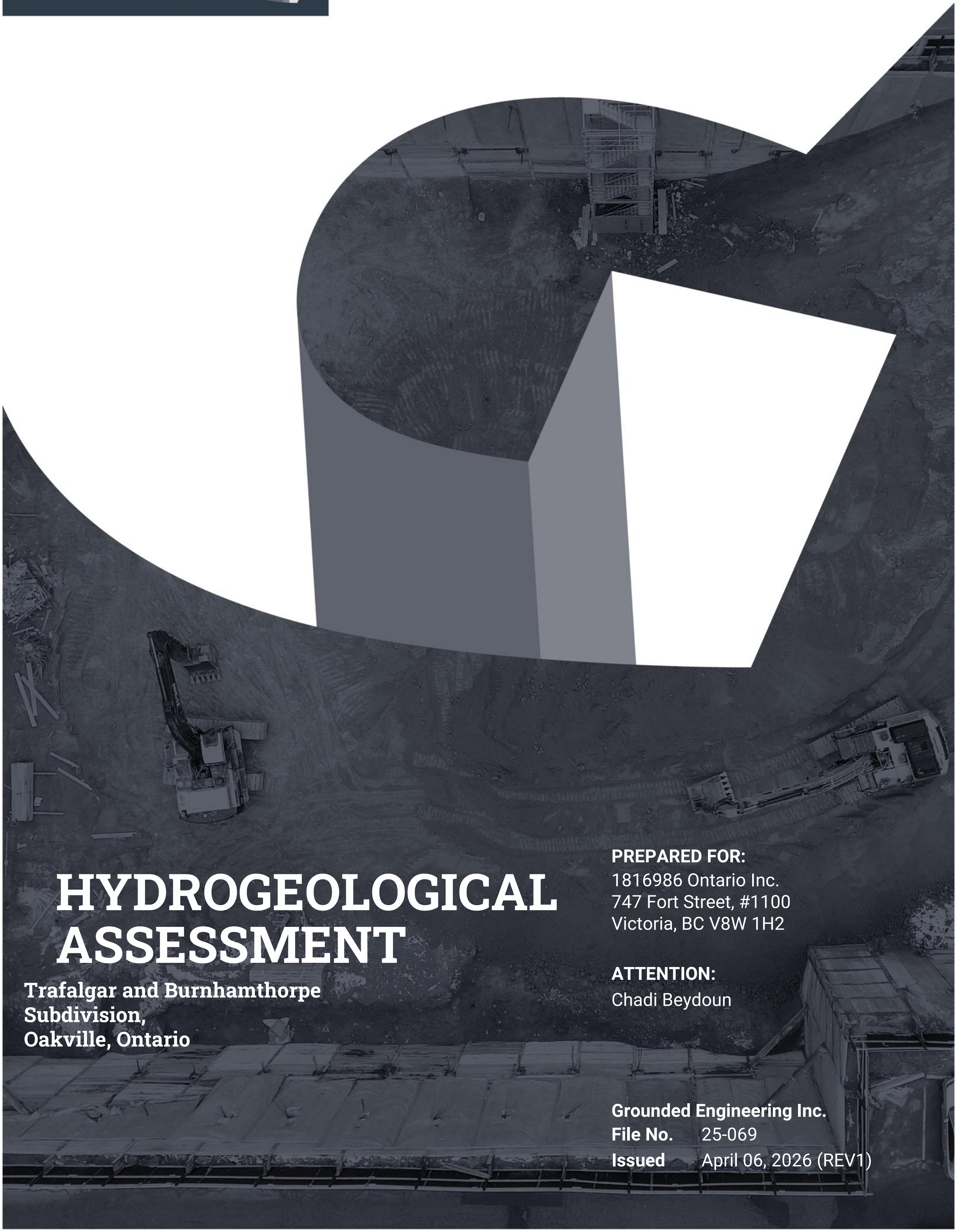

HYDROGEOLOGICAL ASSESSMENT

Trafalgar and Burnhamthorpe Subdivision, Oakville, Ontario

PREPARED FOR:
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Grounded Engineering Inc.
File No. 25-069
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Executive Summary

This executive summary is intended to provide a general overview of the following hydrogeological assessment report. It cannot be relied upon on its own, as the entire hydrogeological report must be reviewed for the presented data, results, and engineering recommendations relevant to the proposed development. This executive summary is subject to limitations included in Section 6 of this report

The proposed development includes constructing a new mixed-use subdivision separated into various building blocks (1 to 15), comprised of mid-rise to high-rise residential and/or commercial buildings ranging in height from 4 to 30-storeys, with podium heights ranging from 1 to 8-storeys. Each block will have underground parking levels ranging from 4 to 10 m depth (P1 to P3) as well as some on-grade structures. The proposed development also includes two public parks (Blocks 14 and 15) and is designed to provide appropriate connections to a planned school site (Block 13).

The subsurface conditions generally consist of surficial materials (topsoil, pavements, etc.) and existing earth fills overlying native, undisturbed Halton Till and/or sands and silts, which are underlain by shale bedrock (Queenston Formation). The groundwater table varies across the site but is generally observed at depths of 0.6 to 2.5± m below existing site grades.

The design hydraulic conductivity of the overburden soils ranges from about 1.0 $\times 10^{-5}$ m/s to 1.3 $\times 10^{-6}$ m/s, while the hydraulic conductivity of the underlying bedrock is taken as 3.0 $\times 10^{-6}$ m/s.

A groundwater sample taken from a monitoring well at the site **met** the criteria for The Region of Halton's Sanitary and Combined Sewer limits but **exceeded** the criteria for the Town of Oakville Storm Sewer limits. As such treatment of groundwater discharged to the Town of Oakville Storm Sewers will be required.

Overburden soils must be positively dewatered to a minimum of 1.2 m below proposed founding elevations prior to excavation to preserve the integrity of the native soils. Positive dewatering of the bedrock is not required, and seepage from the bedrock can be managed with sumps and pumps (in addition to the dewatering system for the overburden soils).

Estimated short term dewatering volumes (groundwater and rainfall) using a factor of safety (F.O.S.) of 3.0 range from about 341,000 to 2,064,000 L/day for Blocks 1 to 12. The total preliminary long term dewatering volumes (groundwater and infiltration) using an F.O.S. of 3.0 ranges from 265,000 to 1,526,000 L/day for Blocks 1 to 12. The zone of influence (ZOI) due to dewatering ranges from 8 to 83 m in the short term and 2 to 71 m in the long term, resulting in the maximum settlement of adjacent structures within the ZOI of <1 to 7 mm due to dewatering activities. The impact on adjacent structures due to dewatering Grounded considers within acceptable limits.

Regulatory Requirements	
Environmental Activity and Sector Registry (EASR) Posting	Required
Short Term Permit to Take Water (PTTW)	Not Required*
Long Term Permit to Take Water (PTTW)	Required**
Short Term Discharge Agreement Region of Halton/Oakville	Required
Long Term Discharge Agreement Region of Halton/Oakville	Required

**Per amendments to O.Reg. 63/16 effective July 1st, 2025, a short term PTTW will no longer be required for construction dewatering above 400,000 L/day. An EASR will still be required.*

Per amendments to Ontario Regulation 387/04 effective July 1st, 2025, low-risk foundation drainage systems used primarily for residential purposes that take less than 379,000 litres of groundwater per day are exempted from requiring environmental permissions, exempt from requiring a PTTW, and exempt from needing to self-register online.* ***Therefore, a Long Term PTTW is not required for Blocks 3, 9, 10, 11 and 12.

Additional boreholes and monitoring wells are required for general site coverage and for a more refined dewatering analysis of particular blocks of development at the detailed design stage. The above estimated volumes are considered preliminary, based on limited design information and assumed soil and groundwater conditions in areas where boreholes and monitoring wells are not currently present.

1 Introduction

1.1 Background

1816986 Ontario Inc. retained Grounded Engineering Inc., to complete a preliminary Hydrogeological Assessment for the property located on the lands known municipally as 340 Burnhamthorpe Road East and 3437 Trafalgar Road, or “Trafalgar and Burnhamthrope Subdivision” (the Property). The Site is located in North Oakville, near the Town's border with Milton, at the intersection of Burnhamthorpe Road East and Trafalgar Road, on the south-east corner. The Subject Site, which is comprised of 2 properties, has a total area of approximately 20.2 hectares (49.9 acres), with approximately 537 metres of frontage along Burnhamthorpe Road East and 374 metres along Trafalgar Road. The site location is presented in Figure 1.

The Proposed Development will redevelop the mostly-vacant Site into a mixed-use, transit-supportive development. The Proposed Development includes 24 mixed-use and residential buildings across 12 development blocks; A new street network, inclusive of public and private streets (Streets A, B, C, Main Street, Settlers Road, and private access lanes); Access to the Site from Trafalgar Road and Burnhamthorpe Road West; 0.5 hectares of parks and open space; and, Public realm improvements throughout the Proposed Development.

The Proposed Development will deliver a total gross floor area (GFA) of 605,635 m^2 of new development, comprised of 591,160 m^2 of residential and 14,475 m^2 of non-residential usage. Within the majority of each of the blocks, the development will generally consist of mixed-use and/or commercial mid-rise to high-rise buildings with 1-3 levels of underground parking.

The hydrogeological assessment was undertaken to evaluate hydrogeological conditions of the proposed development on the Property and to develop a plan to manage risk of potential impacts associated with activities related to the proposed land use during both construction, and in the permanent condition.

Grounded has been provided with the following reports and drawings to assist in our scope of work:

- Site survey, prepared by JD Barnes (Feb. 11, 2025).
- Architectural Drawings, “Draft Trafalgar & Burnhamthorpe”; Project No. 24064, dated 2026-04-06, prepared by BDP. Quadrangle.
- Functional Servicing Report, OPA/ZBA Draft Plan of Subdivision; Project No. 1767, dated April 6, 2026, prepared by Trafalgar Engineering.
- Draft Plan of Subdivision, dated February 9, 2026, prepared by JD. Barnes.

1.2 Scope of Work

A summary of the scope of work is provided below:

- Background Information Review: Review of available background geologic and hydrogeological information for the Property and surrounding areas. This included a review of the Ministry of the Environment, Conservation and Parks (MECP) well records, watershed information by the Conservation Halton and results of previous studies and subsurface investigations.
- Private Well Survey: A well survey was conducted for properties within 500 m of the Property.
- Groundwater Level Monitoring: Groundwater level monitoring was conducted to assess the groundwater flow conditions.
- Hydraulic Conductivity Testing: In-situ hydraulic conductivity tests were conducted in select monitoring wells to assess hydraulic conductivity of the strata. The underlying soils were assessed to determine potential dewatering requirements.

2 Site Information

2.1 Site Location and Description

The Property is rectangular in shape, with a total area of ±202,000 m^2 and is located approximately east of intersection at Trafalgar and Burnhamthrope Roads. The majority of the Site is currently underutilized farmland. There is a two-storey abandoned farmhouse on the southwest of the Site, which is a listed property in the Oakville Heritage Property Register, and the Vic Hadfield Golf & Learning Centre, a small golf facility located on the northwest corner of the Site. The existing site conditions are presented in Figure 2.

The Property and the immediate neighboring areas are not serviced with municipal piped water or sewage services.

2.2 Topography & Drainage

The Ministry of Natural Resources (MNR) and Ministry of Energy and Mines (MEM) database were searched to obtain topographic and geological maps of Ontario for review. The maps are provided as Appendix C. The information obtained is summarized below:

Records	**Information**
Topographic Maps	The elevation of the site ranges from 180.0 m to 185.0 m.

Records	**Information**
Hydrology	There is a small unnamed off-line pond located in the south-central portion of the site. Joshuas Creek is located approximately 125± m north of the site. Groundwater is expected to flow east.
Run Off	Stormwater on the property is expected to drain towards ditches within the developed portions of site. The on-site drainage ditch running roughly north south flows into the municipal catch basins located along Trafalgar Road. Stormwater in the vegetated area of site is assumed to be infiltrated into the ground.

2.3 Regional Physiography

From a regional perspective the Property is situated within the physiographic feature known as the South Slope physiographic region of Southern Ontario.

The South Slope is an approximately 2,500 km^2 area that encompasses the southern slope of the Oak Ridges Moraine. The area is narrow, only 10 to 11 km wide and extends from the Niagara Escarpment to the Trent River. The area is drumlinized with scattered drumlins and is characterised by a variety of soils developed on tills that are sandier in the east and more clayey in the west. Streams and rivers are common and have cut deep gullies into the till and occasionally the bedrock. The orientation of streams is influenced by the orientation of the surrounding drumlins. There are also regions along the south slope where drumlins are less prominent, becoming either faintly drumlinized to gently rolling with knolls, hollows, and occasionally flutings such as east of Maple, near Scarborough within York, Etobicoke, and Mississauga. The area near the Trafalgar Moraine shows knob-and-kettle relief. In the Sheridan the flutings are worn into the shale. Some other notable areas are in Hope Township where large hills 60 to 90 m high, the tops of which have been moulded into drumlins. The bedrock in the area is limestone of the Verulam and Lindsay Formations, or the shale of the Georgian Bay or Queenston Formations. Soils within the South Slope have been characterised as the Bondhead, Darlington, and Woburn loams, the King clay loam, Chinguacousy clay loam and the Oneida clay loam.

The Property is located within the Conservation Halton watershed. Based on the Source Water Protection mapping, which is presented in Appendix B, this site is **not** located within a source water protection area.

2.4 Regional Geology and Soils

Based on the published information, the regional geology is described below.

Records	**Information**
Geological Maps	**Overburden:** The overburden is between 10 to 30 m in thickness within this region and comprises of glacial, glaciofluvial and glaciolacustrine deposits of the Pleistocene age and the fluvial and beach deposits of Recent age. Two tills

Records	Information
	occurred with the Halton Authority. They are Wentworth and Halton Tills. The Halton Till is found as a ground moraine over most of the area below the escarpment. **Bedrock**: The site is located on the Queenston Rock Formation which comprises of Shale, Limestone, Dolostone and Siltstone. The Queenston Formation is one of the oldest bedrock units within the Authority that formed during the Upper Ordovician age. **Depth to Bedrock:** The depth to bedrock on the site varies from 3.0 to 9.4 m.

It should be noted that the subsurface soil and rock conditions described above represent generalized conditions only and should not be considered site specific. The information is presented in Appendix C.

2.5 Regional Hydrogeology

The regional hydrogeologic conditions were assessed through reviewing of the water well records, geologic mapping, published information from Conservation Halton, and the results of previous investigations completed within the vicinity of the site and for the Property. Based on the information, the hydrostratigraphic units below were defined in the vicinity of the Property.

Glacial Till (Aquifer):

The till material in the region is comprised of silt and clay. It has a low permeability and conducts limited quantities of groundwater. The till is observed to extend to depths of approximately 13 m below ground surface around the property.

Queenston Formation Bedrock (Aquifer):

The Queenston Formation Bedrock generally consists of shale and minor limestone. The bedrock is typically located at depths of approximately 18 m below ground surface in the vicinity of the property. Wells installed into the bedrock typically have limited groundwater yielded.

2.6 Regional Climate

The following general climate data for the Property was obtained from Halton Region Source Protection Area Assessment Report for Joshua’s Creek Subwatershed, dated October 2017 (Appendix D).

Mean annual precipitation (mm/yr.)	863 mm
Mean annual evapotranspiration	545 mm
Mean annual water surplus	318 mm

The precipitation data was based on Halton Region Source Protection Area Assessment Report. It is noted that the above are average values, which are representative in a regional context. There will be seasonal and annual variations in these values. However, the average values will govern long-term groundwater recharge and discharge rates. Therefore, average values are appropriate for assessment of hydrogeologic conditions at the site.

2.7 Groundwater Resources

Private well records from the MECP well record database were reviewed for wells located within 500 m radius of the Property. A total of 45 well records were retrieved from the well record database. The MECP well records are presented in Appendix E. Well record locations are presented in plan on Figure 4. A summary of data obtained is presented in the following table.

Total Number of Wells	**35**
Wells completed in Overburden	13 (37%)
Bedrock	11 (31%)
Unknown	11 (31%)
Depth Ranges	
50 ft. or less	31 (41%)
51 ft. to 100 ft.	15 (20%)
101 to 200 ft.	9 (12%)
>200ft	1 (1.3%)
Unknown	19 (25%)
Water Use	
Monitoring/Test Holes	34 (45%)
Commercial/Industrial	Unknown
Water Supply (domestic/public/livestock)	21 (28%)

MECP well records for wells completed in the vicinity of the Property show that the primary aquifer used for potable water is within either coarse grained deposits or fine grained soils. Groundwater supply is generally poor quality and quantity due to the low permeability of the overburden and bedrock. Over 50% of wells were installed within 60 mbgs (up to 200 ft.). Bedrock was encountered at the location of thirty-eight (38) wells which extended to a maxim depth of ±60 m (±200 ft.) below grade.

2.8 Private Well Survey

A house-to-house water well survey within 500 m of the Property was completed on May 26, 2025 to characterize the groundwater resource conditions. Based on the private well survey, it was concluded that one (1) out of fourteen (14) sites within a 500 m radius of the Property was on private well water. The other 13 sites were municipally serviced. The Property is located in an undeveloped area of the City of Oakville, and all properties are not municipally serviced. The locations of the wells surveyed are presented in Figure 4.

2.9 Subsurface Investigation

A subsurface investigation was conducted by Grounded at the Property from June 2nd to 9th . The field investigation is as below. Borehole logs are presented in Appendix F. The borehole and monitoring well locations are shown on Figure 2. A cross section is shown in Figure 5.

Boreholes	BH101 to BH112
Monitoring Wells	BH101, 103, 106, 108D, 108S, 110, 112
Well Depth (mbgs)	Well depths range from 4.6 m to 9.2 m

The stratigraphy beneath the investigated areas of the Property generally consists of the following:

Geological Units	**Description**
Pavement Structure/Topsoil	Borehole 101 encountered a 100 mm thick aggregate layer at the existing ground surface. Borehole 112 encountered 50 mm of asphalt at the existing ground surface. A layer of topsoil, approximately 25 to 300 mm thick, was encountered at the existing ground surface of Boreholes 102 to 104, and 106 to 111, and underlying the above-noted surficial materials in Boreholes 101 and 112.
Earth Fill	Underlying the surficial materials, Boreholes 101 to 107 and 109 observed a layer of earth fill that extends to depths of about 0.8 to 3.0 metres below grade (Elev. 182.7 to 178.8 metres). The earth fill varies in composition but generally consists of sandy silt to clayey silt with trace gravel and trace rootlets. The earth fill is typically dark brown to brown, and moist.
Reworked Native Soils	Underlying the surficial materials in Boreholes 108 and 110 to 112 and underlying the earth fill in Boreholes 101, 105 and 109, the boreholes observed a layer of reworked native soils that extends to depths of 0.8 to 2.3 metres below grade (Elev. 183.2 to 178.1 metres). The reworked native soils are likely in place due to farm-tilling and/or previous site grading activities, and generally consist of sandy silt with some clay, trace gravel, trace rootlets and trace rock fragments. The reworked native sandy silt is typically brown to reddish brown, and moist.

Geological Units	Description
Halton Till	Underlying the fill materials in Boreholes 101 to 104, 106 to 110 and 112 and underlying the sands and silts described below in Borehole 105, the boreholes encountered an undisturbed native glacial till deposit with a matrix of cohesionless and cohesive sandy silt to clayey silt, and cohesionless silty sand, more commonly known in this region as "Halton Till". This unit was encountered at depths of 0.8 to 7.6 metres below grade (Elev. 183.2 to 175.7 m) and extends down to depths of 3.2 to 9.4 m below grade (Elev. 177.9 to 172.9 m). Boreholes 103, 104, 105, 107 and 112 were terminated within this stratum at their target investigation depths. The Halton till is generally brown to grey, and moist. This unit contains a varying amount of clay (trace to clayey), trace to some gravel, trace shale fragments, inferred cobbles and trace rock fragments.
Sands and Silts	Underlying the fill materials in Boreholes 105 and 111 and below the Halton till in Boreholes 106 and 109, an undisturbed native cohesionless sand to silt unit was encountered at depths of 0.8 to 4.6 metres below grade (Elev. 180.9 to 177.7 m) and extending to a depth of about 7.6 m below grade (Elev. 174.8 to 173.9 m). This unit is generally brown to grey and moist to wet, and contains varying amounts of clay (trace to clayey), trace rock fragments, trace shale fragments and trace gravel.
Inferred Bedrock	Inferred bedrock was encountered in Boreholes 101, 102, 106, and 108 to 111 underlying either the Halton till or sands and silts at depths of 3.0 to 9.4 m below grade (Elev. 176.6 to 172.5 m). Rock coring was not included in our scope. The bedrock was inferred from observations of auger and split spoon resistance and limited sample recovery in the split spoons to depths of 4.6 to 9.5 metres below grade (Elev. 175.0 to 170.9 m), at which depth Boreholes 101, 102, 106, 108 to 111 were terminated. The bedrock beneath the site is known to consist of reddish brown shale of the Queenston Formation, which typically has a weathered zone at and near the surface of the bedrock which eventually transitions to unweathered (sound) bedrock. Sound bedrock elevations were not determined in the boreholes, as this was not part of this scope of work.

2.10 Groundwater Level Monitoring

A total of seven (7) monitoring wells were installed on the Property. The appended Table 1 summarizes the details of the monitoring well construction as well as the measured groundwater elevations in the installed wells.

The groundwater level measurements included seasonal fluctuation monitoring from June to October, 2025. The groundwater levels on this site range from 0.6 to 2.5 m depth (Elev. 182.5 m to 178.8 m), the groundwater flows from the southwest to northeast.

Groundwater levels fluctuate with time depending on the amount of precipitation and surface runoff and may be influenced by known or unknown dewatering activities at nearby sites.

2.11 Groundwater Quality

A groundwater sample was obtained from the monitoring wells on-site and submitted for laboratory analysis on June 17, 2025. Monitoring well construction details are provided Table 1. The sample was analyzed with respect to the Halton Sewer Use Bylaw- Sanitary and Combined

Sewer Discharge and Town of Oakville Sewer Use Bylaw – Storm Sewer Discharge. The results of the groundwater testing are presented in Appendix G and summarized below.

Town of Oakville	**Exceedance**
Table 2 Storm Sewer Discharge Criteria	Manganese (Limit 0.15 mg/L, Result 2.48 mg/L)

The groundwater sample met the Limits for Sanitary and Combined Sewer Discharge for all parameters analyzed.

A true copy of the analysis report, Certificate of Analysis, and a chain of custody record for the sample are enclosed.

Treatment of the groundwater should be completed such that the Oakville Storm Sewer Discharge By-Law criteria are met if groundwater is to be discharged to storm sewers.

2.12 Hydraulic Conductivity

2.12.1 In Situ Permeability Test (Single Well Response Test)

In situ single well response tests (SWRT) were conducted in select monitoring wells to assess the hydraulic conductivity of the underlying soil. Data from the SWRT were analyzed using the Bouwer and Rice method (1976). The table below summarizes the results of the hydraulic conductivity testing. The analyses are presented in Appendix I.

The hydraulic properties of the strata applicable to the site are as follows:

Well ID	**Well Screen Elevation (masl)**	**Screened Geological Unit**	**Hydraulic Conductivity (m/s)**
BH103	174.0 – 170.9	Halton Till/Inferred Bedrock	1.00×10^{-6}
BH106	177.1 – 174.1	Sands and Silts / Inferred Bedrock	5.80×10^{-6}
B108	176.1 – 174.5	Inferred Bedrock	3.05×10^{-6}
BH112	178.9 – 175.8	Halton Till	1.31×10^{-6}

2.12.2 Grain Size Analysis

Grain size analyses were conducted on representative soil samples through sieve and hydrometer analysis. The analyses are summarized below and presented in Appendix H.

The hydraulic conductivities of various soil types can also be estimated from grain size analyses. An assessment of the grain sizes was conducted using the excel-based tool, HydrogeoSieve XL

(*HydrogeoSieve XL ver.2.2, J.F. Devlin, University of Kansas, 2015*). HydrogeoSieve XL compares the results of the grain size analyses against fifteen (15) different analytical methods.

Given our experience in the area as well as published literature, some of the geometric means provided for the soil were biased low by one or more methods. In these instances, the values determined by these methods were excluded from the mean. The table below illustrates the hydraulic conductivity values estimated from the mean of the analytical methods where the soil met the applicable analysis criteria.

Sample ID	Soil Description	Applicable Analysis Methods	Hydraulic Conductivity (m/s)
BH101-SS6	Sand and silt till	Alyamani and Sen, Krumbien and Monk, Sauerbrei	$2.1 \text{ x}10^{-7}$
BH102-SS7	Sandy Silt Till	Alyamani and Sen, Barr, Sauerbrei	$2.7 \text{ x } 10^{-8}$
BH103-SS4A	Sandy Silt Till	Alyamani and Sen, Barr, Sauerbrei	$7.4 \text{ x } 10^{-9}$
BH104-SS7B	Sandy Silt Till	Alyamani and Sen, Barr, Sauerbrei	$3.9 \text{ x } 10^{-9}$
BH106-SS5	Sandy Silt Till	Alyamani and Sen, Barr, Sauerbrei	$8.7 \text{ x } 10^{-9}$
BH109-SS8	Inferred Bedrock	Alyamani and Sen, Barr, Sauerbrei	$1.9 \text{ x } 10^{-8}$
BH111-SS4	Sand and silt till	Alyamani and Sen, Barr, Sauerbrei	$4.0 \text{ x } 10^{-7}$
BH112-SS8	Sandy Silt Till	Alyamani and Sen, Barr, Sauerbrei	$1.9 \text{ x } 10^{-7}$

Based on the in-situ testing and grain size analysis, the Property consists of moderate to low permeability soils and is not considered to be significant in terms of groundwater recharge.

2.12.3 Literature

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

Stratum/Formation	Hydraulic Conductivity (m/s)
Earth Fill	10^{-2} to 10^{-6}
Sands	10^{-2} to 10^{-7}
Silts	10^{-5} to 10^{-9}
Glacial Tills	10^{-6} to 10^{-12}
Bedrock (Shale)	10^{-6} to 10^{-13}

2.13 Surface Water Features

A site inspection was conducted to assess the presence of surface water features on or bounding the Property. The inspection includes the following:

- Inspection of surface and groundwater interactions and associated features
- Inspection of areas of actual and potential groundwater discharge
- Inspection of swales and drainage courses
- Evidence of phreatophytic vegetation, which may indicate seasonally high groundwater levels and/or groundwater discharge and seepage

The site inspection was conducted on May 26th, 2025. The Property is mostly flat with a couple hills and some low-lying areas and shallow ditches which would allow ponding of water. There is a man-made off-line pond in the center of the site. Surface water looks likely to flow west overland into ditches and towards catch basins on municipal roads.

3 Discussion and Analysis

3.1 Proposed Development Plan

The proposed development plan is presented in Figure 3.

The proposed development includes constructing a new mixed-use subdivision separated into various building blocks (1 to 15) and comprises mid-rise to high-rise residential and/or commercial buildings ranging in height from 4 to 30-storeys with podium heights ranging from 1 to 8-storeys. Below Blocks 1, 3, 4 and 5 there will be three (P3) levels of underground parking with a lowest P3 FFE set at a depth of 10 m. Below Blocks 2, 6, 8 and 9 there will be two (P2) levels of underground parking with a lowest P2 FFE set at a depth of 7 m. Below blocks 7 and 10 to 12 there will be a single (P1) level of underground parking with a lowest P1 FFE set at a depth of 4 m. The proposed development also includes two public parks (Blocks 14 and 15), and is designed to provide appropriate connections to a planned school site (Block 13).

The following summarizes the proposed land development coverage statistics:

Land Coverage Type	**Areas**
Building Envelope	7.24 ha
Hard Surface Paving	10.16 ha
Landscape areas for infiltration	2.81 ha
Total Area	**20.21 ha**

3.2 Summary of Hydrogeologic Conditions

For design purposes, the stabilized groundwater table varies from block to block and ranges from 0.6 to 2.5 m depth (Elev. 182.5 to 178.8± m). The groundwater table is present in all the native soil units and earth fill. The lowest (P1 to P3) FFE ranges from 4 to 10 m depth. Bulk and foundation excavations for the underground parking level(s) will extend below the design groundwater table. In summary:

- Bulk excavation for the underground parking level(s) will extend below the elevation of the design groundwater table.
- Foundation excavations will extend below the design groundwater table.
- Foundation excavations will penetrate lower wet sands, which will yield free-flowing water.
- A dewatering zone of influence has been estimated (see Section 3.5)

The proposed shoring at the site is assumed to consist of conventional soldier piling and lagging for present purposes.

Prior to excavation, positive dewatering to lower the groundwater table will be required to facilitate construction as well as to maintain the integrity of the subgrade for foundation and slab-on-grade support. The water level must be kept at least 1.2 m below the lowest excavation elevation during construction. Failure to dewater prior to excavation will result in unrecoverable disturbance of the subgrade, which will render advice provided for undisturbed subgrade conditions inapplicable.

Due to the low permeability and strength of bedrock, dewatering of the bedrock is not anticipated.

Dewatering will take some time to accomplish prior to the start of excavation. Stored water within the excavation will need to be considered prior to excavation/dewatering.

A professional dewatering contractor must be consulted to review the subsurface conditions and to design a site-specific dewatering system. It is the dewatering contractor’s responsibility to assess the factual data and to provide recommendations on dewatering system requirements.

The above hydrogeologic features and functions were considered in assessing the potential impact of the proposed development. This information was used to provide mitigating measures to ensure that hydrogeologic function is not adversely affected during the proposed development.

3.3 Groundwater Control Requirements

It is necessary to positively dewater the Property to a minimum of 1.2 m below proposed founding elevation prior to excavation to preserve the integrity of the native soils. Excavation for foundations under the lowest parking level of each block will extend approximately 1.0 to 10.3 m below the groundwater table within the Halton Till or sands and silts. The dewatering target varies from block to block but is generally 1.2 m below the base of excavation for each block.

Preliminary groundwater seepage estimates were conducted for both short term and long-term dewatering scenarios. The modeling was conducted using an equivalent well radius approximation (Powers et al, 2007). The calculation for groundwater seepage indicates the short term (construction) and long term (permanent) dewatering requirements as provided below.

The Equivalent Well Radius results are summarized below and presented in Appendix J.

Estimated Short Term (Construction) Groundwater Quantities – Safety Factor of 3.0 Used

Block No.	Groundwater Seepage		Design Rainfall Event (29 mm)		Total Daily Water Takings	
	L/day	L/min	L/day	L/min	L/day	L/min
1	1,083,000	752	534,000	371	1,617,000	1,123
2	960,000	667	623,000	433	1,583,000	1,099
3	243,000	169	121,000	84	364,000	253
4	1,521,000	1,056	543,000	377	2,064,000	1,433
5	495,000	344	241,000	167	736,000	511
6	960,000	667	299,000	208	1,259,000	874
7	792,000	550	141,000	98	933,000	648
8	477,000	331	223,000	155	700,000	486
9	255,000	177	86,000	59	341,000	237
10	363,000	252	281,000	195	644,000	447
11	375,000	260	323,000	224	698,000	485
12	312,000	217	311,000	216	623,000	433

As required by Ontario Regulation 63/16, a plan for discharge must consider the conveyance of storm water from a 100-year storm. The additional volume that will be generated in the occurrence of a 100-year storm event (101.4 mm) for each block is as follows:

- Block 1: 1,846,000 L
- Block 2: 2,178,000 L
- Block 3: 421,000 L
- Block 4: 1,897,000 L
- Block 5: 840,000 L
- Block 6: 1,043,000 L
- Block 7: 492,000 L
- Block 8: 779,000 L
- Block 9: 301,000 L

- Block 10: 981,000 L
- Block 11: 1,129,000 L
- Block 12: 1,087,000 L

The groundwater control system is required to be designed by a dewatering contractor. The groundwater must be dewatered prior to excavation to maintain a stable working base in the excavation.

Mitigation measures based on dewatering and infiltration requirements as per the MECP are discussed in Section 3.6.

Estimated Long Term (Permanent) Groundwater Quantites – Safety Factor of 3.0 Used

Block No.	Groundwater Seepage		Infiltration Design Rainfall Event (29 mm)		Total Daily Water Takings	
	L/day	L/min	L/day	L/min	L/day	L/min
1	1,083,000	752	18,000	13	1,101,000	765
2	960,000	666	21,000	15	981,000	681
3	243,000	169	5,000	4	248,000	172
4	1,521,000	1,056	5,000	4	1,526,000	1,060
5	495,000	344	9,000	6	504,000	350
6	960,000	667	2,000	1	962,000	668
7	792,000	550	5,000	4	797,000	554
8	477,000	331	18,000	13	495,000	344
9	255,000	177	10,000	7	265,000	184
10	363,000	252	6,000	4	369,000	256
11	375,000	260	8,000	6	383,000	266
12	312,000	217	16,000	11	328,000	228

Regulatory Requirements	
Environmental Activity and Sector Registry (EASR) Posting	Required
Short Term Permit to Take Water (PTTW)	Not Required*
Long Term Permit to Take Water (PTTW)	Required**
Short Term Discharge Agreement Region of Halton/Oakville	Required
Long Term Discharge Agreement Region of Halton/Oakville	Required

**Per amendments to O.Reg. 63/16 effective July 1st, 2025, a short term PTTW will not be required for construction dewatering above 400,000 L/day. An EASR will be required.*

Per amendments to Ontario Regulation 387/04 effective July 1st, 2025, low-risk foundation drainage systems used primarily for residential purposes that take less than 379,000 litres of groundwater per day are exempted from requiring environmental permissions, exempt from requiring a PTTW, and exempt from needing to self-register online.* ***Therefor, a Long Term PTTW is not required for Blocks 3, 9, 10, 11 and 12.

Additional boreholes and monitoring wells are required for general site coverage and for a more refined dewatering analysis for any particular block once design details are finalized. The above estimated volumes are considered preliminary, based on limited design information and assumed soil and groundwater conditions in areas where boreholes and monitoring wells are not currently present. Site grading may also have an impact on the groundwater elevation once site works have been completed.

3.4 Assessment of Potential Impact

The proposed development includes constructing a new mixed-use subdivision separated into various building blocks (1 to 15) and comprised mid-rise to high-rise residential and/or commercial buildings ranging in height from 4 to 30-storeys with podium heights ranging from 1 to 8-storeys. Below Blocks 1, 3, 4 and 5 there will be three (P3) levels of underground parking with a lowest P3 FFE set at a depth of 10 m. Below Blocks 2, 6, 8 and 9 there will be two (P2) levels of underground parking with a lowest P2 FFE set at a depth of 7 m. Below blocks 7 and 10 to 12 there will be a single (P1) level of underground parking with a lowest P1 FFE set at a depth of 4 m. The proposed development also includes two public parks (Blocks 14 and 15), and is designed to provide appropriate connections to a planned school site (Block 13).

The site grade is to be raised, by up to 4± m in some areas, better align with the surrounding grades of Trafalgar Road and Burnhamthorpe Road. The Property will be serviced with municipal piped water, storm and sanitary sewers. The proposed nature of the development does not pose any significant concern with respect to potential impact on groundwater quality in the area.

3.4.1 Short Term Discharge (Construction Dewatering)

The flow of water from the dewatering system must be treated to meet the Town of Oakville Storm Sewer Discharge Requirements prior to discharge to the municipal sewer system. No additional treatment is required should the groundwater be discharged to the Region of Halton’s

Sanitary Sewer System. Sampling of the discharge water from the dewatering system is required during initial discharge and on-going basis as required by the Region during active dewatering activities. Visual monitoring of the dewatering discharge should be conducted daily. Adjustment to the dewatering system should be made if an increase in turbidity or sediment is noted.

3.4.2 Long Term Discharge (Post Construction)

The flow of water from the drained foundation system must be treated to meet the Town of Oakville Storm Sewer Discharge Requirements prior to discharge to the municipal sewer system. No additional treatment is required should the groundwater be discharged to the Region of Halton's Sanitary Sewer System.

3.4.3 Zone of Influence

Localized dewatering of an aquifer produces a cone-shaped depression in the groundwater table that extends some distance away from the dewatering point. The lateral distance which the cone of depression extends (i.e., the distance to where drawdown is effectively zero) is known as the Zone of Influence (ZOI).

The ZOI was calculated using the Sichardt equation below.

$$\boldsymbol{R_0 = 3000(\Delta H)\sqrt{K}}$$

ΔH = dewatering thickness (m)
K = hydraulic conductivity (m/s)
R_0 = radius of influence (m)

The ZOI with respect to groundwater seepage at the site is summarized as follows.

Zone of Influence (ZOI)		
Block No.	**Short Term (Construction), m**	**Long Term (Permanent), m**
1	75	63
2	56	43
3	26	26
4	83	71
5	38	32
6	54	42
7	29	17
8	16	10
9	14	8
10	17	12
11	8	2
12	15	10

3.4.4 Land Stability

The impacts to land stability on adjacent structures due to the proposed short- and long-term dewatering at the site are summarized as follows:

Land Stability (Blocks 1 to 14)		
	Short Term (Construction)	**Long Term (Permanent)**
Dewatering Thickness (m)	1 to 11.5	0 to 8.6
Increase in Effective Stress (kPa)	22 to 113	5 to 96
Maximum Theoretical Settlement due to Dewatering (mm)	1 to 7	<1 to 6
Public Realm Theoretical Settlement due to Dewatering (mm)	1 to 7	<1 to 6

The maximum induced settlement (estimated) occurs directly adjacent to the proposed excavation and decreases in a nonlinear fashion with distance away from the excavation.

On this basis, the impact of the proposed dewatering on the existing adjacent structures is considered by Grounded to be within acceptable limits.

3.5 Mitigation Measures to Maintain Hydrogeologic Functions

3.5.1 Maintenance of Groundwater Recharge

The existing groundwater recharge at the Property occurs in a broad diffuse manner over the entire site. Mitigation measures are available to maintain recharge rates. There are no wetlands in the immediate vicinity of the Property. Joshua’s Creek, the nearest water body, is located approximately 125 m to the east. There will be no direct surface runoff from the Property to the water body.

To maintain groundwater recharge for the Property, low-impact development (LID) methods could be implemented. There is a surplus of water available following development to maintain groundwater recharge and function. Based on the property conditions, the following typical LID measures may be suitable for the proposed development:

- Collection of clean run-offs from the building rooftops and redirection to grass areas and overland flow.
- Planters and green roofs
- Re-use of grey water at the site
- Provision of an extra thickness of topsoil at the Property (approximately 0.3 m) on open areas to promote water storage in surficial soil and infiltration.

The storm water management measures must specifically address the maintenance of groundwater recharge of the proposed development and mitigate any potential impacts to Joshua’s Creek 125± m to the east of the site.

3.5.2 Maintenance of Groundwater Transmission Pathways

The native soils at the Property consist of low to moderate permeability soils which should be considered in terms of groundwater recharge if penetrated below the groundwater table. The underlying clayey silt encountered in Borehole 105 is of low permeability and will not result in significant groundwater recharge if penetrated.

The overall continuity of the groundwater flow at the Property should be maintained, where practical. Generally, the groundwater transmission pathways can be maintained through the following means:

- Bedding materials beneath underground services may serve as a subdrain to collect and convey groundwater. To prevent drainage of groundwater along bedding materials, clay trench plugs should be provided at all manhole locations to cut off the granular bedding.
- The excavation of any underground services or utilities across permeable layers may interrupt the groundwater flow. It is recommended that trench backfilling be carried out with materials that are similar to the materials that have been excavated.

Groundwater flow may occur into the open shallow excavations if more permeable deposits (such as sand or gravel) are encountered; however, based on the results of the subsurface investigation, active groundwater control (such as from wells or well points) is anticipated during construction, therefore groundwater seepage into the excavation will be controlled. Localized groundwater flow into shallow excavations can be controlled by utilizing localized sumps and pumps at the base of the excavations. In addition to this, it is recommended that any excavations should be staged or constructed in such a manner to avoid the collection of overland drainage.

4 Conclusions and Recommendations

- It is assumed that excavations will be made for the underground parking level(s) prior to grade raises at this site. The site grade is to be raised in some areas by up to 4± m to achieve the desired site grading.
- The site is characterized by surficial deposits of topsoil cover underlain by fill material/reworked native consisted of sandy silt to clayey silt and then native material comprising of the Halton Till and/or sands and silts, overlying bedrock. The earth fill and the native sands and silts are highly permeable and provide fast recharge capability and groundwater movement. The Halton Till is moderate to low permeability and provides for low recharge capability and groundwater movement.

- Groundwater was observed within a depth of about 0.6 - 2.5 m (Elev. 182.5 to 178.8 m) from existing ground surface in all monitoring wells. The design groundwater table within the native soils was observed to slope from approximately Elev. 182.5 m in the west to Elev. 178.8± m in the east. Seasonal fluctuations of groundwater are expected at the site.
- Based on the low to moderate permeability of the soils at the surface, groundwater transmission is expected to be slow to moderate. No area of groundwater discharge such as seepages and springs were noted at the Property during the site inspection. LID measures are feasible given the expected increase in site grades and potential for importing material with higher permeability.
- MECP well records for wells completed in the vicinity of the Property show that over 50% of wells were installed within 60 mbgs (up to 200 ft.). Bedrock was encountered at the location of one (1) well which extended to a maxim depth of 84 m (276 ft.) below grade.
- The total short-term discharge volume (storm water and groundwater combined) for the Property ranges from 341,000 L/day for Block 7 to 2,064,000 L/day for Block 2. All blocks will require an EASR application.
- The total long-term discharge volume (storm water and groundwater combined) for the Property ranges from 248,000 L/day for Block 14 to 1,526,000 L/day for Block 2. A long term PTTW will be required for Blocks 1, 2, 3, 5, 6, 8 and 12 .
- Additional boreholes and monitoring wells are required for general site coverage and for a more refined dewatering analysis once design details, including final FFEs, have been established. The dewatering volumes are considered preliminary, based on limited design information and assumed soil and groundwater conditions in areas where boreholes and monitoring wells are not currently present. Site grading may also haver an impact on the groundwater elevation once site works have been completed.

4.1 Signatures

The Hydrogeological Assessment was conducted by Sam Bastan, P.Eng. under the supervision of Freesia Waxman, P.Eng., QP ESA.

We trust that this report meets your requirements at present.

For and on behalf of our team,

GROUNDED
ENGINEERING

LICENSED PROFESSIONAL ENGINEER
SB
S. BASTAN
100532430
2026-04-10
PROVINCE OF ONTARIO

Sam Bastan, P.Eng.
Intermediate Project Engineer

Freesia Waxman, P.Eng., QP ESA
Associate

LICENSED PROFESSIONAL ENGINEER
KB
K. J. BYCKALO
100199873
2026-04-10
PROVINCE OF ONTARIO

Kyle Byckalo, P.Eng.
Associate

5 References

1. Armstrong, D.K. and Dodge, J.E.P. 2007. *Paleozoic Geology Map of Southern Ontario*. Ontario Geological Survey, Miscellaneous Release--Data 219.
2. Chapman, L.J. and Putnam, D.F. 2007. Physiography of Southern Ontario; Ontario Geological Survey, Miscellaneous Release--Data 228.
3. Region of Halton Source Protection Area Assessment Report HaltonARclean_221104.docx.pdf
4. Region of Halton Conservation Authority Mapping, 2024. Regulation Mapping. https://camaps.maps.arcgis.com/apps/webappviewer/index.html?id=cc14d108b062400eba13a44da02bf3d3 Accessed December 2, 2025.
5. Gao, C., Shirota, J., Kelly, R.I., Brunton, F.R., van Haaften, S., 2006. *Bedrock Topography and Overburden Thickness Mapping, Southern Ontario*. Ontario Geological Survey. Miscellaneous Release-Data 207.
6. Government of Canada, 2024. Canadian Climate Normal 1992-2020 Data.
7. J.D. Barnes Ltd., 2025. Survey Drawing, Dated Feb. 11, 2025.
8. Ministry of the Environment, Conservation and Parks, 2023. Source Protection Information Atlas. https://www.lioapplications.lrc.gov.on.ca/SourceWaterProtection/index.html?viewer=SourceWaterProtection.SWPViewer&locale=en-CA Accessed June 4, 2024.
9. Ministry of Natural Resources and Forestry, 2023. Make a Topographic Map. https://www.lioapplications.lrc.gov.on.ca/MakeATopographicMap/index.html?viewer=Make_A_Topographic_Map.MATM Accessed June 4, 2024.
10. Ontario Geological Survey, 2010. *Surficial geology of Southern Ontario*. Miscellaneous Release – Data 128-REV.
11. Singer et. al., 2003. The Hydrogeology of Southern Ontario, Second Edition.

6 Limitations and Restrictions

The assessment should not be considered a comprehensive investigation that eliminates all risks of encountering environmental problems. The information presented in this report is based on information collected during the completion of the Hydrogeological Assessment by Grounded Engineering Inc. It was based on the conditions on the Hydrogeological Assessment at the time of the site inspection supplemented by a review of historical information to assess the environmental conditions regarding the Property.

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

If new information regarding the hydrogeological condition of the Property is identified during future work, or outstanding responses from regulatory agencies indicate outstanding issues on file with respect to the Property, Grounded Engineering Inc. should be notified so that we may re-evaluate the findings of this assessment and provide amendments.

7 Report Use

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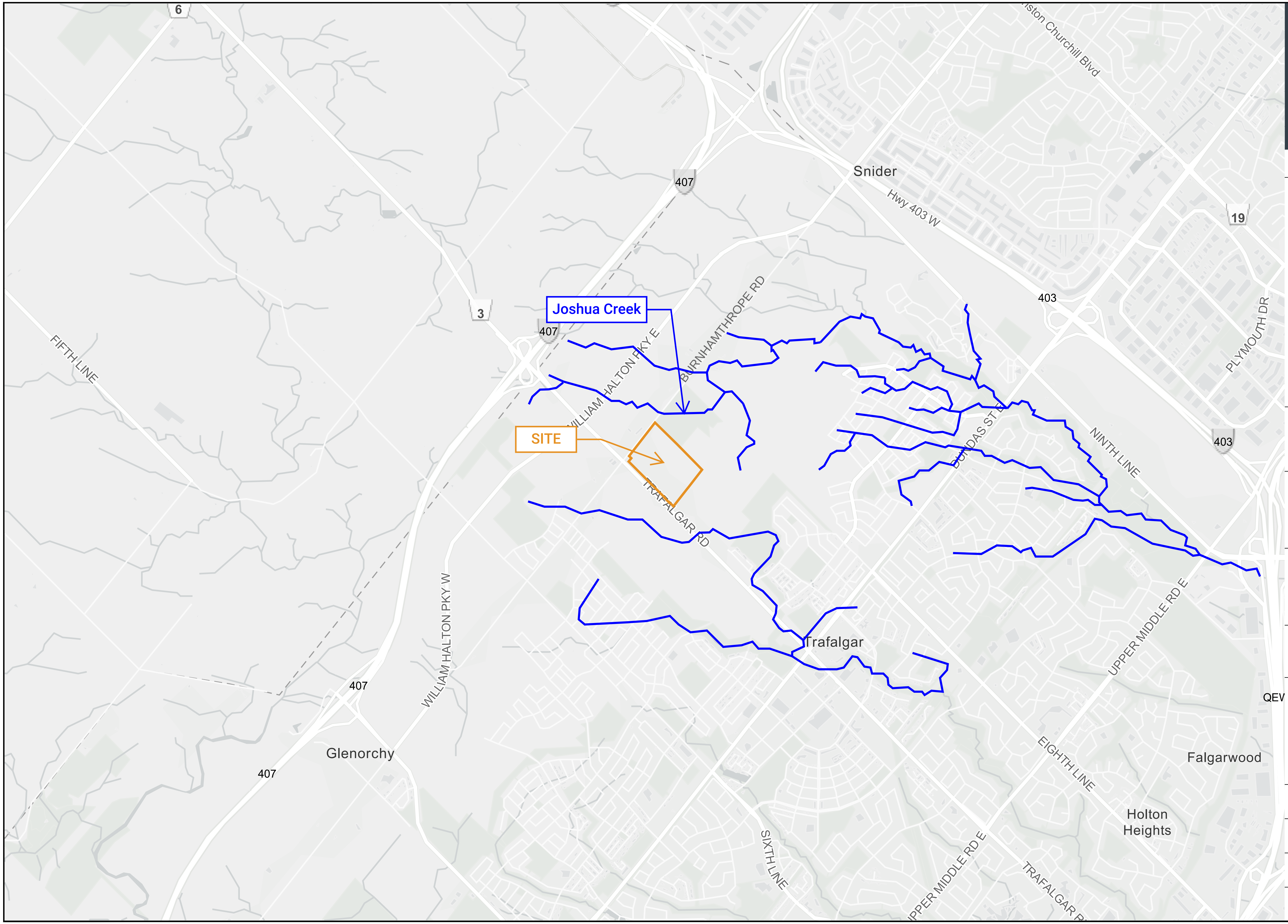
FIGURES



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LEGEND

APPROXIMATE PROPERTY BOUNDARY
WATER BODIES AROUND THE STUDY SITE

Note

Reference
ArcGIS Online 2025

Project
TRAFALGAR & BURNHAMTHORPE SUBDIVISION OAKVILLE, ONTARIO

Figure Title
KEY PLAN

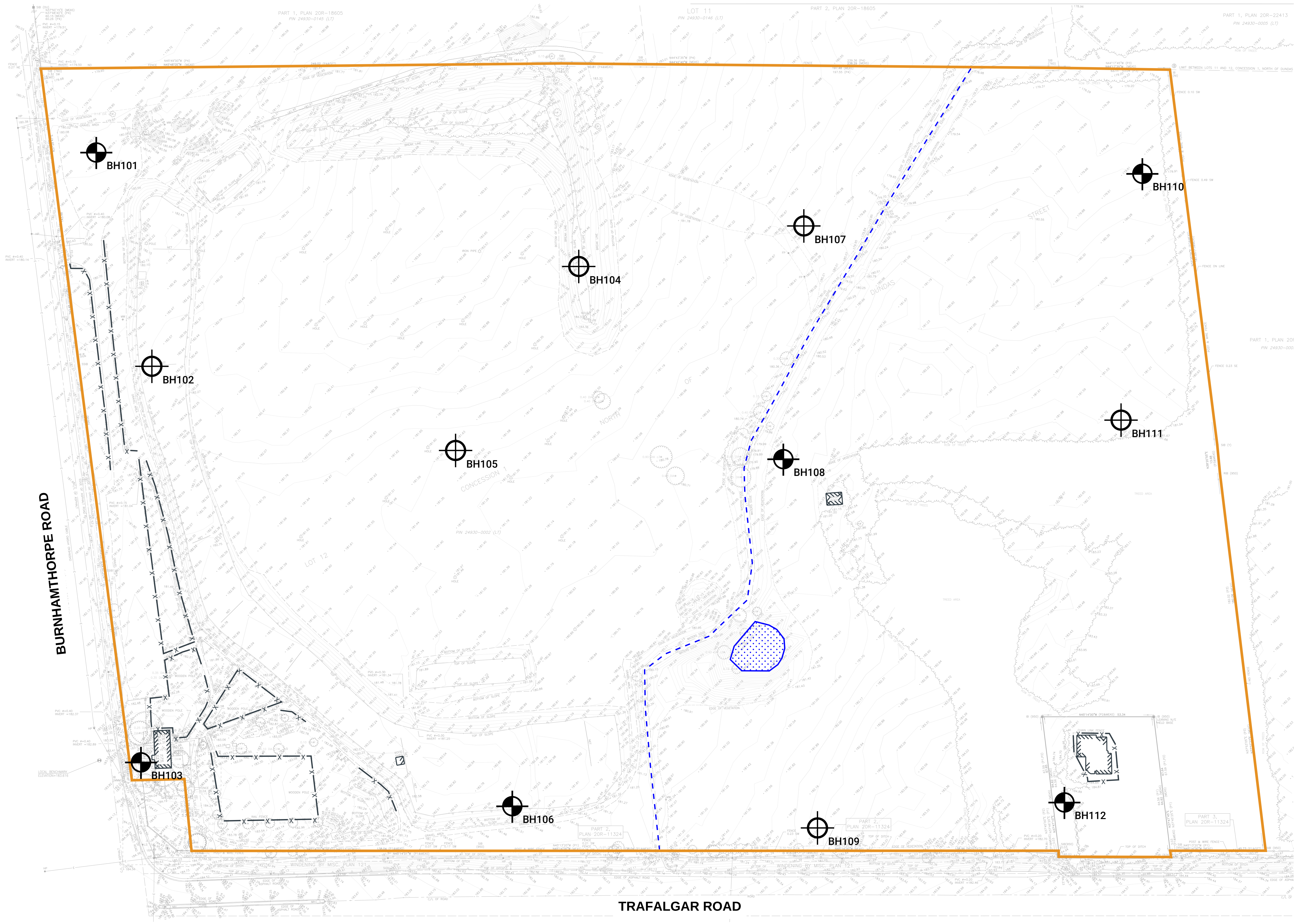
North
TRUE
PROJECT

Date
APRIL 2026

Scale
0m 500m 1000m

Job No
25-069

Figure No
FIGURE 1



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LEGEND

—	APPROX PROPERTY BOUNDARY
▨	EXISTING BUILDING STRUCTURE
—x—	FENCE LINE
⊕ ⊕	MONITORING WELL/BOREHOLE BY GROUNDED
- - -	DRAINAGE DITCH
▨	POND

Note

Reference

Survey Drawing 24-30-276-00.
Dated February 11, 2025.
Prepared by J.D. Barnes Limited.
Received on May 7, 2025.

Project

TRAFALGAR & BURNHAMTHORPE SUBDIVISION OAKVILLE, ONTARIO

Figure Title

BOREHOLE LOCATION PLAN - EXISTING SITE CONDITIONS

North

TRUE
PROJECT

Date

APRIL 2026

Scale

0m 25m 50m

Job No

25-069

Figure No

FIGURE 2

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LEGEND

APPROX PROPERTY BOUNDARY

MONITORING WELL/BOREHOLE BY GROUNDED

Note

Reference

Site Plan A-105S.
Dated 2026-04-06
Prepared by BDP. Quadrangle.

Project

TRAFALGAR & BURNHAMTHORPE SUBDIVISION OAKVILLE, ONTARIO

Figure Title

BOREHOLE LOCATION PLAN - PROPOSED SITE CONDITIONS

North

TRUE

PROJECT

Date

APRIL 2026

Scale

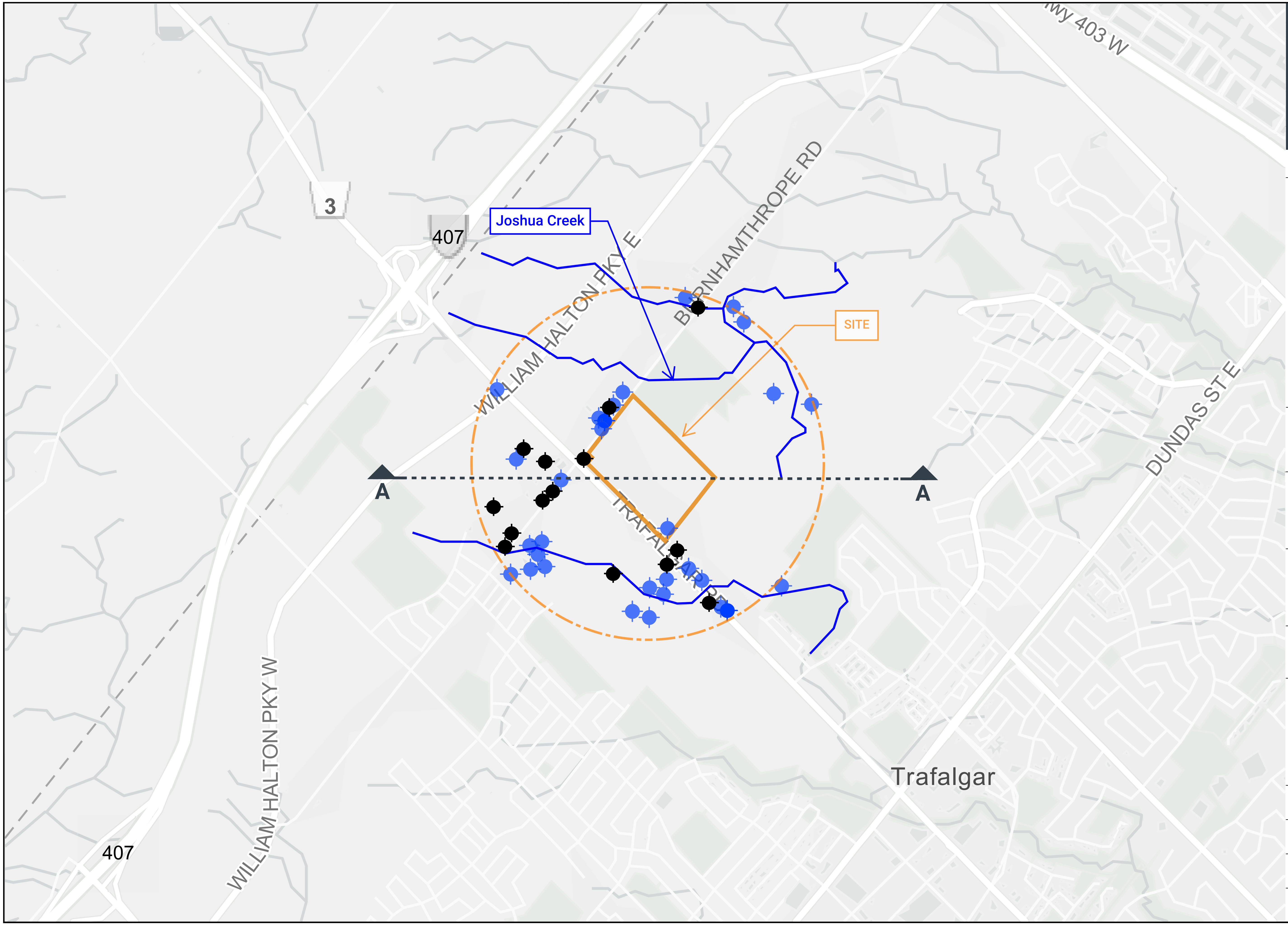
0m 25m 50m

Job No

25-069

Figure No

FIGURE 3



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LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- 500m STUDY AREA
- ● MECP WELLS
- WATER BODIES AROUND THE STUDY STITE
- ● PRIVATE WELL SURVEY LOCATIONS

Note

Reference

ArcGIS Online 2025

Project

TRAFALGAR & BURNHAMTHORPE SUBDIVISION
OAKVILLE, ONTARIO

Figure Title

MECP WELL LOCATION PLAN

North

TRUE
PROJECT

Date

APRIL 2026

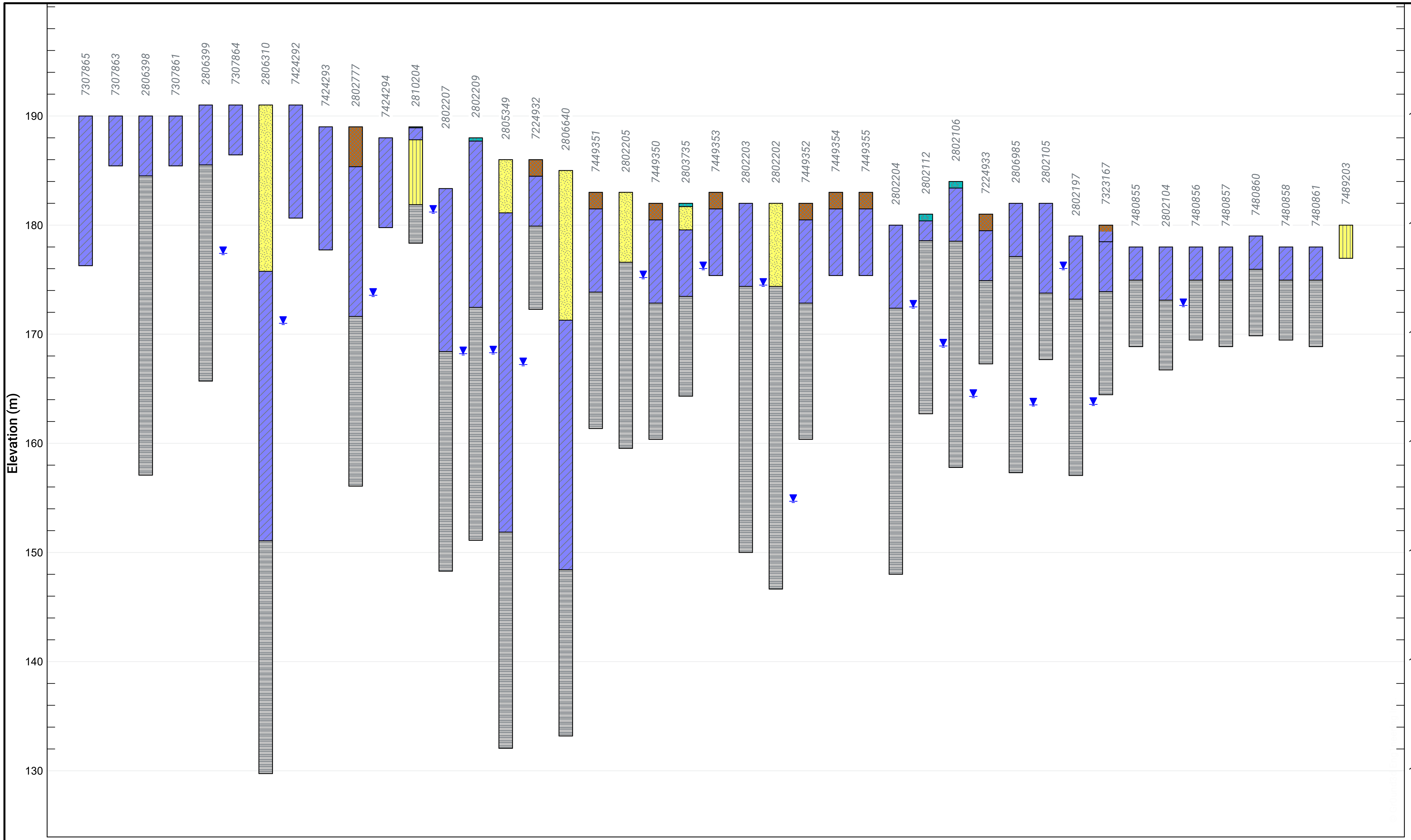
Scale
0m 300m 600m

Job No

25-069

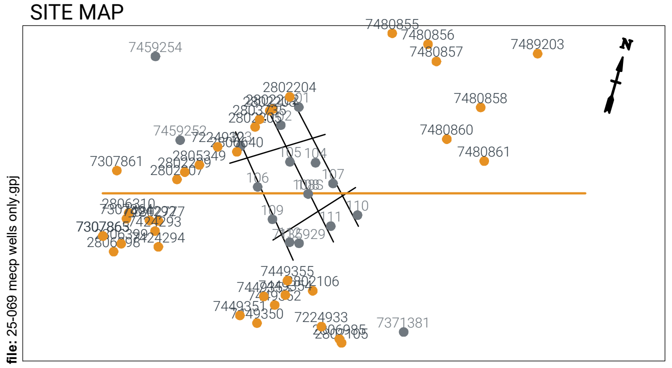
Figure No

FIGURE 4



Boreholes Equally Spaced

SITE MAP



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LEGEND

🟫 FILL
🟧 GRAVELS (gravel to gravelly sand)
🟨 SILT TO SAND (not till)
🟩 COHESIONLESS TILLS
🟪 COHESIVE SOILS (clayey silt to clay, incl. tills)
🟦 DISTURBED/REWORKED/ORGANIC

BH 101 BOREHOLES BY GROUNDED
T-BH7 BOREHOLES BY OTHERS

▽ water level, unstabilized
▼ water level, stabilized (latest)
▼ water level, stabilized (highest)

BOREHOLE STRATIGRAPHY LEGEND

▨ Clay
▦ Fill
☰ Bedrock (cored)
▥ Silt
⬚ Topsoil
⬚ Sand

The factual borehole information shown is from other consultants only. A full list of references is provided in the body of our report.

Project
TRAFALGAR AND
BURNHAMTHORPE
SUBDIVISION
OAKVILLE

Figure Title
SUBSURFACE PROFILE

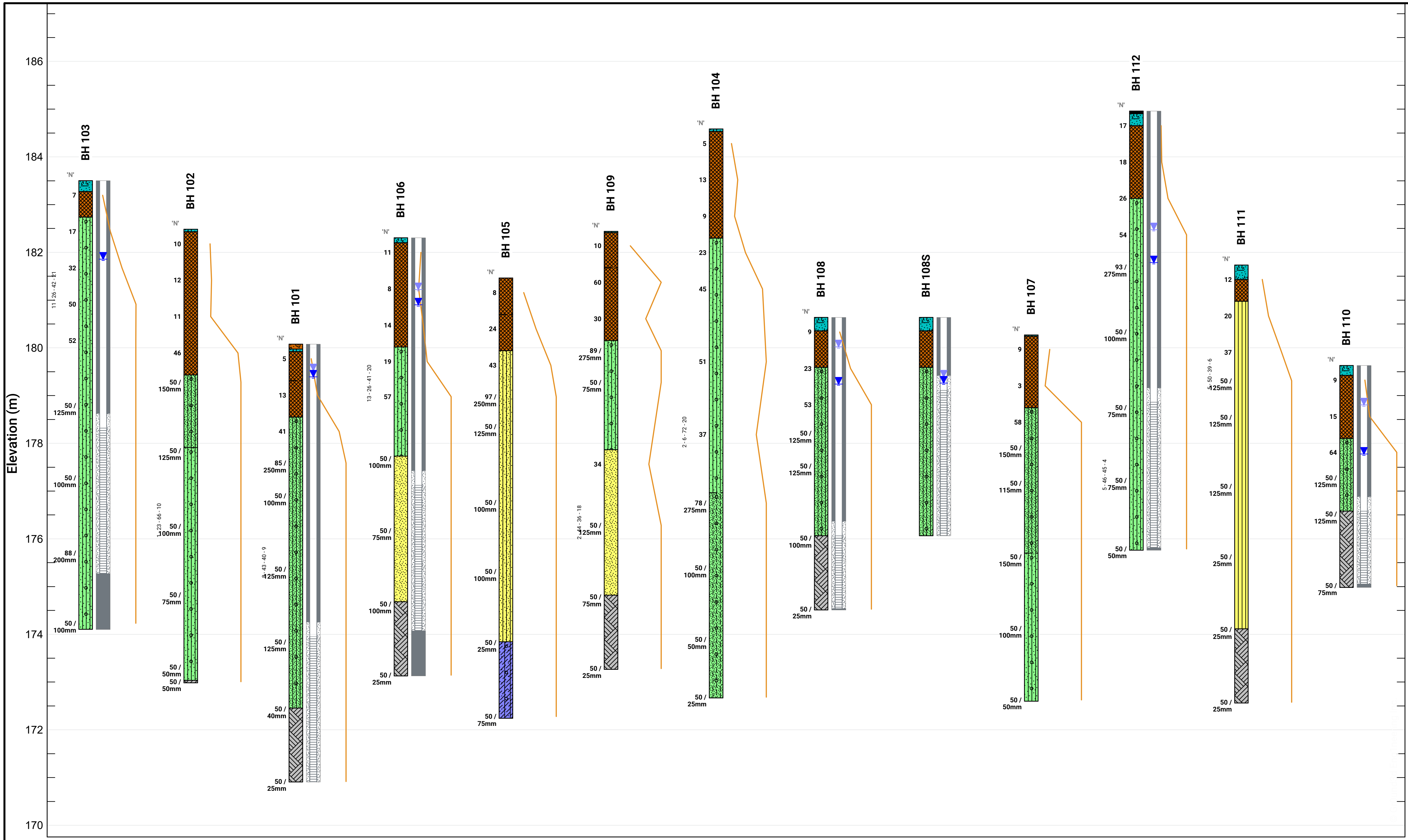
MECP
SECTION A-A

Date
APRIL 2026

Scale
AS INDICATED

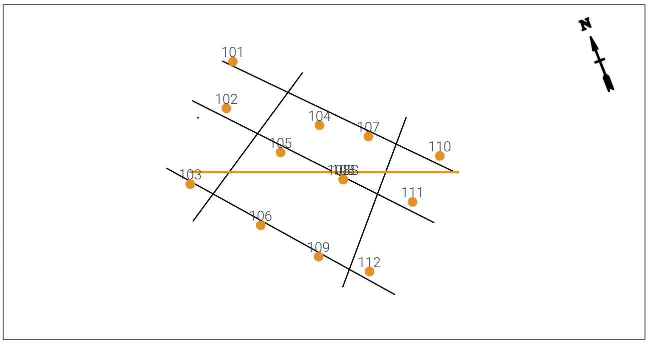
Job No
25-069

Figure No
FIGURE 5



Boreholes Equally Spaced

SITE MAP



file: 25-069 gint.gpj

BOREHOLE STRATIGRAPHY LEGEND

▨ Aggregate	▨ Bedrock (inferred)	▨ Clayey Silt Till	■ Asphalt
▨ Topsoil	▨ Sandy Silt Till	▨ Sand	
▨ Fill	▨ Silty Sand Till	▨ Silt and Sand Till	
▨ Sand and Silt Till	▨ Sand and Silt	▨ Silt	

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LEGEND

🟫	FILL
🟧	GRAVELS (gravel to gravelly sand)
🟨	SILT TO SAND (not till)
🟩	COHESIONLESS TILLS
🟪	COHESIVE SOILS (clayey silt to clay, incl. tills)
🟦	DISTURBED/REWORKED/ORGANIC
BH 101	BOREHOLES BY GROUNDED
T-BH7	BOREHOLES BY OTHERS

▽ water level, unstabilized
▼ water level, stabilized (latest)
▼ water level, stabilized (highest)

Project
TRAFALGAR AND BURNHAMTHORPE SUBDIVISION OAKVILLE

Figure Title
SUBSURFACE PROFILE
B-B'

Date
APRIL 2026

Scale
AS INDICATED

Job No
25-069

Figure No
FIGURE 6

TABLES

TABLE 1:
GROUNDWATER LEVEL MONITORING SUMMARY
340 BURNHAMTHORPE RD. E., 3437 TRAFALGAR RD., Oakville

					Grounded Engineering													
Well ID	**Ground Surface Elev. (masl)**	**Well Screen Interval**		**Soil Strata**	**June 12, 2025**		**July 18, 2025**		**August 8, 2025**		**September 5, 2025**		**October 3, 2025**		**Minimum Elev. (Lowest)**		**Maximum Elev. (Highest)**	
		(mbgs)	**(masl)**		**(mbgs)**	**(masl)**	**(mbgs)**	**(masl)**	**(mbgs)**	**(masl)**	**(mbgs)**	**(masl)**	**(mbgs)**	**(masl)**	**(mbgs)**	**(masl)**	**(mbgs)**	**(masl)**
BH101	180.1	6.1 - 9.2	174.0 - 170.9	SN+SL-TL	0.58	179.52	0.71	179.39	0.97	179.13	0.67	179.43	0.57	179.53	0.97	179.13	0.57	179.53
BH103	183.5	5.2 - 8.2	178.3 - 175.3	SN-SL-TL	1.86	181.64	1.67	181.83	1.82	181.68	1.89	181.61	1.89	181.61	1.89	181.61	1.67	181.83
BH106	182.3	5.2 - 8.2	177.1 - 174.1	SN	1.11	181.19	1.43	180.87	1.76	180.54	1.90	180.40	2.09	180.22	2.09	180.22	1.11	181.19
BH108S	180.6	3.0 - 4.6	177.6 - 176.1	SN+SL-TL	NA	-	1.40	179.20	2.00	178.60	2.50	178.11	2.43	178.17	2.50	178.11	1.40	179.20
BH108	180.6	4.6 - 6.1	176.1 - 174.5	BEDROCK	0.64	179.96	1.42	179.18	2.03	178.57	2.49	178.12	2.63	177.98	2.63	177.98	0.64	179.96
BH110	179.6	3.0 - 4.6	176.6 - 175.1	BEDROCK	0.85	178.75	1.88	177.72	2.52	177.08	3.07	176.53	3.30	176.31	3.30	176.31	0.85	178.75
BH112	185.0	6.1 - 9.1	178.9 - 175.8	SN-SL-TL	2.51	182.49	3.20	181.80	3.63	181.37	4.07	180.93	4.43	180.57	4.43	180.57	2.51	182.49

mbgs = metres below existing ground surface
masl = metres above sea level
* = unstabilized groundwater level
NA = not available, unable to access monitoring well

APPENDIX A

1
A105.S
SITE PLAN

SITE PLAN LEGEND

▬ ▬	PROPERTY LINE
- - -	LINE OF UNDER GROUND GARAGE BELOW
⬅	MAIN BUILDING ENTRANCE
⇦	RETAIL ENTRANCE
➡	EXIT
◁	VEHICLE / LOADING ENTRANCE / EXIT
⌖	FIRE HYDRANT
	SIAMESE CONNECTION
▯	TYPICAL PARKING SPACE
▯	TYPICAL B.F. PARKING SPACE
▨	BUILDING ENVELOPE

Date	No.	Description

REVISION RECORD

2026-04-06	Issued for ZBA

ISSUE RECORD

BDP.
Quadrangle

Quadrangle Architects Limited
The Well, 8 Spadina Avenue, Suite 2100, Toronto, ON M5V 0S8
t 416 598 1240 www.bdpquadrangle.com

340 Burnhamthorpe Road East
and 3437 Trafalgar Road
Oakville, Ontario

for
1816986 Ontario Inc.

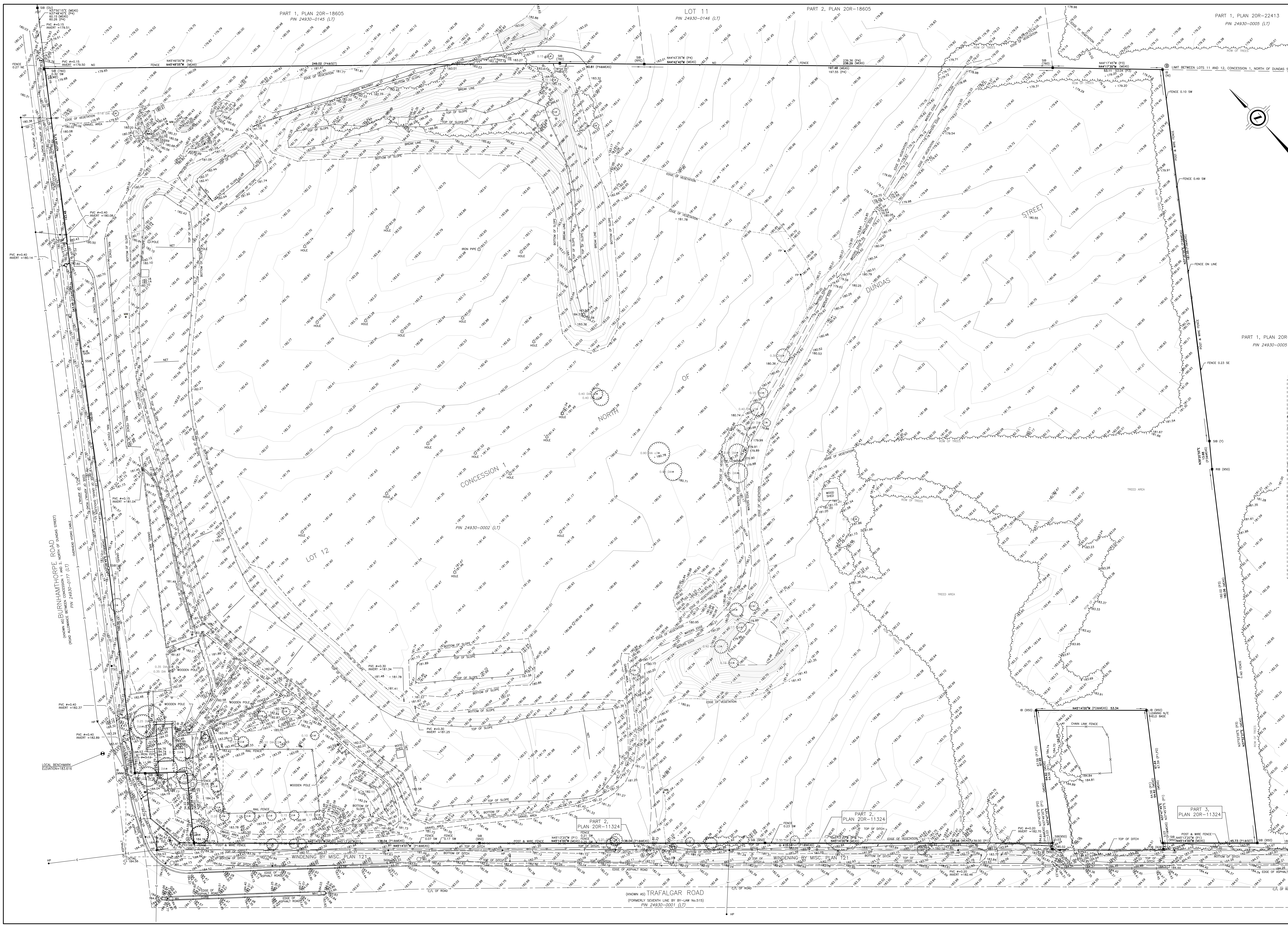
24064	1:750	SR	SK
PROJECT	SCALE	DRAWN	REVIEWED

Site Plan

A105.S

Note: This drawing is the property of the Architect and may not be reproduced or used without the expressed consent of the Architect. The Contractor is responsible for checking and verifying all levels and dimensions and shall report all discrepancies to the Architect and obtain clarification prior to commencing work.

2026-03-27 12:12:22 PM



PLAN OF SURVEY

PART OF LOT 12, CONCESSION 1
NORTH OF DUNDAS STREET

GEOGRAPHIC TOWNSHIP OF TRAFALGAR

CITY OF OAKVILLE

REGIONAL MUNICIPALITY OF HALTON

J.D. BARNES LIMITED

SCALE 1 : 500

10 0 10 20 30 metres

THE INTEDNDED PLOT SIZE OF THIS PLAN IS 1451 mm IN WIDTH BY 917 mm IN HEIGHT WHEN PLOTTED AT A SCALE OF 1:500

METRIC DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

NOTES

BEARINGS ARE UTM GRID, DERIVED FROM OBSERVED REFERENCE POINTS A AND B, BY REAL TIME NETWORK (RTN) OBSERVATIONS, UTM ZONE 17, NAD83 (CSRS) (2010.0).

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999703.

FOR BEARING COMPARISONS, A ROTATION OF 00°48'00" COUNTER-CLOCKWISE WAS APPLIED TO BEARINGS ON P2.

FOR BEARING COMPARISONS, A ROTATION OF 00°50'35" COUNTER-CLOCKWISE WAS APPLIED TO BEARINGS ON P4.

INTEGRATION DATA

OBSERVED REFERENCE POINTS (ORPs): UTM ZONE 17, NAD83 (CSRS) (2010.0).

COORDINATES TO AN URBAN ACCURACY PER SECTION 14 (2) OF O.REG 216/10.

POINT ID	EASTING	NORTHING
ORP Ⓐ	602 046.43	4 817 296.75
ORP Ⓑ	602 642.12	4 817 232.48

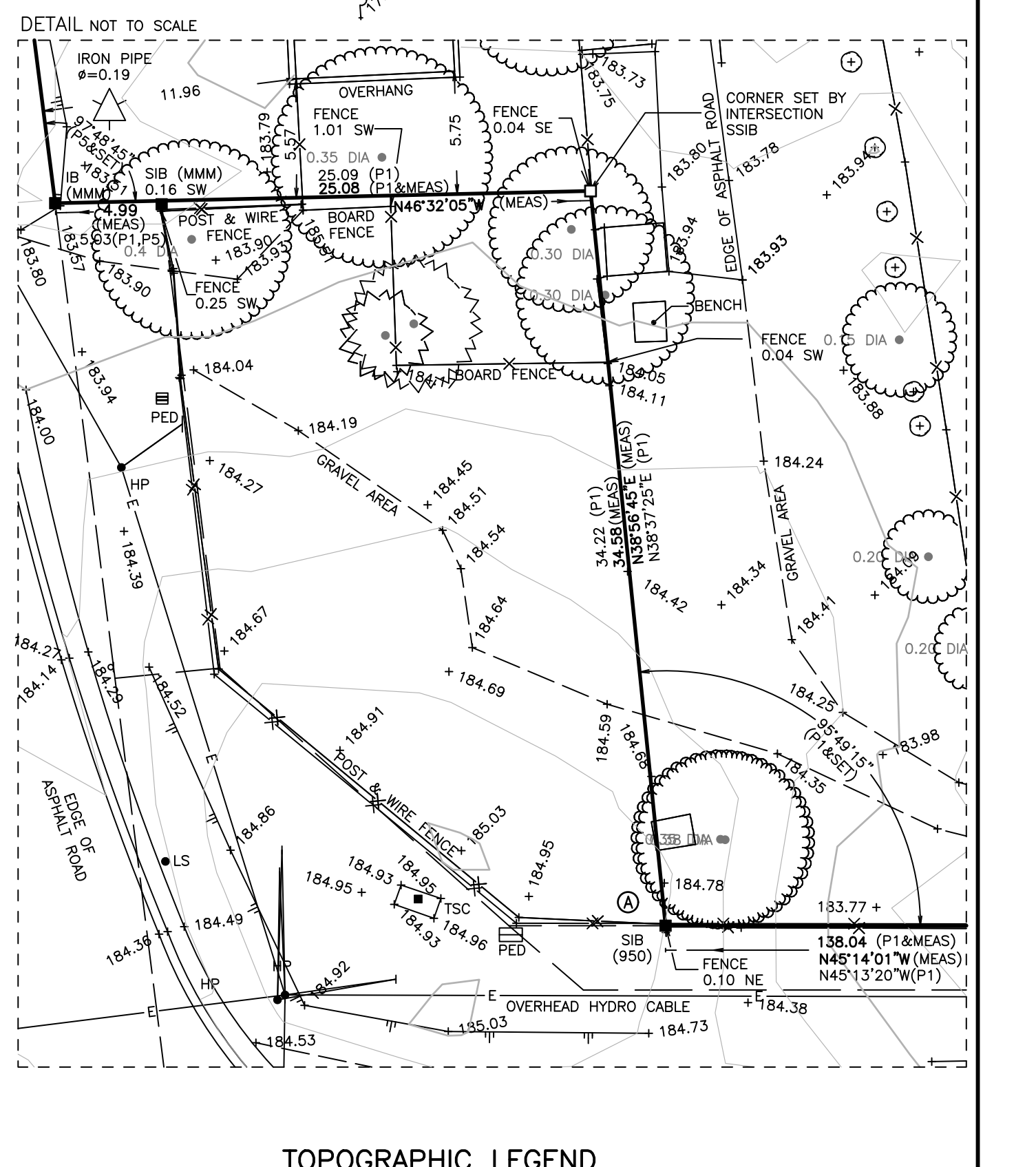
COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

THE RESULTANT TIE BETWEEN ORP Ⓐ AND ORP Ⓑ IS 599.33 N83°50'30"E

LOCAL BENCHMARK

CP LOCATED ON THE WEST SIDE OF BURNHAMTHORPE ROAD APPROXIMATELY 15.65m SOUTH OF HYDRO POLE 5.13m WEST OF C/L OF ROAD.
ELEVATION=183.616m

DETAIL NOT TO SCALE



TOPOGRAPHIC LEGEND

◕	BM	DENOTES BENCH MARK
	CSP	DENOTES CORRUGATED STEEL PIPE
	FG	DENOTES FENCE GATE
•	FP	DENOTES FENCE POST
•	HP	DENOTES HYDRO POLE
•	LS	DENOTES LIGHT STANDARD
○	MH	DENOTES MANHOLE
◕	MW	DENOTES MONITORING WELL
⊟	PED	DENOTES TELEPHONE PEDESTAL
	PVC	DENOTES POLYVINYL CHLORIDE PIPE
ⅆ		DENOTES SIGN
•	TL	DENOTES TRAFFIC SIGNAL
■	TSC	DENOTES TRAFFIC SIGNAL CONTROL
—— E ——		DENOTES OVERHEAD HYDRO CABLE
⊕		DENOTES SHRUB
⊙		DENOTES DECIDUOUS TREE DIA=DIAMETER OF TRUNK IN METRES
✹		DENOTES CONIFEROUS TREE DIA=DIAMETER OF TRUNK IN METRES

LEGEND

■	DENOTES	SURVEY MONUMENT FOUND
□	DENOTES	SURVEY MONUMENT SET
SIB	DENOTES	STANDARD IRON BAR
IB	DENOTES	IRON BAR
RIB	DENOTES	ROUND IRON BAR
MEAS	DENOTES	MEASURED
626	DENOTES	H.D. SEWELL, O.L.S
760	DENOTES	K.H. McCONELL O.L.S
950	DENOTES	F.G. CUNNINGHAM O.L.S
Y	DENOTES	YATES AND PURCELL, O.L.S
OU	DENOTES	ORIGIN UNKNOWN
P1	DENOTES	PLAN 20R-11324
P2	DENOTES	PLAN OF SURVEY BY F.G. CUNNINGHAM O.L.S. DATED NOVEMBER 3, 1966 (PROJECT 66-016M)
P3	DENOTES	PLAN 20R-22413
P4	DENOTES	PLAN 20R-18605
P5	DENOTES	PLAN 20R-9655

N=NORTH, E=EAST, S=SOUTH, W=WEST

ALL SET SSIB MONUMENTS WERE USED DUE TO LACK OF OVERBURDEN AND/OR PROXIMITY OF UNDERGROUND UTILITIES IN ACCORDANCE WITH SECTION 11 (4) OF O.REG. 525/91.

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, AND THE SURVEYORS ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON JANUARY 30, 2025.

FEBRUARY 11, 2025
DATE

R.S. QUERUBIN
ONTARIO LAND SURVEYOR

THIS PLAN OF SURVEY RELATES TO AOLS PLAN SUBMISSION FORM NUMBER V-94997

J.D. BARNES LIMITED
LAND INFORMATION SPECIALISTS
SURVEYING
MAPPING
GIS
401 WHEELABRATOR WAY, SUITE A, MILTON, ON L9T 3C1
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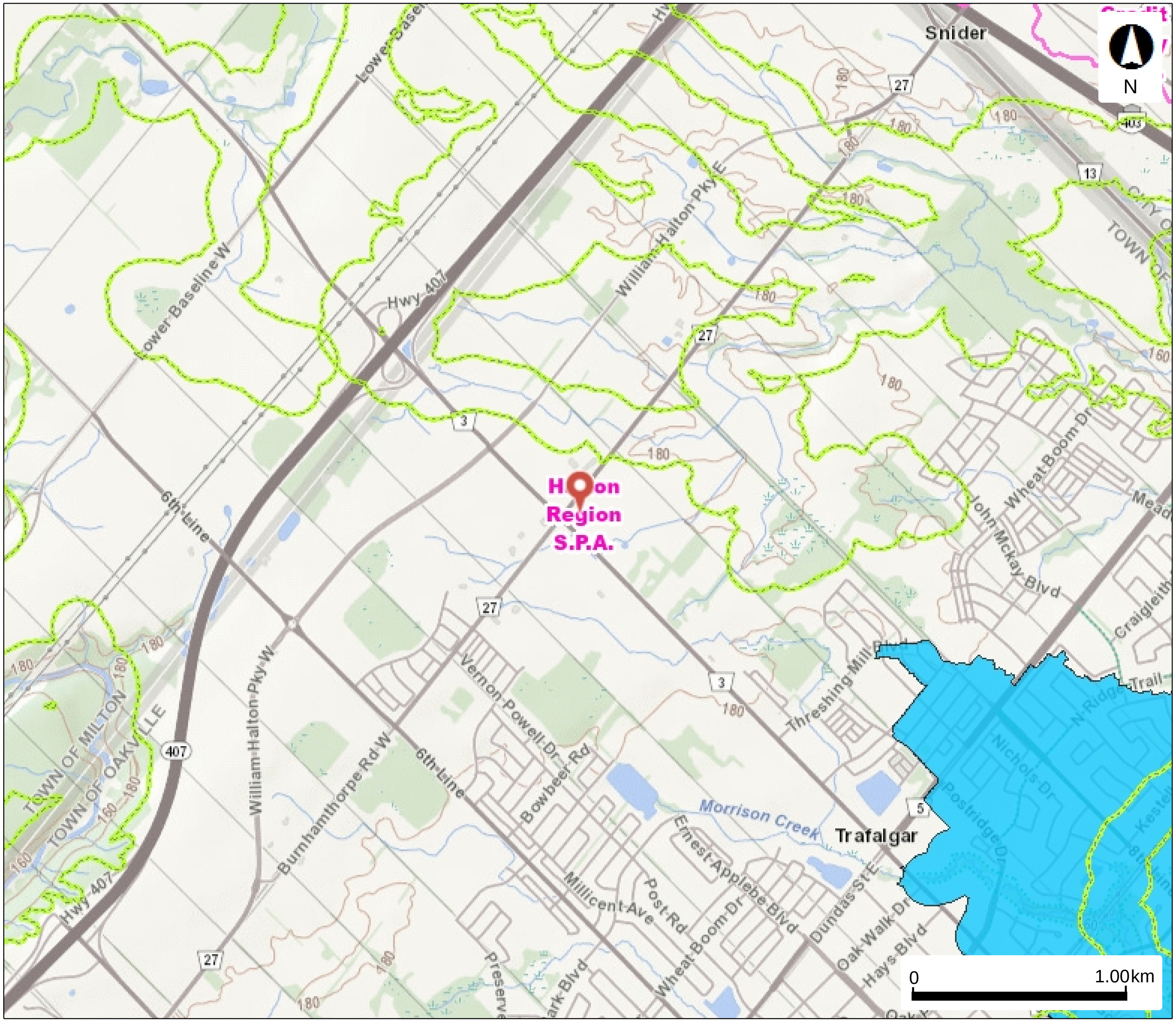
DRAWN BY:	CHECKED BY:	REFERENCE NO.:
TP	RSQ	24-30-276-00
		DATED: 02/11/2025

PLOT DATE: 2/11/2025 10:46 AM

FILE: G:\24-30-276\00\Drawing\24-30-276-00-Upload.dwg

APPENDIX B

Source Water Protection Plan



Legend

- ⊞ Issue Contributing Areas
- ▨ WHPA-E
- Wellhead Protection Area
  - 🟫 A
  - 🟧 B
  - 🟧 C
  - 🟫 C1
  - 🟨 D
  - ⬜ F
- 🟦 Intake Protection Zone 1
- ⬚ Event Based Areas
- 🟦 Intake Protection Zone 2
- ☐ Source Protection Areas

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

Ontario

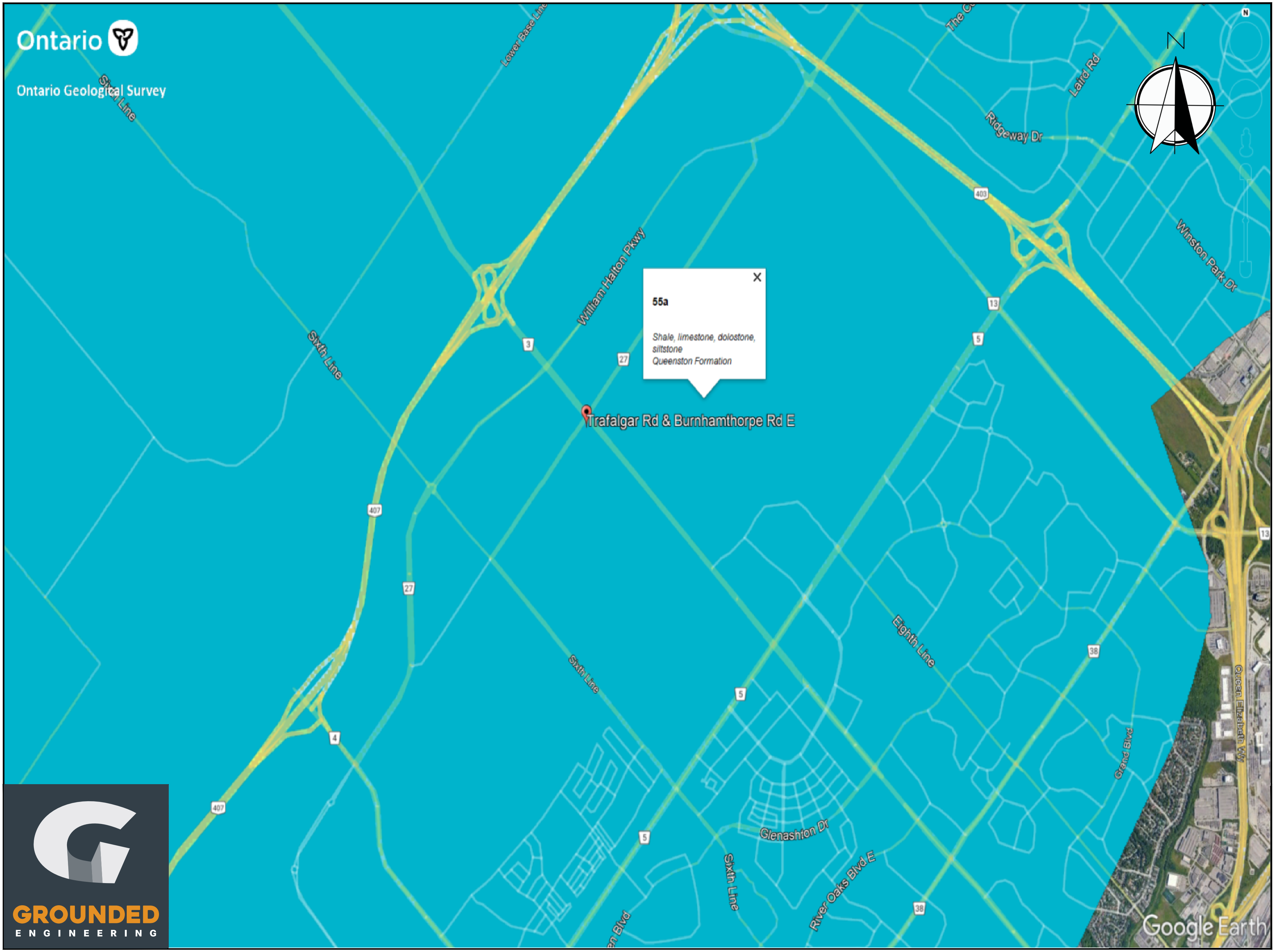
THIS IS NOT A PLAN OF SURVEY.

Map Created: 9/22/2025

Map Center: 43.50192 N, -79.73662 W

APPENDIX C


Ontario
8b Fine-textured glaciolacustrine deposits
Ontario Geological Survey
5d Till
Clay to silt-textured till (derived from glaciolacustrine deposits or shale)
Trafalgar Rd & Burnhamthorpe Rd E
Lower Base Line
William Halton Pkwy
William Halton Pkwy
William Halton Pkwy
Sixth Line
Sixth Line
Eighth Line
North Ridge Trail
407
407
3
3
5
27
N
GROUNDED
ENGINEERING


Ontario
Ontario Geological Survey
55a
Shale, limestone, dolostone, siltstone
Queenston Formation
Trafalgar Rd & Burnhamthorpe Rd E
William Halton Pkwy
Sixth Line
Seventh Line
Eighth Line
Lower Base Line
Laird Rd
Ridgeway Dr
Winston Park Dr
Queen Elizabeth Wy
Grand Blvd
Glenashton Dr
River Oaks Blvd E
407
403
27
3
4
5
13
38
N
Google Earth
GROUNDED
ENGINEERING

APPENDIX D

LOCATION_NAME	PROVINCE_OR_TERRITORY	PERIOD_OF_RECORD	ELEMENT_GROUP	NORMALS_ELEMENT	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Code
TORONTO PEARSON (AIRPORT)	ON	Normal	Temperature	Daily Average (°C)	-5	-4.4	0.6	7	13.7	19.2	22.1	21.1	16.9	10	4.1	-1.6	8.6	B
TORONTO PEARSON (AIRPORT)	ON	Normal	Temperature	StdDev Mean Monthly Temperature (°C)	3	3	2.2	1.6	2	1.3	1.8	1.3	1.7	1.3	2	2.1	1.3	B
TORONTO PEARSON (AIRPORT)	ON	Normal	Temperature	Daily Maximum (°C)	-1.2	-0.3	5	12	19.2	24.5	27.4	26.3	22.3	14.6	7.9	1.9	13.3	B
TORONTO PEARSON (AIRPORT)	ON	Normal	Temperature	Daily Minimum (°C)	-8.9	-8.5	-3.8	1.9	8.2	13.9	16.6	15.8	11.6	5.3	0.2	-5	3.9	B
TORONTO PEARSON (AIRPORT)	ON	Normal	Temperature	Maximum Daily Mean (°C)	13.4	10.9	18.2	22.4	27.6	29.5	31.8	31.5	28.5	24.5	16.1	14.1		
TORONTO PEARSON (AIRPORT)	ON	Normal	Temperature	Maximum Daily Mean (°C) Date (yyyy/mm/dd)	2008-01-08	2017-02-23	2012-03-22	2002-04-17	2006-05-30	2012-06-20	2011-07-21	2006-08-01	2016-09-07	2002-10-01	2020-11-10	2001-12-05		
TORONTO PEARSON (AIRPORT)	ON	Normal	Temperature	Minimum Daily Mean (°C)	-24.7	-22.3	-18.8	-4.7	0.9	8.4	13.6	13.2	4.5	-1	-9.6	-18.6		
TORONTO PEARSON (AIRPORT)	ON	Normal	Temperature	Minimum Daily Mean (°C) Date (yyyy/mm/dd)	1994-01-15	2015-02-15	2003-03-03	2003-04-06	2020-05-08	1992-06-20	1992-07-31	1992-08-13	1993-09-30	2020-10-30	2018-11-22	2017-12-31		
TORONTO PEARSON (AIRPORT)	ON	Normal	Temperature	Extreme Maximum (°C)	17.6	17.7	26	29.6	34.1	36.2	37.9	37.9	35	31.8	24.3	18.3		
TORONTO PEARSON (AIRPORT)	ON	Normal	Temperature	Extreme Maximum (°C) Date (yyyy/mm/dd)	2005-01-13	2017-02-23	2012-03-22	2002-04-16	2006-05-29	1994-06-18	2011-07-21	2001-08-08	2016-09-07	2019-10-01	2020-11-10	2001-12-05		
TORONTO PEARSON (AIRPORT)	ON	Normal	Temperature	Minimum Daily Maximum (°C)	-21	-19.1	-12.8	-3	4.8	10	15.4	16.2	9.9	2.3	-5.9	-14.5		
TORONTO PEARSON (AIRPORT)	ON	Normal	Temperature	Minimum Daily Maximum (°C) Date (yyyy/mm/dd)	1994-01-15	2015-02-15	2003-03-03	2003-04-04	2020-05-08	1992-06-20	1992-07-31	1992-08-13	2000-09-28	2020-10-30	2018-11-22	2017-12-31		
TORONTO PEARSON (AIRPORT)	ON	Normal	Temperature	Maximum Daily Minimum (°C)	11.3	6.5	11.9	16.3	22.2	24.4	26	26.3	23.4	19.4	12.3	9.8		
TORONTO PEARSON (AIRPORT)	ON	Normal	Temperature	Maximum Daily Minimum (°C) Date (yyyy/mm/dd)	2008-01-08	2009-02-11	2012-03-23	2002-04-17	2006-05-30	2012-06-20	2011-07-21	2006-08-01	2001-09-09	2002-10-01	2002-11-10	2001-12-05		
TORONTO PEARSON (AIRPORT)	ON	Normal	Temperature	Extreme Minimum (°C)	-31	-25.5	-24.7	-9.2	-4.7	3	7.9	8	-1.2	-5.4	-13.9	-24.3		
TORONTO PEARSON (AIRPORT)	ON	Normal	Temperature	Extreme Minimum (°C) Date (yyyy/mm/dd)	1994-01-16	2015-02-15	2003-03-03	1995-04-05	2020-05-09	1998-06-05	1992-07-22	1992-08-20	1993-09-30	2020-10-31	2019-11-13	2004-12-20		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Temperature	Maximum Daily Mean (°C)	13.4	10.9	18.2	24	27.6	29.5	31.8	31.5	30	24.5	16.7	15		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Temperature	Maximum Daily Mean (°C) Date (yyyy/mm/dd)	2008-01-08	2017-02-23	2012-03-22	1990-04-26	2006-05-30	2012-06-20	2011-07-21	2006-08-01	1953-09-02	2002-10-01	1974-11-01	1966-12-08		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Temperature	Minimum Daily Mean (°C)	-24.7	-23.4	-18.8	-11.1	0.9	5.3	11.4	9.5	2.5	-3.6	-11.7	-20.9		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Temperature	Minimum Daily Mean (°C) Date (yyyy/mm/dd)	1994-01-15	1943-02-15	2003-03-03	1972-04-07	2020-05-08	1945-06-01	1968-07-03	1965-08-30	1965-09-27	1969-10-22	1949-11-26	1942-12-20		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Temperature	Extreme Maximum (°C)	17.6	17.7	26	31.1	34.4	36.7	37.9	38.3	36.7	31.8	25	20		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Temperature	Extreme Maximum (°C) Date (yyyy/mm/dd)	2005-01-13	2017-02-23	2012-03-22	1990-04-25	1962-05-16	1952-06-25	2011-07-21	1948-08-25	1953-09-02	2019-10-01	1950-11-01	1982-12-03		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Temperature	Minimum Daily Maximum (°C)	-21	-19.2	-15	-5	4.4	9.4	15.4	15.6	6.7	0	-7.3	-17.8		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Temperature	Minimum Daily Maximum (°C) Date (yyyy/mm/dd)	1994-01-15	1979-02-17	1938-03-03	1972-04-07	1976-05-07	1945-06-01	1992-07-31	1964-08-13	1950-09-24	1969-10-22	1987-11-21	1955-12-20		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Temperature	Maximum Daily Minimum (°C)	11.3	6.5	12.6	17.5	22.2	24.4	26	26.3	23.4	19.4	13.9	12.8		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Temperature	Maximum Daily Minimum (°C) Date (yyyy/mm/dd)	2008-01-08	2009-02-11	1989-03-28	1990-04-26	2006-05-30	1959-06-29	2011-07-21	2006-08-01	2001-09-09	2002-10-01	1956-11-01	1966-12-08		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Temperature	Extreme Minimum (°C)	-31.3	-31.1	-28.9	-17.2	-5.6	0.6	3.9	1.1	-3.9	-8.3	-18.3	-31.1		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Temperature	Extreme Minimum (°C) Date (yyyy/mm/dd)	1981-01-04	1943-02-15	1950-03-04	1972-04-07	1966-05-07	1949-06-08	1968-07-30	1965-08-30	1965-09-27	1969-10-23	1949-11-26	1942-12-20		
TORONTO PEARSON (AIRPORT)	ON	Normal	Precipitation	Rainfall (mm)	33.8	23.9	34	70.7	77.5	80.7	74	68.5	69.4	67	62.7	35.3	697.4	B
TORONTO PEARSON (AIRPORT)	ON	Normal	Precipitation	Snowfall (cm)	31.5	27.7	17.2	4.5	0.1	0	0	0	0	0.2	9.3	24.1	114.5	B
TORONTO PEARSON (AIRPORT)	ON	Normal	Precipitation	Precipitation (mm)	61.6	50.2	50.5	76.7	77.6	80.7	74	68.5	69.4	67.2	71.8	58.6	806.8	B
TORONTO PEARSON (AIRPORT)	ON	Normal	Precipitation	Average Snow Depth (cm)	6	7	3	0	0	0	0	0	0	0	0	3	2	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Precipitation	Median Snow Depth (cm)	5	5	1	0	0	0	0	0	0	0	0	1	1	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Precipitation	Snow Depth at Month-end (cm)	8	6	0	0	0	0	0	0	0	0	0	3	1	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Precipitation	Extreme Daily Rainfall (mm)	59	25.8	40.8	55.8	59.4	53.8	126	41.4	66.4	64.8	52.4	30.2		
TORONTO PEARSON (AIRPORT)	ON	Normal	Precipitation	Extreme Daily Rainfall (mm) Date (yyyy/mm/dd)	2020-01-11	2009-02-11	1991-03-27	1992-04-11	2000-05-12	2000-06-13	2013-07-08	1991-08-03	1996-09-07	1995-10-05	1999-11-02	1998-12-06		
TORONTO PEARSON (AIRPORT)	ON	Normal	Precipitation	Extreme Daily Snowfall (cm)	26.4	30.4	15.2	10.4	2.8	0	0	0	0	2	19.4	17.4		
TORONTO PEARSON (AIRPORT)	ON	Normal	Precipitation	Extreme Daily Snowfall (cm) Date (yyyy/mm/dd)	2019-01-28	2008-02-06	1998-03-21	1994-04-06	2020-05-11	1991-06-01	1991-07-01	1991-08-01	1991-09-01	2018-10-27	2020-11-22	2014-12-11		
TORONTO PEARSON (AIRPORT)	ON	Normal	Precipitation	Extreme Daily Precipitation (mm)	59	40.4	40.8	55.8	59.4	53.8	126	41.4	66.4	64.8	52.4	30.2		
TORONTO PEARSON (AIRPORT)	ON	Normal	Precipitation	Extreme Daily Precipitation (mm) Date (yyyy/mm/d	2020-01-11	2001-02-08	1991-03-27	1992-04-11	2000-05-12	2000-06-13	2013-07-08	1991-08-03	1996-09-07	1995-10-05	1999-11-02	1998-12-06		
TORONTO PEARSON (AIRPORT)	ON	Normal	Precipitation	Extreme Snow Depth (cm)	67	48	30	12	0	0	0	0	0	0	18	36		
TORONTO PEARSON (AIRPORT)	ON	Normal	Precipitation	Extreme Snow Depth (cm) Date (yyyy/mm/dd)	1999-01-15	2008-02-13	2008-03-09	1994-04-07	1991-05-01	1991-06-01	1991-07-01	1991-08-01	1991-09-01	1991-10-01	2002-11-18	2008-12-24		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Precipitation	Extreme Daily Rainfall (mm)	59	31.8	41.7	55.8	92.7	53.8	126	80.8	108	121.4	86.1	40.9		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Precipitation	Extreme Daily Rainfall (mm) Date (yyyy/mm/dd)	2020-01-11	1975-02-24	1942-03-16	1992-04-11	1944-05-31	2000-06-13	2013-07-08	1970-08-30	1948-09-18	1954-10-15	1962-11-10	1962-12-06		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Precipitation	Extreme Daily Snowfall (cm)	36.8	39.9	32.3	26.7	2.8	0	0	0	0	7.4	33.5	28.2		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Precipitation	Extreme Daily Snowfall (cm) Date (yyyy/mm/dd)	1966-01-23	1965-02-25	1964-03-10	1939-04-10	2020-05-11	1938-06-01	1938-07-01	1938-08-01	1938-09-01	1962-10-25	1940-11-30	1944-12-11		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Precipitation	Extreme Daily Precipitation (mm)	59	55.9	41.7	55.8	92.7	53.8	126	80.8	108	121.4	86.1	40.9		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Precipitation	Extreme Daily Precipitation (mm) Date (yyyy/mm/d	2020-01-11	1965-02-25	1942-03-16	1992-04-11	1944-05-31	2000-06-13	2013-07-08	1970-08-30	1948-09-18	1954-10-15	1962-11-10	1962-12-06		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Precipitation	Extreme Snow Depth (cm)	67	48	30	13	0	0	0	0	0	13	18	36		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Precipitation	Extreme Snow Depth (cm) Date (yyyy/mm/dd)	1999-01-15	2008-02-13	2008-03-09	1975-04-04	1955-05-01	1955-06-01	1955-07-01	1955-08-01	1955-09-01	1969-10-22	2002-11-18	2008-12-24		
TORONTO PEARSON (AIRPORT)	ON	Normal	Days With ...	Freezing Rain or Freezing Drizzle	2	1.1	0.77	0.47	0	0	0	0	0	0	0.23	0.9	5.5	A
TORONTO PEARSON (AIRPORT)	ON	Normal	Days With ...	Thunderstorms	0.13	0.3	0.5	2.2	3.5	5.1	5.5	4.7	2.6	1.3	0.4	0.2	26.3	A
TORONTO PEARSON (AIRPORT)	ON	Normal	Days With ...	Hail	0	0	0.03	0.13	0.13	0.07	0	0.07	0	0.07	0.03	0	0.53	A
TORONTO PEARSON (AIRPORT)	ON	Normal	Days With ...	Fog, Ice Fog, or Freezing Fog	2	1.3	1.4	1	1.6	0.7	0.43	0.23	0.73	1.3	1.9	1.5	14.2	A
TORONTO PEARSON (AIRPORT)	ON	Normal	Days With ...	Smoke or Haze	2.5	2.2	2.8	2.1	3.5	4.5	4.4	4.2	2.9	2.4	3.1	2.5	37.2	A
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Maximum T	Days with Maximum Temperature <= -30 °C	0	0	0	0	0	0	0	0	0	0	0	0	0	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Maximum T	Days with Maximum Temperature <= -20 °C	0.04	0	0	0	0	0	0	0	0	0	0	0	0.04	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Maximum T	Days with Maximum Temperature <= -10 °C	2.6	1.1	0.24	0	0	0	0	0	0	0	0	0.15	4	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Maximum T	Days with Maximum Temperature <= 0 °C	16.9	13.7	6.3	0.44	0	0	0	0	0	0	1.5	10.7	49.5	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Maximum T	Days with Maximum Temperature > 0 °C	14.1	14.6	24.7	29.6	31	30	31	31	30	31	28.5	20.4	315.8	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Maximum T	Days with Maximum Temperature > 10 °C	1.2	0.77	6.2	18.9	30	30	31	31	29.9	25.2	9.2	1.6	214.7	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Maximum T	Days with Maximum Temperature > 20 °C	0	0	0.6	2.8	12.3	24.6	30.5	30	19.7	4.4	0.24	0	125.1	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Maximum T	Days with Maximum Temperature > 30 °C	0	0	0	0	0.75	3.4	7.7	4	1.3	0.08	0	0	17.2	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Maximum T	Days with Maximum Temperature > 35 °C	0	0	0	0	0	0.07	0.54	0.19	0	0	0	0	0.8	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Maximum T	Days with Maximum Temperature > 40 °C	0	0	0	0	0	0	0	0	0	0	0	0	0	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Minimum T	Days with Minimum Temperature > 20 °C	0	0	0	0	0.08	1.4	5.5	2.4	0.4	0	0	0	9.7	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Minimum T	Days with Minimum Temperature > 10 °C	0.04	0	0.16	0.8	9.9	24.8	30.4	29.8	18.8	4	0.24	0	119	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Minimum T	Days with Minimum Temperature > 0 °C	3.5	1.9	7.6	20.7	30.4	30	31	31	29.8	28	15.4	5.5	234.7	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Minimum T	Days with Minimum Temperature <= 2 °C	30	27.9	27.2	15.6	2.4	0	0	0	0.36	7.5	20.6	29.1	160.6	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Minimum T	Days with Minimum Temperature <= 0 °C	27.5	26.4	23.4	9.3	0.63	0	0	0	0.16	3	14.6	25.5	130.6	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Minimum T	Days with Minimum Temperature < -2 °C	24.8	23.3	18.5	4.4	0.17	0	0	0	0	0.64	8.7	20.5	101	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Minimum T	Days with Minimum Temperature < -10 °C	13.4	10.8	4	0	0	0	0	0	0	0	0.4	5.7	34.2	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Minimum T	Days with Minimum Temperature < -20 °C	1.9	0.54	0.08	0	0	0	0	0	0	0	0	0.15	2.7	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Minimum T	Days with Minimum Temperature < -30 °C	0.04	0	0	0	0	0	0	0	0	0	0	0	0.04	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Minimum T	Days with Minimum Temperature < -40 °C	0	0	0	0	0	0	0	0	0	0	0	0	0	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Rainfall	Days with Rainfall >= 0.2 mm	6.2	4.6	7.2	11.7	12.7	10.8	10.3	9.8	10.2	12.8	10.4	7.5	114.1	B
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Rainfall	Days with Rainfall >= 5 mm	2.2	1.8	2.2	4.7	4.8	5.2	3.9	3.9	4.5	4.1	3.7	2.6	43.5	B
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Rainfall	Days with Rainfall >= 10 mm	0.96	0.96	1	2.5	2.5	3	2.5	2.3	2.3	2.2	2	1.1	23.3	B
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Rainfall	Days with Rainfall >= 25 mm	0.16	0.08	0.08	0.32	0.44	0.52	0.76	0.73	0.52	0.32	0.6	0.08	4.6	B
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Rainfall	Days with Rainfall >= 50 mm	0.04	0	0	0.04	0.04	0.07	0.08	0	0.04	0.04	0.04	0	0.39	B
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Rainfall	Days with Rainfall >= 100 mm	0	0	0	0	0	0	0	0	0	0	0	0	0	B
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Snowfall	Days with Snowfall >= 0.2 cm	12.7	9.7	6.8	2.2	0.12	0	0	0	0	0.24	3.6	9.2	44.7	B
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Snowfall	Days with Snowfall >= 5 cm	1.8	1.9	1.1	0.28	0	0	0	0	0	0	0.56	1.6	7.2	B
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Snowfall	Days with Snowfall >= 10 cm	0.56	0.5	0.36	0.04	0	0	0	0	0	0	0.2	0.52	2.2	B
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Snowfall	Days with Snowfall >= 25 cm	0.04	0.08	0	0	0	0	0	0	0	0	0	0	0.12	B
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Snowfall	Days with Snowfall >= 40 cm	0	0	0	0	0	0	0	0	0	0	0	0	0	B
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Precipitatio	Days with Precipitation >= 0.2 mm	16.2	12	12.3	12.5	12.7	10.8	10.3	9.8	10.2	12.8	12.6	14.9	147.3	B
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Precipitatio	Days with Precipitation >= 1 mm	10.2	8.1	8.3	9.5	9.1	9	8	7.4	7.8	9.2	8.9	10	105.5	B
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Precipitatio	Days with Precipitation >= 5 mm	3.9	3.4	3.2	5	4.8	5.2	3.9	3.9	4.5	4.1	4.3	4	50.3	B
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Precipitatio	Days with Precipitation >= 10 mm	1.7	1.5	1.4	2.8	2.5	3	2.5	2.3	2.3	2.2	2.4	1.6	26.1	B

TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Precipitatic	Days with Precipitation >= 25 mm	0.16	0.15	0.08	0.32	0.44	0.52	0.76	0.73	0.52	0.32	0.64	0.12	4.8	B
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Precipitatic	Days with Precipitation >= 50 mm	0.04	0	0	0.04	0.04	0.07	0.08	0	0.04	0.04	0.04	0	0.39	B
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Precipitatic	Days with Precipitation >= 100 mm	0	0	0	0	0	0	0	0	0	0	0	0	0	B
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Snow Deptl	Days with Snow Depth >= 1 cm	21	20.4	11.4	1.3	0	0	0	0	0	0	2.3	12.2	68.6	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Snow Deptl	Days with Snow Depth >= 5 cm	13.4	10.5	6.5	0.61	0	0	0	0	0	0	0.91	5.5	37.4	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Snow Deptl	Days with Snow Depth >= 10 cm	7.1	6	4	0.22	0	0	0	0	0	0	0.32	3.2	20.8	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Snow Deptl	Days with Snow Depth >= 20 cm	2	1.6	0.78	0	0	0	0	0	0	0	0	0.82	5.3	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Snow Deptl	Days with Snow Depth >= 30 cm	0.78	0.79	0.04	0	0	0	0	0	0	0	0	0.23	1.8	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Snow Deptl	Days with Snow Depth >= 50 cm	0.13	0	0	0	0	0	0	0	0	0	0	0	0.13	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Days with Snow Deptl	Days with Snow Depth >= 100 cm	0	0	0	0	0	0	0	0	0	0	0	0	0	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Wind	Wind Speed (km/h)	17.9	17.8	17.5	17.3	14.8	14	13.9	13.1	13.4	15	16	17	15.7	A
TORONTO PEARSON (AIRPORT)	ON	Normal	Wind	Most Frequent Wind Direction	W	W	N	N	N	N	W	N	N	W	W	W	W	A
TORONTO PEARSON (AIRPORT)	ON	Normal	Wind	Days with Winds >= 52 km/h	2.3	2.4	2.4	3.2	1.4	1.2	0.5	0.78	0.67	2.2	2.5	2.6	22.3	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Wind	Days with Winds >= 63 km/h	0.65	0.64	0.74	0.92	0.35	0.3	0.15	0.17	0.1	0.57	0.82	0.32	5.7	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Wind	Days with Gusts >= 90 km/h	0.19	0.32	0.29	0.2	0	0.13	0.1	0	0.11	0.22	0.32	0.14	2	D
TORONTO PEARSON (AIRPORT)	ON	Normal	Wind	Extreme Wind Speed (km/h)	80	70	72	82	70	59	56	59	61	76	72	76		
TORONTO PEARSON (AIRPORT)	ON	Normal	Wind	Extreme Wind Speed (km/h) Date (yyyy/mm/dd hh:	2017-01-11 2:00	2002-02-01 15:00	2009-03-11 10:00	2011-04-28 10:00	2002-05-10 12:00	2011-06-01 15:00	1996-07-19 13:00	1992-08-10 19:00	2005-09-29 11:00	2003-10-15 12:00	1992-11-12 23:00	2008-12-28 9:00		
TORONTO PEARSON (AIRPORT)	ON	Normal	Wind	Direction of Extreme Wind Speed	W	W	W	W	W	W	NW	NW	NW	W	W	W		
TORONTO PEARSON (AIRPORT)	ON	Normal	Wind	Direction of Extreme Wind Speed Date (yyyy/mm/d	2017-01-11 2:00	2002-02-01 15:00	2009-03-11 10:00	2011-04-28 10:00	2002-05-10 12:00	2011-06-01 15:00	1996-07-19 13:00	1992-08-10 19:00	2005-09-29 11:00	2003-10-15 12:00	1992-11-12 23:00	2008-12-28 9:00		
TORONTO PEARSON (AIRPORT)	ON	Normal	Wind	Extreme Gust Speed (km/h)	109	96	96	115	89	98	104	115	106	102	106	109		
TORONTO PEARSON (AIRPORT)	ON	Normal	Wind	Extreme Gust Speed (km/h) Date (yyyy/mm/dd)	1996-01-27	1997-02-27	1996-03-19	2009-04-25	1996-05-19	1991-06-15	2013-07-19	2009-08-11	2010-09-22	2002-10-07	1995-11-11	1996-12-01		
TORONTO PEARSON (AIRPORT)	ON	Normal	Wind	Direction of Extreme Gust Speed	SW	W	NE	W	SW	SW	NW	NE	NW	W	W	S		
TORONTO PEARSON (AIRPORT)	ON	Normal	Wind	Direction of Extreme Gust Speed Date (yyyy/mm/d	1996-01-27	1997-02-27	1996-03-19	2009-04-25	1996-05-19	1991-06-15	2013-07-19	2009-08-11	2010-09-22	2002-10-07	1995-11-11	1996-12-01		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Wind	Extreme Wind Speed (km/h)	80	77	97	82	71	63	61	71	77	92	80	76		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Wind	Extreme Wind Speed (km/h) Date (yyyy/mm/dd hh:	2017-01-11 2:00	1958-02-17 8:00	1959-03-15 18:00	2011-04-28 10:00	1964-05-09 15:00	1980-06-20 10:00	1964-07-13 2:00	1958-08-31 13:00	1954-09-22 0:00	1954-10-16 0:00	1955-11-16 19:00	2008-12-28 9:00		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Wind	Direction of Extreme Wind Speed	W	N	SW	W	W	NW	E	W	W	W	W	W		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Wind	Direction of Extreme Wind Speed Date (yyyy/mm/d	2017-01-11 2:00	1958-02-17 8:00	1959-03-15 18:00	2011-04-28 10:00	1964-05-09 15:00	1980-06-20 10:00	1964-07-13 2:00	1958-08-31 13:00	1954-09-22 0:00	1954-10-16 0:00	1955-11-16 19:00	2008-12-28 9:00		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Wind	Extreme Gust Speed (km/h)	115	105	124	115	109	107	135	115	106	104	122	109		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Wind	Extreme Gust Speed (km/h) Date (yyyy/mm/dd)	1978-01-26	1956-02-25	1964-03-05	2009-04-25	1983-05-02	1990-06-03	1956-07-01	2009-08-11	2010-09-22	1989-10-14	1955-11-17	1996-12-01		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Wind	Direction of Extreme Gust Speed	E	W	SW	W	W	W	NW	NE	NW	NW	SW	S		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Wind	Direction of Extreme Gust Speed Date (yyyy/mm/d	1978-01-26	1956-02-25	1964-03-05	2009-04-25	1983-05-02	1990-06-03	1956-07-01	2009-08-11	2010-09-22	1989-10-14	1955-11-17	1996-12-01		
TORONTO PEARSON (AIRPORT)	ON	Normal	Degree Days	Degree Days Above 24 °C	0	0	0	0	0.5	5.9	18.2	7.9	1.7	0	0	0	34.1	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Degree Days	Degree Days Above 18 °C	0	0	0	0.7	16	65.4	129.5	101.1	32.4	2.5	0	0	347.6	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Degree Days	Degree Days Above 15 °C	0	0	0.5	3.5	39.5	132.4	218.9	187.2	79.9	10.4	0.1	0	672.4	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Degree Days	Degree Days Above 10 °C	0.2	0	4.4	22.5	125.5	275.2	373.7	341.9	203.8	52.2	6	0.3	1405.7	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Degree Days	Degree Days Above 5 °C	3	1.7	22.2	89.5	265	425.1	528.7	496.9	351.3	159	39.5	5.2	2387.2	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Degree Days	Degree Days Above 0 °C	22.1	17.9	79.3	214.9	419.3	575.1	683.7	651.9	501.3	308.1	131.4	38.7	3643.7	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Degree Days	Degree Days Below 0 °C	175.2	134	59.6	3.1	0	0	0	0	0	0.1	13.4	87.3	472.6	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Degree Days	Degree Days Below 5 °C	311.1	259.2	157.5	27.6	0.7	0	0	0	0	5.9	71.5	208.8	1042.4	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Degree Days	Degree Days Below 10 °C	463.3	398.9	294.7	110.6	16.2	0.1	0	0	2.5	54.2	188	358.8	1887.3	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Degree Days	Degree Days Below 15 °C	618.1	540.2	445.8	241.6	85.2	7.3	0.2	0.3	28.6	167.4	332.1	513.6	2980.4	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Degree Days	Degree Days Below 18 °C	711.1	625	538.3	328.8	154.7	30.3	3.8	7.2	71.1	252.4	422	606.6	3751.3	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Quintiles	Quintile 1 (Lower Bound)	24.4	20.2	18	29.2	14.4	20.4	20.4	11.6	25.2	17.6	10.2	17		
TORONTO PEARSON (AIRPORT)	ON	Normal	Quintiles	Quintile 1 (Upper Bound)	37.5	25.5	30	47.8	47.8	45	34	39.5	44.2	40.2	33	36.2		
TORONTO PEARSON (AIRPORT)	ON	Normal	Quintiles	Quintile 2 (Upper Bound)	47.6	38.4	40.7	63.5	67.4	59.4	57.6	52.6	52.5	54.2	58	52		
TORONTO PEARSON (AIRPORT)	ON	Normal	Quintiles	Quintile 3 (Upper Bound)	63.2	47.3	52.8	88.6	79.6	72.7	85.3	67.4	69.8	66.3	70.8	62.5		
TORONTO PEARSON (AIRPORT)	ON	Normal	Quintiles	Quintile 4 (Upper Bound)	72.2	75.3	63.7	102.7	93.3	109	100.8	91.9	86.3	95.6	91.9	72.4		
TORONTO PEARSON (AIRPORT)	ON	Normal	Quintiles	Quintile 5 (Upper Bound)	133.3	107.6	98.4	133.8	152.8	191.6	193.2	154.4	166.2	136.2	141.2	99.8		
TORONTO PEARSON (AIRPORT)	ON	Normal	Humidex	Days with Humidex >= 30	0	0	0	0.17	3.5	10	18.3	16.2	7.2	0.55	0	0	55.9	A
TORONTO PEARSON (AIRPORT)	ON	Normal	Humidex	Days with Humidex >= 35	0	0	0	0	0.9	4	8	6.2	2.1	0.14	0	0	21.3	A
TORONTO PEARSON (AIRPORT)	ON	Normal	Humidex	Days with Humidex >= 40	0	0	0	0	0.07	0.93	2.1	1.3	0.14	0	0	0	4.6	A
TORONTO PEARSON (AIRPORT)	ON	Normal	Humidex	Extreme Humidex	19	19.1	29.6	34.9	42.6	45.6	50.3	46.6	43	39.1	27.4	21.1		
TORONTO PEARSON (AIRPORT)	ON	Normal	Humidex	Extreme Humidex Date (yyyy/mm/dd)	2005-01-13	2018-02-20	2012-03-22	2002-04-16	2006-05-30	2018-06-30	1995-07-14	2006-08-01	2018-09-05	2007-10-08	2020-11-10	1998-12-06		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Humidex	Extreme Humidex	19	19.1	29.6	37.9	42.6	45.6	50.3	46.6	48	39.1	28.6	23.9		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Humidex	Extreme Humidex Date (yyyy/mm/dd)	2005-01-13	2018-02-20	2012-03-22	1990-04-25	2006-05-30	2018-06-30	1995-07-14	2006-08-01	1953-09-01	2007-10-08	1961-11-03	1982-12-03		
TORONTO PEARSON (AIRPORT)	ON	Normal	Wind Chill	Days with Wind Chill < -20	8.8	7	1.8	0	0	0	0	0	0	0	0.17	2.8	20.6	A
TORONTO PEARSON (AIRPORT)	ON	Normal	Wind Chill	Days with Wind Chill < -30	1.8	0.76	0.1	0	0	0	0	0	0	0	0	0.14	2.8	A
TORONTO PEARSON (AIRPORT)	ON	Normal	Wind Chill	Days with Wind Chill < -40	0.03	0.03	0	0	0	0	0	0	0	0	0	0	0.06	A
TORONTO PEARSON (AIRPORT)	ON	Normal	Wind Chill	Days with Wind Chill < -50	0	0	0	0	0	0	0	0	0	0	0	0	0	A
TORONTO PEARSON (AIRPORT)	ON	Normal	Wind Chill	Extreme Wind Chill	-40.2	-40.6	-36.2	-18.5	-8.9	0	0	0	-5.2	-8.9	-22.9	-37.2		
TORONTO PEARSON (AIRPORT)	ON	Normal	Wind Chill	Extreme Wind Chill Date (yyyy/mm/dd)	1994-01-15	2015-02-15	2003-03-03	1995-04-05	2020-05-09	1991-06-01	1991-07-01	1991-08-01	1993-09-30	2020-10-30	2005-11-25	2004-12-20		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Wind Chill	Extreme Wind Chill	-44.7	-40.6	-36.2	-25.4	-9.5	0	0	0	-8	-13.5	-25.4	-38.5		
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Wind Chill	Extreme Wind Chill Date (yyyy/mm/dd)	1981-01-04	2015-02-15	2003-03-03	1972-04-07	1963-05-01	1953-06-01	1953-07-01	1953-08-01	1965-09-27	1969-10-23	1958-11-30	1980-12-25		
TORONTO PEARSON (AIRPORT)	ON	Normal	Humidity	Average Vapour Pressure (kPa)	0.4	0.4	0.5	0.6	1	1.5	1.8	1.8	1.4	1	0.7	0.5	1	A
TORONTO PEARSON (AIRPORT)	ON	Normal	Humidity	Average Relative Humidity - 0600LST (%)	79.2	77.4	75.2	73	75.7	77.6	79.3	83.7	85.5	83.6	81.4	80.7	79.3	A
TORONTO PEARSON (AIRPORT)	ON	Normal	Humidity	Average Relative Humidity - 1500LST (%)	69.7	65.7	58.5	53.4	53.6	54.4	52.9	55.2	57.3	61.6	66.7	70.5	60	A
TORONTO PEARSON (AIRPORT)	ON	Normal	Pressure	Average Station Pressure (kPa)	99.6	99.6	99.6	99.4	99.4	99.3	99.4	99.5	99.7	99.6	99.6	99.6	99.5	A
TORONTO PEARSON (AIRPORT)	ON	Normal	Pressure	Average Sea Level Pressure (kPa)	101.7	101.7	101.7	101.5	101.5	101.4	101.4	101.6	101.7	101.7	101.8	101.7	101.6	A
TORONTO PEARSON (AIRPORT)	ON	Normal	Visibility	Visibility < 1 km (hours with)	10	9.2	5.5	2.8	3.5	2.1	0.6	0.4	1.4	4.3	6.7	7	53.4	A
TORONTO PEARSON (AIRPORT)	ON	Normal	Visibility	Visibility 1 to 9 km (hours with)	126.9	97.1	76.3	60.5	50.6	53.5	39.7	43.4	43.8	55.1	82.5	103.8	833.2	A
TORONTO PEARSON (AIRPORT)	ON	Normal	Visibility	Visibility > 9 km (hours with)	606.9	571.7	662	656.3	689.5	664	702.9	699.5	674.3	684.1	630.3	632.9	7874.4	A
TORONTO PEARSON (AIRPORT)	ON	Normal	Cloud Amount	Cloud Amount 0 to 2 tenths (hours with)	129.8	154.2	206.3	184.4	221.7	212	229.5	261.4	257.1	200.2	141.7	131.8	2330	D
TORONTO PEARSON (AIRPORT)	ON	Normal	Cloud Amount	Cloud Amount 3 to 7 tenths (hours with)	94.6	104.6	117.6	121.6	152.7	179.7	214.4	200.2	166.8	139	108.3	99.8	1699.2	D
TORONTO PEARSON (AIRPORT)	ON	Normal	Cloud Amount	Cloud Amount 8 to 10 tenths (hours with)	519.7	421.2	420.1	414.1	369.7	328.3	300.1	282.4	296.1	404.8	470	512.4	4738.8	D
TORONTO PEARSON (AIRPORT)	ON	Normal	Frost-Free	Average Date of Last Spring Frost													27-Apr	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Frost-Free	Average Date of First Fall Frost													20-Oct	C
TORONTO PEARSON (AIRPORT)	ON	Normal	Frost-Free	Average Length of Frost-Free Period													174 Days	C
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Frost-Free	Probability of last temperature in spring <= 0°C, on													19-May	
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Frost-Free	Probability of last temperature in spring <= 0°C, on													13-May	
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Frost-Free	Probability of last temperature in spring <= 0°C, on													10-May	
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Frost-Free	Probability of last temperature in spring <= 0°C, on													04-May	
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Frost-Free	Probability of last temperature in spring <= 0°C, on													29-Apr	
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Frost-Free	Probability of last temperature in spring <= 0°C, on													28-Apr	
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Frost-Free	Probability of last temperature in spring <= 0°C, on													17-Apr	
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Frost-Free	Probability of first temperature in fall <= 0°C, on or													22-Sep	
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Frost-Free	Probability of first temperature in fall <= 0°C, on or													29-Sep	
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Frost-Free	Probability of first temperature in fall <= 0°C, on or													04-Oct	
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Frost-Free	Probability of first temperature in fall <= 0°C, on or													09-Oct	
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Frost-Free	Probability of first temperature in fall <= 0°C, on or													17-Oct	
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Frost-Free	Probability of first temperature in fall <= 0°C, on or													20-Oct	
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Frost-Free	Probability of first temperature in fall <= 0°C, on or													30-Oct	

TORONTO PEARSON (AIRPORT)	ON	Long-Term	Frost-Free	Probability of frost-free period equal to or less than	134
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Frost-Free	Probability of frost-free period equal to or less than	143
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Frost-Free	Probability of frost-free period equal to or less than	149
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Frost-Free	Probability of frost-free period equal to or less than	156
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Frost-Free	Probability of frost-free period equal to or less than	166
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Frost-Free	Probability of frost-free period equal to or less than	170
TORONTO PEARSON (AIRPORT)	ON	Long-Term	Frost-Free	Probability of frost-free period equal to or less than	187

APPENDIX E

Water Well Records

December 2, 2025

3:27:42 PM

TOWNSHIP CON L	UTM	DATE CN	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
MILTON TOWN (TRAFALG	17 601967 4817316 W	2014-06 7472	2.04			MO	0015 10	7224932 (Z189606) A165987	BRWN FILL GRVL LOOS 0005 GREY CLAY SILT PCKD 0015 GREY SHLE GRVL PCKD 0025
MILTON TOWN (TRAFALG	17 601559 4817716 W	2014-06 7230						7229890 (C26700) A163756 P	
MILTON TOWN (TRAFALG 02 012	17 601497 4818080 W	2005-04 4868	29.9			DO		2810248 (Z28842) A	
MILTON TOWN (TRAFALG DS N 02 012	17 601652 4817972 W	2011-11 7407	48 36	FR	0///:	ST		7173101 (Z136877) A	
MILTON TOWN (TRAFALG DS N 02 012	17 601684 4818075 W	2023-08 7472	2		///:	MO	0030 5	7459250 (QF8KSN87) A358112	BRWN FILL LOOS 0005 GREY CLAY SILT PCKD 0015 GREY TILL PCKD 0035
MILTON TOWN (TRAFALG DS N 02 012	17 601562 4817794 W	2023-08 7472	2		///:	MO	0030 5	7459251 (DH6KDO6F) A358110	BRWN FILL LOOS 0005 GREY CLAY SILT PCKD 0015 GREY TILL PCKD 0035
MILTON TOWN (TRAFALG DS N 02 012	17 601581 4818034 W	2017-08 7407	42			DO		7294968 (Z247286) A	
MILTON TOWN (TRAFALG DS N 02 013	17 601616 4817606 W	2023-08 7472	2		///:	MO	0010 10	7459254 (M3CYQXZW) A358158	BRWN FILL LOOS 0005 GREY CLAY SILT PCKD 0015 GREY TILL PCKD 0020
MILTON TOWN (TRAFALG DS N 02 013	17 601810 4817300 W	2023-08 7472	2		///:	MO	0025 10	7459252 (WEWYS3ZR) A388064	BRWN FILL LOOS 0005 GREY CLAY SILT PCKD 0015 GREY TILL PCKD 0035
OAKVILLE TOWN	17 602141 4816841 W	2016-11 7215						7276686 (C35133) A218531 P	
OAKVILLE TOWN	17 602898 4816533 W	2018-09 7472	2			MO	0020 10	7323167 (Z290871) A258727	BRWN LOAM LOOS 0001 BRWN FILL GRVL LOOS 0005 GREY CLAY GRVL PCKD 0015 RED SHLE WTHD 0030
OAKVILLE TOWN	17 602875 4816427 W	2014-06 7472	2.04			MO	0011 10	7224934 (Z189608) A165983	BRWN FILL GRVL LOOS 0005 GREY CLAY SILT PCKD 0015 BRWN SHLE GRVL PCKD 0021
OAKVILLE TOWN	17 602904 4816576 W	2023-03 7644						7448477 (Z402063) A365238 P	
OAKVILLE TOWN	17 602585 4816717 W	2014-06 7472	2.04			MO	0020 10	7224933 (Z189607) A165985	BRWN FILL GRVL LOOS 0005 GREY CLAY SILT PCKD 0015 GREY SHLE GRVL PCKD 0030

TOWNSHIP CON L	UTM	DATE CN	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
OAKVILLE TOWN	17 603080 4816959 W	2013-10 7360						7218875 (C23027) A150486 P	
OAKVILLE TOWN	17 601611 4816830 W	2018-01 6607	2.00			MO	0010 5	7307863 (Z266881) A241347	BRWN CLAY SILT TILL 0015
OAKVILLE TOWN	17 601685 4816926 W	2018-01 6607	2.00			MO	0010 5	7307864 (Z266882) A241279	BRWN CLAY SILT TILL 0015
OAKVILLE TOWN	17 601610 4816830 W	2018-01 6607	2.00			MO	0025 5	7307865 (Z266883) A241281	BRWN CLAY SILT TILL 0015 GREY CLAY SILT TILL 0030
OAKVILLE TOWN	17 601729 4817326 W	2022-03 7464						7422287 (Z358916) A345376 P	
OAKVILLE TOWN	17 601720 4817313 W	2022-03 7464						7422288 (Z358915) A345377 P	
OAKVILLE TOWN	17 601786 4816845 W	2022-06 7757						7424715 (Z390846) A334553 P	
OAKVILLE TOWN	17 601592 4817107 W	2018-01 6607	2.00			MO	0010 5	7307861 (Z266879) A241263	BRWN CLAY SILT TILL 0015
OAKVILLE TOWN	17 602426 4816936 W	2023-06 7230						7455379 (C62859) A375141 P	
OAKVILLE TOWN 02 011	17 601519 4818094 W	2005-03 3030	36	0012 0026 0038	14/18/4/1:	DO		2810204 (Z23393) A023150	BRWN LOAM 0001 BRWN CLAY 0012 GREY SILT STNS HARD 0026 GREY SILT SAND LYRD 0038 RED SHLE 0040
OAKVILLE TOWN 02 012	17 602094 4817483 W	2006-10 3349						2810672 (Z71495) A	
OAKVILLE TOWN DS N 01 009	17 603137 4818051 W	2024-08 7472	2		///:	MO	0005 5	7489203 (9T8X9AN8) A412681	GREY SILT TILL PCKD 0010
OAKVILLE TOWN DS N 01 010	17 602872 4817607 W	2024-06 7472	2		///:	MO	0010 10	7480860 (LCUVOCR6) A405387	BRWN CLAY SILT LOOS 0010 RED SHLE HARD 0020
OAKVILLE TOWN DS N 01 010	17 603184 4817581 W	2024-06 7472	2		///:	MO	0008 10	7480859 (NU9ZCUKI) A405391	BRWN CLAY SILT LOOS 0010 RED SHLE HARD 0018
OAKVILLE TOWN DS N 01 010	17 602971 4817772 W	2024-06 7472	2		///:	MO	0008 10	7480858 (XIMSFBFW) A405396	BRWN CLAY SILT LOOS 0010 RED SHLE HARD 0018

TOWNSHIP CON L	UTM	DATE CN	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
OAKVILLE TOWN DS N 01 010	17 602742 4817905 W	2024-06 7472	2		///:	MO	0010 10	7480857 (8WS7DDBB) A405392	BRWN CLAY SILT LOOS 0010 RED SHLE HARD 0020
OAKVILLE TOWN DS N 01 010	17 602689 4817964 W	2024-06 7472	2		///:	MO	0008 10	7480856 (XX3N33ZH) A405395	BRWN CLAY SILT LOOS 0010 RED SHLE HARD 0018
OAKVILLE TOWN DS N 01 010	17 603046 4817562 W	2024-06 7472	2		///:	MO	0010 10	7480861 (QIL56QNC) A405381	BRWN CLAY SILT LOOS 0010 RED SHLE HARD 0020
OAKVILLE TOWN DS N 01 010	17 602534 4817967 W	2024-06 7472	2		///:	MO	0010 10	7480855 (SJPK6VF5) A405335	BRWN CLAY SILT LOOS 0010 RED SHLE HARD 0020
OAKVILLE TOWN DS N 01 010	17 602619 4818048 W	1963-06 1308	30	FR 0018	10/20/2/1:0	DO		2802104 ()	BRWN CLAY 0005 RED CLAY BLDR 0011 RED SHLE 0021
OAKVILLE TOWN DS N 01 012	17 602401 4817024 W	2009-11 7140			9///:	NU		7135929 (Z01648) A	0024 GRVL 0025 0026
OAKVILLE TOWN DS N 01 012	17 602919 4816789 W	2020-09 7437	2		///:	TH	0010 10	7371381 (Z294108) A280907	BRWN LOAM 0001 GREY TILL 0005 RED TILL 0008 RED SHLE 0020
OAKVILLE TOWN DS N 01 012	17 602559 4816814 W	2009-10 7219	6		18///:	NU		7132311 (Z098405) A085721 A	
OAKVILLE TOWN DS N 01 012	17 602684 4816675 W	1962-06 1308	30	FR 0020	8/18/5/1:0	DO		2802105 ()	BRWN CLAY 0008 RED CLAY BLDR 0019 RED SHLE 0020
OAKVILLE TOWN DS N 01 012	17 602510 4816850 W	1965-10 1612	6 6	FR 0065	9/14/2/1:30	DO		2802106 ()	LOAM 0002 BRWN CLAY 0016 RED SHLE 0068
OAKVILLE TOWN DS N 01 012	17 602859 4816560 W	2020-12 7360	2		///:	MO	0020 10	7375761 (8NMEM4NC) A306604	LOAM 0001 BRWN FILL 0006 GREY TILL HARD 0017 RED SHLE 0030
OAKVILLE TOWN DS N 01 012	17 602837 4816527 W	2020-12 7360	2		///:	MO	0020 10	7375762 (75FQPEBV) A306605	LOAM 0001 BRWN FILL 0006 GREY TILL HARD 0017 RED SHLE 0030
OAKVILLE TOWN DS N 01 012	17 602871 4816503 W	2020-12 7360	2		///:	MO	0020 10	7375763 (IWVBAESP) A306606	LOAM 0001 BRWN FILL 0006 GREY TILL HARD 0017 RED SHLE 0030
OAKVILLE TOWN DS N 01 012	17 602917 4816536 W	2020-12 7360	2		///:	MO	0020 10	7375764 (2MC4MXPY) A306631	LOAM 0001 BRWN FILL 0006 GREY TILL HARD 0017 RED SHLE 0030
OAKVILLE TOWN DS N 01 012	17 602811 4816674 W	7654						7381974 (C43270) _NO_TAG P	
OAKVILLE TOWN DS N 01 012	17 602891 4816446 W	2021-10 7230						7413066 (C53921) A320636 P	

TOWNSHIP CON L	UTM	DATE CN	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
OAKVILLE TOWN DS N 01 012	17 602670 4816688 W	1988-07 4005	6	UK 0048 UK 0061	9/53/6/1:0	DO		2806985 (31051)	BRWN CLAY LOOS 0016 RED SHLE HARD 0065
OAKVILLE TOWN DS N 01 012	17 602049 4817318 W	1987-04 4005				DO		2806640 (10163) A	BRWN CLAY FGVL LOOS 0009 GREY CLAY FGVL LOOS 0017 RED CLAY SNDY FGVL 0019 BRWN SAND FGVL LOOS 0021 GREY SAND PCKD 0024 GREY CLAY CGVL LOOS 0030 RED SHLE HARD 0050
OAKVILLE TOWN DS N 01 013	17 601815 4816953 W	1968-04 1307	30	FR 0051	///:	DO		2802777 ()	BRWN LOAM 0012 GREY CLAY 0045 RED SHLE 0051
OAKVILLE TOWN DS N 01 013	17 602565 4816547 W	1953-10 4623	5 5	FR 0040	8//4/:	PS		2802112 ()	LOAM 0002 CLAY BLDR 0008 RED SHLE 0050
OAKVILLE TOWN DS N 01 013	17 602635 4816638 W	2024-06 7725						7486138 (Z429629) A391595 P	
OAKVILLE TOWN DS N 01 013	17 602247 4816669 W	2023-04 7472	2		///:	MO	0031 10	7449351 (NTHBMHHU) A375936	BRWN FILL LOOS 0005 GREY CLAY SILT PCKD 0025 GREY SHLE HARD 0041
OAKVILLE TOWN DS N 01 013	17 602324 4816658 W	2023-04 7472	2		///:	MO	0031 10	7449350 (R6LLZBMQ) A376050	BRWN FILL LOOS 0005 GREY CLAY SILT PCKD 0025 GREY SHLE HARD 0041
OAKVILLE TOWN DS N 01 013	17 602397 4816862 W	2023-04 7472	2		///:	MO	0010 10	7449355 (M2NSNJ4I) A376060	BRWN FILL LOOS 0005 GREY CLAY SILT PCKD 0020
OAKVILLE TOWN DS N 01 013	17 602405 4816802 W	2023-04 7472	2		///:	MO	0010 10	7449354 (OUN7QOK6) A375940	BRWN FILL LOOS 0005 GREY CLAY SILT PCKD 0020
OAKVILLE TOWN DS N 01 013	17 602321 4816772 W	2023-04 7472	2		///:	MO	0010 10	7449353 (MWFICUTR) A376049	BRWN FILL LOOS 0005 GREY CLAY SILT PCKD 0020
OAKVILLE TOWN DS N 01 013	17 602374 4816750 W	2023-04 7472	2		///:	MO	0031 10	7449352 (LKNJQBS6) A375964	BRWN FILL LOOS 0005 GREY CLAY SILT PCKD 0025 GREY SHLE HARD 0041
OAKVILLE TOWN DS N 01 013	17 602350 4816508 W	2024-06 7725						7486136 (Z429631) A391599 P	
OAKVILLE TOWN DS N 01 013	17 601779 4816945 W	2022-06 7472	2		///:	MO	0012 10	7424292 (6Q6GBWGL) A348376	BRWN CLAY PCKD 0012 GREY CLAY SILT PCKD 0022
OAKVILLE TOWN DS N 01 013	17 602345 4816622 W	2024-06 7725						7486135 (Z429630) A391599 P	
OAKVILLE TOWN DS N 01 014	17 601813 4816909 W	2022-06 7472	2		///:	MO	0015 10	7424293 (WQ3GBA4V) A353058	BRWN CLAY PCKD 0012 GREY CLAY SILT PCKD 0025

TOWNSHIP CON L	UTM	DATE CN	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
OAKVILLE TOWN DS N 01 014	17 601671 4816780 W	1985-09 4207	6 6		///:	NU		2806398 () A	BRWN CLAY 0018 RED SHLE 0090
OAKVILLE TOWN DS N 01 014	17 601692 4816820 W	1985-09 4207	6 6	SA 0045	20/65/1/:	NU		2806399 () A	BRWN CLAY 0018 RED SHLE 0065
OAKVILLE TOWN DS N 01 014	17 601844 4816850 W	2022-06 7472	2		///:	MO	0005 10	7424294 (WK8OO5NI) A353056	BRWN CLAY PCKD 0012 GREY CLAY SILT PCKD 0015
OAKVILLE TOWN DS N 02 010	17 602479 4817999 W	1963-11 1308	30	SA 0022 SA 0051	18/52/1/1:0	ST DO		2802197 ()	RED CLAY MSND BLDR 0019 RED SHLE 0053
OAKVILLE TOWN DS N 02 012	17 602134 4817519 W	1955-05 1642	6	FR 0025	5/24/1/:			2802203 () A	MSND CLAY 0025 RED SHLE 0080
OAKVILLE TOWN DS N 02 012	17 602144 4817529 W	1955-05 1642	6	SA 0090	8//1/:	NU		2802202 () A	MSND CLAY 0025 RED SHLE 0091
OAKVILLE TOWN DS N 02 012	17 602198 4817597 W	1955-05 1642	6 6	FR 0025	5/24/1/:	PS		2802204 ()	CLAY MSND 0025 RED SHLE 0080
OAKVILLE TOWN DS N 02 012	17 602094 4817438 W	1962-08 4602	6 6	MN 0026	6/56/1/2:0	PS		2802205 ()	MSND CLAY 0021 RED SHLE 0056
OAKVILLE TOWN DS N 02 012	17 602103 4817473 W	1971-04 3637	30	FR 0020 FR 0028	7/30//4:0	DO		2803735 ()	BRWN LOAM 0001 BRWN MSND CLAY 0007 BRWN CLAY 0020 RED SHLE 0030
OAKVILLE TOWN DS N 02 013	17 601842 4817140 W	1956-11 1642	6 6	FR 0062	6/60/1/0:15	ST DO		2802207 ()	PRDG 0012 BLUE CLAY 0049 RED SHLE 0066
OAKVILLE TOWN DS N 02 013	17 601915 4817223 W	1979-01 4005	6	FR 0062	8/43/1/1:0	DO		2805349 ()	BRWN CLAY SNDY LOOS 0008 BRWN SAND BLDR GRVL 0016 GREY CLAY LOOS 0022 BRWN CLAY BLDR SNDY 0030 BRWN CLAY SNDY LOOS 0036 RED SHLE HARD 0065
OAKVILLE TOWN DS N 02 013	17 601865 4817178 W	1967-02 1612	7 7	FR 0065	26/70/1/2:0	DO		2802209 ()	LOAM 0001 BRWN CLAY 0050 RED SHLE 0070
OAKVILLE TOWN DS N 02 014	17 601687 4816952 W	1985-07 4005	6	FR 0066	12/69/1/1:0	DO		2806310 ()	BRWN CLAY SNDY LOOS 0008 GREY CLAY LOOS 0025 GREY CLAY GRVL LOOS 0048 GREY SAND LOOS 0050 RED SHLE HARD 0070

Notes:
UTM: UTM in Zone, Easting, Northing and Datum is NAD83; L: UTM estimated from Centroid of Lot; W: UTM not from Lot Centroid
DATE CNTR: Date Work Completedand Well Contractor Licence Number
CASING DIA: .Casing diameter in inches
WATER: Unit of Depth in Fee. See Table 4 for Meaning of Code

PUMP TEST: Static Water Level in Feet / Water Level After Pumping in Feet / Pump Test Rate in GPM / Pump Test Duration in Hour : Minutes
WELL USE: See Table 3 for Meaning of Code
SCREEN: Screen Depth and Length in feet
WELL: WEL (AUDIT #) Well Tag . A: Abandonment; P: Partial Data Entry Only

1. Core Material and Descriptive te

Code	Description	Code	Description	Code	Description	Code	Description	Code	Description
BLDR	BOULDERS	FCRD	FRACTURED	IRFM	IRON FORMATION	PORS	POROUS	SOFT	SOFT
BSLT	BASALT	FGRD	FINE-GRAINED	LIMY	LIMY	PRDG	PREVIOUSLY DUG	SPST	SOAPSTONE
CGRD	COARSE-GRAINED	FGVL	FINE GRAVEL	LMSN	LIMESTONE	PRDR	PREV. DRILLED	STKY	STICKY
CGVL	COARSE GRAVEL	FILL	FILL	LOAM	TOPSOIL	QRTZ	QUARTZITE	STNS	STONES
CHRT	CHERT	FLDS	FELDSPAR	LOOS	LOOSE	QSND	QUICKSAND	STNY	STONEY
CLAY	CLAY	FLNT	FLINT	LTCL	LIGHT-COLOURED	QTZ	QUARTZ	THIK	THICK
CLN	CLEAN	FOSS	FOSILIFEROUS	LYRD	LAYERED	ROCK	ROCK	THIN	THIN
CLYY	CLAYEY	FSND	FINE SAND	MARL	MARL	SAND	SAND	TILL	TILL
CMTD	CEMENTED	GNIS	GNEISS	MGRD	MEDIUM-GRAINED	SHLE	SHALE	UNKN	UNKNOWN TYPE
CONG	CONGLOMERATE	GRNT	GRANITE	MGVL	MEDIUM GRAVEL	SHLY	SHALY	VERY	VERY
CRYS	CRYSTALLINE	GRSN	GREENSTONE	MRBL	MARBLE	SHRP	SHARP	WBRG	WATER-BEARING
CSND	COARSE SAND	GRVL	GRAVEL	MSND	MEDIUM SAND	SHST	SCHIST	WDFR	WOOD FRAGMENTS
DKCL	DARK-COLOURED	GRWK	GREYWACKE	MUCK	MUCK	SILT	SILT	WTHD	WEATHERED
DLMT	DOLOMITE	GVLY	GRAVELLY	OBDN	OVERBURDEN	SLTE	SLATE		
DNSE	DENSE	GYPS	GYPSUM	PCKD	PACKED	SLTY	SILTY		
DRTY	DIRTY	HARD	HARD	PEAT	PEAT	SNDS	SANDSTONE		
DRY	DRY	HPAN	HARDPAN	PGVL	PEA GRAVEL	SNDY	SANDYOAPSTONE		

2. Core Color

Code	Description
WHIT	WHITE
GREY	GREY
BLUE	BLUE
GREN	GREEN
YLLW	YELLOW
BRWN	BROWN
RED	RED
BLCK	BLACK
BLGY	BLUE-GREY

3. Well Use

Code	Description	Code	Description
DO	Domestic	OT	Other
ST	Livestock	TH	Test Hole
IR	Irrigation	DE	Dewatering
IN	Industrial	MO	Monitoring
CO	Commercial	MT	Monitoring TestHole
MN	Municipal		
PS	Public		
AC	Cooling And A/C		
NU	Not Used		

4. Water Detail

Code	Description	Code	Description
FR	Fresh	GS	Gas
SA	Salty	IR	Iron
SU	Sulphur		
MN	Mineral		
UK	Unknown		

APPENDIX F

BOREHOLE LOG TERMINOLOGY

GROUNDED
ENGINEERING

SAMPLING/TESTING METHODS

SS: split spoon sample

AS: auger sample

GS: grab sample

FV: shear vane

DP: direct push

PMT: pressuremeter test

ST: shelby tube

CORE: soil coring

RUN: rock coring

SYMBOLS & ABBREVIATIONS

MC: moisture content

LL: liquid limit

PL: plastic limit

PI: plasticity index

γ: soil unit weight (bulk)

G_s: specific gravity

S_u: undrained shear strength

▽ unstabilized water level

▼ 1st water level measurement

▼ 2nd water level measurement most recent

▼ water level measurement

ENVIRONMENTAL SAMPLES

M&I: metals and inorganic parameters

PAH: polycyclic aromatic hydrocarbon

PCB: polychlorinated biphenyl

VOC: volatile organic compound

PHC: petroleum hydrocarbon

BTEX: benzene, toluene, ethylbenzene and xylene

PPM: parts per million

FIELD MOISTURE (based on tactile inspection)

DRY: no observable pore water

MOIST: inferred pore water, not observable (i.e. grey, cool, etc.)

WET: visible pore water

COHESIONLESS

Relative Density	N-Value
Very Loose	<4
Loose	4 - 10
Compact	10 - 30
Dense	30 - 50
Very Dense	>50

COHESIVE

Consistency	N-Value	Su (kPa)
Very Soft	<2	<12
Soft	2 - 4	12 - 25
Firm	4 - 8	25 - 50
Stiff	8 - 15	50 - 100
Very Stiff	15 - 30	100 - 200
Hard	>30	>200

COMPOSITION

Term	% by weight
trace silt	<10
some silt	10 - 20
silt***y***	20 - 35
sand ***and*** silt	>35

ASTM STANDARDS

ASTM D1586 Standard Penetration Test (SPT)
Driving a 51 mm O.D. split-barrel sampler ("split spoon") into soil with a 63.5 kg weight free falling 760 mm. The blows required to drive the split spoon 300 mm ("bpf") after an initial penetration of 150 mm is referred to as the N-Value.

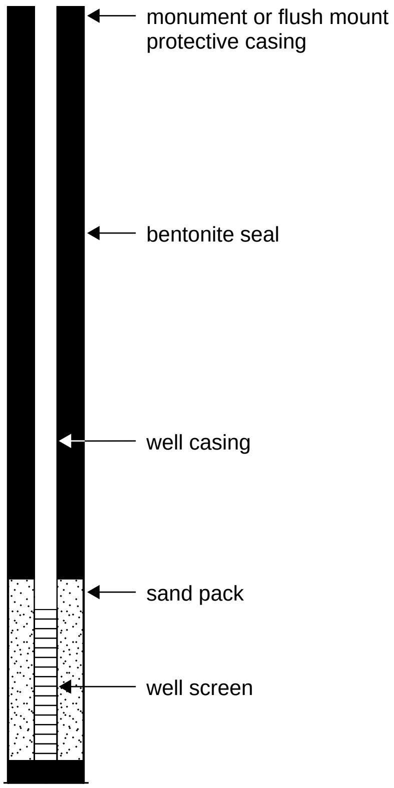
ASTM D3441 Cone Penetration Test (CPT)
Pushing an internal still rod with a outer hollow rod ("sleeve") tipped with a cone with an apex angle of 60° and a cross-sectional area of 1000 mm^2 into soil. The resistance is measured in the sleeve and at the tip to determine the skin friction and the tip resistance.

ASTM D2573 Field Vane Test (FVT)
Pushing a four blade vane into soil and rotating it from the surface to determine the torque required to shear a cylindrical surface with the vane. The torque is converted to the shear strength of the soil using a limit equilibrium analysis.

ASTM D1587 Shelby Tubes (ST)
Pushing a thin-walled metal tube into the in-situ soil at the bottom of a borehole, removing the tube and sealing the ends to prevent soil movement or changes in moisture content for the purposes of extracting a relatively undisturbed sample.

ASTM D4719 Pressuremeter Test (PMT)
Place an inflatable cylindrical probe into a pre-drilled hole and expanding it while measuring the change in volume and pressure in the probe. It is inflated under either equal pressure increments or equal volume increments. This provides the stress-strain response of the soil.

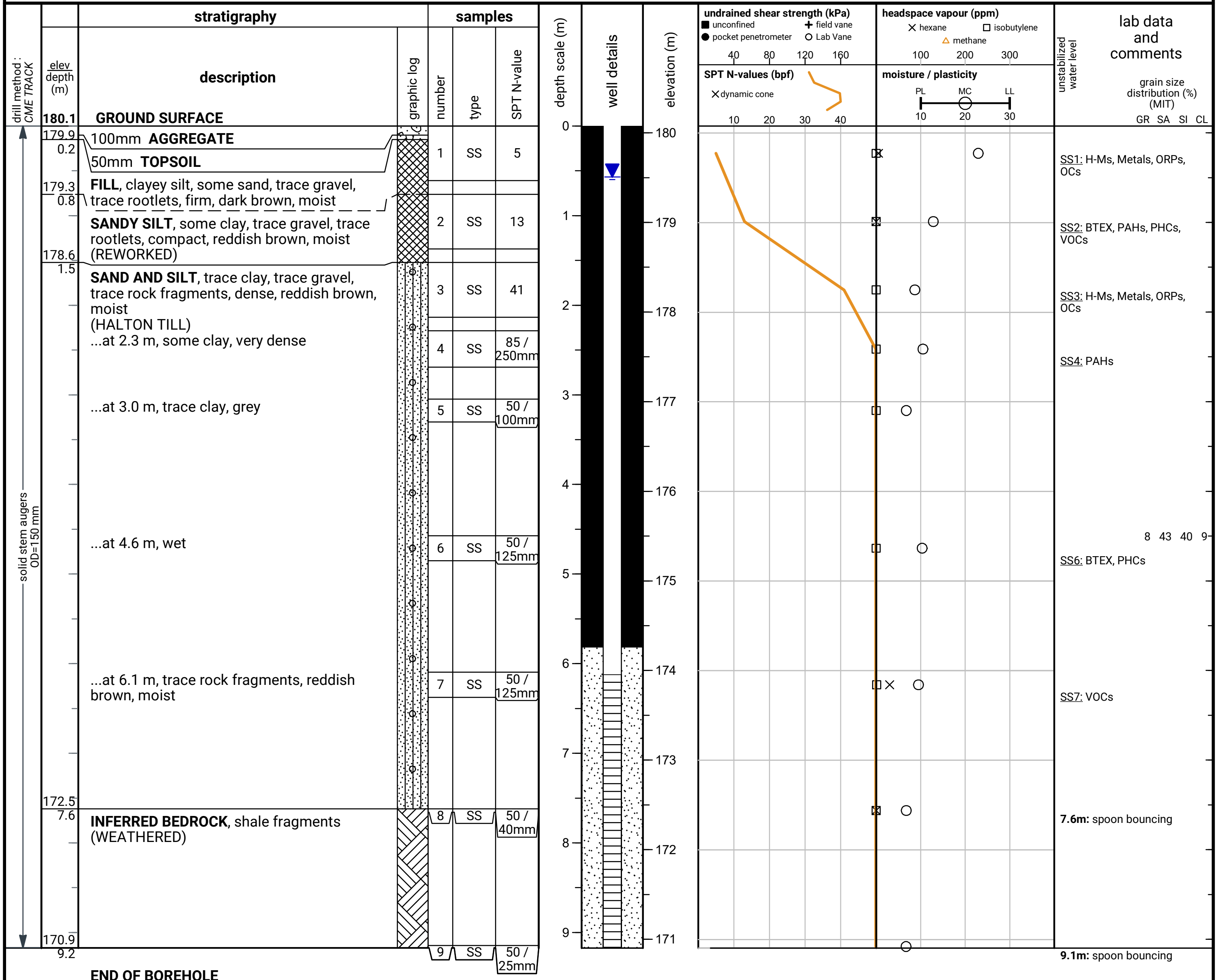
WELL LEGEND



BOREHOLE LOG 101

Date Started : Jun 2, 2025
Position : E: 602245, N: 4817567 (UTM 17T)
Elev. Datum : Geodetic

File No. : 25-069
Project : Trafalgar and Burnhamthorpe Subdivision, Oakville
Client : Westerkirk Trafalgar Inc.



elev depth (m)	description
180.1	GROUND SURFACE
179.9 0.2	100mm **AGGREGATE** 50mm **TOPSOIL**
179.3 0.8	**FILL**, clayey silt, some sand, trace gravel, trace rootlets, firm, dark brown, moist
	SANDY SILT, some clay, trace gravel, trace rootlets, compact, reddish brown, moist (REWORKED)
178.6 1.5	**SAND AND SILT**, trace clay, trace gravel, trace rock fragments, dense, reddish brown, moist (HALTON TILL) ...at 2.3 m, some clay, very dense ...at 3.0 m, trace clay, grey ...at 4.6 m, wet ...at 6.1 m, trace rock fragments, reddish brown, moist
172.5 7.6	**INFERRED BEDROCK**, shale fragments (WEATHERED)
170.9 9.2	**END OF BOREHOLE**

number	type	SPT N-value
1	SS	5
2	SS	13
3	SS	41
4	SS	85 / 250mm
5	SS	50 / 100mm
6	SS	50 / 125mm
7	SS	50 / 125mm
8	SS	50 / 40mm
9	SS	50 / 25mm

lab data and comments

grain size distribution (%) (MIT)

GR	SA	SI	CL
8	43	40	9

SS1: H-Ms, Metals, ORPs, OCs

SS2: BTEX, PAHs, PHCs, VOCs

SS3: H-Ms, Metals, ORPs, OCs

SS4: PAHs

SS6: BTEX, PHCs

SS7: VOCs

7.6m: spoon bouncing

9.1m: spoon bouncing

Water level and cave not measured upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen

GROUNDWATER LEVELS

date	depth (m)	elevation (m)
Jun 12, 2025	0.6	179.5
Jul 18, 2025	0.7	179.4
Aug 8, 2025	1.0	179.1
Sep 5, 2025	0.7	179.4
Oct 3, 2025	0.6	179.5

Date Started : Jun 2, 2025
Position : E: 602194, N: 4817474 (UTM 17T)
Elev. Datum : Geodetic

BOREHOLE LOG 102

File No. : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : *CME TRACK* — solid stem augers OD=150 mm

stratigraphy

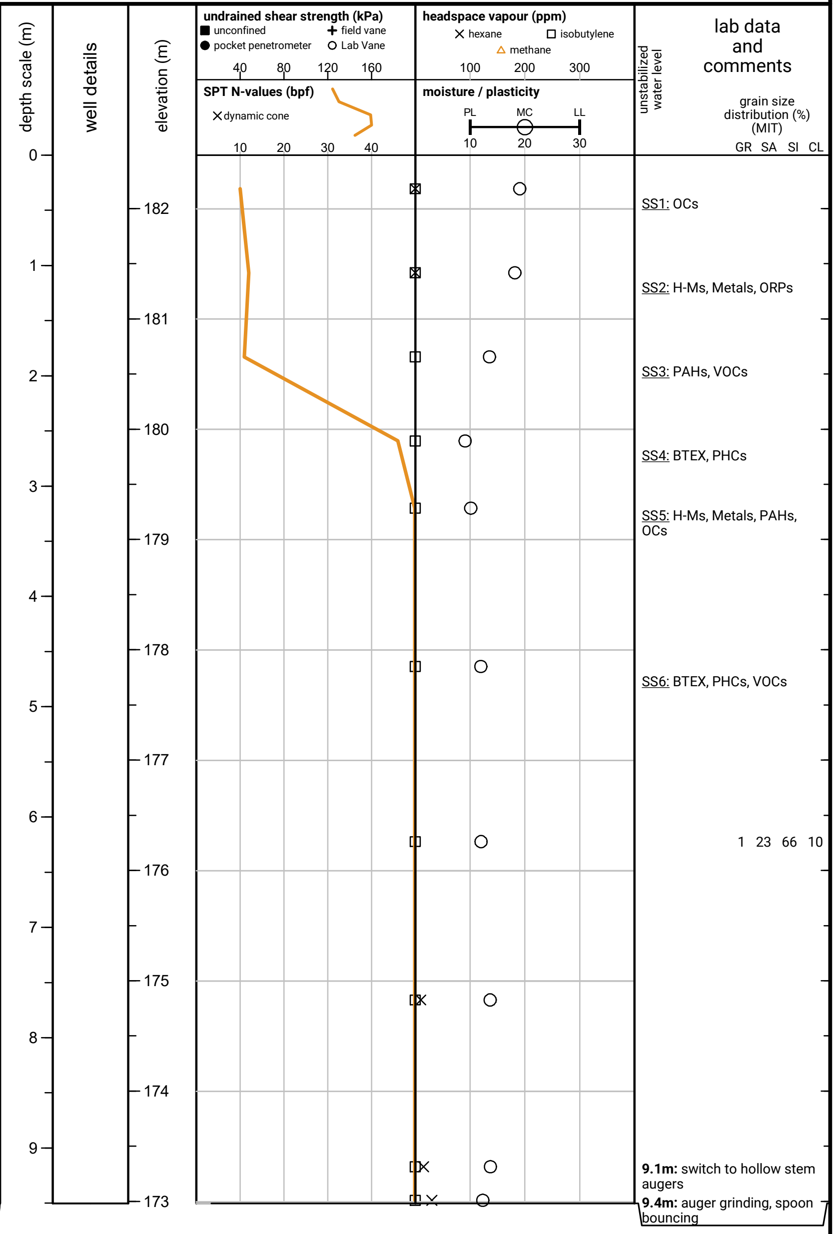
elev depth (m)	description
182.5	**GROUND SURFACE**
	50mm **TOPSOIL**
	FILL, sandy silt, some clay, trace gravel, trace rootlets, organic odour, compact, dark brown, moist ...at 0.8 m, clayey silt, sandy, stiff, reddish brown, moist ...at 1.5 m, silty sand, trace clay, trace gravel, trace shale fragments, compact ...at 2.3 m, sand and gravel, trace silt, dense, brown, wet
179.5 3.0	**SAND AND SILT**, trace clay, trace gravel, very dense, brown, moist (HALTON TILL)
177.9 4.6	**SANDY SILT**, some clay, trace gravel, very dense, grey, moist (HALTON TILL) ...at 9.1 m, some shale fragments, wet
173.1 173.0 9.5	**INFERRED BEDROCK**, shale fragments (WEATHERED)

END OF BOREHOLE

Water level and cave not measured upon completion of drilling.

samples

number	type	SPT N-value	lab data and comments
1	SS	10	SS1: OCs
2	SS	12	SS2: H-Ms, Metals, ORPs
3	SS	11	SS3: PAHs, VOCs
4	SS	46	SS4: BTEX, PHCs
5	SS	50 / 150mm	SS5: H-Ms, Metals, PAHs, OCs
6	SS	50 / 125mm	SS6: BTEX, PHCs, VOCs
7	SS	50 / 100mm	grain size distribution (%) (MIT): GR 1, SA 23, SI 66, CL 10
8	SS	50 / 75mm	
9	SS	50 / 50mm	**9.1m:** switch to hollow stem augers
10	SS	50 / 50mm	**9.4m:** auger grinding, spoon bouncing



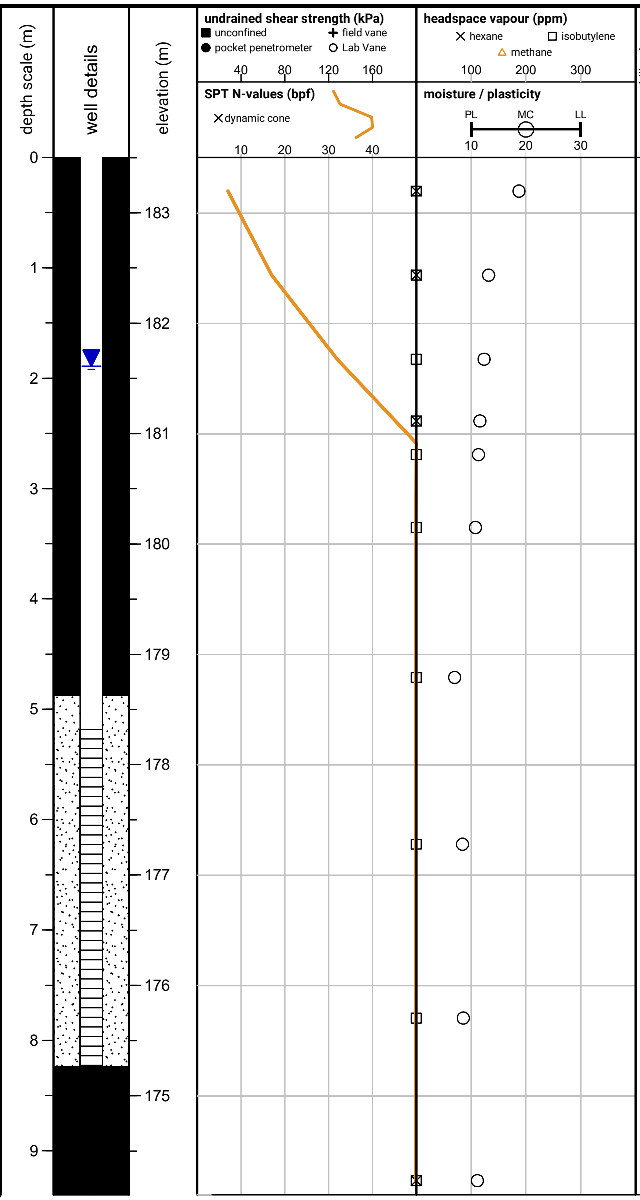
Date Started : Jun 9, 2025
Position : E: 602058, N: 4817345 (UTM 17T)
Elev. Datum : Geodetic

BOREHOLE LOG 103

File No. : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : CME TRACK — hollow stem augers OD=215 mm

elev depth (m)	description	sample number	type	SPT N-value
183.5	**GROUND SURFACE**			
183.3 0.2	225mm **TOPSOIL**			
	FILL, sandy silt, trace gravel, trace clay, trace rootlets, loose, dark brown, moist	1	SS	7
182.7 0.8	**SANDY SILT**, clayey, some shale fragments, trace gravel, trace rock fragments, compact, brown, moist (HALTON TILL)	2	SS	17
	...at 1.5 m, dense	3	SS	32
	...at 2.3 m, some gravel, very dense	4A	SS	50
	...at 2.5 m, some clay	4B		
		5	SS	52
	...at 4.6 m, sand, some silt, grey	6	SS	50 / 125mm
	...at 6.1 m, silty	7	SS	50 / 100mm
		8	SS	88 / 200mm
174.1 9.4		9	SS	50 / 100mm



unstabilized water level

lab data and comments — grain size distribution (%) (MIT): GR SA SI CL

SS1: H-Ms, Metals, ORPs, OCs

SS2: BTEX, PAHs, PHCs

SS3: VOCs

11 26 42 21

4B: H-Ms, Metals, ORPs

SS5: PAHs, OCs

SS7: BTEX, PHCs

▽

SS8: VOCs
7.9m: auger grinding

8.8m: auger grinding

END OF BOREHOLE

Unstabilized water level measured at 7.0 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen

GROUNDWATER LEVELS

date	depth (m)	elevation (m)
Jun 12, 2025	1.9	181.6
Jun 17, 2025	2.0	181.5
Jul 18, 2025	1.7	181.8
Aug 8, 2025	1.8	181.7
Sep 5, 2025	1.9	181.6
Oct 3, 2025	1.9	181.6

file: 25-069 gint.gpj

Date Started : Jun 3, 2025
Position : E: 602375, N: 4817364 (UTM 17T)
Elev. Datum : Geodetic

BOREHOLE LOG 104

File No. : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : CME TRACK

hollow stem augers OD=215 mm

stratigraphy

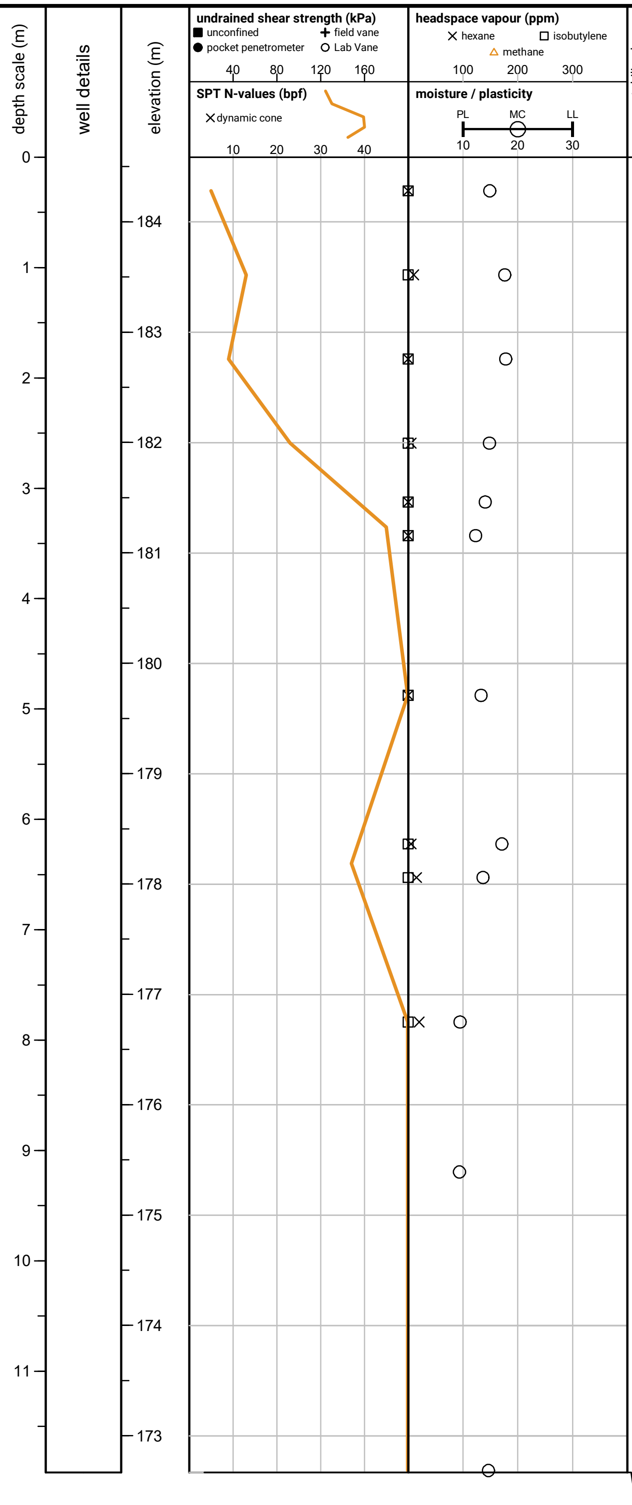
elev depth (m)	description
184.6	**GROUND SURFACE**
	50mm **TOPSOIL**
	FILL, sandy silt, trace clay, trace gravel, trace rootlets, organic odour, loose to compact, brown, moist ...at 0.8 m, trace rock fragments ...at 1.5 m, trace shale fragments
182.3 2.3	**SANDY SILT**, some clay, trace gravel, compact, brown, moist (HALTON TILL) ...at 3.0 m, dense ...at 3.2 m, very dense ...at 4.6 m, brown with orange ...at 6.3 m, clayey silt, trace sand, hard, grey
177.0 7.6	**SILTY SAND**, trace gravel, trace clay, trace rock fragments, very dense, grey, moist (HALTON TILL)
172.7 11.9	...at 11.9 m, clayey, some shale fragments, wet

END OF BOREHOLE

Unstabilized water level measured at 5.5 m below ground surface; caved to 8.5 m below ground surface upon completion of drilling.

samples

number	type	SPT N-value	lab data and comments
1	SS	5	SS1: OCs
2	SS	13	SS2: BTEX, PHCs, VOCs
3	SS	9	SS3: H-Ms, Metals, ORPs, PAHs
4	SS	23	
5A 5B	SS	45	
6	SS	51	
7A 7B	SS	37	grain size distribution (%) (MIT): GR 2, SA 6, SI 72, CL 20
8	SS	78 / 275mm	
9	SS	50 / 100mm	
10	SS	50 / 50mm	**10.7m:** no recovery, auger grinding
11	SS	50 / 25mm	**11.9m:** spoon bouncing, auger refusal



Date Started : Jun 4, 2025
Position : E: 602272, N: 4817338 (UTM 17T)
Elev. Datum : Geodetic

BOREHOLE LOG 105

File No. : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

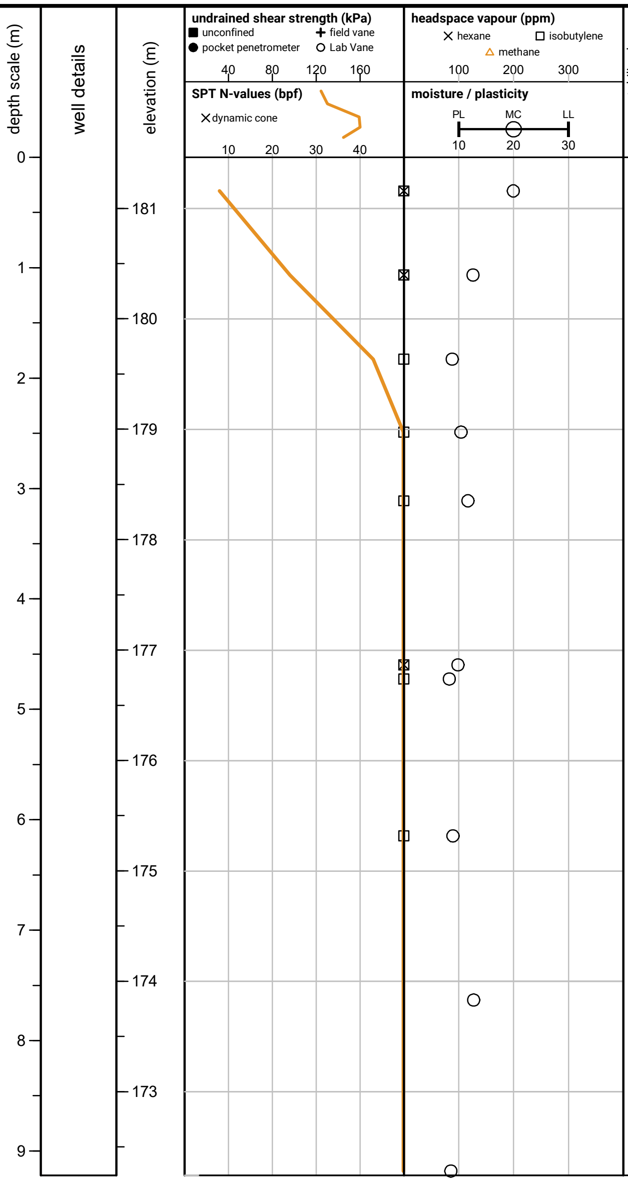
drill method : *CME TRACK*

elev depth (m)	stratigraphy description	samples number	type	SPT N-value
181.5	**GROUND SURFACE**			
	FILL, sandy silt, some clay, trace gravel, trace rootlets, organic odour, loose, brown, moist	1	SS	8
180.7 0.8	**SANDY SILT**, some clay, trace gravel, trace rock fragments, compact, brown, moist (REWORKED)	2	SS	24
180.0 1.5	**SAND AND SILT**, trace clay, trace gravel, trace rock fragments, very dense, brown, moist	3	SS	43
		4	SS	97 / 250mm
	...at 3.0 m, wet	5	SS	50 / 125mm
	...at 4.6 m, sandy silt, clayey, grey ...at 4.6 m, some clay, trace shale fragments, reddish brown	6A 6B	SS	50 / 100mm
		7	SS	50 / 100mm
173.9 7.6	**CLAYEY SILT**, some sand, trace gravel, trace shale fragments, hard (HALTON TILL)	8	SS	50 / 25mm
172.3 9.2	...at 9.1 m, some shale fragments	9	SS	50 / 75mm

solid stem augers OD=150 mm

END OF BOREHOLE

Unstabilized water level measured at 6.4 m below ground surface; caved to 7.0 m below ground surface upon completion of drilling.



unstabilized water level	lab data and comments grain size distribution (%) (MIT) GR SA SI CL
	<u>SS2:</u> OCs
	<u>SS3:</u> H-Ms, Metals, ORPs
▽	

file: 25-069 gint.gpj

Tech : KS/EB | **PM** : KrS | **Rev** : KB

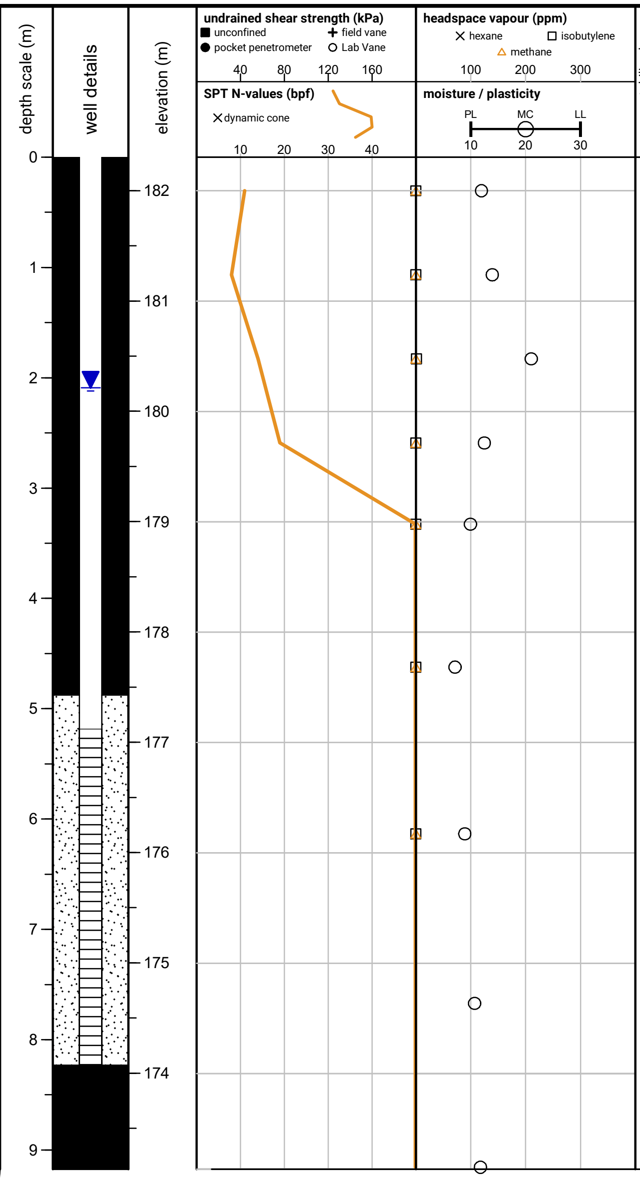
Date Started : Jun 4, 2025
Position : E: 602172, N: 4817202 (UTM 17T)
Elev. Datum : Geodetic

BOREHOLE LOG 106

File No. : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : *CME TRACK* — hollow stem augers OD=215 mm

elev depth (m)	description (stratigraphy)	sample number	type	SPT N-value
182.3	**GROUND SURFACE**			
	100mm **TOPSOIL**			
	FILL, sandy silt, trace gravel, trace rootlets, organic odour, compact to loose, dark brown, moist	1	SS	11
	...at 0.8 m, silty sand	2	SS	8
	...at 1.5 m, sandy silt, some clay, dark grey	3	SS	14
180.0 2.3	**SANDY SILT**, some clay, some gravel, trace rock fragments, trace rootlets, compact, brown, moist (HALTON TILL)	4	SS	19
	...at 3.0 m, very dense	5	SS	57
177.7 4.6	**SAND**, some silt, very dense, grey, moist	6	SS	50 / 100mm
	...at 6.1 m, silty, some clay, trace shale fragments	7	SS	50 / 75mm
174.7 7.6	**INFERRED BEDROCK**, shale fragments, wet (WEATHERED)	8	SS	50 / 100mm
173.1 9.2		9	SS	50 / 25mm



lab data and comments

grain size distribution (%) (MIT)

	GR	SA	SI	CL
SS1: OCs				
SS2: H-Ms, Metals, ORPs				
SS3: BTEX, PAHs, PHCs, VOCs				
	13	26	41	20
4.9m: auger grinding				
▽ **6.1m:** spoon bouncing				

END OF BOREHOLE

Unstabilized water level measured at 6.1 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen

GROUNDWATER LEVELS

date	depth (m)	elevation (m)
Jun 12, 2025	1.1	181.2
Jul 9, 2025	1.2	181.1
Jul 18, 2025	1.4	180.9
Aug 8, 2025	1.8	180.5
Sep 5, 2025	1.9	180.4
Oct 3, 2025	2.1	180.2

file: 25-069 gint.gpj

Tech : KS/EB | **PM** : KrS | **Rev** : KB

Date Started : Jun 3, 2025
Position : E: 602468, N: 4817301 (UTM 17T)
Elev. Datum : Geodetic

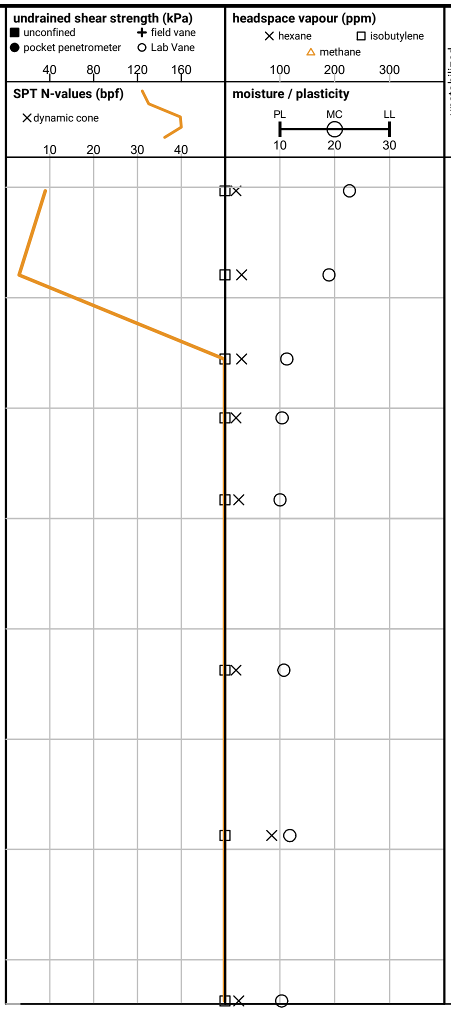
BOREHOLE LOG 107

File No. : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : *CME TRACK*
solid stem augers OD=150 mm

elev depth (m)	description
180.3	**GROUND SURFACE**
	25mm **TOPSOIL**
	FILL, clayey silt, some sand, trace gravel, trace rootlets, firm, dark brown, moist ...at 0.8 m, sandy, soft, wet
178.8 1.5	**SAND AND SILT**, trace gravel, trace clay, very dense, brown, moist (HALTON TILL)
175.7 4.6	**SANDY SILT**, some clay, some gravel, trace shale fragments, very dense, reddish brown, moist (HALTON TILL) ...at 6.1 m, some shale fragments, wet
172.6 7.7	**END OF BOREHOLE** Water level and cave not measured upon completion of drilling.

number	type	SPT N-value
1	SS	9
2	SS	3
3	SS	58
4	SS	50 / 150mm
5	SS	50 / 115mm
6	SS	50 / 150mm
7	SS	50 / 100mm
8	SS	50 / 50mm



lab data and comments

grain size distribution (%) (MIT)
GR SA SI CL

SS2: OCs

SS3: H-Ms, Metals, ORPs

5.5m: auger grinding **to 6.1m**

7.0m: auger grinding **to 7.6m**

Date Started : Jun 6, 2025
Position : E: 602381, N: 4817231 (UTM 17T)
Elev. Datum : Geodetic

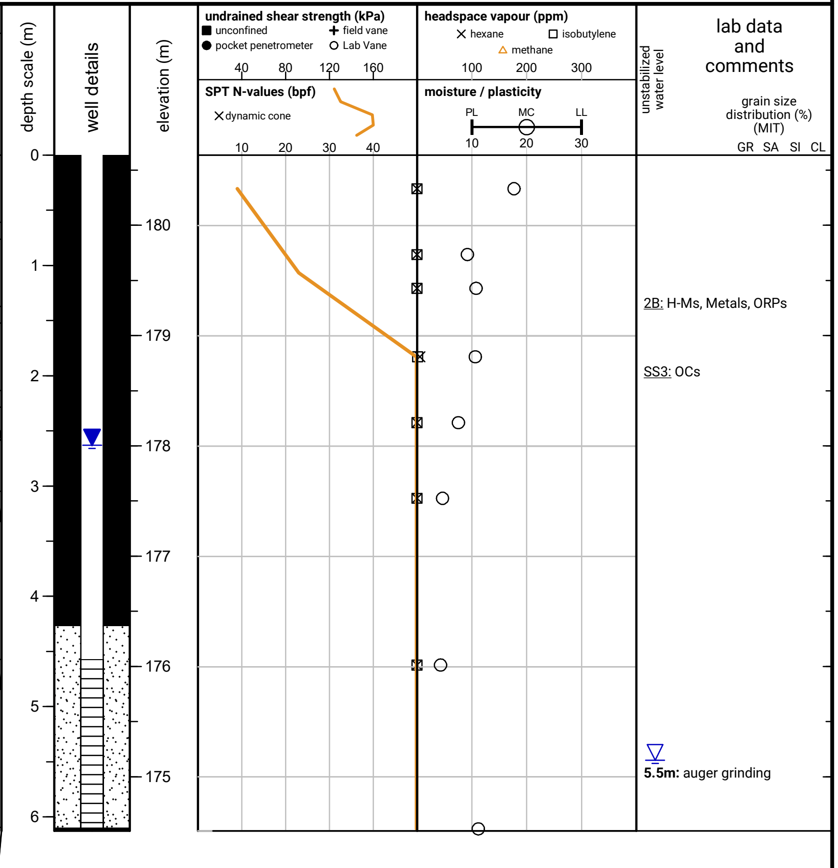
BOREHOLE LOG 108

File No. : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : *CME TRACK*

hollow stem augers OD=215 mm

elev depth (m)	description	number	type	SPT N-value
180.6	**GROUND SURFACE**			
180.3 0.3	275mm **TOPSOIL**			
	SANDY SILT, some clay, trace gravel, trace rootlets, loose, greyish brown, moist (REWORKED)	1	SS	9
	...at 0.8 m, trace rock fragments, compact	2A	SS	23
179.6 1.0	**SAND AND SILT**, trace gravel, trace clay, trace rock fragments, compact, brown, moist (HALTON TILL)	2B		
	...at 1.5 m, very dense	3	SS	53
		4	SS	50 / 125mm
	...at 3.0 m, grey	5	SS	50 / 125mm
176.0 4.6	**INFERRED BEDROCK**, shale fragments (WEATHERED)	6	SS	50 / 100mm
174.5 6.1	...at 6.1 m, wet	7	SS	50 / 25mm



END OF BOREHOLE

Unstabilized water level measured at 5.5 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen

GROUNDWATER LEVELS

date	depth (m)	elevation (m)
Jun 12, 2025	0.6	180.0
Jul 18, 2025	1.4	179.2
Aug 8, 2025	2.0	178.6
Sep 5, 2025	2.5	178.1
Oct 3, 2025	2.6	178.0

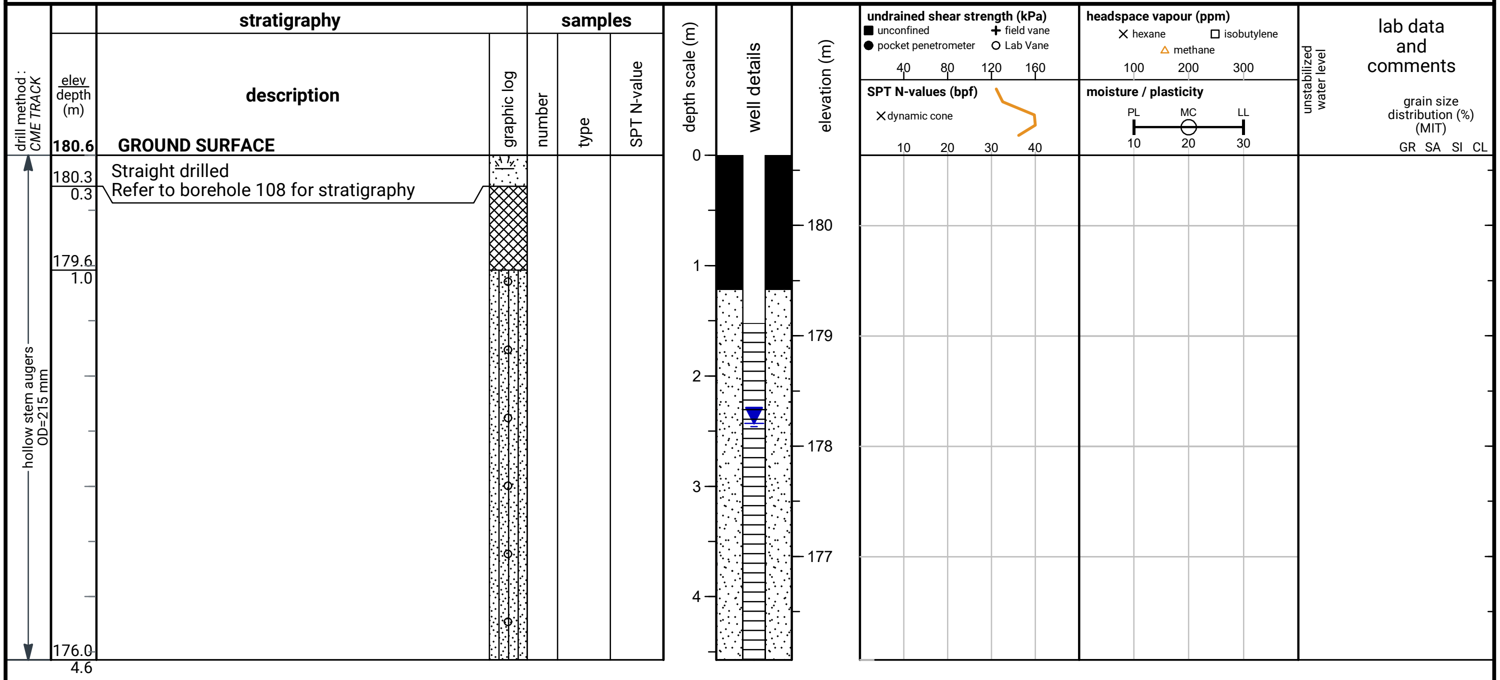
file: 25-069 gint.gpj

Tech : KS/EB | **PM** : KrS | **Rev** : KB

Date Started : Jun 27, 2025
Position : E: 602381, N: 4817231 (UTM 17T)
Elev. Datum : Geodetic

BOREHOLE LOG 108S

File No. : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.



180.6 **GROUND SURFACE**

180.3
0.3 Straight drilled
Refer to borehole 108 for stratigraphy

179.6
1.0

176.0
4.6

END OF BOREHOLE

Dry and open upon completion of drilling.

GROUNDWATER LEVELS

date	depth (m)	elevation (m)
Jul 9, 2025	1.3	179.3
Jul 18, 2025	1.4	179.2
Aug 8, 2025	2.0	178.6
Sep 5, 2025	2.5	178.1
Oct 3, 2025	2.4	178.2

file: 25-069 gint.gpj

Tech : KS/EB | **PM** : KrS | **Rev** : KB

GROUNDED ENGINEERING

Date Started : Jun 9, 2025
Position : E: 602268, N: 4817089 (UTM 17T)
Elev. Datum : Geodetic

BOREHOLE LOG 109

File No. : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : *CME TRACK*
solid stem augers OD=150 mm

stratigraphy

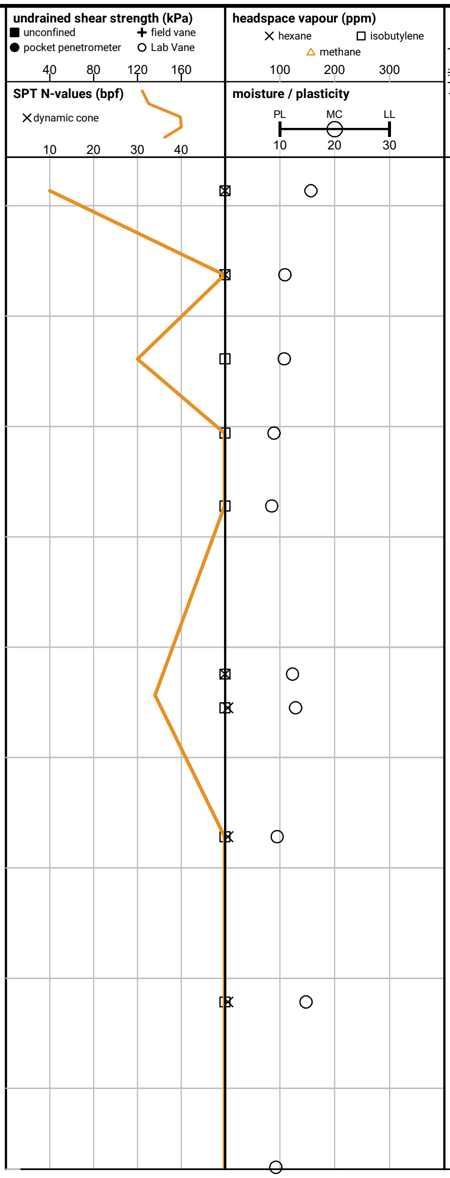
elev depth (m)	description	graphic log
182.4	**GROUND SURFACE**	
	25mm **TOPSOIL**	
	FILL, sandy silt, some clay, trace gravel, trace rootlets, compact, brown, moist	▩
181.6 0.8	**SANDY SILT**, some clay, trace gravel, trace rock fragments, cobbles (inferred), dense, brown, moist (REWORKED)	▩
180.1 2.3	**SANDY SILT**, trace clay, trace gravel, trace rock fragments, cobbles (inferred), dense, brown, moist (HALTON TILL) ...at 3.0 m, some clay, very dense	
177.8 4.6	**SAND**, some silt, trace gravel, dense, grey, wet ...at 4.8 m, some gravel, cobbles (inferred) ...at 6.1 m, sand and silt, some shale fragments, some clay, trace gravel, very dense	
174.8 7.6	**INFERRED BEDROCK**, shale fragments, wet (WEATHERED)	▨
173.2 9.2	...at 9.1 m, moist	

END OF BOREHOLE

Unstabilized water level measured at 2.1 m below ground surface; caved to 4.3 m below ground surface upon completion of drilling.

samples

number	type	SPT N-value
1	SS	10
2	SS	60
3	SS	30
4	SS	89 / 275mm
5	SS	50 / 75mm
6A 6B	SS	34
7	SS	50 / 125mm
8	SS	50 / 75mm
9	SS	50 / 25mm



lab data and comments

grain size distribution (%) (MIT)

	GR	SA	SI	CL
SS7	2	44	36	18

<u>SS2:</u> OCs

<u>SS4:</u> H-Ms, Metals, ORPs

3.4m: auger grinding

file: 25-069 gint.gpj

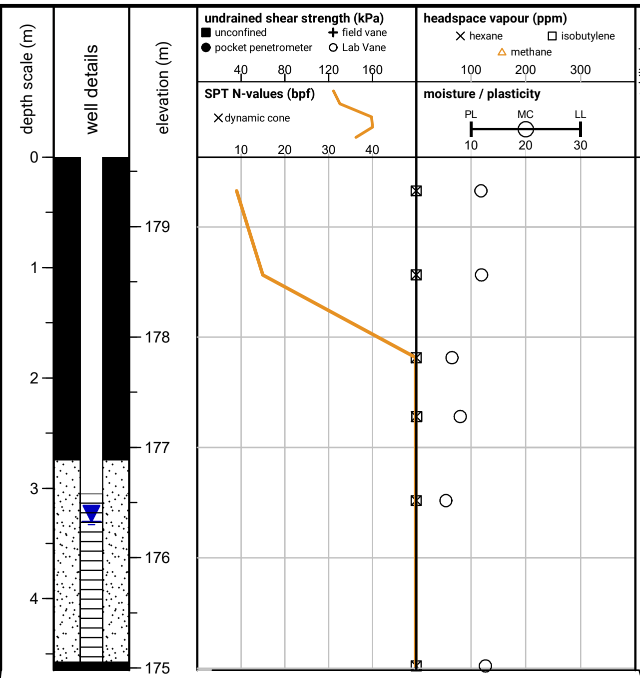
Date Started : Jun 5, 2025
Position : E: 602602, N: 4817203 (UTM 17T)
Elev. Datum : Geodetic

BOREHOLE LOG 110

File No. : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : *CME TRACK*
hollow stem augers OD=215 mm

elev depth (m)	stratigraphy description	samples number	type	SPT N-value	lab data and comments
179.6	**GROUND SURFACE**				
179.4 0.2	200mm **TOPSOIL**				
	SANDY SILT, some clay, trace gravel, trace rootlets, loose to compact, brown, moist (REWORKED)	1	SS	9	SS1: OCs
		2	SS	15	SS2: H-Ms, Metals, ORPs
178.1 1.5	**SILT AND SAND**, trace gravel, trace clay, very dense, brown with orange, moist (HALTON TILL)	3	SS	64	
	...at 2.3 m, trace rock fragments, cobbles (inferred)	4	SS	50 / 125mm	
176.6 3.0	**INFERRED BEDROCK**, shale fragments (WEATHERED)	5	SS	50 / 125mm	**3.7m:** auger grinding
175.0 4.6	...at 4.6 m, wet	6	SS	50 / 75mm	**4.6m:** spoon bouncing



END OF BOREHOLE

Unstabilized water level measured at 2.4 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen

GROUNDWATER LEVELS

date	depth (m)	elevation (m)
Jun 12, 2025	0.9	178.7
Jul 18, 2025	1.9	177.7
Aug 8, 2025	2.6	177.0
Sep 5, 2025	3.1	176.5
Oct 3, 2025	3.3	176.3

file: 25-069 gint.gpj

Tech : KS/EB | **PM** : KrS | **Rev** : KB

GROUNDED ENGINEERING

Date Started : Jun 5, 2025
Position : E: 602508, N: 4817128 (UTM 17T)
Elev. Datum : Geodetic

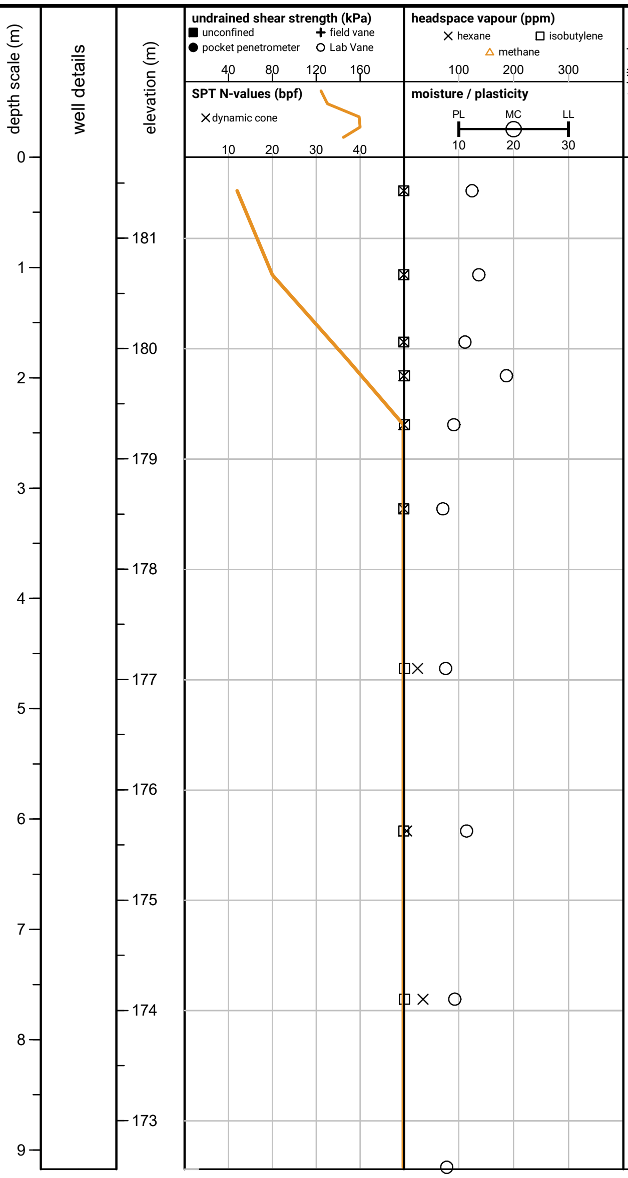
BOREHOLE LOG 111

File No. : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.

drill method : *CME TRACK*

solid stem augers OD=150 mm

elev depth (m)	description	number	type	SPT N-value	unstabilized water level	GR	SA	SI	CL	lab data and comments
181.7	**GROUND SURFACE**									
181.4 0.3	300mm **TOPSOIL**	1	SS	12						
180.9 0.8	**SANDY SILT**, some clay, trace gravel, trace rootlets, compact, brown, moist (REWORKED)									
	SILT, some sand, trace clay, trace gravel, compact, greyish brown, moist	2	SS	20						SS2: OCs
	...at 1.5 m, trace rock fragments, dense	3A	SS	37						
	...at 1.8 m, sandy silt, brown, grey	3B								
	...at 2.3 m, sand and silt, very dense, moist	4	SS	50 / 125mm	∇	5	50	39	6	SS4: H-Ms, Metals, ORPs
	...at 3.0 m, grey	5	SS	50 / 125mm						
		6	SS	50 / 125mm						
										5.8m: auger grinding
	...at 6.1 m, clayey with shale fragments, reddish brown, wet	7	SS	50 / 25mm						
174.1 7.6	**INFERRED BEDROCK**, shale fragments (WEATHERED)	8	SS	50 / 25mm						
172.5 9.2		9	SS	50 / 25mm						



END OF BOREHOLE

Unstabilized water level measured at 2.4 m below ground surface; caved to 4.9 m below ground surface upon completion of drilling.

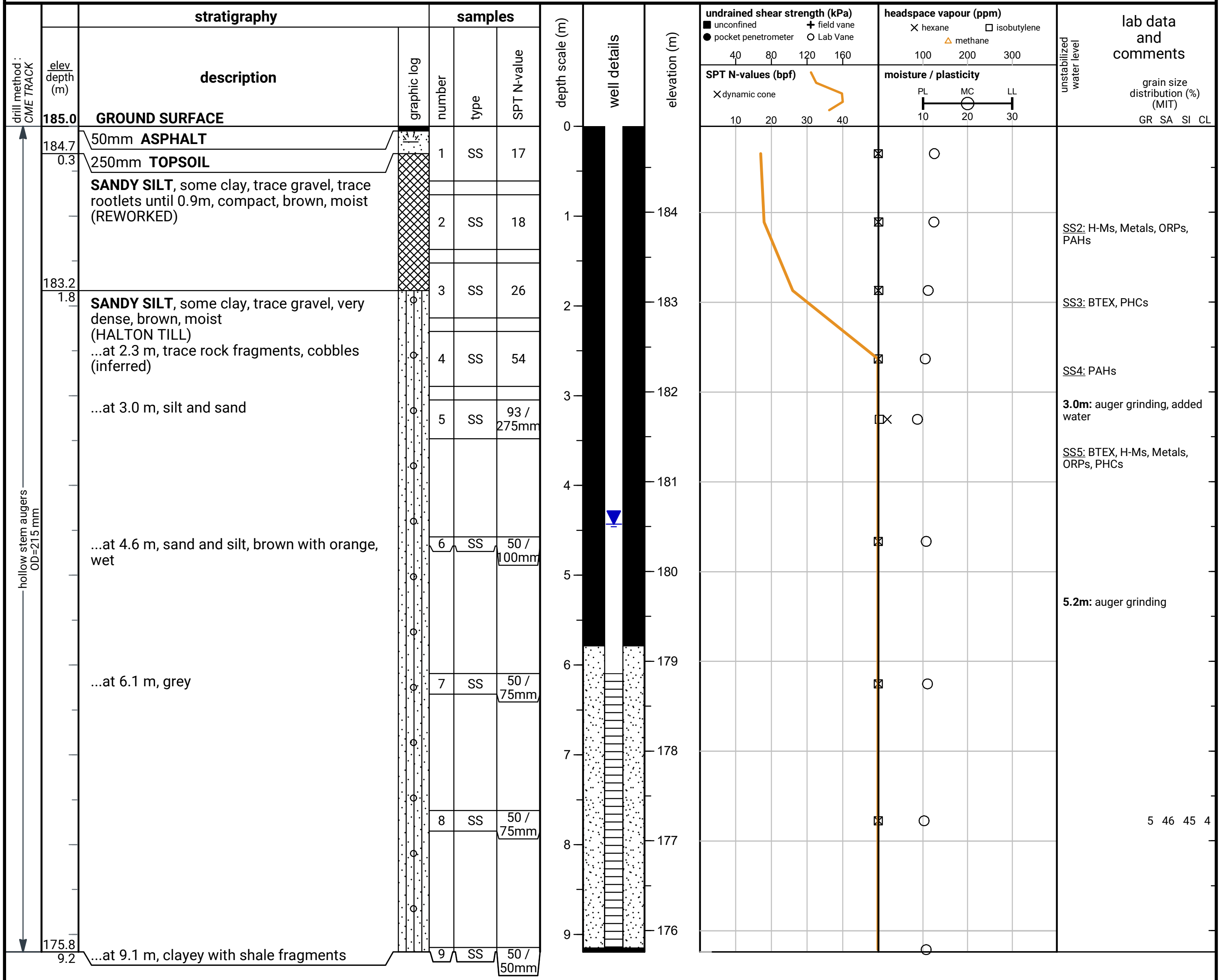
file: 25-069 gint.gpj

Tech : KS/EB | **PM** : KrS | **Rev** : KB

Date Started : Jun 6, 2025
Position : E: 602362, N: 4817017 (UTM 17T)
Elev. Datum : Geodetic

BOREHOLE LOG 112

File No. : 25-069 **Project** : Trafalgar and Burnhamthorpe Subdivision, Oakville **Client** : Westerkirk Trafalgar Inc.



elev depth (m)	description
185.0	GROUND SURFACE
	50mm **ASPHALT**
184.7 0.3	250mm **TOPSOIL**
	SANDY SILT, some clay, trace gravel, trace rootlets until 0.9m, compact, brown, moist (REWORKED)
183.2 1.8	**SANDY SILT**, some clay, trace gravel, very dense, brown, moist (HALTON TILL) ...at 2.3 m, trace rock fragments, cobbles (inferred) ...at 3.0 m, silt and sand ...at 4.6 m, sand and silt, brown with orange, wet ...at 6.1 m, grey
175.8 9.2	...at 9.1 m, clayey with shale fragments

number	type	SPT N-value
1	SS	17
2	SS	18
3	SS	26
4	SS	54
5	SS	93 / 275mm
6	SS	50 / 100mm
7	SS	50 / 75mm
8	SS	50 / 75mm
9	SS	50 / 50mm

lab data and comments

grain size distribution (%) (MIT)

GR	SA	SI	CL
5	46	45	4

SS2: H-Ms, Metals, ORPs, PAHs

SS3: BTEX, PHCs

SS4: PAHs

3.0m: auger grinding, added water

SS5: BTEX, H-Ms, Metals, ORPs, PHCs

5.2m: auger grinding

END OF BOREHOLE

Water level and cave not measured upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen

GROUNDWATER LEVELS

date	depth (m)	elevation (m)
Jun 12, 2025	2.5	182.5
Jun 17, 2025	3.3	181.7
Jul 18, 2025	3.2	181.8
Aug 8, 2025	3.6	181.4
Sep 5, 2025	4.1	180.9
Oct 3, 2025	4.4	180.6

file: 25-069 gint.gpj

Tech : KS/EB | **PM** : KrS | **Rev** : KB

APPENDIX G

FINAL REPORT

CA40176-JUN25 R1

25-069-150, Burnhamthorpe Rd & Trafalgar

Prepared for

Grounded Engineering Inc.

FINAL REPORT

First Page

CLIENT DETAILS		LABORATORY DETAILS	
Client	Grounded Engineering Inc.	Project Specialist	Maarit Wolfe, Hon.B.Sc
		Laboratory	SGS Canada Inc.
Address	49 Mobile Drive Toronto, Ontario M4A 1H5, Canada	Address	185 Concession St., Lakefield ON, K0L 2H0
Contact	Sam Bastan	Telephone	705-652-2000
Telephone		Facsimile	705-652-6365
Facsimile		Email	Maarit.Wolfe@sgs.com
Email	sbastan@groundedeng.ca	SGS Reference	CA40176-JUN25
Project	25-069-150, Burnhamthorpe Rd & Trafalgar	Received	06/17/2025
Order Number		Approved	06/19/2025
Samples	Ground Water (1)	Report Number	CA40176-JUN25 R1
		Date Reported	07/22/2025

COMMENTS

RL - SGS Reporting Limit

Temperature of Sample upon Receipt: 8 degrees C
Cooling Agent Present: yes
Custody Seal Present: yes

Chain of Custody Number: 042898

Tag 9 - Dibenzo(a,i)pyrene RL increased due to a drop in instrument sensitivity. PAH total remains unchanged

SIGNATORIES

Maarit Wolfe, Hon.B.Sc

TABLE OF CONTENTS

FINAL REPORT

Client: Grounded Engineering Inc.
Project: 25-069-150, Burnhamthorpe Rd & Trafalgar
Project Manager: Sam Bastan
Samplers: LB

MATRIX: WATER

L1 = SANSEW / WATER / - - Halton Sewer Use ByLaw - Sanitary and Combined Sewer Discharge - BL_2_03

L2 = SANSEW / WATER / - - Oakville Sewer Use By Law - Storm Sewer Discharge - BL_2009_031

Sample Number 9
Sample Name SW-UF-BH106
Sample Matrix Ground Water
Sample Date 17/06/2025

Parameter	Units	RL	L1	L2	Result
General Chemistry					
Carbonaceous Biochemical Oxygen Demand	mg/L	2			< 4↑
Biochemical Oxygen Demand (BOD5)	mg/L	2	300	15	< 4↑
Total Suspended Solids	mg/L	2	350	15	4
Total Kjeldahl Nitrogen	as N mg/L	0.5	100		1.8
Metals and Inorganics					
Cyanide (total)	mg/L	0.01	2	0.02	< 0.01
Fluoride	mg/L	0.06	10		0.32
Sulphate	mg/L	1	1500		440
Aluminum (total)	mg/L	0.001	50		0.030
Antimony (total)	mg/L	0.0009	5		< 0.0009
Arsenic (total)	mg/L	0.0002	1	0.02	0.0033
Beryllium (total)	mg/L	0.000007	5		< 0.000007
Cadmium (total)	mg/L	0.000003	1	0.008	0.000023
Chromium (total)	mg/L	0.00008	3	0.08	0.00024
Cobalt (total)	mg/L	0.000004	5		0.000738
Copper (total)	mg/L	0.001	3	0.04	0.002
Iron (total)	mg/L	0.007	50		0.351
Lead (total)	mg/L	0.00009	3	0.12	< 0.00009
Manganese (total)	mg/L	0.00001	5	0.05	**0.146**
Molybdenum (total)	mg/L	0.0004	5		0.0095

MATRIX: WATER

Sample Number 9
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Sample Date 17/06/2025

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L2 = SANSEW / WATER / - - Oakville Sewer Use By Law - Storm Sewer Discharge - BL_2009_031

Parameter	Units	RL	L1	L2	Result
Metals and Inorganics (continued)					
Nickel (total)	mg/L	0.0001	3	0.08	0.0009
Phosphorus (total)	mg/L	0.003	10	0.4	0.005
Selenium (total)	mg/L	0.00004	5	0.02	0.00013
Silver (total)	mg/L	0.00005	5	0.12	< 0.00005
Tin (total)	mg/L	0.00006	5		0.00324
Titanium (total)	mg/L	0.0001	5		0.0007
Zinc (total)	mg/L	0.002	3	0.04	0.003
Microbiology					
Ecoli	mpn/100mL	0		200	0
Nonylphenol and Ethoxylates					
Nonylphenol	mg/L	0.001		0.001	< 0.001
Nonylphenol Ethoxylates	mg/L	0.01		0.01	< 0.01
Oil and Grease					
Oil & Grease (total)	mg/L	2			< 2
Oil & Grease (animal/vegetable)	mg/L	4	150		< 4
Oil & Grease (mineral/synthetic)	mg/L	4	15		< 4

MATRIX: WATER

L1 = SANSEW / WATER / - - Halton Sewer Use ByLaw - Sanitary and Combined Sewer Discharge - BL_2_03

L2 = SANSEW / WATER / - - Oakville Sewer Use By Law - Storm Sewer Discharge - BL_2009_031

Sample Number 9
Sample Name SW-UF-BH106
Sample Matrix Ground Water
Sample Date 17/06/2025

Parameter	Units	RL	L1	L2	Result
Organochlorine Pests (OCs)					
Hexachlorobenzene	mg/L	0.00001		0.00004	< 0.00001
Other (ORP)					
pH	No unit	0.05	10	8.5	7.70
Chromium VI	mg/L	0.0002		0.04	< 0.0002
Mercury (total)	mg/L	0.00001	0.05	0.0004	< 0.00001
PAHs					
Benzo(b+j)fluoranthene	mg/L	0.0001			< 0.0001
PCBs					
Polychlorinated Biphenyls (PCBs) - Total	mg/L	0.0001		0.0004	< 0.0001
Pesticides					
Aldrin + Dieldrin	mg/L	0.00002		0.00008	< 0.00002
Chlordane (total)	mg/L	0.00002		0.04	< 0.001↑
DDT+Metabolites	mg/L	0.00004			< 0.00004
op-DDT	mg/L	0.00002			< 0.00002
pp-DDD	mg/L	0.00002			< 0.00002
pp-DDE	mg/L	0.00001			< 0.00001
pp-DDT	mg/L	0.00002			< 0.00002
o,p-DDD	mg/L	0.00002			< 0.00002
o,p-DDE	mg/L	0.00001			< 0.00001
Mirex	mg/L	0.001		0.04	< 0.001
Hexachlorocyclohexane	mg/L	0.001		0.04	< 0.001

MATRIX: WATER

Sample Number 9
Sample Name SW-UF-BH106
Sample Matrix Ground Water
Sample Date 17/06/2025

L1 = SANSEW / WATER / - - Halton Sewer Use ByLaw - Sanitary and Combined Sewer Discharge - BL_2_03

L2 = SANSEW / WATER / - - Oakville Sewer Use By Law - Storm Sewer Discharge - BL_2009_031

Parameter	Units	RL	L1	L2	Result
Phenols					
4AAP-Phenolics	mg/L	0.001	1	0.008	< 0.001
SVOCs					
PAHs (Total)	mg/L			0.002	< 0.001
Perylene	mg/L	0.0005			< 0.0005
di-n-Butyl Phthalate	mg/L	0.002		0.015	< 0.002
Bis(2-ethylhexyl)phthalate	mg/L	0.002		0.0088	< 0.002
3,3-Dichlorobenzidine	mg/L	0.0005		0.0008	< 0.0005
Pentachlorophenol	mg/L	0.0005		0.002	< 0.0005
SVOCs - PAHs					
Naphthalene	mg/L	0.0005	0.14		< 0.0005
7Hdibenzo(c,g)carbazole	mg/L	0.0001			< 0.0001
Anthracene	mg/L	0.0001			< 0.0001
Benzo(a)anthracene	mg/L	0.0001			< 0.0001
Benzo(a)pyrene	mg/L	0.0001			< 0.0001
Benzo(e)pyrene	mg/L	0.0001			< 0.0001
Benzo(ghi)perylene	mg/L	0.0002			< 0.0002
Benzo(k)fluoranthene	mg/L	0.0001			< 0.0001
Chrysene	mg/L	0.0001			< 0.0001
Dibenzo(a,h)anthracene	mg/L	0.0001			< 0.0001
Dibenzo(a,i)pyrene	mg/L	0.0001			< 0.0002↑
Dibenzo(a,j)acridine	mg/L	0.0001			< 0.0001

MATRIX: WATER

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Sample Name SW-UF-BH106
Sample Matrix Ground Water
Sample Date 17/06/2025

L1 = SANSEW / WATER / - - Halton Sewer Use ByLaw - Sanitary and Combined Sewer Discharge - BL_2_03

L2 = SANSEW / WATER / - - Oakville Sewer Use By Law - Storm Sewer Discharge - BL_2009_031

Parameter	Units	RL	L1	L2	Result
SVOCs - PAHs (continued)					
Fluoranthene	mg/L	0.0001			< 0.0001
Indeno(1,2,3-cd)pyrene	mg/L	0.0002			< 0.0002
Phenanthrene	mg/L	0.0001			< 0.0001
Pyrene	mg/L	0.0001			< 0.0001
VOCs					
Chloroform	mg/L	0.0005	0.04	0.002	0.0011
1,2-Dichlorobenzene	mg/L	0.0005		0.0056	< 0.0005
1,4-Dichlorobenzene	mg/L	0.0005	0.08	0.0068	< 0.0005
cis-1,2-Dichloroethylene	mg/L	0.0005		0.0056	< 0.0005
trans-1,3-Dichloropropene	mg/L	0.0005		0.0056	< 0.0005
Methylene Chloride	mg/L	0.0005	2	0.0052	< 0.0005
Tetrachloroethylene (perchloroethylene)	mg/L	0.0005	1	0.0044	< 0.0005
Trichloroethylene	mg/L	0.0005	0.4	0.0076	< 0.0005
1,1,2,2-Tetrachloroethane	mg/L	0.0005		0.017	< 0.0005

MATRIX: WATER

L1 = SANSEW / WATER / - - Halton Sewer Use ByLaw - Sanitary and Combined Sewer Discharge - BL_2_03

L2 = SANSEW / WATER / - - Oakville Sewer Use By Law - Storm Sewer Discharge - BL_2009_031

Sample Number 9

Sample Name SW-UF-BH106

Sample Matrix Ground Water

Sample Date 17/06/2025

Parameter	Units	RL	L1	L2	Result
VOCs - BTEX					
Benzene	mg/L	0.0005	0.01	0.002	< 0.0005
Ethylbenzene	mg/L	0.0005	0.16	0.002	< 0.0005
Toluene	mg/L	0.0005	0.016	0.002	< 0.0005
m-p-xylene	mg/L	0.0005			< 0.0005
o-xylene	mg/L	0.0005			< 0.0005
Xylene (total)	mg/L	0.0005			< 0.0005

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	SANSEW / WATER / - - Halton Sewer Use ByLaw - Sanitary and Combined Sewer Discharge - BL_2_03 L1	SANSEW / WATER / - - Oakville Sewer Use By Law - Storm Sewer Discharge - BL_2009_031 L2

SW-UF-BH106

Parameter	Method	Units	Result	L1	L2
Manganese	SM 3030/EPA 200.8	mg/L	0.146		0.05

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 375.4 I Internal ref.: ME-CA-[ENV]EWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Sulphate	DIO8038-JUN25	mg/L	1	<2	1	20	100	80	120	84	75	125

Biochemical Oxygen Demand

Method: SM 5210 I Internal ref.: ME-CA-[ENV]EWL-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0038-JUN25	mg/L	2	< 2	6	30	104	70	130	74	70	130
Carbonaceous Biochemical Oxygen Demand	BOD0039-JUN25	(CBOD5) mg/L	2	< 2	11	30	86	70	130	NV	70	130

QC SUMMARY

Cyanide by SFA

Method: SM 4500 | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Cyanide (total)	SKA0197-JUN25	mg/L	0.01	<0.01	ND	10	99	90	110	94	75	125

Fluoride by Specific Ion Electrode

Method: SM 4500 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-014

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Fluoride	EWL0489-JUN25	mg/L	0.06	<0.06	ND	10	100	90	110	106	75	125

Hexavalent Chromium by SFA

Method: EPA218.6/EPA3060A | Internal ref.: ME-CA-[ENV]SKA-LAK-AN-012

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chromium VI	SKA0195-JUN25	mg/L	0.0002	<0.0002	ND	20	99	80	120	94	75	125

QC SUMMARY

Mercury by CVAAS

Method: EPA 7471A/SM 3112B | Internal ref.: ME-CA-[ENV]SPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (total)	EHG0027-JUN25	mg/L	0.00001	< 0.00001	ND	20	102	80	120	116	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-[ENV]SPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (total)	EMS0157-JUN25	mg/L	0.00005	<0.00005	ND	20	100	90	110	72	70	130
Aluminum (total)	EMS0157-JUN25	mg/L	0.001	<0.001	4	20	91	90	110	111	70	130
Arsenic (total)	EMS0157-JUN25	mg/L	0.0002	<0.0002	14	20	97	90	110	106	70	130
Beryllium (total)	EMS0157-JUN25	mg/L	0.000007	<0.000007	19	20	98	90	110	107	70	130
Cadmium (total)	EMS0157-JUN25	mg/L	0.000003	<0.000003	11	20	97	90	110	102	70	130
Cobalt (total)	EMS0157-JUN25	mg/L	0.000004	<0.000004	0	20	99	90	110	97	70	130
Chromium (total)	EMS0157-JUN25	mg/L	0.00008	<0.00008	ND	20	98	90	110	113	70	130
Copper (total)	EMS0157-JUN25	mg/L	0.001	<0.001	3	20	98	90	110	98	70	130
Iron (total)	EMS0157-JUN25	mg/L	0.007	<0.007	0	20	99	90	110	125	70	130
Manganese (total)	EMS0157-JUN25	mg/L	0.00001	<0.00001	1	20	99	90	110	97	70	130
Molybdenum (total)	EMS0157-JUN25	mg/L	0.0004	<0.0004	ND	20	96	90	110	98	70	130
Nickel (total)	EMS0157-JUN25	mg/L	0.0001	<0.0001	2	20	98	90	110	99	70	130
Lead (total)	EMS0157-JUN25	mg/L	0.00009	<0.00009	1	20	99	90	110	99	70	130
Phosphorus (total)	EMS0157-JUN25	mg/L	0.003	<0.003	ND	20	94	90	110	NV	70	130
Antimony (total)	EMS0157-JUN25	mg/L	0.0009	<0.0009	ND	20	110	90	110	95	70	130
Selenium (total)	EMS0157-JUN25	mg/L	0.00004	<0.00004	19	20	96	90	110	107	70	130
Tin (total)	EMS0157-JUN25	mg/L	0.00006	<0.00006	ND	20	97	90	110	NV	70	130
Titanium (total)	EMS0157-JUN25	mg/L	0.0001	<0.0001	12	20	95	90	110	NV	70	130
Zinc (total)	EMS0157-JUN25	mg/L	0.002	<0.002	2	20	101	90	110	101	70	130

QC SUMMARY

Microbiology

Method: SM 9223B | Internal ref.: ME-CA-[ENV]MIC-LAK-AN-021

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ecoli	BAC9297-JUN25	mpn/100mL	-	ACCEPTED	ACCEPTED							

Nonylphenol and Ethoxylates

Method: ASTM D7065-06 | Internal ref.: ME-CA-[ENV]GC-LAK-AN-015

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nonylphenol	GCM0316-JUN25	mg/L	0.001	<0.001			92	55	120			

Oil & Grease

Method: MOE E3401 | Internal ref.: ME-CA-[ENV]GC-LAK-AN-019

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Oil & Grease (total)	GCM0290-JUN25	mg/L	2	<2	NSS	20	104	75	125			

QC SUMMARY

Oil & Grease-AV/MS

Method: MOE E3401/SM 5520F | Internal ref.: ME-CA-[ENV]GC-LAK-AN-019

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Oil & Grease (animal/vegetable)	GCM0290-JUN25	mg/L	4	< 4	NSS	20	NA	70	130			
Oil & Grease (mineral/synthetic)	GCM0290-JUN25	mg/L	4	< 4	NSS	20	NA	70	130			

Pesticides

Method: EPA 3510C/8270D | Internal ref.: ME-CA-[ENV]GC-LAK-AN-018

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Hexachlorobenzene	GCM0284-JUN25	mg/L	0.00001	< 0.00001	ND	30	90	50	140	93	50	140
Hexachlorocyclohexane	GCM0284-JUN25	mg/L	0.001	< 0.001	ND	30	95	50	140	100	50	140
Mirex	GCM0284-JUN25	mg/L	0.001	< 0.001	ND	30	92	50	140	96	50	140
o,p-DDD	GCM0284-JUN25	mg/L	0.00002	< 0.00002	ND	30	95	50	140	100	50	140
o,p-DDE	GCM0284-JUN25	mg/L	0.00001	< 0.00001	ND	30	89	50	140	95	50	140
op-DDT	GCM0284-JUN25	mg/L	0.00002	< 0.00002	ND	30	110	50	140	118	50	140
pp-DDD	GCM0284-JUN25	mg/L	0.00002	< 0.00002	ND	30	86	50	140	94	50	140
pp-DDE	GCM0284-JUN25	mg/L	0.00001	< 0.00001	ND	30	94	50	140	99	50	140
pp-DDT	GCM0284-JUN25	mg/L	0.00002	< 0.00002	ND	30	121	50	140	138	50	140

QC SUMMARY

pH

Method: SM 4500 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0448-JUN25	No unit	0.05	NA	0		100			NA		

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0215-JUN25	mg/L	0.001	<0.001	ND	10	102	80	120	94	75	125

Polychlorinated Biphenyls

Method: MOE E3400/EPA 8082A | Internal ref.: ME-CA-[ENV]GC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Polychlorinated Biphenyls (PCBs) - Total	GCM0300-JUN25	mg/L	0.0001	<0.0001	NSS	30	83	60	140	NSS	60	140

QC SUMMARY

Semi-Volatile Organics

Method: EPA 3510C/8270D | Internal ref.: ME-CA-[ENV]GC-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
7Hdibenzo(c,g)carbazole	GCM0329-JUN25	mg/L	0.0001	< 0.0001	NSS	30	96	50	140	NSS	50	140
Anthracene	GCM0329-JUN25	mg/L	0.0001	< 0.0001	NSS	30	89	50	140	NSS	50	140
Benzo(a)anthracene	GCM0329-JUN25	mg/L	0.0001	< 0.0001	NSS	30	93	50	140	NSS	50	140
Benzo(a)pyrene	GCM0329-JUN25	mg/L	0.0001	< 0.0001	NSS	30	88	50	140	NSS	50	140
Benzo(b+j)fluoranthene	GCM0329-JUN25	mg/L	0.0001	< 0.0001	NSS	30	94	50	140	NSS	50	140
Benzo(e)pyrene	GCM0329-JUN25	mg/L	0.0001	< 0.0001	NSS	30	97	50	140	NSS	50	140
Benzo(ghi)perylene	GCM0329-JUN25	mg/L	0.0002	< 0.0002	NSS	30	94	50	140	NSS	50	140
Benzo(k)fluoranthene	GCM0329-JUN25	mg/L	0.0001	< 0.0001	NSS	30	97	50	140	NSS	50	140
Bis(2-ethylhexyl)phthalate	GCM0329-JUN25	mg/L	0.002	< 0.002	NSS	30	97	50	140	NSS	50	140
Chrysene	GCM0329-JUN25	mg/L	0.0001	< 0.0001	NSS	30	93	50	140	NSS	50	140
di-n-Butyl Phthalate	GCM0329-JUN25	mg/L	0.002	< 0.002	NSS	30	97	50	140	NSS	50	140
Dibenzo(a,h)anthracene	GCM0329-JUN25	mg/L	0.0001	< 0.0001	NSS	30	93	50	140	NSS	50	140
Dibenzo(a,i)pyrene	GCM0329-JUN25	mg/L	0.0001	< 0.0001	NSS	30	95	50	140	NSS	50	140
Dibenzo(a,j)acridine	GCM0329-JUN25	mg/L	0.0001	< 0.0001	NSS	30	94	50	140	NSS	50	140
Fluoranthene	GCM0329-JUN25	mg/L	0.0001	< 0.0001	NSS	30	92	50	140	NSS	50	140
Indeno(1,2,3-cd)pyrene	GCM0329-JUN25	mg/L	0.0002	< 0.0002	NSS	30	96	50	140	NSS	50	140
Naphthalene	GCM0329-JUN25	mg/L	0.0005	< 0.0005	NSS	30	83	50	140	NSS	50	140
Pentachlorophenol	GCM0329-JUN25	mg/L	0.0005	< 0.0005	NSS	30	97	50	140	NSS	50	140
Perylene	GCM0329-JUN25	mg/L	0.0005	< 0.0005	NSS	30	105	50	140	NSS	50	140
Phenanthrene	GCM0329-JUN25	mg/L	0.0001	< 0.0001	NSS	30	91	50	140	NSS	50	140

QC SUMMARY

Semi-Volatile Organics (continued)

Method: EPA 3510C/8270D | Internal ref.: ME-CA-[ENV]GC-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Pyrene	GCM0329-JUN25	mg/L	0.0001	< 0.0001	NSS	30	93	50	140	NSS	50	140
3,3-Dichlorobenzidine	GCM0331-JUN25	mg/L	0.0005	< 0.0005	NSS	30	80	30	130	NSS	30	130

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0455-JUN25	mg/L	2	< 2	5	10	95	90	110	NA		

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen	SKA0186-JUN25	as N mg/L	0.5	<0.5	ND	10	96	90	110	87	75	125

FINAL REPORT

QC SUMMARY

Volatile Organics

Method: EPA 5030B/8260C | Internal ref.: ME-CA-[ENV]GC-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
1,1,2,2-Tetrachloroethane	GCM0308-JUN25	mg/L	0.0005	<0.0005	ND	30	96	60	130	106	50	140
1,2-Dichlorobenzene	GCM0308-JUN25	mg/L	0.0005	<0.0005	ND	30	93	60	130	98	50	140
1,4-Dichlorobenzene	GCM0308-JUN25	mg/L	0.0005	<0.0005	ND	30	90	60	130	96	50	140
Benzene	GCM0308-JUN25	mg/L	0.0005	<0.0005	ND	30	93	60	130	103	50	140
Chloroform	GCM0308-JUN25	mg/L	0.0005	<0.0005	ND	30	94	60	130	103	50	140
cis-1,2-Dichloroethylene	GCM0308-JUN25	mg/L	0.0005	<0.0005	ND	30	95	60	130	94	50	140
Ethylbenzene	GCM0308-JUN25	mg/L	0.0005	<0.0005	ND	30	96	60	130	100	50	140
m-p-xylene	GCM0308-JUN25	mg/L	0.0005	<0.0005	ND	30	96	60	130	101	50	140
Methylene Chloride	GCM0308-JUN25	mg/L	0.0005	<0.0005	ND	30	106	60	130	88	50	140
o-xylene	GCM0308-JUN25	mg/L	0.0005	<0.0005	ND	30	95	60	130	101	50	140
Tetrachloroethylene (perchloroethylene)	GCM0308-JUN25	mg/L	0.0005	<0.0005	ND	30	94	60	130	99	50	140
Toluene	GCM0308-JUN25	mg/L	0.0005	<0.0005	ND	30	95	60	130	100	50	140
trans-1,3-Dichloropropene	GCM0308-JUN25	mg/L	0.0005	<0.0005	ND	30	98	60	130	102	50	140
Trichloroethylene	GCM0308-JUN25	mg/L	0.0005	<0.0005	ND	30	83	60	130	97	50	140

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

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

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS	Insufficient sample for analysis.
RL	Reporting Limit.
↑	Reporting limit raised.
↓	Reporting limit lowered.
NA	The sample was not analysed for this analyte
ND	Non Detect

Results relate only to the sample tested.
Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.
"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.
Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

This report supersedes all previous versions.

-- End of Analytical Report --

SGS

Request for Laboratory Services and CHAIN OF CUSTODY

Industries & Environment - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

No: 042898

Page 1 of 1

Laboratory Information Section - Lab use only

Received By:
Received Date: 06 / 17 2025 (mm/dd/yy)
Received Time: 17:15 (hr : min)

Received By (signature):
Custody Seal Present: Yes ☐ No ☐
Custody Seal Intact: Yes ☑ No ☐

Cooling Agent Present: Yes ☑ No ☐ Type: Ice
Temperature Upon Receipt (°C) 8 cx3

CA-L10176-Jun25

LAB LIMS #:

REPORT INFORMATION

Company: Grounded Eng
Contact: Sam Bastan
Address: 49 Mobile Dr
Phone: 647-361-5439
Fax:
Email: sbastan@groundedeng.ca

INVOICE INFORMATION

☑ (same as Report Information)
Company:
Contact:
Address:
Phone:
Email:

Quotation #:
P.O. #:
Project #: 25-069-150
Site Location/ID: Burnhamthorpe Rd & Trafalgar

TURNAROUND TIME (TAT) REQUIRED

☐ Client Regular TAT ☑ Regular TAT (5-7days)

TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 6pm or on weekends: TAT begins next business day

RUSH TAT (Additional Charges May Apply): ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days

PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date:

*NOTE: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

REGULATIONS

☐ O.Reg 153/04 ☐ O.Reg 406/19
☐ Table 1 ☐ Res/Park Soil Texture:
☐ Table 2 ☐ Ind/Com ☐ Coarse
☐ Table 3 ☐ Agri/Other ☐ Medium/Fine
☐ Table ____ Appx. ____
Soil Volume ☐ <350m3 ☐ >350m3

Other Regulations:
☐ Reg 347/558 (3 Day min TAT)
☐ PWQO ☐ MMER
☐ CCME ☐ Other:
☐ MISA
☐ ODWS Not Reportable *See note

Sewer By-Law:
☑ Sanitary
☑ Storm
Municipality: Halton / Oakville

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	Field Filtered (Y/N)	M & I: Metals & Inorganics incl CrVI, CN,Hg pH,(B(HWS),EC,SAR-soil) (Cl, Na-water)	M & I: Full Metals Suite ICP metals plus B(HWS-soil only) Hg, CrVI	M & I: ICP Metals only Sb,As,Ba,Be,B,Cd, Cr,Co,Cu,Pb,Mo,Ni,Se,Ag,Tl,U,V,Zn	SVOC: PAHs only	SVOC: SVOCs all incl PAHs, ABNs, CPs	PCB: PCBs Total ☐ Aroclor ☐	PHC: F1-F4 + BTEX	PHC: F1-F4 only no BTEX	VOC: VOCs all incl BTEX	VOC: BTEX only	Pest: Pesticides Organochlorine or specify other	Other (please specify)	Other	Other	Other	Sewer Use: Halton/Oakville Specify pkg: Sanitary & Storm Combined	Water Characterization Pkg General ☐ Extended ☐	SPLP Specify tests ☐Metals ☐VOC ☐1,4-Dioxane ☐OCP ☐ABN	TCLP Specify tests ☐M&I ☐VOC ☐PCB ☐B(a)P ☐ABN ☐Ignit.	COMMENTS:
1	SW-4F-BH106	06/17/25	13:00	22	GW	N																X				
2																										
3																										
4																										
5																										
6																										
7																										
8																										
9																										
10																										
11																										
12																										

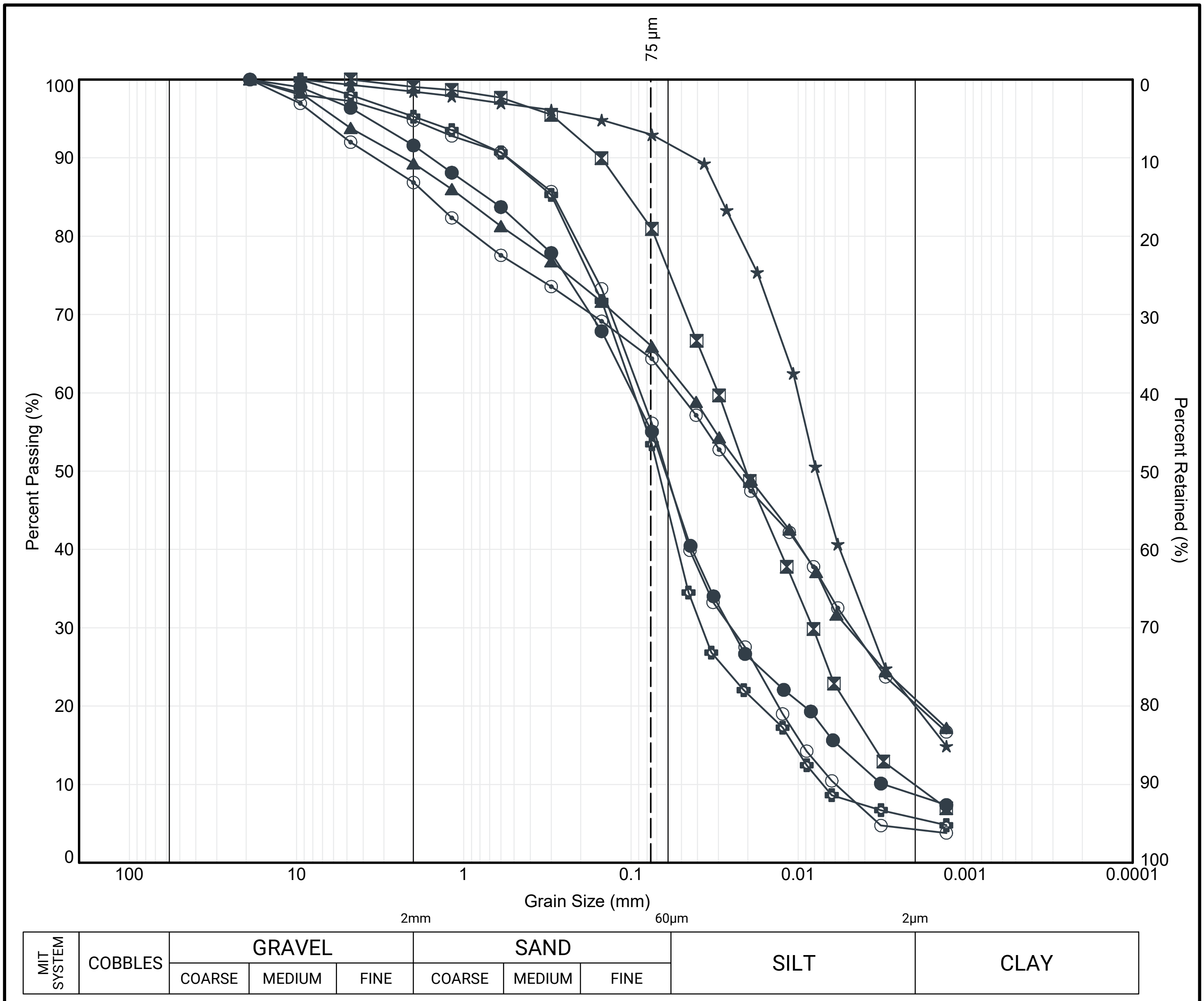
Observations/Comments/Special Instructions

Sampled By (NAME): LB Signature: Date: 06/17/25 (mm/dd/yy) Pink Copy - Client
Relinquished by (NAME): LB Signature: Date: 06/17/25 (mm/dd/yy) Yellow & White Copy - SGS

Revision #: 1.8
Date of Issue: 06 SEP 2024

Note: Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. (Printed copies are available upon request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

APPENDIX H



	Location	Sample	Depth (m)	Elev. (m)	MIT SYSTEM			
					Gravel (%)	Sand (%)	Silt (%)	Clay (%)
●	**BH 101**	SS6	4.7	175.4	8	43	40	9
☒	**BH 102**	SS7	6.2	176.3	1	23	66	10
▲	**BH 103**	4A	2.4	181.1	11	26	42	21
★	**BH 104**	7B	6.5	178.1	2	6	72	20
⊙	**BH 106**	SS5	3.3	179.0	13	26	41	20
✚	**BH 111**	SS4	2.4	179.3	5	50	39	6
○	**BH 112**	SS8	7.7	177.2	5	46	45	4

GROUNDED
ENGINEERING

Title:

GRAIN SIZE DISTRIBUTION

File No.:

25-069

K from Grain Size Analysis Report

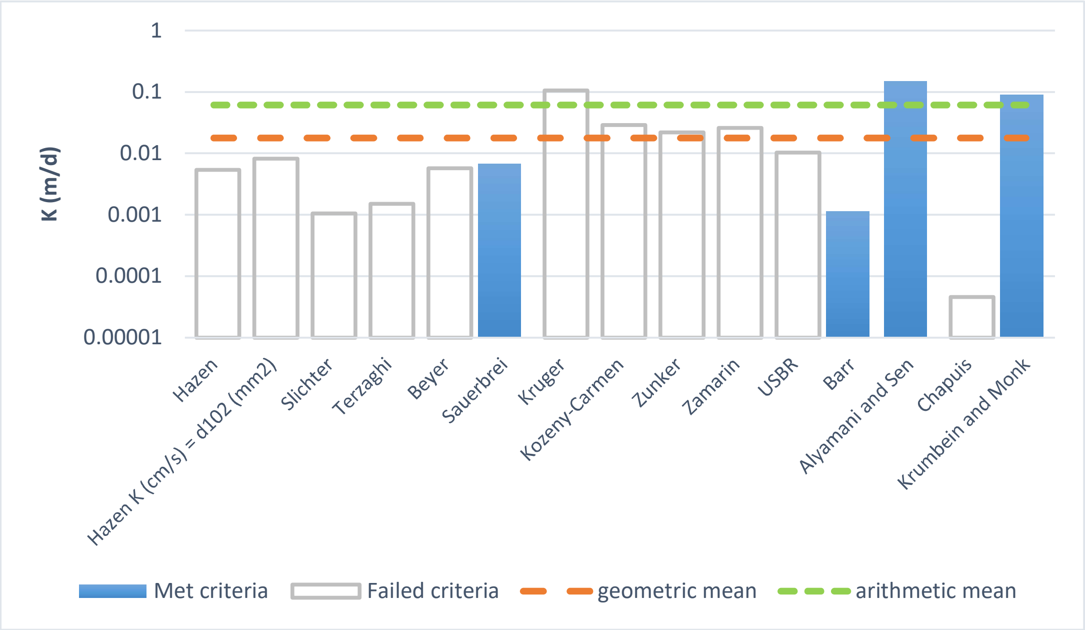
Date: 09-Jul-25

Sample Name: BH101-SS6

Mass Sample (g): 199.2

T (oC) 26

Poorly sorted sand with fines



Estimation of Hydraulic Conductivity	cm/s	m/s	m/d	de
Hazen	6.2E-06	6.2E-08	0.01	
Hazen K (cm/s) = d_{10} (mm)	9.5E-06	9.5E-08	0.01	
Slichter	1.2E-06	1.2E-08	0.00	
Terzaghi	1.7E-06	1.7E-08	0.00	
Beyer	6.6E-06	6.6E-08	0.01	
Sauerbrei	7.7E-06	7.7E-08	0.01	
Kruger	1.2E-04	1.2E-06	0.11	
Kozeny-Carmen	3.3E-05	3.3E-07	0.03	
Zunker	2.5E-05	2.5E-07	0.02	
Zamarin	3.0E-05	3.0E-07	0.03	
USBR	1.2E-05	1.2E-07	0.01	
Barr	1.3E-06	1.3E-08	0.00	
Alyamani and Sen	1.7E-04	1.7E-06	0.15	
Chapuis	5.3E-08	5.3E-10	0.00	
Krumbein and Monk	1.0E-04	1.0E-06	0.09	
geometric mean	2.1E-05	2.1E-07	0.02	
arithmetic mean	7.1E-05	7.1E-07	0.06	

K from Grain Size Analysis Report

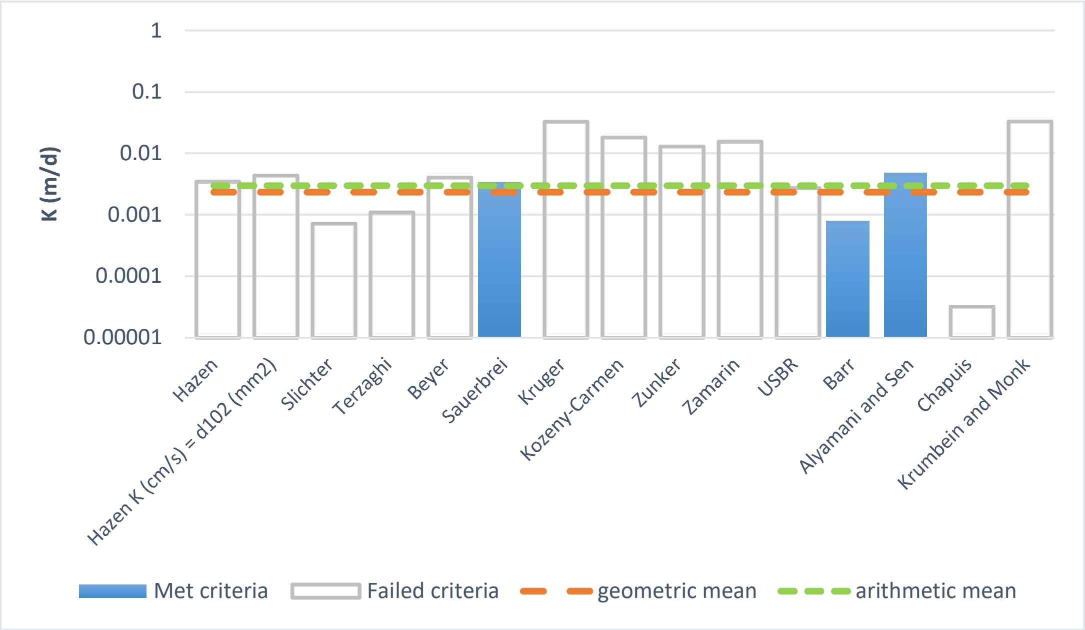
Date: 09-Jul-25

Sample Name: BH102-SS7

Mass Sample (g): 115.94

T (oC) 26

Poorly sorted sandy silt with fines



Estimation of Hydraulic Conductivity	cm/s	m/s	m/d	de
Hazen	4.0E-06	4.0E-08	0.00	
Hazen K (cm/s) = d_{10} (mm)	5.0E-06	5.0E-08	0.00	
Slichter	8.3E-07	8.3E-09	0.00	
Terzaghi	1.3E-06	1.3E-08	0.00	
Beyer	4.7E-06	4.7E-08	0.00	
Sauerbrei	3.9E-06	3.9E-08	0.00	
Kruger	3.8E-05	3.8E-07	0.03	
Kozeny-Carmen	2.1E-05	2.1E-07	0.02	
Zunker	1.5E-05	1.5E-07	0.01	
Zamarin	1.8E-05	1.8E-07	0.02	
USBR	3.1E-06	3.1E-08	0.00	
Barr	9.2E-07	9.2E-09	0.00	
Alyamani and Sen	5.5E-06	5.5E-08	0.00	
Chapuis	3.7E-08	3.7E-10	0.00	
Krumbein and Monk	3.8E-05	3.8E-07	0.03	
geometric mean	2.7E-06	2.7E-08	0.00	
arithmetic mean	3.5E-06	3.5E-08	0.00	

K from Grain Size Analysis Report

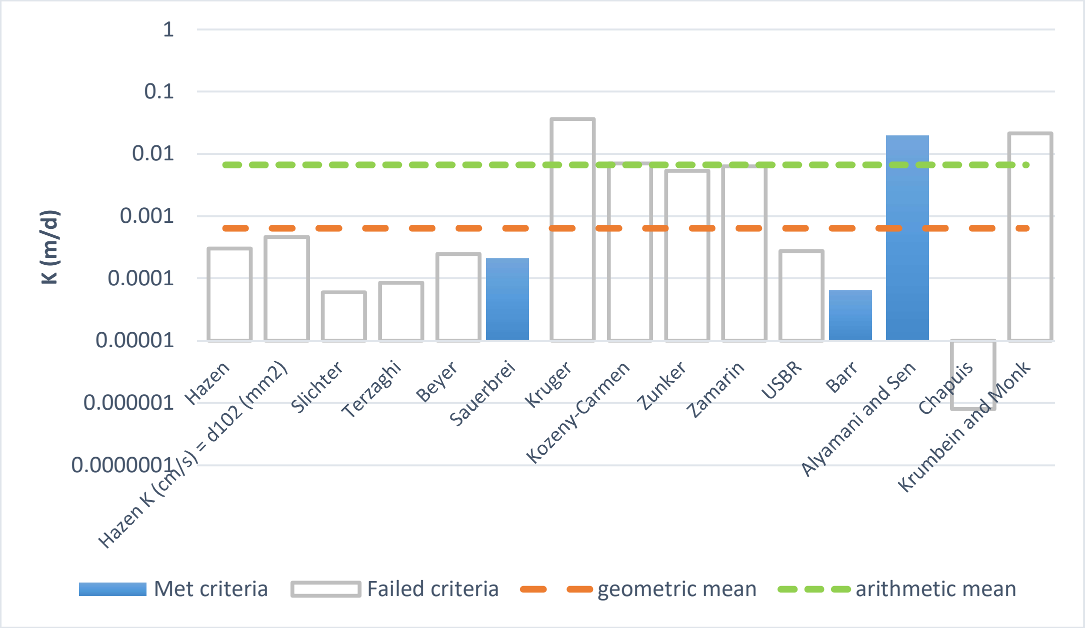
Date: 09-Jul-25

Sample Name: BH103-SS4A

Mass Sample (g): 137.43

T (oC) 26

Poorly sorted sandy gravelly silt with fines



Estimation of Hydraulic Conductivity	cm/s	m/s	m/d	de
Hazen	3.5E-07	3.5E-09	0.00	
Hazen K (cm/s) = d_{10} (mm)	5.4E-07	5.4E-09	0.00	
Slichter	6.9E-08	6.9E-10	0.00	
Terzaghi	9.8E-08	9.8E-10	0.00	
Beyer	2.9E-07	2.9E-09	0.00	
Sauerbrei	2.4E-07	2.4E-09	0.00	
Kruger	4.2E-05	4.2E-07	0.04	
Kozeny-Carmen	8.2E-06	8.2E-08	0.01	
Zunker	6.2E-06	6.2E-08	0.01	
Zamarin	7.3E-06	7.3E-08	0.01	
USBR	3.2E-07	3.2E-09	0.00	
Barr	7.4E-08	7.4E-10	0.00	
Alyamani and Sen	2.3E-05	2.3E-07	0.02	
Chapuis	9.2E-10	9.2E-12	0.00	
Krumbein and Monk	2.5E-05	2.5E-07	0.02	
geometric mean	7.4E-07	7.4E-09	0.00	
arithmetic mean	7.8E-06	7.8E-08	0.01	

K from Grain Size Analysis Report

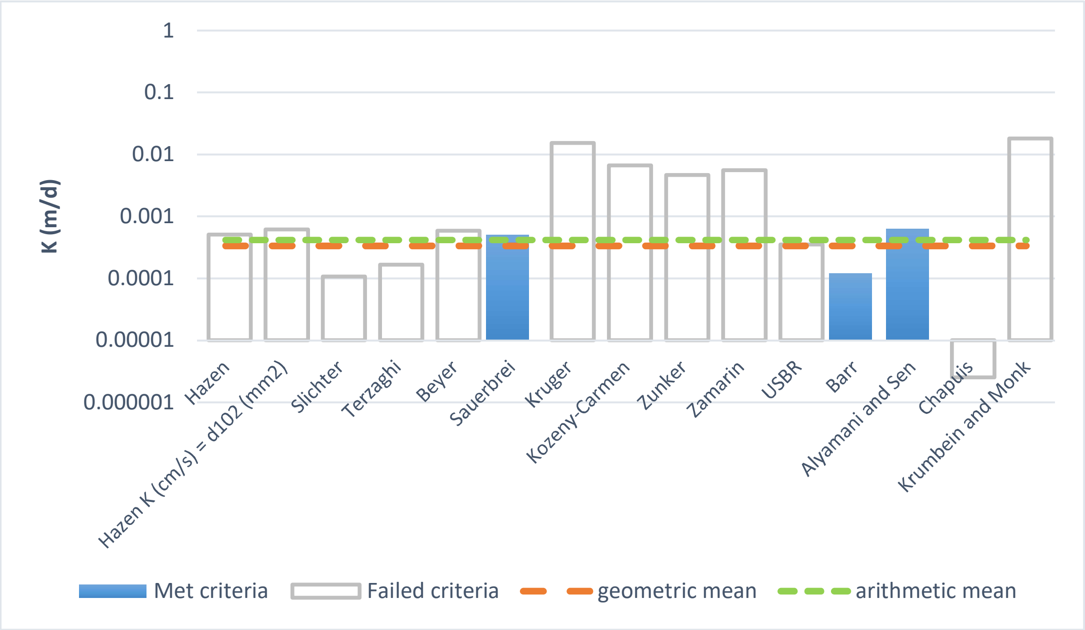
Date: 09-Jul-25

Sample Name: BH104-SS7B

Mass Sample (g): 117.17

T (oC) 26

Poorly sorted clay with fines

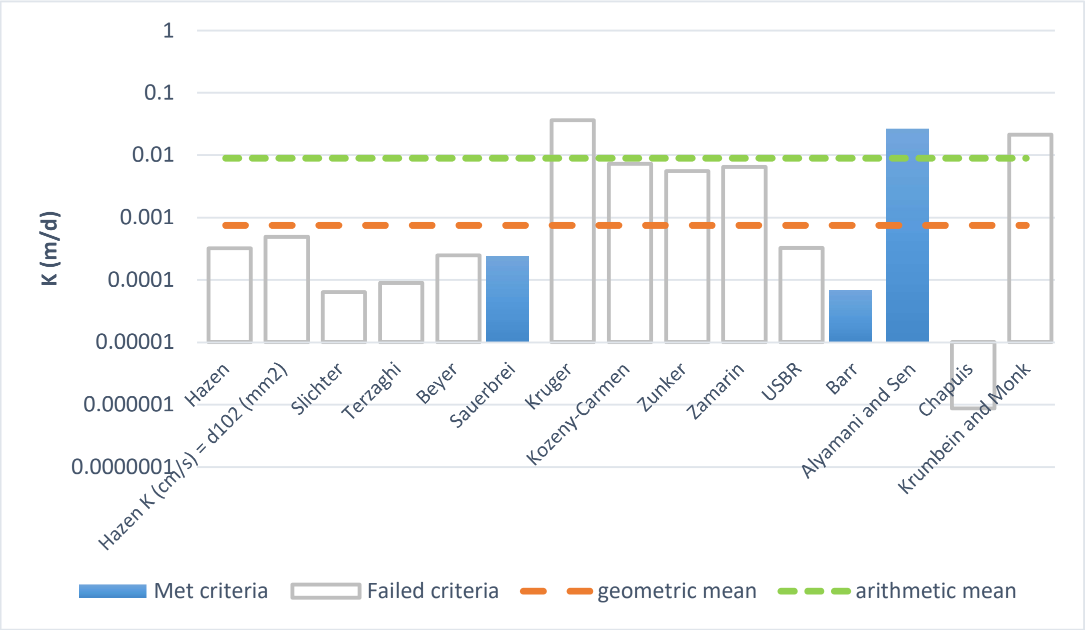


Estimation of Hydraulic Conductivity	cm/s	m/s	m/d	de
Hazen	5.9E-07	5.9E-09	0.00	
Hazen K (cm/s) = d_{10} (mm)	7.2E-07	7.2E-09	0.00	
Slichter	1.2E-07	1.2E-09	0.00	
Terzaghi	1.9E-07	1.9E-09	0.00	
Beyer	6.8E-07	6.8E-09	0.00	
Sauerbrei	5.8E-07	5.8E-09	0.00	
Kruger	1.8E-05	1.8E-07	0.02	
Kozeny-Carmen	7.7E-06	7.7E-08	0.01	
Zunker	5.4E-06	5.4E-08	0.00	
Zamarin	6.5E-06	6.5E-08	0.01	
USBR	4.1E-07	4.1E-09	0.00	
Barr	1.4E-07	1.4E-09	0.00	
Alyamani and Sen	7.3E-07	7.3E-09	0.00	
Chapuis	2.9E-09	2.9E-11	0.00	
Krumbein and Monk	2.1E-05	2.1E-07	0.02	
geometric mean	3.9E-07	3.9E-09	0.00	
arithmetic mean	4.8E-07	4.8E-09	0.00	

K from Grain Size Analysis Report

Date:	09-Jul-25		
Sample Name:	BH106-SS5		
Mass Sample (g):	138.51	T (oC)	26

Poorly sorted sandy gravelly silt with fines



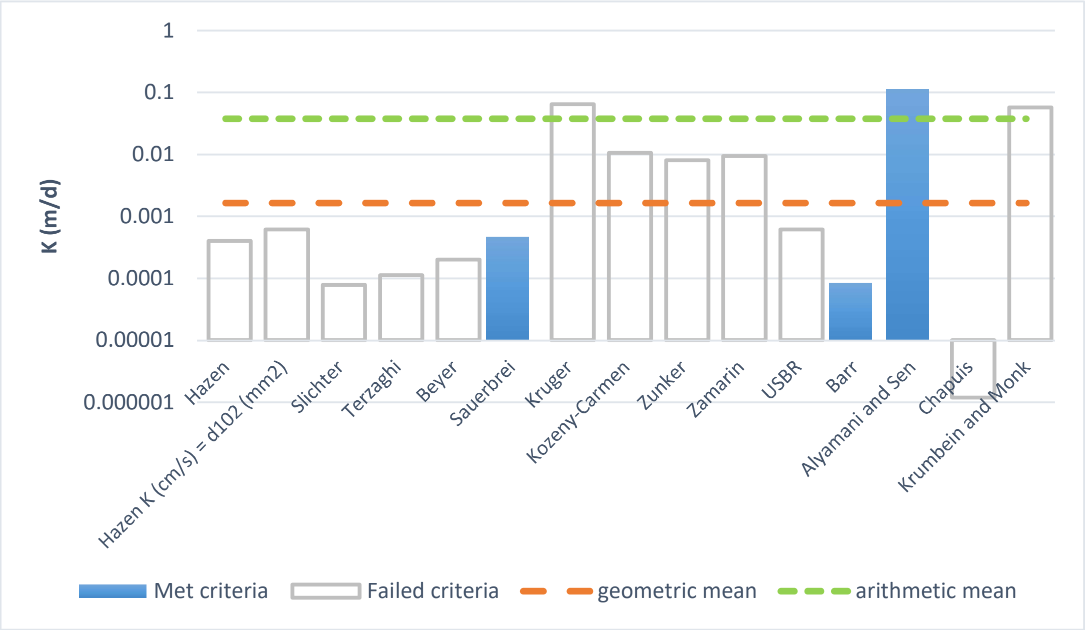
Estimation of Hydraulic Conductivity	cm/s	m/s	m/d	de
Hazen	3.7E-07	3.7E-09	0.00	
Hazen K (cm/s) = d_{10} (mm)	5.7E-07	5.7E-09	0.00	
Slichter	7.3E-08	7.3E-10	0.00	
Terzaghi	1.0E-07	1.0E-09	0.00	
Beyer	2.8E-07	2.8E-09	0.00	
Sauerbrei	2.8E-07	2.8E-09	0.00	
Kruger	4.2E-05	4.2E-07	0.04	
Kozeny-Carmen	8.4E-06	8.4E-08	0.01	
Zunker	6.4E-06	6.4E-08	0.01	
Zamarin	7.5E-06	7.5E-08	0.01	
USBR	3.7E-07	3.7E-09	0.00	
Barr	7.8E-08	7.8E-10	0.00	
Alyamani and Sen	3.1E-05	3.1E-07	0.03	
Chapuis	1.0E-09	1.0E-11	0.00	
Krumbein and Monk	2.5E-05	2.5E-07	0.02	
geometric mean	8.7E-07	8.7E-09	0.00	
arithmetic mean	1.0E-05	1.0E-07	0.01	

K from Grain Size Analysis Report Date: 09-Jul-25

Sample Name: BH109-SS8

Mass Sample (g): 192.32 T (oC) 26

Poorly sorted sandy silt with fines



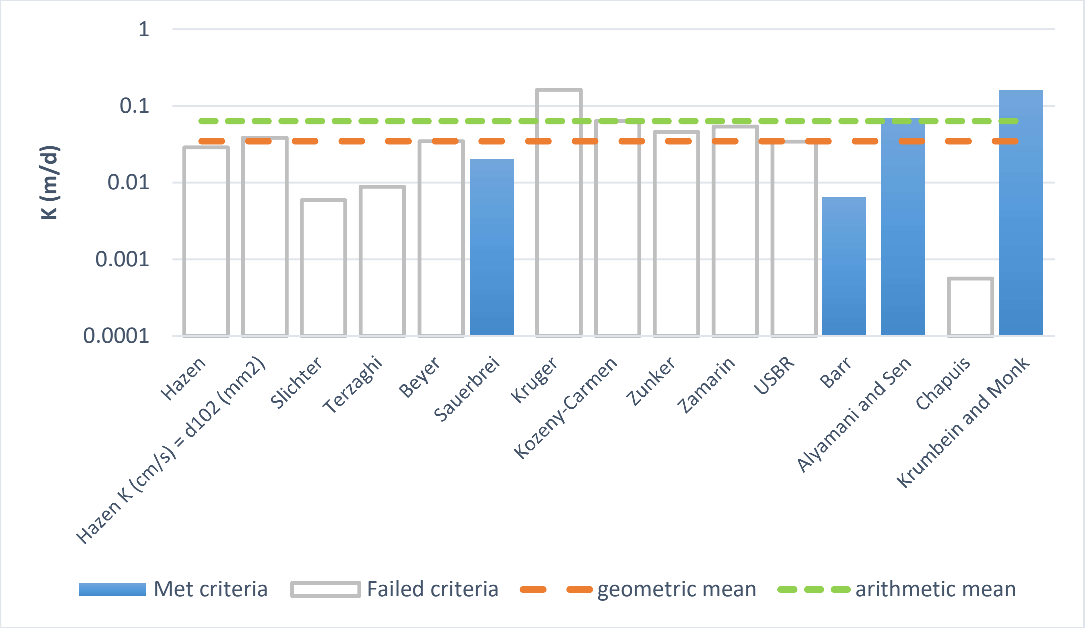
Estimation of Hydraulic Conductivity	cm/s	m/s	m/d	de
Hazen	4.7E-07	4.7E-09	0.00	
Hazen K (cm/s) = d_{10} (mm)	7.1E-07	7.1E-09	0.00	
Slichter	9.1E-08	9.1E-10	0.00	
Terzaghi	1.3E-07	1.3E-09	0.00	
Beyer	2.3E-07	2.3E-09	0.00	
Sauerbrei	5.4E-07	5.4E-09	0.00	
Kruger	7.5E-05	7.5E-07	0.06	
Kozeny-Carmen	1.2E-05	1.2E-07	0.01	
Zunker	9.3E-06	9.3E-08	0.01	
Zamarin	1.1E-05	1.1E-07	0.01	
USBR	7.1E-07	7.1E-09	0.00	
Barr	9.8E-08	9.8E-10	0.00	
Alyamani and Sen	1.3E-04	1.3E-06	0.11	
Chapuis	1.4E-09	1.4E-11	0.00	
Krumbein and Monk	6.6E-05	6.6E-07	0.06	
geometric mean	1.9E-06	1.9E-08	0.00	
arithmetic mean	4.4E-05	4.4E-07	0.04	

K from Grain Size Analysis Report | Date: 09-Jul-25

Sample Name: BH111-SS4

Mass Sample (g): 135.78 | T (oC) 26

Poorly sorted sand low in fines



Estimation of Hydraulic Conductivity	cm/s	m/s	m/d	de
Hazen	3.3E-05	3.3E-07	0.03	
Hazen K (cm/s) = d_{10} (mm)	4.4E-05	4.4E-07	0.04	
Slichter	6.9E-06	6.9E-08	0.01	
Terzaghi	1.0E-05	1.0E-07	0.01	
Beyer	4.0E-05	4.0E-07	0.03	
Sauerbrei	2.4E-05	2.4E-07	0.02	
Kruger	1.9E-04	1.9E-06	0.16	
Kozeny-Carmen	7.3E-05	7.3E-07	0.06	
Zunker	5.3E-05	5.3E-07	0.05	
Zamarin	6.2E-05	6.2E-07	0.05	
USBR	4.0E-05	4.0E-07	0.03	
Barr	7.5E-06	7.5E-08	0.01	
Alyamani and Sen	8.1E-05	8.1E-07	0.07	
Chapuis	6.5E-07	6.5E-09	0.00	
Krumbein and Monk	1.8E-04	1.8E-06	0.16	
geometric mean	4.0E-05	4.0E-07	0.03	
arithmetic mean	7.4E-05	7.4E-07	0.06	

K from Grain Size Analysis Report

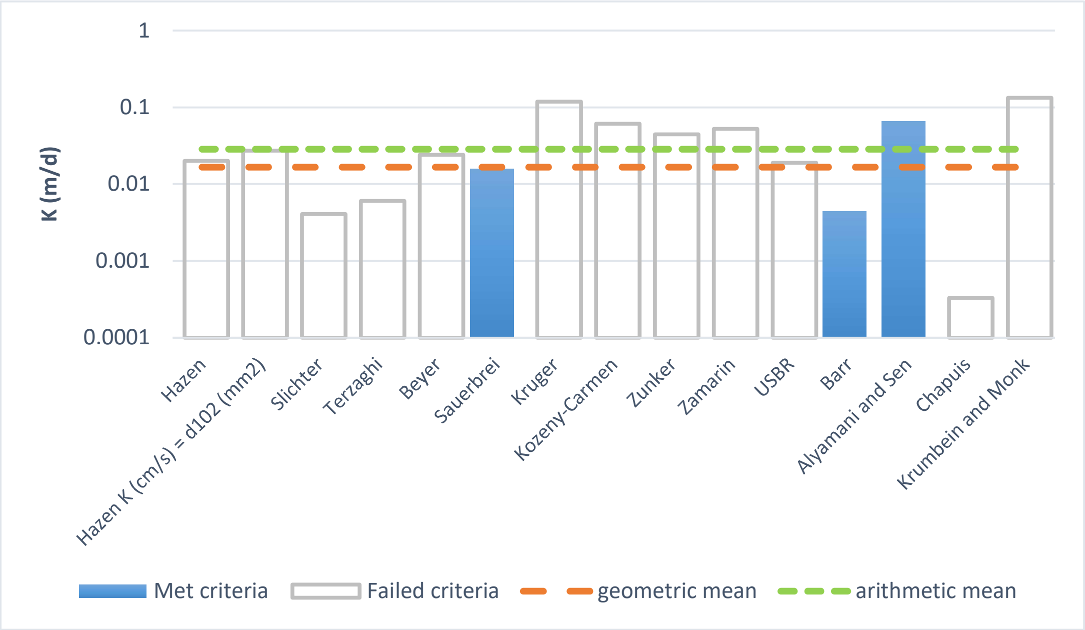
Date: 09-Jul-25

Sample Name: BH112-SS8

Mass Sample (g): 227.82

T (oC) 26

Poorly sorted sandy silt low in fines

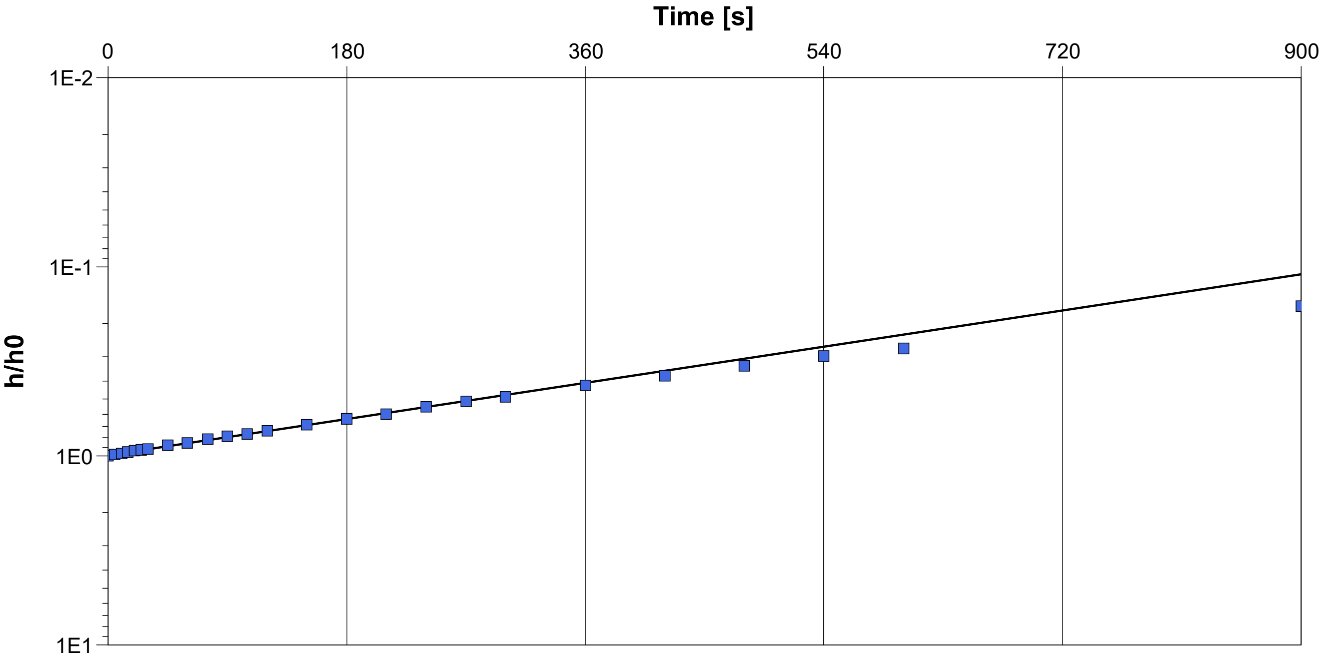


Estimation of Hydraulic Conductivity	cm/s	m/s	m/d	de
Hazen	2.3E-05	2.3E-07	0.02	
Hazen K (cm/s) = d_{10} (mm)	3.2E-05	3.2E-07	0.03	
Slichter	4.7E-06	4.7E-08	0.00	
Terzaghi	7.0E-06	7.0E-08	0.01	
Beyer	2.8E-05	2.8E-07	0.02	
Sauerbrei	1.8E-05	1.8E-07	0.02	
Kruger	1.4E-04	1.4E-06	0.12	
Kozeny-Carmen	7.1E-05	7.1E-07	0.06	
Zunker	5.1E-05	5.1E-07	0.04	
Zamarin	6.1E-05	6.1E-07	0.05	
USBR	2.2E-05	2.2E-07	0.02	
Barr	5.1E-06	5.1E-08	0.00	
Alyamani and Sen	7.6E-05	7.6E-07	0.07	
Chapuis	3.8E-07	3.8E-09	0.00	
Krumbein and Monk	1.5E-04	1.5E-06	0.13	
geometric mean	1.9E-05	1.9E-07	0.02	
arithmetic mean	3.3E-05	3.3E-07	0.03	

APPENDIX I

GROUNDED ENGINEERING	**Slug Test Analysis Report**
	Project: Trafalgar and Burnhamthorpe Subdivision, Oakville
	Number: 25-069
	Client: Westerkirk Trafalgar Inc.

Location: Oakville	Slug Test: BH103	Test Well: BH103
Test Conducted by: LB		Test Date: 2025-06-17
Analysis Performed by: RR	BH103	Analysis Date: 2025-07-14
Aquifer Thickness: 9.00 m		

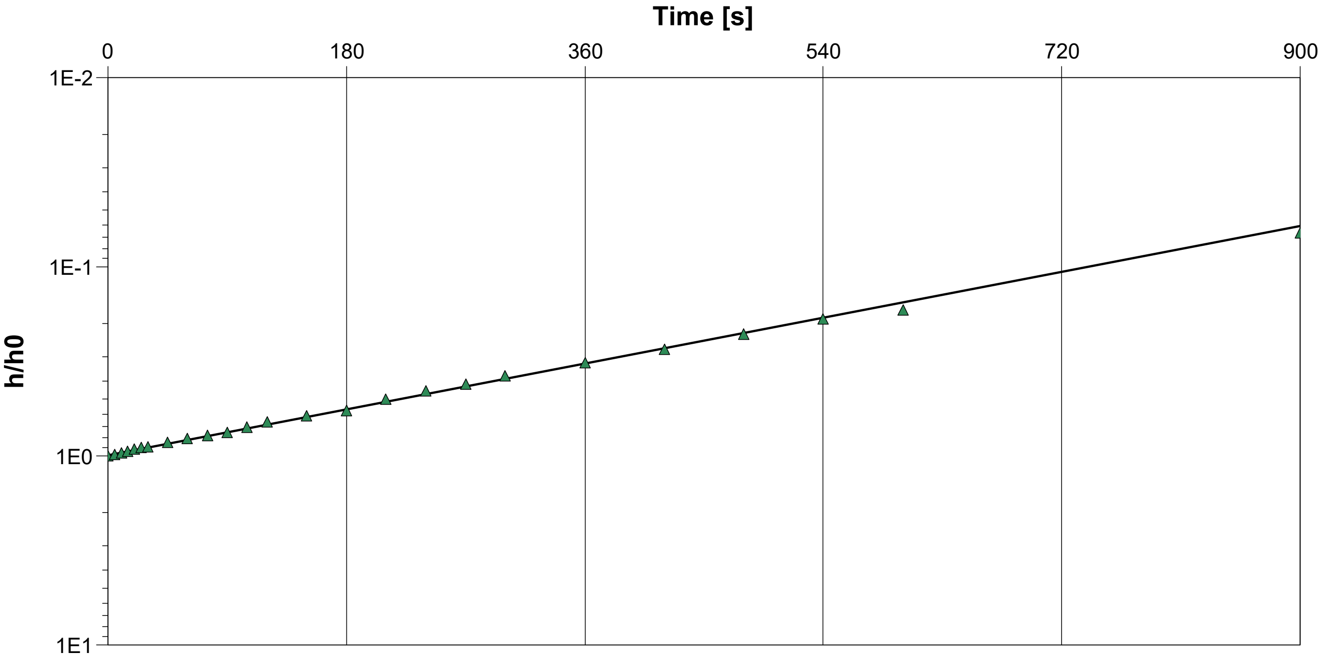


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH103	1.00×10^{-6}	

GROUNDED ENGINEERING	**Slug Test Analysis Report**
	Project: Trafalgar and Burnhamthorpe Subdivision, Oakville
	Number: 25-069
	Client: Westerkirk Trafalgar Inc.

Location: Oakville	Slug Test: BH112	Test Well: BH112
Test Conducted by: LB		Test Date: 2025-06-17
Analysis Performed by: RR	BH112	Analysis Date: 2025-07-14
Aquifer Thickness: 9.50 m		

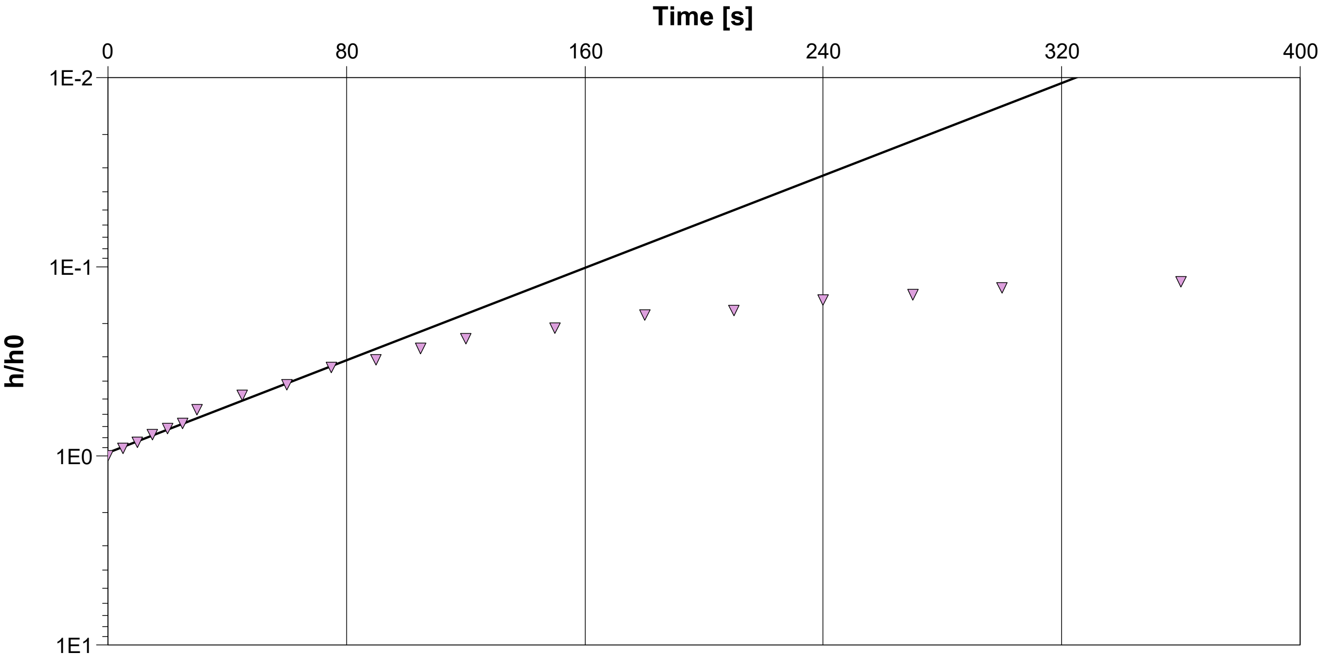


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH112	1.31×10^{-6}	

GROUNDED ENGINEERING	**Slug Test Analysis Report**
	Project: Trafalgar and Burnhamthorpe Subdivision, Oakville
	Number: 25-069
	Client: Westerkirk Trafalgar Inc.

Location: Oakville	Slug Test: BH106	Test Well: BH106
Test Conducted by: EB		Test Date: 2025-07-18
Analysis Performed by: RR	BH106A	Analysis Date: 2025-08-06
Aquifer Thickness: 9.00 m		

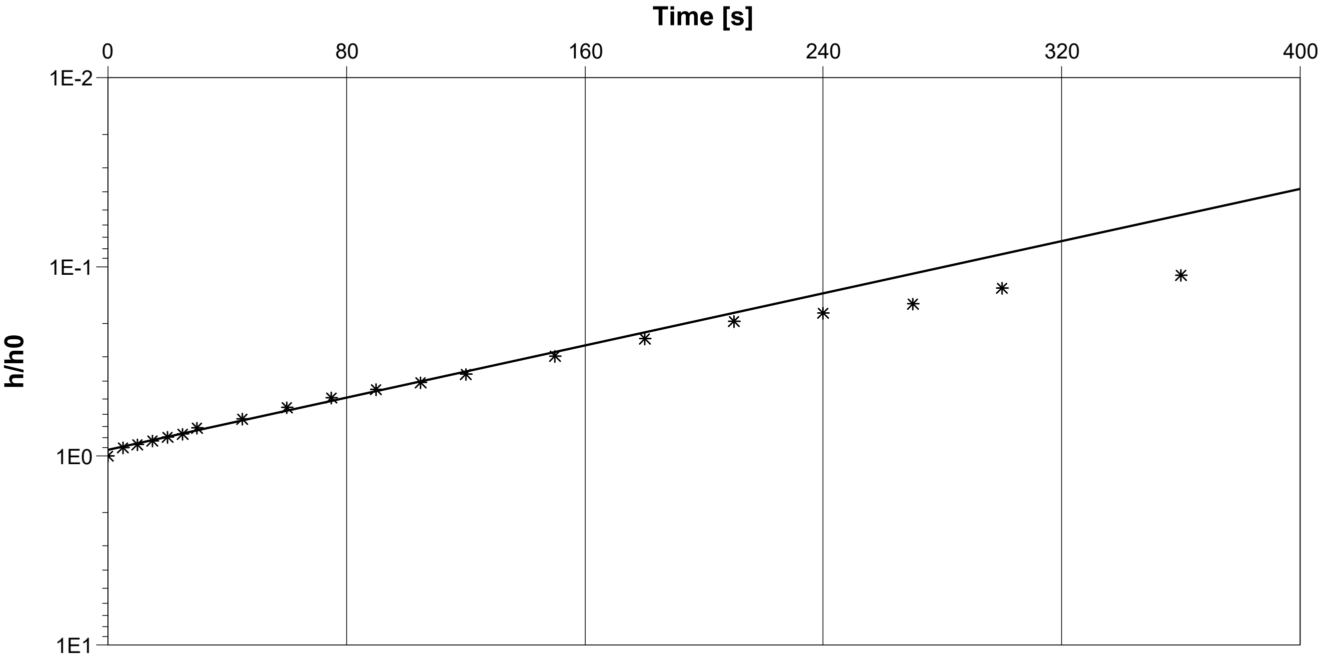


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]
BH106	5.80×10^{-6}

Slug Test Analysis Report	
Project:	Trafalgar and Burnhamthorpe Subdivision, Oakville
Number:	25-069
Client:	Westerkirk Trafalgar Inc.

Location: Oakville	Slug Test: BH108	Test Well: BH108
Test Conducted by: EB		Test Date: 2025-07-18
Analysis Performed by: RR	BH108	Analysis Date: 2025-08-06
Aquifer Thickness: 9.00 m		



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH108	3.05×10^{-6}	

APPENDIX J

Equivalent Well Radius - PILE & LAGGING BLOCK 01

$R_0 = 3000*dH*K^{0.5}$

$r_s = (a+b)/3.14$

applies when a/b <1.5 and R_0>>rs

$r_s = ((a*b)/3.14)^{0.5}$

$$Q = \frac{3.14*K*(H^2-h_w^2)}{\ln(R_0/r_s)}$$

Ground Surface	183	masl
Highest Water Level	181.7	masl
Base of Excavation	172.5	masl
Drawdown Target	171.3	masl
Aquifer Bottom	170	masl
Rain Fall	0.029	m
Factor of Safety	3.0	
Hydrualic Gradient	1	
K =	5.80E-06	m/s
H =	11.7	m
h_w =	1.3	m
dH =	10.4	m
R_0 =	75.1	m
r_s+ R_0=	168	m
a =	91	m
b =	202	m
r_s =	93	m

SHORT TERM

Summary	L/day	L/min
Groundwater	1,083,000	752.1
Rainfall	534,000	370.8
Total	1,617,000	1,122.9

100 year storm event (L/day): 1,864,000

LONG TERM

Summary	L/day	L/min
Groundwater	1,083,000	752.1
Infiltration	18,000	12.5
Total	1,101,000	764.6

Legend:

K = Hydraulic Conductivity

H = Depth from static wate table to the assumed aquifer bottom

h_w = Depth from the dewatering target to the assumed aquifer bottom

dH = Dewatering thickness

a = Length of Excavation

b = Width of Excavation

Reference: J. Patrick Powers… [et al.] (2007), "Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd ed." Wiley, Hoboken, NJ.

Equivalent Well Radius - PILE & LAGGING BLOCK 02

$R_0 = 3000*dH*K^{0.5}$

$r_s = (a+b)/3.14$ applies when a/b <1.5 and R_0>>rs

$r_s = ((a*b)/3.14)^{0.5}$

$$Q = \frac{3.14*K*(H^2-h_w^2)}{\ln(R_0/r_s)}$$

Ground Surface	183.5	masl
Highest Water Level	182.5	masl
Base of Excavation	176	masl
Drawdown Target	174.8	masl
Aquifer Bottom	173	masl
Rain Fall	0.029	m
Factor of Safety	3.0	
Hydrualic Gradient	1	
K =	5.80E-06	m/s
H =	9.5	m
h_w =	1.8	m
dH =	7.7	m
R_0 =	55.6	m
$r_s + R_0$=	160	m
a =	91	m
b =	236	m
r_s =	104	m

SHORT TERM

Summary	L/day	L/min
Groundwater	960,000	666.7
Rainfall	623,000	432.6
Total	1,583,000	1,099.3

100 year storm event (L/day): 2,178,000

LONG TERM

Summary	L/day	L/min
Groundwater	960,000	666.7
Infiltration	21,000	14.6
Total	981,000	681.3

Legend:

K = Hydraulic Conductivity
H = Depth from static wate table to the assumed aquifer bottom
h_w = Depth from the dewatering target to the assumed aquifer bottom
dH = Dewatering thickness
a = Length of Excavation
b = Width of Excavation

Reference: J. Patrick Powers… [et al.] (2007), "Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd ed." Wiley, Hoboken, NJ.

Equivalent Well Radius - PILE & LAGGING BLOCK 03

R_0 = $3000*dH*K^{0.5}$

r_s = $(a+b)/3.14$ applies when a/b <1.5 and R_0>>rs

r_s = $((a*b)/3.14)^{0.5}$

$$Q = \frac{3.14*K*(H^2-h_w^2)}{\ln(R_0/r_s)}$$

Ground Surface	185	masl
Highest Water Level	182.5	masl
Base of Excavation	174.5	masl
Drawdown Target	174.8	masl
Aquifer Bottom	171.5	masl
Rain Fall	0.029	m
Factor of Safety	3.0	
Hydrualic Gradient	1	
K =	1.30E-06	m/s
H =	11.0	m
h_w =	3.3	m
dH =	7.7	m
R_0 =	26.3	m
r_s+ R_0=	69	m
a =	50	m
b =	83	m
r_s =	42	m

SHORT TERM		
Summary	**L/day**	**L/min**
Groundwater	243,000	168.8
Rainfall	121,000	84.0
Total	364,000	252.8

100 year storm event (L/day): **421,000**

LONG TERM		
Summary	**L/day**	**L/min**
Groundwater	243,000	168.8
Infiltration	5,000	3.5
Total	248,000	172.2

Legend:

K = Hydraulic Conductivity
H = Depth from static wate table to the assumed aquifer bottom
h_w = Depth from the dewatering target to the assumed aquifer bottom
dH = Dewatering thickness
a = Length of Excavation
b = Width of Excavation

Reference: J. Patrick Powers... [et al.] (2007), "Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd ed." Wiley, Hoboken, NJ.

Equivalent Well Radius - PILE & LAGGING BLOCK 04

$R_0 = 3000*dH*K^{0.5}$

$r_s = (a+b)/3.14$ applies when a/b <1.5 and R_0>>rs

$r_s = ((a*b)/3.14)^{0.5}$

$$Q = \frac{3.14*K*(H^2-h_w^2)}{\ln(R_0/r_s)}$$

Ground Surface	182	masl
Highest Water Level	181.8	masl
Base of Excavation	171.5	masl
Drawdown Target	170.3	masl
Aquifer Bottom	167	masl
Rain Fall	0.029	m
Factor of Safety	3.0	
Hydrualic Gradient	1	
K =	5.80E-06	m/s
H =	14.8	m
h_w =	3.3	m
dH =	11.5	m
R_0 =	83.1	m
$r_s + R_0$=	174	m
a =	100	m
b =	187	m
r_s =	91	m

SHORT TERM		
Summary	**L/day**	**L/min**
Groundwater	1,521,000	1,056.3
Rainfall	543,000	377.1
Total	2,064,000	1,433.3

100 year storm event (L/day): **1,897,000**

LONG TERM		
Summary	**L/day**	**L/min**
Groundwater	1,521,000	1,056.3
Infiltration	5,000	3.5
Total	1,526,000	1,059.7

Legend:

K = Hydraulic Conductivity
H = Depth from static wate table to the assumed aquifer bottom
h_w = Depth from the dewatering target to the assumed aquifer bottom
dH = Dewatering thickness
a = Length of Excavation
b = Width of Excavation

Reference: J. Patrick Powers… [et al.] (2007), "Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd ed." Wiley, Hoboken, NJ.

Equivalent Well Radius - PILE & LAGGING BLOCK 05

$$R_0 = 3000 \cdot dH \cdot K^{0.5}$$

$$r_s = (a+b)/3.14$$

applies when a/b <1.5 and R_0>>rs

$$r_s = ((a \cdot b)/3.14)^{0.5}$$

$$Q = \frac{3.14 \cdot K \cdot (H^2 - h_w^2)}{\ln(R_0/r_s)}$$

Ground Surface	180.7	masl
Highest Water Level	180	masl
Base of Excavation	170.2	masl
Drawdown Target	169	masl
Aquifer Bottom	164	masl
Rain Fall	0.029	m
Factor of Safety	3.0	
Hydrualic Gradient	1	
K =	1.31E-06	m/s
H =	16.0	m
h_w =	5.0	m
dH =	11.0	m
R_0 =	37.8	m
$r_s + R_0$=	96	m
a =	82	m
b =	101	m
r_s =	58	m

SHORT TERM

Summary	L/day	L/min
Groundwater	495,000	343.8
Rainfall	241,000	167.4
Total	736,000	511.1

100 year storm event (L/day): 840,000

LONG TERM

Summary	L/day	L/min
Groundwater	495,000	343.8
Infiltration	9,000	6.3
Total	504,000	350.0

Legend:

K = Hydraulic Conductivity

H = Depth from static wate table to the assumed aquifer bottom

h_w = Depth from the dewatering target to the assumed aquifer bottom

dH = Dewatering thickness

a = Length of Excavation

b = Width of Excavation

Reference: J. Patrick Powers… [et al.] (2007), "Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd ed." Wiley, Hoboken, NJ.

Equivalent Well Radius - PILE & LAGGING BLOCK 06

$R_0 = 3000*dH*K^{0.5}$

$r_s = (a+b)/3.14$ applies when a/b <1.5 and R_0>>rs

$r_s = ((a*b)/3.14)^{0.5}$

$$Q = \frac{3.14*K*(H^2-h_w^2)}{\ln(R_0/r_s)}$$

Ground Surface	181.2	masl
Highest Water Level	180	masl
Base of Excavation	173.7	masl
Drawdown Target	172.5	masl
Aquifer Bottom	168	masl
Rain Fall	0.029	m
Factor of Safety	3.0	
Hydrualic Gradient	1	
K =	5.80E-06	m/s
H =	12.0	m
h_w =	4.5	m
dH =	7.5	m
R_0 =	54.2	m
$r_s + R_0$=	119	m
a =	97	m
b =	106	m
r_s =	65	m

SHORT TERM		
Summary	**L/day**	**L/min**
Groundwater	960,000	666.7
Rainfall	299,000	207.6
Total	1,259,000	874.3

100 year storm event (L/day): 1,043,000

LONG TERM		
Summary	**L/day**	**L/min**
Groundwater	960,000	666.7
Infiltration	2,000	1.4
Total	962,000	668.1

Legend:

K = Hydraulic Conductivity
H = Depth from static wate table to the assumed aquifer bottom
h_w = Depth from the dewatering target to the assumed aquifer bottom
dH = Dewatering thickness
a = Length of Excavation
b = Width of Excavation

Reference: J. Patrick Powers... [et al.] (2007), "Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd ed." Wiley, Hoboken, NJ.

Equivalent Well Radius - PILE & LAGGING BLOCK 07

$R_0 = 3000 \cdot dH \cdot K^{0.5}$

$r_s = (a+b)/3.14$ applies when a/b <1.5 and R_0>>rs

$r_s = ((a \cdot b)/3.14)^{0.5}$

$$Q = \frac{3.14 \cdot K \cdot (H^2 - h_w^2)}{\ln(R_0/r_s)}$$

Ground Surface	181.7	masl
Highest Water Level	180	masl
Base of Excavation	177.2	masl
Drawdown Target	176	masl
Aquifer Bottom	168	masl
Rain Fall	0.029	m
Factor of Safety	3.0	
Hydrualic Gradient	1	
K =	5.80E-06	m/s
H =	12.0	m
h_w =	8.0	m
dH =	4.0	m
R_0 =	28.9	m
r_s+ R_0=	76	m
a =	49	m
b =	99	m
r_s =	47	m

SHORT TERM

Summary	L/day	L/min
Groundwater	792,000	550.0
Rainfall	141,000	97.9
Total	933,000	647.9

100 year storm event (L/day): 492,000

LONG TERM

Summary	L/day	L/min
Groundwater	792,000	550.0
Infiltration	5,000	3.5
Total	797,000	553.5

Legend:

K = Hydraulic Conductivity

H = Depth from static wate table to the assumed aquifer bottom

h_w = Depth from the dewatering target to the assumed aquifer bottom

dH = Dewatering thickness

a = Length of Excavation

b = Width of Excavation

Reference: J. Patrick Powers... [et al.] (2007), "Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd ed." Wiley, Hoboken, NJ.

Equivalent Well Radius - PILE & LAGGING BLOCK 08

$R_0 = 3000*dH*K^{0.5}$

$r_s = (a+b)/3.14$ applies when a/b <1.5 and R_0>>rs

$r_s = ((a*b)/3.14)^{0.5}$

$$Q = \frac{3.14*K*(H^2-h_w^2)}{\ln(R_0/r_s)}$$

Ground Surface	183.5	masl
Highest Water Level	179.5	masl
Base of Excavation	176	masl
Drawdown Target	174.8	masl
Aquifer Bottom	168	masl
Rain Fall	0.029	m
Factor of Safety	3.0	
Hydrualic Gradient	1	
K =	1.30E-06	m/s
H =	11.5	m
h_w =	6.8	m
dH =	4.7	m
R_0 =	16.1	m
r_s+ R_0=	93	m
a =	38	m
b =	202	m
r_s =	76	m

SHORT TERM		
Summary	**L/day**	**L/min**
Groundwater	477,000	331.3
Rainfall	223,000	154.9
Total	700,000	486.1

100 year storm event (L/day): 779,000

LONG TERM		
Summary	**L/day**	**L/min**
Groundwater	477,000	331.3
Infiltration	18,000	12.5
Total	495,000	343.8

Legend:

K = Hydraulic Conductivity

H = Depth from static wate table to the assumed aquifer bottom

h_w = Depth from the dewatering target to the assumed aquifer bottom

dH = Dewatering thickness

a = Length of Excavation

b = Width of Excavation

Reference: J. Patrick Powers... [et al.] (2007), "Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd ed." Wiley, Hoboken, NJ.

Equivalent Well Radius - PILE & LAGGING BLOCK 09

$R_0 = 3000*dH*K^{0.5}$

$r_s = (a+b)/3.14$ applies when $a/b < 1.5$ and $R_0 >> rs$

$r_s = ((a*b)/3.14)^{0.5}$

$$Q = \frac{3.14*K*(H^2-h_w^2)}{\ln(R_0/r_s)}$$

Ground Surface	184.6	masl
Highest Water Level	180	masl
Base of Excavation	177.1	masl
Drawdown Target	175.9	masl
Aquifer Bottom	168	masl
Rain Fall	0.029	m
Factor of Safety	3.0	
Hydrualic Gradient	1	
$K =$	1.30E-06	m/s
$H =$	12.0	m
$h_w =$	7.9	m
$dH =$	4.1	m
$R_0 =$	14.0	m
$r_s + R_0 =$	49	m
$a =$	52	m
$b =$	57	m
$r_s =$	35	m

SHORT TERM		
Summary	**L/day**	**L/min**
Groundwater	255,000	177.1
Rainfall	86,000	59.7
Total	341,000	236.8

100 year storm event (L/day): 301,000

LONG TERM		
Summary	**L/day**	**L/min**
Groundwater	255,000	177.1
Infiltration	10,000	6.9
Total	265,000	184.0

Legend:

$K =$ Hydraulic Conductivity
$H =$ Depth from static wate table to the assumed aquifer bottom
$h_w =$ Depth from the dewatering target to the assumed aquifer bottom
$dH =$ Dewatering thickness
$a =$ Length of Excavation
$b =$ Width of Excavation

Reference: J. Patrick Powers… [et al.] (2007), "Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd ed." Wiley, Hoboken, NJ.

Equivalent Well Radius - PILE & LAGGING BLOCK 10

$R_0 = 3000*dH*K^{0.5}$

$r_s = (a+b)/3.14$ applies when a/b <1.5 and R_0>>rs

$r_s = ((a*b)/3.14)^{0.5}$

$$Q = \frac{3.14*K*(H^2-h_w^2)}{\ln(R_0/r_s)}$$

Ground Surface	180.1	masl
Highest Water Level	179.5	masl
Base of Excavation	175.6	masl
Drawdown Target	174.4	masl
Aquifer Bottom	170	masl
Rain Fall	0.029	m
Factor of Safety	3.0	
Hydrualic Gradient	1	
K =	1.30E-06	m/s
H =	9.5	m
h_w =	4.4	m
dH =	5.1	m
R_0 =	17.4	m
r_s+ R_0=	93	m
a =	52	m
b =	186	m
r_s =	76	m

SHORT TERM		
Summary	**L/day**	**L/min**
Groundwater	363,000	252.1
Rainfall	281,000	195.1
Total	644,000	447.2

100 year storm event (L/day): 981,000

LONG TERM		
Summary	**L/day**	**L/min**
Groundwater	363,000	252.1
Infiltration	6,000	4.2
Total	369,000	256.3

Legend:

K = Hydraulic Conductivity

H = Depth from static wate table to the assumed aquifer bottom

h_w = Depth from the dewatering target to the assumed aquifer bottom

dH = Dewatering thickness

a = Length of Excavation

b = Width of Excavation

Reference: J. Patrick Powers… [et al.] (2007), "Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd ed." Wiley, Hoboken, NJ.

Equivalent Well Radius - PILE & LAGGING BLOCK 11

$R_0 = 3000*dH*K^{0.5}$

$r_s = (a+b)/3.14$ applies when a/b <1.5 and R_0>>rs

$r_s = ((a*b)/3.14)^{0.5}$

$$Q = \frac{3.14*K*(H^2-h_w^2)}{\ln(R_0/r_s)}$$

Ground Surface	182.5	masl
Highest Water Level	179	masl
Base of Excavation	178	masl
Drawdown Target	176.8	masl
Aquifer Bottom	170	masl
Rain Fall	0.029	m
Factor of Safety	3.0	
Hydrualic Gradient	1	
K =	1.30E-06	m/s
H =	9.0	m
h_w =	6.8	m
dH =	2.2	m
$R_{0} =$	7.5	m
$r_s+R_{0}=$	80	m
a =	70	m
b =	159	m
$r_{s} =$	73	m

SHORT TERM		
Summary	**L/day**	**L/min**
Groundwater	375,000	260.4
Rainfall	323,000	224.3
Total	698,000	484.7

100 year storm event (L/day): **1,129,000**

LONG TERM		
Summary	**L/day**	**L/min**
Groundwater	375,000	260.4
Infiltration	8,000	5.6
Total	383,000	266.0

Legend:

K = Hydraulic Conductivity
H = Depth from static wate table to the assumed aquifer bottom
h_w = Depth from the dewatering target to the assumed aquifer bottom
dH = Dewatering thickness
a = Length of Excavation
b = Width of Excavation

Reference: J. Patrick Powers… [et al.] (2007), "Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd ed." Wiley, Hoboken, NJ.

Equivalent Well Radius - PILE & LAGGING BLOCK 12

$R_0 = 3000*dH*K^{0.5}$

$r_s = (a+b)/3.14$ applies when a/b <1.5 and R_0>>rs

$r_s = ((a*b)/3.14)^{0.5}$

$$Q = \frac{3.14*K*(H^2-h_w^2)}{\ln(R_0/r_s)}$$

Ground Surface	180	masl
Highest Water Level	178.8	masl
Base of Excavation	175.5	masl
Drawdown Target	174.3	masl
Aquifer Bottom	170	masl
Rain Fall	0.029	m
Factor of Safety	3.0	
Hydrualic Gradient	1	
K =	1.30E-06	m/s
H =	8.8	m
h_w =	4.3	m
dH =	4.5	m
R_0 =	15.4	m
r_s+ R_0=	85	m
a =	76	m
b =	141	m
r_s =	69	m

SHORT TERM

Summary	L/day	L/min
Groundwater	312,000	216.7
Rainfall	311,000	216.0
Total	623,000	432.6

100 year storm event (L/day): **1,087,000**

LONG TERM

Summary	L/day	L/min
Groundwater	312,000	216.7
Infiltration	16,000	11.1
Total	328,000	227.8

Legend:

K = Hydraulic Conductivity

H = Depth from static wate table to the assumed aquifer bottom

h_w = Depth from the dewatering target to the assumed aquifer bottom

dH = Dewatering thickness

a = Length of Excavation

b = Width of Excavation

Reference: J. Patrick Powers… [et al.] (2007), "Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd ed." Wiley, Hoboken, NJ.