acres). It is assumed that the Site will be proposed three (3) industrial slab-on-grade buildings (Buildings 2A, 2B and 2C) without basement, associated access roads, loading and parking areas. A summary of the existing (pre-development) landscape features is provided in Table 5-1:

Table 5-1: Pre-Development (Existing) Land Use

Description	Pre-Construction (Existing) (m ²)	Percentage %
Buildings	0	0%
Site Area Available for Infiltration (Landscaped)	305,171	48.6%
Areas with Depth to Water <1.0m	314,200	50.1%
Wetland	8,400	1.3%
Total Site Area	627,771	100%

The areas provided in Table 5-1 above were determined based on a review of available Site plans and these estimates are considered appropriate for assessing the water balance. According to Table 5.1, under pre-development conditions 48.6% of the Site area is pervious and available for groundwater infiltration (Figure 7).

5.3.2 Post-Development Site Characteristics

As provided in the preliminary conceptual Site Plan (Appendix H), Table 5-2 provides a summary of the post-development Site characteristics. This will be updated once the site plan is finalized.

Table 5-2: Post-Development Site Characteristics

Description	Impervious Areas m ²	Pervious Areas available for Infiltration m ²	Total Areas Post-Construction (Proposed) m ²
Paved Surfaces (roads, sidewalks, parking and areas with Depth to Water <1.0m)	174,641	0	174,641
Building roofs	181,830	0	181,830
Wetland and SWM	36,700	0	36,700
Landscaped areas	0	234,600	234,600
Totals	393,171	234,600	627,771
Percentage %	62.6	37.4	100

Under post-development conditions, the total pervious area is reduced from 48.6% to 37.4% of the total Site area (Tables 5-1 and 5-2 and Figure 8).

5.4 Pre-Development Water Balance Estimates

5.4.1 Climate Data Analysis

The mean annual water surplus was calculated by using the Thornthwaite and Mather (1955) method. Monthly average precipitation values were obtained for 30 years (1981 to 2010) from the National Climate Data and Information Archive (Environment Canada) for the Georgetown WWTP (Station ID No. 6152695) climatic station (elevation 221.0 masl).

Moisture storage of 135 mm/year was assumed for soils and considered to be representative of pre-construction Site conditions. The closest latitude to the Site is 44°, which was used in the USGS model (2020).

Table 5.3 summarizes the climatic water balance analysis. Appendix F-1 and F-2 provide the model input and output, respectively.

Table 5.3: Climatic Water Balance Analysis in Pre-Development Conditions

Soil Moisture Storage (mm/yr)	Precipitation (mm/yr)	Actual ET (mm/yr)	Surplus (mm/yr)
135 mm/yr	877.3	542.0	335.3

Note: ET = Evapotranspiration

The results of the climatic water balance analysis for the Site suggest that a surplus of 335.3 mm/year of water is available for surface runoff and infiltration.

5.4.2 Infiltration

The infiltration is expected to be controlled by soil type, topography, and soil cover type. Surplus water is portioned between runoff and infiltration based on the controlling factors provided by MOE (1995). The controlling factors provided by the MOE were used for estimating infiltration factors.

Using this method, a total infiltration factor for the Site was estimated by using the individual sub-factors, which are representative of the topography, soil type and land cover conditions (Figures 2 and 7). Appendix F-3 provides a summary of the sub factors and total factor based on the Site conditions. The infiltration sub-factors were determined for estimating pre-development infiltration rates of the entire Site.

The estimated pre-development total infiltration factor of 0.34 (or 34%) represents the fraction of the water surplus available for infiltration. The complementary fraction of the available water for runoff is 0.66. The infiltration factor is utilized to calculate the amount of annual infiltration (in units of m³/yr) at the Site by multiplying it with the average yearly water surplus estimate and with the Site area available for infiltration.

Applying the infiltration factor of 0.34 and a water surplus of 335.3 mm/yr, the estimated pre-development infiltration rate of the whole Site is 115.34 mm/yr.

In areas with water table at or above surface and less than approximately 1.0 m below surface, the infiltration rate would be considered negligible for existing and proposed grade. Water levels above ground surface were not reported and water levels less than 1 m below ground surface were not reported while monitoring water levels at this Site except at Piezometers 2-3, 2-4 and 2-17 and BH2-5, BH2-8, BH2-13, BH2-14, BH2-15 and BH2-16. The area of high water levels was mapped and excluded for infiltration.

5.4.3 Pre-Development Water Balance Analysis

The water balance analysis is based on available information on a regional scale and deemed representative for the Site. Table 5-4 provides the water balance analysis for the Site.

Table 5-4: Pre-Development Water Balance Results

Location	Total Site Area (m ²)	Area Available for Infiltration (m ²)	Total Precipitation (m ³ /yr)	Actual Evapo-transpiration (m ³ /yr)	Runoff (m ³ /yr)	Infiltration (m ³ /yr)
Total Site	627,771	305,171	550,743	340,252	175,292	35,199
Percentage of Total Precipitation			100%	62%	32%	6%

The total property area was used to estimate the annual precipitation volume of the Site (Appendix F-4). As summarized in Table 5-4, the breakdown of the pre-development water balance is as follows: 62% of the total precipitation is subject to evapotranspiration, 32% to runoff, and 6% to infiltration.

The pre-development water balance, on a weighted average depth basis (in mm/year) is as follows:

$$P (877.30) = ET (542.00) + R (279.23) + I (56.07) + ST (0)$$

5.5 Post-Development Water Balance Estimates

5.5.1 Post-Development Water Balance

Based on the proposed development drawings, the total area of pervious surfaces under post-development conditions is approximately 234,600 m², representing approximately 37.4% of the total Site area of 627,771 m² (Table 5-2). The remaining 393,171 m² will not contribute to infiltration in the post-development phase (approximately 62.6% of the total land area).

Post-development infiltration sub-factors were determined in a similar manner as for estimating infiltration sub-factors for pre-development Site conditions, both based on the method recommended by MOE (1995). For post-development infiltration sub-factors, the landscaped areas were assumed to be consistent with cultivated cover with an infiltration sub-factor of 0.14 (Appendix F-3). The estimated post-development total infiltration factor of 0.34 (or 34%).

Table 5-5 presents a summary of the overall post-development water balance assessment.

Table 5-5: Post-Development Water Balance Forecast

Location	Total Site Area (m ²)	Area Available for Infiltration (m ²)	Total Precipitation (m ³ /yr)	Evapo-transpiration (m ³ /yr)	Runoff (m ³ /yr)	Infiltration (m ³ /yr)
Total Site	627,771	234,600	550,743	147,045	376,639	27,060
Percentage of Total Precipitation			100%	26.7	68.4%	4.9%

If no remedial measures are implemented to maintain infiltration, it is expected that the annual infiltration volume will be reduced from approximately 35,199 m³/year to 27,060 m³/year in post-development, resulting in a deficit of 8,140 m³/year (Appendix F-4).

Infiltration deficits based on pre- and post-development Site conditions can be utilized to guide mitigation measures under idealized soil and groundwater conditions. If suitable mitigation measures are implemented, it is expected that the infiltration deficit of 8,140 m³/year can be mitigated under the post-development Site conditions under engineered conditions. Reasonable mitigation measures onsite are therefore recommended to maintain the pre-development infiltration under post-development Site conditions.

Under unmitigated post-development conditions, a reduction in annual infiltration volume may occur, as compared to pre-development conditions. Consequently, water contribution from infiltration to downgradient drainage features would decrease.

The post-development water balance, on a weighted average depth basis (in mm/year) is as follows:

$$P (877.30) = ET (234.23) + R (599.96) + I (43.11) + ST (0)$$

5.6 Impact and Proposed Mitigation Measures

Mitigation measures should be implemented to balance the estimated post-development infiltration rate deficit of 10,923 m³/year (Appendix F-4). To offset the noted deficit, approximately 14% from the available runoff from roof-top water of 78,840 m³/year (in 8 months) would need be infiltrated. This could be accommodated in Low Impact Development (LID) facilities, such as infiltration galleries and enhanced grass swales implemented onsite to maintain the pre-development infiltration rates during the post-development phase.

As per the CA and MECP guidelines, the invert of the infiltration system needs to be 1.0 m above the highest water level or top of bedrock measured at location of the infiltration system, as a minimum.

The following mitigation measures are proposed to be implemented onsite to maintain the pre-development infiltration rates during the post-development phase:

- **Infiltration Galleries**

To balance the infiltration deficit in 8 months per year a LID system (infiltration gallery) with a total of approximately 1,325 m² in size would be required. The LID area is based on the estimated design infiltration rate of 8 mm/hr, on the assumption that precipitation is evenly distributed during the year over two-week interval, and bi-weekly volumes from roof will be infiltrated in 48-hour. The infiltration system will need to have a minimum storage of 509 m³ to store two weeks of precipitation to meet the pre-development infiltration levels (Appendix F-5).

As per regulatory requirements, the invert of the infiltration system needs to be 1.0 m above the highest water level measured at the location of the proposed infiltration system, as a minimum.

- **Enhanced Grass Swales and Rain Gardens**

To increase the post-development infiltration onsite, enhanced grass swales and / or rain gardens are also recommended where feasible.

These facilities are recommended to be designed to mimic current shallow groundwater (interflow). Where possible, selected areas can also be used as rain gardens to enhance groundwater infiltration.

6 Dewatering Assessment

6.1 Dewatering Flow Rate Estimate

The Dupuit equation for steady linear flow to both sides of an excavation through an unconfined aquifer resting on a horizontal impervious surface was used to obtain a flow rate estimate. Dewatering flow rate is expressed as follows:

$$Q_w = xK(H^2 - h^2)/L_o$$

Where:

- Q_w = Rate of pumping (m³/s)
- X = Length of excavation (m)
- K = Hydraulic conductivity (m/s)
- H = Hydraulic head beyond the influence of pumping (static groundwater elevation) (m)
- h = Hydraulic head above the base of aquifer in an excavation (m)
- L_o = Distance of influence (m)

It is expected that the initial dewatering rate will be higher to remove groundwater from within the overburden formation. The dewatering rates are expected to decrease once the target water level is achieved in the excavation footprint as groundwater will have been removed, primarily from storage, resulting in lower seepage rates into the excavation.

6.2 Sichardt's Radius of Influence

The radius of influence (R_s) for the construction dewatering was calculated based on Sichardt's equation. This equation is used to predict the distance at which the drawdown resulting from pumping is negligible. This empirical formula was developed to provide representative flow rates using the steady state flow dewatering equations, as discussed below.

The estimated radius of influence due to pumping is based on Sichardt's formula as follows:

$$R_s = C(H - h)\sqrt{K}$$

Where:

- R_s = Estimated Sichardt's radius of influence (m)
- H = Hydraulic head in aquifer (static water level or saturated depth) (m)
- h = Dynamic water level (m)
- K = Hydraulic conductivity (m/sec)
- C = Constant (3,000)

Based on Sichardt's formula and the highest K-value, the calculated distance of influence (L_o = R_o/2) is provided in Appendix G.

6.3 Stormwater

Additional pumping capacity may be required to maintain dry conditions within the excavation during and following significant precipitation events. Therefore, the dewatering rates at the Site should also include removing stormwater from the excavation.

A 25 mm precipitation event was utilized for estimating the stormwater volume. The calculation of the stormwater volume is included in Appendix G.

The estimate of the stormwater volume only accounts for direct precipitation into the excavation. The dimensions of the excavation are considered in the dewatering calculations. Runoff which originated outside of the excavation's footprint is excluded and it should be directed away from the excavation.

During precipitation events greater than 15 mm (ex: 100-year storm), measures should be taken by the contractor to retain stormwater onsite in a safe manner to not exceed the allowable water taking and discharge limits, as necessary. A two (2) and a one hundred (100) year storm event over a 24-hour period are approximately 57.3 and 124.9 mm.

6.4 Results of Dewatering Rate Estimates

6.4.1 Construction Dewatering Rate Estimate

Short-term (construction) dewatering calculations are presented in Appendix G. Based on the assumptions provided in this report, the results of the dewatering rate estimate can be summarized as follows:

Table 6-1 Summary of Construction Dewatering Assumptions and Rate

Input Parameter	Industrial Buildings	Utility Trench	Units	Notes
Number of Subgrade Levels	Slab-on-grade without basement	Not applicable	-	
Ground Elevations	184.16	184.16	masl	The highest BH2-5 elevation
Lowest Footing Elevation	181.16	180.16	masl	Assumed to be approximately 3 mbgs and 4 mbgs for the building and utility trench respectively
Excavation Area (Length x Width)	(30 x 2)	(30 x 3)	m ² (m x m)	At one time 30 m trench will be excavated for the building footings and the utility trench
Short Term Dewatering				
With Safety Factor and Precipitation	36,130	36,700	L/day	25 mm of precipitation
With Safety Factor	34,630	34,450	L/day	Safety factor of 2 and without precipitation
Without Safety Factor	17,310	17,220	L/day	Without precipitation

The contractor is responsible for the design of the dewatering systems (depth of wells, screen length, number of wells, spacing sand pack around screens, prevent soil loss etc.) to ensure that dry conditions are always maintained within the excavation at all costs.

6.4.2 Post-Construction Dewatering Rate Estimate

Based on the geotechnical report dated June 17, 2026, section 6.4, it is our understanding that the underfloor drains will not be required since the proposed buildings are slab-on-grade and that the slab will be placed above the groundwater table. As such, there will be no long-term (post construction) dewatering.

6.5 MECP Water Taking Permits

6.5.1 Short-Term Discharge Rate (Construction Phase)

In accordance with the Ontario Water Resources Act, if the water taking for the construction dewatering is more than 50,000 L/day, then an online registration in the Environmental Activity and Sector Registry (EASR) with the MECP will be required.

As of July 1, 2025, an amendment of O. Reg. 63/16 has come into effect and replaced the former subsection 7 (5) such that the EASR water taking limit of 400,000 L/day would no longer apply to groundwater takings of each dewatered work area only, excluding stormwater.

The dewatering estimate including a safety factor is less than 50,000 L/day as shown in Table 6-1. The MECP construction dewatering rate excludes the precipitation amount and is the rate used for the permit application. Based on the MECP construction dewatering an EASR will not be required to facilitate the construction dewatering program of the Site.

A Discharge Plan (dewatering sketch, sewer discharge agreement) must be developed and applied for any discharges from the Site. Monitoring of both water quantity and water quality must be carried out for the entire duration of the construction dewatering phase. During this phase, the Discharge Plan and the daily water taking records must be available onsite.

The Discharge Plan, hydrogeological investigation report, and geotechnical assessment of settlements must also be available at the construction Site during the entire construction dewatering. EXP should be notified immediately about any changes to the construction dewatering schedule or design, since the EASR may be required to be updated to reflect these modifications. Altogether, the hydrogeological report, Discharge Plan and geotechnical assessment constitute the Water Taking Plan which needs to be available onsite during the construction dewatering.

6.5.2 Long-Term Discharge Rate (Post Construction Phase)

Based on the geotechnical report dated June 17, 2026, section 5.4, it is our understanding that the underfloor drains will not be required since the proposed buildings are slab-on-grade. As such, there will be no long-term (post construction) dewatering and no PTTW is required.

7 Environmental Impact

7.1 Surface Water Features

The Site is located within the Bronte Creek watershed. The nearest surface water feature is a tributary of Bronte Creek, approximately located 1.2 kilometers south of the Site boundary. Lake Ontario is approximately 15.3 km from the Site boundary to the south.

Since the tributary of Bronte Creek is outside the anticipated zone of influence (ZOI) of approximately 5 m, no surface water level monitoring plan in the creek during the construction is required. No impacts to the surface water feature are anticipated.

7.2 Groundwater Sources

Well Records from the MECP Water Well Record (WWR) Database were reviewed to determine the presence and number of water supply wells within a 500 m radius of the Site boundaries. The MECP WWR database indicates that forty-one (41) records within a 500 m radius from the Site centroid where two (2) well records are identified onsite (Figure 3 and Appendix A). Well distances are calculated relative to the Site centroid, therefore some distances in Appendix A exceed 500 m.

All wells were reportedly identified as monitoring wells/test holes (5), water supply wells (10), abandoned wells (24) and/or listed with unknown use (2).

The Well Identification Numbers (Well ID No.) of the water supply wells (10) are 2802463, 2802476, 2802479, 2803312, 2804074, 2805663, 2806273, 2806309, 2807195 and 2807804 located between 495 m to 1,187 m from the Site centroid.

It is recommended to complete a baseline residential well survey to verify results of the MECP WWR searches and to confirm current conditions and use of wells in 500 m zone of the Site.

7.3 Geotechnical Considerations

A letter related to geotechnical issues as it pertains to the Site is required to be completed under a separate cover.

7.4 Groundwater Quality

It is our understanding that the potential effluent from the dewatering system during the construction will be released to the natural environment system. As such, the quality of groundwater discharge is required to conform the PWQO criteria.

Dewatering (short-term) may induce migration of contaminants within the zone of influence and beyond due to changing hydraulic gradients, hydrogeological conditions beyond Site boundaries and preferential pathways in utility beddings etc. The water quality sampling conducted as part of this assessment was performed under static conditions. As a result, monitoring may be required during dewatering activities (short-term) to monitor potential migration, and this should be performed more frequently during early dewatering stages.

For the short-term dewatering discharge (natural environment) and based on the water quality test results, it is recommended to implement a suitable pre-treatment, as required.

For discharge to the natural environment (e.g.: surface water, drainage feature), the treatment systems will require Environmental Compliance Approvals (ECA) for construction and post construction phases.

The Environmental Site Assessment Report(s) shall be reviewed for more information on the groundwater quality conditions at the Site.

7.5 Well Decommissioning

In conformance with Regulation 903 of the Ontario Water Resources Act, the installation and eventual decommissioning of any dewatering system wells or monitoring wells must be completed by a licensed well contractor. This will be required for all wells that are no longer in use.

8 Conclusions and Recommendations

Based on the findings of the Preliminary Hydrogeological Investigation and Water Balance Assessment, the following conclusions and recommendations are provided:

- The Site is within the Bronte Creek watershed. The Site is located in the physiographic region known as Peel Plain and physiographic landform known as Bevelled Till Plains.
- The main overburden soil types encountered during on-site drilling program include clayey silt till to silty clay till.
- Tributary of Bronte Creek Surface water features cross the site. The nearest surface water feature is a tributary of Bronte Creek, approximately located 1.2 kilometers south of the Site boundary. Lake Ontario is approximately 15.3 km from the Site boundary to the south.
- The Site is located within Halton Region Source Protection Area and Conservation Halton. The Site is not located within Wellhead Protection Area (WHPA), Intake Protection Area (IPA), Issue Contributing Area (ICA), Significant Groundwater Recharge Area (SGRA), Highly Vulnerable Area (HVA) and Event Based Area (EBA).
- MECP WWR database indicates forty-one (41) records within a 500 m radius of the Site with ten (10) of these WWRs reportedly completed as water supply wells.
- It is recommended to complete a baseline residential well survey prior construction to verify results of the MECP WWR searches and to confirm current conditions and use of wells in 500 m zone of the Site.
- The groundwater elevation recorded in the intermediate wells ranged from 178.74 masl (3.28 mbgs at BH2-11 on July 12, 2024) to 183.62 masl (0.39 mbgs at Piezo 2-4 on July 5, 2024). During the seasonal groundwater monitoring program from July 5, 2024 to November 13, 2025, the water level fluctuated from 0.68 m (Piezometer 2-4) to 2.73 m (BH2-7). It is interpreted that seasonal high groundwater elevations were observed during the July 5 of 2024 monitoring event.
- The direction of groundwater flow is interpreted to follow topographic relief and to be directed to be southeast of the Site.
- The highest estimated bulk hydraulic conductivity is approximately 1.1×10^{-7} m/s.
- The measured geometric mean of design infiltration rate from the site specific infiltration tests is 8 mm/hr
- The following parameters exceeded the PWQO parameters: Dissolved and Total Boron (B), Dissolved and Total Cobalt (Co), Total Iron (Fe), Total Phosphorus, Total Sulphide, Sulphide (as H₂S), Dissolved and Total Uranium (U).
- Based on water balance assessment for the Site there will be an infiltration deficit in post-development. To fully mitigate the infiltration deficit of approximately 8,140 m³/yr in post-development conditions the feasible LIDs measures should be implemented. The LID area is based on the estimated design infiltration rate of 8 mm/hr, on the assumption that precipitation is evenly distributed during the year over two-week intervals, and bi-weekly volumes from roof will be infiltrated in 48-hour. The area of feasible LID that is required to offset the water balance deficit is approximately 1,325 m². The infiltration system will need to have a minimum storage of 509 m³ to store two weeks of precipitation to meet the pre-development infiltration levels.
- Based on the assumptions outlined in this report, the estimated peak dewatering rate for proposed construction activities is approximately 36,130 L/day and 36,700 L/day for the industrial building (one at a time) and utility trench (services) respectively at any given time and does not occur concurrently. This is the rate which will be required to be discharged to the natural environment system.
- As the dewatering flow rate estimate is less than 50,000 L/day for one at a time, an EASR will not be required to facilitate the construction dewatering program for the Site.

- Based on the geotechnical report dated April 17, 2026, section 5.4, it is our understanding that the underfloor drains will not be required since the proposed buildings are slab-on-grade and the slab will be placed above the groundwater table. As such, there will be no long-term (post construction) dewatering. A PTTW will not be required for long-term discharge.
- The construction dewatering is based on the assumptions outlined in this report. Any variations in hydrogeological conditions beyond those encountered as part of this preliminary investigation may significantly influence the discharge volumes.
- For the short-term dewatering system (construction phase), it is anticipated that TSS levels and some other parameters (for example, Total Metals) in the pumped groundwater may become elevated and exceed PWQO limits. To control the concentration of TSS and associated metals, it is recommended that a suitable treatment method be implemented (filtration or decantation facilities and/ or any other applicable treatment system) during construction dewatering activities to discharge to the natural environment system. The specifications of the treatment system will need to be adjusted to the reported water quality results by the treatment contractor/process engineer.
- For the short-term dewatering discharge (natural environment) and based on the water quality test results, it is recommended to implement a suitable pre-treatment, as required.
- For discharge to the natural environment (e.g.: surface water, drainage feature), the treatment systems will require Environmental Compliance Approvals (ECA) for construction and post construction phases.
- A letter related to geotechnical issues as it pertains to the Site is required to be completed under a separate cover.
- A Discharge Plan (dewatering sketch, sewer discharge agreement) must be developed and applied for any discharges from the Site. The Discharge Plan and monitoring for both water quantity and water quality must be carried at the Site during the entire construction dewatering phase. The daily water taking records must be maintained onsite for the entire construction dewatering phase. The Discharge Plan, hydrogeological investigation report, and geotechnical assessment of settlements must always also be available at the construction Site for the entire construction dewatering. EXP should be notified immediately about any changes to the construction dewatering schedule or design, since EASR may be required to be updated to reflect these modifications. The hydrogeological report, Discharge Plan and geotechnical assessment constitutes the Water Taking Plan which needs to be available onsite for the duration of construction dewatering.
- In conformance with Regulation 903 of the Ontario Water Resources Act, the installation and eventual decommissioning of any dewatering system wells or monitoring wells must be completed by a licensed well contractor. This will be required for all wells that are no longer in use.

The conclusions and recommendations provided above should be reviewed in conjunction with the entirety of the report. They assume that the present design concept described throughout the report will proceed to construction. This report is solely intended for the construction and long-term dewatering assessments. Any changes to the design concept may result in a modification to the recommendations provided in this report.

9 Limitations

This report is based on a limited investigation designed to provide information to support an assessment of the current hydrogeological conditions within the study area. The conclusions and recommendations presented within this report reflect Site conditions existing at the time of the assessment. EXP must be contacted immediately, if any unforeseen Site conditions are experienced during construction activities. This will allow EXP to review the new findings and provide appropriate recommendations to allow the construction to proceed in a timely and cost-effective manner.

Our undertaking at EXP, therefore, is to perform our work within limits prescribed by our clients, with the usual thoroughness and competence of the geoscience/engineering profession. No other warranty or representation, either expressed or implied, is included or intended in this report.

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We trust that this information is satisfactory for your purposes. Should you have any questions or comments, please do not hesitate to contact this office.

Sincerely,

EXP Services Inc.

Amar Neku



Amar Neku, Ph.D., P.Eng., P.Geo.
Senior Hydrogeologist
Environmental Services

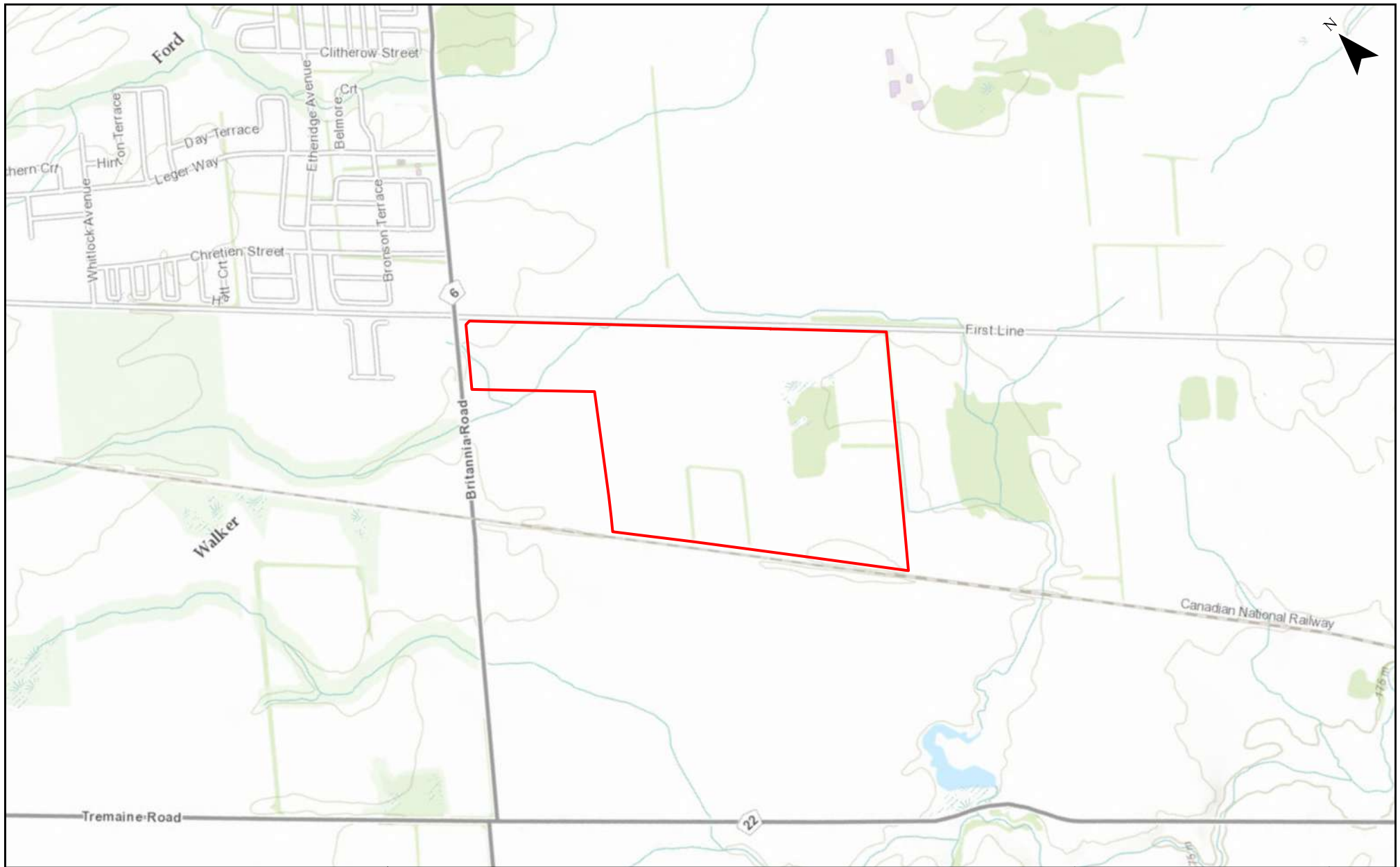
Francois Chartier

Francois Chartier, M.Sc., P.Geo.
Discipline Manager, Hydrogeology
Environmental Services

10 References

- Cashman and Preene (2013) Groundwater Lowering in Construction, 2nd Edition.
- Chapman, L.J. and Putnam, D.F. (2007). Physiography of Southern Ontario, 3rd Edition, Ontario Geological Survey.
- EXP Services Inc. (June 17, 2026), Preliminary Geotechnical Investigation, Britannia Road and First Line, Phase Two Land, Milton, ON, prepared for Tribal Development Management Services Inc.
- EXP Services Inc. (November 1, 2024), Preliminary Hydrogeological Investigation (Draft), Britannia Road and First Line, Phase Two Land, Milton, ON, prepared for Tribal Development Management Services Inc.
- J.P. Powers, A.B. Corwin, P.C. Schmall and W.E. Kaeck (2007). Construction Dewatering and Groundwater Control, Third Edition.
- Ministry of Northern Development and Mines (May, 2012). OGS Earth. Retrieved from <http://www.mndm.gov.on.ca/en/mines-and-minerals/applications/ogsearth>.
- Oak Ridges Moraine Groundwater Program. Accessed to the website (<https://oakridgeswater.ca/>) July 2024.

Figures



SCALE:

0 150 300 450 600 750 m



DRAWN BY:
AC

CHECKED BY:
AN

LEGEND:

 APPROXIMATE SITE BOUNDARY

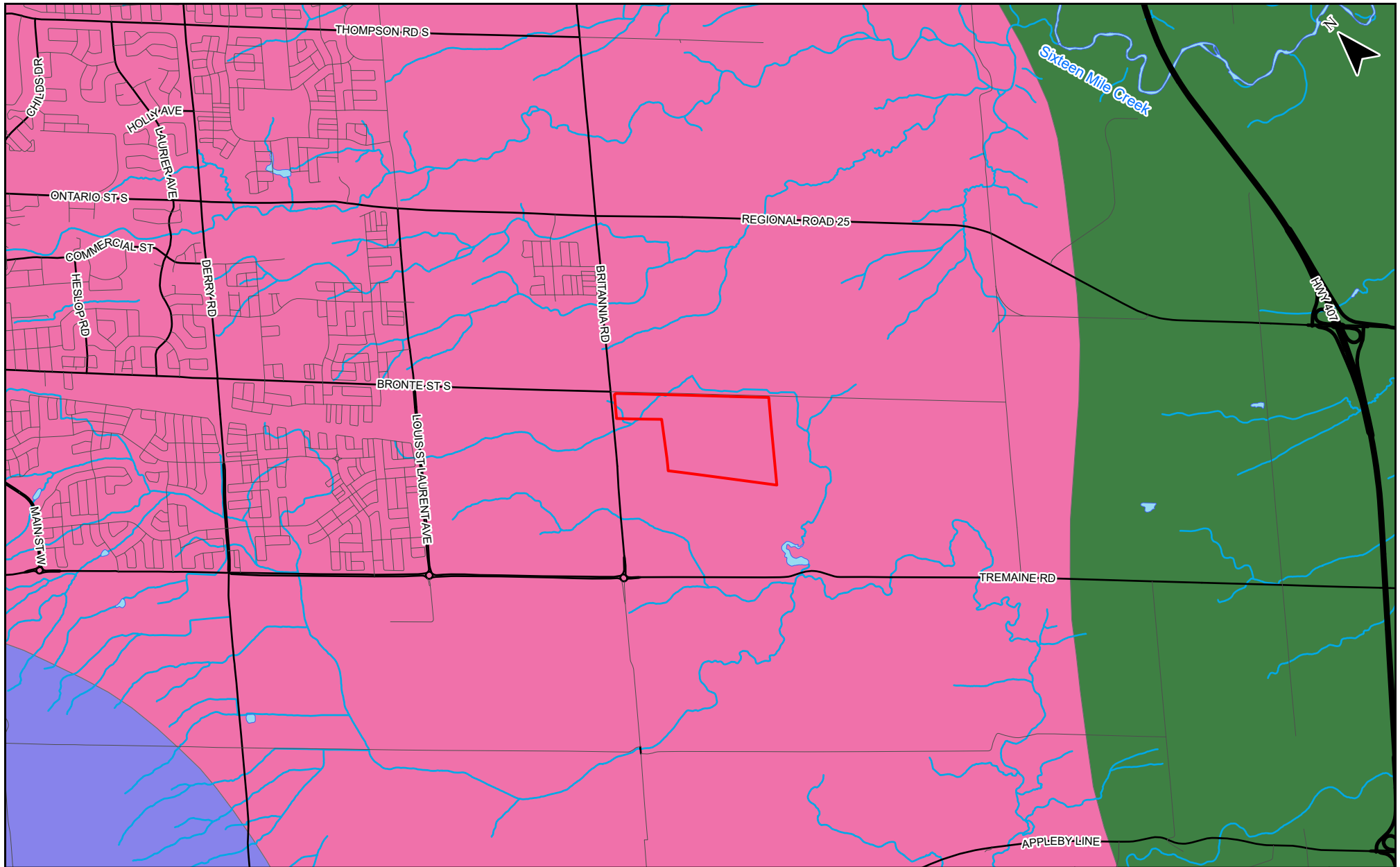
SITE LOCATION PLAN

FIGURE:
1

HYDROGEOLOGICAL INVESTIGATION AND
WATER BALANCE ASSESSMENT
DEVELOPMENT LANDS (PHASE 2)
AT BRITANNIA ROAD AND FIRST LINE
MILTON, ONTARIO

PROJECT NUMBER: BRM-23015226-A0

DATE: JUNE 2026



SCALE:
0 500 1,000 1,500 2,000 2,500
m

SOURCE:
BASED ON ONTARIO GEOLOGICAL SURVEY DATA PUBLISHED IN 2007

LEGEND:
 NIAGARA ESCARPMENT
 SOUTH SLOPE
 PEEL PLAIN
 APPROXIMATE SITE BOUNDARY

PHYSIOGRAPHIC REGIONS

FIGURE:
2A

HYDROGEOLOGICAL INVESTIGATION AND
WATER BALANCE ASSESSMENT
DEVELOPMENT LANDS (PHASE 2)
AT BRITANNIA ROAD AND FIRST LINE
MILTON, ONTARIO

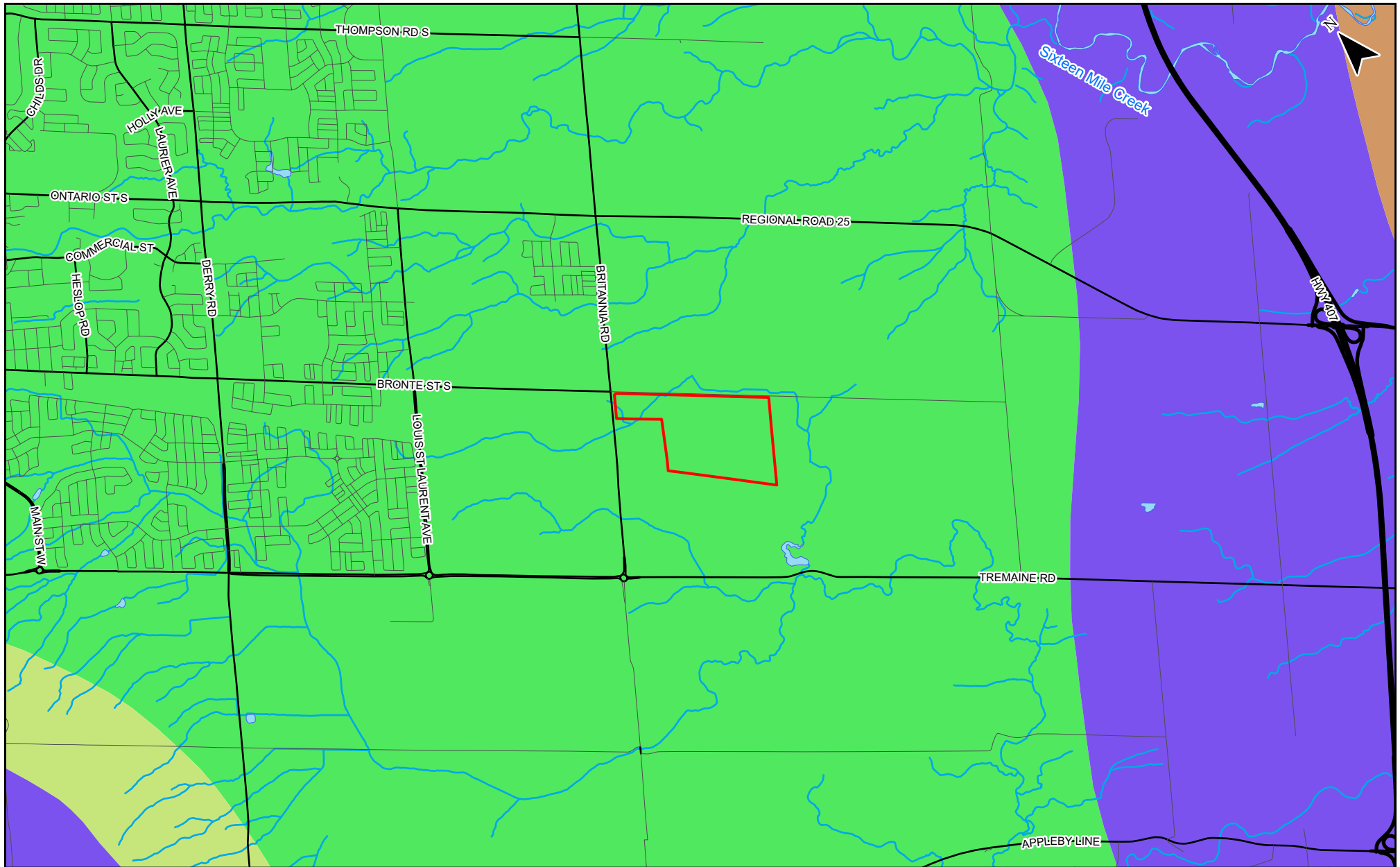
PROJECT NUMBER: BRM-23015226-A0

DATE: JUNE 2026



DRAWN BY:
AC

CHECKED BY:
AN



SCALE:
0 500 1,000 1,500 2,000 2,500 m

SOURCE:
BASED ON ONTARIO GEOLOGICAL SURVEY DATA PUBLISHED IN 2007

LEGEND:
■ BEVELLED TILL PLAINS
■ ESCARPMENTS
■ TILL MORAINES
■ TILL PLAINS (DRUMLINIZED)
■ APPROXIMATE SITE BOUNDARY

PHYSIOGRAPHIC LANDFORMS

FIGURE:
2B

HYDROGEOLOGICAL INVESTIGATION AND
WATER BALANCE ASSESSMENT
DEVELOPMENT LANDS (PHASE 2)
AT BRITANNIA ROAD AND FIRST LINE
MILTON, ONTARIO

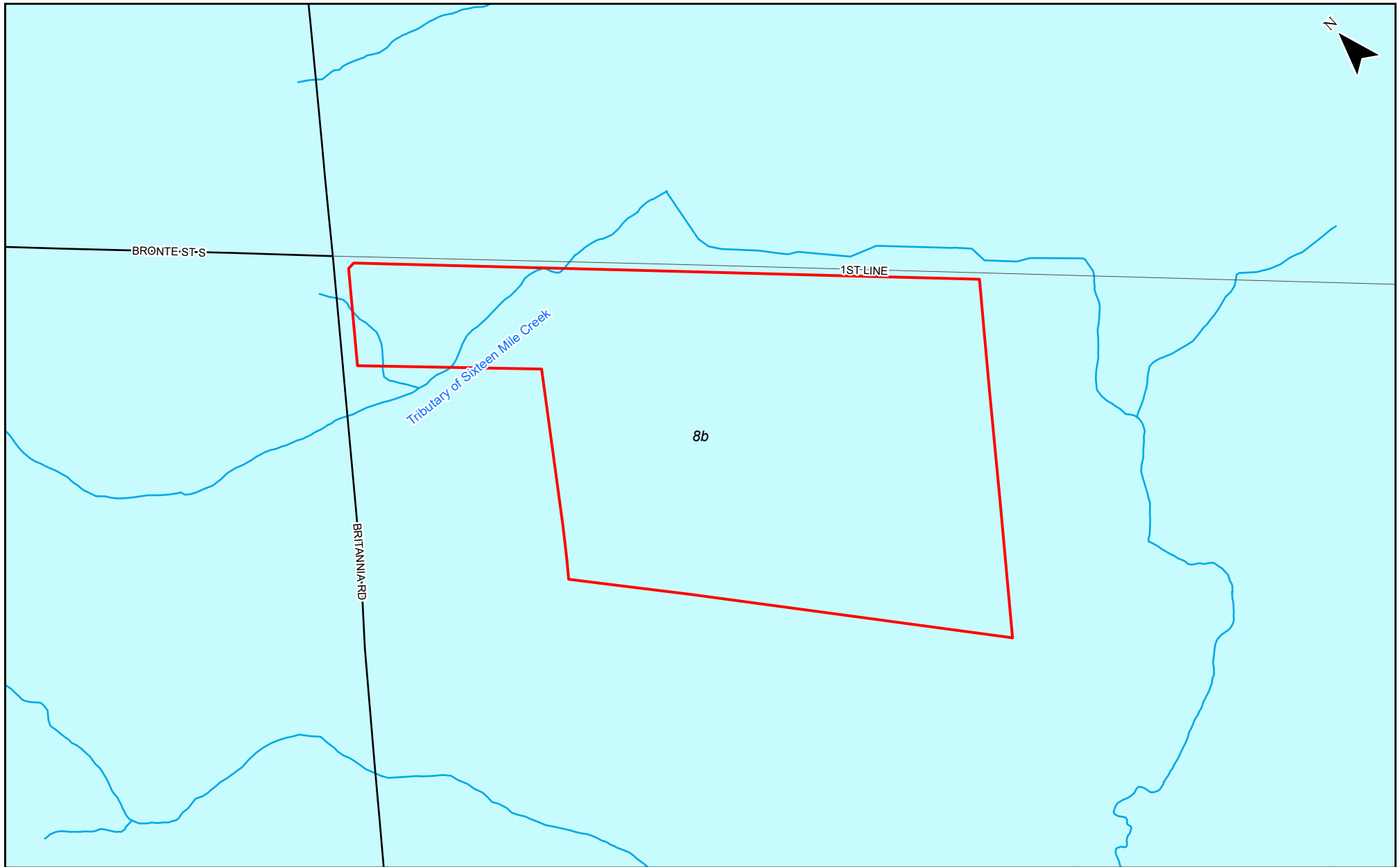
PROJECT NUMBER: BRM-23015226-A0

DATE: JUNE 2026



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SCALE:
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m

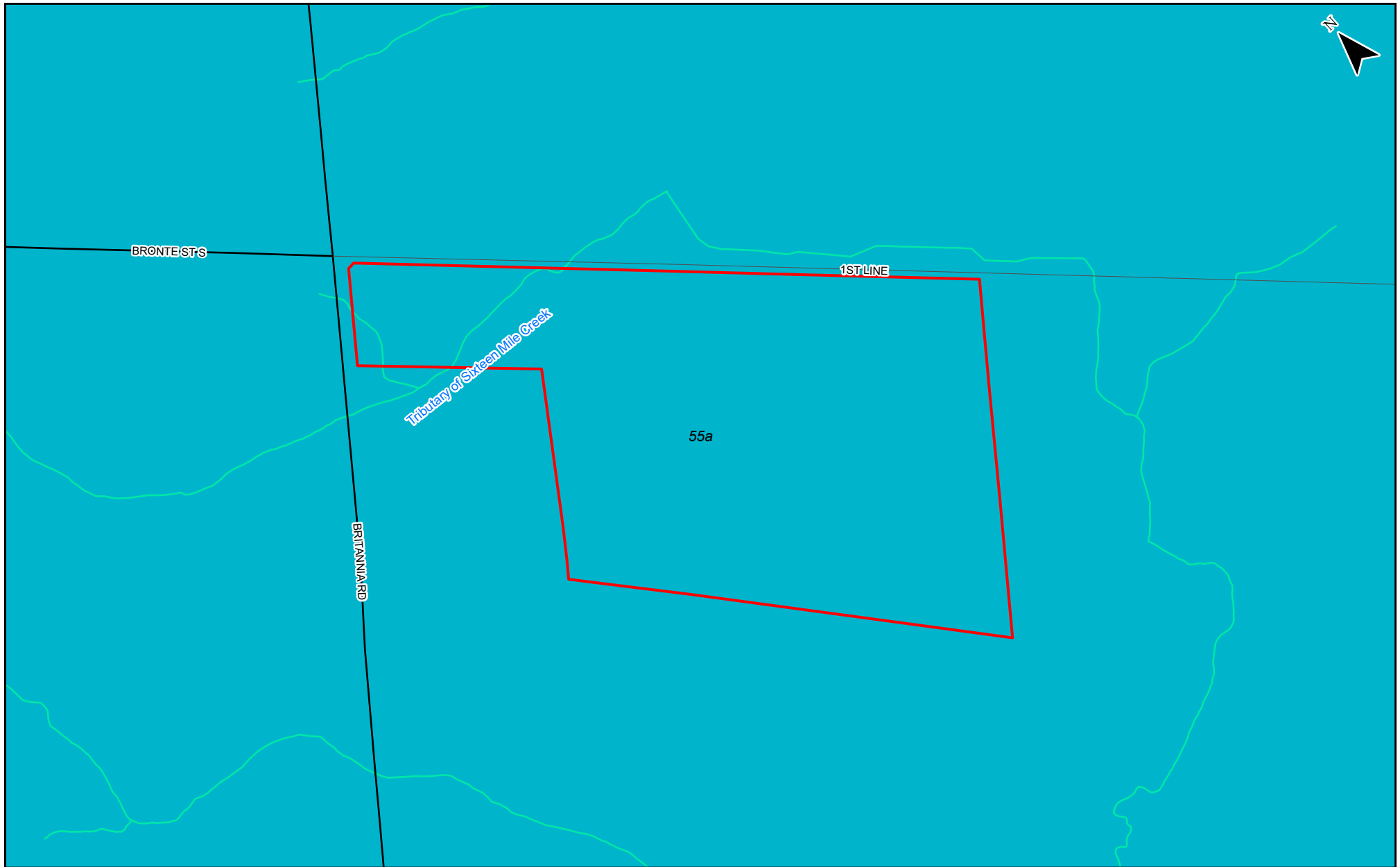
SOURCE:
BASED ON ONTARIO GEOLOGICAL SURVEY DATA PUBLISHED IN 2010

LEGEND:
8B: FINE-TEXTURED GLACIOLACUSTRINE DEPOSITS
APPROXIMATE SITE BOUNDARY

QUATERNARY GEOLOGY
FIGURE:
2C

exp.
DRAWN BY:
AC
CHECKED BY:
AN

HYDROGEOLOGICAL INVESTIGATION AND
WATER BALANCE ASSESSMENT
DEVELOPMENT LANDS (PHASE 2)
AT BRITANNIA ROAD AND FIRST LINE
MILTON, ONTARIO
PROJECT NUMBER: BRM-23015226-A0
DATE: JUNE 2026



SCALE:
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SOURCE:
BASED ON ONTARIO GEOLOGICAL SURVEY DATA PUBLISHED IN 2011

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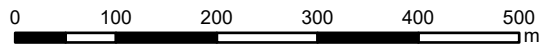
LEGEND:

- APPROXIMATE SITE BOUNDARY
- 55a: SHALE, LIMESTONE, DOLOSTONE, SILTSTONE
Queenston Formation

BEDROCK GEOLOGY	FIGURE: 2D
HYDROGEOLOGICAL INVESTIGATION AND WATER BALANCE ASSESSMENT DEVELOPMENT LANDS (PHASE 2) AT BRITANNIA ROAD AND FIRST LINE MILTON, ONTARIO	
PROJECT NUMBER: BRM-23015226-A0	DATE: JUNE 2026



SCALE:



LEGEND:

- BOREHOLE (EXP, 2024)
- BOREHOLE / MONITORING WELL (EXP, 2024)
- PIEZOMETER (EXP, 2024)
- INFILTRATION TEST LOCATION (EXP, 2024)
- CROSS SECTION AXIS
- APPROXIMATE SITE BOUNDARY

BOREHOLE / MONITORING WELL LOCATION PLAN

FIGURE:

1

HYDROGEOLOGICAL INVESTIGATION AND
WATER BALANCE ASSESSMENT
DEVELOPMENT LANDS (PHASE 2)
AT BRITANNIA ROAD AND FIRST LINE
MILTON, ONTARIO

PROJECT NUMBER: BRM-23015226-A0

DATE: JUNE 2026

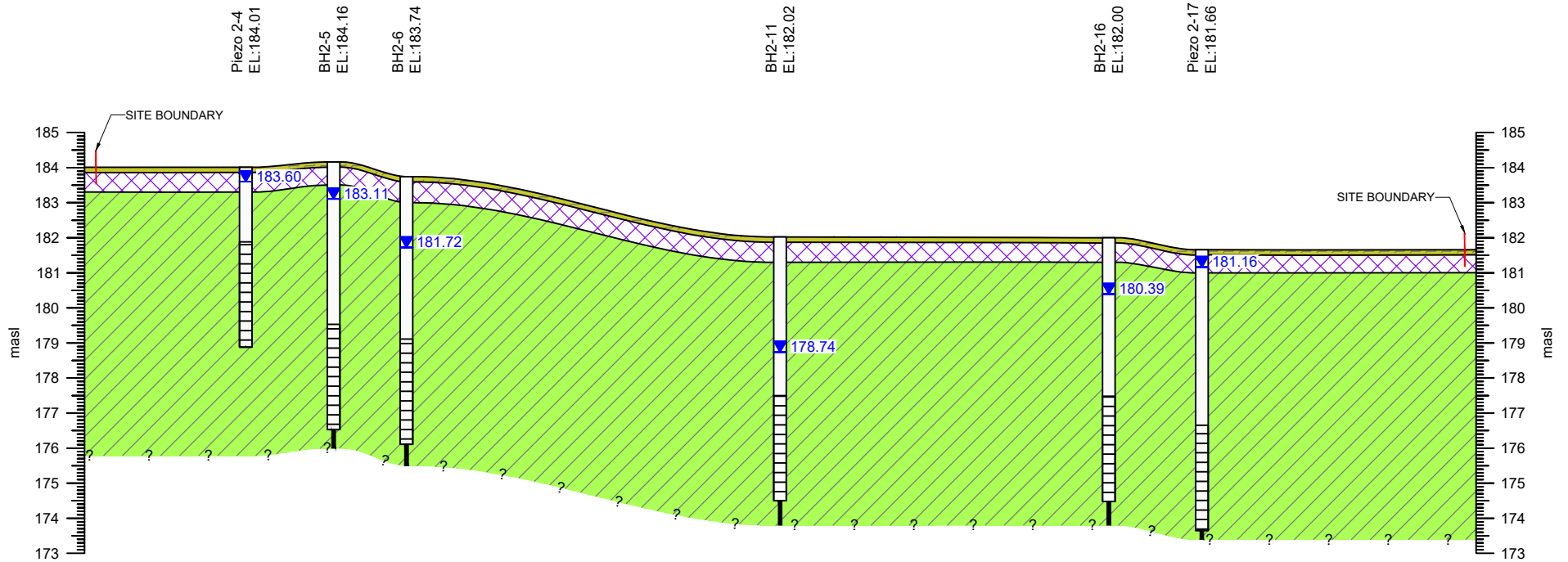


DRAWN BY:
AC

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AN

A
NORTH

A'
SOUTH



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LEGEND:

- TOPSOIL
- REWORKED TILL
- CLAYEY SILT TILL TO SILTY CLAY TILL

GROUNDWATER ELEVATION (masl) AS
MEASURED ON JULY 12, 2024

TITLE AND LOCATION:

CROSS SECTION A-A'
HYDROGEOLOGICAL INVESTIGATION
AND WATER BALANCE ASSESSMENT
DEVELOPMENT LANDS (PHASE 2)
AT BRITANNIA ROAD AND FIRST LINE
MILTON, ONTARIO

PROJECT NO.:

BRM-23015226-A0

DWN.:

JA

SCALE:

AS NOTED

CK:

AN

DATE:

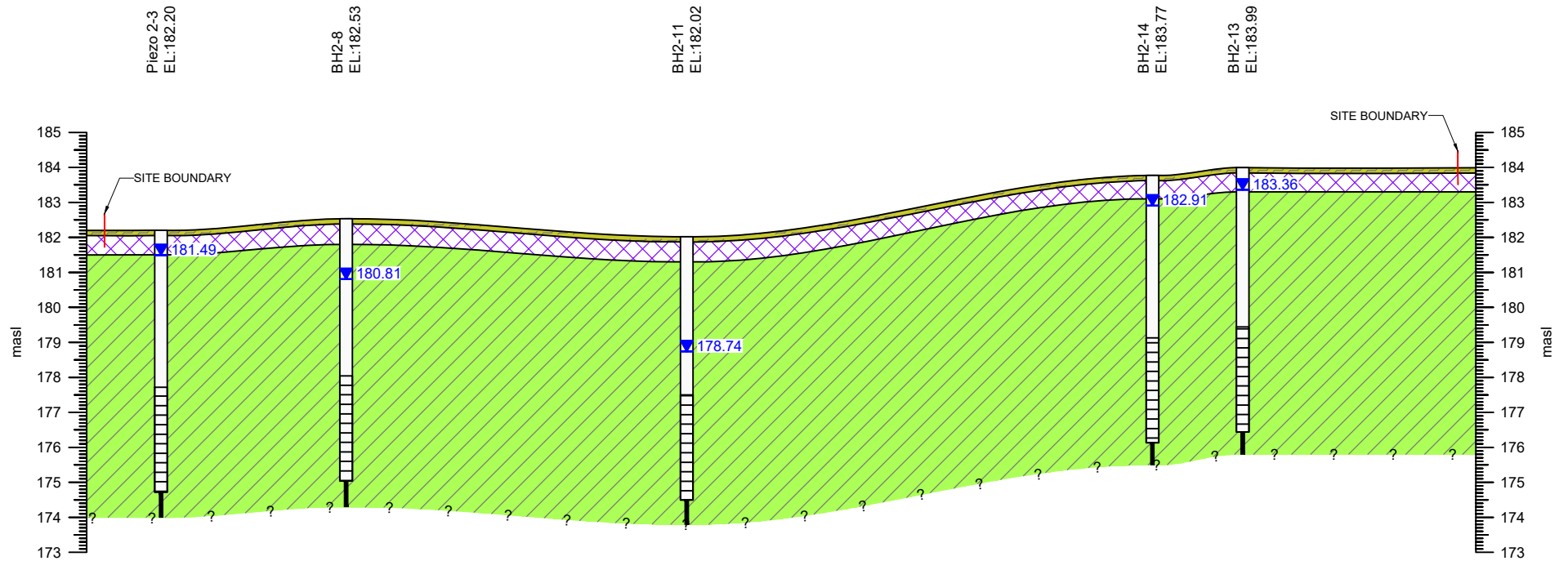
JULY 2024

FIG. NO.:

5A

B
EAST

B'
WEST



VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE:



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LEGEND:

- TOPSOIL
- REWORKED TILL
- CLAYEY SILT TILL TO SILTY CLAY TILL

GROUNDWATER ELEVATION (masl) AS
MEASURED ON JULY 12, 2024

TITLE AND LOCATION:

CROSS SECTION B-B'
HYDROGEOLOGICAL INVESTIGATION
AND WATER BALANCE ASSESSMENT
DEVELOPMENT LANDS (PHASE 2)
AT BRITANNIA ROAD AND FIRST LINE
MILTON, ONTARIO

PROJECT NO.:

BRM-23015226-A0

DWN.:

JA

SCALE:

AS NOTED

CK:

AN

DATE:

JULY 2024

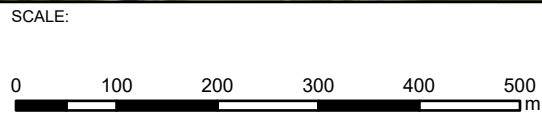
FIG. NO.:

5B



NOTE: GROUNDWATER ELEVATIONS AT BH 2-7, BH2-11, Piezo 2-3, AND Piezo 2-17 WERE OMITTED FROM GROUNDWATER CONTOUR ANALYSIS DUE TO ANOMALOUS DATA.

SCALE: 0100200300400500m			LEGEND: ● BOREHOLE / MONITORING WELL (EXP, 2024) ○ PIEZOMETER (EXP, 2024) — GROUNDWATER CONTOUR → GROUNDWATER FLOW DIRECTION [XX.XX] GROUNDWATER ELEVATION (m asl) AS MEASURED ON JULY 12, 2024 □ APPROXIMATE SITE BOUNDARY	GROUNDWATER CONTOUR PLAN	FIGURE: 6
	DRAWN BY: AC	CHECKED BY: AN		HYDROGEOLOGICAL INVESTIGATION AND WATER BALANCE ASSESSMENT DEVELOPMENT LANDS (PHASE 2) AT BRITANNIA ROAD AND FIRST LINE MILTON, ONTARIO	
			PROJECT NUMBER: BRM-23015226-A0		DATE: JUNE 2026



- LEGEND:
- LANDSCAPE
 - WETLAND
 - WOODLOT
 - APPROXIMATE SITE BOUNDARY
 - HIGH WATER LEVEL AREA

EXISTING LAND USE
AND HIGH WATER LEVEL AREAS

FIGURE:
7

HYDROGEOLOGICAL INVESTIGATION AND
WATER BALANCE ASSESSMENT
DEVELOPMENT LANDS (PHASE 2)
AT BRITANNIA ROAD AND FIRST LINE
MILTON, ONTARIO



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AC

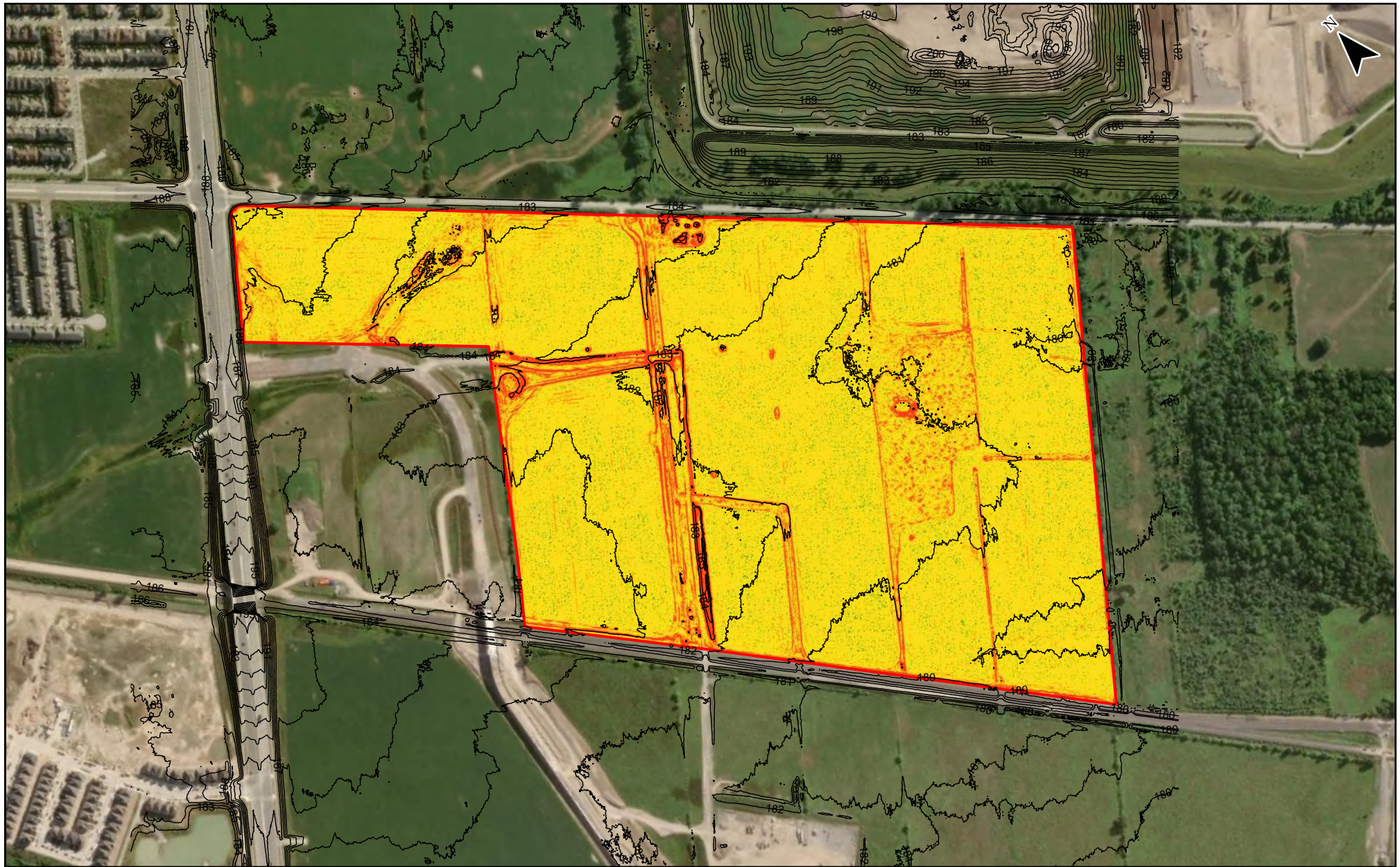
CHECKED BY:
AN

PROJECT NUMBER: BRM-23015226-A0

DATE: JUNE 2026



SCALE: 0 100 200 300 400 500 m		LEGEND: BUILDING APPROXIMATE SITE BOUNDARY LANDSCAPE HIGH WATER LEVEL AREA PAVEMENT STORMWATER MANAGEMENT POND WETLAND WOODLOT		PROPOSED LAND USE AND HIGH WATER LEVEL AREAS	FIGURE: 8
SOURCE: PROPOSED LAND USE BASED ON MILTON LINK SITE PLAN, JUNE 2 2026		HYDROGEOLOGICAL INVESTIGATION AND WATER BALANCE ASSESSMENT DEVELOPMENT LANDS (PHASE 2) AT BRITANNIA ROAD AND FIRST LINE MILTON, ONTARIO			
	DRAWN BY: AC	CHECKED BY: AN	PROJECT NUMBER: BRM-23015226-A0		
			DATE: JUNE 2026		



SCALE:
0 100 200 300 400 500 m

SOURCE:
TOPOGRAPHIC CONTOURS BASED ON HIGH RESOLUTION
DIGITAL ELEVATION MODEL (HRDEM)
MADE AVAILABLE UNDER THE OPEN GOVERNMENT LICENCE - CANADA.

LEGEND:

- TOPOGRAPHIC CONTOUR (m asl)
- APPROXIMATE SITE BOUNDARY

EXISTING SLOPE (INFILTRATION FACTOR):

- | | |
|-----------------------|----------------------|
| ■ <0.06% (0.30) | ■ 0.38 - 2.8% (0.15) |
| ■ 0.06 - 0.28% (0.25) | ■ 2.8 - 4.7% (0.10) |
| ■ 0.28 - 0.38% (0.20) | ■ >4.7% (0.05) |

EXISTING SLOPE

FIGURE:

9

HYDROGEOLOGICAL INVESTIGATION AND
WATER BALANCE ASSESSMENT
DEVELOPMENT LANDS (PHASE 2)
AT BRITANNIA ROAD AND FIRST LINE
MILTON, ONTARIO

PROJECT NUMBER: BRM-23015226-A0

DATE: JUNE 2026



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List of Tables (Groundwater Elevations, Hydrographs and Summary of K Values)

TABLE 4-1: Groundwater Elevation Summary

Britannia Rd and First Line - Phase 2
BRM-23015226-A0

Monitoring Well ID	Ground Surface Elevation (masl)	Stick Up (m)	Approximate Full Well Depth (mbTOP)	Approximate Full Well Depth (mbgs)	Minimum GW Elevation (masl)	Maximum GW Elevation (masl)	Depth	5-Jul-24	12-Jul-24	30-Jan-25	28-Mar-25	23-May-25	11-Jul-25	16-Sep-25	13-Nov-25
Piezo 2-3	182.20	0.97	8.45	7.48	179.97	181.58	mbTOP	1.59	1.68	2.52	2.14	2.34	2.22	3.20	2.34
							mbgs	0.62	0.71	1.55	1.17	1.37	1.25	2.23	1.37
							masl	181.58	181.49	180.65	181.03	180.83	180.95	179.97	180.83
Piezo 2-4	184.01	0.87	6.00	5.13	182.94	183.62	mbTOP	1.26	1.28	1.65	1.58	1.42	1.35	1.92	1.94
							mbgs	0.39	0.41	0.78	0.71	0.55	0.48	1.05	1.07
							masl	183.62	183.60	183.23	183.30	183.46	183.53	182.96	182.94
BH/MW 2-5	184.16	0.97	8.60	7.63	182.43	183.39	mbTOP	1.93	2.02	2.17	2.70	2.41	2.26	2.33	2.54
							mbgs	0.96	1.05	1.20	1.73	1.44	1.29	1.36	1.57
							masl	183.20	183.11	182.96	182.43	182.72	182.87	182.80	182.59
BH/MW 2-6	183.74	0.97	8.60	7.63	181.12	182.54	mbTOP	2.17	2.99	2.89	3.45	3.12	2.92	3.11	3.59
							mbgs	1.20	2.02	1.92	2.48	2.15	1.95	2.14	2.62
							masl	182.54	181.72	181.82	181.26	181.59	181.79	181.60	181.12
BH/MW 2-7	183.33	1.02	8.47	7.45	178.80	181.53	mbTOP	2.82	5.55	3.70	4.09	3.87	3.68	3.85	4.49
							mbgs	1.80	4.53	2.68	3.07	2.85	2.66	2.83	3.47
							masl	181.53	178.80	180.65	180.26	180.48	180.67	180.50	179.86
BH/MW 2-8	182.53	1.00	8.49	7.49	179.83	181.54	mbTOP	1.99	2.72	2.77	2.61	2.68	2.70	3.70	2.64
							mbgs	0.99	1.72	1.77	1.61	1.68	1.70	2.70	1.64
							masl	181.54	180.81	180.76	180.92	180.85	180.83	179.83	180.89
BH/MW 2-11	182.02	1.03	8.55	7.52	178.74	180.51	mbTOP	2.54	4.31	3.41	3.52	3.48	3.21	3.62	3.71
							mbgs	1.51	3.28	2.38	2.49	2.45	2.18	2.59	2.68
							masl	180.51	178.74	179.64	179.53	179.57	179.84	179.43	179.34
BH/MW 2-13	183.99	1.00	8.55	7.55	181.76	183.36	mbTOP	1.67	1.63	2.53	2.65	2.84	2.77	3.05	3.23
							mbgs	0.67	0.63	1.53	1.65	1.84	1.77	2.05	2.23
							masl	183.32	183.36	182.46	182.34	182.15	182.22	181.94	181.76
BH/MW 2-14	183.77	0.98	8.62	7.64	180.98	182.91	mbTOP	1.86	1.84	3.77	2.79	2.87	2.74	3.18	2.90
							mbgs	0.88	0.86	2.79	1.81	1.89	1.76	2.20	1.92
							masl	182.89	182.91	180.98	181.96	181.88	182.01	181.57	181.85
BH/MW 2-15	183.03	0.94	8.46	7.52	180.82	182.06	mbTOP	1.91	2.05	2.81	3.11	2.98	2.86	3.15	2.70
							mbgs	0.97	1.11	1.87	2.17	2.04	1.92	2.21	1.76
							masl	182.06	181.92	181.16	180.86	180.99	181.11	180.82	181.27
BH/MW 2-16	182.00	1.00	8.52	7.52	178.80	181.09	mbTOP	1.91	2.61	3.20	3.30	2.96	2.79	3.59	4.20
							mbgs	0.91	1.61	2.20	2.30	1.96	1.79	2.59	3.20
							masl	181.09	180.39	179.80	179.70	180.04	180.21	179.41	178.80
Piezo 2-17	181.66	1.03	9.04	8.01	180.14	181.17	mbTOP	1.52	1.53	1.99	1.72	1.88	1.92	2.55	2.11
							mbgs	0.49	0.50	0.96	0.69	0.85	0.89	1.52	1.08
							masl	181.17	181.16	180.70	180.97	180.81	180.77	180.14	180.58

Notes:

mbTOP - meters below top of the pipe
mbgs - meters below ground surface
masl - meters above mean sea level

	Min. GW Elev.	Max. Gw Elev.
Shallow Wells	178.74	183.62
Deep Wells	0	0

Tribal Milton Phase 2 Hydrograph

July 2024 - November 2025

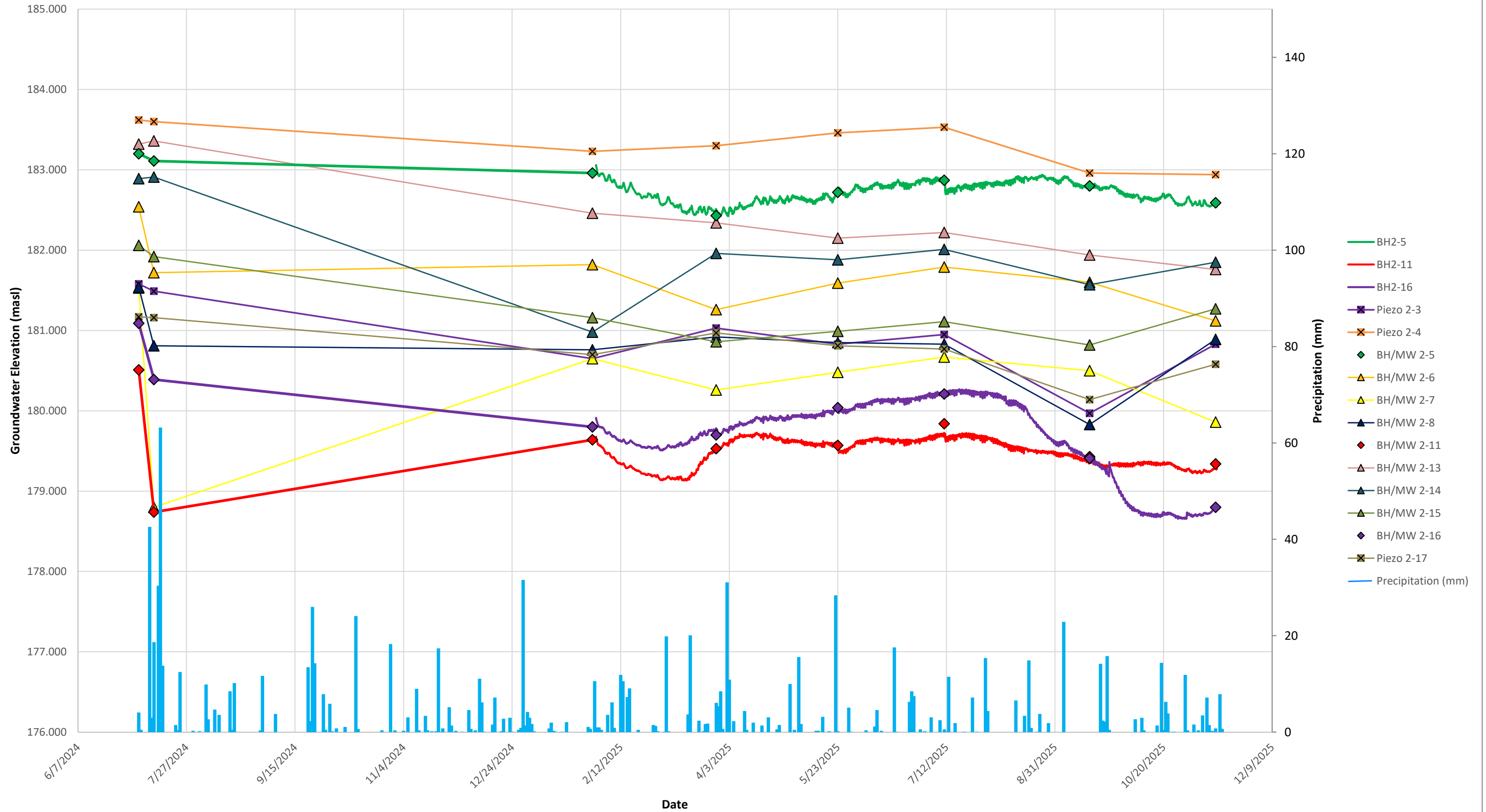


Table 4-2: Summary of Hydraulic Conductivity Testing Results

Britannia Rd and First Line - Phase 2

BRM-23015226-A0

Monitoring Well	Well Depth (mbgs)	Screen Interval (mbgs)		Soil Formation Screened	Estimated Hydraulic Conductivity (m/s)
		from	to		
BH/MW 2-5	7.63	4.63	7.63	CLAYEY SILT TILL TO SILTY CLAY TILL	5.2E-08
BH/MW 2-6	7.63	4.63	7.63	CLAYEY SILT TILL TO SILTY CLAY TILL	1.4E-08
BH/MW 2-7	7.45	4.45	7.45	CLAYEY SILT TILL TO SILTY CLAY TILL	2.7E-08
BH/MW 2-8	7.49	4.49	7.49	CLAYEY SILT TILL TO SILTY CLAY TILL	8.8E-09
BH/MW 2-11	7.52	4.52	7.52	CLAYEY SILT TILL TO SILTY CLAY TILL	1.2E-09
BH/MW 2-13	7.55	4.55	7.55	CLAYEY SILT TILL TO SILTY CLAY TILL	1.1E-07
BH/MW 2-14	7.64	4.64	7.64	CLAYEY SILT TILL TO SILTY CLAY TILL	1.4E-08
BH/MW 2-15	7.52	4.52	7.52	CLAYEY SILT TILL TO SILTY CLAY TILL	6.6E-08
BH/MW 2-16	7.52	4.52	7.52	CLAYEY SILT TILL TO SILTY CLAY TILL	1.0E-08
Highest Estimated K Value					1.1E-07
Arithmetic Mean of Estimated K Values					3.3E-08
Geometric Mean of Estimated K Values					1.8E-08

Appendix A – MECP WWR Summary Table

On-Site																
BORE_HOLE_ID	WELL_ID	DATE	EAST83	NORTH83	ELEVATION (m ASL)	LOCATION ACCURACY	STREET	CITY	DISTANCE FROM SITE CENTROID (m)	CONSTRUCTION METHOD	WELL DEPTH (m bgs)	WATER FOUND (m bgs)	CASING DIAMETER (cm)	1st USE	2nd USE	FINAL STATUS
1008785638	7398178	8/17/2021	593881	4813064	180.1	on Water Well Record	5202 First Line	Milton	1682	Diamond	25.9	16.8	5.1	Monitoring and Test Hole		Monitoring and Test Hole
1008785641	7398179	8/7/2021	594046	4812677	178.5	on Water Well Record			2065	Rotary (Convent.)	19.5	16.8	5.1	Monitoring and Test Hole		Monitoring and Test Hole
Off-Site																
BORE_HOLE_ID	WELL_ID	DATE	EAST83	NORTH83	ELEVATION (m ASL)	LOCATION ACCURACY	STREET	CITY	DISTANCE FROM SITE CENTROID (m)	CONSTRUCTION METHOD	WELL DEPTH (m bgs)	WATER FOUND (m bgs)	CASING DIAMETER (cm)	1st USE	2nd USE	FINAL STATUS
10149012	2802462	1/3/1955	593181	4814511	188.3	unknown UTM			923	Cable Tool	25.9	25.6	15.2	Not Used		Abandoned-Quality
10149013	2802463	1/12/1955	594052	4814226	180.8	margin of error : 100 - 300 m			636	Cable Tool	22.3	21.9	15.2	Domestic		Water Supply
10149026	2802476	8/7/1964	593670	4814263	183.7	margin of error : 100 - 300 m			540	Cable Tool	22.9	21.6	15.2	Domestic		Water Supply
10149029	2802479	8/31/1962	593155	4814473	187.7	margin of error : 30 - 100 m			905	Boring	17.4	12.8	76.2	Livestock	Domestic	Water Supply
10149854	2803312	2/2/1970	594392	4813347	179.9	margin of error : 30 - 100 m			821	Boring	12.5	4.9	76.2	Domestic		Water Supply
10150600	2804074	2/28/1973	594435	4813363	180.0	margin of error : 30 - 100 m			853	Boring	14.0	13.4	76.2	Domestic		Water Supply
10152139	2805663	6/16/1980	594061	4812809	179.0	Lot centroid			998	Boring	11.6	10.7	76.2	Domestic		Water Supply
10152551	2806273	3/17/1984	592713	4814081	185.2	Lot centroid			1013	Boring	15.8	15.2	76.2	Domestic		Water Supply
10152585	2806309	6/15/1985	593017	4814720	188.2	from gps			1187	Cable Tool	19.8	18.3	15.2	Commerical		Water Supply
10153457	2807195	8/17/1988	593616	4813230	180.2	Lot centroid			495	Cable Tool	24.7	18.9	15.2	Domestic		Water Supply
10154061	2807804	7/23/1990	593616	4813230	180.2	Lot centroid			495	Cable Tool	18.3	15.8	15.2	Domestic		Water Supply
10155251	2808994	6/9/1999	593616	4813230	180.2	Lot centroid			495	Air Percussion	18.3			Not Used		Abandoned-Supply
10155252	2808995	6/9/1999	594440	4813922	184.8	on Water Well Record	REGIONAL RD 25	MILTON	803	Rotary (Convent.)	24.4			Not Used		Abandoned-Supply
11766527	7044093	4/30/2007	594400	4813764	187.4	on Water Well Record	REGIONAL RD 25	MILTON	740	Other Method						Abandoned-Other
11766528	7044094	4/30/2007	594051	4814032	190.3	on Water Well Record	5400 REGIONAL RD. #25	BOYNE	497	Boring				Not Used		Abandoned-Other
1002736086	7117475	12/3/2008	594051	4814032	187.7	on Water Well Record	5400 REGIONAL RD. #25	BOYNE	497	Driving				Not Used		Other Status
1002736090	7117475	12/3/2008	594051	4814032	190.7	on Water Well Record	5400 REGIONAL RD. #25	BOYNE	497	Driving				Not Used		Other Status
1002736094	7117475	12/3/2008	594051	4814032	188.4	on Water Well Record	5400 REGIONAL RD. #25	BOYNE	497	Driving				Not Used		Other Status
1001945176	7117475	12/3/2008	593276	4814759	187.5	on Water Well Record	7151 BRITTANIA RD.	Milton	1105	Driving	13.7			Not Used		Other Status
1002950857	7141643	1/7/2010	593274	4814722	187.5	on Water Well Record	7151 BRITTANIA RD.	Milton	1071	Digging			76.2	Not Used		Abandoned-Other
1002950859	7141644	1/7/2010	594283	4813461	179.9	from gis	5338 1ST LINE	Milton	675	Digging	1.5			Not Used		Abandoned-Other
1003636972	7175426	1/5/2012	593129	4814802	188.1	from gis	1ST LINE + BRITTANIA RD	Milton	1203	Boring			76.2	Domestic		Abandoned-Other
1003718850	7180170	4/9/2012	592780	4813677	183.0	on Water Well Record	NIA APRX.500M E. TREMAINE RD. & APRX.30M N. BRIT	Milton	883	Diamond			61.0	Domestic		Abandoned-Other
1005763976	7250897	9/28/2015	592780	4813677	183.0	on Water Well Record	NIA APX.430M E. TREMAINE RD. & APX.20M N. BRIT	Milton	883							Abandoned-Other
1005763979	7250898	9/28/2015	592763	4813651	183.1	on Water Well Record	INIA APX.430M E. TREMAINE RD. & APX. 20M N. BRIT.	Milton	901							Abandoned-Other
1005763982	7250899	9/28/2015	593214	4814553	188.2	on Water Well Record	1501 BRONTE ST. S	MILTON	943							Abandoned-Other
1005850883	7255182	11/26/2015	593214	4814554	188.2	on Water Well Record	1510 BRONTE S. S	MILTON	944							Abandoned-Other
1005849215	7255120	11/26/2015	593157	4814506	188.1	on Water Well Record	1510 BRONTE ST. S.	Milton	931							Abandoned-Other
1005981661	7262912	3/22/2016	593266	4813674	183.4	on Water Well Record	Britannia Road W	Milton	399				91.4	Domestic		Abandoned-Other
1007396844	7329555	1/11/2019	593124	4814128	184.1	on Water Well Record			673	Boring	12.2		5.1	Monitoring		Monitoring and Test Hole
1007640916	7341771	8/14/2019	594211	4813472	181.0	on Water Well Record	5440 FIRST LINE	Milton	604							
1007843594	7350551	12/10/2019	593010	4813886	185.4	on Water Well Record	BRITANNIA ROAD WEST	Milton	671				76.2	Domestic		Abandoned-Other
1008045709	7352583	11/19/2019	593010	4813886	185.4	on Water Well Record	BRITANNIA ROAD WEST	Milton	671							Abandoned-Other
1008045712	7352584	11/19/2019	593371	4813470	182.2	on Water Well Record	Britannia Rd W and Tremaine	Milton	385			1.0				Abandoned-Other
1008190776	7354717	12/4/2019	593196	4814211	183.9	on Water Well Record	Britannia Road West	Milton	674	Boring	19.8		5.1	Monitoring		Observation Wells
1008469782	7368401	6/29/2020	592806	4813793	183.6	on Water Well Record	- Britannia Road & Tremaine Road	Milton	858			0.5				Abandoned-Other
1008613744	7385411	3/31/2021	593855	4813039	180.4	on Water Well Record	5202 First Line	Milton	711				5.0			Abandoned-Other
1009158360	7425043	4/7/2022	594571	4813395	189.0	on Water Well Record	5400 Regional Rd 25	Milton	967							
1009169930	7427029	6/27/2022	594571	4813395	189.0	on Water Well Record	5400 Regional Rd 25	Milton	967	Other Method	15.5	14.6	15.2	Test Hole		Test Hole

	COUNT
Monitoring Well / Test Hole	5
Dewatering Well	0
Water Supply Well	10
Abandoned Well	24
Unclassified / Unfinished Well	2
TOTAL	41

Appendix B – Borehole Logs

Elapsed Time	Water Level (m)	Hole Open to (m)
Upon Completion	Dry	Open

Elapsed Time	Water Level (m)	Hole Open to (m)
Upon Completion	Dry	Open
July 5, 2024	0.62	
July 12, 2024	0.71	

Log of Borehole 2 - 4

Project No. BRM-23015226-A0

Drawing No. 5

Project: Geotechnical and Hydrogeological Investigation

Sheet No. 1 of 1

Location: Britannia rd and First line, Milton (Phase 2)

See Borehole Location Plan

Date Drilled: June 11, 2024

Auger Sample



SPT (N) Value



Dynamic Cone Test



Shelby Tube



Field Vane Test



Combustible Vapour Reading



Natural Moisture



Plastic and Liquid Limit



Undrained Triaxial at



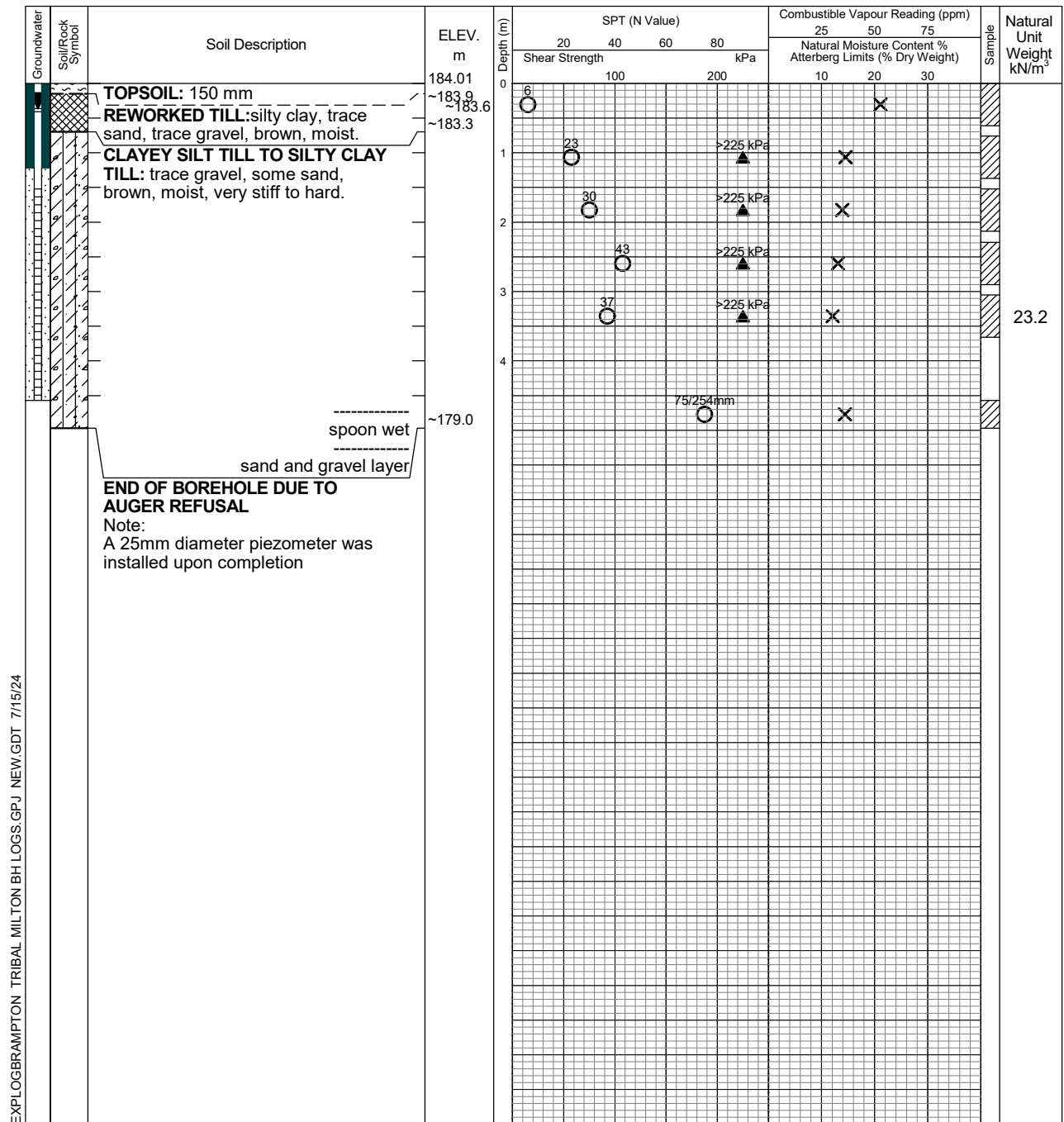
% Strain at Failure



Penetrometer



Datum: Geodetic



EXPLOGBRAMPTON TRIBAL MILTON BH LOGS.GPJ NEW.GDT 7/15/24



New identity of Trow Associates Inc.

Elapsed Time	Water Level (m)	Hole Open to (m)
Upon Completion	2.74	Open
July 5, 2024	0.39	
July 12, 2024	0.41	

Elapsed Time	Water Level (m)	Hole Open to (m)
Upon Completion	Dry	Open
July 5, 2024	0.96	
July 12, 2024	1.05	

Elapsed Time	Water Level (m)	Hole Open to (m)
Upon Completion	Dry	Open
July 5, 2024	1.2	
July 12, 2024	2.02	

Log of Borehole 2 - 7

Project No. BRM-23015226-A0

Drawing No. 8

Project: Geotechnical and Hydrogeological Investigation

Sheet No. 1 of 1

Location: Britannia rd and First line, Milton (Phase 2)

See Borehole Location Plan

Date Drilled: June 12, 2024

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at

% Strain at Failure

Penetrometer

☐

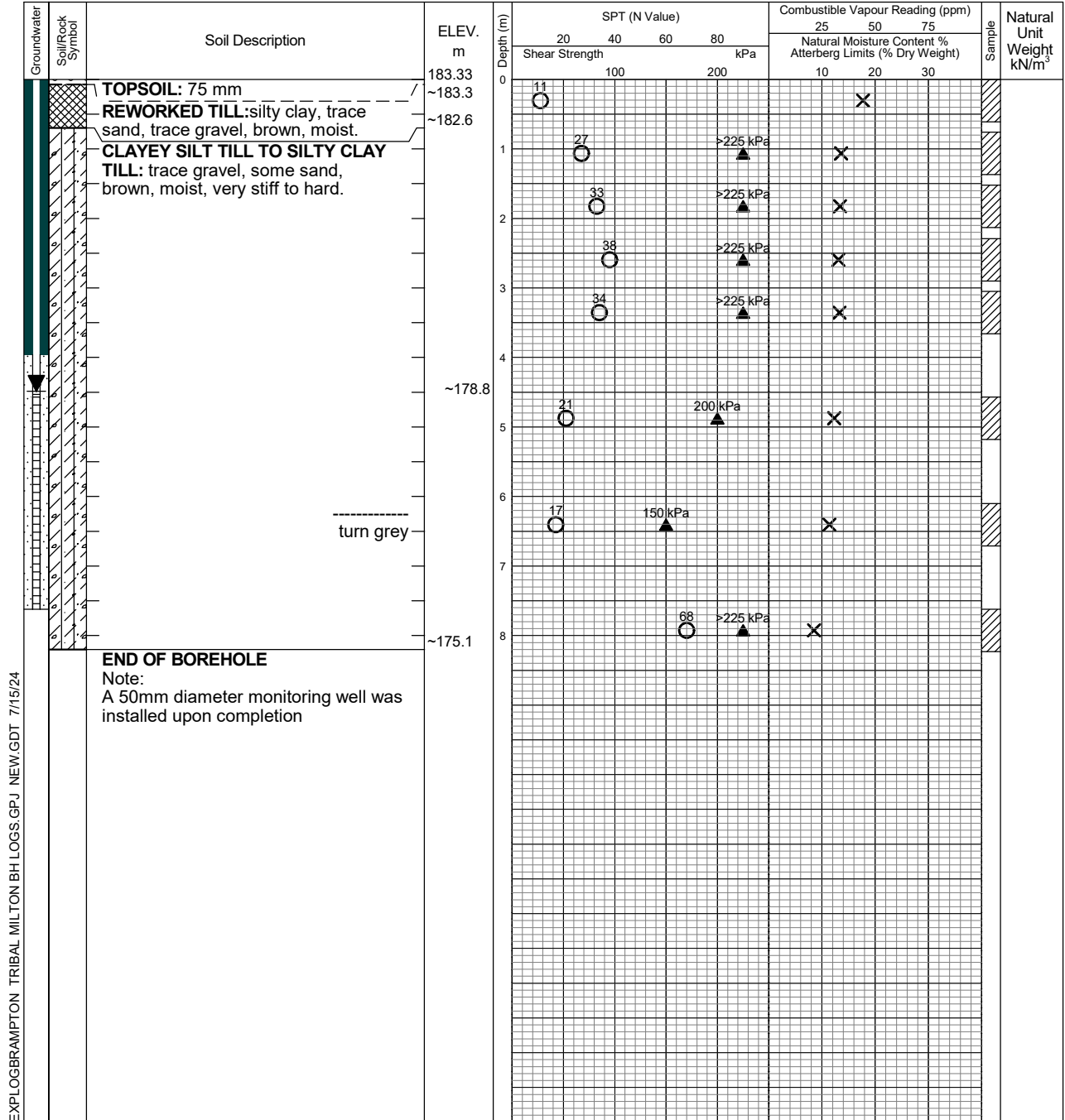
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Datum: Geodetic



New identity of Trow Associates Inc.

Elapsed Time	Water Level (m)	Hole Open to (m)
Upon Completion	Dry	Open
July 5, 2024	1.8	
July 12, 2024	4.53	

Elapsed Time	Water Level (m)	Hole Open to (m)
Upon Completion	Dry	Open
July 5, 2024	0.99	
July 12, 2024	1.72	

Log of Borehole 2 -10

Project No. BRM-23015226-A0

Drawing No. 11

Project: Geotechnical and Hydrogeological Investigation

Sheet No. 1 of 1

Location: Britannia rd and First line, Milton (Phase 2)

See Borehole Location Plan

Date Drilled: June 13, 2024

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at

% Strain at Failure

Penetrometer

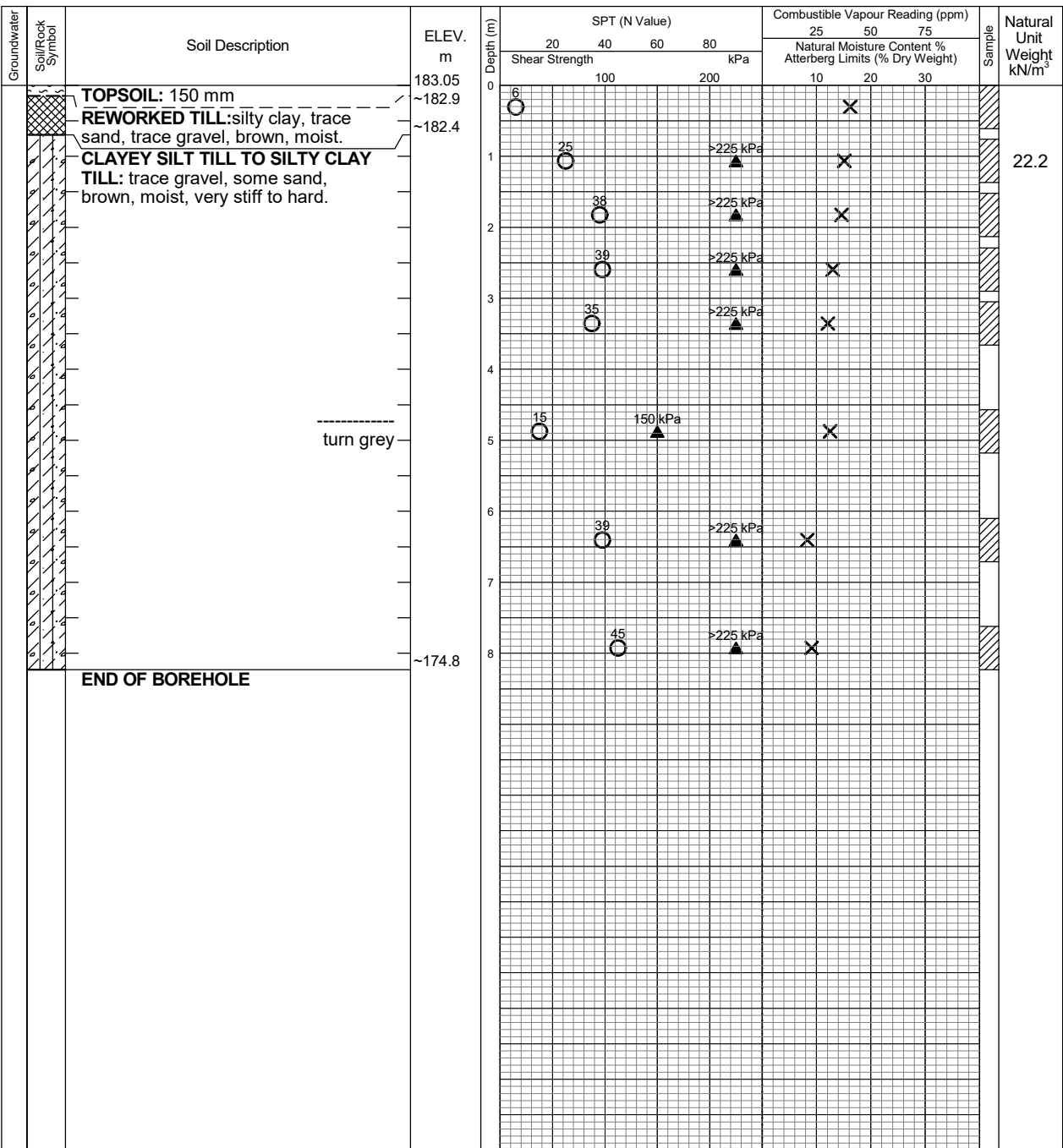
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EXPLOGBRAMPTON TRIBAL MILTON BH LOGS.GPJ NEW.GDT 7/15/24



New identity of Trow Associates Inc.

Elapsed Time	Water Level (m)	Hole Open to (m)
Upon Completion	Dry	Open

Log of Borehole 2 -11

Project No. BRM-23015226-A0

Drawing No. 12

Project: Geotechnical and Hydrogeological Investigation

Sheet No. 1 of 1

Location: Britannia rd and First line, Milton (Phase 2)

See Borehole Location Plan

Date Drilled: June 14, 2024

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at

% Strain at Failure

Penetrometer

☐

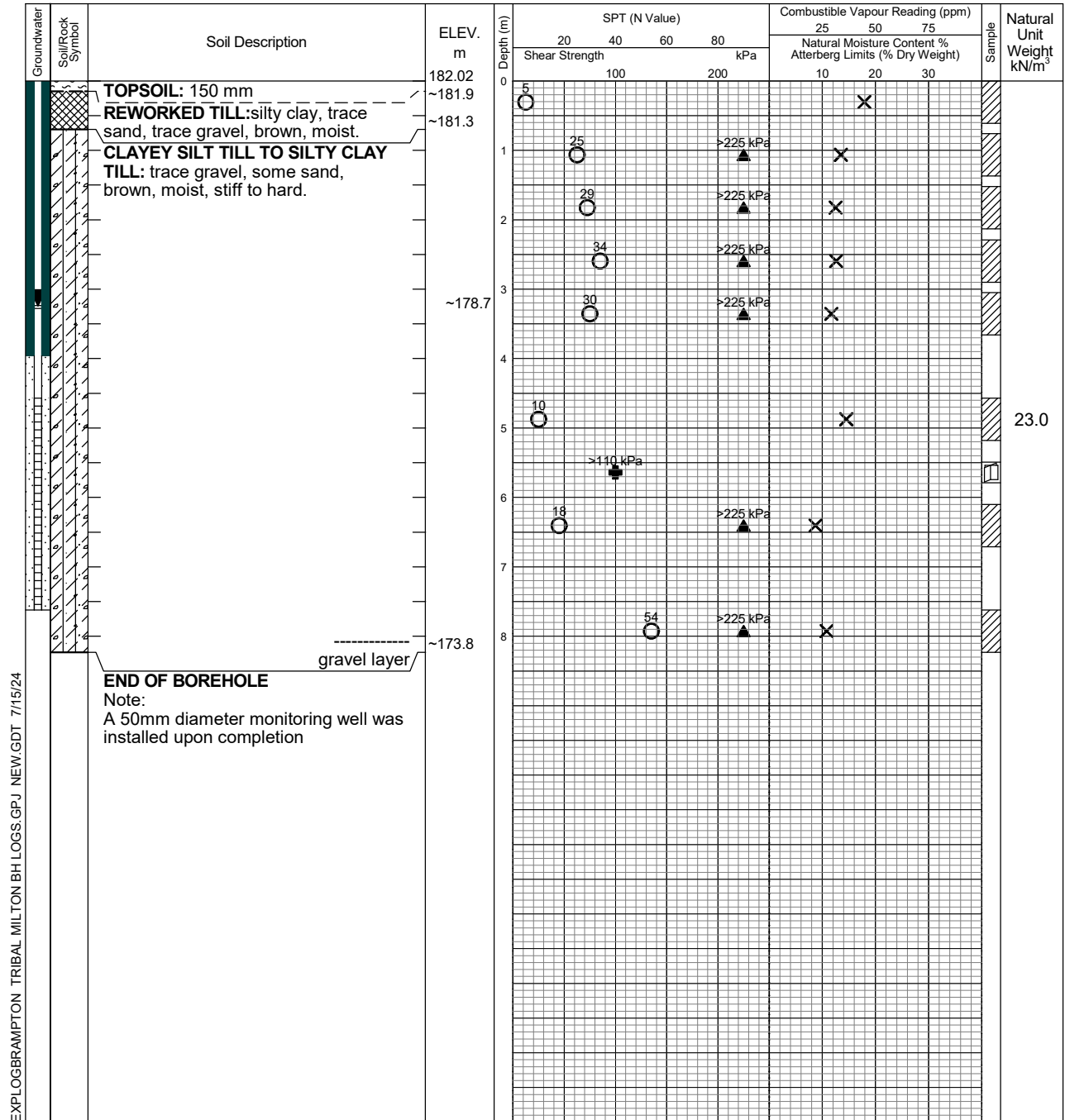
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Datum: Geodetic



EXPLOGBRAMPTON TRIBAL MILTON BH LOGS.GPJ NEW.GDT 7/15/24



New identity of Trow Associates Inc.

Elapsed Time	Water Level (m)	Hole Open to (m)
Upon Completion	Dry	Open
July 5, 2024	1.51	
July 12, 2024	3.28	

Elapsed Time	Water Level (m)	Hole Open to (m)
Upon Completion	Dry	Open

Elapsed Time	Water Level (m)	Hole Open to (m)
Upon Completion	Dry	Open
July 5, 2024	0.67	
July 12, 2024	0.63	

Elapsed Time	Water Level (m)	Hole Open to (m)
Upon Completion	Dry	Open
July 5, 2024	0.88	
July 12, 2024	0.86	

Elapsed Time	Water Level (m)	Hole Open to (m)
Upon Completion	Dry	Open
July 5, 2024	0.97	
July 12, 2024	1.11	

Elapsed Time	Water Level (m)	Hole Open to (m)
Upon Completion	Dry	Open
July 5, 2024	0.91	
July 12, 2024	1.61	

Log of Borehole 2 -17

Project No. BRM-23015226-A0

Drawing No. 18

Project: Geotechnical and Hydrogeological Investigation

Sheet No. 1 of 1

Location: Britannia rd and First line, Milton (Phase 2)

See Borehole Location Plan

Date Drilled: June 14, 2024

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at

% Strain at Failure

Penetrometer

☐

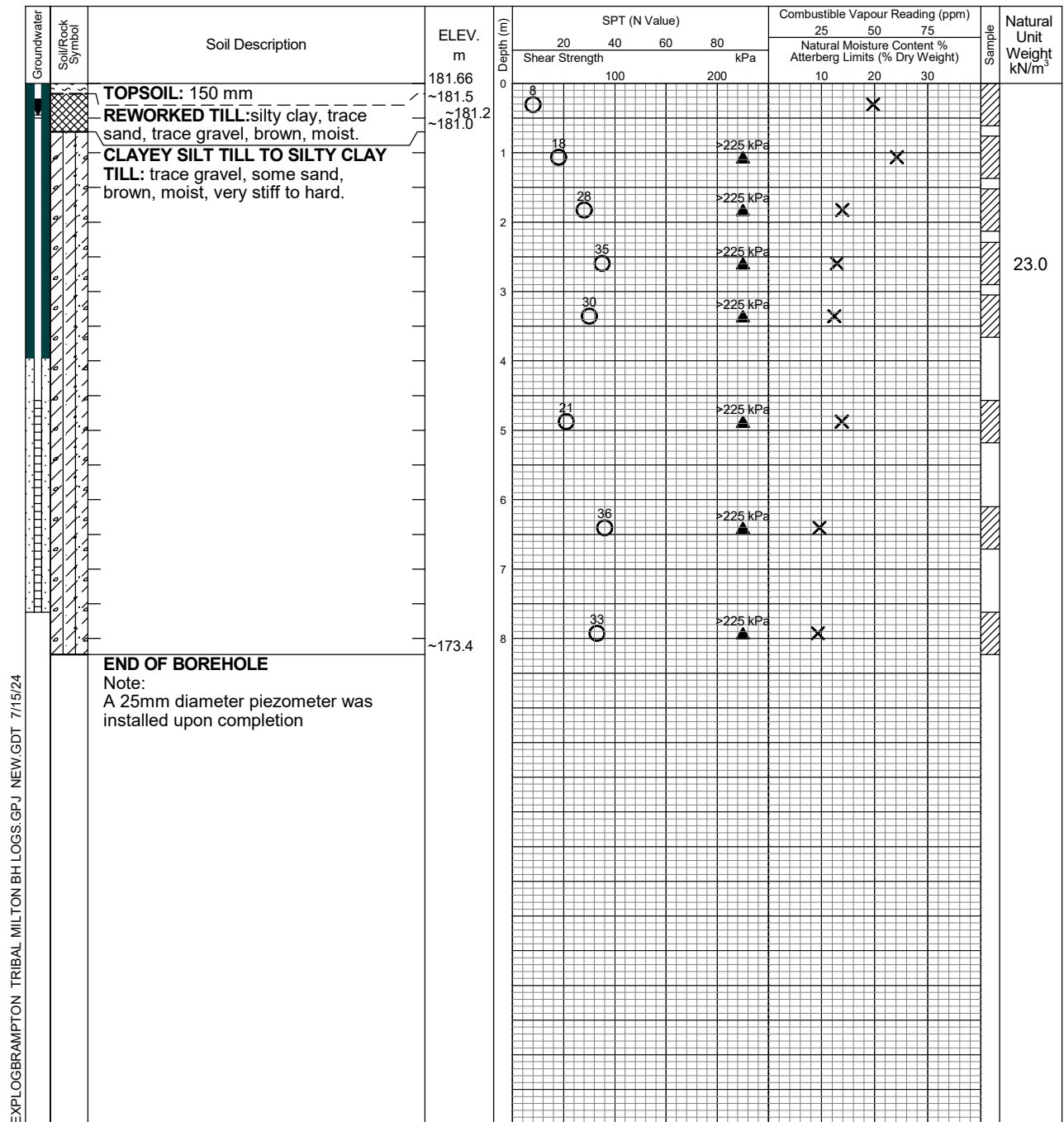
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Datum: Geodetic



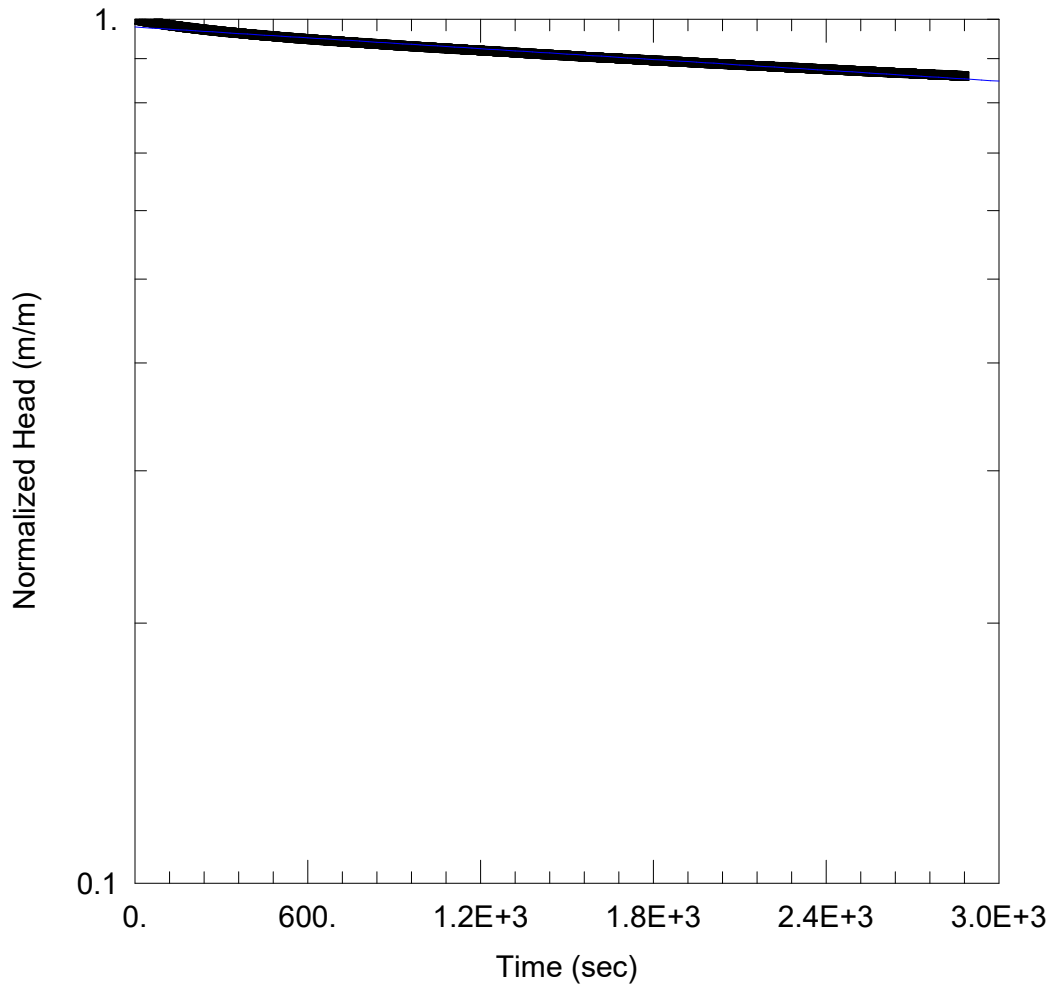
EXPLOGBRAMPTON TRIBAL MILTON BH LOGS.GPJ NEW.GDT 7/15/24



New identity of Trow Associates Inc.

Elapsed Time	Water Level (m)	Hole Open to (m)
Upon Completion	Dry	Open
July 5, 2024	0.49	
July 12, 2024	0.5	

Appendix C – SWRT Procedures and Results



BH 2-5 RISING HEAD

Data Set: \...\BH 2-5 RH.aqt

Date: 07/22/24

Time: 18:13:55

PROJECT INFORMATION

Company: EXP Services Inc.

Client: Tribal Development

Project: BRM-23015226-A0

Location: Tribal Milton Phase 2

Test Well: BH 2-5 Rising Head

Test Date: July 12, 2024

AQUIFER DATA

Saturated Thickness: 1.58 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (BH 2-5 Rising Head)

Initial Displacement: 3.358 m

Static Water Column Height: 1.58 m

Total Well Penetration Depth: 3. m

Screen Length: 3. m

Casing Radius: 0.0254 m

Well Radius: 0.0762 m

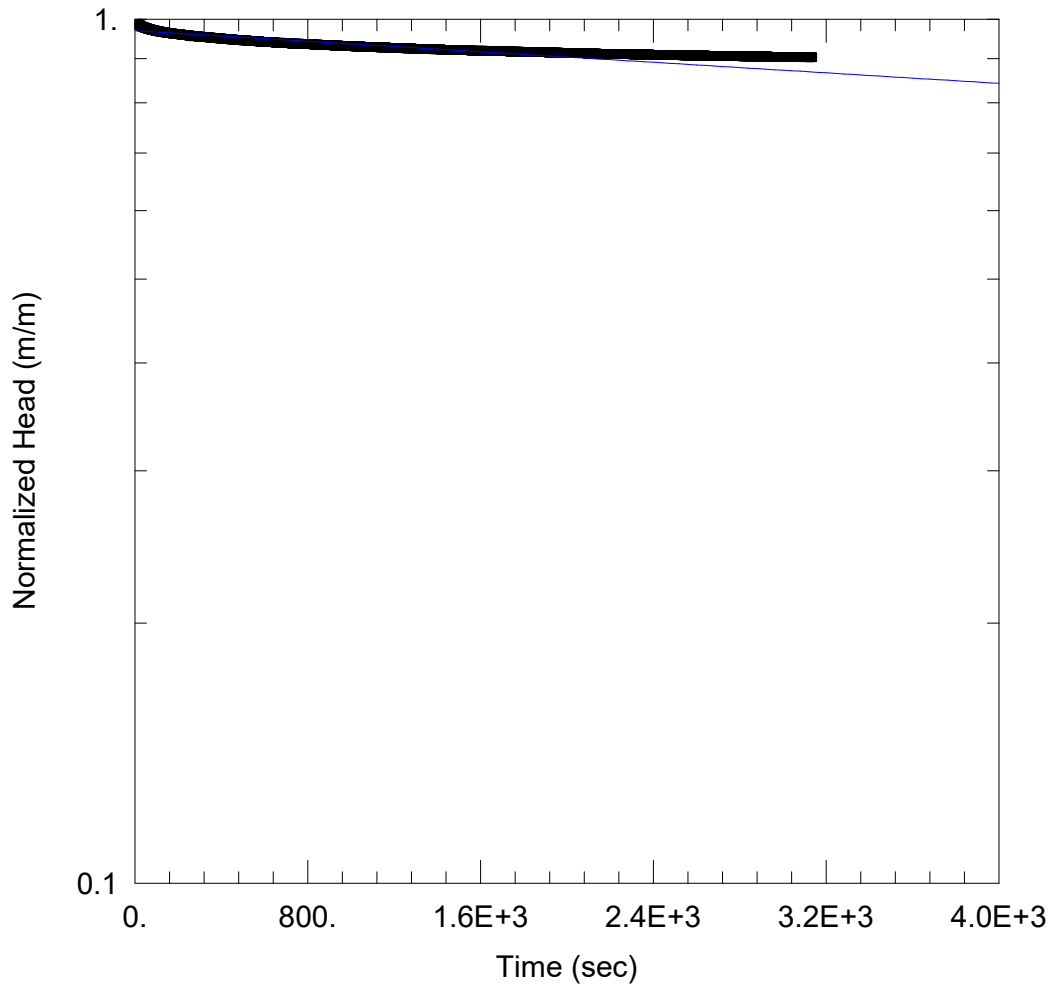
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

$K = 5.195E-8$ m/sec

$y_0 = 3.288$ m



BH 2-6 RISING HEAD

Data Set: \...\BH 2-6 RH.aqt

Date: 07/22/24

Time: 18:16:05

PROJECT INFORMATION

Company: EXP Services Inc.

Client: Tribal Development

Project: BRM-23015226-A0

Location: Tribal Milton Phase 2

Test Well: BH 2-6 Rising Head

Test Date: July 12, 2024

AQUIFER DATA

Saturated Thickness: 5.61 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (BH 2-6 Rising Head)

Initial Displacement: 2.993 m

Static Water Column Height: 5.61 m

Total Well Penetration Depth: 5.61 m

Screen Length: 3. m

Casing Radius: 0.0254 m

Well Radius: 0.0762 m

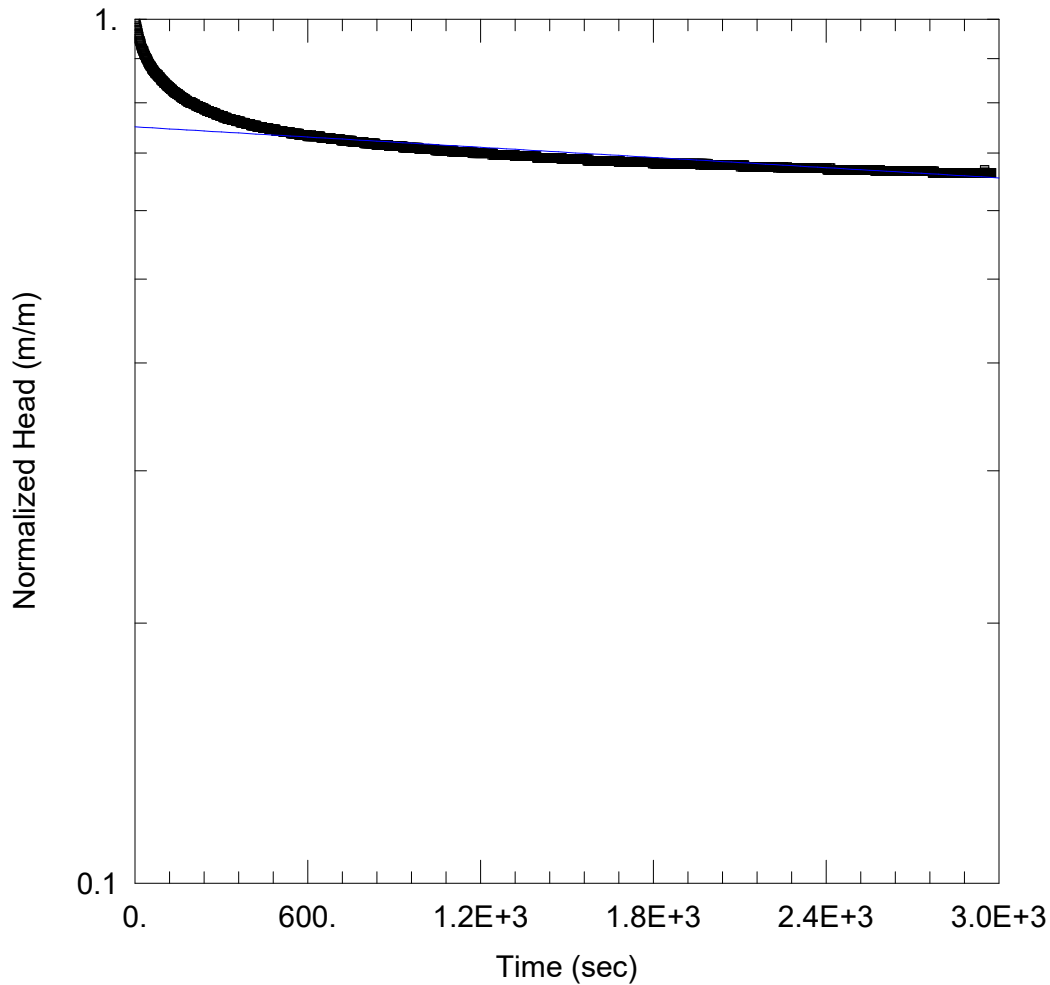
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

$K = 1.387E-8$ m/sec

$y_0 = 2.902$ m



BH 2-7 RISING HEAD

Data Set: \\...\BH 2-7 RH.aqt

Date: 07/22/24

Time: 18:25:25

PROJECT INFORMATION

Company: EXP Services Inc.

Client: Tribal Development

Project: BRM-23015226-A0

Location: Tribal Milton Phase 2

Test Well: BH 2-7 Rising Head

Test Date: July 12, 2024

AQUIFER DATA

Saturated Thickness: 2.92 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (BH 2-7 Rising Head)

Initial Displacement: 1.107 m

Static Water Column Height: 2.92 m

Total Well Penetration Depth: 3. m

Screen Length: 3. m

Casing Radius: 0.0254 m

Well Radius: 0.0762 m

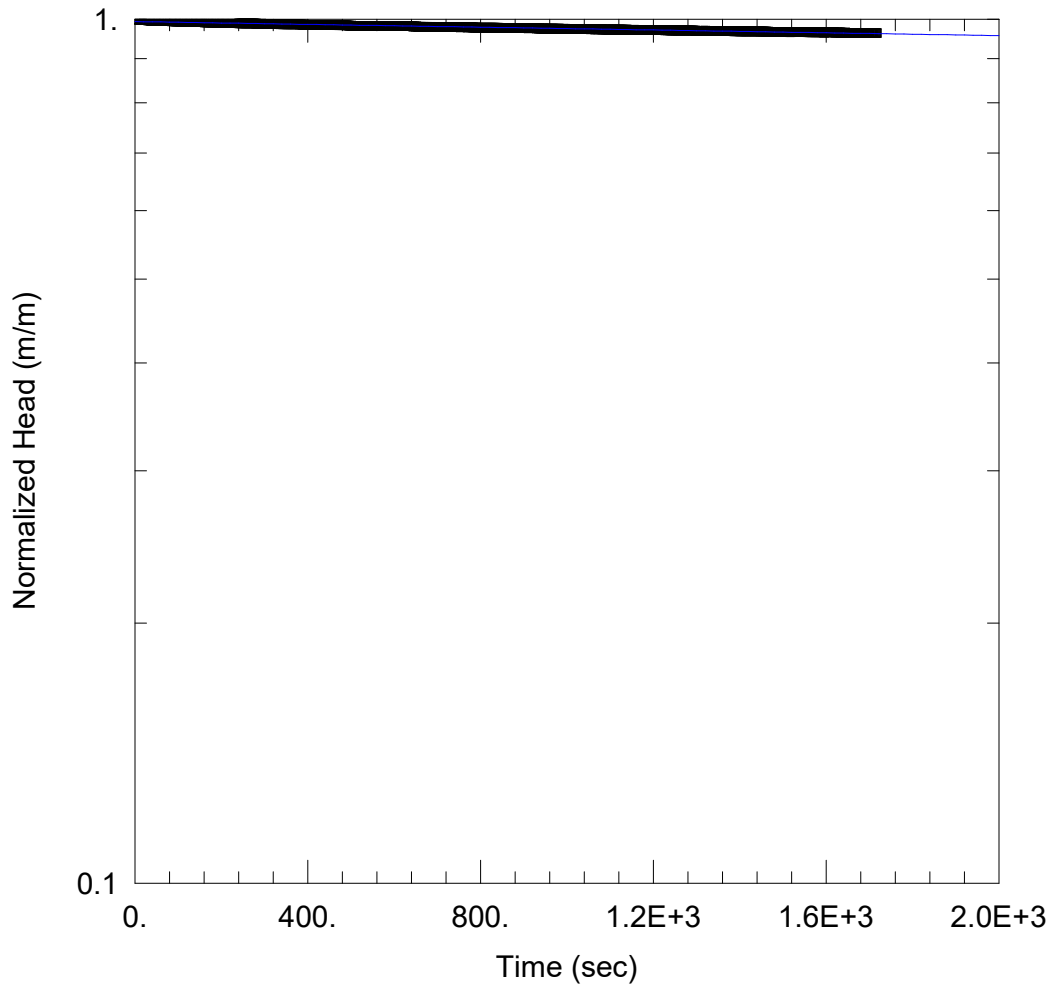
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

$K = 2.653E-8$ m/sec

$y_0 = 0.8307$ m



BH 2-8 RISING HEAD

Data Set: \\...\BH 2-8 RH.aqt

Date: 07/22/24

Time: 18:19:39

PROJECT INFORMATION

Company: EXP Services Inc.

Client: Tribal Development

Project: BRM-23015226-A0

Location: Tribal Milton Phase 2

Test Well: BH 2-8 Rising Head

Test Date: July 12, 2024

AQUIFER DATA

Saturated Thickness: 5.77 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH 2-8 Rising Head)

Initial Displacement: 2.065 m

Static Water Column Height: 5.77 m

Total Well Penetration Depth: 5.77 m

Screen Length: 3. m

Casing Radius: 0.0254 m

Well Radius: 0.0762 m

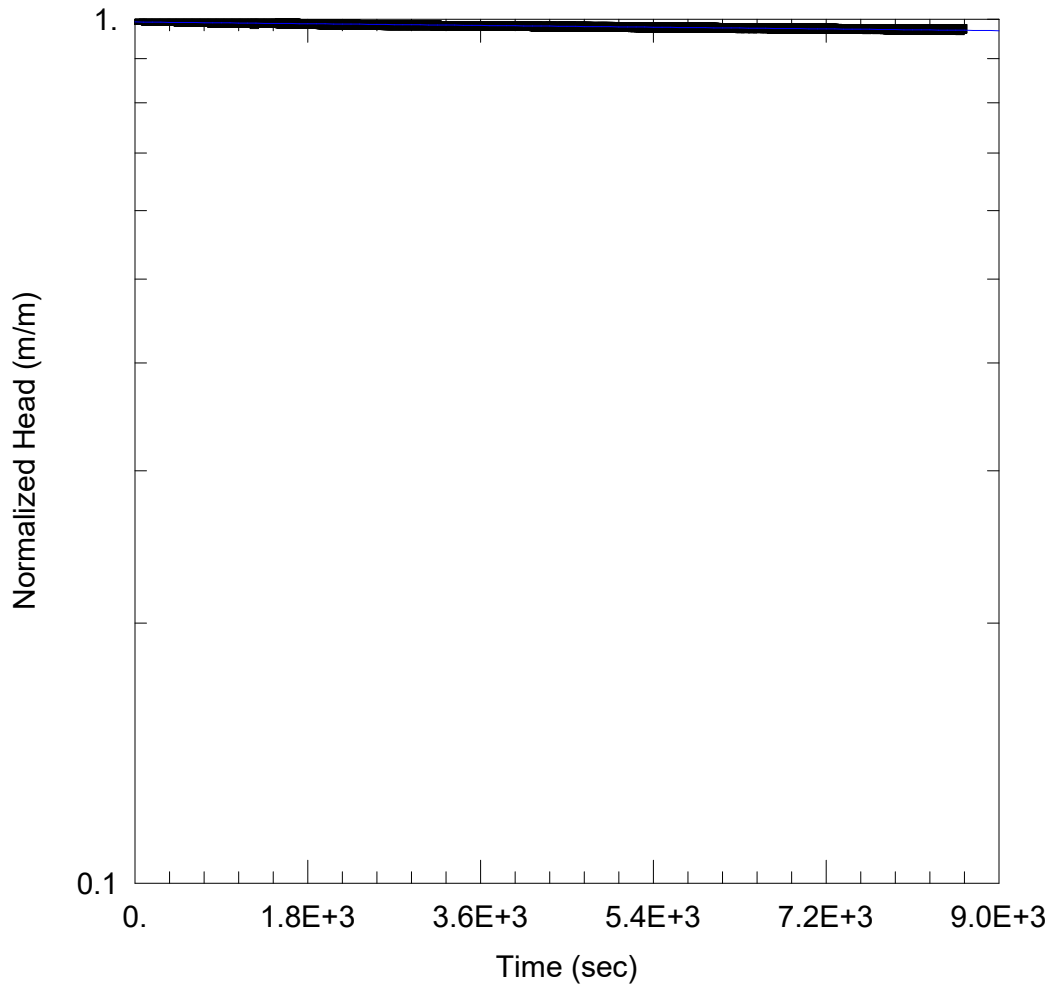
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

K = 8.78E-9 m/sec

y0 = 2.052 m



BH 2-11 RISING HEAD

Data Set: \\...\BH 2-11 RH.aqt
 Date: 07/22/24

Time: 18:20:27

PROJECT INFORMATION

Company: EXP Services Inc.
 Client: Tribal Development
 Project: BRM-23015226-A0
 Location: Tribal Milton Phase 2
 Test Well: BH 2-11 Rising Head
 Test Date: July 12, 2024

AQUIFER DATA

Saturated Thickness: 4.24 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH 2-11 Rising Head)

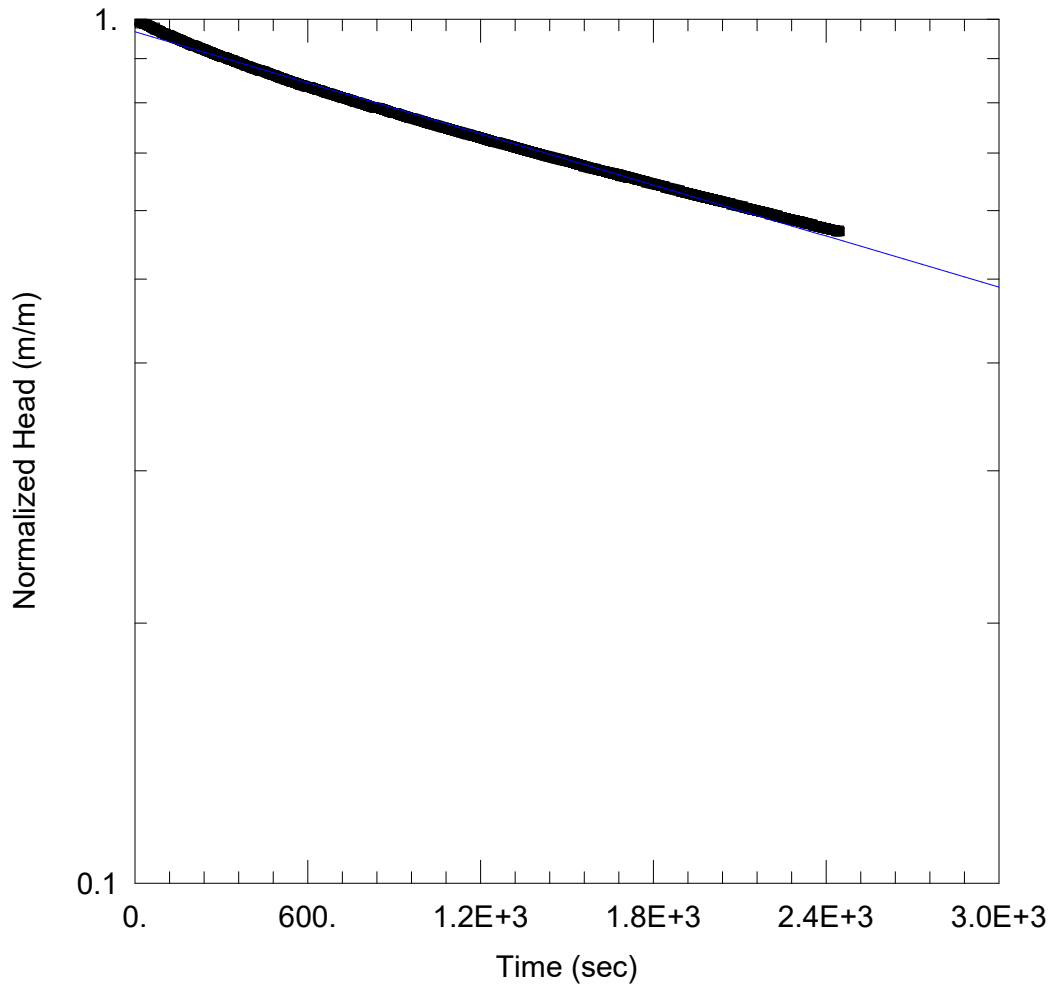
Initial Displacement: 2.55 m
 Total Well Penetration Depth: 4.24 m
 Casing Radius: 0.0254 m

Static Water Column Height: 4.24 m
 Screen Length: 3. m
 Well Radius: 0.0762 m

SOLUTION

Aquifer Model: Unconfined
 K = 1.207E-9 m/sec

Solution Method: Hvorslev
 y0 = 2.531 m



BH 2-13 RISING HEAD

Data Set: \...\BH 2-13 RH.aqt

Date: 07/22/24

Time: 18:21:21

PROJECT INFORMATION

Company: EXP Services Inc.

Client: Tribal Development

Project: BRM-23015226-A0

Location: Tribal Milton Phase 2

Test Well: BH 2-13 Rising Head

Test Date: July 12, 2024

AQUIFER DATA

Saturated Thickness: 6.92 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH 2-13 Rising Head)

Initial Displacement: 1.701 m

Static Water Column Height: 6.92 m

Total Well Penetration Depth: 6.92 m

Screen Length: 3. m

Casing Radius: 0.0254 m

Well Radius: 0.0762 m

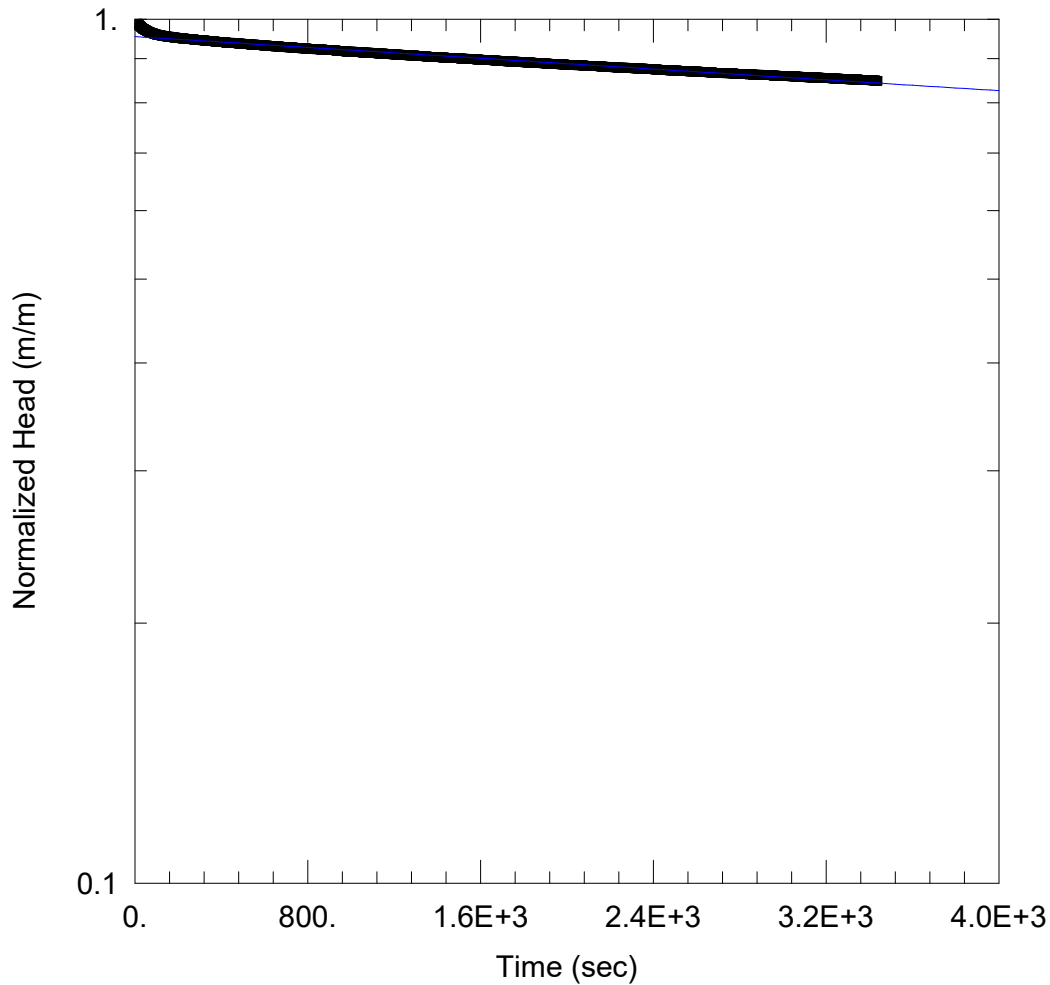
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

K = 1.065E-7 m/sec

y0 = 1.645 m



BH 2-14 RISING HEAD

Data Set: \...\BH 2-14 RH.aqt

Date: 07/22/24

Time: 18:22:01

PROJECT INFORMATION

Company: EXP Services Inc.

Client: Tribal Development

Project: BRM-23015226-A0

Location: Tribal Milton Phase 2

Test Well: BH 2-14 Rising Head

Test Date: July 12, 2024

AQUIFER DATA

Saturated Thickness: 6.78 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH 2-14 Rising Head)

Initial Displacement: 2.084 m

Static Water Column Height: 6.78 m

Total Well Penetration Depth: 6.78 m

Screen Length: 3. m

Casing Radius: 0.0254 m

Well Radius: 0.0762 m

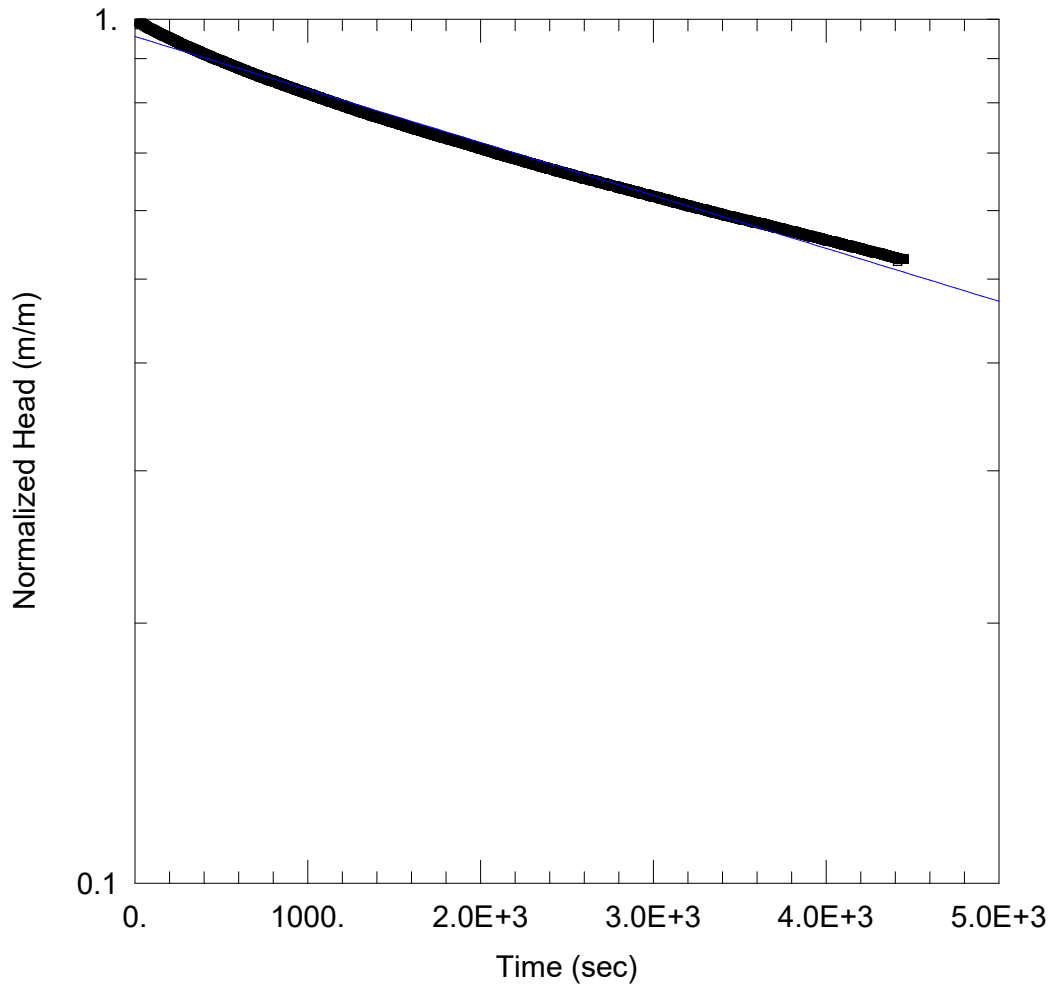
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

K = 1.423E-8 m/sec

y0 = 1.989 m



BH 2-15 RISING HEAD

Data Set: \...\BH 2-15 RH.aqt

Date: 07/22/24

Time: 18:22:45

PROJECT INFORMATION

Company: EXP Services Inc.

Client: Tribal Development

Project: BRM-23015226-A0

Location: Tribal Milton Phase 2

Test Well: BH 2-15 Rising Head

Test Date: July 12, 2024

AQUIFER DATA

Saturated Thickness: 6.41 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (BH 2-15 Rising Head)

Initial Displacement: 2.436 m

Static Water Column Height: 6.41 m

Total Well Penetration Depth: 6.41 m

Screen Length: 3. m

Casing Radius: 0.0254 m

Well Radius: 0.0762 m

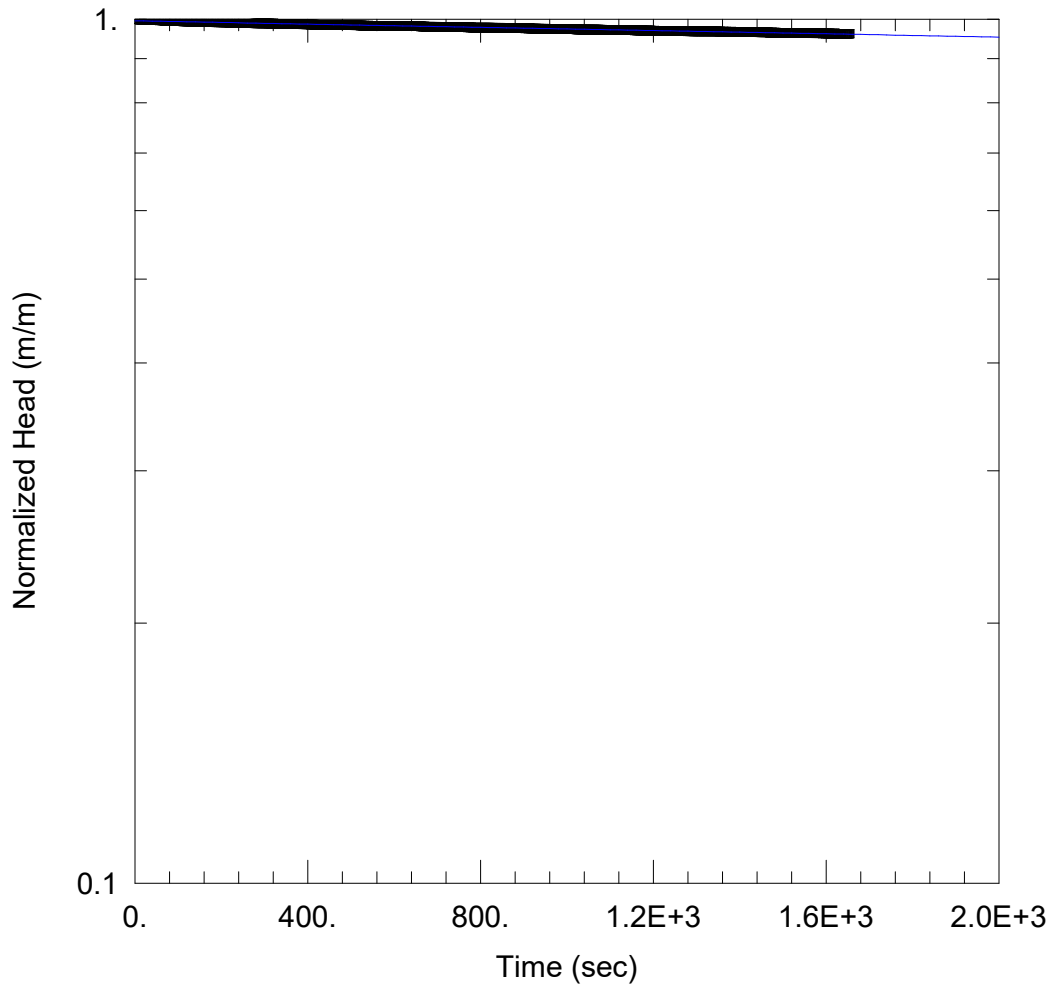
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

$K = 6.628E-8$ m/sec

$y_0 = 2.326$ m



BH 2-16 RISING HEAD

Data Set: \...\BH 2-16 RH.aqt

Date: 07/22/24

Time: 18:23:22

PROJECT INFORMATION

Company: EXP Services Inc.

Client: Tribal Development

Project: BRM-23015226-A0

Location: Tribal Milton Phase 2

Test Well: BH 2-16 Rising Head

Test Date: July 12, 2024

AQUIFER DATA

Saturated Thickness: 5.71 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH 2-16 Rising Head)

Initial Displacement: 1.806 m

Static Water Column Height: 5.71 m

Total Well Penetration Depth: 5.71 m

Screen Length: 3. m

Casing Radius: 0.0254 m

Well Radius: 0.0762 m

SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

K = 1.014E-8 m/sec

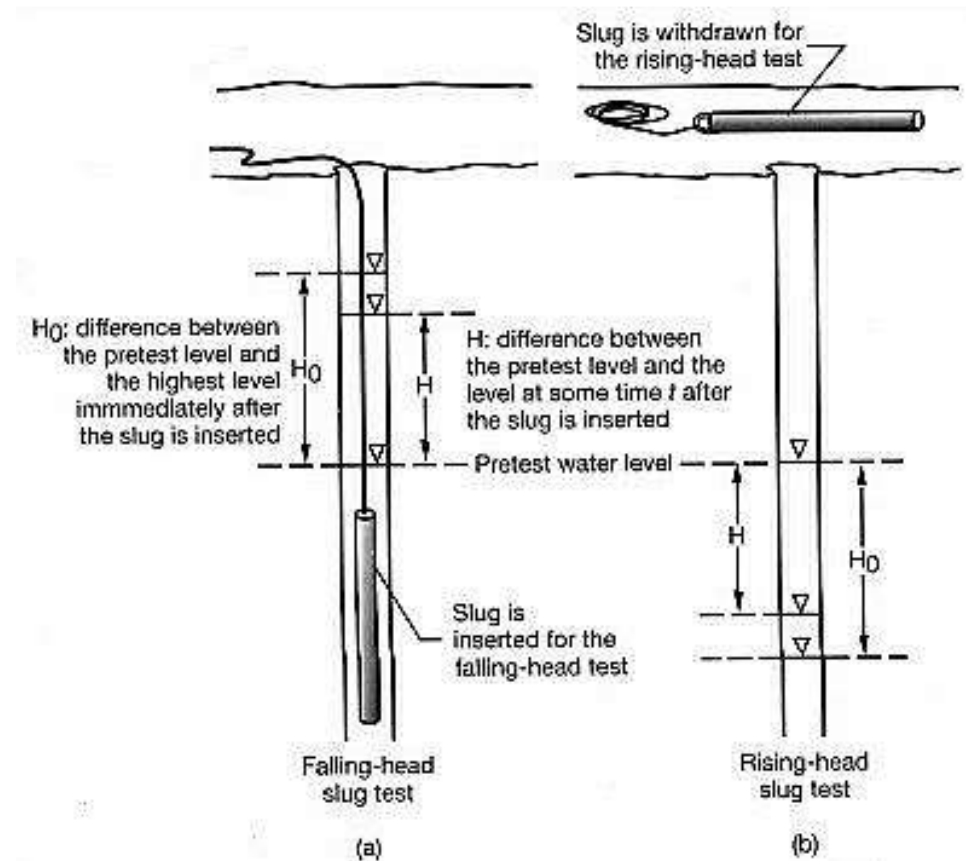
y0 = 1.798 m

Single Well Response Test Procedure

A Single Well Response Test (SWRT), also known as a bail test or a slug test, is conducted in order to determine the saturated hydraulic conductivity (K) of an aquifer. The method of the SWRT is to characterize the change of groundwater level in a well or borehole over time.

In order to ensure consistency and repeatability, all **exp** employees are to follow the procedure outlined in this document when conducting SWRTs.

The figure below depicts a schematic of a slug and bail test and the respective water level changes.





Slug Test Procedure

Equipment Required

- Copy of a signed health and safety plan
- Copy of the work program
- PPE as required by Site-Specific HASP
- Copy of the monitoring well location plan/site plan
- Waterproof pen and bound field note book
- SWRT field data Entry form
- Disposable gloves
- Duct tape
- Deionized water
- Alconox (phosphate free detergent)
- Spray bottles
- Electronic water level meter and spare batteries
- Solid PVC or stainless steel slug of known volume or clean water
- String (nylon)
- Water pressure transducer (data logger) and baro-logger
- Watch or stop watch with second hand
- Plastic sheeting

Testing Procedure

1. Remove cap from well and collect static water level
2. Remove waterra tubing/bailer and place in garbage bag. Record static water level measurement again.
3. Lower the slug into the well and record the dynamic water level.
4. Record the drawdown (for the slug test) at set five (5) second intervals for the first five (5) minutes, then reduce to every one (1) minute.
5. Continue recording the drawdown until 95% recovery is reached. To calculate this value: Find the difference between the dynamic water level and the static water level, then multiply by 95% (.95). Add the resulting value to the dynamic water level.
$$(\text{Static Water Level} - \text{Dynamic Water Level}) \times .95 + \text{Static Water Level} = 95\% \text{ Recovery Value}$$
6. Once complete, replace the waterra tubing/bailer and re-secure the well cap.

Note: If the well is deep, more than one slug may be inserted by attaching the slugs to a series.

Slugs must be washed with methanol, then lab grade soap, and then rinsed with de-ionized water after each use.



Based on the recorded observations, the hydraulic conductivity (in m/s) of the aquifer will be determined. In order to determine the hydraulic conductivity; the well diameter, radius of the borehole and length of the screen will also be required.

Bail Test Procedure

Equipment Required

- 20 L (5 gal) Graduated pail
- Stop watch or watch with seconds
- Garbage bags
- Water level meter
- Field sheets/log book
- Latex Gloves
- Bailer and Rope

Procedure

1. Remove cap from well and collect static water level.
2. If using a **bailer**:
 - a. Affix the rope to the bailer.
 - b. Remove the waterra tubing and place in garbage bag
 - c. Record static water level measurement again.
 - d. Record how much water was removed by either counting the number of full bailers or emptying removed water into a container.
 - e. Quickly lower the bailer into the well and remove.
 - f. Continue this process until the water level will reduce no further.
 - g. Record the dynamic water level.
3. If using **waterra** to bail the water:
 - a. Pump the water into graduated bucket until the water level will reduce no further.
 - b. Record how much water has been removed.
 - c. Record the dynamic water level.
4. Record the recovery at set five (5) second intervals for the first (5) minutes, then reduce to every one (1) minute.
5. Continue recording the drawdown/recovery until 95% recovery is reached.
6. Once complete, replace any waterra tubing that may have been removed from the well and re-secure the well cap.

Appendix D – Laboratory's Certificates of Analysis



Your P.O. #: ENV-BRM
Your Project #: BRM-23015226-A0
Site Location: BRITANNIA RD & FIRST LINE
Your C.O.C. #: 886982-09-01

Attention: Francois Chartier

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2024/07/19
Report #: R8241914
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4L3562

Received: 2024/07/12, 15:00

Sample Matrix: Water
Samples Received: 1

Analyses	Date		Date Analyzed	Laboratory Method	Analytical Method
	Quantity	Extracted			
Dissolved Aluminum (0.2 u, clay free)	1	N/A	2024/07/18	CAM SOP-00447	EPA 6020B m
Alkalinity	1	N/A	2024/07/16	CAM SOP-00448	SM 24 2320 B m
Chromium (VI) in Water	1	N/A	2024/07/17	CAM SOP-00436	EPA 7199 m
Free (WAD) Cyanide	1	N/A	2024/07/15	CAM SOP-00457	OMOE E3015 m
Dissolved Oxygen	1	2024/07/15	2024/07/15	CAM SOP-00427	SM 24 4500 O G m
Hardness (calculated as CaCO3)	1	N/A	2024/07/18	CAM SOP 00102/00408/00447	SM 2340 B
Mercury	1	2024/07/18	2024/07/18	CAM SOP-00453	EPA 7470A m
Lab Filtered Metals by ICPMS	1	2024/07/17	2024/07/18	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS	1	2024/07/18	2024/07/18	CAM SOP-00447	EPA 6020B m
Sulphide (as H2S) (1)	1	N/A	2024/07/17	AB WI-00065	Auto Calc
Total Sulphide (1)	1	N/A	2024/07/17	AB SOP-00080	SM 24 4500 S2-A D Fm
Total Ammonia-N	1	N/A	2024/07/18	CAM SOP-00441	USGS I-2522-90 m
pH (2)	1	2024/07/16	2024/07/16	CAM SOP-00413	SM 24th - 4500H+ B
Phenols (4AAP)	1	N/A	2024/07/16	CAM SOP-00444	OMOE E3179 m
Field Measured pH (3)	1	N/A	2024/07/18		Field pH Meter
Field Temperature (3)	1	N/A	2024/07/18		Field Thermometer
Total Phosphorus (Colourimetric)	1	2024/07/18	2024/07/18	CAM SOP-00407	SM 24 4500-P I
Turbidity	1	N/A	2024/07/15	CAM SOP-00417	SM 24 2130 B
Un-ionized Ammonia (4)	1	2024/07/13	2024/07/19	Auto Calc.	PWQO

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or



Your P.O. #: ENV-BRM
Your Project #: BRM-23015226-A0
Site Location: BRITANNIA RD & FIRST LINE
Your C.O.C. #: 886982-09-01

Attention: Francois Chartier

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2024/07/19
Report #: R8241914
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4L3562

Received: 2024/07/12, 15:00

implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Bureau Veritas Calgary (19th), 4000 19th Street NE, Calgary, AB, T2E 6P8

(2) "The CCME method and Analytical Protocol (O. Reg 153/04, O. Reg. 406/19) requires pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME and Analytical Protocol (O. Reg 153/04, O. Reg. 406/19) holding time. Bureau Veritas endeavors to analyze samples as soon as possible after receipt."

(3) This is a field test, therefore, the results relate to items that were not analysed at Bureau Veritas.

(4) Un-ionized ammonia is calculated using the total ammonia result and field data provided by the client for pH and temperature.

Encryption Key



**AUTHORIZED REPORT
RAPPORT AUTORISÉ**

Bureau Veritas

19 Jul 2024 16:27:48

Please direct all questions regarding this Certificate of Analysis to:

Patricia Legette, Project Manager

Email: Patricia.Legette@bureauveritas.com

Phone# (905)817-5799

=====

This report has been generated and distributed using a secure automated process.

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.



PWQO METALS AND INORGANICS (WATER)

Bureau Veritas ID			ZSD787			ZSD787		
Sampling Date			2024/07/12 10:50			2024/07/12 10:50		
COC Number			886982-09-01			886982-09-01		
	UNITS	Criteria	BH2-11	RDL	QC Batch	BH2-11 Lab-Dup	RDL	QC Batch
Calculated Parameters								
Hardness (CaCO3)	mg/L	-	1000	1.0	9513059			
Sulphide (as H2S)	mg/L	0.002	0.0089	0.0020	9523366			
Total Un-ionized Ammonia	mg/L	0.02	0.0035	0.0009	9513053			
Field Measurements								
Field Temperature	Celsius	-	17.8	N/A	ONSITE			
Field Measured pH	pH	6.5:8.5	7.65		ONSITE			
Inorganics								
Total Ammonia-N	mg/L	-	0.19	0.050	9519962			
Dissolved Oxygen	mg/L	-	7.99	0.050	9515310	8.00	0.050	9515310
pH	pH	6.5:8.5	7.79		9516647			
Phenols-4AAP	mg/L	0.001	ND	0.0010	9516880			
Total Phosphorus	mg/L	0.01	0.025	0.004	9520818			
Total Sulphide	mg/L	0.002	0.0084 (1)	0.0018	9521517			
Turbidity	NTU	-	12	0.1	9515683			
WAD Cyanide (Free)	ug/L	5	ND	1	9515305			
Alkalinity (Total as CaCO3)	mg/L	-	110	1.0	9516632			
Metals								
Dissolved (0.2u) Aluminum (Al)	ug/L	15	5	5	9521642			
Chromium (VI)	ug/L	1	ND	0.50	9516775			
Mercury (Hg)	ug/L	0.2	ND	0.10	9522422			
Total Antimony (Sb)	ug/L	20	0.70	0.50	9522094			
Total Arsenic (As)	ug/L	100	ND	1.0	9522094			
Total Beryllium (Be)	ug/L	11	ND	0.40	9522094			
Total Boron (B)	ug/L	200	1100	10	9522094			
No Fill	No Exceedance							
Grey	Exceeds 1 criteria policy/level							
Black	Exceeds both criteria/levels							
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								
Lab-Dup = Laboratory Initiated Duplicate								
Criteria: Ontario Provincial Water Quality Objectives								
Ref. to MOEE Water Management document dated Feb.1999								
N/A = Not Applicable								
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.								
(1) Sample pH <9, preservation incomplete. Due to volatility of analyte, a low bias in the results is likely.								



Bureau Veritas Job #: C4L3562
Report Date: 2024/07/19

exp Services Inc
Client Project #: BRM-23015226-A0
Site Location: BRITANNIA RD & FIRST LINE
Your P.O. #: ENV-BRM

PWQO METALS AND INORGANICS (WATER)

Bureau Veritas ID			ZSD787			ZSD787		
Sampling Date			2024/07/12 10:50			2024/07/12 10:50		
COC Number			886982-09-01			886982-09-01		
	UNITS	Criteria	BH2-11	RDL	QC Batch	BH2-11 Lab-Dup	RDL	QC Batch
Total Cadmium (Cd)	ug/L	0.2	ND	0.090	9522094			
Total Chromium (Cr)	ug/L	-	ND	5.0	9522094			
Total Cobalt (Co)	ug/L	0.9	1.1	0.50	9522094			
Total Copper (Cu)	ug/L	5	2.2	0.90	9522094			
Total Iron (Fe)	ug/L	300	420	100	9522094			
Total Lead (Pb)	ug/L	5	1.3	0.50	9522094			
Total Molybdenum (Mo)	ug/L	40	24	0.50	9522094			
Total Nickel (Ni)	ug/L	25	3.2	1.0	9522094			
Total Selenium (Se)	ug/L	100	ND	2.0	9522094			
Total Silver (Ag)	ug/L	0.1	ND	0.090	9522094			
Total Thallium (Tl)	ug/L	0.3	ND	0.050	9522094			
Total Tungsten (W)	ug/L	30	ND	1.0	9522094			
Total Uranium (U)	ug/L	5	5.4	0.10	9522094			
Total Vanadium (V)	ug/L	6	1.3	0.50	9522094			
Total Zinc (Zn)	ug/L	30	18	5.0	9522094			
Total Zirconium (Zr)	ug/L	4	ND	1.0	9522094			
No Fill	No Exceedance							
Grey	Exceeds 1 criteria policy/level							
Black	Exceeds both criteria/levels							
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								
Lab-Dup = Laboratory Initiated Duplicate								
Criteria: Ontario Provincial Water Quality Objectives								
Ref. to MOEE Water Management document dated Feb.1999								
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.								



Bureau Veritas Job #: C4L3562
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exp Services Inc
Client Project #: BRM-23015226-A0
Site Location: BRITANNIA RD & FIRST LINE
Your P.O. #: ENV-BRM

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID				ZSD787		
Sampling Date				2024/07/12 10:50		
COC Number				886982-09-01		
		UNITS	Criteria	BH2-11	RDL	QC Batch
Metals						
Dissolved Aluminum (Al)	ug/L	-	5.7	4.9	9521633	
Dissolved Antimony (Sb)	ug/L	20	0.69	0.50	9521633	
Dissolved Arsenic (As)	ug/L	100	ND	1.0	9521633	
Dissolved Barium (Ba)	ug/L	-	51	2.0	9521633	
Dissolved Beryllium (Be)	ug/L	11	ND	0.40	9521633	
Dissolved Bismuth (Bi)	ug/L	-	ND	1.0	9521633	
Dissolved Boron (B)	ug/L	200	1200	10	9521633	
Dissolved Cadmium (Cd)	ug/L	0.2	ND	0.090	9521633	
Dissolved Calcium (Ca)	ug/L	-	190000	1000	9521633	
Dissolved Chromium (Cr)	ug/L	-	ND	5.0	9521633	
Dissolved Cobalt (Co)	ug/L	0.9	0.92	0.50	9521633	
Dissolved Copper (Cu)	ug/L	5	1.0	0.90	9521633	
Dissolved Iron (Fe)	ug/L	300	ND	100	9521633	
Dissolved Lead (Pb)	ug/L	5	ND	0.50	9521633	
Dissolved Lithium (Li)	ug/L	-	39	5.0	9521633	
Dissolved Magnesium (Mg)	ug/L	-	130000	50	9521633	
Dissolved Manganese (Mn)	ug/L	-	160	2.0	9521633	
Dissolved Molybdenum (Mo)	ug/L	40	27	0.50	9521633	
Dissolved Nickel (Ni)	ug/L	25	2.7	1.0	9521633	
Dissolved Phosphorus (P)	ug/L	-	ND	100	9521633	
Dissolved Potassium (K)	ug/L	-	20000	200	9521633	
Dissolved Selenium (Se)	ug/L	100	ND	2.0	9521633	
Dissolved Silicon (Si)	ug/L	-	3600	50	9521633	
Dissolved Silver (Ag)	ug/L	0.1	ND	0.090	9521633	
Dissolved Sodium (Na)	ug/L	-	230000	100	9521633	
Dissolved Strontium (Sr)	ug/L	-	13000	1.0	9521633	
Dissolved Tellurium (Te)	ug/L	-	ND	1.0	9521633	
No Fill	No Exceedance					
Grey	Exceeds 1 criteria policy/level					
Black	Exceeds both criteria/levels					
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						
Criteria: Ontario Provincial Water Quality Objectives						
Ref. to MOEE Water Management document dated Feb.1999						
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.						



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Bureau Veritas Job #: C4L3562
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exp Services Inc
Client Project #: BRM-23015226-A0
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Your P.O. #: ENV-BRM

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID			ZSD787		
Sampling Date			2024/07/12 10:50		
COC Number			886982-09-01		
	UNITS	Criteria	BH2-11	RDL	QC Batch
Dissolved Thallium (Tl)	ug/L	0.3	ND	0.050	9521633
Dissolved Tin (Sn)	ug/L	-	ND	1.0	9521633
Dissolved Titanium (Ti)	ug/L	-	ND	5.0	9521633
Dissolved Tungsten (W)	ug/L	30	ND	1.0	9521633
Dissolved Uranium (U)	ug/L	5	5.4	0.10	9521633
Dissolved Vanadium (V)	ug/L	6	0.54	0.50	9521633
Dissolved Zinc (Zn)	ug/L	30	14	5.0	9521633
Dissolved Zirconium (Zr)	ug/L	4	ND	1.0	9521633
No Fill	No Exceedance				
Grey	Exceeds 1 criteria policy/level				
Black	Exceeds both criteria/levels				
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					
Criteria: Ontario Provincial Water Quality Objectives					
Ref. to MOEE Water Management document dated Feb.1999					
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.					



Bureau Veritas Job #: C4L3562
Report Date: 2024/07/19

exp Services Inc
Client Project #: BRM-23015226-A0
Site Location: BRITANNIA RD & FIRST LINE
Your P.O. #: ENV-BRM

TEST SUMMARY

Bureau Veritas ID: ZSD787
Sample ID: BH2-11
Matrix: Water

Collected: 2024/07/12
Shipped:
Received: 2024/07/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	9521642	N/A	2024/07/18	Indira HarryPaul
Alkalinity	AT	9516632	N/A	2024/07/16	Surinder Rai
Chromium (VI) in Water	IC	9516775	N/A	2024/07/17	Surleen Kaur Romana
Free (WAD) Cyanide	SKAL/CN	9515305	N/A	2024/07/15	Alen Wang
Dissolved Oxygen	DO	9515310	2024/07/15	2024/07/15	Amrutha Anilkumar
Hardness (calculated as CaCO3)		9513059	N/A	2024/07/18	Automated Statchk
Mercury	CV/AA	9522422	2024/07/18	2024/07/18	Aswathy Neduveli Suresh
Lab Filtered Metals by ICPMS	ICP/MS	9521633	2024/07/17	2024/07/18	Indira HarryPaul
Total Metals Analysis by ICPMS	ICP/MS	9522094	2024/07/18	2024/07/18	Indira HarryPaul
Sulphide (as H2S)	CALC	9523366	N/A	2024/07/17	Automated Statchk
Total Sulphide	SPEC	9521517	N/A	2024/07/17	Naitik Jigneshbhai Desai
Total Ammonia-N	SKAL/NH4	9519962	N/A	2024/07/18	Yogesh Patel
pH	AT	9516647	2024/07/16	2024/07/16	Surinder Rai
Phenols (4AAP)	TECH/PHEN	9516880	N/A	2024/07/16	Chloe Pollock
Field Measured pH	PH	ONSITE	N/A	2024/07/18	Patricia Legette
Field Measured pH	PH	ONSITE	N/A	2024/07/18	Patricia Legette
Total Phosphorus (Colourimetric)	SKAL/P	9520818	2024/07/18	2024/07/18	Sachi Patel
Turbidity	AT	9515683	N/A	2024/07/15	Gurparteek KAUR
Un-ionized Ammonia	CALC/NH3	9513053	2024/07/19	2024/07/19	Automated Statchk

Bureau Veritas ID: ZSD787 Dup
Sample ID: BH2-11
Matrix: Water

Collected: 2024/07/12
Shipped:
Received: 2024/07/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Oxygen	DO	9515310	2024/07/15	2024/07/15	Amrutha Anilkumar



Bureau Veritas Job #: C4L3562
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exp Services Inc
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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	12.0°C
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Results relate only to the items tested.

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Bureau Veritas Job #: C4L3562

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QUALITY ASSURANCE REPORT

exp Services Inc

Client Project #: BRM-23015226-A0

Site Location: BRITANNIA RD & FIRST LINE

Your P.O. #: ENV-BRM

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9515305	WAD Cyanide (Free)	2024/07/15	101	80 - 120	101	80 - 120	ND,RDL=1	ug/L	NC	20		
9515310	Dissolved Oxygen	2024/07/15							0.13	30		
9515683	Turbidity	2024/07/15			99	80 - 120	ND, RDL=0.1	NTU	7.7	20		
9516632	Alkalinity (Total as CaCO3)	2024/07/16			96	85 - 115	ND, RDL=1.0	mg/L	2.1	20		
9516647	pH	2024/07/16			101	98 - 103			0.96	N/A		
9516775	Chromium (VI)	2024/07/17	102	80 - 120	101	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9516880	Phenols-4AAP	2024/07/16	101	80 - 120	101	80 - 120	ND, RDL=0.0010	mg/L	NC	20		
9519962	Total Ammonia-N	2024/07/18	96	75 - 125	99	80 - 120	ND, RDL=0.050	mg/L	NC	20		
9520818	Total Phosphorus	2024/07/18	103	80 - 120	102	80 - 120	ND, RDL=0.004	mg/L	1.5	20	102	80 - 120
9521517	Total Sulphide	2024/07/17	113	80 - 120	113	80 - 120	ND, RDL=0.0018	mg/L				
9521633	Dissolved Aluminum (Al)	2024/07/18	102	80 - 120	104	80 - 120	ND, RDL=4.9	ug/L	18	20		
9521633	Dissolved Antimony (Sb)	2024/07/18	104	80 - 120	106	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9521633	Dissolved Arsenic (As)	2024/07/18	99	80 - 120	100	80 - 120	ND, RDL=1.0	ug/L	NC	20		
9521633	Dissolved Barium (Ba)	2024/07/18	103	80 - 120	100	80 - 120	ND, RDL=2.0	ug/L	3.9	20		
9521633	Dissolved Beryllium (Be)	2024/07/18	107	80 - 120	100	80 - 120	ND, RDL=0.40	ug/L	NC	20		
9521633	Dissolved Bismuth (Bi)	2024/07/18	100	80 - 120	103	80 - 120	ND, RDL=1.0	ug/L				
9521633	Dissolved Boron (B)	2024/07/18	106	80 - 120	104	80 - 120	ND, RDL=10	ug/L	0.48	20		
9521633	Dissolved Cadmium (Cd)	2024/07/18	102	80 - 120	101	80 - 120	ND, RDL=0.090	ug/L	NC	20		
9521633	Dissolved Calcium (Ca)	2024/07/18	NC	80 - 120	100	80 - 120	ND, RDL=200	ug/L	1.1	20		
9521633	Dissolved Chromium (Cr)	2024/07/18	95	80 - 120	95	80 - 120	ND, RDL=5.0	ug/L	NC	20		
9521633	Dissolved Cobalt (Co)	2024/07/18	104	80 - 120	101	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9521633	Dissolved Copper (Cu)	2024/07/18	106	80 - 120	102	80 - 120	ND, RDL=0.90	ug/L	0.59	20		
9521633	Dissolved Iron (Fe)	2024/07/18	103	80 - 120	102	80 - 120	ND, RDL=100	ug/L	3.3	20		
9521633	Dissolved Lead (Pb)	2024/07/18	98	80 - 120	97	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9521633	Dissolved Lithium (Li)	2024/07/18	108	80 - 120	105	80 - 120	ND, RDL=5.0	ug/L				
9521633	Dissolved Magnesium (Mg)	2024/07/18	99	80 - 120	103	80 - 120	ND, RDL=50	ug/L	0.24	20		
9521633	Dissolved Manganese (Mn)	2024/07/18	100	80 - 120	101	80 - 120	ND, RDL=2.0	ug/L	2.0	20		

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QUALITY ASSURANCE REPORT(CONT'D)

exp Services Inc

Client Project #: BRM-23015226-A0

Site Location: BRITANNIA RD & FIRST LINE

Your P.O. #: ENV-BRM

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9521633	Dissolved Molybdenum (Mo)	2024/07/18	99	80 - 120	99	80 - 120	ND, RDL=0.50	ug/L	3.9	20		
9521633	Dissolved Nickel (Ni)	2024/07/18	100	80 - 120	99	80 - 120	ND, RDL=1.0	ug/L	3.9	20		
9521633	Dissolved Phosphorus (P)	2024/07/18	101	80 - 120	105	80 - 120	ND, RDL=100	ug/L	1.3	20		
9521633	Dissolved Potassium (K)	2024/07/18	105	80 - 120	105	80 - 120	ND, RDL=200	ug/L	1.8	20		
9521633	Dissolved Selenium (Se)	2024/07/18	100	80 - 120	100	80 - 120	ND, RDL=2.0	ug/L	NC	20		
9521633	Dissolved Silicon (Si)	2024/07/18	102	80 - 120	100	80 - 120	ND, RDL=50	ug/L	0.032	20		
9521633	Dissolved Silver (Ag)	2024/07/18	98	80 - 120	99	80 - 120	ND, RDL=0.090	ug/L	NC	20		
9521633	Dissolved Sodium (Na)	2024/07/18	NC	80 - 120	103	80 - 120	ND, RDL=100	ug/L	1.5	20		
9521633	Dissolved Strontium (Sr)	2024/07/18	97	80 - 120	100	80 - 120	ND, RDL=1.0	ug/L	0.93	20		
9521633	Dissolved Tellurium (Te)	2024/07/18	97	80 - 120	101	80 - 120	ND, RDL=1.0	ug/L				
9521633	Dissolved Thallium (Tl)	2024/07/18	104	80 - 120	103	80 - 120	ND, RDL=0.050	ug/L	NC	20		
9521633	Dissolved Tin (Sn)	2024/07/18	104	80 - 120	104	80 - 120	ND, RDL=1.0	ug/L	NC	20		
9521633	Dissolved Titanium (Ti)	2024/07/18	101	80 - 120	100	80 - 120	ND, RDL=5.0	ug/L	NC	20		
9521633	Dissolved Tungsten (W)	2024/07/18	99	80 - 120	100	80 - 120	ND, RDL=1.0	ug/L	NC	20		
9521633	Dissolved Uranium (U)	2024/07/18	101	80 - 120	100	80 - 120	ND, RDL=0.10	ug/L	18	20		
9521633	Dissolved Vanadium (V)	2024/07/18	99	80 - 120	99	80 - 120	ND, RDL=0.50	ug/L	0.35	20		
9521633	Dissolved Zinc (Zn)	2024/07/18	98	80 - 120	100	80 - 120	ND, RDL=5.0	ug/L	NC	20		
9521633	Dissolved Zirconium (Zr)	2024/07/18	108	80 - 120	108	80 - 120	ND, RDL=1.0	ug/L				
9521642	Dissolved (0.2u) Aluminum (Al)	2024/07/18	93	80 - 120	102	80 - 120	ND,RDL=5	ug/L	5.0	20		
9522094	Total Antimony (Sb)	2024/07/18	105	80 - 120	102	80 - 120	ND, RDL=0.50	ug/L				
9522094	Total Arsenic (As)	2024/07/18	99	80 - 120	101	80 - 120	ND, RDL=1.0	ug/L	NC	20		
9522094	Total Beryllium (Be)	2024/07/18	111	80 - 120	103	80 - 120	ND, RDL=0.40	ug/L				
9522094	Total Boron (B)	2024/07/18	109	80 - 120	105	80 - 120	ND, RDL=10	ug/L	3.4	20		
9522094	Total Cadmium (Cd)	2024/07/18	102	80 - 120	100	80 - 120	ND, RDL=0.090	ug/L	NC	20		
9522094	Total Chromium (Cr)	2024/07/18	96	80 - 120	97	80 - 120	ND, RDL=5.0	ug/L	NC	20		
9522094	Total Cobalt (Co)	2024/07/18	101	80 - 120	101	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9522094	Total Copper (Cu)	2024/07/18	104	80 - 120	105	80 - 120	ND, RDL=0.90	ug/L	0.78	20		
9522094	Total Iron (Fe)	2024/07/18	100	80 - 120	101	80 - 120	ND, RDL=100	ug/L	1.9	20		

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QUALITY ASSURANCE REPORT(CONT'D)

exp Services Inc

Client Project #: BRM-23015226-A0

Site Location: BRITANNIA RD & FIRST LINE

Your P.O. #: ENV-BRM

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9522094	Total Lead (Pb)	2024/07/18	97	80 - 120	98	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9522094	Total Molybdenum (Mo)	2024/07/18	98	80 - 120	96	80 - 120	ND, RDL=0.50	ug/L				
9522094	Total Nickel (Ni)	2024/07/18	98	80 - 120	100	80 - 120	ND, RDL=1.0	ug/L	1.7	20		
9522094	Total Selenium (Se)	2024/07/18	106	80 - 120	104	80 - 120	ND, RDL=2.0	ug/L	NC	20		
9522094	Total Silver (Ag)	2024/07/18	99	80 - 120	96	80 - 120	ND, RDL=0.090	ug/L	NC	20		
9522094	Total Thallium (Tl)	2024/07/18	105	80 - 120	101	80 - 120	ND, RDL=0.050	ug/L				
9522094	Total Tungsten (W)	2024/07/18	100	80 - 120	100	80 - 120	ND, RDL=1.0	ug/L				
9522094	Total Uranium (U)	2024/07/18	101	80 - 120	98	80 - 120	ND, RDL=0.10	ug/L				
9522094	Total Vanadium (V)	2024/07/18	98	80 - 120	98	80 - 120	ND, RDL=0.50	ug/L				
9522094	Total Zinc (Zn)	2024/07/18	99	80 - 120	102	80 - 120	ND, RDL=5.0	ug/L	NC	20		
9522094	Total Zirconium (Zr)	2024/07/18	108	80 - 120	104	80 - 120	ND, RDL=1.0	ug/L				
9522422	Mercury (Hg)	2024/07/18	95	75 - 125	96	80 - 120	ND, RDL=0.10	ug/L	NC	20		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

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

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



Bureau Veritas Job #: C4L3562
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exp Services Inc
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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Anastassia Hamanov, Scientific Specialist

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Patricia Legett, Project Manager



Bureau Veritas Proprietary Software
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BOD

Bureau Veritas
5740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel: (905) 817-5700 Toll-free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

CHAIN



NONT-2024-07-1288

Page 1 of 1

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:	
Company Name: #30554 exp Services Inc	Company Name: <u>EXP Services Inc</u>	Quotation #: C20374	<u>Stream 2</u>		
Attention: Accounts Payable	Attention: <u>Francois Chartier</u>	P.O. #: ENV-BRM			
Address: 1595 Clark Blvd	Address: <u>Ryan Alexander @exp.com</u>	Project: <u>BRM-23015226-A0</u>			
Brampton ON L6T 4V1	Address: <u>Thabiso Modise</u>	Project Name: <u>Britannia Rd & First Line</u>			
Tel: (905) 793-9800 Fax: (905) 793-0641	Tel: (905) 793-9800 Ext: 2523 Fax:	Site #: <u>RA</u>			
Email: AP@exp.com; Karen.Burke@exp.com	Email: <u>Francois.Chartier@exp.com</u> <u>amar.neru@exp.com</u>	Sampled By: <u>RA</u>			

Bottle Order #:

86682

Project Manager:

Patricia Legette

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)		Other Regulations		Special Instructions		Field Filtered (please circle):		Vaughan Sanitary/Storm Sewer (2016)		PWQ Metals and inorganics		Disolved metals by ICPMS		ANALYSIS REQUESTED (PLEASE BE SPECIFIC)		Turnaround Time (TAT) Required:		
☐ Table 1	☐ Res/Park	☐ Medium/Fine	☐ CCME	☒ Sanitary Sewer Bylaw													Regular (Standard) TAT:	
☐ Table 2	☐ Ind/Comm	☐ Coarse	☐ Reg 556	☒ Storm Sewer Bylaw														(will be applied if Rush TAT is not specified)
☐ Table 3	☐ Agri/Other	☐ For RSG	☐ MISA	Municipality <u>Milton</u>														Standard TAT = 5-7 Working days for most tests.
☐ Table			☒ PWQO	☐ Reg 406 Table														Please note: Standard TAT for certain tests such as BOD and Coliforms are > 5 days - contact your Project Manager for details.
			☐ Other															Job Specific Rush TAT (if applies to entire submission)
Include Criteria on Certificate of Analysis (CNA)? <u>YES</u>														Date Required: _____ Time Required: _____		Rush Confirmation Number: _____		
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix												# of Bottles	Comments	
1	BH 2-11	24/07/12	10:50	GW	NO											11	Please include CoC in final report	
2																		
3																		
4																	Preservative washed	
5																	from dissolved metals	
6																	bottle. Please lab	
7																	filter	
8																		
9																		
10																		

* RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	# Jars used and not submitted	Laboratory Use Only	
<u>RYAN ALEXANDER</u>		<u>24/07/12</u>	<u>15:00</u>	<u>THABISO MODISE</u>		<u>24/07/12</u>	<u>15:00</u>		Time Sensitive	Temperature (°C) on Recd
<u>THABISO MODISE</u>		<u>24/07/12</u>	<u>15:00</u>	<u>THABISO MODISE</u>		<u>24/07/12</u>	<u>15:00</u>		9/15/17	Custody Seal
										Preserved
										Intact
										Yes
										No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS-AND-CONDITIONS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

White: Bureau Veritas Yellow: Client

PN file

Bureau Veritas Canada (2019) Inc.



BUREAU
VERITAS

Bureau Veritas Job #: C4L3562
Report Date: 2024/07/19

exp Services Inc
Client Project #: BRM-23015226-A0
Site Location: BRITANNIA RD & FIRST LINE
Your P.O. #: ENV-BRM

Exceedance Summary Table – Prov. Water Quality Obj.
Result Exceedances

Sample ID	Bureau Veritas ID	Parameter	Criteria	Result	DL	UNITS
BH2-11	ZSD787-01	Dissolved Boron (B)	200	1200	10	ug/L
BH2-11	ZSD787-02	Total Boron (B)	200	1100	10	ug/L
BH2-11	ZSD787-02	Total Cobalt (Co)	0.9	1.1	0.50	ug/L
BH2-11	ZSD787-01	Dissolved Cobalt (Co)	0.9	0.92	0.50	ug/L
BH2-11	ZSD787-02	Total Iron (Fe)	300	420	100	ug/L
BH2-11	ZSD787-05	Total Phosphorus	0.01	0.025	0.004	mg/L
BH2-11	ZSD787-06	Total Sulphide	0.002	0.0084	0.0018	mg/L
BH2-11	ZSD787-06	Sulphide (as H2S)	0.002	0.0089	0.0020	mg/L
BH2-11	ZSD787-01	Dissolved Uranium (U)	5	5.4	0.10	ug/L
BH2-11	ZSD787-02	Total Uranium (U)	5	5.4	0.10	ug/L

The exceedance summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.



Your Project #: Campobello job# C4L3562

Attention: Patricia Legette

BUREAU VERITAS
CAMPOBELLO
6740 CAMPOBELLO ROAD
MISSISSAUGA, ON
CANADA L5N 2L8

Report Date: 2024/07/18

Report #: R3528955

Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C452724

Received: 2024/07/13, 16:31

Sample Matrix: Water
Samples Received: 1

Analyses	Date		Laboratory Method	Analytical Method
	Quantity	Extracted		
Sulphide (as H ₂ S)	1	N/A	2024/07/17	Auto Calc
Total Sulphide	1	N/A	2024/07/17 AB SOP-00080	SM 24 4500 S2-A D Fm

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.



Your Project #: Campobello job# C4L3562

Attention: Patricia Legette

BUREAU VERITAS
CAMPOBELLO
6740 CAMPOBELLO ROAD
MISSISSAUGA, ON
CANADA L5N 2L8

Report Date: 2024/07/18

Report #: R3528955

Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C452724

Received: 2024/07/13, 16:31

Encryption Key



**AUTHORIZED REPORT
RAPPORT AUTORISÉ**

Bureau Veritas

18 Jul 2024 12:15:25

Please direct all questions regarding this Certificate of Analysis to:
Stephanie Rodriguez Camacho, Customer Solutions Representative
Email: Stephanie.Rodriguez@bureauveritas.com
Phone# (403) 291-3077

=====

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RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		CRE470		
Sampling Date		2024/07/12 10:50		
	UNITS	BH2-11	RDL	QC Batch
Calculated Parameters				
Sulphide (as H ₂ S)	mg/L	0.0089	0.0020	B437763
Anions				
Total Sulphide	mg/L	0.0084 (1)	0.0018	B441911
RDL = Reportable Detection Limit (1) Sample pH <9, preservation incomplete. Due to volatility of analyte, a low bias in the results is likely.				



Bureau Veritas Job #: C452724
Report Date: 2024/07/18

BUREAU VERITAS
Client Project #: Campobello job# C4L3562

TEST SUMMARY

Bureau Veritas ID: CRE470
Sample ID: BH2-11
Matrix: Water

Collected: 2024/07/12
Shipped:
Received: 2024/07/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sulphide (as H ₂ S)	CALC	B437763	N/A	2024/07/17	Automated Statchk
Total Sulphide	SPEC	B441911	N/A	2024/07/17	Naitik Jigneshbhai Desai



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.9°C
-----------	-------

Results relate only to the items tested.



Bureau Veritas Job #: C452724
Report Date: 2024/07/18

QUALITY ASSURANCE REPORT

BUREAU VERITAS
Client Project #: Campobello job# C4L3562

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B441911	Total Sulphide	2024/07/17	113	80 - 120	113	80 - 120	<0.0018	mg/L	NC	20
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement. Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference. Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy. Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination. NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).										



BUREAU
VERITAS

Bureau Veritas Job #: C452724

Report Date: 2024/07/18

BUREAU VERITAS

Client Project #: Campobello job# C4L3562

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics



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Appendix E – In-Situ Infiltration Tests Results

Location:	Britannia Road and First Line - Tribal Milton Phase 2
Date:	8-Jul-24
Weather:	Sunny
Analyst:	RA

Borehole radius (cm):	2.5				
Soil class:	Default	12.0	2.074	0.093	0.754

Measurement	Start depth of water (cm)	End depth of water (cm)	Start time (*decimal min)	End time (*decimal min)	Elapsed time (min)	Change in head (cm)	Perc test result (min/cm)	Perc test (hr/mm)	mean head (m)	H/a (unitless)	2H*2 (m2)	2H/* (unitless)	C (unitless)	Ca2 (m2)	Denom	K _s (mm/hr)	Kfs (m/sec)	Kfs (cm/sec)
INF 2-7	65.91	58.61	0.0	61.4	61.43	7.3	8.4	0.0140	0.623	24.904	0.775	0.104	3.7014	0.00231	0.012361587	0.2	5.2E-08	5.2E-06

Britannia Road and First Line - Tribal Milton Phase 2
BRM-23015226-A0
Low Impact Design (LID) Calculations for Infiltration Gallery

Test Location	Hydraulic Conductivity (K _{fs}) (m/s)	Hydraulic Conductivity (K _{fs}) (cm/s)	Infiltration Rate (IR) (mm/hr)	Discrete Design Infiltration Rate(DIR) (mm/hr)	Percolation Time (min/cm)
INF 2-7	5.2E-08	5.2E-06	21	8	72

Geology Units	Geometric Mean of K _{fs} (m/s)	Geometric Mean of K _{fs} (cm/s)	Infiltration Rate (I) (mm/hr)*	Ratio of Mean Measured Infiltration Rates	Safety Correction Factor (SCF)
Overlying Geology Unit	5.20E-08	5.20E-06	21	1.0	2.5
Underlying Geology Unit (1.5 m below the bottom of trench)	5.20E-08	5.20E-06	21		

Design Infiltration Rate(DIR) (mm/hr)	Minimum	8	Percolation Time (min/cm)	72
	Maximum	8		72
	Geometric Mean	8		72

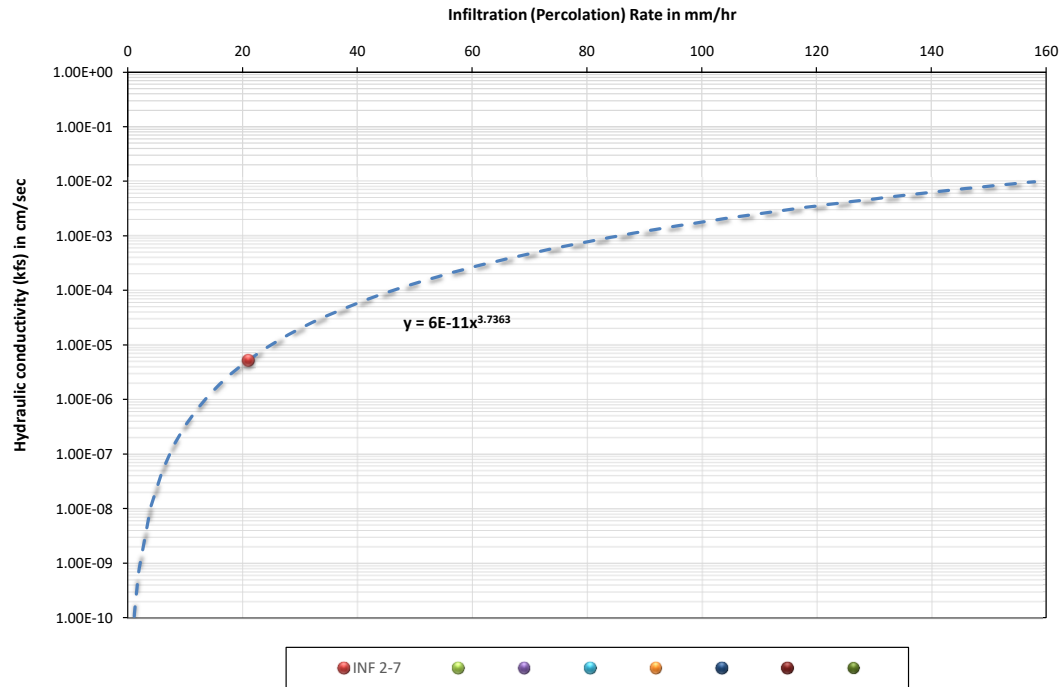
Note:
 Analytical Solutions (CVC and TRCA 2010)

$$Infiltration\ Rate\ (IR) = (\frac{K_{fs}}{6 \times 10^{-11}})^{\frac{1}{3.7363}}$$

$$Design\ Infiltration\ Rate\ (DIR) = \frac{IR}{SCF}$$

Kfs: hydraulic conductivity (cm/sec)
IR: infiltration rate (mm/hr)
DIR: design infiltration rate (mm/hr)
SCF: Safety Correction Factor (based on the chart recommended by CVC and TRCA, 2010)

**Figure : Approximate relationship between infiltration rate and hydraulic conductivity
(LID SWM planning and Design Guide, Appendix C1)**



Appendix F – Water Balance Assessment (Site Specific)

Appendix F-1: Model Input

Britannia Road and First Line, Milton (Phase 2)
BRM-23015226-A0

Period	Month	Average Temperature (°C)	Average Precipitation (mm)
1981-2010	1	-6.30	52.77
1981-2010	2	-5.20	60.00
1981-2010	3	-0.90	57.20
1981-2010	4	6.00	76.50
1981-2010	5	12.30	79.30
1981-2010	6	17.40	74.80
1981-2010	7	20.00	73.50
1981-2010	8	19.00	79.30
1981-2010	9	14.80	86.20
1981-2010	10	8.40	68.30
1981-2010	11	2.80	88.50
1981-2010	12	-2.90	65.90

Note:

Station Name	Gerogetown WWTP	
Station ID	6152695	
Longitude	-79.88	
Latitude	43.64	
Elevation	221.0	masl

Appendix F-2: Model Output

Britannia Road and First Line, Milton (Phase 2)
BRM-23015226-A0

Date	Month	PET	P	P-PET	Soil Moisture	AET	PET-AET	Snow Storage	Surplus
1981-2010	January	8.4	67.8	24.7	135.0	8.4	0.0	34.7	39.7
1981-2010	February	10.3	60.0	38.7	135.0	10.3	0.0	45.8	38.7
1981-2010	March	19.2	57.2	64.8	135.0	19.2	0.0	18.9	64.8
1981-2010	April	36.8	76.5	58.6	135.0	36.8	0.0	0.0	58.6
1981-2010	May	67.7	79.3	11.6	135.0	67.7	0.0	0.0	11.6
1981-2010	June	98.6	74.8	-23.8	111.2	98.6	0.0	0.0	0.0
1981-2010	July	114.6	73.5	-41.1	77.3	107.4	7.2	0.0	0.0
1981-2010	August	91.6	79.3	-12.3	70.3	86.3	5.2	0.0	0.0
1981-2010	September	54.0	86.2	32.2	102.6	54.0	0.0	0.0	0.0
1981-2010	October	28.7	68.3	39.6	135.0	28.7	0.0	0.0	7.1
1981-2010	November	15.1	88.5	73.4	135.0	15.1	0.0	0.0	73.4
1981-2010	December	9.5	65.9	42.8	135.0	9.5	0.0	13.6	42.8
Annual rate (mm/yr)		554.50	877.30			542.00		113.00	335.30

Note:

Station Name	Gerogetown WWTP	
Station ID	6152695	
Longitude	-79.88	
Latitude	43.64	
Elevation	221.0	masl

APPENDIX F-3

Average Infiltration Factors

Britannia Road and First Line, Milton (Phase 2)
BRM-23015226-A0

F-3-1. Average Infiltration Factor – Pre Development Conditions

Un-Mitigated

Category	Weighted Infiltration Factor
Topography/Slope	0.14
Soil Type Glaciolacustrine deposits (Silty to Clayey)	0.10
Cover Landscaped Areas	0.10
Total weighted Infiltration factor	0.34

F-3-2. Average Infiltration Factor – Post Development Conditions

Un-Mitigated

Category	Weighted Infiltration Factor
Topography/Slope	0.144
Soil Type Glaciolacustrine deposits (Silty to Clayey)	0.10
Cover Landscaped areas	0.10
Total weighted Infiltration factor	0.34

Notes:

Landscaped area considered equivalent to Cultivated Cover

Assumed existing and proposed slopes are similar

Appendix F-4

Summary of Pre and Post-Development Water Balance

Britannia Road and First Line, Milton (Phase 2)

BRM-23015226-A0

F-4-1. Climate Data

Item	Pre-Development mm/a	Post-Development mm/a
Precipitation	877.30	877.30
Evapotranspiration	542.00	542.00
Water Surplus	335.30	335.30
Infiltration Rate	115.34	115.34
Runoff	219.96	219.96

F-4-2. Pre-Developed Area Statistics

Open spaces/Landscaped and Woodlot	305,171 sq.m.	48.6%
Building	0 sq.m.	0.0%
Areas with depth of water table < 1.0 m (impervious)	314,200 sq.m.	50.1%
Wetland	8,400 sq.m.	1.3%
TOTAL	627,771 sq.m.	100%

F-4-3. Post Development Area Statistics

Commercial Development

Building Roofs	181,830 sq.m.	29.0%
ROW (roads, sidewalks, parking and also areas with depth of water table < 1.0 m) - Paved	174,641 sq.m.	27.8%
Wetland and SWM	36,700 sq.m.	5.8%
Open Areas/Landscaped Areas and Woodlot	234,600 sq.m.	37.4%
TOTAL	627,771 sq.m.	

F-4-4-1. Annual Pre-Development Water Balance

Land Use	Area (sq.m.)	Precipitation (cu.m.)	Actual Evapotranspiration (cu.m.)	Infiltration Rate (cu.m.)	Run-off (cu.m.)
Building	0	0	0	0	0
Wetland and Areas with depth of water table < 1.0 m	322,600	283,017	174,849	0	108,168
Open Spaces/Landscaped and Woodlot	305,171	267,727	165,403	35,199	67,124
TOTAL	627,771	550,743	340,252	35,199	175,292
Pre-development Infiltration Rate			542.000	56.070	279.230
		100	62	6	32

F-4-5-1. Annual Post-Development Water Balance

Land Use	Area (sq.m.)	Precipitation (cu.m.)	Actual Evapotranspiration (cu.m.)	Infiltration Rate (cu.m.)	Run-off (cu.m.)
Building Roofs	181,830	159,519	0	0	159,519
ROW (roads, sidewalks, parking and also areas with depth of water table < 1.0 m) - Paved	174,641	153,213	0	0	153,213
Wetland and SWM	36,700	32,197	19,891	0	12,306
Landscaped Areas and Woodlot	234,600	205,815	127,153	27,060	51,602
TOTAL	627,771	550,743	147,045	27,060	376,639
Post-development Infiltration Rate			234.233	43.10	599.96
		100.0	26.7	4.9	68.4

F-4-6-1. Comparison of Pre-Development and Post-Development

Item	Precipitation (cu.m.)	Actual Evapotranspiration (cu.m.)	Run-off (cu.m.)	Infiltration Rate (cu.m.)
Pre-Development	550,743	340,252	175,292	35,199
Post Development	550,743	147,045	376,639	27,060
Pre-development Infiltration Rate				56.1
Post-development Infiltration Rate				43.1
Deficit Post Development				8,140

APPENDIX F-5

Britannia Road and First Line, Milton (Phase 2)

BRM-23015226-A0

Estimate of Area for Infiltration System

1. Design Infiltration Rate

Item	Value	Unit
Geometric mean of design infiltration rates	8	mm/h
	192.00	mm/day
	0.19	m/day/m ²
	0.38	m/48 hrs/m ²

2. Climate Data

Total precipitation based on weather station records	877.30	mm/yr
Total rain in an eight (8) month precipitation period	584.87	mm/8 months
Based on a 16-week precipitation period	36.55	mm/2 week
Based on a 16-week precipitation period	0.037	m/2 weeks

3. Roof and Resulted Runoff Volume

Total roof area	181,830	m ²
Rooftop runoff volume in an eight (8) month precipitation period	106,346	m ³ /year
Total rooftop runoff volume per 2 week	6,647	m ³ /2 week

4. Estimated Deficit Volume

Estimated deficit based on water balance calculations	8,140	m ³ /yr
Deficit over available water (roof runoff)	8%	-
Min. Storage to infiltrate to meet deficit	508.74	m ³ /2 week
mm Retention	0.8	mm

Area of infiltration system required to mitigate infiltrate deficit (rounded)	1,325	m ²
% of total site area	0.21%	

Note: only roof water to be infiltrated (clean water)

Appendix G – Construction Flow Rate Calculations

APPENDIX G: Construction Dewatering Calculations

Britannia Rd and First Line - Phase 2
BRM-23015226-A0

Table G-1: Flow all Sides of the Excavation

Parameters	Symbols	Unit	Two Industrial Buildings one at a time (slab-on-grade)	Utility Trench
Ground Elevation	-	mASL	184.16	184.16
Highest Groundwater Elevation	-	mASL	184.16	184.16
Lowest Footing Elevation	-	mASL	181.16	180.16
Dewatered Elevation Target	-	mASL	180.16	179.16
Top of the Water-Bearing Zone	-	mASL	184.16	184.16
Base of the Water-Bearing Zone	-	mASL	168.00	168.00
Height of Water Table Above the Base of Water-Bearing Zone	H	m	16.16	16.16
Height of Dewatering Target Above the Base of Water-Bearing Zone	h_w	m	12.16	11.16
Hydraulic Conductivity	K	m/s	1.10E-07	1.10E-07
Length of Excavation	-	m	30.00	30.00
Width of Excavation	-	m	2.00	3.00
Method to Calculate Radius of Influence	-	-	Sichardt	Sichardt
Radius of Influence from Sides of Excavation	Ro	m	3.98	4.97
Distance to Linear Source from Sides of excavation	$Lo=Ro/2$	m	1.99	2.49
Dewatering Flow Rate (unconfined linear flow component)	Q	m ³ /day	17.31	17.22
Factor of Safety	FS	-	2.00	2.00
Dewatering Flow Rate (multiplied by factor of safety)	Q.FS	m ³ /day	34.63	34.45
Precipitation Event	-	mm/day	25	25
Volume from Precipitation	-	m3/day	1.5	2.25
Dewatering Flow Rate Without Safety Factor (including rainwater collection)	-	m3/day	18.81	19.47
Dewatering Flow Rate With Safety Factor (including rainwater collection)	-	m3/day	36.13	36.70

Precipitation Event 2 year storm (~57.3 mm)	-	m ³ /day	3.438	5.157
Precipitation Event 100 year storm (~124.9 mm)	-	m ³ /day	7.494	11.241

Notes:

mASL - meters above sea level

Analytical Solution for Estimating Plane Flow from an Unconfined Aquifer to a Fully-Penetrating Excavation

$$Q_w = Kx \frac{H^2 - h_w^2}{L_o}$$

Where:

Q_w = Flow rate per unit length of excavation (m³/s)

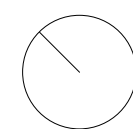
K = Hydraulic conductivity (m/s)

H = Height of static water table above base of water-bearing zone (m)

h_w = Height of target water level above the base of water-bearing zone (m)

(Based on the Dupuit Equation)

Appendix H – Site Plan



0 100 200 400