



B.I.G.
CONSULTING
INC.

HYDROGEOLOGICAL **INVESTIGATION**

590 Argus Road, Oakville, Ontario

Client

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Project Number

BIGC-ENV-554D

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1 Introduction

1.1 Project Description

B.I.G. Consulting Inc. (BIG) was retained by 590 Argus LP. (Client), to conduct a Hydrogeological Investigation to update the previously completed report for the site located at 590 Argus Road, Oakville, Ontario (Site). A previous report titled, "Preliminary Hydrogeological Investigation, 590 Argus Road, Oakville, Ontario," was prepared by BIG on February 1, 2023. The earlier field investigations remain valid following design updates.

The Site is located north of Argus Road and to the west of South Service Road East in Oakville, Ontario, as shown on Figure 1. The Site measures approximately 15,500 m² in size and is currently occupied by a commercial building (Site building). The areas surrounding the Site building are covered with asphalt and landscaped areas.

Based on the architectural drawings prepared by Teeple Architects Inc. (TAI), dated March 20, 2024, BIG understands that the proposed development will consist of three (3) condominium towers (referenced as 47-storey Building A, 50-storey Building B and 55-storey Building C, from west to east) with 3-storey podium and six (6) levels of underground parking structure (P6).

The following investigations previously completed for the subject Site and surrounding properties were reviewed by BIG:

- Memo – Findings of Preliminary Geotechnical Investigation, 590 Argus Road, Oakville, Ontario, prepared by BIG, dated June 15, 2022.
- Phase II Environmental Site Assessment, 590 Argus Road, Oakville, Ontario, prepared by BIG, dated October 4, 2022.

It should be noted that the dewatering estimated provided in this report are based on the conceptual building information available at this time. If design details are changed (including any changes to excavation depth), the dewatering estimates must be revised to include the final layout of the development.

This report addresses the hydrogeological aspects of the proposed project. Reports for the Environmental Geotechnical Investigations will be issued under separate covers. The field investigations for the geotechnical, environmental and hydrogeological investigations were carried out concurrently.

1.2 Project Objectives

The main objectives of the Hydrogeological Investigation were to:

- a) Further establish the subsurface geological and hydrogeological conditions at the expected foundation elevation;
- b) Re-assessment of any potential construction dewatering flow rates;
- c) Re-assessment of foundation sub-drain discharge volumes, if applicable; and
- d) Prepare an updated Hydrogeological Investigation Report.

1.3 Scope of Work

The previous Preliminary Hydrogeological investigation conducted by BIG in February 1, 2023 consisted of the advancement of eight (8) boreholes (BH1 to BH8) and installation of five (5) monitoring wells (BH/MW1, BH/MW3, BH/MW4, BH/MW6 and BH/MW8), utilization of pre-existing monitoring wells at 581 to 587 Argus Avenue, 217 Cross Avenue and 571 Argus Avenue (BH/MW2, BH/MW5, BH/MW114 and

BH/MW115) installed by BIG to investigate the subsurface groundwater conditions, performing single well response tests (SWRT) at selected existing monitoring wells to assess the hydraulic characteristics at the Site and collection of one (1) groundwater sample for laboratory testing and compare it against the Regional Municipality of Halton and Town of Oakville Storm and Combined/Sanitary Sewer Use By-Law parameters.

To achieve the investigation objectives noted above, BIG proposed and initiated the following scope of work:

- a) Background desktop review of pertinent geological and hydrogeological resources;
- b) Review of the Ministry of Environment, Conservation and Parks (MECP) Water Well Records;
- c) Utilizing pre-existing monitoring wells drilled at the Site by BIG to investigate the subsurface groundwater conditions;
- d) Advancement of thirteen (13) boreholes (BH101 to BH113) to a maximum depth of 30.8 m below ground surface (bgs) and installation of ten (10) monitoring wells (BH/MW102, BH/MW105 to BH/MW113);
- e) Perform single well response tests (SWRT) at selected monitoring wells to assess the hydraulic characteristics of the saturated soils at the Site;
- f) Completion groundwater level measurements at all monitoring wells present on-Site;
- g) Evaluate the information of groundwater level measurements;
- h) Re-assessment of groundwater discharges during construction phases;
- i) Re-assessment of foundation sub-drain discharge volumes; and
- j) The preparation of an updated Hydrogeological Investigation Report.

1.4 Previous Reports

1.4.1 BIG Memo Findings of Preliminary Geotechnical Investigation

BIG completed a Memo – Findings of Preliminary Geotechnical Investigation at the Site, dated June 15, 2022, that consisted of advancement of eight (8) boreholes (BH1 to BH8) to a maximum depth of 7.7 m bgs and installation of five (5) monitoring wells (BH/MW1, BH/MW3, BH/MW4, BH/MW6 and BH/MW8).

1.4.2 BIG Phase II ESA

BIG completed a Phase II ESA at the Site, dated October 4, 2022, that consisted of advancement of eight (8) boreholes (BH1 to BH8) to a maximum depth of 7.7 m bgs and installation of five (5) monitoring wells (BH/MW1, BH/MW3, BH/MW4, BH/MW6 and BH/MW8).

2 Regional Setting

2.1 Regional Physiography

The Ontario Geological Survey Map P. 2204, indicates the Site lies in the Iroquois Plain physiographic region of Southern Ontario known as the shale plains. Figure 2 shows the physiographic regions of Southern Ontario around the Site.

During the last retreat of the Laurentide Ice Sheet (12,000 years B.P.) lake levels in what was to become Lake Ontario were much higher due to ice blockage in the St. Lawrence waterway. This created the glacial Lake Iroquois which was up to 60 m higher in elevation in the Toronto area than the current Lake Ontario water levels. The Iroquois Shoreline that coincided with this elevated lake, terminated just above St. Clair Avenue West.

2.2 Regional Geology

The surficial geology of the immediate area around the Site is described as Paleozoic bedrock. The surficial geology for the Site and surrounding areas is shown on Figure 3.

Bedrock of the region corresponds to the Georgian Bay Formation, Blue Mountain Formation, Billings Formation, Collingwood Member and Eastview Member consisting of shale, limestone, dolostone and siltstone. The contact between the bedrock and the overlying overburden is expected to be at approximately 1.5 m to 3.1 m bgs.

2.3 Regional Hydrogeology

Groundwater movement through the subsurface is controlled by hydraulic gradients, the physical characteristics of the sediments, and the interconnectedness of lithological formations. Fine grained sediments restrict lateral movement of groundwater and induce vertical infiltration, while coarse grained sediments allow vertical flow with increased transmissivity.

The regional shallow groundwater flow is expected to follow the local topography and discharge to local area creeks and streams. Local deviation from the regional groundwater flow directions may occur in response to changes in topography and/or soil stratigraphy, as well as the presence of surface water features and/or existing subsurface infrastructure.

No local aquifers were identified that could negatively impact the subject Site.

3 Site Setting

3.1 Site Topography and Drainage

The Site is rectangular in shape and has an area of approximately 15,500 m². The Site is currently occupied by a commercial building (Site building). The areas surrounding the Site building are covered with asphalt and landscaped areas. The topography of the Site generally slopes to the south/southeast and based on the borehole logs, the ground elevation ranges between 105.36 m and 104.45 m above sea level (asl).

3.2 Local Surface Water Features

The Site does not feature any surface water bodies on the Site. The closest surface water body to the Site is Sixteen Mile Creek, located approximately 470 m southwest of the Site. The Site is situated within the Lower Morrison Creek watershed and is not part of a Conservation Halton regulated area.

3.3 Ministry of Environment, Conservation and Parks Water Well Review

Well Records from the Ministry of Environment, Conservation and Parks (MECP) Water Well Record Database (WWR) were reviewed to determine the number of water wells and locations present within a 500 m radius of the Site boundaries.

The MECP WWR database indicated one-hundred one (101) well records within 500 m radius of the Site. All identified wells are shown on Figure 4. A summary of the Water Well Records is included in Appendix B, Table B-1. A review of the records indicated that the majority of the wells were classified as abandoned or for observation well, monitoring well and test hole purposes within 500 m radius of the Site. One (1) supply water well was identified at the Queen Elizabeth Way, located approximate 265 m southwest of the Site. The well was installed in 1948 and the well is located in a developed area, the supply well is likely not present. Given the area is serviced by municipal system, no private well water user is expected.

3.4 Permit to Take Water and Environmental Activity and Sector Registry Search

The MECP also maintains a database of all active and expired Permit to Take Water (PTTW) and Environmental Activity and Sector Registry (EASR) items related to construction dewatering and pumping test. There are seven (7) expired PTTW registrations and two (2) expired EASR registrations within 1 km of the Site and are summarized in Table B-2, Appendix B. The location for each registration is shown on Figure 5.

4 Field Program

4.1 Borehole and Monitoring Well Details

BIG advanced thirteen (13) boreholes (BH101 to BH113) to a maximum depth of 30.8 m below ground surface (bgs) between February 10 and March 1, 2023, and instrumented ten (10) boreholes with monitoring wells (BH/MW102, BH/MW105 to BH/MW113). The boreholes were advanced by using a truck mounted solid stem and hollow stem continuous flight auger equipment under the direction and supervision of BIG field personnel. Soil samples were retrieved at regular intervals with a 50 mm outside diameter split barrel sampler drive and accordance with the Standard Penetration Test Procedure (ASTM D1586). The samples were logged in the field and returned to the BIG laboratory for detailed visual examination. The borehole records and monitoring well construction detail are included in Appendix A.

The following monitoring wells were previously installed at the Site:

- a) Five (5) monitoring wells (BH/MW1, BH/MW3, BH/MW4, BH/MW6, BH/MW8) installed by BIG in 2022.

Figure 6 is a detailed Borehole/Monitoring Well Location Map of the Site. The borehole logs are attached in Appendix A.

4.2 Site Specific Overburden Geology

The borehole locations are shown on Figure 6 and detailed subsurface and bedrock conditions are presented on the borehole logs in Appendix A. The following table is provided in addition to the borehole descriptions to provide a general summary of the soil conditions. The soil descriptions are predominately based on BIG's investigation, however, where applicable soil conditions encountered during previous investigation by others are included. The soil boundaries indicated on the borehole logs and discussed herein are inferred from the visual observations and auger resistance and should not be regarded as exact planes of geological change.

The soil conditions encountered at the borehole locations are summarized below. A stratigraphic cross-section across the property as aligned on Figure 6 is included as Figure 7.

Table 4-1: Soil description

Layer	Description
Asphalt Pavement	All boreholes were drilled through the existing pavement. The pavement structure consists of approximately 40 to 100 mm (average 57 mm) of asphaltic concrete over 100 to 240 mm (average 133 mm) of granular base, with the exception of BH/MW111 where 50 mm asphalt over 140 mm crush asphalt and 180 mm granular base were encountered.
Fill	Fill materials were encountered below the asphalt pavement in all boreholes and extended to depths ranging from 0.8 m to 2.3 m bgs. The fill materials encountered are heterogeneous in nature and primarily consist of silty clay, clayey silt, sandy silt, silty sand and sand and gravel, with a trace of organics, black stains/streaks and shale fragments.
Silty Clay/Clayey Silt/Shale Complex	A stratum of silty clay/clayey silt/shale complex was encountered below the fill materials in all boreholes except BH/MW4, BH7 and BH/MW8. The deposits extended to depths ranging from approximately 1.5 to 3.1 m bgs.
Shale Bedrock	Below the overburden soils in all boreholes, reddish brown to grey, highly weathered to fresh shale bedrock of Georgian Bay Formation was encountered. All boreholes were terminated within the shale bedrock at depths ranging from 2.7 to 30.8 m bgs.

4.3 Water Level Monitoring

Water levels at all monitoring well locations were recorded after installation. A summary of all available water level observations is included in Table 4-2. Groundwater was observed in some monitoring wells on March 23, 2023, and depths to the groundwater ranged from 2.46 m to 22.00 m bgs. The shallow wells BH/MW1, BH/MW3, BH/MW4, BH/MW6, BH/MW8, BH/MW102, BH/MW105 and BH/MW106 were observed with groundwater elevations that ranged from 102.85 m to 100.68 m asl. The deep wells BH/MW108, BH/MW109, BH/MW110, BH/MW111, BH/MW112 and BH/MW113 were observed with groundwater elevations that ranged from 101.46 m to 83.08 m asl.

An interpreted shallow and deep groundwater contour maps for the water level measurements recorded on March 23, 2023, is included as Figures 8A and 8B, respectively. Based on the water level measurements obtained, the inferred shallow direction of groundwater flow across the Site is interpreted to be to the southeastern direction. Based on the water level measurements obtained, the inferred deep direction of groundwater flow across the Site is interpreted to be to the southern direction.

Seasonal variability can produce significant changes to the static water level. It has been observed that groundwater can rise and lower in response to changing weather and climate.

Table 4-2: Monitoring Well Details and Water Levels Elevations

Well ID	Consultant	Ground Elevation (m asl)	Well Depth (m bgs)	May 31, 2022		March 3, 2023		March 23, 2023	
				Water Level (m bgs)	Elevation (m asl)	Water Level (m bgs)	Elevation (m asl)	Water Level (m bgs)	Elevation (m asl)
BH/MW1	BIG	104.45	6.1	3.90	100.55	3.36	101.09	3.59	100.86
BH/MW3	BIG	104.84	6.1	3.37	101.47	2.88	101.96	3.06	101.78
BH/MW4	BIG	105.05	6.1	3.44	101.61	3.08	101.97	3.18	101.87
BH/MW6	BIG	105.36	6.1	2.92	102.44	N/A	N/A	2.51	102.85
BH/MW8	BIG	105.12	6.1	4.55	100.57	N/A	N/A	4.37	100.75
BH/MW102	BIG	105.04	5.9	-	-	3.52	101.52	3.42	101.62
BH/MW105	BIG	104.96	6.1	-	-	4.20	100.76	4.28	100.68
BH/MW106	BIG	105.13	6.1	-	-	2.41	102.72	2.46	102.67
BH/MW107	BIG	104.65	5.9	-	-	N/A	N/A	N/A	N/A
BH/MW108	BIG	104.51	13.7	-	-	3.45	101.06	3.57	100.94
BH/MW109	BIG	105.09	24.4	-	-	23.09	82.00	17.43	87.66
BH/MW110	BIG	105.30	12.2	-	-	3.66	101.64	3.84	101.46
BH/MW111	BIG	105.08	18.3	-	-	6.84	98.24	6.71	98.37
BH/MW112	BIG	104.85	15.2	-	-	5.04	99.81	5.05	99.80
BH/MW113	BIG	105.08	24.4	-	-	23.84	81.24	22.00	83.08

Notes:

N/A – Not accessible

4.4 Hydraulic Conductivity Testing

The hydraulic conductivity test was completed to estimate the saturated hydraulic conductivity (K) of the soil at the well screen depth at selected monitoring well locations.

In advance of performing SWRT, the monitoring well was developed to remove the potential presence of fine sediments. The development process involved purging of the monitoring wells to induce the flow of fresh formation water through the screen. The monitoring well water level was permitted to fully recover prior to performing SWRTs.

During the SWRT, a slug of water was instantaneously removed from the well and the response to the water level is recorded. The Hydraulic Conductivity values for each of the tested wells were calculated from the SWRT data using Aqtesolv Software and the Hvorslev solution for unconfined conditions. The semi-log plots for normalized drawdown versus time are included in Appendix C.

The summary of the hydraulic conductivity (K) values estimated from the SWRTs are provided below in Table 4-3:

Table 4-3: Summary of Hydraulic Conductivity (K) Testing Results

Monitoring Well	Well Depth (m bgs)	Screen Material	Hydraulic Conductivity (m/s)
BH/MW1	6.1	Shale	7.46×10^{-6}
BH/MW3	6.1	Shale	2.71×10^{-5}
BH/MW4	6.1	Shale	5.87×10^{-8}
BH/MW6	6.1	Shale	1.24×10^{-5}
BH/MW8	6.1	Shale	2.28×10^{-6}
BH/MW102	5.9	Shale	3.26×10^{-6}
BH/MW106	6.1	Shale	4.87×10^{-6}
BH/MW108	13.7	Shale	4.07×10^{-6}
BH/MW109	24.4	Shale	1.52×10^{-8}
BH/MW110	12.2	Shale	1.27×10^{-6}
BH/MW111	18.3	Shale	1.47×10^{-7}
BH/MW112	15.2	Shale	5.48×10^{-6}
BH/MW113	24.4	Shale	3.73×10^{-8}
Geometric mean K value (m/s)			1.22×10^{-6}

The SWRT provides an estimate of K for the geological formation in the immediate media zone surrounding the well screen and may not be representative of bulk formation hydraulic conductivities.

4.5 Groundwater Sampling

To assess the suitability for discharge of pumped groundwater to the Region of Halton Sanitary or Town of Oakville Storm Sewer during dewatering activities, a groundwater sample was collected from BH/MW1 on June 3, 2022.

Prior to collection of the samples, approximately three (3) standing well volumes of groundwater were purged from the well. The sample was collected and placed into pre-cleaned laboratory-supplied vials and/or bottles provided with analytical test group specific preservatives, as required.

The sample was not field filtered. Dedicated nitrile gloves were used during sample handling. The groundwater sample was submitted to an independent laboratory, Bureau Veritas Laboratories, of Mississauga, Ontario, for analysis.

For the assessment purposes, the analytical results were compared to Table 1 – Limits for Sanitary and Combined Sewer Discharge (By-Law No. 2-03) of the Regional Municipality of Halton; and Table 2 – Limits for Storm Sewer Discharge (By-Law No 2009-031) of the Corporation of the Town of Oakville.

The laboratory Certificate of Analysis (CofAs) and chain of custody are enclosed in Appendix D.

The laboratory CofAs show that there were no exceedances against the Table 1 – Limits for Sanitary and Combined Sewer Discharge.

When compared against the more stringent Table 2 – Limits for Storm Sewer Discharge, the sample indicated exceedance for benzene, total manganese (Mn) and total suspended solids (TSS). A summary of the exceedance is provided in Table 4-4.

Table 4-4: Summary of Analytical Results

Parameter	Limits for Sanitary and Combined Sewer Discharge (mg/L) (Table 1)	Limits for Storm Sewer Discharge (mg/L) (Table 2)	Concentration for BH/MW1 (mg/L) (June 3, 2022)
Benzene	0.01	0.002	0.0024
Total Manganese (Mn)	5	0.05	0.20
Total Suspended Solids (TSS)	350	15	110

Notes:

Bold indicates concentration exceeds the Storm Sewer Discharge Limit.

If the groundwater encountered is discharged to the Region of Halton sanitary and combined sewer, no treatment will be required. A treatment is required prior to discharge to the Town of Oakville storm sewer.

Although the water quality meets the limits of Region of Halton sanitary and combined sewer, the Region typically does not typically allow groundwater discharge to the Regional sewer system. Alternative discharge method or negotiation with the Town of Oakville will be required.

5 Temporary Construction Dewatering

5.1 Construction Dewatering Requirements

It is BIG's understanding that the proposed re-development at the Site will consist of three (3) condominium towers (referenced as 47-storey Building A, 50-storey Building B and 55-storey Building C, from west to east) with 3-storey podium and six (6) levels of underground parking structure (P6). Based on A200, Level P6 Plan, prepared by TAI, dated March 20, 2024, the finished floor elevation (FFE) of P6 is at 85.28 m asl. The footing elevation is assumed approximately 2 m below FFE.

The stabilized groundwater level measurements, both in shallow and deep monitoring wells, observed in some monitoring wells on March 23, 2023 were found to be varying between elevations of 102.85 m to 83.08 m asl. For conservative purposes, the construction dewatering calculation is based on an open cut excavation at the present time. To excavate under dry conditions, the water level is anticipated to be lowered at least to a minimum of approximately 1.0 m below the footing elevation.

If the footing or foundation elevation is deeper than the assumptions in this report, additional investigation will be required.

Additional dewatering capacity may be required to maintain dry conditions within the excavation during and following significant precipitation events. It should be noted that the dewatering estimates provided in this report are based on the conceptual building information available at this time. If design details are changed (including any changes to excavation depth), the dewatering estimates must be revised to include the final layout of the development.

5.2 Construction Dewatering Flow Rate Assumptions

The assumptions used for the calculation of the dewatering rate for the proposed development are presented in Table 5-1.

Table 5-1 - Dewatering Estimate Assumptions

Input Parameter	P6	Notes
Established Grade Elevation (m asl)	104.96	Based on drawing A401, North and South Elevations, prepared by TAI, dated March 20, 2024
P6 FFE (m asl)	85.28	P6 FFE is 85.28 m asl based on drawing A200, Level P6 Plan, prepared by TAI, dated March 20, 2024
Footing Elevation (m asl)	83.28	Assumed 2 m below FFE
Dewatered Elevation Target (m asl)	82.28	Assumed 1 m below footing
Groundwater Elevation (m asl)	102.85	Highest groundwater elevation (March 23, 2023)
Estimated Excavation Area	150 m x 90 m	Based on drawing A200, Level P6 Plan, prepared by TAI, dated March 20, 2024
Hydraulic Conductivity (m/s)	1.22E-6	Geometric mean K

5.3 Dewatering Flow Rate Equation

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

$$Q_w = \frac{K(x + a)(H^2 - h^2)}{L_o}$$

Where:

Q _w	= Rate of pumping (m ³ /s)
x	= Length of excavation (m)
a	= Width of excavation (m)
K	= Hydraulic conductivity (m/s)
H	= Head beyond the influence of pumping (static groundwater elevation) (m)
h	= Head above base of aquifer at the excavation (m)
L _o	= Distance to Line Source (m)

It is expected that the initial dewatering rate will be higher in order to remove groundwater from within the overburden and bedrock formations. The dewatering rates are expected to decrease once the target water level is achieved in the excavation footprint as groundwater will have been removed locally from storage resulting in lower seepage rates into the excavation. Additionally, the use of a continuous caisson shoring system will further reduce groundwater migration into the excavation reducing the ongoing seepage rate.

5.4 Radius of Influence

The Radius of Influence (ROI) for the construction dewatering is based on the empirical Sichardt Equation. This equation is used to predict the distance at which the drawdown resulting from pumping is negligible. This equation is empirical and was developed to provide representative flow rates using the steady state flow dewatering equations, as discussed below.

It is noted that in steady state conditions, the radius of influence of pumping will extend until boundary flow conditions are reached and provide sufficient water inputs to the aquifer, such as recharge and surface water bodies. As a result, the distance of influence calculated using Sichardt equation is used to provide a representative flow rate calculation, but it is not precise in determining the actual radius influenced by pumping.

The ROI of pumping (dewatering) for linear flow is calculated based on the Sichardt equation, which is described as follows:

$$L_o = 1750 (H - h)\sqrt{K}$$

Where:

K	= Hydraulic conductivity (m/s)
H	= Static Saturated Head (m)
h	= Dynamic Saturated Head (m)

Based on the Sichardt equation and the geometric mean K value, the ROI is approximately 39.7 m from the edge of the excavation for linear flow. The ROI calculation is provided in Appendix E.

The ROI calculation is a conservative methodology and is calculated based on the assumption of active pumping during the construction dewatering. It should be noted that most of the water will be pumped during the first stage of the construction period or when a rain event occurs.

Although the ROI was conservatively predicted as 39.7 m from the edge of the excavation, over a period of time, the drawdown curve will be very close to the bottom of the excavation and thus resulting in negligible ROI. The likelihood for impacts to the nearby structures are negligible. Additionally, the use of a shoring system will further reduce radius of influence.

5.5 Results of Construction Dewatering Flow Rate Estimates

Based on the assumptions provided in this report, the results of the dewatering rate estimate are as follows:

Table 5-2 Summary of Construction Dewatering Flow Rate Estimate

Underground Levels	Construction Dewatering Flow Rate Without Safety Factor (L/day)	Peak Construction Dewatering Flow Rate Including Safety Factor of 1.5 (L/day)
P6	266,000	399,000

Construction dewatering flow rate estimates are provided in Table E-1, in Appendix E.

The peak construction dewatering flow rate includes a factor of safety of one and a half (1.5) to account for accumulation of rainfall, seasonal fluctuations in the groundwater table, flow from beddings of existing sewers, and variation in hydrogeological properties beyond those encountered during the course of this study. This total dewatering flow rate also provides additional capacity for the dewatering contractors. Given that the predicted dewatering volume exceeds the 50,000 L/day limit, an EASR for construction dewatering will be required.

It should be noted that if caisson wall shoring system is considered for the subject Site, reduction in groundwater quantities can be anticipated.

Please note that it is the responsibility of the contractor to ensure dry conditions are maintained within the excavation at all times. The dewatering contractor should ensure that silt removal or replacement from subsoil be eliminated and monitored during remediation dewatering at all times.

Additional pumping capacity may be required to maintain dry conditions within the excavation during and following significant precipitation events. Additionally, the presence of near-surface fill material could hold significant groundwater.

The maximum flow calculation is intended to provide a conservative estimate to account for unforeseeable conditions that may arise during construction. It should be noted that the dewatering estimate provided in this report are based on the proposed development information available at this time. If changes to the design are implemented (e.g., increase to planned excavation depths, widening of excavations, etc.), the dewatering estimates must be revised to include and reflect future changes.

6 Long Term Discharge Estimate

6.1 Long-Term Dewatering Assumptions

Given that the groundwater level is above foundation depths for the development, a permanent foundation sub-drain is recommended. It is assumed that the below grade structure will feature a perimeter drain and sub-drain system installed at approximately 0.5 m below the FFE elevation. Table 6-1 presents the assumptions used to calculate the long-term drainage rate estimates.

Once the design is available, BIG needs to review and re-evaluate the dewatering estimates. If the foundation elevation is deeper than the assumptions in this report, additional investigation will be required.

Table 6-1 - Dewatering Estimate Assumptions

Input Parameter	P6	Notes
Established Grade Elevation (m asl)	104.96	Based on drawing A401, North and South Elevations, prepared by TAI, dated March 20, 2024
P6 FFE (m asl)	85.28	P6 FFE is 85.28 m asl based on drawing A200, Level P6 Plan, prepared by TAI, dated March 20, 2024
Groundwater Elevation (m asl)	98.37	Highest deep groundwater elevation from BH/MW111 (March 23, 2023)
Sub-drain Elevation Target (m asl)	84.78	Assumed 0.5 m below the P6 basement elevation
Drainage Dimensions	150 m x 90 m	Based on drawing A200, Level P6 Plan, prepared by TAI, dated March 20, 2024
Hydraulic Conductivity (m/s)	2.30E-07	Geometric mean K of deep wells

6.2 Radius of Influence

The ROI calculation is a conservative methodology and is calculated based on the assumption of active pumping during long-term dewatering. It should be noted that there will be no active pumping during long-term dewatering. The foundation drains will be constructed below the floor slab and/or near the foundation and the groundwater would passively drain into these sub drains and discharged directly to sumps. Due to the nature of overburden material, the groundwater will flow through the natural gradient that exists on the Site and passively flow into the foundation sub-drains and will not be actively pumped. Although, the ROI which was conservatively predicted was at 29.0 m from the edge of the sub-drain, over a period of time, the drawdown curve will be very close to the foundation walls and thus resulting in negligible ROI.

6.3 Long-Term Perimeter Drain Flow Rate Estimate

Based on the assumptions provided in this report (outlined in Section 6.1), the results of the long-term discharge volume estimate are summarized below:

Table 6-2 Summary of Long-Term Discharge Flow Rate

Underground Levels	Long-Term Peak Flow Rate (L/day)	Notes
P6	66,000	Long term sub-drain flow value rounded based on Dupuit's equation including flow from all sides. Safety factor of 2 was used.

The results for the estimate are available in Appendix F, Table F-1. The maximum flow rate estimates represent short term events and are not indicative of long-term continuous contributions to the drainage system. Intermittent cycling of sump pumps and seasonal fluctuation in groundwater regimes should be considered for pump specifications. Given that the predicted dewatering volume exceeds the 50,000 L/day limit, a PTTW is required.

It should be noted that the dewatering estimates provided in this report are based on the proposed building information available at this time.

If the groundwater encountered during long-term dewatering is discharged to the Region of Halton sanitary and combined sewer, no treatment will be required. A treatment is required prior to discharge to the Town of Oakville storm sewer.

In the event that the long-term foundation drainage is not allowed to discharge into the City's sewer system, the proposed building may be designed and supported by "tanked" water-proofed continuous raft foundation without permanent dewatering (i.e., avoiding permanent perimeter and under-floor drainage system).

7 Potential Groundwater Impacts

7.1 Impacts to Nearby Groundwater Users

The Site lies within an urban area of Oakville, based on the MECP WWR database, one (1) supply water well was identified at the Queen Elizabeth Way, located approximate 265 m southwest of the Site. The well was installed in 1948, and the well is located in a developed area, the supply well is likely not present. Given the area is serviced by municipal system, no private well water user is expected. There are no potential impacts to nearby groundwater users due to construction dewatering or long-term dewatering is expected.

7.2 Impacts to Nearby Structures

As discussed in Section 5, given the groundwater table is above the excavation, construction dewatering is required. The ROI calculation is a conservative methodology and is calculated based on the assumption of active pumping during the construction dewatering. It should be noted that most of the water will be pumped during the first stage of the construction period or when a rain event occurs. Although the ROI was conservatively predicted as 39.7 m from the edge of the excavation, over a period of time, the drawdown curve will be very close to the bottom of the excavation and thus resulting in negligible ROI. The likelihood for impacts to the nearby structures are negligible. Additionally, the use of a shoring system will further reduce radius of influence.

As discussed in Section 6, given that the groundwater level is above foundation depths for the development, a permanent foundation sub-drain is recommended. It is assumed that the below grade structure will feature a perimeter drain and sub-drain system installed at approximately 0.5 m below the basement elevation. If the foundation drains operate on a long-term basis, the radius of influence was conservatively estimated at 29.0 m from the edge of the sub-drain. However, unlike the construction dewatering activities where active dewatering takes places, the long-term dewatering operates passively where water would flow through fractured bedrock primarily via vertical drains. Therefore, the actual radius of influence will be less than the predicted distance and no impacts to the surrounding feature is expected.

8 Water Taking and Discharge Permits

8.1 EASR and PTTW

During the active construction dewatering phase, the volume of water expected to be pumped exceeds the daily limit on groundwater taking under the Ontario Water Resources Act (50,000 L/day) if the excavation is to be undertaken all at once. Therefore, it is necessary to register the construction dewatering under the EASR guidelines, as cumulative discharge rate for construction is 399,000 L/day. The limit for water taking under an EASR is 400,000 L/day. If combined storm and groundwater were to exceed this limit, the dewatering rate would need to be capped to 400,000 L/day of pumped water. If it is necessary to exceed 400,000 L/day of water taking, a Permit to Take Water as per O.Reg.387/04 would be required.

Given that the predicted long-term dewatering volume exceeds the 50,000 L/day limit, a PTTW for long-term discharge is required.

9 Conclusions

Based on the findings of the Preliminary Hydrogeological Investigation, the following summary of conclusions are provided:

- a) It is BIG's understanding that the proposed re-development will consist of three (3) condominium towers (referenced as 47-storey Building A, 50-storey Building B and 55-storey Building C, from west to east) with 3-storey podium and six (6) levels of underground parking structure;
- b) The Site is located within a physiographic region within the Iroquois Plain known as the shale plains;
- c) The surficial geology of the immediate area around the Site is described as Paleozoic bedrock;
- d) The MECP WWR database indicated one-hundred one (101) well records within 500 m radius of the Site. One (1) supply water well was identified at the Queen Elizabeth Way, located approximate 265 m southwest of the Site. The well was installed in 1948 and the well is located in a developed area, the supply well is likely not present. Given the area is serviced by municipal system, no private well water user is expected;
- e) Groundwater was observed in some monitoring wells on March 23, 2023 and depths to the groundwater ranged from 2.46 m to 22.00 m bgs. The shallow wells BH/MW1, BH/MW3, BH/MW4, BH/MW6, BH/MW8, BH/MW102, BH/MW105 and BH/MW106 were observed with groundwater elevations that ranged from 102.85 m to 100.68 m asl. The deep wells BH/MW108, BH/MW109, BH/MW110, BH/MW111, BH/MW112 and BH/MW113 were observed with groundwater elevations that ranged from 101.46 m to 83.08 m asl;
- f) Based on the water level measurements obtained, the inferred shallow direction of groundwater flow across the Site is interpreted to be to the southeastern direction. Based on the water level measurements obtained, the inferred deep direction of groundwater flow across the Site is interpreted to be to the southern direction;
- g) The estimated hydraulic conductivity of the soil and bedrock ranges from 2.71×10^{-5} m/s to 1.52×10^{-8} m/s with a geometric mean of 1.22×10^{-6} m/s;
- h) Based on the assumptions outlined in this report, the estimated peak construction dewatering flow rate including rainfall for the proposed construction activity is 399,000 L/day;
- i) Based on the assumptions outlined in this report, the cumulative contribution to the foundation drains is 66,000 L/day;
- j) Given that the predicted dewatering volume exceeds the 50,000 L/day limit, an EASR for construction dewatering is required;
- k) Given that the predicted long-term dewatering volume exceeds the 50,000 L/day limit, a PTTW for long-term discharge is required;
- l) The laboratory CofA shows that no exceedance under Table 1 – Limits for Sanitary and Combined Sewer Discharge;
- m) When compared against the more stringent Table 2 – Limits for Storm Sewer Discharge, the sample indicated exceedances for benzene, total manganese (Mn) and total suspended solids (TSS);
- n) If the groundwater encountered is discharged to the Region of Halton sanitary and combined sewer, no treatment will be required. A treatment is required prior to discharge to the Town of Oakville storm sewer; and,
- o) Although the water quality meets the limits of Region of Halton sanitary and combined sewer, the Region typically does not typically allow groundwater discharge to the Regional sewer system. Alternative discharge method or negotiation with the Town of Oakville will be required.

It should be noted that the comments and recommendations in this report are based on the assumption that the present design concept described throughout the report will proceed to construction. Any changes to the design concept may result in a modification to the recommendations provided in this report. It is noted that these conclusions and recommendations should be read in conjunction with the entirety of the report.

10 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 conclusion and recommendations presented within this report reflect Site conditions existing at the time of the assessment. BIG must be contacted immediately if any unforeseen Site conditions are experienced during the dewatering activities. This will allow BIG to review the new findings and provide appropriate recommendations to allow the construction to proceed in a timely and cost-effective manner.

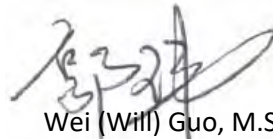
Our undertaking at BIG, therefore, is to perform our work within limits prescribed by our clients, with the usual thoroughness and competence of the geoscience profession. No other warranty or presentation, either expressed or implied, is included or intended in this report.

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

Yours truly,

B.I.G. Consulting Inc.


Travis Van Holst, M.Env.Sc., GIT
Environmental Scientist

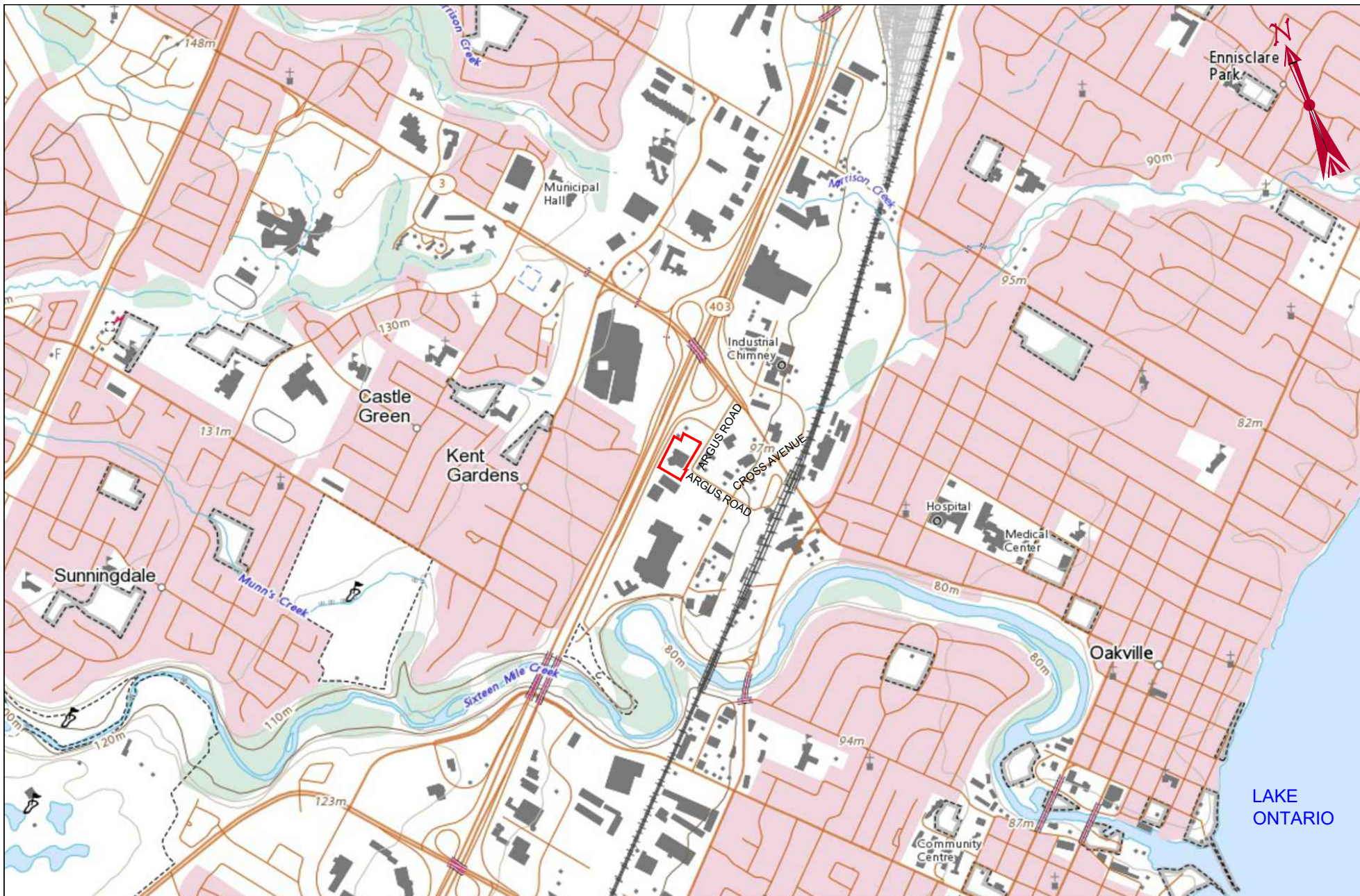

Wei (Will) Guo, M.Sc., P.Ge.
Senior Hydrogeologist



11 References

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- The Regional Municipality of Halton (2001). By-Law No.2-03


FIGURES



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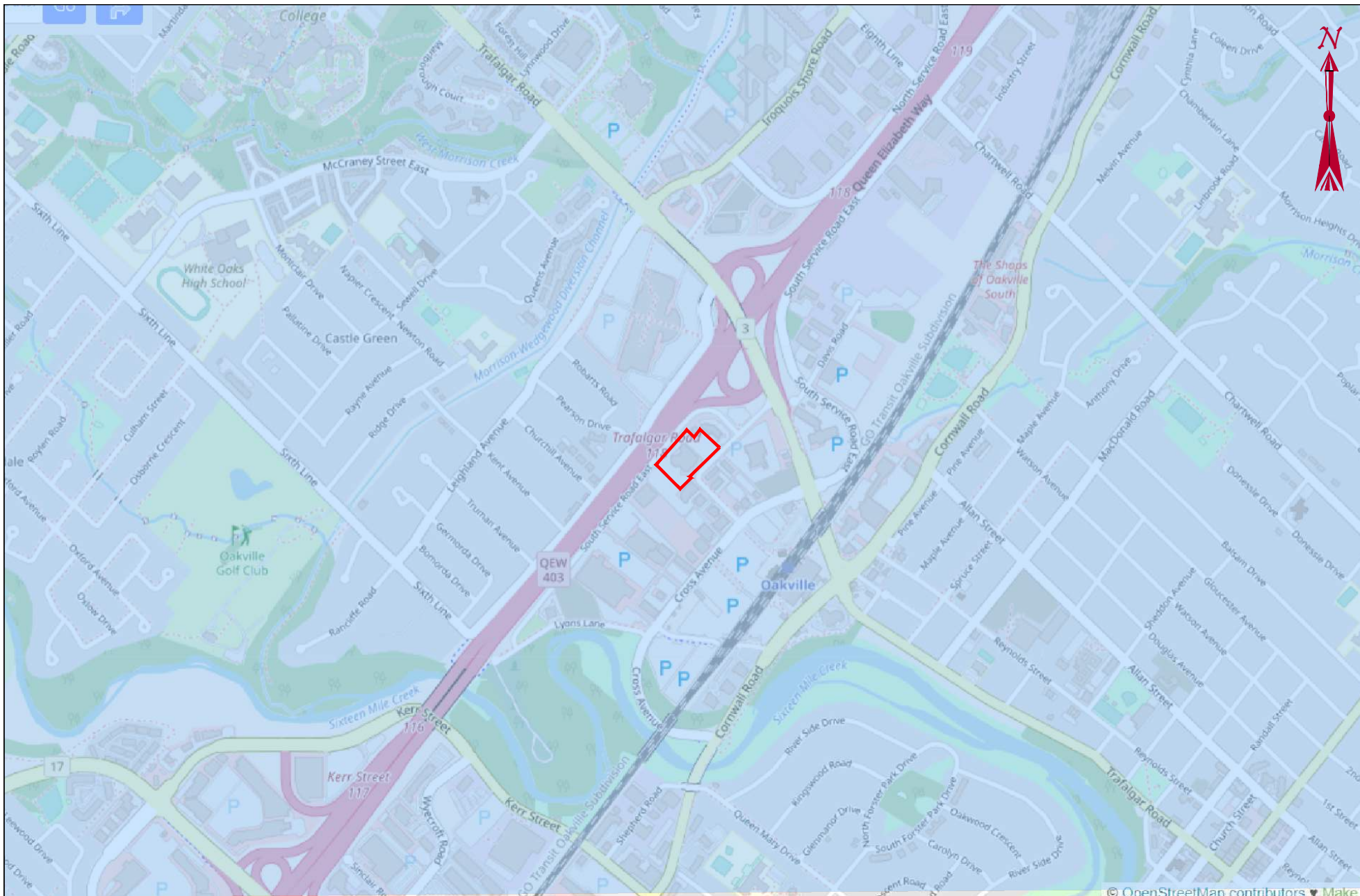
LEGEND
 SITE BOUNDARY

SCALE
 100m 0m 100m 200m 300m 400m 500m

TITLE AND LOCATION

**SITE LOCATION PLAN
 HYDROGEOLOGICAL
 INVESTIGATION
 590 ARGUS ROAD,
 OAKVILLE, ONTARIO**

PROJECT NO. BIGC-ENV-554D	DWN. M.M.
SCALE AS NOTED	CK. T.V.H
DATE MAY 2023	FIG NO. 1



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LEGEND

- SITE BOUNDARY
- IROQUOIS PLAIN



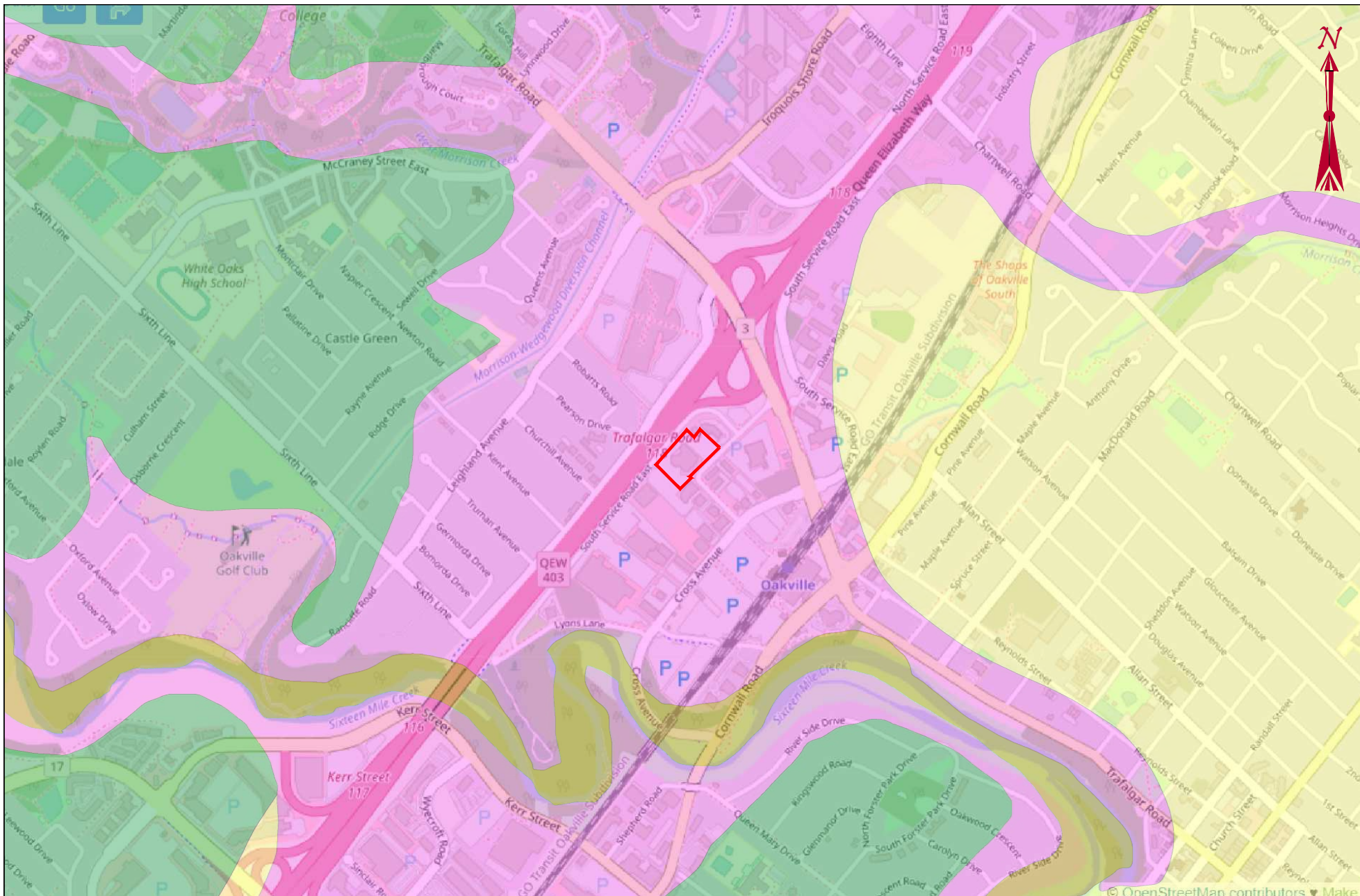
TITLE AND LOCATION

**PHYSIOGRAPHIC REGIONS
 OF SOUTHERN ONTARIO
 HYDROGEOLOGICAL
 INVESTIGATION
 590 ARGUS ROAD,
 OAKVILLE, ONTARIO**

NOTES:

1. PHYSIOGRAPHIC REGIONS PRODUCED BY MINISTRY OF ENERGY, NORTHERN DEVELOPMENT AND MINES, 2017
2. IMAGERY OBTAINED FROM OPENSTREETMAP, 2022

PROJECT NO.	DWN.
BIGC-ENV-554D	M.M.
SCALE	CK.
AS NOTED	T.V.H
DATE	FIG. NO.
MAY 2023	2

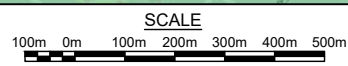


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LEGEND	
	SITE BOUNDARY
	COARSE-TEXTURED GLACIOLACUSTRINE DEPOSITS
	TILL
	PALEOZOIC BEDROCK
	MODERN ALLUVIAL DEPOSITS

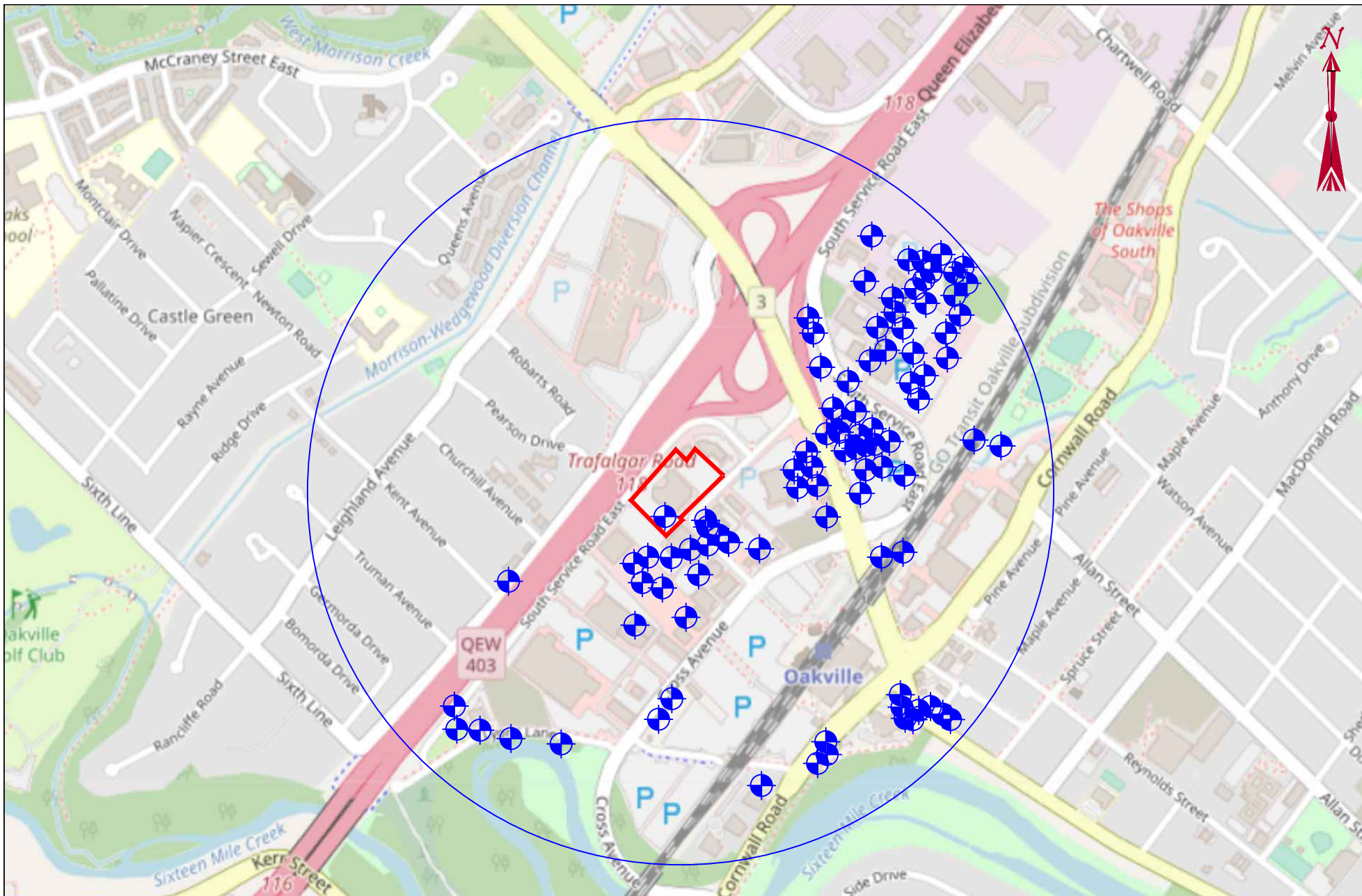


- NOTES:**
1. SURFICIAL GEOLOGY PRODUCED BY MINISTRY OF ENERGY, NORTHERN DEVELOPMENT AND MINES, 2017
 2. IMAGERY OBTAINED FROM OPENSTREETMAP, 2022

TITLE AND LOCATION

**SURFICIAL GEOLOGY MAP
 HYDROGEOLOGICAL
 INVESTIGATION
 590 ARGUS ROAD,
 OAKVILLE, ONTARIO**

PROJECT NO.	DWN.
BIGC-ENV-554D	M.M.
SCALE	CK.
AS NOTED	T.V.H
DATE	FIG. NO.
MAY 2023	3



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LEGEND

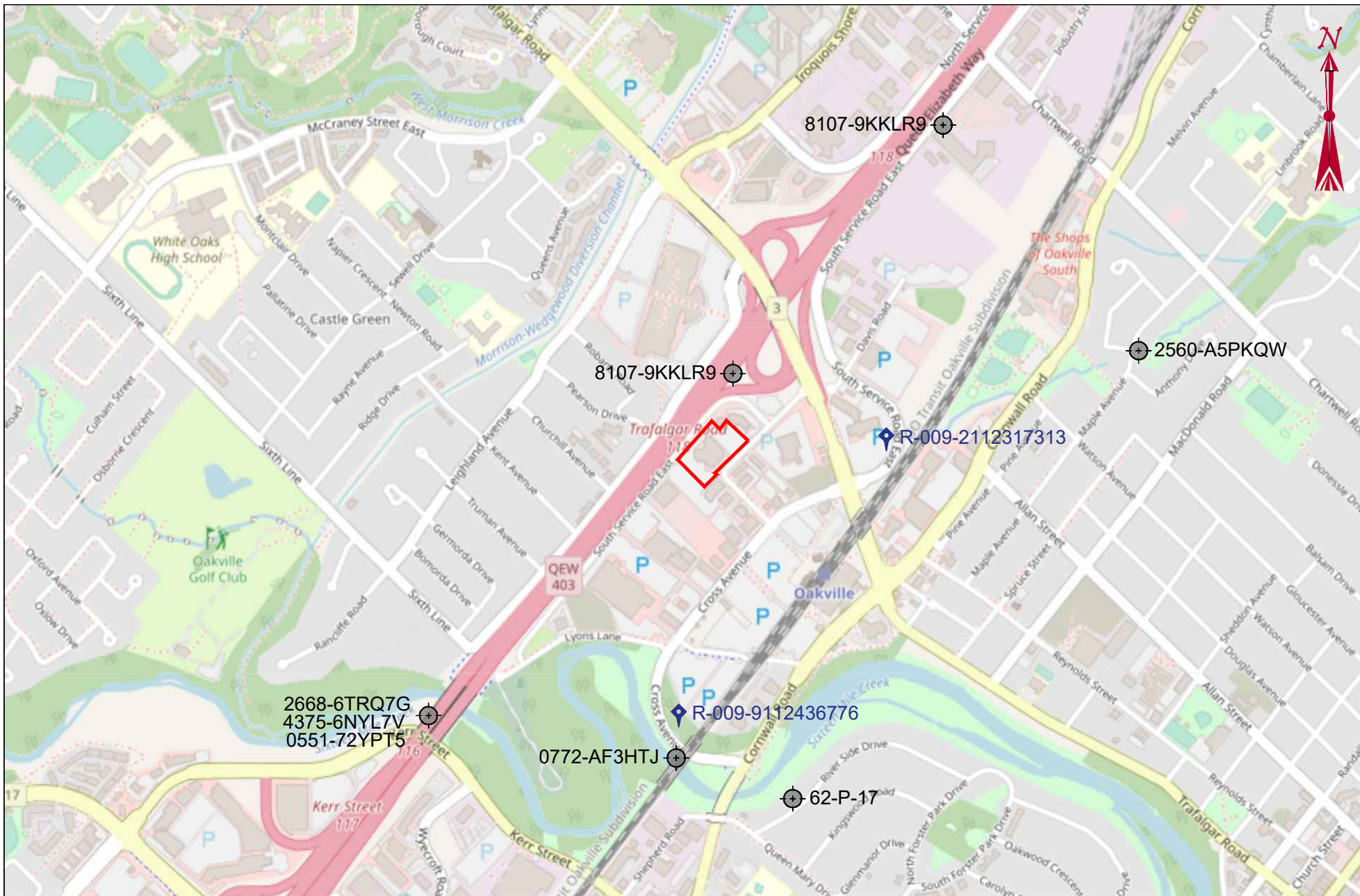
- SITE BOUNDARY
- WELL RECORD STUDY AREA BOUNDARY
- WELL RECORD LOCATION (2022)



TITLE AND LOCATION

**MECP WATER WELL
 RECORD LOCATIONS
 HYDROGEOLOGICAL
 INVESTIGATION
 590 ARGUS ROAD,
 OAKVILLE, ONTARIO**

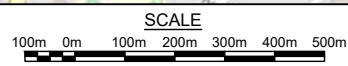
PROJECT NO. BIGC-ENV-554D	DWN. M.M.
SCALE AS NOTED	CK. T.V.H
DATE MAY 2023	FIG. NO. 4



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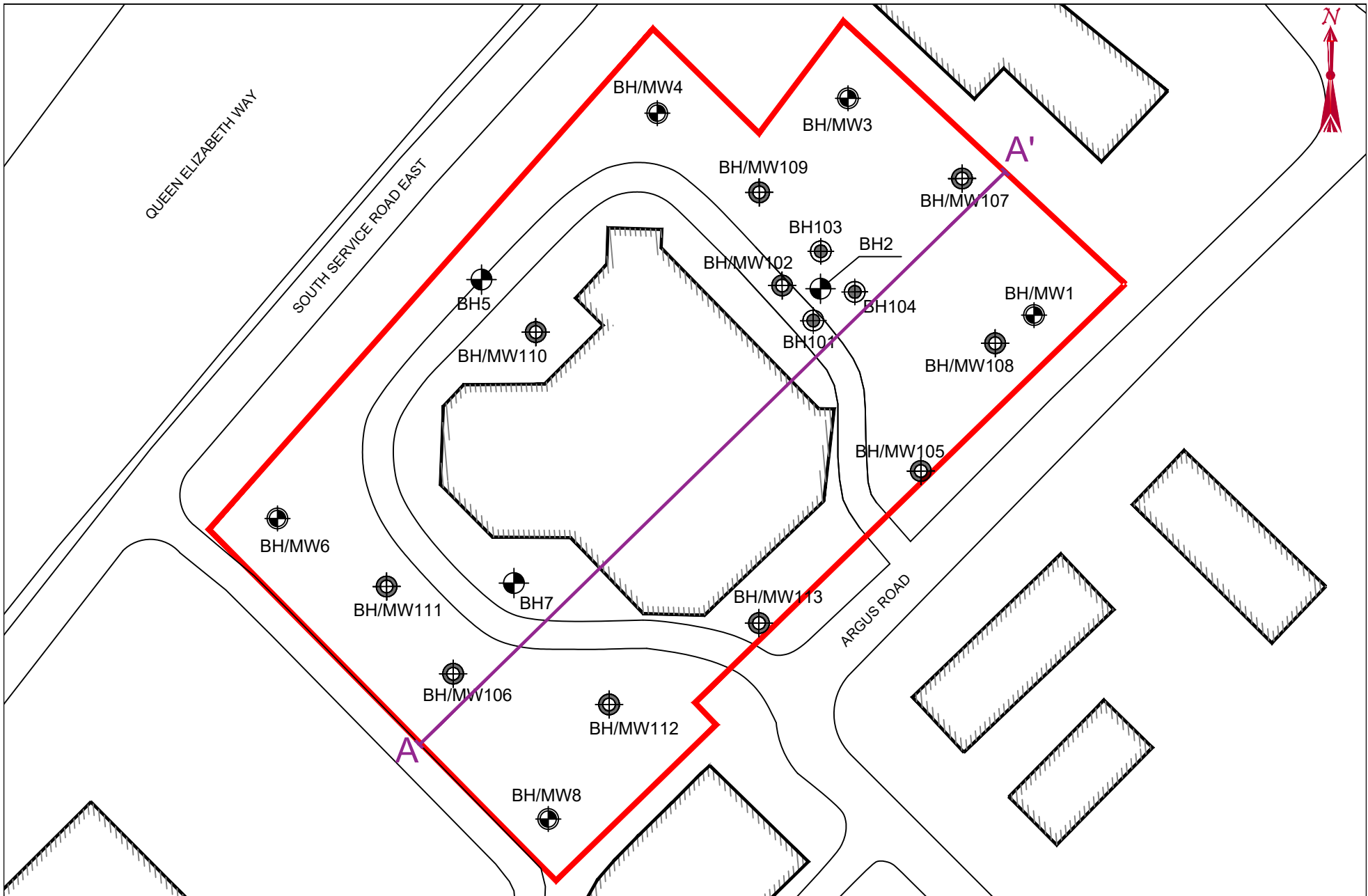
- LEGEND**
- SITE BOUNDARY
 - ◆ EASR RECORD LOCATION
 - ⊕ PTTW RECORD LOCATION



TITLE AND LOCATION

**PTTW AND EASR
 RECORD LOCATIONS
 PRELIMINARY
 HYDROGEOLOGICAL
 INVESTIGATION
 590 ARGUS ROAD,
 OAKVILLE, ONTARIO**

PROJECT NO. BIGC-ENV-554D	DWN. M.M.
SCALE AS NOTED	CK. T.V.H
DATE MAY 2023	FIG. NO.









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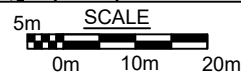
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LEGEND

-  SITE BOUNDARY
-  BUILDING FOOTPRINT
-  LOCATION OF BOREHOLE/MONITORING WELL (BIG, 2022)
-  LOCATION OF BOREHOLE (BIG, 2022)
-  LOCATION OF THE BOREHOLE/MONITORING WELL (BIG, FEBRUARY 2023)
-  LOCATION OF THE BOREHOLE (BIG, FEBRUARY 2023)

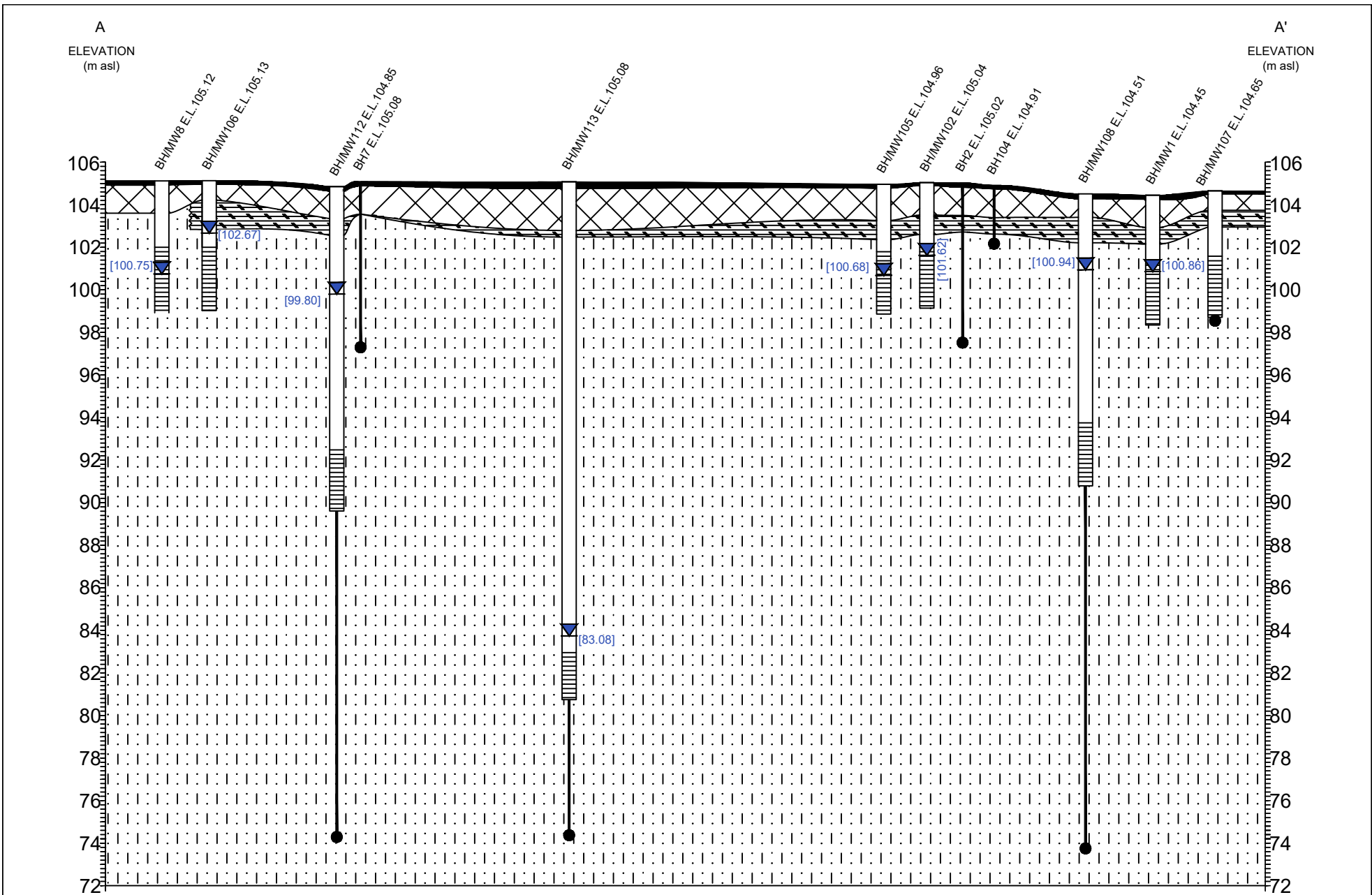
 GEOLOGICAL CROSS SECTION (SEE FIGURE 7)



TITLE AND LOCATION

**BOREHOLE/MONITORING
 WELL LOCATION PLAN
 HYDROGEOLOGICAL
 INVESTIGATION
 590 ARGUS ROAD, OAKVILLE,
 ONTARIO**

PROJECT NO. BIGC-ENV-554D	DWN. M.M.
SCALE AS NOTED	CK. T.V.H
DATE MAY 2023	FIG NO. 6



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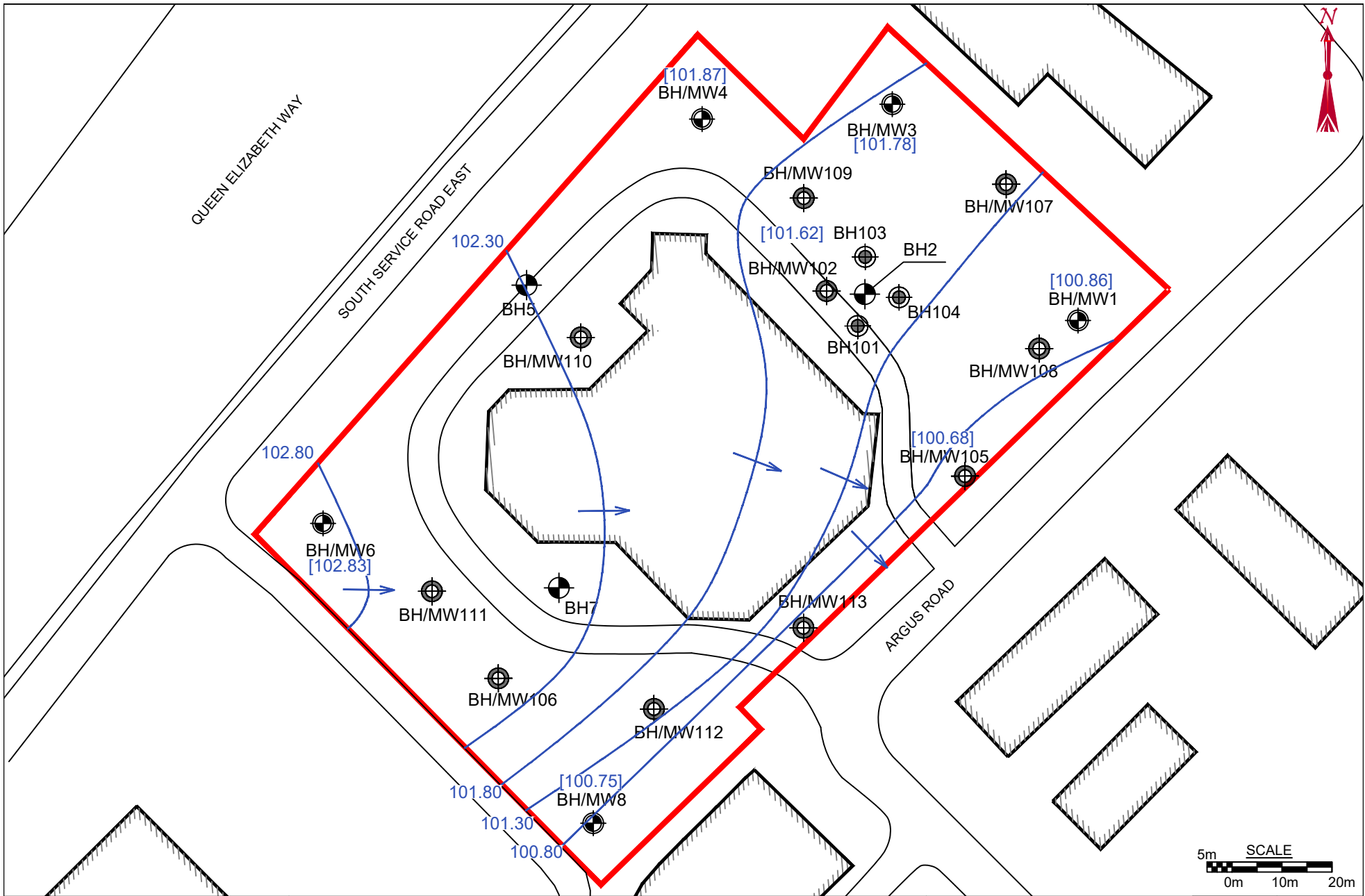
- ASPHALT
- FILL
- SHALE BEDROCK
- CLAYEY SILT / SILTY CLAY / SHALE COMPLEX
- WATER LEVEL
- WATER LEVEL MEASUREMENT (MAR 23, 2023) (m asl)

HORIZONTAL SCALE
 0m 5m 10m 15m

TITLE AND LOCATION

GEOLOGICAL CROSS SECTION A-A'
HYDROGEOLOGICAL INVESTIGATION
 590 ARGUS ROAD, OAKVILLE, ONTARIO

PROJECT NO.	DWN.
BIGC-ENV-554D	S.R.
SCALE	CK.
AS NOTED	T.V.H
DATE	FIG NO.
MAY 2023	7



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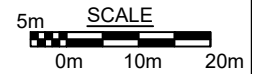
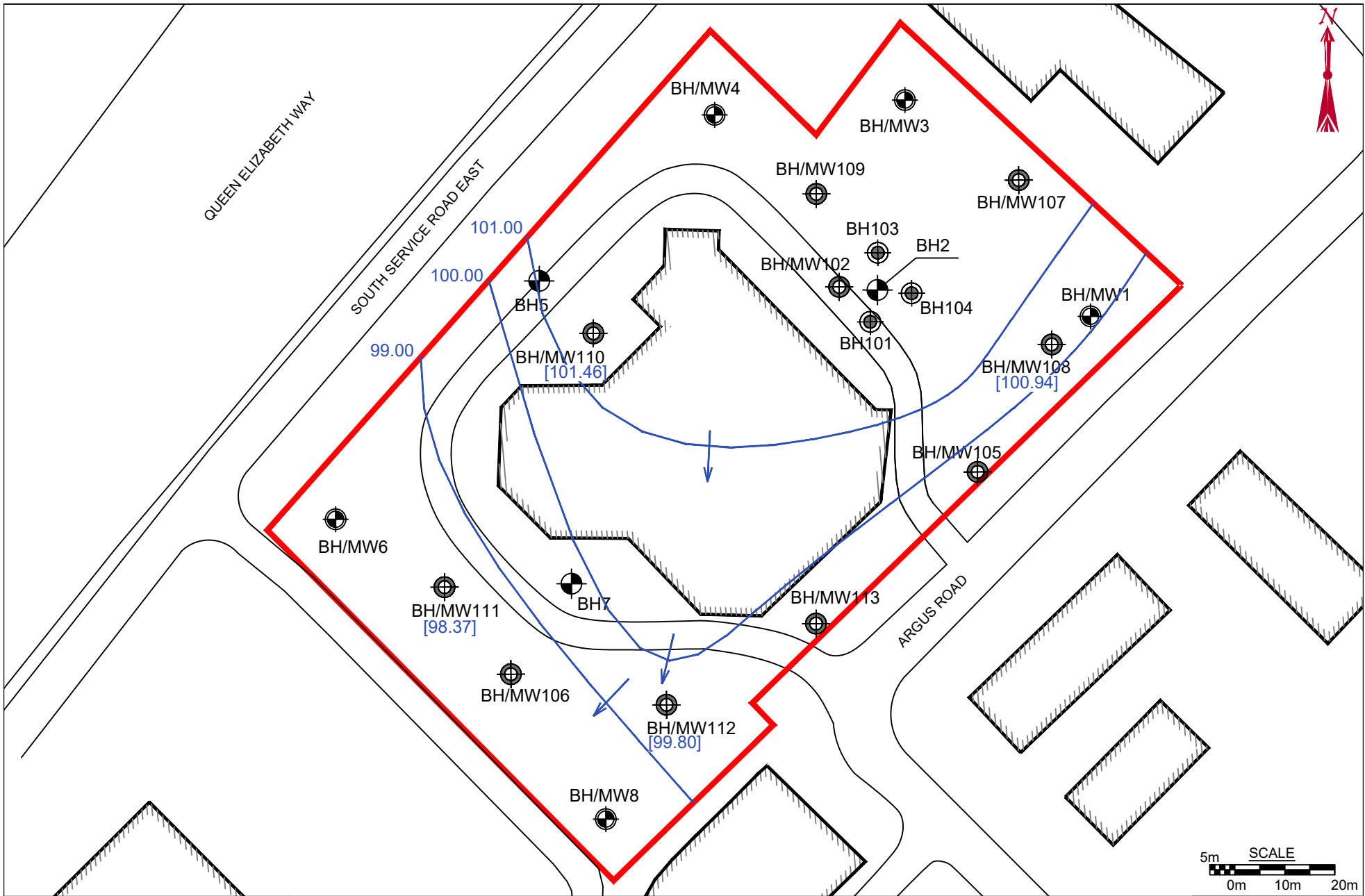


LEGEND		LEGEND	
	SITE BOUNDARY		WATER LEVEL MEASUREMENT (MARCH 23, 2023) (m asl)
	BUILDING FOOTPRINT		GROUNDWATER CONTOUR
	LOCATION OF BOREHOLE/MONITORING WELL (BIG, 2022)		INTERPRETED DIRECTION OF GROUNDWATER FLOW
	LOCATION OF BOREHOLE (BIG, 2022)		
	LOCATION OF THE BOREHOLE/MONITORING WELL (BIG, FEBRUARY 2023)		
	LOCATION OF THE BOREHOLE (BIG, FEBRUARY 2023)		


TITLE AND LOCATION

SHALLOW GROUNDWATER CONTOUR MAP
HYDROGEOLOGICAL INVESTIGATION
 590 ARGUS ROAD, OAKVILLE, ONTARIO









PROJECT NO.	DWN.
BIGC-ENV-554D	M.M.
SCALE	CK.
AS NOTED	T.V.H
DATE	FIG NO.
MAY 2023	8A



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LEGEND		WATER LEVEL MEASUREMENT (MARCH 23, 2023) (m asl)	
	SITE BOUNDARY		WATER LEVEL MEASUREMENT (MARCH 23, 2023) (m asl)
	BUILDING FOOTPRINT		GROUNDWATER CONTOUR
	LOCATION OF BOREHOLE/MONITORING WELL (BIG, 2022)		INTERPRETED DIRECTION OF GROUNDWATER FLOW
	LOCATION OF BOREHOLE (BIG, 2022)		
	LOCATION OF THE BOREHOLE/MONITORING WELL (BIG, FEBRUARY 2023)		
	LOCATION OF THE BOREHOLE (BIG, FEBRUARY 2023)		

TITLE AND LOCATION

**DEEP GROUNDWATER
 CONTOUR MAP
 HYDROGEOLOGICAL
 INVESTIGATION**
 590 ARGUS ROAD, OAKVILLE,
 ONTARIO

PROJECT NO.	DWN.
BIGC-ENV-554D	M.M.
SCALE	CK.
AS NOTED	T.V.H
DATE	FIG NO.
MAY 2023	8B

APPENDIX A: BOREHOLE LOGS

RECORD OF BOREHOLE No. BH101



Project Number: **BIGC-ENV-554D** Drilling Location: **See borehole location plan** Logged by: **FJ**
 Project Client: **Distrikt Capital Corporation** Drilling Method: **150 mm Solid Stem Augering** Compiled by: **MM**
 Project Name: **Phase II ESA and Supplementary Geotechnical and Hydrogeological Investigations** Drilling Machine: **Truck Mounted Drill** Reviewed by: **KK**
 Project Location: **590 Argus Road, Oakville, ON** Date Started: **17 Feb 23** Date Completed: **17 Feb 23** Revision No.: **0, 10/4/23**

Lithology Profile	DESCRIPTION	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	LAB TESTING	INSTRUMENTATION INSTALLATION	COMMENTS
		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RCD%						
	Geodetic Ground Surface Elevation: 105.00 m										
	ASPHALT PAVEMENT: 40 mm asphalt over 120 mm granular base										
	FILL: silty sand, some clay, trace gravel, trace limestone fragments, black streaks, brown, wet, loose	SS	1	54	8	0.7	104.85				
	FILL: silty clay, trace sand, trace gravel, trace 0.8 oxidization, brown to grey, moist, firm	SS	2	33	6	104.24	104				
	SILTY CLAY/SHALE COMPLEX: trace sand, 1.5 trace gravel, trace limestone fragments, reddish brown to grey, moist, hard	SS	3	54	38	103.48	103				
	BEDROCK: Shale, grey, moist	SS	4	100	50/10 cm	102.56	102.56				
	End of Borehole due to Auger Refusal					102.10	102.10				
	Notes: 1. Borehole open and dry upon completion of drilling.										

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∇ No freestanding groundwater measured in open borehole on completion of drilling.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

Scale: 1 : 53
 Page: 1 of 1

RECORD OF BOREHOLE No. BH/MW102



Project Number: **BIGC-ENV-554D** Drilling Location: **See borehole location plan** Logged by: **FJ**
 Project Client: **Distrikt Capital Corporation** Drilling Method: **150 mm Solid Stem Augering** Compiled by: **MM**
 Project Name: **Phase II ESA and Supplementary Geotechnical and Hydrogeological Investigations** Drilling Machine: **Truck Mounted Drill** Reviewed by: **KK**
 Project Location: **590 Argus Road, Oakville, ON** Date Started: **17 Feb 23** Date Completed: **17 Feb 23** Revision No.: **0, 10/4/23**

Lithology Profile	DESCRIPTION	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RCD%			Penetration Testing	Soil Vapour Reading				
	Geodetic Ground Surface Elevation: 105.04 m												
	ASPHALT PAVEMENT: 50 mm asphalt over 100 mm granular base												
	FILL: silty clay/clayey silt, trace sand, trace gravel, trace oxidization, trace organics, trace shale fragments, reddish brown to grey, moist, stiff	SS	1	59	11	1	104	○	○ ⁵	○ ²²			
		SS	2	51	8	2	103	○	○ ¹³				
	SILTY CLAY/SHALE COMPLEX: trace sand, 1.5 trace gravel, trace limestone fragments, reddish brown to grey, moist, hard	SS	3	87	35	3	102	○ 50 13 cm	○ ¹¹				
		SS	4	64	50/13 cm	4	101	○ 50 2 cm	○ ⁸				
	BEDROCK: Shale, reddish brown to grey, moist	SS	5	56	50/2 cm	5	100	○ 50 8 cm	○ ¹¹				
		SS	6	100	50/8 cm								
	End of Borehole due to Auger Refusal												
	Notes: 1. Borehole open upon completion of drilling. 2. Groundwater level reading at 4.57 m bgs upon completion of drilling. 3. Ground water level reading at 3.42 m bgs on March 23, 2023.												

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Groundwater depth on completion of drilling: 4.57 m.
 Groundwater depth observed on 3/23/2023 at a depth of: 3.42 m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF BOREHOLE No. BH103



Project Number: **BIGC-ENV-554D** Drilling Location: **See borehole location plan** Logged by: **FJ**
 Project Client: **Distrikt Capital Corporation** Drilling Method: **150 mm Solid Stem Augering** Compiled by: **MM**
 Project Name: **Phase II ESA and Supplementary Geotechnical and Hydrogeological Investigations** Drilling Machine: **Truck Mounted Drill** Reviewed by: **KK**
 Project Location: **590 Argus Road, Oakville, ON** Date Started: **17 Feb 23** Date Completed: **17 Feb 23** Revision No.: **0, 10/4/23**

Lithology Profile	DESCRIPTION	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	LAB TESTING	INSTRUMENTATION INSTALLATION	COMMENTS
		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RCD%						
	Geodetic Ground Surface Elevation: 104.90 m ASPHALT PAVEMENT: 60 mm asphalt over 140 mm granular base FILL: silty sand, trace clay, trace to some gravel, brown, moist, loose	SS	1	41	8		104.75	○	○ ₁₂		
	SILTY CLAY/SHALE COMPLEX: trace sand, 1.2 trace gravel, trace limestone fragments, reddish brown to grey, moist, hard	SS	2	67	6	1	104.68	○	○ ₁₈		
		SS	3	59	50	2	103.68	○	○ ₁₀		
	BEDROCK: Shale, reddish brown to grey, moist	SS	4	80	50/10 cm		102.61	○ ₅₀ ○ _{10 cm}			
	End of Borehole	SS	5	0	50/2 cm	3	101.83	○ ₅₀ ○ _{2 cm}			
Notes: 1. Borehole open and dry upon completion of drilling.											

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∇ No freestanding groundwater measured in open borehole on completion of drilling.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

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RECORD OF BOREHOLE No. BH104



Project Number: **BIGC-ENV-554D** Drilling Location: **See borehole location plan** Logged by: **FJ**
 Project Client: **Distrikt Capital Corporation** Drilling Method: **150 mm Solid Stem Augering** Compiled by: **MM**
 Project Name: **Phase II ESA and Supplementary Geotechnical and Hydrogeological Investigations** Drilling Machine: **Truck Mounted Drill** Reviewed by: **KK**
 Project Location: **590 Argus Road, Oakville, ON** Date Started: **17 Feb 23** Date Completed: **17 Feb 23** Revision No.: **0, 10/4/23**

Lithology Profile	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	LAB TESTING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)						
<p>Geodetic Ground Surface Elevation: 104.91 m</p>										
	ASPHALT PAVEMENT: 50 mm asphalt over 120 mm granular base 0.7									
	FILL: silty clay, trace sand, trace gravel, brown, moist, firm 104.15	SS	1	5	8					
	FILL: silty sand, trace to some clay, trace gravel, some reddish brown shale fragments, brown to grey, moist, compact 104.15 - 103.39	SS	2	54	10	1	104			
	SILTY CLAY/SHALE COMPLEX: trace sand, 1.5 trace gravel, trace limestone fragments, reddish brown to grey, moist, hard 103.39 - 102.62	SS	3	70	43	2	103			
BEDROCK: Shale, grey, moist 102.62 - 102.17	SS	4	100	50/8 cm						
<p>End of Borehole due to Auger Refusal 2.7</p> <p>Notes: 1. Borehole open and dry upon completion of drilling.</p>										

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∇ No freestanding groundwater measured in open borehole on completion of drilling.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

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RECORD OF BOREHOLE No. BH/MW105



Project Number: **BIGC-ENV-554D** Drilling Location: **See borehole location plan** Logged by: **FJ**
 Project Client: **District Capital Corporation** Drilling Method: **150 mm Solid Stem Augering** Compiled by: **MM**
 Project Name: **Phase II ESA and Supplementary Geotechnical and Hydrogeological Investigations** Drilling Machine: **Truck Mounted Drill** Reviewed by: **KK**
 Project Location: **590 Argus Road, Oakville, ON** Date Started: **1 Mar 23** Date Completed: **1 Mar 23** Revision No.: **0, 10/4/23**

Lithology Profile	SOIL SAMPLING				FIELD TESTING		LAB TESTING				INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RCD%	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ● DCPT △ Intact ◇ Intact ▲ Remould ◆ Remould * Undrained Shear Strength (kPa) 20 40 60 80	★ Rinse pH Values 2 4 6 8 10 12 Soil Vapour Reading parts per million (ppm) 100 200 300 400 Lower Explosive Limit (LEL) W _p W _L Plastic Liquid 20 40 60 80			
<p>Geodetic Ground Surface Elevation: 104.96 m</p> <p>ASPHALT PAVEMENT: 40 mm asphalt over 150 mm granular base</p> <p>FILL: silty clay, some sand, trace to some gravel, trace shale fragments, trace organic odour, black to dark brown, moist, firm to very stiff</p> <p>SILTY CLAY/SHALE COMPLEX: trace sand, trace gravel, trace limestone fragments, grey, moist, very stiff to hard</p> <p>BEDROCK: Shale, grey, moist</p>												
	SS	1	70	8		104.81	○	○ ⁶				
	SS	2	41	7		104.07	○	○ ¹⁷				
	SS	3	70	28		103.28	○	○ ²				
	SS	4	77	50/13 cm		102.37	○ ⁵⁰ ○ ¹³	○ ¹³				
	SS	5	52	50/10 cm		102.37	○ ⁵⁰ ○ ¹⁰					
						101.00						
						100.00						
						99.86						
<p>End of Borehole 6.1</p> <p>Notes: 1. Borehole open upon completion of drilling. 2. Groundwater level reading at 5.49 m bgs upon completion of drilling. 3. Ground water level reading at 4.28 m bgs on March 23, 2023.</p>												

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∇ Groundwater depth on completion of drilling: 5.49 m.
 ▼ Groundwater depth observed on 3/23/2023 at a depth of: 4.28 m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF BOREHOLE No. BH/MW106



Project Number: **BIGC-ENV-554D** Drilling Location: **See borehole location plan** Logged by: **FJ**
 Project Client: **Distrikt Capital Corporation** Drilling Method: **150 mm Solid Stem Augering** Compiled by: **MM**
 Project Name: **Phase II ESA and Supplementary Geotechnical and Hydrogeological Investigations** Drilling Machine: **Truck Mounted Drill** Reviewed by: **KK**
 Project Location: **590 Argus Road, Oakville, ON** Date Started: **1 Mar 23** Date Completed: **1 Mar 23** Revision No.: **0, 10/4/23**

Lithology Profile	DESCRIPTION	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RCD%			Penetration Testing	Soil Vapour Reading				
	Geodetic Ground Surface Elevation: 105.13 m												
	ASPHALT PAVEMENT: 60 mm asphalt over 120 mm granular base					105							
	FILL: silty sand, some clayey silt, trace gravel, trace oxidization, reddish brown, moist, compact to dense	SS	1	70	12					11			
	SILTY CLAY/SHALE COMPLEX: trace sand, trace gravel, trace limestone fragments, reddish brown to grey, moist, hard	SS	2	70	48	1	104			14			
		SS	3	70	61	2	103			6			
	BEDROCK: Shale, reddish brown to grey, moist	SS	4	65	50/5 cm	3	102			6			
		SS	5	100	50/13 cm	3	102						
						4	101						
						5	100						
	End of Borehole					6							
	Notes: 1. Borehole open upon completion of drilling. 2. Groundwater level reading at 3.05 m bgs upon completion of drilling. 3. Ground water level reading at 2.46 m bgs on March 23, 2023.												

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Groundwater depth on completion of drilling: 3.05 m
 Groundwater depth observed on 3/23/2023 at a depth of: 2.46 m

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying Notes to Record of Boreholes.

RECORD OF BOREHOLE No. BH/MW107



Project Number: **BIGC-ENV-554D** Drilling Location: **See borehole location plan** Logged by: **FJ**
 Project Client: **Distrikt Capital Corporation** Drilling Method: **150 mm Solid Stem Augering** Compiled by: **MM**
 Project Name: **Phase II ESA and Supplementary Geotechnical and Hydrogeological Investigations** Drilling Machine: **Truck Mounted Drill** Reviewed by: **KK**
 Project Location: **590 Argus Road, Oakville, ON** Date Started: **17 Feb 23** Date Completed: **17 Feb 23** Revision No.: **0, 10/4/23**

Lithology Profile	DESCRIPTION	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RCD%			Penetration Testing	Soil Vapour Reading				
	Geodetic Ground Surface Elevation: 104.65 m												
	ASPHALT PAVEMENT: 50 mm asphalt over 110 mm granular base												
	FILL: silty sand, trace gravel, trace oxidization, trace organic odour, grey to black, moist, loose to compact	SS	1	51	5		104						
	SILTY CLAY/SHALE COMPLEX: trace sand, trace gravel, trace limestone fragments, reddish brown to grey, moist, very stiff to hard	SS	2	84	27	1				15			
	BEDROCK: Shale, reddish brown to grey, moist	SS	3	54	50/13 cm		103	50 13 cm		14			
		SS	4	56	50/2 cm	2	102	50 2 cm					
		SS	5	100	50/2 cm	3	101	50 2 cm					
		SS	6	100	50/2 cm	4	100	50 2 cm					
							99						
	End of Borehole					6	98.55						
	Notes: 1. Borehole open upon completion of drilling. 2. Groundwater level reading at 4.27 m bgs upon completion of drilling.												

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Groundwater depth on completion of drilling: 4.27 m

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

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RECORD OF BOREHOLE No. BH/MW108



Project Number: **BIGC-ENV-554D** Drilling Location: **See borehole location plan** Logged by: **FJ**
 Project Client: **Distrikt Capital Corporation** Drilling Method: **200 mm Hollow Stem Augering** Compiled by: **MM**
 Project Name: **Phase II ESA and Supplementary Geotechnical and Hydrogeological Investigations** Drilling Machine: **Truck Mounted Drill** Reviewed by: **KK**
 Project Location: **590 Argus Road, Oakville, ON** Date Started: **27 Feb 23** Date Completed: **28 Feb 23** Revision No.: **0, 10/4/23**

Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RQD%			Penetration Testing	Soil Vapour Reading				
	<p>Geodetic Ground Surface Elevation: 104.51 m</p> <p>ASPHALT PAVEMENT: 70 mm asphalt over 170 mm granular base</p> <p>FILL: sandy silt, trace gravel, trace clay, trace limestone fragments, black, moist, loose to compact</p> <p>SILTY CLAY/SHALE COMPLEX: trace sand, 1.1 trace gravel, trace limestone fragments, reddish brown to grey, moist, very stiff to hard</p> <p>BEDROCK: Shale, highly weathered to fresh, very poor to excellent quality, trace limestone inclusion, reddish brown to grey, moist</p> <p>ROCK CORING START</p> <p>- Poor Quality</p> <p>- Very Poor Quality</p> <p>- Good Quality</p> <p>- Poor Quality</p> <p>- Good Quality</p> <p>- Good Quality</p>							Penetration Testing ○ SPT ● DCPT △ Intact ◇ Intact ▲ Remould ◆ Remould * Undrained Shear Strength (kPa) 20 40 60 80	★ Rinse pH Values 2 4 6 8 10 12 △ Soil Vapour Reading parts per million (ppm) 100 200 300 400 ▲ Lower Explosive Limit (LEL) W _p W _L Plastic Liquid 20 40 60 80				
		SS	1	46	8	104	104	○		21			
		SS	2	84	18	103.43	103	○		16			
		SS	3	67	31	102.22	103	○		12			
		SS	4	50	50/5 cm	102	102	○	50				
		SS	5	100	50/2 cm	101	102	○	50				
		RC	1	100	50	100	100	○					
		RC	2	100	17	99	99	○					
		RC	3	100	83	98	98						
		RC	4	88	36	96	96	○					
		RC	5	100	82	94	94						
		RC	6	100	79	93	93						

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▽ Groundwater depth on completion of drilling: N/A m.
 ▼ Groundwater depth observed on 3/23/2023 at a depth of: 3.57 m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying Notes to Record of Boreholes.

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RECORD OF BOREHOLE No. BH/MW108



Project Number: **BIGC-ENV-554D**

Drilling Location: **See borehole location plan**

Logged by: **FJ**

Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)		ELEVATION (m)		FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RQD%					Penetration Testing ○ SPT ● DCPT MTO Vane* Nilcon Vane* △ Intact ◇ Intact ▲ Remould ◆ Remould * Undrained Shear Strength (kPa) 20 40 60 80		★ Rinse pH Values 2 4 6 8 10 12 Soil Vapour Reading parts per million (ppm) 100 200 300 400 ▲ Lower Explosive Limit (LEL) W _p W L _L Plastic Liquid 20 40 60 80			
	BEDROCK: Shale, highly weathered to fresh, very poor to excellent quality, trace limestone inclusion, reddish brown to grey, moist					92									
	- Good Quality	RC	7	100	79	13					○				
	- Fair Quality	RC	8	100	68	14					○				
	- Excellent Quality	RC	9	100	93	16					○				
	- Excellent Quality	RC	10	100	98	17					○				
	- Excellent Quality	RC	11	100	97	18					○				
	- Excellent Quality	RC	12	100	98	19					○				
	- Good Quality	RC	13	100	89	20					○				
	- Excellent Quality	RC	14	100	93	21					○				
	- Excellent Quality	RC	15	100	93	22					○				
						23									
						24									
						25									
						79									

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

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RECORD OF BOREHOLE No. BH/MW108



Project Number: **BIGC-ENV-554D**

Drilling Location: **See borehole location plan**

Logged by: **FJ**

Lithology Plot	LITHOLOGY PROFILE DESCRIPTION	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING				LAB TESTING				INSTRUMENTATION INSTALLATION	COMMENTS
		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RQD%			Penetration Testing		MTO Vane*		Nilcon Vane*		Soil Vapour Reading parts per million (ppm)			
	BEDROCK: Shale, highly weathered to fresh, very poor to excellent quality, trace limestone inclusion, reddish brown to grey, moist - Good Quality - Excellent Quality - Excellent Quality					26											
		RC	16	100	84	27											
		RC	17	100	98	28											
		RC	18	100	100	29											
	End of Borehole Notes: 1. Borehole open upon completion of drilling. 2. Ground water level reading at 3.57 m bgs on March 23, 2023.					30											

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF BOREHOLE No. BH/MW109



Project Number: **BIGC-ENV-554D** Drilling Location: **See borehole location plan** Logged by: **FJ**
 Project Client: **District Capital Corporation** Drilling Method: **200 mm Hollow Stem Augering** Compiled by: **MM**
 Project Name: **Phase II ESA and Supplementary Geotechnical and Hydrogeological Investigations** Drilling Machine: **Truck Mounted Drill** Reviewed by: **KK**
 Project Location: **590 Argus Road, Oakville, ON** Date Started: **15 Feb 23** Date Completed: **16 Feb 23** Revision No.: **0, 10/4/23**

Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RCD%			Penetration Testing	Soil Vapour Reading				
	<p>Geodetic Ground Surface Elevation: 105.09 m</p> <p>ASPHALT PAVEMENT: 50 mm asphalt over 140 mm granular base</p> <p>FILL: clayey silt/silty clay, some sand, trace gravel, trace organics, brown to reddish brown, moist, firm to hard</p> <p>103.41</p> <p>SILTY CLAY/SHALE COMPLEX: trace sand, 1.7 trace gravel, trace limestone fragments, grey, moist, hard</p> <p>102.80</p> <p>BEDROCK: Shale, highly weathered to fresh, 2.3 poor to excellent quality, trace limestone inclusion, grey, moist</p>							Penetration Testing ○ SPT ● DCPT △ Intact ◇ Intact ▲ Remould ◆ Remould * Undrained Shear Strength (kPa) 20 40 60 80	★ Rinse pH Values 2 4 6 8 10 12 Soil Vapour Reading parts per million (ppm) 100 200 300 400 Lower Explosive Limit (LEL) W _p W _l Plastic Liquid 20 40 60 80				
		SS	1	70	7		104	○	○	2			
		SS	2	59	12	1	104	○	○	17			
		SS	3	70	34	2	103	○	○	17			
		SS	4	65	89/28 cm				○	89 28 cm			
		SS	5	88	91/25 cm	3	102		○	91 25 cm			
	- Auger Grinding					4	101						
						5	100						
						6	99						
	ROCK CORING START					7	98		○				
	- Good Quality	RC	1	100	77								
						8	97		○				
	- Poor Quality	RC	2	100	42								
						9	96						
	- Poor Quality	RC	3	100	44		95		○				
						11	94						
	- Good Quality	RC	4	100	87				○				

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▽ Groundwater depth on completion of drilling: N/A m.
 ▼ Groundwater depth observed on 3/23/2023 at a depth of: 17.43 m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

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RECORD OF BOREHOLE No. BH/MW109



Project Number: **BIGC-ENV-554D**

Drilling Location: **See borehole location plan**

Logged by: **FJ**

Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RQD%			Penetration Testing	Soil Vapour Reading parts per million (ppm)	Lower Explosive Limit (LEL)	W _p		
	BEDROCK: Shale, highly weathered to fresh, poor to excellent quality, trace limestone inclusion, grey, moist												
	- Good Quality	RC	5	100	84	13	92	○					
	- Good Quality	RC	6	100	76	14	91	○					
	- Excellent Quality	RC	7	100	94	15	90						
	- Good Quality	RC	8	100	85	16	89	○					
	- Excellent Quality	RC	9	100	98	17	88	○					
	- Excellent Quality	RC	10	100	100	18	87	○					
	- Excellent Quality	RC	11	100	100	19	86	○					
	- Weak Strength - Excellent Quality	RC	12	100	95	20	85	○					
	- Excellent Quality	RC	13	100	100	21	84	○					
						22	83	○					
						23	82	○					
						24	81	○					
						25	80	○					

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

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RECORD OF BOREHOLE No. BH/MW109



Project Number: **BIGC-ENV-554D**

Drilling Location: **See borehole location plan**

Logged by: **FJ**

Lithology Plot	LITHOLOGY PROFILE DESCRIPTION	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING				LAB TESTING				INSTRUMENTATION INSTALLATION	COMMENTS
		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RQD%			Penetration Testing ○ SPT ● DCPT		MTO Vane* Nilcon Vane* △ Intact ◇ Intact ▲ Remould ◆ Remould		★ Rinse pH Values 2 4 6 8 10 12		Soil Vapour Reading parts per million (ppm) 100 200 300 400			
	BEDROCK: Shale, highly weathered to fresh, poor to excellent quality, trace limestone inclusion, grey, moist - Excellent Quality - Excellent Quality - Excellent Quality					26	79										
		RC	14	100	100	27	78										
		RC	15	100	100	28	77										
		RC	16	100	100	29	76										
	74.38 End of Borehole 30.7 Notes: 1. Borehole open upon completion of drilling. 2. Ground water level reading at 17.43 m bgs on March 23, 2023.					30	75										

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF BOREHOLE No. BH/MW110



Project Number: **BIGC-ENV-554D** Drilling Location: **See borehole location plan** Logged by: **FJ**
 Project Client: **District Capital Corporation** Drilling Method: **200 mm Hollow Stem Augering** Compiled by: **MM**
 Project Name: **Phase II ESA and Supplementary Geotechnical and Hydrogeological Investigations** Drilling Machine: **Truck Mounted Drill** Reviewed by: **KK**
 Project Location: **590 Argus Road, Oakville, ON** Date Started: **10 Feb 23** Date Completed: **13 Feb 23** Revision No.: **0, 10/4/23**

Lithology Plot	DESCRIPTION	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RCD%			Penetration Testing	Soil Vapour Reading				
	Geodetic Ground Surface Elevation: 105.30 m												
	ASPHALT PAVEMENT: 60 mm asphalt over 240 mm granular base					105							
	FILL: clayey silt, some sand, trace to some gravel, trace limestone fragments, brown to grey, firm to very stiff	SS	1	62	7	105				24			
		SS	2	33	25	104				12			
	SILTY CLAY/SHALE COMPLEX: trace sand, 1.1 trace gravel, trace limestone fragments, containing cobbles and boulders, reddish brown to grey, moist, very stiff to hard	SS	3	33	65	103							
		SS	4	63	50/8 cm	103							
	BEDROCK: Shale, highly weathered to fresh, 2.3 poor to excellent quality, trace limestone inclusion, reddish brown to grey, moist	SS	5	80	50/10 cm	102							
		SS	6	80	50/10 cm	101							
		SS	7	46	25	99				16			
		SS	8	100	50/10 cm	98							
	ROCK CORING START					97							
	- Poor Quality	RC	1	100	48	97							
		RC	2	100	46	96							
	- Poor Quality					95							
		RC	3	100	48	94							
	- Poor Quality					93							

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∇ Groundwater depth on completion of drilling: N/A m.
 ▾ Groundwater depth observed on 3/23/2023 at a depth of: 3.84 m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying Notes to Record of Boreholes.

RECORD OF BOREHOLE No. BH/MW110



Project Number: **BIGC-ENV-554D**

Drilling Location: **See borehole location plan**

Logged by: **FJ**

Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING						FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RQD%	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ● DCPT MTO Vane* Nilcon Vane* △ Intact ◇ Intact ▲ Remould ◆ Remould * Undrained Shear Strength (kPa) 20 40 60 80		★ Rinse pH Values 2 4 6 8 10 12 Soil Vapour Reading parts per million (ppm) 100 200 300 400 ▲ Lower Explosive Limit (LEL) W _p W L _L W _L Plastic Liquid 20 40 60 80			
	BEDROCK: Shale, highly weathered to fresh, poor to excellent quality, trace limestone inclusion, reddish brown to grey, moist					93							
	- Good Quality	RC	4	100	83	13			○				
	- Good Quality	RC	5	100	87	14			○				
	- Excellent Quality	RC	6	100	98	15			○				
	- Excellent Quality	RC	7	100	100	16			○				
	- Excellent Quality	RC	8	100	100	17			○				
	- Excellent Quality	RC	9	100	95	18			○				
	- Excellent Quality	RC	10	100	97	19			○				
	- Weak Strength - Excellent Quality	RC	11	100	95	20			○				
	- Excellent Quality	RC	12	100	97	21			○				
						22							
						23							
						24							
						25							
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						80							

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF BOREHOLE No. BH/MW110



Project Number: **BIGC-ENV-554D**

Drilling Location: **See borehole location plan**

Logged by: **FJ**

Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)		ELEVATION (m)		FIELD TESTING				LAB TESTING				INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RQD%					Penetration Testing		Soil Vapour Reading parts per million (ppm)		Lower Explosive Limit (LEL)		Plastic Liquid			
										○ SPT ● DCPT	★ Rinse pH Values 2 4 6 8 10 12	△ Intact ◇ Intact	▲ Remould ◆ Remould	100 200 300 400	W _p W _L	Plastic Liquid			
	BEDROCK: Shale, highly weathered to fresh, poor to excellent quality, trace limestone inclusion, reddish brown to grey, moist					26	79												
	- Excellent Quality	RC	13	100	100	27	78												
	- Good Quality	RC	14	100	83	28	77												
	- Excellent Quality	RC	15	100	95	29	76												
						30	75												
	End of Borehole					74.64	30.7												
	Notes: 1. Borehole open upon completion of drilling. 2. Ground water level reading at 3.84 m bgs on March 23, 2023.																		

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF BOREHOLE No. BH/MW111



Project Number: **BIGC-ENV-554D** Drilling Location: **See borehole location plan** Logged by: **FJ**
 Project Client: **District Capital Corporation** Drilling Method: **200 mm Hollow Stem Augering** Compiled by: **MM**
 Project Name: **Phase II ESA and Supplementary Geotechnical and Hydrogeological Investigations** Drilling Machine: **Truck Mounted Drill** Reviewed by: **KK**
 Project Location: **590 Argus Road, Oakville, ON** Date Started: **10 Feb 23** Date Completed: **15 Feb 23** Revision No.: **0, 10/4/23**

Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	LAB TESTING	INSTRUMENTATION INSTALLATION	COMMENTS
		DESCRIPTION	Sample Type	Sample Number	Recovery (%)						
	Geodetic Ground Surface Elevation: 105.08 m										
	ASPHALT PAVEMENT: 50 mm asphalt over 140 mm crush asphalt over 180 mm granular base										
	FILL: silty clay/clayey silt, trace gravel, reddish brown to grey, moist, stiff to very stiff	SS	1	62	13						
		SS	2	62	17	1	104				
	SILTY CLAY/SHALE COMPLEX: trace sand, 1.2 trace gravel, trace limestone fragments, reddish brown, moist, very stiff to hard	SS	3	100	50/13 cm						
		SS	4	71	50/13 cm	2	103				
		SS	5	0	50/5 cm	3	102				
	BEDROCK: Shale, highly weathered to fresh, 2.3 very poor to excellent quality, trace limestone inclusion, grey, moist	RC	1	48	0	4	101				
		RC	2	100	63	5	100				
		RC	3	100	76	6	99				
		RC	4	100	64	7	98				
		RC	5	100	62	8	97				
						9	96				
						10	95				
						11	94				
						12					

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∇ Groundwater depth on completion of drilling: N/A m.
 ▾ Groundwater depth observed on 3/23/2023 at a depth of: 6.71 m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying Notes to Record of Boreholes.

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RECORD OF BOREHOLE No. BH/MW111



Project Number: **BIGC-ENV-554D**

Drilling Location: **See borehole location plan**

Logged by: **FJ**

Lithology Plot	LITHOLOGY PROFILE DESCRIPTION	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RQD%			Penetration Testing ○ SPT ● DCPT MTO Vane* Nilcon Vane* △ Intact ◇ Intact ▲ Remould ◆ Remould * Undrained Shear Strength (kPa) 20 40 60 80	Soil Vapour Reading parts per million (ppm) 100 200 300 400 ▲ Lower Explosive Limit (LEL) W _P W W _L Plastic Liquid 20 40 60 80	★ Rinse pH Values 2 4 6 8 10 12			
	BEDROCK: Shale, highly weathered to fresh, very poor to excellent quality, trace limestone inclusion, grey, moist												
	- Good Quality	RC	6	100	79	13	92	○					
	- Excellent Quality	RC	7	100	94	14	91		○				
	- Good Quality	RC	8	100	80	15	90		○				
	- Fair Quality	RC	9	100	69	16	89		○				
	- Good Quality	RC	10	100	88	17	88		○				
	- Excellent Quality	RC	11	100	97	18	87		○				
	- Good Quality - Weak Strength	RC	12	100	87	19	86		○				
	- Excellent Quality	RC	13	100	95	20	85		○				
	- Excellent Quality	RC	14	100	97	21	84		○				
	- Excellent Quality	RC	14	100	97	22	83		○				
	- Excellent Quality	RC	14	100	97	23	82		○				
	- Excellent Quality	RC	14	100	97	24	81		○				
	- Excellent Quality	RC	14	100	97	25	80		○				

UCS: 17.7 MPa

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF BOREHOLE No. BH/MW111



Project Number: **BIGC-ENV-554D**

Drilling Location: **See borehole location plan**

Logged by: **FJ**

Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
		DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value/RQD%	Penetration Testing	Soil Vapour Reading	Lower Explosive Limit (LEL)		
	<p>BEDROCK: Shale, highly weathered to fresh, very poor to excellent quality, trace limestone inclusion, grey, moist</p> <p>- Excellent Quality</p> <p>- Excellent Quality</p> <p>- Excellent Quality</p>					26	79						
		RC	15	100	100	27	78						
		RC	16	100	100	28	77						
		RC	17	100	100	29	76						
	74.37					30	75						
	<p>End of Borehole</p> <p>Notes: 1. Borehole open upon completion of drilling. 2. Ground water level reading at 6.71 m bgs on March 23, 2023.</p>												

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF BOREHOLE No. BH/MW112



Project Number: **BIGC-ENV-554D** Drilling Location: **See borehole location plan** Logged by: **FJ**
 Project Client: **Distrikt Capital Corporation** Drilling Method: **200 mm Hollow Stem Augering** Compiled by: **MM**
 Project Name: **Phase II ESA and Supplementary Geotechnical and Hydrogeological Investigations** Drilling Machine: **Truck Mounted Drill** Reviewed by: **KK**
 Project Location: **590 Argus Road, Oakville, ON** Date Started: **22 Feb 23** Date Completed: **27 Feb 23** Revision No.: **0, 10/4/23**

Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
		DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value/RCD%	Penetration Testing	Soil Vapour Reading	Rinse pH Values		
	Geodetic Ground Surface Elevation: 104.85 m												
	ASPHALT PAVEMENT: 60 mm asphalt over 170 mm granular base												
	FILL: sand and gravel, trace wood pieces, trace red & yellow brick fragments, brown to grey, moist, compact	SS	1	41	10		104.70						
	FILL: silty sand, trace gravel, zones of silty clay, reddish brown to grey, moist, loose	SS	2	75	7	1	104.09						
	SILTY CLAY/SHALE COMPLEX: trace sand, 1.5 trace gravel, trace limestone fragments, reddish brown, moist, hard	SS	3	84	30	2	103.33						
	BEDROCK: Shale, highly weathered to fresh, very poor to excellent quality, trace limestone inclusion, reddish brown to grey, moist	SS	4	89	50/13 cm	3	102.56						
	grey	SS	5	100	50/10 cm	3	102.00						
	ROCK CORING START					5	100.00						
	- Very Poor Quality	RC	1	100	8	6	99.00						
	- Fair Quality	RC	2	100	54	7	98.00						
	- Good Quality	RC	3	100	79	8	97.00						
	- Fair Quality	RC	4	100	56	10	95.00						
	- Excellent Quality	RC	5	100	97	11	94.00						

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Groundwater depth on completion of drilling: N/A m.
 Groundwater depth observed on 3/23/2023 at a depth of: 5.05 m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying Notes to Record of Boreholes.

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RECORD OF BOREHOLE No. BH/MW112



Project Number: **BIGC-ENV-554D**

Drilling Location: **See borehole location plan**

Logged by: **FJ**

Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RQD%			Penetration Testing	Soil Vapour Reading parts per million (ppm)	Lower Explosive Limit (LEL)	W _p		
	BEDROCK: Shale, highly weathered to fresh, very poor to excellent quality, trace limestone inclusion, reddish brown to grey, moist												
	- Fair Quality	RC	6	100	58	13	92	○					
	- Good Quality	RC	7	100	75	14	91		○				
	- Excellent Quality	RC	8	100	100	16	89		○				
	- Excellent Quality	RC	9	100	95	17	88		○				
	- Good Quality	RC	10	100	80	19	86		○				
	- Excellent Quality	RC	11	100	97	20	85		○				
	- Excellent Quality	RC	12	100	98	22	83		○				
	- Excellent Quality	RC	13	100	98	23	82		○				
	- Excellent Quality	RC	14	100	97	25	80		○				

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

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RECORD OF BOREHOLE No. BH/MW112



Project Number: **BIGC-ENV-554D**

Drilling Location: **See borehole location plan**

Logged by: **FJ**

Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)		ELEVATION (m)		FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RQD%					Penetration Testing ○ SPT ● DCPT		★ Rinse pH Values 2 4 6 8 10 12 Soil Vapour Reading parts per million (ppm) 100 200 300 400 ▲ Lower Explosive Limit (LEL) W _p W W _L Plastic Liquid			
	BEDROCK: Shale, highly weathered to fresh, very poor to excellent quality, trace limestone inclusion, reddish brown to grey, moist - Excellent Quality	RC	15	100	98	26	79								
	- Good Quality	RC	16	100	85	28	77								
	- Excellent Quality	RC	17	100	100	29	75								
	74.29														
	End of Borehole 30.6 Notes: 1. Borehole open upon completion of drilling. 2. Ground water level reading at 5.05 m bgs on March 23, 2023.														

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF BOREHOLE No. BH/MW113



Project Number: **BIGC-ENV-554D** Drilling Location: **See borehole location plan** Logged by: **FJ**
 Project Client: **District Capital Corporation** Drilling Method: **200 mm Hollow Stem Augering** Compiled by: **MM**
 Project Name: **Phase II ESA and Supplementary Geotechnical and Hydrogeological Investigations** Drilling Machine: **Truck Mounted Drill** Reviewed by: **KK**
 Project Location: **590 Argus Road, Oakville, ON** Date Started: **21 Feb 23** Date Completed: **22 Feb 23** Revision No.: **0, 10/4/23**

Lithology Profile	SOIL SAMPLING				FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RCD%	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ● DCPT △ Intact ◇ Intact ▲ Remould ◆ Remould * Undrained Shear Strength (kPa) 20 40 60 80		
Geodetic Ground Surface Elevation: 105.08 m										
ASPHALT PAVEMENT: 100 mm asphalt over 220 mm granular base FILL: silty sand, trace to some clay, trace to some gravel, trace organics, block to brown, moist, loose to compact SILTY CLAY/SHALE COMPLEX: trace sand, 2.3 trace gravel, trace limestone fragments, red brown, moist, hard BEDROCK: Shale, highly weathered to fresh, poor to excellent quality, trace limestone inclusion, grey, moist	SS	1	62	7		104	○ ⁶			
	SS	2	59	7		103	○ ²⁰			
	SS	3	41	11		103	○ ¹⁵			
	SS	4	100	65/28 cm		102	○ ⁶⁵ 28 cm	○ ⁹		
	SS	5	100	82/10 cm		102	○ ⁸² 10 cm			
ROCK CORING START										
- Poor Quality	RC	1	100	50		98	○			
- Poor Quality	RC	2	100	43		97	○			
- Fair Quality	RC	3	100	72		95	○			
- Good Quality	RC	4	100	76		94	○			

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▽ Groundwater depth on completion of drilling: N/A m.
 ▼ Groundwater depth observed on 3/23/2023 at a depth of: 22.00 m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying Notes to Record of Boreholes.

RECORD OF BOREHOLE No. BH/MW113



Project Number: **BIGC-ENV-554D**

Drilling Location: **See borehole location plan**

Logged by: **FJ**

Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				FIELD TESTING		LAB TESTING				INSTRUMENTATION INSTALLATION	COMMENTS	
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RQD%	DEPTH (m)	ELEVATION (m)	Penetration Testing		Soil Vapour Reading parts per million (ppm)				
								○ SPT ● DCPT ▲ Intact ◇ Intact ▲ Remould ◇ Remould * Undrained Shear Strength (kPa) 20 40 60 80	★ Rinse pH Values 2 4 6 8 10 12 Soil Vapour Reading parts per million (ppm) 100 200 300 400 ▲ Lower Explosive Limit (LEL) W _p W W _L Plastic Liquid 20 40 60 80					
	BEDROCK: Shale, highly weathered to fresh, poor to excellent quality, trace limestone inclusion, grey, moist													
	- Good Quality	RC	5	100	75	13	92		○					
	- Good Quality	RC	6	100	77	14	91		○					
	- Excellent Quality	RC	7	100	95	15	90		○					
	- Excellent Quality	RC	8	100	96	16	89		○					
	- Excellent Quality	RC	9	100	100	17	88		○					
	- Excellent Quality	RC	10	100	95	18	87		○					
	- Excellent Quality	RC	11	100	91	19	86		○					
	- Excellent Quality	RC	12	100	94	20	85		○					
	- Excellent Quality	RC	13	100	83	21	84		○					
	- Excellent Quality	RC	14	100	91	22	83		○					
	- Excellent Quality	RC	15	100	94	23	82		○					
	- Good Quality	RC	16	100	83	24	81		○					
	- Good Quality	RC	17	100	83	25	80		○					

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

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RECORD OF BOREHOLE No. BH/MW113



Project Number: **BIGC-ENV-554D**

Drilling Location: **See borehole location plan**

Logged by: **FJ**

Lithology Plot	LITHOLOGY PROFILE DESCRIPTION	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING				LAB TESTING				INSTRUMENTATION INSTALLATION	COMMENTS
		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RQD%			Penetration Testing ○ SPT ● DCPT		MTO Vane* Nilcon Vane* △ Intact ◇ Intact ▲ Remould ◆ Remould		★ Rinse pH Values 2 4 6 8 10 12		Soil Vapour Reading parts per million (ppm) 100 200 300 400			
	BEDROCK: Shale, highly weathered to fresh, poor to excellent quality, trace limestone inclusion, grey, moist - Excellent Quality - Excellent Quality - Excellent Quality					26	79										
		RC	14	100	100	27	78										
		RC	15	100	95	28	77										
		RC	16	100	100	29	76										
	74.37 End of Borehole 30.7 Notes: 1. Borehole open upon completion of drilling. 2. Ground water level reading at 22.00 m bgs on March 23, 2023.					30	75										

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF MONITORING WELL No. BH/MW1



Project Number: **BIGC-ENV-554A** Drilling Location: **See Borehole Location Plan** Logged by: **KK**
 Project Client: **Distrikt Capital** Drilling Method: **100 mm Solid Stem Augering** Compiled by: **KK**
 Project Name: **Preliminary Geotechnical Investigation** Drilling Machine: **Truck Mounted Drill** Reviewed by: **AC**
 Project Location: **590 Argus Road, Oakville, Ontario** Date Started: **25 May 22** Date Completed: **25 May 22** Revision No.: **1, 4/4/23**

Lithology Profile	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value/RCD%	Penetration Testing	Soil Vapour Reading	Lower Explosive Limit (LEL)		
Geodetic Ground Surface Elevation: 104.45 m												
ASPHALT PAVEMENT: 50 mm asphalt over 100 mm granular base												
FILL: sand and gravel, trace silt, trace organics, brown, moist, loose	SS	1	41	6		104						
- black stains, oxidations	SS	2	84	8	1							
SILTY CLAY/CLAYEY SILT/SHALE COMPLEX: trace silt, trace gravel, grey, moist, hard	SS	3	95	63	2							
BEDROCK: Shale, highly weathered, grey, damp to moist, hard	SS	4	125	50/8cm		102						
	SS	5	260	50/5cm	3							
	SS	6	48	50/15cm	4							
	SS	7	50	53/28cm	5							
----- wet	SS	8	100	50/8cm		99						
End of Borehole					6							
Notes: 1. Borehole open upon completion of drilling. 2. Ground water level reading at 3.89 m bgs upon completion of drilling. 3. Groundwater level reading at 3.9 m bgs on May 31, 2022.												

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∇ Groundwater depth on completion of drilling: **4.4 m.**
 ▾ Groundwater depth observed on **2022-05-31** at a depth of: **3.9 m.**

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF BOREHOLE No. BH2



Project Number: **BIGC-ENV-554A** Drilling Location: **See Borehole Location Plan** Logged by: **KK**
 Project Client: **District Capital** Drilling Method: **100 mm Solid Stem Augering** Compiled by: **KK**
 Project Name: **Preliminary Geotechnical Investigation** Drilling Machine: **Truck Mounted Drill** Reviewed by: **AC**
 Project Location: **590 Argus Road, Oakville, Ontario** Date Started: **25 May 22** Date Completed: **25 May 22** Revision No.: **1, 4/4/23**

Lithology Profile	DESCRIPTION	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RCD%			Penetration Testing	Soil Vapour Reading				
Geodetic Ground Surface Elevation: 105.02 m ASPHALT PAVEMENT: 50 mm asphalt over 100 mm granular base FILL: sand and gravel, brown, moist, compact - silty clay/clayey silt, trace sand, black stains, oxidations, brown/grey, moist, stiff SILTY CLAY/CLAYEY SILT/SHALE COMPLEX: trace silt, trace gravel, reddish brown, moist, very stiff BEDROCK: Shale, highly weathered, occasional limestone layers, grey, damp to moist													
		SS	1	38	16		104.87	○	○	1			
		SS	2	100	10	1	104	○	○	13			
		SS	3	92	26	2	103	○	○	7			
		SS	4	100	50/13cm		102.73	○	○	12			
		SS	5	100	50/10cm		101	○	○	13			
		SS	6	100	50/5cm		99	○	○	14			
		SS	7	100	50/5cm		97.32	○	○	10			
	End of Borehole						7.7						

Notes:
 1. Borehole open upon completion of drilling.
 2. Ground water level reading measured at 4.31 m bgs upon completion of drilling.

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Groundwater depth on completion of drilling: 4.30 m

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying Notes to Record of Boreholes.

RECORD OF MONITORING WELL No. **BH/MW3**



Project Number: **BIGC-ENV-554A** Drilling Location: **See Borehole Location Plan** Logged by: **KK**
 Project Client: **District Capital** Drilling Method: **100 mm Solid Stem Augering** Compiled by: **KK**
 Project Name: **Preliminary Geotechnical Investigation** Drilling Machine: **Truck Mounted Drill** Reviewed by: **AC**
 Project Location: **590 Argus Road, Oakville, Ontario** Date Started: **25 May 22** Date Completed: **25 May 22** Revision No.: **1, 4/4/23**

Lithology Profile	DESCRIPTION	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RQD%			Penetration Testing	Soil Vapour Reading (ppm)	Lower Explosive Limit (LEL)	Plastic		
	Geodetic Ground Surface Elevation: 104.84 m												
	ASPHALT PAVEMENT: 60 mm asphalt over 110 mm granular base												
	FILL: sand and gravel, trace silt, trace organics, brown, moist, loose	SS	1	79	9		104.67			8			
	- silty clay/clayey silt, trace sand, black stains, oxidations, brown/grey, moist, firm						104.08						
	SILTY CLAY/CLAYEY SILT/SHALE COMPLEX: trace silt, trace gravel, reddish brown to grey, moist, hard	SS	2	79	38	1	104.08			10			
		SS	3	58	58/28cm	2	103.08	58 28cm		5			
		SS	4	100	50/5cm	2	102.58	50 5cm		10			
	BEDROCK: Shale, highly weathered, grey, damp to moist, hard	SS	5	100	50/8cm	3	101.79	50 8cm		5			
		SS	6	100	50/13cm	4	100.79	50 13cm					
	----- wet					5	100.00						
	End of Borehole	SS	7	100	50/3cm	6	98.74	50 3cm					
	Notes: 1. Borehole open upon completion of drilling. 2. Ground water level reading measured at 3.35 m bgs upon completion of drilling. 3. Groundwater level reading at 3.37m bgs on May 31, 2022.						6.1						

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∇ Groundwater depth on completion of drilling: **3.5 m.**
 ▼ Groundwater depth observed on **2022-05-31** at a depth of: **3.37 m.**

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying Notes to Record of Boreholes.

RECORD OF MONITORING WELL No. **BH/MW4**



Project Number: **BIGC-ENV-554A** Drilling Location: **See Borehole Location Plan** Logged by: **KK**
 Project Client: **District Capital** Drilling Method: **100 mm Solid Stem Augering** Compiled by: **KK**
 Project Name: **Preliminary Geotechnical Investigation** Drilling Machine: **Truck Mounted Drill** Reviewed by: **AC**
 Project Location: **590 Argus Road, Oakville, Ontario** Date Started: **25 May 22** Date Completed: **25 May 22** Revision No.: **1, 4/4/23**

Lithology Profile	SOIL SAMPLING				FIELD TESTING		LAB TESTING				INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RCD%	DEPTH (m)	ELEVATION (m)	Penetration Testing	Soil Vapour Reading	Lower Explosive Limit (LEL)		
<p>Geodetic Ground Surface Elevation: 105.05 m</p> <p>ASPHALT PAVEMENT: 50 mm asphalt over 120 mm granular base</p> <p>FILL: sand and gravel, trace silt, trace organics, brown, moist, loose</p> <p>- silty clay/clayey silt, trace sand, black stains, oxidations, brown/grey, moist, firm</p> <p>BEDROCK: Shale, highly weathered, reddish brown, damp to moist</p> <p>----- grey</p>												
	SS	1	84	7		104.88			28			
	SS	2	100	6	1	104			19			
	SS	3	100	81	2	103			6			
	SS	4	100	50/10cm			50 10cm		7			
	SS	5	100	50/3cm	3	102	50 3cm					
	SS	6	100	50/13cm	4	101	50 13cm		11			
	SS	7	100	50/3cm	6	99	50 3cm					
<p>End of Borehole</p> <p>Notes: 1. Borehole open upon completion of drilling. 2. Ground water level reading measured at 4.88 m bgs upon completion of drilling. 3. Groundwater level reading at 3.44 on May 31, 2022.</p>												

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∇ Groundwater depth on completion of drilling: **4.9 m.**
 ▾ Groundwater depth observed on **2022-05-31** at a depth of: **3.44 m.**

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying Notes to Record of Boreholes.

RECORD OF BOREHOLE No. **BH5**



Project Number: **BIGC-ENV-554A** Drilling Location: **See Borehole Location Plan** Logged by: **KK**
 Project Client: **District Capital** Drilling Method: **100 mm Solid Stem Augering** Compiled by: **KK**
 Project Name: **Preliminary Geotechnical Investigation** Drilling Machine: **Truck Mounted Drill** Reviewed by: **AC**
 Project Location: **590 Argus Road, Oakville, Ontario** Date Started: **26 May 22** Date Completed: **26 May 22** Revision No.: **1, 4/4/23**

Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RQD%			Penetration Testing		★ Rinse pH Values	Soil Vapour Reading		
	Geodetic Ground Surface Elevation: 105.13 m												
	ASPHALT PAVEMENT: 70 mm asphalt over 100 mm granular base					105							
	FILL: sand and gravel, trace silt, trace organics, brown, moist, compact	SS	1	41	14	104.95		○		5			
						104.37							
	SILTY CLAY/CLAYEY SILT/SHALE COMPLEX: trace silt, trace gravel, reddish brown, moist, very stiff	SS	2	92	20	104		○		6			
						103.61							
	BEDROCK: Shale, highly weathered, reddish brown, damp to moist	SS	3	100	73	103				9			
						102							
		SS	4	100	5/10cm	102		○		6			
						101							
	----- grey	SS	5	56	76/20cm	102		○		15			
						101							
		SS	6	100	50/8cm	100		○		16			
						99							
		SS	7	100	50/3cm	99		○					
						98							
		SS	8	100	50/8cm	97.43		○		10			
	End of Borehole					7.7							

Notes:
 1. Borehole open upon completion of drilling.
 2. Ground water level reading measured at 5.18 m bgs upon completion of drilling.

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∇ Groundwater depth on completion of drilling: **5.3 m.**

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

Scale: 1 : 47
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RECORD OF BOREHOLE No. BH7



Project Number: **BIGC-ENV-554A** Drilling Location: **See Borehole Location Plan** Logged by: **KK**
 Project Client: **Distrikt Capital** Drilling Method: **100 mm Solid Stem Augering** Compiled by: **KK**
 Project Name: **Preliminary Geotechnical Investigation** Drilling Machine: **Truck Mounted Drill** Reviewed by: **AC**
 Project Location: **590 Argus Road, Oakville, Ontario** Date Started: **26 May 22** Date Completed: **26 May 22** Revision No.: **1, 4/4/23**

Lithology Profile	DESCRIPTION	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RQD%			Penetration Testing	Soil Vapour Reading (ppm)				
	Geodetic Ground Surface Elevation: 105.08 m												
	ASPHALT PAVEMENT: 60 mm asphalt over 110 mm granular base					105							
	FILL: sand and gravel, trace silt, trace organics, brown, moist, loose	SS	1	100	12	0.2		○		○14			
	- silty clay/clayey silt, trace sand, black stains, oxidations, brown/grey, moist, firm	SS	2	95	15	1	104	○		○13			
	BEDROCK: Shale, highly weathered, reddish brown, damp to moist	SS	3	92	69	2	103		○	○7			
	----- grey	SS	4	135	50/13cm		102	○ 50 13cm		○5			
		SS	5	100	50/8cm	3	102	○ 50 8cm		○24			
						4	101						
	----- wet	SS	6	100	50/13cm		100	○ 50 13cm		○14			
						5	100						
		SS	7	100	50/3cm	6	99	○ 50 3cm		○15			
						7	98						
	End of Borehole	SS	8	100	50/5cm		97.38	○ 50 5cm		○18			
	Notes: 1. Borehole open upon completion of drilling. 2. Ground water level reading measured at 3.01 m bgs upon completion of drilling.						7.7						

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∇ Groundwater depth on completion of drilling: 3.2 m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

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RECORD OF MONITORING WELL No. BH/MW8



Project Number: **BIGC-ENV-554A** Drilling Location: **See Borehole Location Plan** Logged by: **KK**
 Project Client: **District Capital** Drilling Method: **100 mm Solid Stem Augering** Compiled by: **KK**
 Project Name: **Preliminary Geotechnical Investigation** Drilling Machine: **Truck Mounted Drill** Reviewed by: **AC**
 Project Location: **590 Argus Road, Oakville, Ontario** Date Started: **26 May 22** Date Completed: **26 May 22** Revision No.: **1, 4/4/23**

Lithology Profile	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value/RCD%	Penetration Testing	Soil Vapour Reading	Soil Vapour Reading		
<p>Geodetic Ground Surface Elevation: 105.12 m</p> <p>ASPHALT PAVEMENT: 50 mm asphalt over 110 mm granular base</p> <p>FILL: silty clay/clayey silt, trace sand, occasional organics, oxidations, brown/grey, moist, firm to stiff</p> <p>BEDROCK: Shale, highly weathered, reddish brown, damp to moist</p> <p>----- grey</p>												
104.96	SS	1	92	7		105	○	○16				
104.02	SS	2	84	12	1	104	○	○11				
103.60	SS	3	58	70/28cm		103	○	○17				
	SS	4	100	50/3cm		103	○	○7				
	SS	5	100	50/10cm	3	102	○	○3				
	SS	6	100	50/13cm		101	○	○4				
	SS	7	100	50/8cm	6	100	○	○5				
98.92	SS	7	100	50/8cm		99	○	○5				
6.2	<p>End of Borehole</p> <p>Notes: 1. Borehole open upon completion of drilling. 2. Ground water level reading measured at 5.80 m bgs upon completion of drilling. 3. Groundwater level reading at 4.55 mbgs on May 31, 2022.</p>											

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▽ Groundwater depth on completion of drilling: 2.9 m.
 ▼ Groundwater depth observed on 2022-05-31 at a depth of: 4.55 m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

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APPENDIX B: MECP WWR, PTTW AND EASR SUMMARY TABLES

Table B-1: MECP WWR Summary Table

Count	Well ID	Date Completed	Depth (m)	Reported Water Level (m)	Status of Well
1.	2802422	07/21/1948	12.2	4.9	Water supply
2.	2810039	04/06/2004	5.1	N/A	Observation well
3.	2810241	05/13/2005	N/A	4	Abandoned
4.	2810285	02/01/2005	6	N/A	Observation well
5.	2810392	09/20/2005	4.5	3.9	Observation well
6.	2810455	12/13/2005	5.8	5.5	Observation well
7.	2810456	12/16/2005	N/A	2	Abandoned
8.	2810649	08/28/2006	7.6	N/A	Observation well
9.	7041205	01/12/2007	2.4	N/A	Observation well
10.	7100453	09/26/2007	4.7	N/A	Observation well
11.	7100453	09/26/2007	N/A	N/A	Observation well
12.	7101141	09/27/2007	N/A	N/A	Test Hole
13.	7101141	09/27/2007	N/A	N/A	Test Hole
14.	7104345	03/17/2008	5.2	N/A	Observation well
15.	7134031	09/16/2009	6.1	N/A	Observation well
16.	7152039	09/03/2010	4	N/A	Test Hole
17.	7152039	09/03/2010	N/A	N/A	Test Hole
18.	7152039	09/03/2010	N/A	N/A	Test Hole
19.	7152039	09/03/2010	N/A	N/A	Test Hole
20.	7152039	09/03/2010	N/A	N/A	Test Hole
21.	7152039	09/07/2010	N/A	N/A	Test Hole
22.	7152039	09/07/2010	N/A	N/A	Test Hole
23.	7152039	09/07/2010	N/A	N/A	Test Hole
24.	7152039	09/07/2010	N/A	N/A	Test Hole
25.	7152039	09/07/2010	N/A	N/A	Test Hole
26.	7152039	09/07/2010	N/A	N/A	Test Hole
27.	7152039	09/08/2010	N/A	N/A	Test Hole
28.	7152039	09/08/2010	N/A	N/A	Test Hole
29.	7152039	09/08/2010	N/A	N/A	Test Hole
30.	7152039	09/09/2010	N/A	N/A	Test Hole
31.	7152039	09/09/2010	N/A	N/A	Test Hole
32.	7161332	03/29/2011	3.4	N/A	N/A
33.	7161333	03/29/2011	3.4	N/A	N/A
34.	7161334	03/29/2011	3.4	N/A	N/A
35.	7173256	11/17/2011	5.5	N/A	Test Hole
36.	7173257	11/17/2011	4.6	N/A	Test Hole
37.	7173258	11/17/2011	4.3	N/A	Test Hole
38.	7173259	11/17/2011	4.3	N/A	Test Hole
39.	7173260	11/17/2011	4.3	N/A	Test Hole
40.	7187270	05/04/2012	N/A	1.5	Abandoned
41.	7187271	05/07/2012	N/A	1.5	Abandoned
42.	7187272	05/07/2012	N/A	1.4	Abandoned
43.	7187273	05/07/2012	N/A	1.5	Abandoned

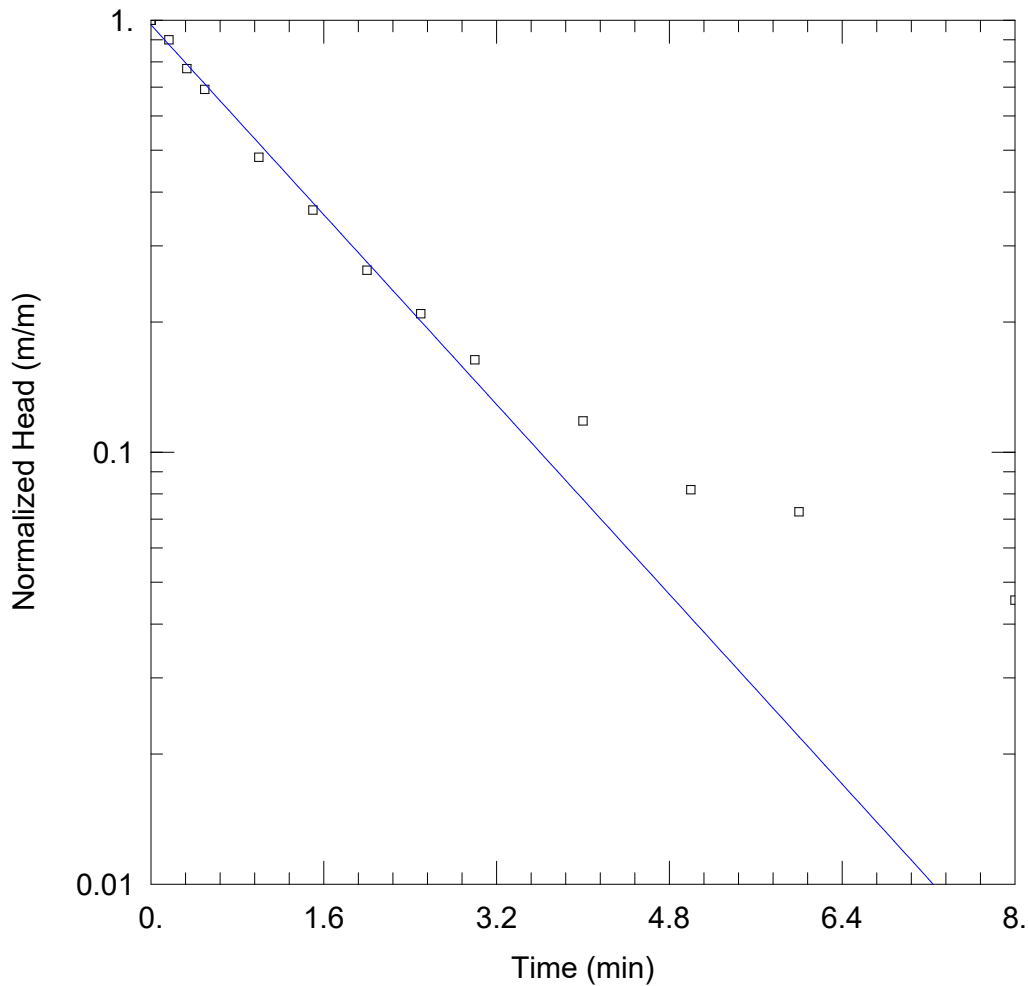
Count	Well ID	Date Completed	Depth (m)	Reported Water Level (m)	Status of Well
44.	7187274	05/07/2012	N/A	1.3	Abandoned
45.	7187275	05/07/2012	N/A	1.5	Abandoned
46.	7187276	05/02/2012	N/A	1.5	Abandoned
47.	7187277	05/07/2012	N/A	1.5	Abandoned
48.	7187278	05/07/2012	N/A	1.5	Abandoned
49.	7187787	08/28/2012	3.4	N/A	Observation well
50.	7188619	04/13/2012	N/A	N/A	N/A
51.	7192191	05/18/2012	N/A	N/A	N/A
52.	7205225	06/21/2013	4.9	N/A	Test Hole
53.	7205226	06/21/2013	4.9	N/A	Test Hole
54.	7205227	06/20/2013	4.6	N/A	Test Hole
55.	7205228	06/20/2013	4.6	N/A	Test Hole
56.	7205229	06/20/2013	4.6	N/A	Test Hole
57.	7205230	06/20/2013	4.6	N/A	Test Hole
58.	7205231	06/20/2013	4.6	N/A	Test Hole
59.	7207704	07/15/2013	6.1	N/A	Monitoring and Test Hole
60.	7217180	12/23/2013	N/A	N/A	N/A
61.	7241910	02/13/2015	20.1	N/A	Observation well
62.	7241911	02/17/2015	20.1	N/A	Observation well
63.	7241968	02/11/2015	20.1	N/A	Observation well
64.	7247761	02/09/2015	N/A	N/A	N/A
65.	7253999	11/20/2015	6.1	N/A	Observation well
66.	7254000	11/20/2015	6.1	N/A	Observation well
67.	7259855	09/09/2015	N/A	N/A	N/A
68.	7263647	04/23/2016	6.1	N/A	Monitoring and Test Hole
69.	7263648	04/23/2016	6.1	N/A	Monitoring and Test Hole
70.	7263649	04/23/2016	6.1	N/A	Monitoring and Test Hole
71.	7263650	04/23/2016	6.1	N/A	Monitoring and Test Hole
72.	7286766	N/A	N/A	N/A	N/A
73.	7318608	06/14/2018	N/A	N/A	N/A
74.	7322522	05/17/2018	6.1	N/A	Monitoring and Test Hole
75.	7322523	05/17/2018	5	N/A	Monitoring and Test Hole
76.	7322524	05/17/2018	6.4	N/A	Monitoring and Test Hole
77.	7325283	09/11/2018	N/A	N/A	N/A
78.	7327366	08/29/2018	N/A	N/A	N/A
79.	7329556	01/04/2019	16.8	N/A	Monitoring and Test Hole
80.	7343775	09/05/2019	N/A	N/A	N/A
81.	7374253	10/29/2020	N/A	N/A	N/A
82.	7376602	08/13/2020	N/A	N/A	N/A
83.	7381731	02/02/2021	N/A	N/A	N/A
84.	7381732	02/02/2021	N/A	N/A	N/A
85.	7384388	01/26/2021	6.1	N/A	Observation well
86.	7384399	01/26/2021	7.6	N/A	Observation well
87.	7384402	01/26/2021	6.1	N/A	Observation well

Count	Well ID	Date Completed	Depth (m)	Reported Water Level (m)	Status of Well
88.	7393298	07/09/2021	N/A	N/A	Abandoned - Other
89.	7393299	06/25/2021	N/A	N/A	Abandoned - Other
90.	7393335	06/25/2021	N/A	2.1	Abandoned - Other
91.	7393339	06/25/2021	N/A	2.9	Abandoned - Other
92.	7393340	06/25/2021	N/A	1.8	Abandoned - Other
93.	7393341	06/25/2021	N/A	1.7	Abandoned - Other
94.	7405067	10/08/2021	22.9	N/A	Observation well
95.	7405068	10/08/2021	15.2	N/A	Observation well
96.	7405069	10/08/2021	4.9	N/A	Observation well
97.	7405070	10/08/2021	7	N/A	Observation well
98.	7405071	10/08/2021	7.3	N/A	Observation well
99.	7412585	02/17/2022	6.1	4.57	Observation well
100.	7412588	02/17/2022	8.2	6.1	Observation well
101.	7412591	02/17/2022	6.7	4.57	Observation well

Table B-2: MECP EASR Summary Table

Permit Number	Purpose	Address	Municipality	Water Source	Max L/Day	Active
2560-A5PKQW	Dewatering construction	477 Maple Avenue	Oakville	Groundwater	390,000	No
62-P-17	Lake	491 River Side Drive	Oakville	Surface water	1,083,940	No
0772-AF3HTJ	Dewatering	Canadian National Railway and Cross Avenue	Oakville	Groundwater	20,000 to 400,000	No
2668-6TRQ7G	Dewatering construction	Northeast of Queen Elizabeth Way (Hwy 403) and Kerr Street	Oakville	Groundwater	1,962,744	No
4375-6NYL7V	Dewatering construction	Northeast of Queen Elizabeth Way (Hwy 403) and Kerr Street	Oakville	Groundwater	1,962,744	No
0551-72YPT5	Dewatering construction	Northeast of Queen Elizabeth Way (Hwy 403) and Kerr Street	Oakville	Groundwater	1,962,744	No
8107-9KKLR9	Dewatering construction	Queen Elizabeth Way (Hwy 403), north of South Service Road East, southwest of Chartwell Road	Oakville	Surface water	449,280,000 to 1,168,128,000	No
R-009-2112317313	Construction dewatering	547 Trafalgar Road	Oakville	Groundwater	50,000 to 400,000	No
R-009-9112436776	Construction dewatering	Trans-Northern Pipelines Inc.	Oakville	Groundwater	50,000 to 400,000	No

APPENDIX C: SWRT RESULTS



WELL TEST ANALYSIS

Data Set: C:\...\BH.MW1 - 554A SWRT.aqt

Date: 06/09/22

Time: 17:53:57

PROJECT INFORMATION

Company: B.I.G. Consulting

Client: Distrikt Capital

Project: BIGC-ENV-554A

Location: 590 Argus Road

Test Well: BH/MW1

Test Date: May 31, 2022

AQUIFER DATA

Saturated Thickness: 2.34 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (BH/MW1)

Initial Displacement: 1.1 m

Static Water Column Height: 2.34 m

Total Well Penetration Depth: 2.34 m

Screen Length: 2.34 m

Casing Radius: 0.025 m

Well Radius: 0.025 m

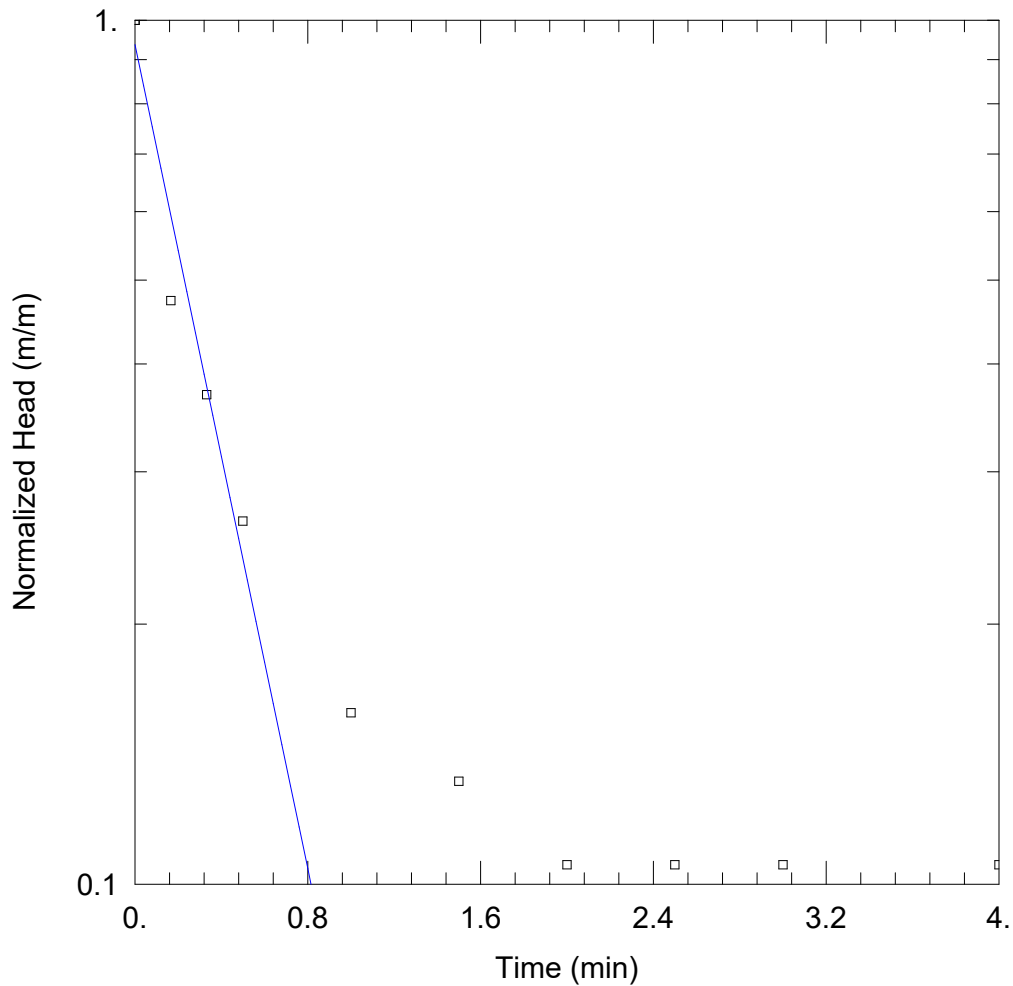
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

$K = 7.457E-6$ m/sec

$y_0 = 1.072$ m



WELL TEST ANALYSIS

Data Set: C:\...\BH.MW3 - 554A SWRT.aqt

Date: 06/09/22

Time: 17:57:18

PROJECT INFORMATION

Company: B.I.G. Consulting

Client: Distrikt Capital

Project: BIGC-ENV-554A

Location: 590 Argus Road

Test Well: BH/MW3

Test Date: May 31, 2022

AQUIFER DATA

Saturated Thickness: 2.88 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (BH/MW3)

Initial Displacement: 0.19 m

Static Water Column Height: 2.88 m

Total Well Penetration Depth: 2.88 m

Screen Length: 2.88 m

Casing Radius: 0.0254 m

Well Radius: 0.025 m

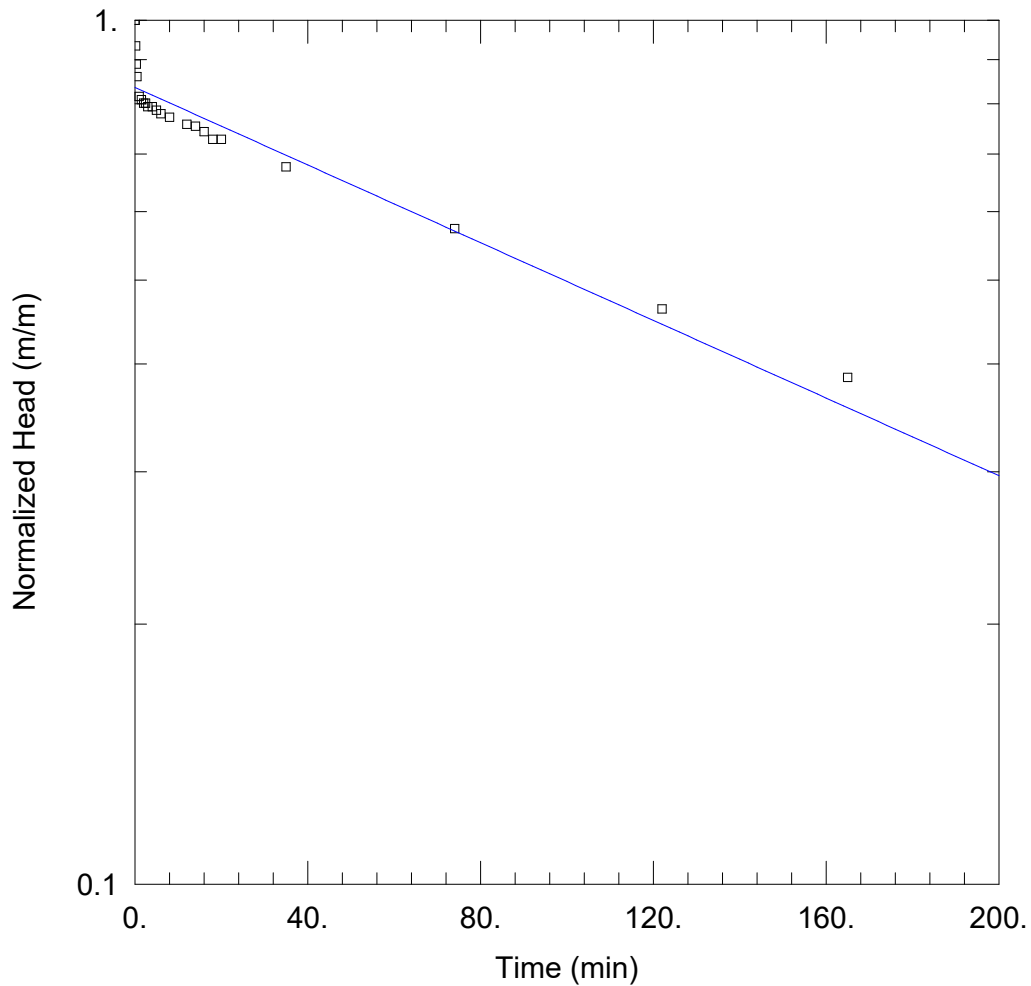
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

$K = 2.714E-5$ m/sec

$y_0 = 0.178$ m



WELL TEST ANALYSIS

Data Set: C:\...\BH.MW4 - 554A SWRT.aqt

Date: 06/09/22

Time: 17:56:55

PROJECT INFORMATION

Company: B.I.G. Consulting

Client: Distrikt Capital

Project: BIGC-ENV-554A

Location: 590 Argus Road

Test Well: BH/MW4

Test Date: May 31, 2022

AQUIFER DATA

Saturated Thickness: 2.51 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH/MW4)

Initial Displacement: 1.36 m

Static Water Column Height: 2.51 m

Total Well Penetration Depth: 2.51 m

Screen Length: 2.51 m

Casing Radius: 0.0254 m

Well Radius: 0.0254 m

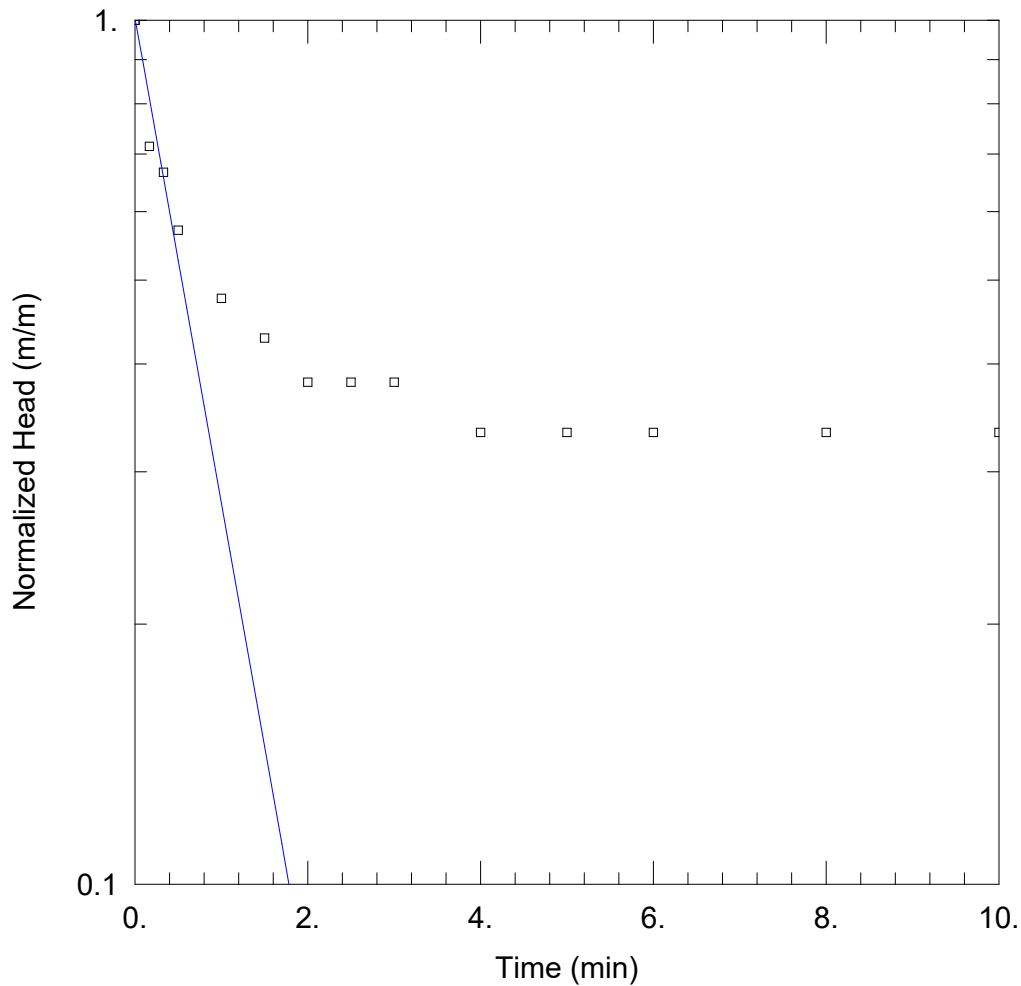
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

K = 5.874E-8 m/sec

y0 = 1.137 m



WELL TEST ANALYSIS

Data Set: C:\...\BH.MW6 - 554A SWRT.aqt

Date: 06/09/22

Time: 17:59:59

PROJECT INFORMATION

Company: B.I.G. Consulting

Client: Distrikt Capital

Project: BIGC-ENV-554A

Location: 590 Argus Road

Test Well: BH/MW6

Test Date: May 31, 2022

AQUIFER DATA

Saturated Thickness: 2.98 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH/MW6)

Initial Displacement: 0.21 m

Static Water Column Height: 2.98 m

Total Well Penetration Depth: 2.98 m

Screen Length: 2.98 m

Casing Radius: 0.0254 m

Well Radius: 0.0254 m

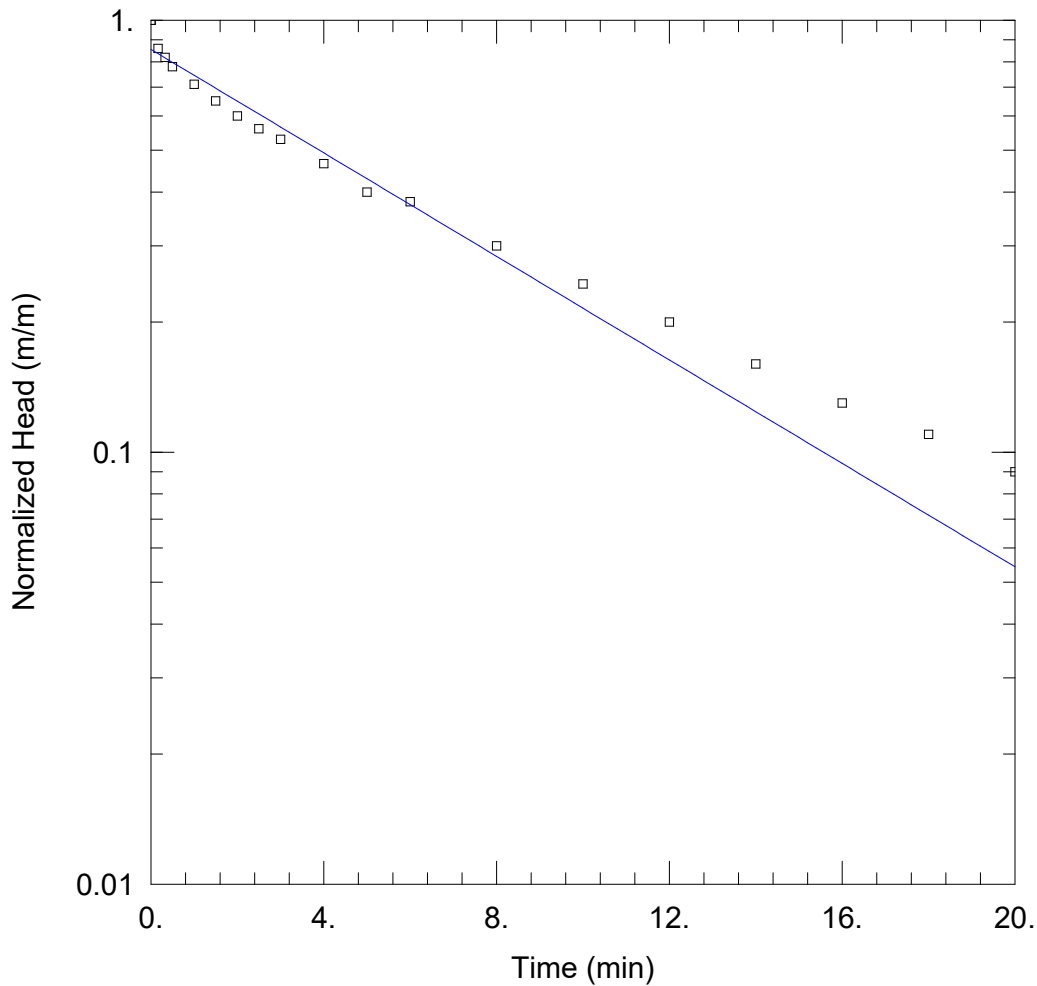
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

K = 1.239E-5 m/sec

y0 = 0.2117 m



WELL TEST ANALYSIS

Data Set: C:\...\BH.MW8 - 554A SWRT.aqt

Date: 06/09/22

Time: 18:04:10

PROJECT INFORMATION

Company: B.I.G. Consulting

Client: Distrikt Capital

Project: BIGC-ENV-554A

Location: 590 Argus Road

Test Well: BH/MW8

Test Date: May 31, 2022

AQUIFER DATA

Saturated Thickness: 1.72 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (BH/MW8)

Initial Displacement: 1. m

Static Water Column Height: 1.72 m

Total Well Penetration Depth: 1.72 m

Screen Length: 1.72 m

Casing Radius: 0.0254 m

Well Radius: 0.0254 m

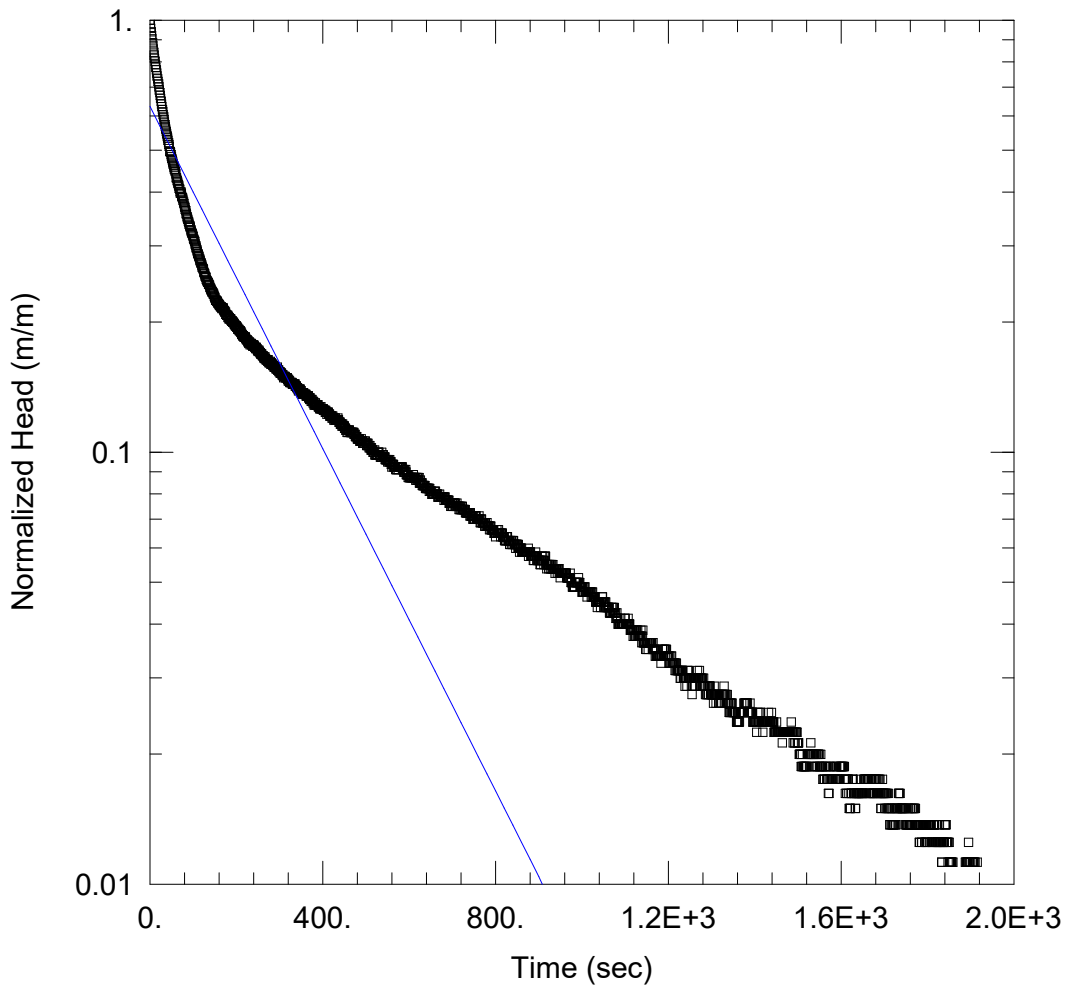
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

$K = 2.283E-6$ m/sec

$y_0 = 0.8552$ m



WELL TEST ANALYSIS

Data Set: C:\...\102.aqt

Date: 04/25/23

Time: 16:52:34

PROJECT INFORMATION

Company: B.I.G. Consulting Inc.

Client: 590 Argus LP.

Project: BIGC-ENV-554D

Location: 590 Argus Road, Oakville

Test Well: BH/MW102

Test Date: March 1, 2023

AQUIFER DATA

Saturated Thickness: 2.32 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (BH/MW102)

Initial Displacement: 0.801 m

Static Water Column Height: 2.32 m

Total Well Penetration Depth: 2.32 m

Screen Length: 2.32 m

Casing Radius: 0.025 m

Well Radius: 0.025 m

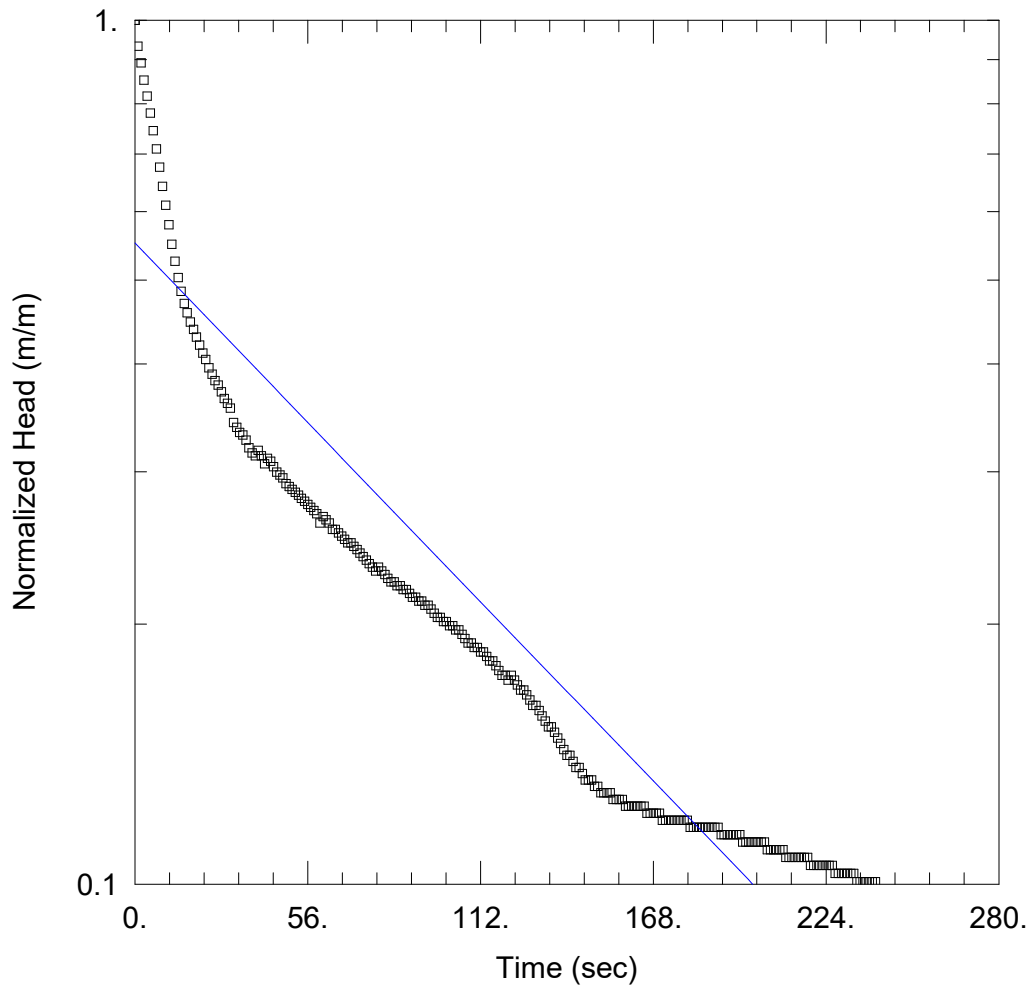
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

$K = 3.255E-6$ m/sec

$y_0 = 0.5057$ m



WELL TEST ANALYSIS

Data Set: C:\...\106.aqt

Date: 04/25/23

Time: 16:22:03

PROJECT INFORMATION

Company: B.I.G. Consulting Inc.

Client: 590 Argus LP.

Project: BIGC-ENV-554D

Location: 590 Argus Road, Oakville

Test Well: BH/MW106

Test Date: March 2, 2023

AQUIFER DATA

Saturated Thickness: 3.255 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (BH/MW106)

Initial Displacement: 1.341 m

Static Water Column Height: 3.255 m

Total Well Penetration Depth: 3.255 m

Screen Length: 3. m

Casing Radius: 0.025 m

Well Radius: 0.025 m

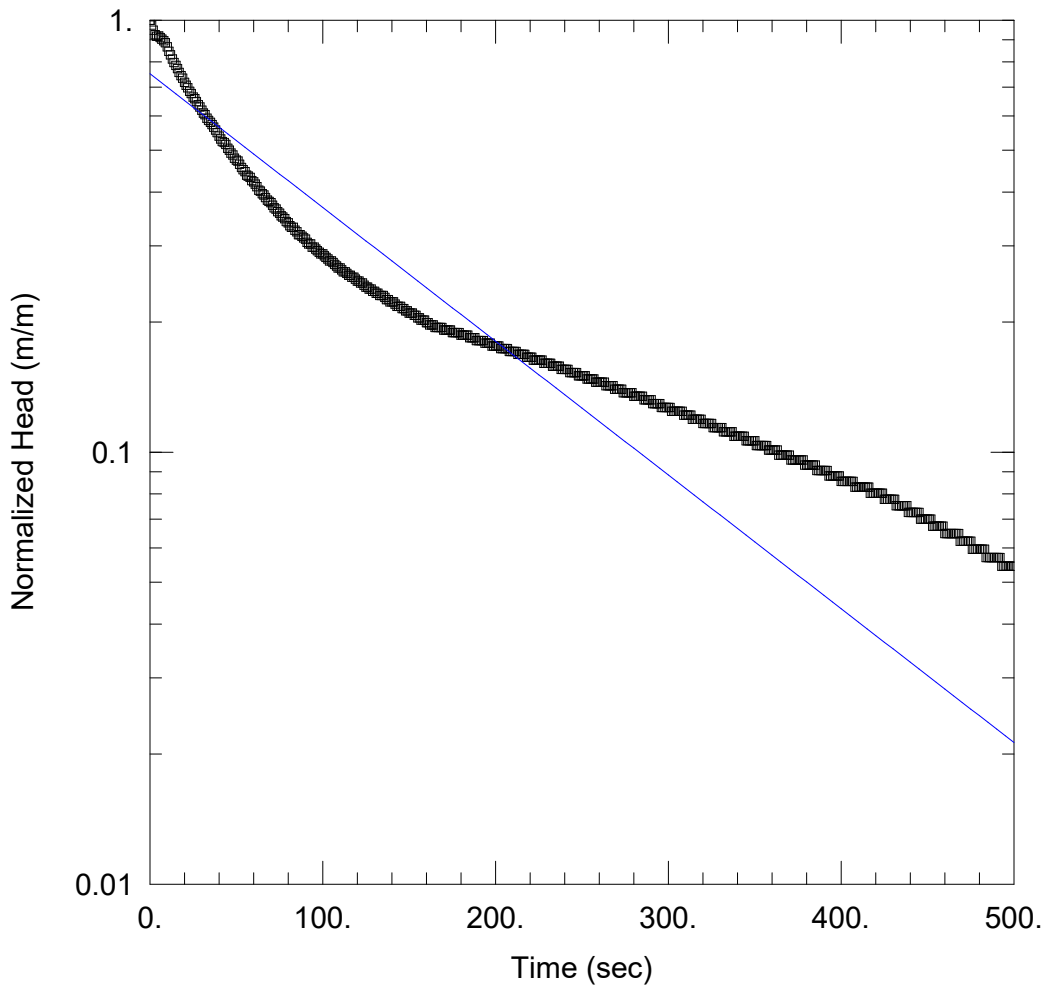
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

$K = 4.872E-6$ m/sec

$y_0 = 0.7403$ m



WELL TEST ANALYSIS

Data Set: C:\...\108.aqt

Date: 04/25/23

Time: 16:33:54

PROJECT INFORMATION

Company: B.I.G. Consulting Inc.

Client: 590 Argus LP.

Project: BIGC-ENV-554D

Location: 590 Argus Road, Oakville

Test Well: BH/MW108

Test Date: March 2, 2023

AQUIFER DATA

Saturated Thickness: 8.745 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH/MW108)

Initial Displacement: 1.158 m

Static Water Column Height: 8.745 m

Total Well Penetration Depth: 8.745 m

Screen Length: 3. m

Casing Radius: 0.025 m

Well Radius: 0.025 m

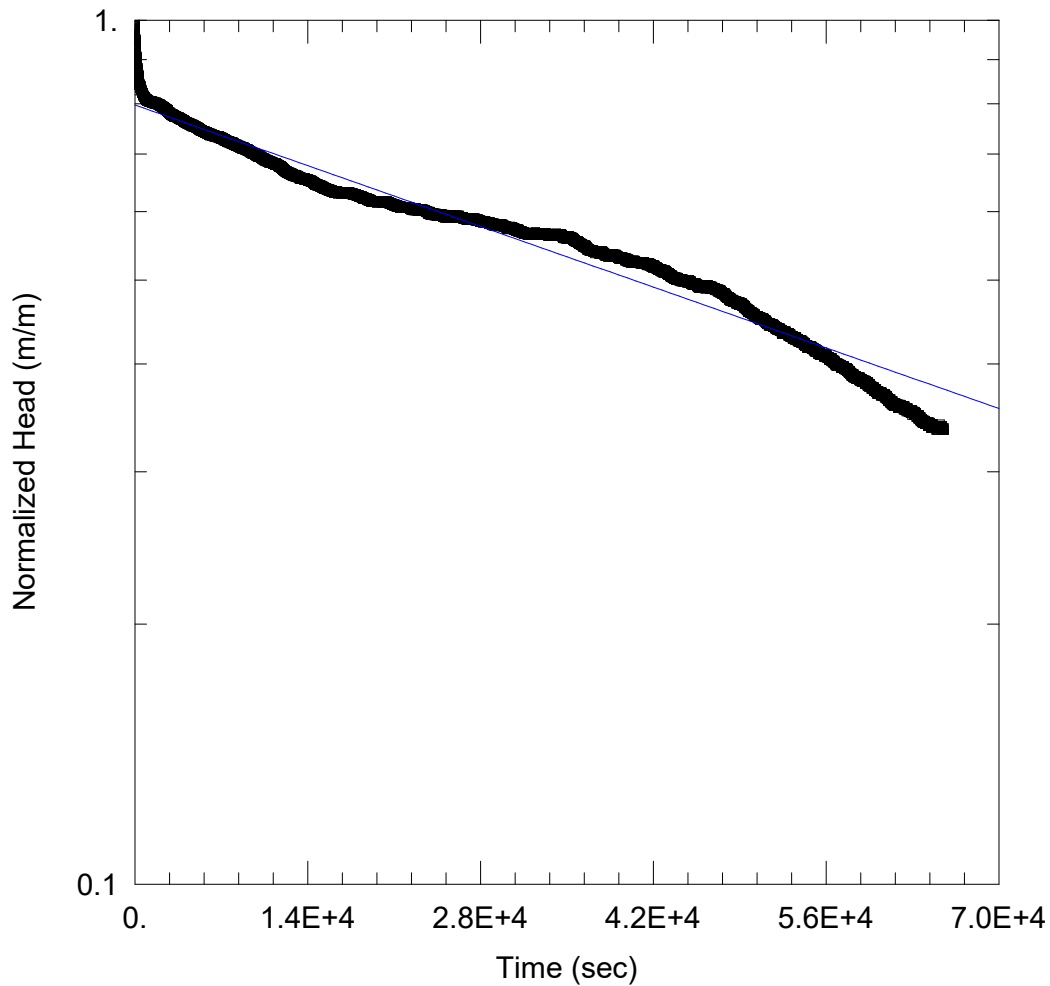
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

K = 4.07E-6 m/sec

y0 = 0.8701 m



WELL TEST ANALYSIS

Data Set: C:\...\109.aqt

Date: 04/25/23

Time: 16:50:09

PROJECT INFORMATION

Company: B.I.G. Consulting Inc.

Client: 590 Argus LP.

Project: BIGC-ENV-554D

Location: 590 Argus Road, Oakville

Test Well: BH/MW109

Test Date: March 1, 2023

AQUIFER DATA

Saturated Thickness: 1.26 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH/MW109)

Initial Displacement: 0.596 m

Static Water Column Height: 1.26 m

Total Well Penetration Depth: 1.26 m

Screen Length: 1.26 m

Casing Radius: 0.025 m

Well Radius: 0.025 m

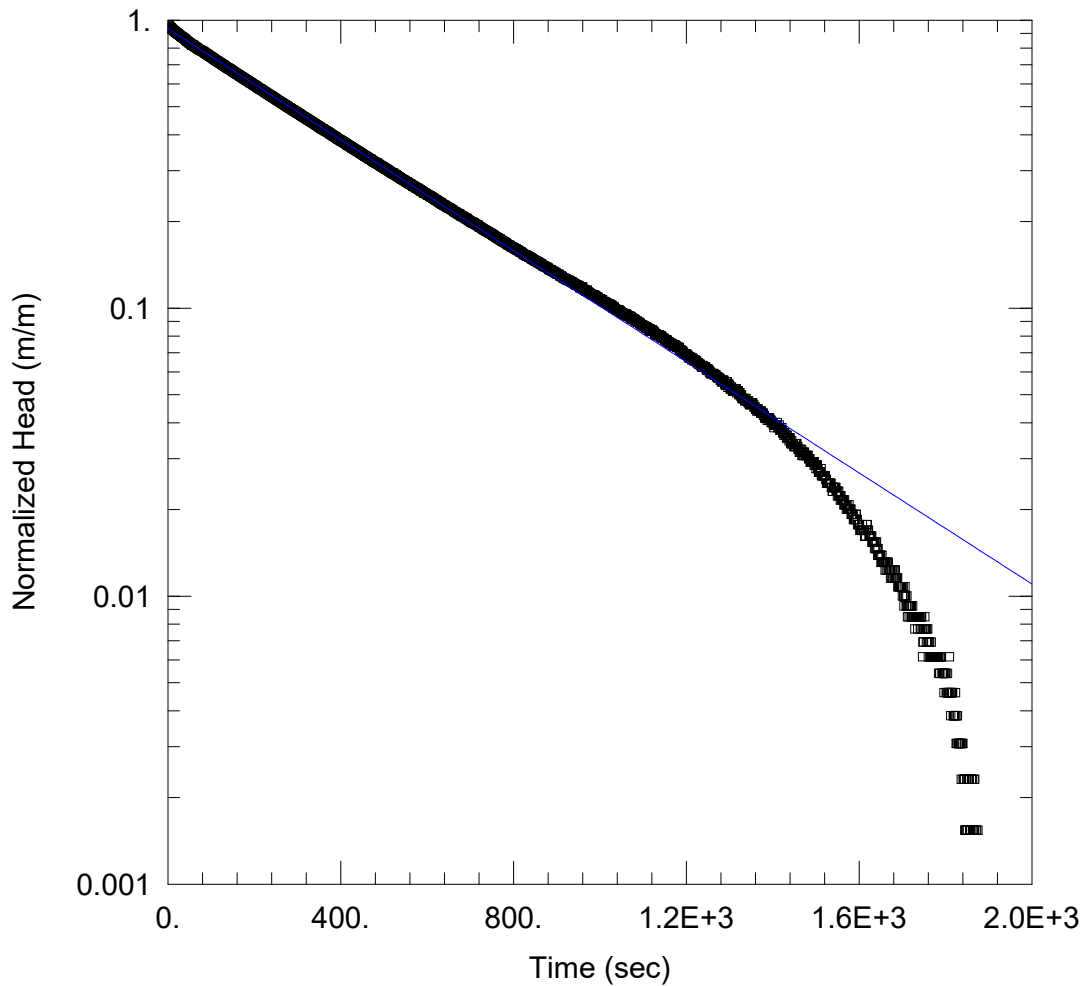
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

K = 1.519E-8 m/sec

y0 = 0.4754 m



WELL TEST ANALYSIS

Data Set: C:\...\110.aqt

Date: 04/25/23

Time: 17:02:39

PROJECT INFORMATION

Company: B.I.G. Consulting Inc.

Client: 590 Argus LP.

Project: BIGC-ENV-554D

Location: 590 Argus Road, Oakville

Test Well: BH/MW110

Test Date: March 1, 2023

AQUIFER DATA

Saturated Thickness: 8.44 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (BH/MW110)

Initial Displacement: 1.299 m

Static Water Column Height: 8.44 m

Total Well Penetration Depth: 8.44 m

Screen Length: 3. m

Casing Radius: 0.025 m

Well Radius: 0.025 m

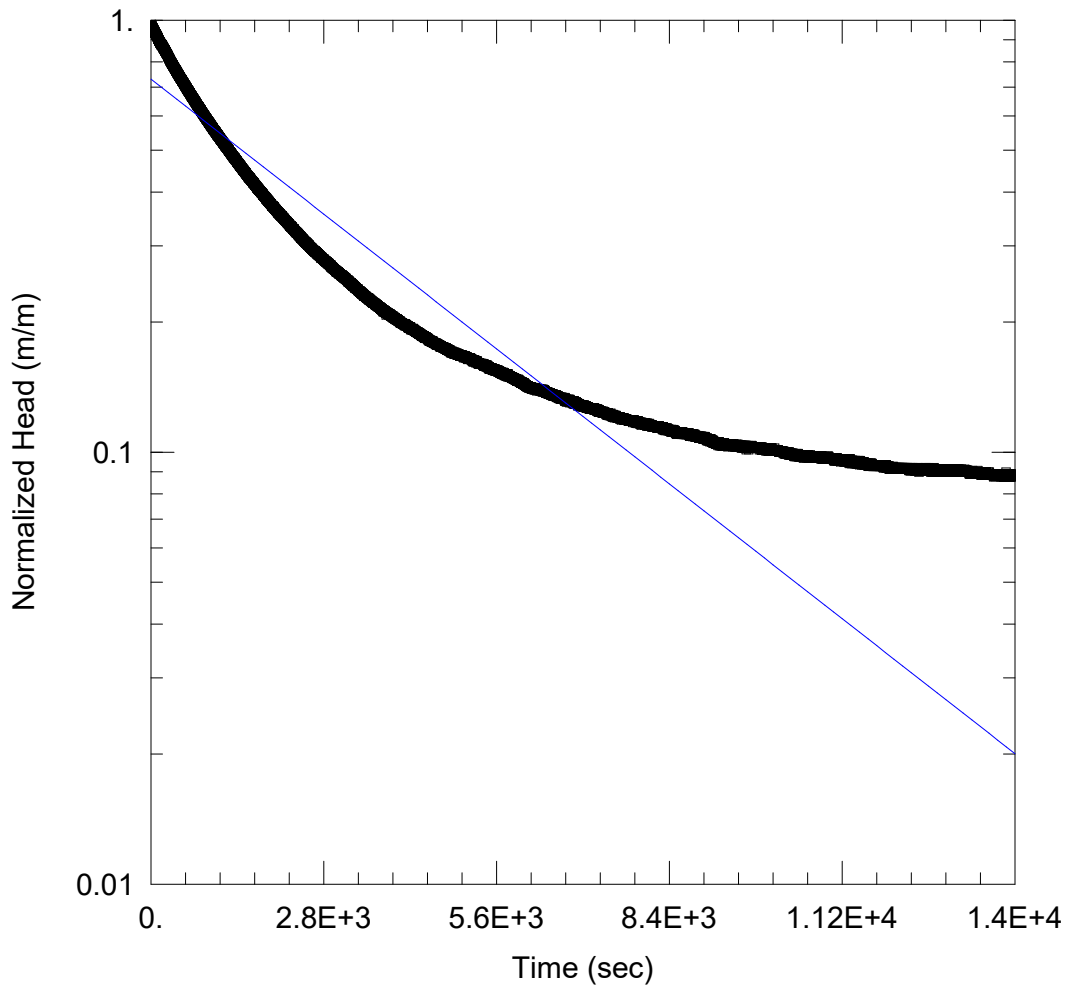
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

$K = 1.267E-6$ m/sec

$y_0 = 1.213$ m



WELL TEST ANALYSIS

Data Set: C:\...\111.aqt

Date: 04/25/23

Time: 17:20:13

PROJECT INFORMATION

Company: B.I.G. Consulting Inc.

Client: 590 Argus LP.

Project: BIGC-ENV-554D

Location: 590 Argus Road, Oakville

Test Well: BH/MW111

Test Date: March 1, 2023

AQUIFER DATA

Saturated Thickness: 11.37 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (BH/MW111)

Initial Displacement: 1.391 m

Static Water Column Height: 11.37 m

Total Well Penetration Depth: 11.37 m

Screen Length: 3. m

Casing Radius: 0.025 m

Well Radius: 0.025 m

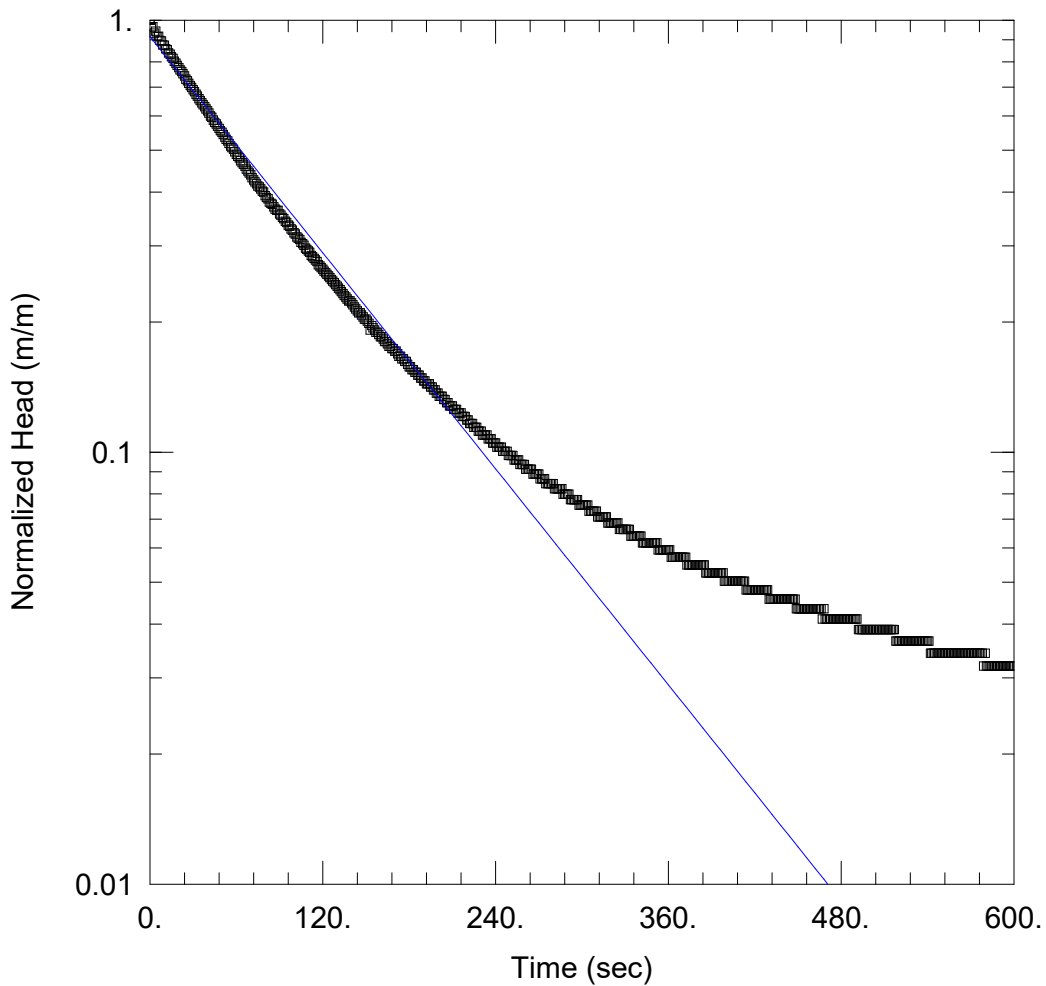
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

$K = 1.466E-7$ m/sec

$y_0 = 1.015$ m



WELL TEST ANALYSIS

Data Set: C:\...\112.aqt

Date: 04/25/23

Time: 17:27:10

PROJECT INFORMATION

Company: B.I.G. Consulting Inc.

Client: 590 Argus LP.

Project: BIGC-ENV-554D

Location: 590 Argus Road, Oakville

Test Well: BH/MW112

Test Date: March 2, 2023

AQUIFER DATA

Saturated Thickness: 10.02 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH/MW112)

Initial Displacement: 1.314 m

Static Water Column Height: 10.02 m

Total Well Penetration Depth: 10.02 m

Screen Length: 3. m

Casing Radius: 0.025 m

Well Radius: 0.025 m

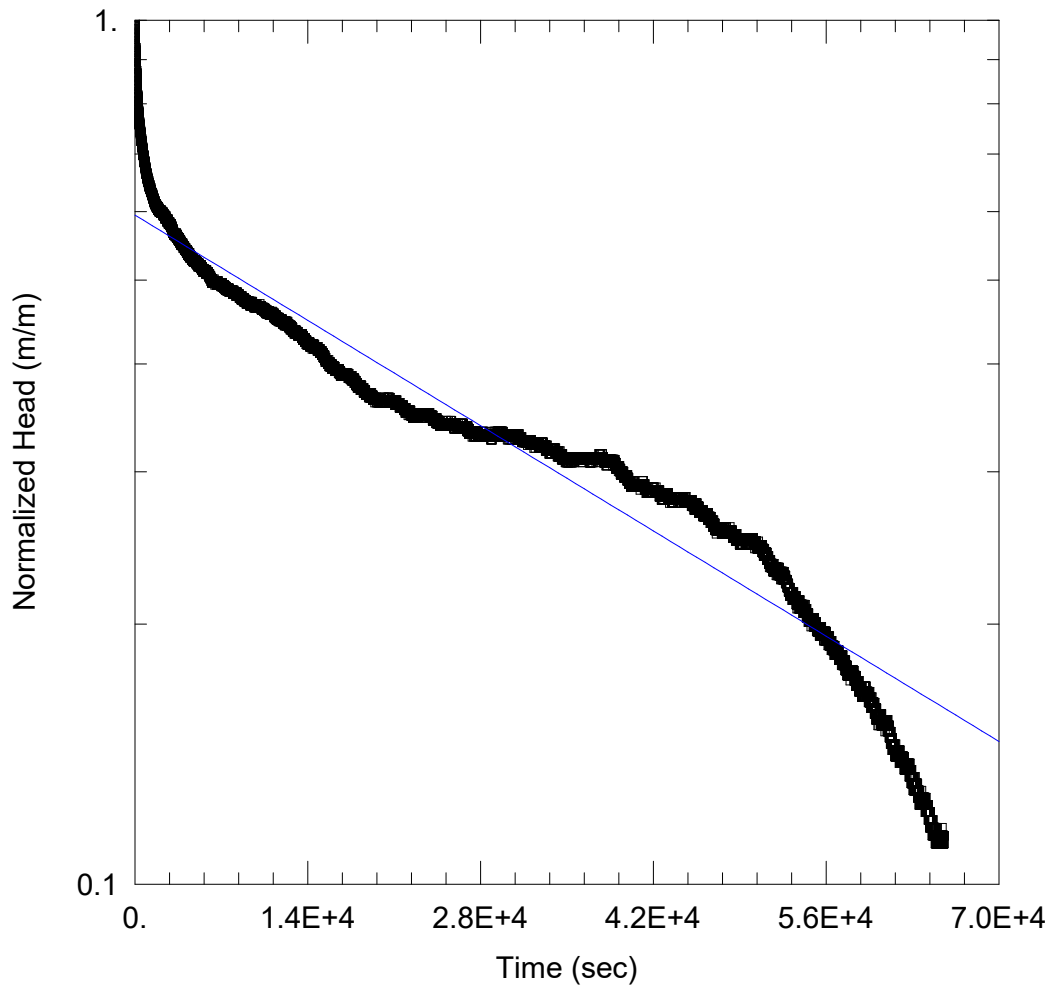
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

K = 5.478E-6 m/sec

y0 = 1.203 m



WELL TEST ANALYSIS

Data Set: C:\...\1113.aqt

Date: 04/25/23

Time: 17:42:39

PROJECT INFORMATION

Company: B.I.G. Consulting Inc.

Client: 590 Argus LP

Project: BIGC-ENV-554D

Location: 590 Argus Road, Oakville

Test Well: BH/MW113

Test Date: March 1, 2023

AQUIFER DATA

Saturated Thickness: 0.89 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (BH/MW113)

Initial Displacement: 0.413 m

Static Water Column Height: 0.89 m

Total Well Penetration Depth: 0.89 m

Screen Length: 0.89 m

Casing Radius: 0.025 m

Well Radius: 0.025 m

SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

$K = 3.727E-8$ m/sec

$y_0 = 0.2456$ m

**APPENDIX D: WATER QUALITY LABORATORY CERTIFICATE OF
ANALYSIS AND CHAIN OF CUSTODY**



Your Project #: BIGC-ENV-554A
 Your C.O.C. #: 881898-01-01

Attention: Eileen Liu

B.I.G Consulting Inc.
 12-5500 Tomken Road
 Mississauga, ON
 CANADA L4W 2Z4

Report Date: 2022/06/12
 Report #: R7164264
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C2F2517

Received: 2022/06/03, 19:47

Sample Matrix: Water
 # Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Sewer Use By-Law Semivolatile Organics	1	2022/06/07	2022/06/08	CAM SOP 00301	EPA 8270 m
Biochemical Oxygen Demand (BOD)	1	2022/06/06	2022/06/11	CAM SOP-00427	SM 23 5210B m
Carbonaceous BOD	1	2022/06/06	2022/06/11	CAM SOP-00427	SM 23 5210B m
Chromium (VI) in Water	1	N/A	2022/06/07	CAM SOP-00436	EPA 7199 m
Total Cyanide	1	2022/06/04	2022/06/04	CAM SOP-00457	OMOE E3015 5 m
Fluoride	1	2022/06/04	2022/06/07	CAM SOP-00449	SM 23 4500-F C m
Mercury in Water by CVAA	1	2022/06/07	2022/06/07	CAM SOP-00453	EPA 7470A m
Total Metals Analysis by Axial ICP	1	2022/06/09	2022/06/09	CAM SOP-00408	EPA 6010D m
Total Metals Analysis by ICPMS	1	N/A	2022/06/09	CAM SOP-00447	EPA 6020B m
E.coli, (CFU/100mL)	1	N/A	2022/06/03	CAM SOP-00552	MOE LSB E3371
Total Nonylphenol in Liquids by HPLC	1	2022/06/05	2022/06/07	CAM SOP-00313	In-house Method
Nonylphenol Ethoxylates in Liquids: HPLC	1	2022/06/05	2022/06/07	CAM SOP-00313	In-house Method
Animal and Vegetable Oil and Grease	1	N/A	2022/06/10	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2022/06/09	2022/06/09	CAM SOP-00326	EPA1664B m,SM5520B m
OC Pesticides (Selected) & PCB (1)	1	2022/06/06	2022/06/07	CAM SOP-00307	EPA 8081A/8082B m
OC Pesticides Summed Parameters	1	N/A	2022/06/04	CAM SOP-00307	EPA 8081A/8082B m
pH	1	2022/06/04	2022/06/07	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2022/06/07	CAM SOP-00444	OMOE E3179 m
Sulphate by Automated Colourimetry	1	N/A	2022/06/09	CAM SOP-00464	EPA 375.4 m
Total Kjeldahl Nitrogen in Water	1	2022/06/07	2022/06/09	CAM SOP-00938	OMOE E3516 m
Total PAHs (2)	1	N/A	2022/06/08	CAM SOP - 00301	
Mineral/Synthetic O & G (TPH Heavy Oil) (3)	1	2022/06/09	2022/06/09	CAM SOP-00326	EPA1664B m,SM5520F m
Total Suspended Solids	1	2022/06/08	2022/06/09	CAM SOP-00428	SM 23 2540D m
Volatile Organic Compounds in Water	1	N/A	2022/06/07	CAM SOP-00228	EPA 8260C m

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, MELCC, EPA, APHA.

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



Your Project #: BIGC-ENV-554A
Your C.O.C. #: 881898-01-01

Attention: Eileen Liu

B.I.G Consulting Inc.
12-5500 Tomken Road
Mississauga, ON
CANADA L4W 2Z4

Report Date: 2022/06/12
Report #: R7164264
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C2F2517

Received: 2022/06/03, 19:47

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.

- (1) Chlordane (Total) = Alpha Chlordane + Gamma Chlordane
- (2) Total PAHs include only those PAHs specified in the sewer use by-by-law.
- (3) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Deepthi Shaji, Project Manager
Email: Deepthi.Shaji@bureauveritas.com
Phone# (905)817-5700 Ext:7065843

=====
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HALTON SANITARY & COMBINED BYLAW (2-03)

Bureau Veritas ID					SUN780		
Sampling Date					2022/06/03 05:00		
COC Number					881898-01-01		
	UNITS	Criteria	Criteria B	Criteria-2	BH/MW1	RDL	QC Batch
Calculated Parameters							
Total Animal/Vegetable Oil and Grease	mg/L	150	-	-	ND	0.50	8033291
Inorganics							
Total Carbonaceous BOD	mg/L	300	-	-	ND	2	8036062
Fluoride (F-)	mg/L	10	-	-	0.41	0.10	8034172
Total Kjeldahl Nitrogen (TKN)	mg/L	100	-	-	2.2	0.10	8038660
pH	pH	6.0:10.0	6.5:8.5	6.5:8.5	7.85		8034173
Phenols-4AAP	mg/L	1	-	0.008	ND	0.0010	8037445
Total Suspended Solids	mg/L	350	-	15	110	10	8035930
Dissolved Sulphate (SO4)	mg/L	1500	-	-	250	1.0	8035929
Total Cyanide (CN)	mg/L	2	-	0.02	ND	0.0050	8034252
Petroleum Hydrocarbons							
Total Oil & Grease	mg/L	-	-	-	ND	0.50	8043541
Total Oil & Grease Mineral/Synthetic	mg/L	-	-	-	ND	0.50	8043548
Metals							
Total Aluminum (Al)	mg/L	50	-	-	0.6	0.1	8042315
Total Antimony (Sb)	mg/L	5	-	-	ND	0.02	8042315
Total Arsenic (As)	mg/L	1	-	0.02	ND	0.01	8042315
Total Beryllium (Be)	mg/L	5	-	-	ND	0.0005	8042315
Total Cadmium (Cd)	mg/L	1	-	0.008	ND	0.002	8042315
Total Chromium (Cr)	mg/L	3	-	0.08	ND	0.01	8042315
Total Cobalt (Co)	mg/L	5	-	-	ND	0.002	8042315
Total Copper (Cu)	mg/L	3	-	0.04	ND	0.01	8042315
Total Iron (Fe)	mg/L	50	-	-	3.2	0.02	8042315
Total Lead (Pb)	mg/L	3	-	0.12	ND	0.01	8042315
Total Manganese (Mn)	mg/L	5	-	0.05	0.20	0.001	8042315
Mercury (Hg)	mg/L	0.05	-	0.0004	ND	0.00010	8037167
Total Molybdenum (Mo)	mg/L	5	-	-	ND	0.005	8042315
Total Nickel (Ni)	mg/L	3	-	0.08	ND	0.005	8042315
Total Phosphorus (P)	mg/L	10	-	0.4	ND	0.05	8042315
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,Criteria B: Halton Sanitary and Storm sewer by-law							
Criteria-2: The Town of Oakville Storm Sewer Discharge By Law 2009-031							
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.							



HALTON SANITARY & COMBINED BYLAW (2-03)

Bureau Veritas ID					SUN780		
Sampling Date					2022/06/03 05:00		
COC Number					881898-01-01		
	UNITS	Criteria	Criteria B	Criteria-2	BH/MW1	RDL	QC Batch
Total Selenium (Se)	mg/L	5	-	0.02	ND	0.02	8042315
Total Silver (Ag)	mg/L	5	-	0.12	ND	0.01	8042315
Total Tin (Sn)	mg/L	5	-	-	ND	0.02	8042315
Total Titanium (Ti)	mg/L	5	-	-	ND	0.005	8042315
Total Zinc (Zn)	mg/L	3	-	0.04	ND	0.005	8042315
Volatile Organics							
Benzene	ug/L	10	-	2	2.4	0.40	8034119
Chloroform	ug/L	40	-	2	ND	0.40	8034119
1,2-Dichlorobenzene	ug/L	-	-	5.6	ND	0.80	8034119
1,4-Dichlorobenzene	ug/L	80	-	6.8	ND	0.80	8034119
cis-1,2-Dichloroethylene	ug/L	-	-	5.6	ND	1.0	8034119
trans-1,3-Dichloropropene	ug/L	-	-	5.6	ND	0.80	8034119
Ethylbenzene	ug/L	160	-	2	ND	0.40	8034119
Methylene Chloride(Dichloromethane)	ug/L	2000	-	5.2	ND	4.0	8034119
1,1,2,2-Tetrachloroethane	ug/L	-	-	17	ND	0.80	8034119
Tetrachloroethylene	ug/L	1000	-	4.4	ND	0.40	8034119
Toluene	ug/L	16	-	2	ND	0.40	8034119
Trichloroethylene	ug/L	400	-	7.6	ND	0.40	8034119
Total Xylenes	ug/L	-	-	4.4	ND	0.40	8034119
Surrogate Recovery (%)							
4-Bromofluorobenzene	%	-	-	-	98		8034119
D4-1,2-Dichloroethane	%	-	-	-	104		8034119
D8-Toluene	%	-	-	-	96		8034119
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, Criteria B: Halton Sanitary and Storm sewer by-law							
Criteria-2: The Town of Oakville Storm Sewer Discharge By Law 2009-031							
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.							



OAKVILLE STORM SEWER BYLAW (2009-031)

Bureau Veritas ID					SUN780		
Sampling Date					2022/06/03 05:00		
COC Number					881898-01-01		
	UNITS	Criteria	Criteria B	Criteria-2	BH/MW1	RDL	QC Batch
Inorganics							
Total BOD	mg/L	-	-	15	ND	2	8036060
Miscellaneous Parameters							
Nonylphenol Ethoxylate (Total)	mg/L	-	-	0.01	ND	0.005	8034479
Nonylphenol (Total)	mg/L	-	-	0.001	ND	0.001	8034478
Metals							
Chromium (VI)	ug/L	-	-	40	ND	0.50	8034995
Total Arsenic (As)	ug/L	1000	-	20	1.2	1.0	8042314
Total Cadmium (Cd)	ug/L	1000	-	8	ND	0.090	8042314
Total Chromium (Cr)	ug/L	3000	-	80	ND	5.0	8042314
Total Copper (Cu)	ug/L	3000	-	40	4.4	0.90	8042314
Total Lead (Pb)	ug/L	3000	-	120	ND	0.50	8042314
Total Manganese (Mn)	ug/L	5000	-	50	200	2.0	8042314
Total Nickel (Ni)	ug/L	3000	-	80	1.8	1.0	8042314
Total Phosphorus (P)	ug/L	10000	-	400	ND	100	8042314
Total Selenium (Se)	ug/L	5000	-	20	ND	2.0	8042314
Total Silver (Ag)	ug/L	5000	-	120	ND	0.090	8042314
Total Zinc (Zn)	ug/L	3000	-	40	6.6	5.0	8042314
Semivolatile Organics							
Naphthalene	ug/L	140	-	-	ND	0.3	8036992
Di-N-butyl phthalate	ug/L	-	-	15	ND	2	8036992
Bis(2-ethylhexyl)phthalate	ug/L	-	-	8.8	ND	2	8036992
3,3'-Dichlorobenzidine	ug/L	-	-	0.8	ND	0.8	8036992
Pentachlorophenol	ug/L	-	-	2	ND	1	8036992
Phenanthrene	ug/L	-	-	-	ND	0.2	8036992
Anthracene	ug/L	-	-	-	ND	0.2	8036992
Fluoranthene	ug/L	-	-	-	ND	0.2	8036992
Pyrene	ug/L	-	-	-	ND	0.2	8036992
Benzo(a)anthracene	ug/L	-	-	-	ND	0.2	8036992
Chrysene	ug/L	-	-	-	ND	0.2	8036992
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, Criteria B: Halton Sanitary and Storm sewer by-law							
Criteria-2: The Town of Oakville Storm Sewer Discharge By Law 2009-031							
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.							



OAKVILLE STORM SEWER BYLAW (2009-031)

Bureau Veritas ID					SUN780		
Sampling Date					2022/06/03 05:00		
COC Number					881898-01-01		
	UNITS	Criteria	Criteria B	Criteria-2	BH/MW1	RDL	QC Batch
Benzo(b/j)fluoranthene	ug/L	-	-	-	ND	0.2	8036992
Benzo(k)fluoranthene	ug/L	-	-	-	ND	0.2	8036992
Benzo(a)pyrene	ug/L	-	-	-	ND	0.2	8036992
Indeno(1,2,3-cd)pyrene	ug/L	-	-	-	ND	0.2	8036992
Dibenzo(a,h)anthracene	ug/L	-	-	-	ND	0.2	8036992
Benzo(g,h,i)perylene	ug/L	-	-	-	ND	0.2	8036992
Dibenzo(a,i)pyrene	ug/L	-	-	-	ND	0.2	8036992
Benzo(e)pyrene	ug/L	-	-	-	ND	0.2	8036992
Perylene	ug/L	-	-	-	ND	0.2	8036992
Dibenzo(a,j) acridine	ug/L	-	-	-	ND	0.4	8036992
7H-Dibenzo(c,g) Carbazole	ug/L	-	-	-	ND	0.4	8036992
1,6-Dinitropyrene	ug/L	-	-	-	ND	0.4	8036992
1,3-Dinitropyrene	ug/L	-	-	-	ND	0.4	8036992
1,8-Dinitropyrene	ug/L	-	-	-	ND	0.4	8036992
Calculated Parameters							
Total PAHs (18 PAHs)	ug/L	-	-	2	ND	1	8032665
Pesticides & Herbicides							
Aldrin	ug/L	-	-	-	ND	0.005	8034785
Dieldrin	ug/L	-	-	-	ND	0.005	8034785
a-Chlordane	ug/L	-	-	-	ND	0.005	8034785
g-Chlordane	ug/L	-	-	-	ND	0.005	8034785
o,p-DDT	ug/L	-	-	0.04	ND	0.005	8034785
p,p-DDT	ug/L	-	-	0.04	ND	0.005	8034785
Lindane	ug/L	-	-	40	ND	0.003	8034785
Hexachlorobenzene	ug/L	-	-	0.04	ND	0.005	8034785
Mirex	ug/L	-	-	40	ND	0.005	8034785
Microbiological							
Escherichia coli	CFU/100mL	-	200	200	<10	10	8033562
Surrogate Recovery (%)							
2,4,6-Tribromophenol	%	-	-	-	100		8036992
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, Criteria B: Halton Sanitary and Storm sewer by-law							
Criteria-2: The Town of Oakville Storm Sewer Discharge By Law 2009-031							
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.							



OAKVILLE STORM SEWER BYLAW (2009-031)

Bureau Veritas ID					SUN780		
Sampling Date					2022/06/03 05:00		
COC Number					881898-01-01		
	UNITS	Criteria	Criteria B	Criteria-2	BH/MW1	RDL	QC Batch
2-Fluorobiphenyl	%	-	-	-	70		8036992
D14-Terphenyl (FS)	%	-	-	-	63		8036992
D5-Nitrobenzene	%	-	-	-	79		8036992
D8-Acenaphthylene	%	-	-	-	72		8036992
2,4,5,6-Tetrachloro-m-xylene	%	-	-	-	87		8034785
Decachlorobiphenyl	%	-	-	-	93		8034785
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, Criteria B: Halton Sanitary and Storm sewer by-law							
Criteria-2: The Town of Oakville Storm Sewer Discharge By Law 2009-031							



ORGANOCHLORINATED PESTICIDES BY GC-ECD (WATER)

Bureau Veritas ID			SUN780		
Sampling Date			2022/06/03 05:00		
COC Number			881898-01-01		
	UNITS	Criteria	BH/MW1	RDL	QC Batch
Calculated Parameters					
Aldrin + Dieldrin	ug/L	0.08	ND	0.005	8032139
Chlordane (Total)	ug/L	40	ND	0.005	8032139
DDT+ Metabolites	ug/L	-	ND	0.005	8032139
Heptachlor + Heptachlor epoxide	ug/L	-	ND	0.005	8032139
o,p-DDD + p,p-DDD	ug/L	-	ND	0.005	8032139
o,p-DDE + p,p-DDE	ug/L	-	ND	0.005	8032139
o,p-DDT + p,p-DDT	ug/L	-	ND	0.005	8032139
Total Endosulfan	ug/L	-	ND	0.005	8032139
Total PCB	ug/L	0.4	ND	0.05	8032139
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: The Town of Oakville Storm Sewer Discharge By Law 2009-031					
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.					



GENERAL COMMENTS

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

Package 1	18.0°C
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Sample SUN780 [BH/MW1] : VOC Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.



QUALITY ASSURANCE REPORT

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
8034119	4-Bromofluorobenzene	2022/06/07	103	70 - 130	100	70 - 130	98	%				
8034119	D4-1,2-Dichloroethane	2022/06/07	104	70 - 130	99	70 - 130	98	%				
8034119	D8-Toluene	2022/06/07	96	70 - 130	100	70 - 130	98	%				
8034785	2,4,5,6-Tetrachloro-m-xylene	2022/06/07	88	50 - 130	83	50 - 130	62	%				
8034785	Decachlorobiphenyl	2022/06/07	85	50 - 130	119	50 - 130	75	%				
8036992	2,4,6-Tribromophenol	2022/06/07	97	10 - 130	106	10 - 130	95	%				
8036992	2-Fluorobiphenyl	2022/06/07	73	30 - 130	73	30 - 130	64	%				
8036992	D14-Terphenyl (FS)	2022/06/07	59	30 - 130	76	30 - 130	75	%				
8036992	D5-Nitrobenzene	2022/06/07	71	30 - 130	76	30 - 130	69	%				
8036992	D8-Acenaphthylene	2022/06/07	70	30 - 130	73	30 - 130	67	%				
8034119	1,1,2,2-Tetrachloroethane	2022/06/07	103	70 - 130	94	70 - 130	ND, RDL=0.40	ug/L	NC	30		
8034119	1,2-Dichlorobenzene	2022/06/07	96	70 - 130	92	70 - 130	ND, RDL=0.40	ug/L	NC	30		
8034119	1,4-Dichlorobenzene	2022/06/07	105	70 - 130	102	70 - 130	ND, RDL=0.40	ug/L	NC	30		
8034119	Benzene	2022/06/07	94	70 - 130	89	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8034119	Chloroform	2022/06/07	97	70 - 130	94	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8034119	cis-1,2-Dichloroethylene	2022/06/07	98	70 - 130	95	70 - 130	ND, RDL=0.50	ug/L	NC	30		
8034119	Ethylbenzene	2022/06/07	89	70 - 130	87	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8034119	Methylene Chloride(Dichloromethane)	2022/06/07	106	70 - 130	101	70 - 130	ND, RDL=2.0	ug/L	NC	30		
8034119	Tetrachloroethylene	2022/06/07	87	70 - 130	86	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8034119	Toluene	2022/06/07	89	70 - 130	90	70 - 130	ND, RDL=0.20	ug/L	7.1	30		
8034119	Total Xylenes	2022/06/07					ND, RDL=0.20	ug/L	11	30		
8034119	trans-1,3-Dichloropropene	2022/06/07	95	70 - 130	89	70 - 130	ND, RDL=0.40	ug/L	NC	30		
8034119	Trichloroethylene	2022/06/07	100	70 - 130	97	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8034172	Fluoride (F-)	2022/06/07	100	80 - 120	109	80 - 120	ND, RDL=0.10	mg/L	0.96	20		
8034173	pH	2022/06/07			101	98 - 103			2.3	N/A		
8034252	Total Cyanide (CN)	2022/06/04	87	80 - 120	99	80 - 120	ND, RDL=0.0050	mg/L	NC	20		
8034478	Nonylphenol (Total)	2022/06/06	104	50 - 130	103	50 - 130	ND, RDL=0.001	mg/L	NC	40		
8034479	Nonylphenol Ethoxylate (Total)	2022/06/06	91	50 - 130	86	50 - 130	ND, RDL=0.005	mg/L	NC	40		



QUALITY ASSURANCE REPORT(CONT'D)

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
8034785	a-Chlordane	2022/06/07	95	50 - 130	97	50 - 130	ND, RDL=0.005	ug/L	NC	30		
8034785	Aldrin	2022/06/07	99	50 - 130	93	50 - 130	ND, RDL=0.005	ug/L	NC	30		
8034785	Dieldrin	2022/06/07	88	50 - 130	117	50 - 130	ND, RDL=0.005	ug/L	NC	30		
8034785	g-Chlordane	2022/06/07	97	50 - 130	93	50 - 130	ND, RDL=0.005	ug/L	NC	30		
8034785	Hexachlorobenzene	2022/06/07	86	50 - 130	92	50 - 130	ND, RDL=0.005	ug/L	NC	30		
8034785	Lindane	2022/06/07	88	50 - 130	92	50 - 130	ND, RDL=0.003	ug/L	NC	30		
8034785	Mirex	2022/06/07	73	30 - 130	104	30 - 130	ND, RDL=0.005	ug/L	NC	40		
8034785	o,p-DDT	2022/06/07	57	50 - 130	108	50 - 130	ND, RDL=0.005	ug/L	NC	30		
8034785	p,p-DDT	2022/06/07	117	50 - 130	117	50 - 130	ND, RDL=0.005	ug/L	NC	30		
8034995	Chromium (VI)	2022/06/07	100	80 - 120	103	80 - 120	ND, RDL=0.50	ug/L	NC	20		
8035929	Dissolved Sulphate (SO4)	2022/06/09	127 (1)	75 - 125	103	80 - 120	ND, RDL=1.0	mg/L	NC	20		
8035930	Total Suspended Solids	2022/06/09					ND, RDL=10	mg/L	3.5	25	100	85 - 115
8036060	Total BOD	2022/06/11					ND,RDL=2	mg/L	0.77	30	97	80 - 120
8036062	Total Carbonaceous BOD	2022/06/11					ND,RDL=2	mg/L	NC	30	94	85 - 115
8036992	1,3-Dinitropyrene	2022/06/07	66	30 - 130	99	30 - 130	ND, RDL=0.4	ug/L				
8036992	1,6-Dinitropyrene	2022/06/07	67	30 - 130	96	30 - 130	ND, RDL=0.4	ug/L				
8036992	1,8-Dinitropyrene	2022/06/07	65	30 - 130	96	30 - 130	ND, RDL=0.4	ug/L				
8036992	3,3'-Dichlorobenzidine	2022/06/07	23 (1)	30 - 130	80	30 - 130	ND, RDL=0.8	ug/L	NC	40		
8036992	7H-Dibenzo(c,g) Carbazole	2022/06/07	88	30 - 130	89	30 - 130	ND, RDL=0.4	ug/L	NC	40		
8036992	Anthracene	2022/06/07	80	30 - 130	89	30 - 130	ND, RDL=0.2	ug/L	NC	40		
8036992	Benzo(a)anthracene	2022/06/07	79	30 - 130	92	30 - 130	0.2, RDL=0.2 (2)	ug/L	NC	40		
8036992	Benzo(a)pyrene	2022/06/07	81	30 - 130	101	30 - 130	0.3, RDL=0.2	ug/L	NC	40		



BUREAU
VERITAS

Bureau Veritas Job #: C2F2517

Report Date: 2022/06/12

QUALITY ASSURANCE REPORT(CONT'D)

B.I.G Consulting Inc.

Client Project #: BIGC-ENV-554A

Sampler Initials: MM

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
8036992	Benzo(b/j)fluoranthene	2022/06/07	87	30 - 130	103	30 - 130	0.7, RDL=0.2	ug/L	NC	40		
8036992	Benzo(e)pyrene	2022/06/07	86	30 - 130	105	30 - 130	0.4, RDL=0.2	ug/L	NC	40		
8036992	Benzo(g,h,i)perylene	2022/06/07	105	30 - 130	113	30 - 130	0.5, RDL=0.2	ug/L	NC	40		
8036992	Benzo(k)fluoranthene	2022/06/07	93	30 - 130	100	30 - 130	0.4, RDL=0.2	ug/L	NC	40		
8036992	Bis(2-ethylhexyl)phthalate	2022/06/07	74	30 - 130	83	30 - 130	ND, RDL=2	ug/L	NC	40		
8036992	Chrysene	2022/06/07	99	30 - 130	108	30 - 130	ND, RDL=0.2	ug/L	NC	40		
8036992	Dibenzo(a,h)anthracene	2022/06/07	104	30 - 130	113	30 - 130	0.4, RDL=0.2	ug/L	NC	40		
8036992	Dibenzo(a,i)pyrene	2022/06/07	78	30 - 130	86	30 - 130	0.2, RDL=0.2	ug/L	NC	40		
8036992	Dibenzo(a,j) acridine	2022/06/07	95	30 - 130	93	30 - 130	ND, RDL=0.4	ug/L	NC	40		
8036992	Di-N-butyl phthalate	2022/06/07	76	30 - 130	89	30 - 130	ND, RDL=2	ug/L	NC	40		
8036992	Fluoranthene	2022/06/07	81	30 - 130	98	30 - 130	ND, RDL=0.2	ug/L	NC	40		
8036992	Indeno(1,2,3-cd)pyrene	2022/06/07	112	30 - 130	115	30 - 130	0.4, RDL=0.2	ug/L	NC	40		
8036992	Naphthalene	2022/06/07	66	30 - 130	66	30 - 130	ND, RDL=0.3	ug/L				
8036992	Pentachlorophenol	2022/06/07	65	30 - 130	66	30 - 130	ND, RDL=1	ug/L	NC	40		
8036992	Perylene	2022/06/07	92	30 - 130	82	30 - 130	0.4, RDL=0.2	ug/L	NC	40		
8036992	Phenanthrene	2022/06/07	83	30 - 130	91	30 - 130	ND, RDL=0.2	ug/L	NC	40		
8036992	Pyrene	2022/06/07	80	30 - 130	98	30 - 130	ND, RDL=0.2	ug/L	NC	40		
8037167	Mercury (Hg)	2022/06/07	89	75 - 125	91	80 - 120	ND, RDL=0.00010	mg/L	NC	20		
8037445	Phenols-4AAP	2022/06/07	97	80 - 120	99	80 - 120	ND, RDL=0.0010	mg/L	NC	20		
8038660	Total Kjeldahl Nitrogen (TKN)	2022/06/09	NC	80 - 120	105	80 - 120	ND, RDL=0.10	mg/L	0.071	20	105	80 - 120
8042314	Total Arsenic (As)	2022/06/09	99	80 - 120	96	80 - 120	ND, RDL=1.0	ug/L	4.4	20		
8042314	Total Cadmium (Cd)	2022/06/09	101	80 - 120	98	80 - 120	ND, RDL=0.090	ug/L	NC	20		
8042314	Total Chromium (Cr)	2022/06/09	98	80 - 120	95	80 - 120	ND, RDL=5.0	ug/L	NC	20		
8042314	Total Copper (Cu)	2022/06/09	102	80 - 120	96	80 - 120	ND, RDL=0.90	ug/L	NC	20		
8042314	Total Lead (Pb)	2022/06/09	92	80 - 120	91	80 - 120	ND, RDL=0.50	ug/L	NC	20		
8042314	Total Manganese (Mn)	2022/06/09	99	80 - 120	98	80 - 120	ND, RDL=2.0	ug/L	5.4	20		
8042314	Total Nickel (Ni)	2022/06/09	98	80 - 120	96	80 - 120	ND, RDL=1.0	ug/L	6.1	20		
8042314	Total Phosphorus (P)	2022/06/09	101	80 - 120	106	80 - 120	ND, RDL=100	ug/L	NC	20		



BUREAU
VERITAS

Bureau Veritas Job #: C2F2517

Report Date: 2022/06/12

QUALITY ASSURANCE REPORT(CONT'D)

B.I.G Consulting Inc.

Client Project #: BIGC-ENV-554A

Sampler Initials: MM

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
8042314	Total Selenium (Se)	2022/06/09	104	80 - 120	102	80 - 120	ND, RDL=2.0	ug/L	NC	20		
8042314	Total Silver (Ag)	2022/06/09	99	80 - 120	97	80 - 120	ND, RDL=0.090	ug/L	NC	20		
8042314	Total Zinc (Zn)	2022/06/09	101	80 - 120	100	80 - 120	ND, RDL=5.0	ug/L	NC	20		
8042315	Total Aluminum (Al)	2022/06/09	100	80 - 120	101	80 - 120	ND, RDL=0.1	mg/L				
8042315	Total Antimony (Sb)	2022/06/09	110	80 - 120	107	80 - 120	ND, RDL=0.02	mg/L				
8042315	Total Arsenic (As)	2022/06/09	108	80 - 120	104	80 - 120	ND, RDL=0.01	mg/L	NC	20		
8042315	Total Beryllium (Be)	2022/06/09	104	80 - 120	104	80 - 120	ND, RDL=0.0005	mg/L				
8042315	Total Cadmium (Cd)	2022/06/09	106	80 - 120	103	80 - 120	ND, RDL=0.002	mg/L	NC	20		
8042315	Total Chromium (Cr)	2022/06/09	108	80 - 120	105	80 - 120	ND, RDL=0.01	mg/L	NC	20		
8042315	Total Cobalt (Co)	2022/06/09	104	80 - 120	102	80 - 120	ND, RDL=0.002	mg/L				
8042315	Total Copper (Cu)	2022/06/09	102	80 - 120	102	80 - 120	ND, RDL=0.01	mg/L	16	20		
8042315	Total Iron (Fe)	2022/06/09	105	80 - 120	106	80 - 120	ND, RDL=0.02	mg/L				
8042315	Total Lead (Pb)	2022/06/09	103	80 - 120	102	80 - 120	ND, RDL=0.01	mg/L	NC	20		
8042315	Total Manganese (Mn)	2022/06/09	101	80 - 120	102	80 - 120	ND, RDL=0.001	mg/L	0	20		
8042315	Total Molybdenum (Mo)	2022/06/09	106	80 - 120	104	80 - 120	ND, RDL=0.005	mg/L				
8042315	Total Nickel (Ni)	2022/06/09	104	80 - 120	103	80 - 120	ND, RDL=0.005	mg/L	NC	20		
8042315	Total Phosphorus (P)	2022/06/09	99	80 - 120	99	80 - 120	ND, RDL=0.05	mg/L	1.7	20		
8042315	Total Selenium (Se)	2022/06/09	106	80 - 120	103	80 - 120	ND, RDL=0.02	mg/L	NC	20		
8042315	Total Silver (Ag)	2022/06/09	99	80 - 120	99	80 - 120	ND, RDL=0.01	mg/L	NC	20		
8042315	Total Tin (Sn)	2022/06/09	105	80 - 120	103	80 - 120	ND, RDL=0.02	mg/L				
8042315	Total Titanium (Ti)	2022/06/09	102	80 - 120	103	80 - 120	ND, RDL=0.005	mg/L				
8042315	Total Zinc (Zn)	2022/06/09	103	80 - 120	103	80 - 120	ND, RDL=0.005	mg/L	5.6	20		
8043541	Total Oil & Grease	2022/06/09			99	85 - 115	ND, RDL=0.50	mg/L	0.51	25		



QUALITY ASSURANCE REPORT(CONT'D)

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
8043548	Total Oil & Grease Mineral/Synthetic	2022/06/09			97	85 - 115	ND, RDL=0.50	mg/L	0.52	25		

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.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) The flagged analytes were detected in the method blank above the detection limit. Sample results have not been blank corrected. The results may be biased high. For results that were not detected (ND), this potential bias has no impact.



VALIDATION SIGNATURE PAGE

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

Cristina Carriere

Cristina Carriere, Senior Scientific Specialist

Sonja Elavinamannil, Master of Biochemistry, Team Lead

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 Signature Page.



**Exceedance Summary Table – Halton Storm and Sanitary
 Result Exceedances**

Sample ID	Bureau Veritas ID	Parameter	Criteria	Result	DL	UNITS
No Exceedances						
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.						

**Exceedance Summary Table – Oakville Storm Sewer
 Result Exceedances**

Sample ID	Bureau Veritas ID	Parameter	Criteria	Result	DL	UNITS
BH/MW1	SUN780-06	Benzene	2	2.4	0.40	ug/L
BH/MW1	SUN780-12	Total Manganese (Mn)	0.05	0.20	0.001	mg/L
BH/MW1	SUN780-12	Total Manganese (Mn)	50	200	2.0	ug/L
BH/MW1	SUN780-08	Total Suspended Solids	15	110	10	mg/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.						



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

CHAIN OF CUSTODY RECORD

Page of

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name: #31796 B.I.G Consulting Inc.	Company Name: <u>BIG Consulting</u>	Quotation #: C12477	Bureau Veritas Job #:	Bottle Order #:	Barcode: 881898		
Attention: Accounts Payable	Attention: <u>Eileen Liu</u>	P.O. #:	Project: BIGC-ENV-554A	COC #:	Project Manager:		
Address: 12-5500 Tomken Road Mississauga ON L4W 2Z4	Address: <u>12-5500 Tomken Road Mississauga ON, L4W 2Z4</u>	Project Name:	Site #:	Barcode: C#881898-01-01		Deepthi Shaji	
Tel: (416) 214-4880 Fax:	Tel: <u>416-214-4880</u> Fax:	Sampled By: <u>MA/KAL</u>					
Email: ldougherty@brownfieldgi.com; admin@brownfieldgi.co	Email: <u>eliu@brownfieldgi.com</u>						

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY						ANALYSIS REQUESTED (PLEASE BE SPECIFIC)										Turnaround Time (TAT) Required Please provide advance notice for rush projects					
Regulation 153 (2011)			Other Regulations			Special Instructions	Field Filtered (please circle): Metals / Hg / Cr VI	Halton Sanitary & Combined Bylaw (2009)	Oakville Storm Sewer Bylaw (2009-031)											Regular (Standard) TAT: (will be applied if Rush TAT is not specified): Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.	
<input type="checkbox"/> Table 1	<input type="checkbox"/> Res/Park	<input type="checkbox"/> Medium/Fine	<input type="checkbox"/> CCME	<input checked="" type="checkbox"/> Sanitary Sewer Bylaw			N	✓	✓	Job Specific Rush TAT (if applies to entire submission) Date Required: _____ Time Required: _____ Rush Confirmation Number: _____ (call lab for #)										# of Bottles 19	
<input type="checkbox"/> Table 2	<input type="checkbox"/> Ind/Comm	<input type="checkbox"/> Coarse	<input type="checkbox"/> Reg 558	<input checked="" type="checkbox"/> Storm Sewer Bylaw						Job Specific Rush TAT (if applies to entire submission) Date Required: _____ Time Required: _____ Rush Confirmation Number: _____ (call lab for #)										Comments	
<input type="checkbox"/> Table 3	<input type="checkbox"/> Agri/Other	<input type="checkbox"/> For RSC	<input type="checkbox"/> MISA	Municipality: <u>Halton/Oakville</u>																	
<input type="checkbox"/> Table			<input type="checkbox"/> PWQO	<input type="checkbox"/> Reg 406 Table																	
Include Criteria on Certificate of Analysis (Y/N)? <u>Y</u>																					
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix																	
1	<u>BH/mw 1</u>	<u>June 3rd 2012</u>	<u>5:00pm</u>	<u>GW</u>																	
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					

03-Jun-22 19:47
 Deepthi Shaji
 C2F2517
 RPK ENV-1691

* 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>[Signature]</u>	<u>22/06/03</u>	<u>7:43pm</u>	<u>[Signature]</u>	<u>20/06/03</u>	<u>19:42</u>		Time Sensitive	Temperature (°C) on Recept: <u>18/19/17</u>
							Custody Seal Present	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
							Custody Seal Intact	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

* 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
ONICE

APPENDIX E: CONSTRUCTION DEWATERING ESTIMATE RATE CALCULATIONS

Construction Dewatering Rate Estimate

590 Argus Road, Oakville, Ontario

Six (6) levels of underground parking, unconfined aquifer, groundwater seepage to rectangular excavation (line source)

Table E-1: Construction Dewatering Rate Estimates

Description	Symbol	6 Levels	Unit	Explanation
Input				
Established Grade Elevation		104.96	m asl	Based on Drawing A401, North and South Elevations, prepared by TAI, dated March 20, 2024
Highest Groundwater Elevation		102.85	m asl	Highest groundwater elevation (March 23, 2023)
Footing Elevation		83.28	m asl	Assumed 2.0 m below FFE, P6 FFE is 85.28 m asl based on Drawing A200, Level P6 Plan, prepared by TAI, dated March 20, 2024
Aquifer Bottom		82.38	m asl	Assumed 1 m below footing
Hydraulic Conductivity	K	1.22E-06	m/s	Geometric mean K
Length of Excavation	x	150.0	m	Based on Drawing A200, Level P6 Plan, prepared by TAI, dated March 20, 2024
Width of Excavation	a	90.0	m	Based on Drawing A200, Level P6 Plan, prepared by TAI, dated March 20, 2024
Output				
Top of Aquifer		102.85	m asl	water table for unconfined aquifer
Target Water Level		82.28	m asl	assumed 1 m below footing
Water Level above aquifer bottom before dewatering	H	20.5	m	
target water level above aquifer bottom	h	0.0	m	
Radius of Influence	L (R ₀)	39.68	m	Sichardt's Formula C=1750
Construction Dewatering Flow Rate - Steady State	Q	266.08	m ³ /day	Construction Dewatering Flow - Dupuit Equation
Maximum Construction Flow Rate (safety factor of 1.5)	1.5Q	399.11	m ³ /day	During the initial period and after rains
Construction Dewatering Flow Rate - Steady State	Q	266,000	L/day	
Maximum Construction Flow Rate (safety factor of 1.5)	1.5Q	399,000	L/day	

APPENDIX F: LONG TERM DRAINAGE FLOW RATE ESTIMATE CALCULATIONS

Foundation Drain Flow Rate Estimate

590 Argus Road, Oakville, Ontario

Six (6) levels of underground parking, Unconfined Aquifer, Groundwater seepage to rectangular excavation (line source)

Table F-1: Foundation Drain Flow Rate Estimate of Southern Portion

Description	Symbol	6 Levels	Unit	Explanation
Input				
Established Grade Elevation		104.96	m asl	Based on Drawing A401, North and South Elevations, prepared by TAI, dated March 20, 2024
Highest Groundwater Elevation		98.37	m asl	Highest deep groundwater elevation from BH/MW111 (March 23, 2023)
Basement slab level (top)		85.28	m asl	P6 FFE is 87.00 m asl and P7 FFE is assumed 84.20 m asl based on drawing A401, North and South Elevations, prepared by Teeple, dated February 27
Aquifer Bottom		84.28	m asl	Assumed 1 m below basement level
Hydraulic Conductivity	K	2.30E-07	m/s	Geometric mean K of deep wells
Length of Excavation	x	150.0	m	Based on Drawing A200, Level P6 Plan, prepared by TAI, dated March 20, 2024
Width of Excavation	a	90.0	m	Based on Drawing A200, Level P6 Plan, prepared by TAI, dated March 20, 2024
Output				
Top of Aquifer		98.4	m asl	Water table for unconfined aquifer
Target Water Level		84.78	m asl	Assumed 0.5 m below basement floor level
Water Level above aquifer bottom before dewatering	H	14.1	m	
Target water level above aquifer bottom	h	0.5	m	
Radius of Influence	L (R ₀)	29.01	m	Weber Equation
Long-Term Flow Rate - Steady State	Q	32.66	m ³ /day	Long-term flow rate - Dupuit Equation
Maximum Foundation Drain Flow Rate (safety factor of 2)	2Q	65.33	m ³ /day	During the initial period and after rains
Estimated Long-term Foundation Drain Flow Rate	Q	33,000	L/day	
Estimated Maximum Foundation Drain Flow Rate	2Q	66,000	L/day	