

Hydrogeological Investigation

Draft Plan of Subdivision – TACC Development Lands, Bramalea Road and Old School Road Revision 1

Town of Caledon, Ontario

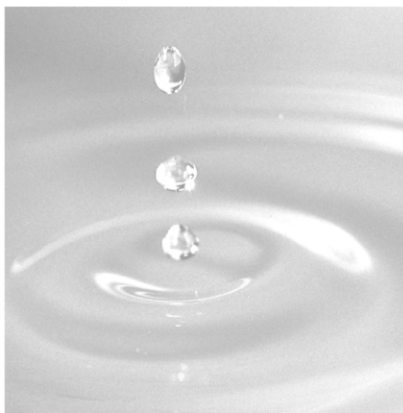
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AB/KP/RW:sg

Record of Revisions

Identification	Date	Description of Issued and/or Revision
First Submission	March 30, 2026	Hydrogeological Investigation
Revision 1	June 9, 2026	Updated grading plans provided by client and mitigated water balance.

Acronyms and Abbreviations

%	Percent (per 100 units)
<	Less than ...
>	Greater than ...
Δ	Change in ...
µm	micrometer
ANSI	Area of Natural and Scientific Interest
APEC	Areas of Potential Environmental Concern
BESR	Brownfields Environmental Site Registry
bgs	Below Ground Surface
BH	Borehole
BH/MW	Borehole / Monitoring Well
cm	centimeters
CVC	Credit Valley Conservation
EASR	Environmental Activity and Sector Registry
EBA	Event Based Area
Elev.	Elevation
ERIS	EcoLog Environmental Risk Information Services Ltd.
ESA	Environmental Site Assessment
ET	Evapotranspiration/Evaporation
FOS	Factor of Safety
FSR	Functional Servicing Report
GEI	GEI Consultants Canada Ltd.
ha	hectares
hr	hours
HVA	Highly Vulnerable Aquifer
I	Infiltration
ICA	Issue Contributing Area
ID	Identification
IPZ	Intake Protection Zone
K	Hydraulic Conductivity
kg	kilogram
km	Kilometers
kPa	Kilopascal
L	Litres
LID	Low Impact Development
m	Ms
m ³	Cubic Meters
MECP	Ministry of Environment, Conservation and Parks
min	minute
mm	Millimeters

MMAH	Ministry of Municipal Affairs and Housing
MW	Monitoring Well
N values	“N” Values
NVCA	Nottawasaga Valley Conservation Authority
O.Reg.	Ontario Regulation
OWES	Ontario Wetland Evaluation System
P	Precipitation
PHC	Petroleum Hydrocarbon
PTTW	Permit to Take Water
PWQO	Provincial Water Quality Objective
R	Runoff
ROI/ROIs	Radius/Radii of Influence
RQD	Rock Quality Designation
RSC	Record of Site Condition
s	Seconds
S	Storage
SCS	Site Condition Standards
SGRA	Significant Groundwater Recharge Area
SPT	Standard Penetration Test
SS	Split Spoon
TRCA	Toronto and Region Conservation Authority
TSS	Total Suspended Solids
VOC	Volatile Organic Compound
WHPA	Wellhead Protection Area
WTRS	Water Taking and Reporting System

It is noted that all elevations in this report are metric/geodetic and expressed in m. All measurements are also in metric and expressed in mm, m or km.

Executive Summary

GEI was retained by TACC Developments (the “client”) to complete a hydrogeological investigation and report for the proposed subdivision at Bramalea Road and Old School Road in Caledon, Ontario. The purpose of this hydrogeological investigation was to determine the subsurface and groundwater conditions at the site and provide a report with preliminary recommendations regarding permitting requirements, construction dewatering, and precipitation run-off and infiltration conditions.

E.S.1. Site Description

- Location: The site is generally bounded by Old School Road to the north; farmland, NHS land, and a golf course to the east; farmland and NHS land to the south; and Bramalea Road to the west.
- The topography of the site was observed to be approximately 258.6 m asl to 272.6m asl and slope from the northwestern border to the south border of the site towards a tributary of the West Humber River.
- Geology: The overburden generally consists of clay and silt glacial till (Halton Till) or sandy silt glacial till (Newmarket Till) overlying sand and silt (Oak Ridges Moraine Deposits).

E.S.2. Groundwater Conditions

- Site Specific Current Monitoring Period Reported: December 2024 to January 2026.
- Supplemented with GEI’s Mayfield Tullamore Land Owner’s Group Local Subwatershed Study from June 2024 to present.
- Groundwater Depths: -0.93 to 12.83 m below ground surface (mbgs), and elevations ranging from Elev. 268.4 to 254.0 masl.
- Local groundwater flow on the site appears to have a general trend towards the southeast towards tributaries of the West Humber River. On the northwestern portion of the site the groundwater contour flow appears to head towards the southwest.
- Regional Groundwater Flow: Generally south, towards Lake Ontario.
- Preliminary Groundwater Quality Chemical Results
 - Regulatory Standards (unfiltered samples):
 - PWQO and Interim PWQO: Met except for aluminum, cobalt, copper, iron, lead, arsenic, zinc and vanadium.
 - Regulatory Standards (filtered samples):
 - PWQO and Interim PWQO: Met except for arsenic, iron, lead and zinc.

E.S.3. Preliminary Construction Dewatering Conditions

- Hypothetical Construction Dewatering Plan

- Zone 1: Excavation for typical site servicing at the site.
- Zone 2: Excavation for the stormwater management (SWM) pond.
- Zone 3: Excavation for the largest residential block.
- Zone 4: Excavation for a deep sanitary invert crossing in the northwest portion of the site.
- Zone 5: Excavation for a deep sanitary invert at the intersection of Street 'B' and Street 'C'.
- Zone 6: Excavation for a deep sanitary invert at the intersection of Street 'A' and Street 'X'.
- Zone 7: Excavation for a deep sanitary invert at the intersection of Street 'A' and Street 'B'.
- Zone 8: Excavation for a deep sanitary invert at the intersection of Street 'B' and Street 'Y'.
- Predicted Water Taking Rates: As high as 347,500 L/day.
- Recommended Dewatering Methods:
 - Shallow Excavations Finer Soils: Conventional sump pumping should suffice above the groundwater table.
 - Deeper Excavations: May require a well-point system.
 - Final Decision: At the discretion of the dewatering contractor based on expertise and site conditions.

E.S.4. Preliminary Water Balance

- Pre-Development Average Annual Infiltration: 105,986 m³/year
- Pre-Development Average Annual Runoff: 104,761 m³/year
- Post-Development (no mitigation) Average Annual Infiltration deficit: 42,499 m³/year
- Post-Development (no mitigation) Average Annual Runoff: 336,225 m³/year
- Post-Development (with mitigation) Average Annual Infiltration deficit: 27,592 m³/year
- Post Development (with mitigation) Average Annual Runoff change from Pre to Post-Development: 195,569 m³/year.
- If LID infiltration measures will be designed and constructed on site, it is recommended to measure the in-situ infiltration rates by excavating test pits and conducting Guelph Permeameter tests in the exact footprints and elevations of the LID measures.

E.S.5. Disclaimer

This executive summary provides a high-level overview of the Hydrogeological Investigation's findings and recommendations. It does not encompass all the details and considerations covered in the full report. For comprehensive information and context, it is essential to read the entire report in full.

1. Introduction

GEI was retained by TACC Developments (the “client”) to complete a hydrogeological investigation and report for the proposed subdivision at Bramalea Road and Old School Road in Caledon, Ontario (hereinafter referred to as the “site”).

For purposes of this report, Bramalea Road is assumed to be oriented in a north/south direction and Old School Road is assumed to be oriented in an east/west direction.

The purpose of this hydrogeological investigation was to determine the subsurface and groundwater conditions at the site and provide a report with preliminary recommendations regarding permitting requirements, construction dewatering, and precipitation run-off and infiltration conditions.

1.1. Site & Project Description

The site is slated for the development of a new subdivision in the Caledon area. Currently, the site is irregular in shape and is occupied primarily with farmland, with silos, barns and other structures near Bramalea Road. NHS lands run generally north-to-south along the eastern and western areas of the site. Based on GEI’s Mayfield Tullamore Local Subwatershed Study Phase 1 two (2) tributaries for the West Humber River are noted on-site. One tributary is located within the northwestern portion of the site and the second tributary is located within the northeastern eastern corner of the site. Four (4) headwater drainage features are in the central to southeastern portion of the site.

Based on the site concept plan provided by the Client the site is approximately 69.9 ha in area, and is bounded by Old School Road to the north; farmland, NHS land, and a golf course to the east; farmland and NHS land to the south; and Bramalea Road to the west, as shown in Figure 1, 2 and in closer detail in Figure 3.

It is understood that most of the site will consist of primarily single detached lots, with rear lane and back-to-back townhouses, a public elementary school near the middle of the site, mixed use / retail in the northwest corner of the site, various parks / parkettes, which could contain LID measures and associated roadways. From the concept plan there appears to be one SWM facility in the northwestern portion of the site. A deep trunk sanitary sewer will run generally west to east and north to south through the middle of the site. The inverts could be as deep as 11.1 m below grade. The remaining sanitary sewers are assumed to be at a depth of 5 to 6 m below grade.

The Mayfield Tullamore Local Subwatershed Study Phase 1 and 2 authored by GEI has been utilized in the writing of this report to review the baseline and subsurface conditions at the site and in the surrounding area. The site is currently a participating property of the Mayfield Tullamore Local Subwatershed Study, Phase 2 and 3 are currently ongoing. Additionally, geotechnical, fluvial geomorphic, natural heritage, hydraulic and hydrologic investigations and conceptual design briefs were also a part of the concurrent scope of work. Relevant sections of the Mayfield Tullamore Local Subwatershed Study Phase 1 and 2 have been summarized, included and referenced in this report.

1.2. Scope of Work

The main objectives of the site specific 2025 hydrogeological investigation for draft plan were to:

- a) Establish the local hydrogeological setting of the site.
- b) Assess groundwater quality and compare the results to PWQO metals.
- c) Carry out preliminary analysis for construction dewatering rates based on the subsurface conditions and assumed site works and discuss the regulatory requirements.
- d) Complete a preliminary water balance (pre-construction and post-construction) and
- e) Prepare a hydrogeological investigation report.

To achieve the objectives of the investigation, GEI proposed and completed the following scope of work:

- a) Conduct a background desktop review of pertinent geological and hydrogeological resources, MECP Water Well Records, previous reports, and proposed site plan drawings.
- b) Visit the site and note existing site conditions, site setting, topography, drainage, water features, and potential water wells within 500 m of the site, if any.
- c) As part of the concurrent geotechnical investigation, GEI advanced fifteen (15) boreholes across the site and installed fifteen (15) monitoring wells within select boreholes. GEI has utilized nine (9) boreholes and ten (10) wells advanced as part of the Mayfield Tullamore Local Subwatershed Study. Certain wells, installed as part of the drilling programs, were designed as nested wells, consisting of both a "deep" and a "shallow" well.
- d) Measure groundwater levels in all monitoring wells and perform hydraulic conductivity testing in six (6) selected monitoring wells.
- e) Collect and submit three (3) representative unfiltered groundwater samples for laboratory testing to compare against PWQO standards for metals and TSS, subject to sufficient available monitoring well groundwater quantity.
- f) Collect and submit three (3) representative filtered groundwater samples for laboratory testing to compare against the PWQO standards for metals and TSS; subject to sufficient available monitoring well groundwater quantity.
- g) Assess eight (8) selected soil samples for particle size distribution (as per Ontario LS standards in reference to ASTM D6913 and D7928).
- h) Carry out a dewatering assessment for construction.
- i) Complete a preliminary water balance (pre-construction).
- j) Prepare a hydrogeological report.

1.3. Applicable Regulations

1.3.1. Source Water Protection

The site is within the jurisdictional boundary of the Toronto and Region Conservation Authority (TRCA) in the CTC Source Protection Region. The following documents should be used in determination of the regulatory requirements when it comes to maintaining hydrogeological function at this site:

- “Approved Source Protection Plan: CTC Source Protection Region”, as amended, by the CTC Source Protection Committee.
 - As the proposed development at the site is assumed to include the construction of a building or buildings on a lot with a cumulative ground floor area equal to or greater than 500 m², and any other impervious surfaces, it will likely be considered a major development.
- Approved Assessment Report: Toronto and Region Source Protection Area, CTC Source Protection Committee, February 23, 2022.

Based on Source Water Protection and Natural Heritage Areas online mapping, the following is noted:

- Wellhead Protection Area (WHPA): The site is not located within a WHPA (Figure 4).
 - A WHPA is an area of land around a municipal well, the size of which is determined by how quickly water travels underground to the well, measured in years, where drinking water may be vulnerable to threats (Peel Region, 2019)
- Intake Protection Zone (IPZ): The site is not located within an IPZ (Figure 5).
 - An IPZ is a vulnerable surface water area (Peel Region, 2019)
- Highly Vulnerable Aquifer (HVA): The northwestern portion of the site is partially located within an HVA (Figure 6).
 - HVA’s are determined through desktop studies and are mapped based on how shallow the water table is, depth to the aquifer and the coarseness of the material.
 - An HVA is an aquifer that has the potential for increased risk of contamination due to its proximity to the ground surface or the presence of surrounding geological materials with high permeability.
- Significant Groundwater Recharge Area (SGRA): The site is located within a SGRA (Figure 7)
 - Significant Groundwater Recharge Areas (SGRAs) are specific regions of the landscape that facilitate an above-average infiltration of water into the ground compared to the overall watershed. These areas are typically characterized by highly permeable soils, consisting of loosely packed coarse materials such as sand, gravel, or exposed fractured bedrock, which enable efficient infiltration of rainfall and snowmelt.
- The site is not located within the Oak Ridges Moraine nor Niagara Escarpment planning areas.
- The site is not located nor within 500 m of an Area of Natural and Scientific Interest (ANSI).

- Two (2) tributaries for the West Humber River are noted on-site. One tributary is located within the northwestern portion of the site and the second tributary is located within the northeastern eastern corner of the site. Four (4) headwater drainage features are in the central to south eastern portion of the site. The site is approximately 11 km from the main channel of the West Humber River and the site is approximately 32 km from the nearest shore of Lake Ontario.
- Based on GEI's Mayfield Tullamore Local Subwatershed Study Phase One, two (2) wetlands are located currently on site. and one (1) wetland in the northwestern portion of the site is considered to be a non-significant wetland and one (1) wetland in the northeastern portion is a candidate for significant wetland.

2. Background Review & Site Setting

The site is approximately 69.9 ha in area and is irregular in shape. The site is located southeast of the intersection of Old School Road and Bramalea Road in Caledon, Ontario. The site is bounded by Old School Road to the north; farmland, NHS land, and a golf course to the east; farmland and NHS land to the south; and Bramalea Road to the west. The site consists mostly of farmland, with silos, barns and other structures near Bramalea Road. NHS lands run generally north-to-south along the eastern and western areas of the site.

2.1. Relevant Previous Investigations

2.1.1. *GEI's Mayfield Tullamore Local Subwatershed Study, Phase 1 Subwatershed Characterization and Intergation (December 2024)*

In 2024, GEI Consultants Canada Ltd. (GEI) was retained to investigate the site as well as other surrounding sites owned by the Mayfield Tullamore Landowner Group Inc. (MTLOG) to conduct a Subwatershed Study. The Subwatershed Study was broken down into Phases. The purpose of the Phase 1 report was to support their privately initiated Secondary Plan and Official Plan Amendment to the Town of Caledon's Official Plan (OP). One of the disciplines studied in the report was Hydrogeology and is outlined and summarized below.

- The Study Area is predominantly covered by fine-grained till soils which are interpreted as Halton Till. In the SABE Scoped SWS, this was subdivided into multiple subunits, the uppermost of which consisted of a fractured till within the uppermost 5 m.
- Groundwater levels ranged across the site. In general, the expected regional groundwater flow directions based on the Study Area data was relatively consistent with the SABE Scoped SWS reporting. Additional monthly groundwater levels are being monitored for one year, and continued monitoring of these monitoring locations will be used to confirm or update the conclusions made to date.
- Artesian groundwater conditions were encountered in several locations, particularly along the watercourse or near a Headwater Drainage Feature on Properties 8 and 9.
- In general groundwater appears to flow towards the southeast, with local flows towards topographic lows such as valley features and watercourses. The major valley features associated with Channel Reaches WHT4(3)-2 and WHT4(3)-1 (see Figure 8, Appendix B1) appear to cut into the water table and groundwater discharge occurs along the valley walls, eventually running off into the watercourse. Based on the results of the drilling program and the borehole logs given in Appendix E3, several wells within the northern portion of the site intersect the ORAC. The top surface of the ORAC appears to slope towards the southeast significantly. Based on the groundwater levels measured within the monitoring wells screened within the ORAC, the groundwater table within the ORAC does not slope as significantly as the upper surface of the ORAC, and instead slopes gently towards the southeast. Therefore, the groundwater table within the ORAC becomes confined by the overlying Halton Till in the northeast portion of the site in wells BH/MW26, BH/MW27, BH/MW29, BH30, BH/MW31D, BH/MW33D, and BH/MW37D.

- The GEI results measured a hydraulic conductivity typically on the order of 5×10^{-7} to 5×10^{-8} m/s for the site soils tested.
- Some exceedances for PWQO metals were encountered in the groundwater samples tested. The filtered groundwater results show that filtration will reduce the amount of metal exceedances within the groundwater. Metals often bind to sediments, which are removed by filtering.
- The preliminary water balance calculations for existing (pre-development) conditions found that the total yearly target for infiltration across the Study Area (including participating and non-participating properties) is 935,451 m³/year.
- The existing condition water balance results determined for the Study Area properties found about 821 mm/year of precipitation, 583 mm/year of potential evapotranspiration, 123 to 134 mm/year of runoff, and 150 to 162 mm/year of infiltration. For the overall Study Area, the averaged total infiltration was 159 mm/year and the runoff was 127 mm/year.
- The calculated infiltration for the Study Area is somewhat higher than the 2008 TRCA estimated value, but are in line with expectations considering the Study Area is mostly surfaced with low-permeability cohesive glacial till deposits (Halton Till). The Study Area results are within the ranges noted by TRCA's online tool. The wider range in values from the online tool could be attributed to the regional scale of the tool lacking site-specific data, or slight differences in the methodology. Overall, the Thornthwaite and Mather model used for the water balance is corroborated based on comparison to TRCA's existing models.

Based on the findings of the report it was concluded by GEI that the Phase 2 report will build on the outputs from Phase 1 to develop an integrated and iterative impact assessment across all disciplines. Phase 2 will introduce a land use plan and include a fulsome assessment of potential impacts on natural heritage and water resource features and functions as a result of land use changes. The Phase 2 report will also review the goals, objectives, and targets set within the SABE SWS, and will include an exploration of climate smart mitigation and management strategies for the proposed land uses.

2.1.2. GEI's Mayfield Tullamore Local Subwatershed Study Phase 2 – Detailed Update to Existing Conditions and Impact Assessment Report (April, 2025)

Subsequent to the Phase 1 report, the objective of the Phase 2 Local SWS report is to use the outcomes of the Phase 1 report to provide a multidisciplinary, integrated impact assessment of proposed land use changes within the Study Area to support the delivery of a preferred land use concept. The report includes recommendations of mitigation and management strategies for identified impacts associated with land use changes and ultimately has guided the iterative determination of a preferred land use plan for the Secondary Plan area.

GEI and SCS have been engaged with the consultant teams tasked with providing Planning and Transportation services as part of the Secondary Plan. Through several technical meetings and discussions, a variety of road alignment and land use concepts have been reviewed. GEI and SCS's input has been focused on how to ensure natural heritage and stormwater management policies and provisions are incorporated and considered. This Phase 2 SWS introduces the preferred land use plan,

however, at this stage, the proposed land use plan being assessed is very high-level. It contemplates the location of a natural heritage system, approximate stormwater management facility and institutional locations, parks, and general neighborhood areas where more specific land uses will be explored as part of the tertiary plan process.

Potential impacts and mitigation measures included in the Phase 2 report pertaining to hydrogeological conditions of the site are summarized below:

Construction Dewatering:

- Where construction dewatering intersects with the ORAC aquifer, depressurization may be required, although temporary, structures built in such conditions have the potential to require long-term drainage.
- Discharge related to construction typically contain a substantial concentration of total suspended solids, most filtered groundwater samples taken showed no exceedances of PWQO metals and therefore filtration is anticipated to be an effective treatment for PWQO metals and should be confirmed by stormwater management engineers.

Post Construction Dewatering:

- Building foundations intersecting the ORAC aquifer may also be impacted, these conditions should be addressed accordingly with water proofing, and/or long-term drainage systems.
- There is potential for post-construction drainage to cause aquifer mining of the ORAC, further detailed studies will be required to confirm if post-construction drainage will be detrimental to ORAC.
- Long-term passive drainage may also occur where infrastructure is constructed below the phreatic surface creating preferential pathways of groundwater flow in subsurface, trench plugs may be used to minimize preferential flow paths. Future studies are recommended to assess the significance of potential impacts.

Natural Environment:

- Majority of surface water features are supported by surface water; some features are supported by groundwater and have the potential to be impacted where construction dewatering ROI intersected the feature. Future reports must investigate the potential for dewatering and drainage to impact these natural features including monitoring plans and features based water balance.
- Where post-construction drainage related to foundation drainage of potential site-specific buildings may have an impact of prevailing groundwater tables and natural features (groundwater supported wetlands) monitoring, and mitigation plans should be developed and SWM design should be adapted to minimize the impact. Where the impact of long-term foundation drainage includes larger drawdowns and impacts, waterproofing basements should be considered to avoid relying on long-term drainage.
- SWM design, guided by feature-based water balance, should seek to mitigate impacts by maintaining the water balance of the wetlands/features.

Future Storm Water Infrastructure:

- High groundwater and artesian conditions may overload SWM infrastructure due to unintended inflows from dewatering along preferential pathways, foundation drains or aquifer upwellings, requiring flow verification, discharge planning and design controls to protect system performance and water balance.
- Design and construction must mitigate groundwater interactions by limiting foundation drain discharges, using third-pipe or waterproof basement systems where needed, installing trench plugs in linear infrastructure, and conducting detailed hydrogeological investigations—especially for deep excavations and SWM facilities in artesian areas.

Land Stability and Settlement

- Construction dewatering and long-term drainage can cause soil settlement and subsidence due to increased effective stress, internal soil erosion, or artesian discharge; therefore, future development must assess settlement risks, protect utilities and foundations through proper filtering and backfill design, and rely on detailed hydrogeological investigations—particularly in artesian areas (e.g., Properties 7, 8, and 9)—to define appropriate mitigation measures and avoid long-term aquifer mining.

Water Supply Wells

- Groundwater supply impacts from development are expected to be low, as the Study Area is outside regulated protection zones, far from municipal wells, and underlain mainly by low-permeability Halton Till that limits recharge to deeper aquifers; artesian conditions further reduce downward infiltration.
- Mapped Highly Vulnerable Aquifer (HVA) and Significant Groundwater Recharge Areas (SGRAs) are based on desktop studies, and site-specific Phase 1 investigations indicate lower actual vulnerability and recharge potential; nevertheless, contamination risks (e.g., salt, fuel, runoff) and water balance maintenance through LIDs must be evaluated in future stages.
- Future development must include safeguards and contingency planning, including well decommissioning, assessment of potential water quality impacts from SWM infiltration, evaluation of deep excavation and dewatering effects, and a response plan for any private well interference during construction.

Climate Change:

- Climate change is expected to increase runoff variability, reduce groundwater recharge, and cause wider groundwater-level fluctuations, potentially stressing wetlands and sensitive ecosystems and slightly increasing water-quantity risks for some nearby shallow or low-yield wells, though overall impacts to local water supply and water quality are expected to remain limited.

Building on the high-level impact assessment and potential mitigation plan outlined in Phase 2, Phase 3 of the Local SWS till focus on identifying mitigation opportunities and establishing monitoring and groundwater management strategies to protect groundwater quantity and quality during construction and long-term development, while informing stormwater design, infiltration opportunities, and planning for hydrogeologically sensitive areas under the preferred land use plan.

2.2. Review of MECP Water Well Records

MECP water well records within 500 m of the site area were obtained from the MECP's online interactive well records map to assess the general nature of the groundwater resource in the near vicinity of the site, and historical/current uses of wells in the area, as shown in Figure 8 and summarized in Appendix A.

Thirty-four (34) water well records were identified on-site and within 500 m of the site. A summary of well records is provided below.

Table 2-1. Summary of MECP Water Well Records

Well Use	Number of Records	Year(s) Installed	Depth of Water Encountered	Well Screen / Open Hole (Media & Depth)
Domestic and/or Livestock	18	1949 to 2019	7.0 to 66.8 m	Overburden: 16.8 to 43.9 m Bedrock: 26.5 to 30.2 m
Public Supply	1	1975	13.4	Unknown
Other, Not Used, and/or Not Listed	15	1964 to 2021	3.0 to 15.2 m	Overburden: 3.0 to 19.8 m Bedrock: 9.1 to 11.0 m

The stratigraphic descriptions within the MECP monitoring well records are often inaccurate due to the methodology in which they are determined (observations of cuttings without depositional context and possibly some mixture between layers, plus no consistency between descriptions of soils between drillers). While this may be the case, an overall sense of the regional stratigraphy can be determined by looking at commonalities between most stratigraphic descriptions and where the wells were terminated in an aquifer. The well records typically indicate silty sand or sandy silt (potentially glacial till in some locations), then clay, sand and silt, then sand and gravel, then shale. Bedrock was encountered in several wells at depths ranging from 9.1 to 30.2 m below existing grade. The noted domestic water supply wells were installed in sand or sand and gravel units typically screened between 16.8 to 43.9 m below existing grade. It is noted the bedrock wells were screened from 9.1 to 30.2 m below existing grade. It is expected that any existing private water supply wells (used for domestic or livestock purposes) on and/or within 500 m of the site may still be in use. Based on the well records with available well screen information the deeper sand and gravel units would most likely be part of the Oak Ridges Aquifer Complex (ORAC). A larger portion of groundwater recharge for the ORAC would most likely not come from surface water as approximately 7.6 to 57.6 m of clay and silt glacial till (Halton Till) is overlying the aquifer reducing local infiltration and recharge.

As dewatering is expected to be temporary and near the ground surface, it is anticipated that any water supply wells within 500 m of the site will not be affected by the temporary dewatering near the ground surface.

2.3. Review of MECP Permits to Take Water

Records of PTTW were obtained within 500 m of the site area from the Access Environment and MECP's online interactive Permits to Take Water map to assess the general nature of the groundwater resources in the vicinity of the site, and the scale of historical/current groundwater takings required in the area. It should be noted that while these records indicate approved daily water taking volumes, it does not provide details on target depths for the water takings nor does it provide the actual volumes extracted, which could be less.

No active water taking records were found on-site, no active water taking records were found surrounding the site within 500 m of the site. The recorded locations of the PTTWs are presented in Figure 9.

2.4. Site Physiographic and Geological Setting

From a regional perspective the site is located primarily within the physiographic region known as the South Slope per Chapman and Putnam (1984). The South Slope is noted to be present at the southernmost flank of the Oak Ridges Moraine, and glacial till are typically encountered (soil types are mostly clay to loam). Runoff tends to be higher, and infiltration tends to be lower in the South Slope as the terrain is not hummocky like the Oak Ridges Moraine (TRCA, 2008) and the finer-grained soils restrict infiltration. The physiographic landform mapping shows that the northern and central part of the site are within the South Slope consisting of Till Plains (Drumlinized).

Ontario Geological Survey surficial geological mapping indicates the site, and surrounding area is surfaced predominantly by either glaciolacustrine deposits comprising of clay to silt-textured till. Modern alluvial deposits of clay, silt, sand or gravel may exist along the tributaries of the West Humber River west of Torbram Road.

The bedrock at the site area corresponds to the Queenston Formation, consisting of shale, siltstone, minor limestone and sandstone. Bedrock topography mapping (Ontario Department of Mines, 1968) shows that the bedrock surface is estimated to range from Elev. 233 to 207 m across the site.

2.5. Visual Inspection of the Site

A visual site inspection was carried out on November 25, 26 and December 4, by GEI staff to assess site drainage, topography, the presence of surface water features, ground cover, and any existing buildings.

At the time of the site inspection the temperature was approximately 0 C and overcast. The topography of the site was observed to be approximately 258.6 m asl to 272.6m asl and slope from the northwestern border to the south border of the site towards a tributary of the West Humber River.

The site is currently mostly farmland with some residential dwellings, barns and other structures. During the site inspection, mostly agricultural fields were observed throughout the site. Based on GEI's Mayfield Tullamore Local Subwatershed Study Phase 1, two (2) tributaries for the West Humber River are noted on-site. One tributary is located within the northwestern portion of the site and the second tributary is located within the northeastern eastern corner of the site. Four (4) headwater drainage features are in the central to south eastern portion of the site. The site is approximately 11 km from the main channel

of the West Humber River and the site is approximately 32 km from the nearest shore of Lake Ontario. Additionally, two (2) wetlands are located currently on site and one (1) wetland in the northwestern portion of the site is considered to be a non-significant wetland and one (1) wetland in the northeastern portion of the site is a candidate for significant wetland.

Considering the site's topography, surface runoff is anticipated to drain predominantly towards the headwater drainage features and wetlands on site or towards the south towards the tributary of the West Humber River to the south of the site.

There were no signs of recent ponding water on the site nor areas with phreatophytic vegetation, such as cattails and bull rushes, which could indicate either groundwater at the surface or low permeability soils. No other surface water or any groundwater discharge features (seeps) were observed on or near the property.

3. Procedures and Methodology

3.1. Borehole Drilling & Monitoring Well Installation

A drilling program associated with GEI's concurrent geotechnical investigation at the site was carried out November 25 to 26 and December 4, 2024.

- Fifteen (15) boreholes were advanced across the site to provide sufficient coverage for investigation of the soil properties across the site.
 - Fifteen (15) boreholes drilled within the overburden to a depth of 6.6 to 23.3 m below current grade or until auger refusal.
 - Fifteen (15) boreholes were instrumented with monitoring wells.
 - Select boreholes were instrumented with nested wells including a “deep” and “shallow well”.

A previous drilling program associated with GEI's Mayfield Tullamore Local Subwatershed Study Phase 1 at the site was carried out April 22 to 30 and May 2 to 17, 2024.

- Fifty-eight (58) boreholes drilled within the overburden to a depth of 2.7 to 20.3 m below current grade or until auger refusal, one (1) borehole was terminated within the bedrock at 6.2 m below current grade.
- Forty-seven (47) boreholes were instrumented with monitoring wells.
- Select boreholes were instrumented with nested wells including a “deep” and “shallow well”.

It is noted the drilling conducted for GEI's Mayfield Tullamore Local Subwatershed Study Phase 1 study area included, but was not limited to the site. Utilized for this report From GEI's Mayfield Tullamore Local Subwatershed Study Phase 1 was fourteen (14) boreholes and ten (10) wells. Select boreholes were instrumented with nested wells including a “deep” and “shallow well”.

The borehole locations were laid out in the field by GEI staff prior to commencement of drilling operations. The locations of underground utilities were coordinated with locating companies. Ground surface elevations of the boreholes and coordinates (referencing NAD 83 geodetic datum) were surveyed by GEI with a Topcon Hiper SR GPS Survey unit. The elevations are provided on the borehole logs in Appendix B. Borehole and monitoring well locations are shown on Figure 3.

Drilling and sampling of the boreholes were completed using track mounted drilling equipment operated by a specialty drilling subcontractor retained and supervised by GEI. The boreholes were advanced to predetermined depths using solid stem augers and sampling was conducted using a 51 mm O.D. SS sampler. SPT N values were recorded for the sampled intervals as the number of blows required to drive an SS sampler 305 mm into the soil using a 63.5 kg drop hammer falling 750 mm, in accordance with ASTM D1586. Soil sampling was conducted at 0.75 m intervals for the upper 3.0 m and at 1.5 m intervals thereafter.

As previously mentioned, a total of twenty-five (25) monitoring wells were installed by GEI on site to facilitate long-term groundwater monitoring, sampling, and in-situ testing. The monitoring well consisted of 50 mm diameter PVC pipe and protective casing. The monitoring wells were installed with 1.5 m or 3.0 m long screens where sufficient overburden was available. Boreholes without wells were backfilled in accordance with O. Reg. 903. Monitoring well construction is shown on the borehole logs in Appendix B and summarized below.

Table 3-1. Summary of Monitoring Well Installation Details

Borehole / Monitoring Well ID	Well Screen Depth (m / masl)	Soil Unit Screened
<i>GEI's Mayfield Tullamore Local Subwatershed Study Phase 1</i>		
BH/MW 20	4.6 to 6.1 / 264 to 262.5	Clayey Silt Glacial Till
BH/MW 21	4.6 to 6.1 / 261.8 to 260.3	Sand
BH/MW 23	19.8 to 21.3 / 248.3 to 246.8	Sand and Gravel
BH/MW 24D BH/MW 24S	4.6 to 6.1 / 259.2 to 257.7 0.6 to 2.1 / 263.2 to 261.7	Clayey Silt Glacial Till
BH/MW 26	4.6 to 6.1 / 256.2 / 254.7	Sand and Silt
BH/MW 28	4.6 to 6.1 / 259.3 to 257.8	Clayey Silt Glacial Till
BH/MW 35	4.6 to 6.1 / 255.4 to 253.9	Sandy Silt Glacial Till
BH/MW 101	16.8 to 19.8 / 250.3 to 247.3	Sand and Silt
BH/MW 102	16.8 to 19.8 / 248.6 to 245.6	Sand and Silt Glacial Till
<i>GEI's Draft Plan of Subdivision – TACC Development Lands, Bramalea Road and Old School Road Revision 1</i>		
BH/MW 201	4.6 to 6.1 / 268 to 266.5	Silt
BH/MW 202	4.6 to 6.1 / 266.5 to 265	Silty Sand to Sandy Silt
BH/MW 204D BH/MW 204S	13.7 to 15.2 / 255.8 to 254.3 4.6 to 6.1 / 264.9 to 263.4	Sand Silty Sand to Sandy Silt
BH/MW 205	4.6 to 6.1 / 265.6 to 264.1	Clayey Sandy Silt Glacial Till
BH/MW 206	4.6 to 6.1 / 264.5 to 263	Silty Sand to Sandy Silt
BH/MW 208D BH/MW 208S	7.6 to 9.1 / 251.2 to 249.7 3.0 to 4.6 / 255.8 to 254.2	Clayey Sandy Silt Glacial Till
BH/MW 209D BH/MW 209S	7.6 to 9.1 / 251 to 249.5 4.6 to 6.1 / 254 to 252.5	Silt Clayey Silt Glacial Till

Borehole / Monitoring Well ID	Well Screen Depth (m / masl)	Soil Unit Screened
BH/MW 211D	16.8 to 19.8 / 245.8 to 242.8	Silt
BH/MW 211S	4.6 to 6.1 / 258 to 256.5	Clayey Silt Glacial Till
BH/MW 212D	19.8 to 22.8 / 248.3 to 245.3	Sand
BH/MW 212S	4.6 to 6.1 / 263.5 to 262	Clayey Silt Glacial Till
BH/MW 215	4.6 to 6.1 / 256 to 254.5	Clay and Silt

GEI field staff examined, and classified characteristics of the soils encountered in the boreholes, including the presence of fill materials, groundwater observations during and upon completion of the drilling, recorded observations of borehole advancement, and processed the recovered samples. All recovered soil samples were logged in the field, carefully packaged, and transported to the laboratory for more detailed examination and classification.

In the laboratory, the samples were classified as to their visual and textural characteristics. All samples were submitted for moisture content determination. Nine (9) samples of the underlying strata were submitted for particle size distribution and are provided in Appendix C. Six (6) samples of the underlying strata were submitted previously from GEI's Mayfield Tullamore Local Subwatershed Study Phase 1 and are provided in Appendix C.

3.2. Hydraulic Conductivity Testing

Rising head hydraulic conductivity tests were conducted to estimate the hydraulic conductivity (K) of the soils at the depths of the well screens. These tests were carried out in monitoring wells at the site with an adequate water volume available (>0.5 m column of water) on December 17 and 18, 2024, after drilling, development, and stabilization of groundwater levels. The hydraulic conductivity tests from GEI's Mayfield Tullamore Local Subwatershed Study Phase 1 which were conducted between May 24 to June 12, 2024 and have been included in this report where applicable.

In a rising head test, water is manually purged rapidly from the monitoring well using LDPE tubing and a foot valve to create a near-instantaneous displacement of water within the well. The water level is then measured as it returns to an equilibrium.

The static water level was measured prior to the start of testing, and the initial change in water level was monitored both manually and by using an electronic level logger. The level loggers were left in the monitoring wells to measure recovery of the groundwater to equilibrium, with regular manual measurements recorded for corroboration of the level logger data. Specialty software (AQTESOLV Pro V4.50.002 by HydroSOLVE Inc.) was then used to analyze the data. The semi-log plots from this analysis for drawdown versus time for the tests are provided in Appendix E.

3.3. Groundwater Sampling

To establish baseline conditions and assess the most suitable discharge options for pumped groundwater during potential dewatering activities, groundwater samples were collected from three (3) monitoring

wells across the site on December 18, 2024 and groundwater samples for GEI's Mayfield Tullamore Local Subwatershed Study Phase 1 on June 5 and 12, 2024 were utilized:

- Three (3) unfiltered groundwater samples for PWQO metals and TSS.
- Three (3) filtered groundwater samples for PWQO metals and TSS.
- Four (4) unfiltered groundwater samples for PWQO metals previously sampled from GEI's Mayfield Tullamore Local Subwatershed Study Phase 1 were utilized for this site.
- One (1) filtered groundwater samples for PWQO metals previously sampled for GEI's Local Subwatershed Study LSS Phase 1 were utilized for this site.

The purpose of sampling for PWQO metals and TSS is for the evaluation of the groundwater to discharge into the natural environment.

Although PWQO and interim PWQO are not legally binding standards, they serve as the foundation for establishing acceptable wastewater loading limits on a site-specific basis. The MECP has acknowledged that applying PWQOs can pose challenges, especially in regard to the limits of PHCs and VOCs. These challenges include instances where PWQOs may fall below the laboratory limits of detection, or PWQOs may be more stringent than background concentrations, even in water bodies with apparently thriving aquatic ecosystems.

Should the quality of groundwater found on site exceed the PWQO standards, additional treatment measures from the dewatering contractor may be required before discharging to the natural environment is advisable and/or approved.

Prior to collection of the samples, a minimum of three (3) standing well volumes of groundwater were purged from each well. The samples were collected via a "low-flow" peristaltic pump (Geotech Geopump Series I, to reduce sediment collected during sampling) and placed into sterile laboratory-supplied vials and/or bottles already pre-charged with analytical test group specific preservatives, as required. New single-use nitrile gloves were used during sample handling. The field-filtered samples were processed through a sterile 45 µm filter prior to collection in the required vials/bottles.

The samples were submitted to CALA-accredited Eurofins for analysis. The results of the groundwater chemistry are presented in the laboratory Certificates of Analysis provided in Appendix F.

3.4. Infiltration Testing

In accordance with the "Low Impact Development Stormwater Management Planning and Design Guide," (Dated 2010, by CVC and TRCA), GEI conducted infiltration testing using a Guelph Permeameter to determine the saturated hydraulic conductivity in the vertical direction.

Measurement of the field-saturated hydraulic conductivity (Kfs) was carried out using a Guelph Permeameter apparatus (Model 2800K1) on November 5 and 6, 2024, at five (5) locations. The weather on the days of testing was clear to overcast and 10 degrees Celsius. The Guelph Permeameter testing was conducted in 60 mm diameter hand-augured boreholes completed to a depth of 0.50 m below existing

grade. Results of the Guelph Permeameter testing are provided in Appendix G and are discussed in Section 4.6.

GEI field staff examined and classified characteristics of the soils encountered in the hand-augured boreholes, including the presence of fill materials, and made groundwater observations during and upon completion of the boreholes. All recovered soil samples were logged in the field, carefully packaged and transported to the laboratory for more detailed examination and classification. In the laboratory, the samples were classified as to their visual and textural characteristics and geotechnical laboratory testing for grain size was carried out on five (5) representative samples with the results provided in Appendix C.

GEI understands that LID measures will be designed and constructed on site, however the location and design details are not currently finalized. GEI can further refine the infiltration rates by conducting Guelph Permeameter tests in the exact footprints and elevations of LID measures, as needed.

4. Subsurface Conditions

4.1. Borehole Stratigraphy

The detailed soil profiles encountered in the boreholes are indicated on the attached borehole logs in Appendix B, and the geotechnical laboratory results are included in Appendix C. The borehole locations are shown on Figure 3 and the subsurface profiles (conceptual geological cross section) interpreted from those logs are included as Figure 10 and 11.

It should be noted that the conditions indicated on the borehole logs are for specific locations only and can vary between and beyond the locations. Additionally, the soil boundaries indicated on the borehole logs are inferred from non-continuous sampling and observations during drilling. These boundaries are intended to reflect approximate transition zones and should not be interpreted as exact planes of geological change.

In addition, the descriptions provided in the borehole logs are inferred from a variety of factors, including visual observations of the soil samples retrieved, laboratory testing, measurements prior to and after drilling, and the drilling process itself (speed of drilling, shaking/grinding of the augers, etc.). The passage of time also may result in changes in conditions interpreted to exist at locations where sampling was conducted.

The soil units from the GEI borehole logs are described below.

4.1.1. *Topsoil and Earth Fill*

The boreholes encountered approximately 50 to 280 mm of topsoil at grade. Topsoil thickness may vary between boreholes and in other areas of the site. Due to the widely spaced boreholes, it is not recommended to rely on the topsoil thicknesses in the boreholes for topsoil volume estimates.

Borehole 20 was advanced near a residential dwelling on Old School Road, encountering earth fill beneath the topsoil. The earth fill consisted of clayey silt with some sand, trace gravel, trace organics and rootlets, extending to a depth of 0.8 m below grade. The fill was dark brown and moist with a firm consistency.

4.1.2. *Upper Cohesive Glacial Till*

The site was predominantly underlain by glacial till deposits with a cohesive matrix comprising clayey silt, some sand to sandy, with trace gravel. Some zones of the glacial till graded to some clay or some sand. cobbles and boulders are inferred to be embedded within the deposits. The cohesive glacial till was encountered in Boreholes 19 to 26, 28, 29, 32, 35, 36, 102, and 201 to 215, extending to depths of 2.3 to 13.7 m below grade (Elev. 270.3 to 249.6 m), or beyond the depth of drilling at 6.6 m below grade in some locations. The upper 0.5 to 0.8 m of the glacial till was weathered (potentially from frost action) or disturbed (possibly from historic farming practices). The weathered / disturbed zone locally contained trace organics or trace rootlets.

The clayey silt glacial till was typically brown and moist, turning grey with depth. The SPT N values measured in the undisturbed glacial till ranged from 6 to greater than 50, indicated a firm to hard (but typically very stiff to hard) consistency. Moisture contents typically ranged from 8 to 22%. Grain size analysis was carried out on samples from Boreholes 205, 208, 210, and 211, and from the five Guelph Permeameter testing locations (GP1 to GP5), measuring 0 to 7% gravel, 18 to 31% sand, 38 to 53% silt, and 16 to 41% clay. The results are in Appendix C.

This upper cohesive glacial till is interpreted as the regional soil unit known as Halton Till.

4.1.3. Layered Clay and Silt

Layered clay and silt, to clayey silt, to silty clay was encountered underlying the upper glacial till in Boreholes 211, 212, 214, and 215, at depths of 4.6 to 13.7 m below grade (Elev. 254.4 to 256.0 m). The deposits extended to depths of 15.2 to 16.8 m below grade (Elev. 247.4 to 251.4 m) in Boreholes 211 and 212, and extended beyond the 6.6 m depth of drilling in Boreholes 214 and 215.

The deposits were grey and moist, wet at depth in Borehole 211, with moisture contents ranging from 12 to 25%. The SPT N values ranged from 21 to greater than 100, indicating a very stiff to hard (but typically hard) consistency.

4.1.4. Cohesionless Sands, Silts, and Gravels

Various cohesionless deposits of sands, silts, and gravels were encountered underlying the upper glacial till in Boreholes 19, 21, 23, 25, 26, 29, 102, 201 to 204, and 206 to 209, or underlying the layered clay and silt in Boreholes 211 and 212. The cohesionless deposits were encountered directly below the topsoil and weathered / disturbed soil in Borehole 101 at 1.2 m below grade (Elev. 265.9 m) and at depths of 2.3 to 16.8 m below grade (Elev. 270.3 to 247.2 m) in the other borehole locations. The deposits typically extended beyond the depth of drilling at 6.6 to 23.3 m below grade, but extended to depths of 12.2 to 13.7 m (Elev. 251.7 to 246.6 m) specifically in Boreholes 29 and 102.

The composition of the deposits had a wide spectrum, grading from sand, to silt, to silty sand, to sandy silt, to sandy gravel, to gravelly sand, with distinct layering noted in some locations. The sandy gravel to gravelly sand layers were encountered in Boreholes 23 and 101 at depths of 9.1 to 10.7 m, extending beyond the depth of drilling in Borehole 23 at 12.6 m and extending to 16.8 m in Borehole 101.

The cohesionless deposits were brown to grey and moist, becoming wet with depth. Moisture contents typically ranged from 2 to 25%. SPT N values measured a loose to very dense relative density, typically compact to very dense.

Grain size analysis was carried out on samples from Boreholes 23, 29, 101, 102, 201, 203, 209, and 211 as shown in Appendix C. The silt deposits in Boreholes 102, 201, and 209 measured 0 to 1% gravel, 2 to 18% sand, 70 to 93% silt, and 5 to 11% clay. The gravel / gravelly deposits in Boreholes 23 and 101 measured 26 to 35% gravel, 52 to 66% sand, 8 to 10% silt, and 0 to 3% clay. The sand deposits in Boreholes 29, 203, and 211 measured 0 to 1% gravel, 78 to 82% sand, 14 to 19% silt, and 3 to 4% clay.

The cohesionless deposits of sands, silts, and gravels encountered between the upper Halton Till and lower Newmarket Till units are interpreted to be part of the regional soil unit known as the Oak Ridges Aquifer Complex (ORAC).

4.1.5. Lower Cohesionless Glacial Till

A deeper cohesionless glacial till deposit was encountered underlying the cohesive glacial till in Boreholes 35 and 213 at 3.0 to 4.6 m below grade (Elev. 262.2 to 255.4 m) and underlying the sands, silts, and gravels in Boreholes 29 and 102 at 12.2 to 13.7 m (Elev. 246.6 to 251.7 m). The deposit extended beyond the depth of drilling in Boreholes 29, 35, and 213 at 6.6 to 15.7 m, and extended to 18.3 m (Elev. 247.1 m) in Borehole 102.

The glacial till had a cohesionless matrix consisting of sand and silt to sandy silt, with trace to some clay and trace gravel, locally silt with some sand. Cobbles and boulders are inferred to be embedded within the glacial till. The measured SPT N values indicated dense to very dense conditions. The deposit was grey and moist to wet with moisture contents ranging from 9 to 15%.

Grain size analyses was carried out on samples from Boreholes 29 and 102, both measuring 9% gravel, 44% sand, 43% silt, and about 5% clay. The results are in Appendix C.

This lower cohesionless till is interpreted as the regional soil unit known as Newmarket Till.

4.2. Groundwater Conditions

Unstabilized groundwater level measurements were taken upon the completion of drilling of each borehole, as shown on the borehole logs in Appendix C. These measurements were taken to provide a rough estimate of the possible excavation and temporary groundwater control constructability considerations that may arise. Additional groundwater level measurements taken during the remainder of the field investigation are considered more representative of static groundwater conditions as the wells had been developed and had time to recover and stabilize following initial construction.

The current groundwater observations are noted on the borehole logs in Appendix B, and a summary of deep and shallow groundwater measurements recorded to date are provided below. Manual groundwater level measurements of the monitoring wells on site are enclosed in Appendix D.

GEI has been retained to complete a groundwater level monitoring program at the site for twelve (12) months (from December 2024 to January 2026). For preliminary planning purposes the highest and lowest groundwater levels measured to date are summarized below.

Table 4-1. Summary of Groundwater Levels.

Shallowest Groundwater Level (m)	Highest Groundwater Elevation (masl)
-0.93 (April to June 2025 – MW 29)	268.4 (April 2025 – MW 205)
Deepest Groundwater Level (m)	Lowest Groundwater Elevation (masl)
12.83 (October 2025 – MW 23)	254.0 (December 2025 – BH/MW 35)

Stabilized groundwater levels have been measured within the monitoring wells from December 2024 to January 2026 for twelve (12) consecutive months, at depths ranging from -0.93 to 12.83 m below ground surface (mbgs), and elevations ranging from Elev. 268.4 to 254.0 masl. It is noted that due to the site's varying surface topography the location of the shallowest or deepest groundwater levels measured do not necessarily coincide with the highest or lowest groundwater elevations measured, respectively.

Groundwater levels, especially near the surface, are expected to show seasonal fluctuations and vary in response to prevailing climate conditions. Based on preliminary data, the local groundwater flow direction is expected to mimic the topography. It is anticipated that groundwater flow within the surficial Halton Till will be towards topographic lows. An approximate groundwater contour plan is provided as Figure 12. Based on this plan, local groundwater flow on the site appears to have a general trend towards the southeast towards tributaries of the West Humber River. On the northwestern portion of the site the groundwater contour flow appears to head towards the southwest.

Flowing artesian groundwater conditions were measured in BH/MW 208D and 209D, which were screened across the clayey silt glacial till interface with the underlying sand and silt deposits. Groundwater was measured at 0.4 to 0.7 m above grade, indicating the underlying sands and silts in those locations are confined and pressurized. BH/MW 208S and 209S screened in the upper glacial till measured groundwater levels deeper than the deep wells, indicating an upward gradient. Flowing artesian groundwater conditions were also encountered in BH/MW 29, which was screened in the deep sand and silt glacial till but also partially captured a confined silt deposit. Groundwater was measured at 0.9 m above grade in that location.

Artesian conditions were also encountered in deep Boreholes 211 and 212. The monitoring wells were screened in the deep sands, confined below the layered clay and silt and clayey silt glacial till deposits. Measurements indicate the piezometric surface is about 12.0 to 12.5 m above the top of the confined sand aquifer. In Borehole 26, the well was screened in sand and silt confined by the clayey silt glacial till, measuring the piezometric surface at 3.2 m above the top of the sand and silt.

The sands, silts, and gravels are interpreted to be the ORAC, which was revealed as a confined aquifer below large areas of the site. The artesian groundwater conditions encountered in the ORAC across the central, southern, and western parts of the site are a significant consideration for deep services, deep foundations, deep SWM ponds, or other excavations that could extend into or near the ORAC deposits.

4.3. Hydraulic Conductivity

In-situ hydraulic conductivity tests were conducted in ten (10) monitoring wells containing a sufficient water volume (greater than 0.5 m column of water in well) on December 17 and 18, 2024. Data from the hydraulic conductivity tests from GEI's Mayfield Tullamore Local Subwatershed Study Phase 1 which was conducted between May 24 to June 12, 2024 and have been included in this report where applicable. The data from these tests were inputted into AQTESOLV Pro V4.50.002 (HydroSOLVE, Inc.) and by applying:

- a. Hvorslev's solution (1979) where the well screen was fully saturated.
- b. Dagan's solution (1978) where the screen was partially penetrating the groundwater table.

Hydraulic conductivity values were calculated from each test. The semi-log plots for the results are provided in Appendix E and are summarized in the table below. It should be noted that the hydraulic conductivity values obtained from the manual level measurements were very similar to the results obtained from the test where the logger data was analyzed.

Table 4-2. Summary of Hydraulic Conductivity Testing Results

ID	Well Screen Depth / Elevation (m)	Soil Unit Screened	Static Water Level ¹ Depth / Elevation (m)	In-Situ Bulk Hydraulic Conductivity (K) (m/s)
<i>GEI's Mayfield Tullamore Local Subwatershed Study Phase 1</i>				
BH/MW 24D	4.6 to 6.1 / 259.2 to 257.7	Clayey Silt Glacial Till	3.5 / 260.4	2.7×10^{-7}
BH/MW 24S	0.6 to 2.1 / 263.2 to 261.7	Clayey Silt Glacial Till	1.3 / 262.5	3.2×10^{-7}
BH/MW 101	16.8 to 19.8 / 250.3 to 247.3	Sand and Silt	10.7 / 256.4	5.6×10^{-8}
BH/MW 102	16.8 to 19.8 / 248.6 to 245.6	Sand and Silt Glacial Till	5.3 / 260.1	7.8×10^{-8}
<i>GEI's Draft Plan of Subdivision – TACC Development Lands, Bramalea Road and Old School Road Revision 1</i>				
BH/MW 204D	13.7 to 15.2 / 255.8 to 254.3	Sand	12.2 / 257.3	4.2×10^{-4}
BH/MW 205	4.6 to 6.1 / 265.6 to 264.1	Clayey Sandy Silt Glacial Till	4.9 / 265.3	6.5×10^{-8}
BH/MW 208D	7.6 to 9.1 / 251.2 to 249.7	Clayey Sandy Silt Glacial Till	-0.7 / 259.5	1.5×10^{-5}
BH/MW 211D	16.8 to 19.8 / 245.8 to 242.8	Sand / Silt	2.8 / 259.8	8.1×10^{-5}
BH/MW 211S	4.6 to 6.1 / 258 to 256.5	Clayey Silt Glacial Till	4.2 / 258.4	2.1×10^{-8}
BH/MW 212D	19.8 to 22.8 / 248.3 to 245.3	Sand	8.4 / 259.7	1.7×10^{-6}

Notes:

1. Variation in the static water levels measured 1-2 weeks after well installation, compared to those measured before hydraulic conductivity testing, can be expected due to the effects of well purging prior to and during the testing.

According to Freeze and Cherry (1979), the typical range in hydraulic conductivity for the soils encountered are as follows:

- Sand: 10^{-2} to 10^{-6} m/s

- Silty Sand: 10^{-3} to 10^{-7} m/s
- Silt: 10^{-5} to 10^{-9} m/s
- Glacial Till: 10^{-6} to 10^{-12} m/s
- Clay: 10^{-9} to 10^{-12} m/s

From the hydraulic conductivity test results the wells screened within or partially within the various glacial till units encountered on site were the order of 10^{-5} to 10^{-8} m/s and fell within the middle to greater of range of the expected values for glacial till (10^{-6} to 10^{-12} m/s) by Freeze and Cherry, with exception of BH/MW 208D. In BH/MW 208D the well was fully screened in clayey sandy silt glacial till and the hydraulic conductivity was on the order of 10^{-5} m/s. This may be due to the artesian conditions observed in the monitoring well. The bottom of the well screen in BH/MW 208D is straddling a silty fine sand which is where the artesian conditions were observed increasing the hydraulic conductivity.

As such, the hydraulic conductivity test results measured on site, at the discrete locations of the monitoring wells are considered to be representative of the overall horizontal hydraulic conductivity of the wide variety of soils encountered on site, the maximum and minimum hydraulic conductivities calculated for the overburden on site are 4.2×10^{-4} m/s to 7.8×10^{-8} m/s, respectively. The values presented above are appropriate conservative values to be used for the preliminary construction dewatering calculations in Section 5.

It is noted that soil samples collected during borehole drilling were collected at discrete depths such that unidentified lenses or layers between these samples and within the depth of the monitoring wells' screens may exist causing any deviations from the typical ranges in hydraulic conductivities as expected from Freeze and Cherry (1979).

4.4. Hydrostratigraphy

The soil stratigraphy across the site varies and units appear to be discontinuous, it is generally expected that all overburden soils on site are permeable to allow groundwater flow to some degree, with the primary water-bearing units expected to generate groundwater inflow during construction being the clayey silt glacial till (Halton Till), sandy silt glacial till (Newmarket Till) and sand and gravel (Oak Ridges Moraine) (described in Sections 4.1.4 and 4.1.8) when they are fully or partially saturated.

Halton Till varies in composition but is known to generally consist of sandy silt to clayey silt till interbedded with silt, clay, sand and gravel (Kassenaar and Wexler, 2006). Figure B126 from Kassenaar and Wexler (2006) estimates the thickness of Halton Till could be on the order of 5 to 10 m thick or greater at the site. This forms the Halton Aquitard hydrostratigraphic unit.

Additionally, Section 2.3.1.3 of Peel Region's Scoped SWS: Part A (Wood, 2022), included a hydrostratigraphic interpretation of the Halton Till, further breaking it down into four (4) distinct units, including the:

- Upper Fractured Till Unit at the top, which was described as massive and generally weathered with vertical fracturing that extended up to 5 mbgs;

- Middle Till Complex that consisted of massive till layers with interbeds of staggered silt to sand and gravel with components exhibiting varying degrees of weathering;
- Underlain by Glaciolacustrine Deposits of layers of fine-grained glaciolacustrine clayey silts and silty clays of varying thicknesses; and,
- Over Lower Till Complex with similar characteristics to the Middle Till Complex, but not as variable.

The regional hydrostratigraphic units expected to be encountered on site are summarized below (Wood, 2022).

Table 4-4. Regional Hydrostratigraphy

Geological Unit	Lithology	Aquifer or Aquitard
Halton Till	Sandy silt to clayey silt till	Aquitard
Oak Ridges Moraine Deposits	Fine sands and silts, with coarser sands and gravels that can dominate local areas	Aquifer
Newmarket Till	Massive and frequently over-consolidated stony and dense silty sand till	Aquitard
Georgian Bay Formation Bedrock	Thin beds of grey-green and grey-blue shales, calcareous siltstones, and silty to argillaceous limestones	Poor aquifers, except where sufficiently weathered or fractured
Queenston Formation Bedrock	Red, silty calcareous shales and clay shale with thin interbeds of grey to green silty limestones and calcareous siltstones	

Of particular importance at the site is the Upper Fractured Till Unit which can be a relatively active groundwater flow zone as it can exhibit a significantly higher relative conductivity, approximately 2 to 3 orders of magnitude higher than the underlying till materials (albeit still considered to be relatively low conductivity). The flow in this unit is considered to be primarily lateral towards surrounding depressional features (wetlands, streams, etc.). Predominant water movement can be laterally through this unit or overland, depending on the groundwater level and the relative locations of depressional features.

Additionally, where stream reaches have incised far enough into or through the till, ephemeral discharge locations (seeps) may be observed. If the stream reaches have incised entirely through the till into the underlying Oak Ridges Moraine Deposits, more permanent groundwater discharge may be observed.

4.5. Groundwater Chemistry

To assess the suitability for discharge of pumped groundwater to the land surface during construction dewatering activities, three (3) monitoring wells were sampled BH/MW 208D, BH/MW 211D and BH/MW 212S on December 18, 2024. Data from GEI's Mayfield Tullamore Local Subwatershed Study Phase 1 was also used and included below where applicable.

The results of the groundwater chemistry are presented in the laboratory Certificates of Analysis provided in Appendix F. A summary of the results is presented in the table below for samples relative to PWQO and Interim PWQO guidelines.

Table 4-5. Summary of Groundwater Quality with Identified Exceedances

Sample ID	Exceedances	
	Interim PWQO	PWQO
<i>GEI's Mayfield Tullamore Local Subwatershed Study Phase 1</i>		
BH/MW24D (Unfiltered)	Aluminum, Cobalt Copper and Vanadium	Iron and Lead
BH/MW 24D (Filtered)	Copper	No exceedances
BH/MW 24S (Unfiltered)	Aluminum, Cobalt, Copper and Vanadium	Arsenic, Iron, Lead and Zinc
BH/MW 101 (Unfiltered)	No exceedances	No exceedances
BH/MW 102 (Unfiltered)	Aluminum, Copper, Cobalt	Iron and Lead
<i>GEI's Draft Plan of Subdivision – TACC Development Lands, Bramalea Road and Old School Road Revision 1</i>		
BH/MW 208D (Unfiltered)	Aluminum	Iron
BH/MW 208D (Filtered)	No exceedances	No exceedances
BH/MW 211D (Unfiltered)	Aluminum and Cobalt	Iron
BH/MW 211D (Filtered)	No exceedances	No exceedances
BH/MW 212S (Unfiltered)	Aluminum and Cobalt	Iron
BH/MW 212S (Filtered)	Cobalt	No exceedances

Seven (7) unfiltered and four (4) filtered groundwater samples were evaluated from both GEI's Mayfield Tullamore Local Subwatershed Study and GEI's Support Draft Plan of Subdivision against the PWQO guidelines. All parameters met the criteria, except for aluminum, cobalt, copper and vanadium for IPWQO and iron, lead, arsenic and zinc for PWQO. Notably, field-filtered samples from the same wells demonstrated a reduction in TSS compared to the unfiltered samples, which correlated with a general decrease in metal concentrations. However, field filtration alone was insufficient to bring all parameters within compliance.

If pumped groundwater will be released to the ground surface it must be suitably treated to remove the parameter exceedances prior to discharge (treatment methods to be determined by the dewatering contractor or civil engineer).

It is expected that during construction dewatering, the pumped water is to be first discharged to a sedimentation tank and/or a silt/sediment bag, at a minimum, before being discharged to the surface.

4.6. Infiltration

4.6.1. Field Methodology

The infiltration testing was conducted to support future preliminary LID design at this site. Locations and elevations of potential LIDs were unknown at the time of the field investigation and reporting. The method used on site is summarized below:

- GEI conducted infiltration testing using a Guelph Permeameter (GP) apparatus (Model 2800K1) on November 5 and 6, 2024, to determine the field-saturated hydraulic conductivity (K_{fs}) of the near-surface soils in the vertical direction. The tests were completed in park and parkette areas shown

on the previous September 2024 concept plan. Some of the parkland has shifted or been removed on the January 2026 site plan.

- The temperature was about 10 degrees Celsius, the weather was clear to cloudy, and a significant rainfall event did not occur within 24 hours nor during the tests.
- The GP testing was conducted in hand-augered boreholes at depths of 0.5 m below grade (Elev. 267.4 to 259.7 m).
- The soils encountered in the hand-augered boreholes consisted of clayey silt to silt and clay glacial till, with some sand to sandy and trace gravel. Grain size analyses were completed on the soil samples from each GP location, with the results in Appendix C.
- The field-saturated hydraulic conductivity was converted to infiltration rates using the approximate relationships provided within Table C2 of Appendix C2 of “*Stormwater Management Criteria*,” (Version 1.0, dated August 2012, by Toronto and Region Conservation Authority). A factor of safety was applied based on Table C3 in Appendix C2 of the TRCA design guide.

4.6.2. Analysis Methods

The field-saturated hydraulic conductivity of the soil was calculated using the one-head method which is calculated as follows:

$$K_{fs} = \frac{C_1 Q_1}{2H_1^2 + \pi a^2 C_1 + 2\pi \frac{H_1}{\alpha^*}}$$

Where: C_1 = shape factor
 Q_1 = flow rate (cm³/s)
 H_1 = water column height (cm)
 a = well radius (cm)
 α^* = alpha factor (0.01 to 0.36 cm⁻¹)

Hydraulic conductivity and infiltration rate are two different concepts and conversion from one parameter to another must account for the hydraulic gradient and consequently cannot be done through unit conversion. In accordance with the TRCA guidelines, the infiltration rate was determined as per the relationship with the field-saturated hydraulic conductivity provided within the document, “*Ministry of Municipal Affairs and Housing (MMAH) Supplementary Guidelines SG-6, Percolation Time and Soil Descriptions, 1997*”, which is summarized below. This table is also shown as Table C2 in Appendix C2 of TRCA’s guideline.

Table 4-1. Approximate Relationships between K_{fs} , T, and I

Hydraulic Conductivity, K_{fs} (cm/s)	Percolation Time, T (min/cm)	Infiltration Rate, I (mm/hr)
0.1	2	300
0.01	4	150
0.001	8	75
0.0001	12	50
0.00001	20	30

Hydraulic Conductivity, K_{fs} (cm/s)	Percolation Time, T (min/cm)	Infiltration Rate, I (mm/hr)
0.000001	50	12

Infiltration rate is the inverse of percolation time. The approximate relationship (as provided in Figure C11 of the TRCA guideline) in which the infiltration rate can be directly calculated from saturated hydraulic conductivity is as follows:

$$K_{fs} = 6 * 10^{-11} (I)^{3.7363}$$

A factor of safety is then applied to the calculated infiltration rate to account for soil variability, gradual accumulation of fine soil sediments during the lifespan of the facility, and compaction during construction. The factor of safety is taken from Table C3 of the TRCA guideline. A higher factor of safety is applied if a soil with a lower infiltration rate is encountered within 1.5 m of the base of the infiltration measure. The factor of safety is established by calculating the ratio of infiltration rate between the upper and lower soil units.

4.6.3. Infiltration Testing Results

The field-saturated hydraulic conductivity and infiltration rates of the soil was calculated using the one-head method with the results summarized below and included in Appendix G.

Table 4-2. Summary of Infiltration Testing Results

Test Pit	GP Test Depth / Elev. (m)	Tested Soil Type ¹	Field-Saturated Hydraulic Conductivity (cm/sec)	Unfactored Infiltration Rate (mm/hr)	Factor of Safety	Factored Infiltration Rate for Design (mm/hr)
GP1	0.5 / 267.4	Clayey Silt to Clay and Silt Glacial Till, Some Sand to Sandy, Trace Gravel	1.17×10^{-4}	48.25	2.5	19.30
GP2	0.5 / 264.7		7.02×10^{-6}	22.72	2.5	9.09
GP3	0.5 / 263.5		3.04×10^{-5}	33.65	2.5	13.46
GP4	0.5 / 260.8		3.14×10^{-5}	33.94	2.5	13.58
GP5	0.5 / 259.7		n/a ²	n/a ²	-	n/a ²

Notes:

1. See Appendix C for laboratory grain size analysis.
2. Steady-state rate of fall did not occur in this test location, indicating low permeability and limited potential for infiltration.

The test results indicate factored infiltration rates ranging from about 9 to 19 mm/hr within the upper glacial till, with one location not achieving a steady-state rate of fall and no infiltration. It is noted that a factored infiltration value less than 15 mm/hr is typically found to be impractical for LID use based on industry experience.

Once LID plans or details are available, they should be provided to GEI for review. Additional in-situ infiltration testing at the LID footprints and elevations should be expected as the design progresses.

It is not recommended to design LIDs to infiltrate into the surficial topsoil layer and/or into the earth fill due to the possibility for variable soil consistency and trace organic content observed in the earth fill. It is typical for the base of infiltration features to be kept at least 1 m above the seasonally high groundwater level.

5. Site Dewatering

5.1. Preliminary Construction Dewatering

No plans have yet been provided for any basements, foundation levels, levels of underground parking and servicing. Preliminary drawings were available for the stormwater management ponds, layout of the proposed mixed-use community and preliminary grading plan (Urbantech, 2026), but due to the preliminary nature are likely to change. In the following section hypothetical dewatering scenarios for excavation and trenching consisting of basements, foundation levels, stormwater management ponds, and servicing are presented for discussion purposes only.

This section of the report presents hydrogeological assumptions, assessments and recommendations regarding the hypothetical excavations and trenching for basements, foundation levels, stormwater management ponds and servicing for the zones summarized below:

- Zone 1: Excavation for typical site servicing at the site.
- Zone 2: Excavation for the stormwater management (SWM) pond.
- Zone 3: Excavation for the largest residential block overlying clayey glacial till deposits.
- Zone 4: Excavation for a deep sanitary invert crossing in the northwest portion of the site.
- Zone 5: Excavation for a deep sanitary invert at the intersection of Street 'B' and Street 'C'.
- Zone 6: Excavation for a deep sanitary invert at the intersection of Street 'A' and Street 'X'.
- Zone 7: Excavation for a deep sanitary invert at the intersection of Street 'A' and Street 'B'.
- Zone 8: Excavation for a deep sanitary invert at the intersection of Street 'B' and Street 'Y'.

The recommendations are based on our understanding of the project and the results of the field investigation. The interpretation and recommendations are intended for the use of the design consultant and Client and shall not be relied upon by any other parties including the construction contractor or used for any purposes other than development of the project design.

Comments on construction methodology and equipment, where presented, are provided only to highlight those aspects that could affect the design of the project. Contractors must make their own assessment of the factual information presented in previous sections of the report, and the implications on equipment selection, construction methodology, and scheduling.

It should be noted that these calculations have been prepared using hypothetical scenarios for discussion and preliminary planning purposes. Should the designs become available, updated drawings will need to be provided and GEI will need to update the calculations to confirm that any recommendations presented here remain valid.

5.1.1. Construction Description & Dewatering Assumptions

The current highest groundwater level measured to date has been assumed that it will be encountered during any removal and replacement of fill materials beneath installations of site servicing and/or beneath future building(s) or SWM ponds.

The dewatering assessment in the following sections assumes open-cut excavations or permeable shoring. A mitigated "worst-case-scenario" approach has been applied to these preliminary dewatering calculations. This approach assesses the reasonable potential impact and suggests methods to consider during construction dewatering.

As outlined in the geotechnical report (GEI, 2026), the site plan shows the proposed creek crossing for street C has shifted north, trenchless methods may be required to install deeper trunk sanitary sewers at this location. It is strongly recommended to advance additional deep boreholes at the crossing located to confirm the subsurface conditions. Given the deep deposits of wet sands and gravels, embedded cobbles and boulders within the glacial till, artesian groundwater conditions encountered in various locations beneath the site, and changing alignment for the proposed crossing, additional geotechnical investigation is considered critical for the success of trenchless sewer installations. For the purpose of this dewatering section, dewatering calculation in the following section is assuming open-cut sections.

GEI's understanding of the proposed work, the excavation, dewatering, and site condition assumptions are summarized below, and explanations are provided in the tables below.

Table 5-1. Summary of Assumed Excavation Geometry

Dewatering Zone		Hypothetical Excavation Dimension				Target Groundwater Elev. ⁴ (m)
		Length (m)	Width (m)	Assume Ground Surface ³ (Elev.)	Lowest Excavation Depth / Elev. (m)	
1	General Site Servicing	100 ¹	4 ¹	258.8	6.0 / 252.8	251.8
2	Excavation for Northwestern SWM Pond	139 ²	100 ²	267.1	7.1 / 260.0	260.7
3	Largest Residential Block (Clayey Glacial Till)	212 ²	52 ²	258.8	3.0 / 255.8	254.8
4	Deep Sanitary Sewer invert at crossing	50 ¹	10 ¹	269.4	5.4 / 258.5	257.5
5	Deep Sanitary Sewer (Street 'B' x Street 'C')	50 ¹	10 ¹	261.5	6.6 / 256.0	255.0
6	Deep Sanitary Sewer (Street 'A' x Street 'X')	50 ¹	10 ¹	262.1	11.1 / 251.0	250.0
7	Deep Sanitary Sewer (Street 'A' x Street 'B')	50 ¹	10 ¹	258.6	8.8 / 250.0	249.0
8	Deep Sanitary Sewer (Street 'B' x Street 'Y')	50 ¹	10 ¹	256.0	5.9 / 249.0	248.0

Notes:

1. Assumed based on similar construction scenarios.
2. Assumed per conceptual site plan.
3. Assumed ground surface from borehole logs or conceptual servicing plan.
4. For functionality and stability during construction groundwater would ideally be at 1 m or below this level.

Table 5-2. Summary of Assumed Groundwater Conditions

	Dewatering Zone	Assume Ground Surface (Elev.) ¹	Local Groundwater Depth / Elev. ² (m)	Target Groundwater Depth / Elev. ³ (m)	Construction Dewatering Expected?
1	General Site Servicing	258.8	259.4	251.8	Yes
2	Excavation for Northwestern SWM Pond	267.1	259.2	260.7	No
3	Largest Residential Block (Clayey Glacial Till)	258.8	259.4	254.8	Yes
4	Deep Sanitary Sewer invert at crossing	269.4	263.5	257.5	Yes
5	Deep Sanitary Sewer (Street 'B' x Street 'C')	261.5	261.3	255.0	Yes
6	Deep Sanitary Sewer (Street 'A' x Street 'X')	262.1	261.9	250.0	Yes
7	Deep Sanitary Sewer (Street 'A' x Street 'B')	258.6	259.8	249.0	Yes
8	Deep Sanitary Sewer (Street 'B' x Street 'Y')	256.0	259.4	248.0	Yes

Notes:

1. Assumed ground surface from borehole logs or conceptual servicing plan.
2. Table 5-1. Summary of Unstabilized and Stabilized Groundwater Encountered
3. For functionality and stability during construction groundwater would ideally be at 1.0 m or below this level.
4. Assumed 1.0 m below target groundwater depth (as per Table 5-1. Summary of Assumed Excavation Geometry).

Based on the conditions above, the following points/assumptions were noted:

- The highest hydraulic conductivity for the shallow clayey silt glacial till was measured to be 3.2×10^{-7} m/s. The hydraulic conductivity for the deeper layers of sand that was used was for the calculations 1.5×10^{-5} m/s as it was representative of the site conditions. The hydraulic conductivity was chosen to represent the soils near each excavation to represent each excavation zone more accurately.
- The highest groundwater elevation measured on site was used for the dewatering calculations for the general site servicing and largest residential blocks. The groundwater elevation used for the deep sanitary inverts was the groundwater elevation measured in the closest monitoring well to the invert location.

As a part of the hypothetical scenario approach, excavations across the site are planned to extend approximately 3.0 to 11.1 m below the prevailing groundwater table.

5.1.2. Radius/Radii of Influence

The Radius of Influence (ROI) for the construction dewatering is estimated based on the empirical Sichardt Equation. The Sichardt equation is described as follows and the results are summarized in the table below (and presented in Appendix H):

$$R_0 = C(H - h)\sqrt{K}$$

Where:

- R_0 = Radius of Influence from the edge of the excavation (m)
- H = Saturated thickness prior to dewatering (m)
- h = Saturated thickness after dewatering (m)
- K = Hydraulic Conductivity (m/s)
- C = C is a factor equal to 3000 for radial flow to the pump wells and between 1500 to 2000 for line flow for the trench or to a line of well points (Somerville 2005,). For the purpose of this investigation, a value of 1750 for C is considered since the ratio of length to width is more than 1.5.

A summary of estimated ROI is provided in Table 5.3.

Table 5-3. Summary of Dewatering Drawdown Conditions for Radius/Radii of Influence

Dewatering Zone		Static Saturated Head	Hydraulic Conductivity	Radius of Influence From The Edge of Excavation
		Above Aquifer Bottom		
		H (m)	K (m/s)	R_0 (m)
1	General Site Servicing	8.6	3.2×10^{-7}	7.5
2	Excavation for Northwestern SWM Pond	-0.51	1.5×10^{-5}	0
3	Largest Residential Block (Clayey Glacial Till)	5.6	3.2×10^{-7}	4.6
4	Deep Sanitary Sewer invert at crossing	7.0	3.2×10^{-7}	6.0
5	Deep Sanitary Sewer (Street 'B' x Street 'C')	7.3	3.2×10^{-7}	6.2
6	Deep Sanitary Sewer (Street 'A' x Street 'X')	12.9	1.5×10^{-5}	80.7
7	Deep Sanitary Sewer (Street 'A' x Street 'B')	11.8	1.5×10^{-5}	73.1
8	Deep Sanitary Sewer (Street 'B' x Street 'Y')	12.4	1.5×10^{-5}	77.1

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

uncertain whether dewatering efforts would reach steady state prior to the completion of construction of each dewatered segment.

5.1.3. Temporary Dewatering Flow Rates

The dewatering rate was estimated using the Driscoll (1986) equation for unconfined and point source flow (where ratio of length to width is less than 1.5). The equation is based on a number of assumptions including ideal aquifer conditions such as homogenous, isotropic uniform thickness and infinite areal extent (Powers et al. 2007). The equation was used to calculate the dewatering flow rate estimates for non-linear excavations (Zone 2) and is expressed as follows:

$$Q = \frac{\pi K(H^2 - h^2)}{\ln R_a / r_s}$$

Where:

- Q = Anticipated pumping rate (m³/day)
- K = Hydraulic conductivity (m/day)
- H = Saturated thickness prior to dewatering (m)
- h = Saturated thickness post dewatering (m)
- R₀ = Radius of Influence from the edge of excavation (m)
- r_s = Equivalent well radius of excavation (m)
- $r_s = \sqrt{XW/\pi}$
X = Excavation length (m)
W = Excavation Width
- R_a = radius of influence from the center of the excavation (R₀+r_s)

The dewatering rate was estimated using Driscoll (1986) equation for unconfined and line source flow (where ratio of length to width is more than 1.5). The equation is based on a number of assumptions including ideal aquifer conditions such as homogeneous, isotropic, uniform thickness and infinite areal extent (Powers et al. 2007). This equation was used to calculate the dewatering flow rate estimates for linear excavations (Zone 1, 3,4 and 5) and is expressed as follows:

$$Q = 2 \left(\frac{xK(H^2 - h^2)}{2L} \right) + \left(\frac{\pi K(H^2 - h^2)}{\ln R_a / r_s} \right)$$

Where:

- Q = Rate of pumping (m³/s)
- K = Hydraulic conductivity (m/s)
- B = Confined aquifer thickness
- H = Head beyond the influence of pumping (static groundwater elevation) (m)
- h = Head above base of aquifer at the excavation (m)
- R₀ = Radius or zone of influence (m)*
- r_s = Equivalent well radius (m)
- R_a = radius of influence from the center of the excavation (R₀+r_s)

x = Length of excavation (m)
L = Length of Influence for linear flow to trench (m)

The dewatering rate was estimated using Driscoll (1986) equation for confined and line source flow (where ratio of length to width is more than 1.5). The equation is based on a number of assumptions including ideal aquifer conditions such as homogeneous, isotropic, uniform thickness and infinite areal extent (Powers et al. 2007). This equation was used to calculate the dewatering flow rate estimates for linear excavations (Zone 6, 7 and 8) and is expressed as follows:

$$Q = 2 \left(\frac{xKB(H-h)}{L} \right) + \left(\frac{2\pi KB(H-h)}{\ln R_a/r_s} \right)$$

Where:

Q = Rate of pumping (m³/s)
K = Hydraulic conductivity (m/s)
B = Confined aquifer thickness
H = Head beyond the influence of pumping (static groundwater elevation) (m)
h = Head above base of aquifer at the excavation (m)
R₀ = Radius or zone of influence (m)*
r_s = Equivalent well radius (m)
R_a = radius of influence from the center of the excavation (R₀+r_s)
x = Length of excavation (m)
L = Length of Influence for linear flow to trench (m)

Based on the assumptions provided in this report, the results of the dewatering rate estimates are summarized in Table 5-4, and calculation details are provided in Appendix H. To account for variability of parameters such as uncertainty of hydraulic properties of water bearing formation and climate conditions, a safety factor of 2 was applied to the estimated results (Table 5-4).

In addition to groundwater seepage estimates, the precipitation from a storm event into the excavation footprint should be considered. In the absence of guideline to consider precipitation from Peel Region, the City of Toronto (2014) design criteria have been used. According to the City of Toronto (2014), an intensity of precipitation for 2-hour storm event with a frequency of 2-years is to be considered, which is a 25 mm storm event.

The detailed estimates dewatering flow calculations are provided in Appendix H.

Table 5-4. Summary of Construction Dewatering Flow Rate Calculations

Dewatering Zone		Construction Dewatering Flow Rate		
		As Calculated	Including FOS ¹	Including FOS and Rainfall Event ^{2,3}
		L/day		
1	General Site Servicing	25,276	50,553	60,553

Dewatering Zone		Construction Dewatering Flow Rate		
		As Calculated	Including FOS ¹	Including FOS and Rainfall Event ^{2,3}
		L/day		
2	Excavation for Northwestern SWM Pond	0	0	347,500
3	Largest Residential Block (Clayey Glacial Till)	22,211	44,421	320,021
4	Deep Sanitary Sewer invert at crossing	11,434	22,867	35,367
5	Deep Sanitary Sewer (Street 'B' x Street 'C')	11,955	23,909	36,409
6	Deep Sanitary Sewer (Street 'A' x Street 'X')	52,115	104,230	116,730
7	Deep Sanitary Sewer (Street 'A' x Street 'B')	99,679	199,358	211,858
8	Deep Sanitary Sewer (Street 'B' x Street 'Y')	81,674	163,347	175,847

Notes:

1. A Factor of Safety (FOS) of 2.0 is included to account for seasonal fluctuations in the groundwater table, initial removal of groundwater from storage and variation in hydrogeological properties beyond those encountered during this study.
2. A 25 mm rainfall event was included in the water-taking calculation.
3. It is noted that under specific conditions, if the water taking is 100% storm water registration on the EASR may not be required, however if water taking consists of any mixture of storm water and groundwater typical registry or permitting is likely required.

The servicing for the deep sanitary sewer has deepest inverts of 11.1 m bgs potentially within the deeper sand and silts of the ORAC. The artesian conditions encountered in the southern portion and potentially elsewhere on site could pose a challenge for dewatering considerations and depressurization of the sand and silts of the ORAC could be necessary depending on target groundwater level and excavation depths. The calculations for an open cut excavation are shown above to aid in discussions of dewatering and permitting

The Town of Caledon engineering standards do not specify a minimum clearance between basement slabs and the seasonal high groundwater table. Based on the groundwater monitoring data provided in Section 4.2, seasonal high groundwater levels typically range from -0.93 to 12.83 m below existing grade Elev 268.4 to 254.0 m above sea level. Some basements in the proposed development would extend below the seasonal high groundwater level, and in most cases below the prevailing groundwater table throughout the year. Similarly, subsurface infrastructure (e.g., watermains, sewers) have the potential to form preferential flow paths due to disturbance of soils along their length, potentially leading to groundwater drainage and lowering of the overburden water table.

Where basement levels and any perimeter subdrains are kept above the seasonal high groundwater level (with a typical clearance of at least 0.5 to 1.0 m to account for long-term yearly variations) or where basement levels are fully waterproofed (i.e. no drains) and designed to resist hydrostatic pressures, no long-term dewatering would be anticipated. Installation of sewers and watermains with trench plugs or clay collars can also limit long-term dewatering and groundwater drainage.

A preliminary assessment is completed below for potential permanent dewatering rates, should basement levels be constructed below the groundwater table without waterproofing of structures that extend below the water table. The following additional assumptions are made for the purposes of providing an assessment:

- For most of the residential development areas, low density development is anticipated (e.g., single-detached dwelling units, townhouses). The largest residential block shown in the concept plan provided to GEI is 52 m wide by 212 m.
- It is assumed the basements are constructed in the clayey silt glacial till. If basements encounter sand, sand and gravels and silts long-term dewatering rates could be significantly higher.
- Rainfall events are not included for long-term dewatering because there is no open excavation.
- The preliminary permanent dewatering rates for the largest residential block is 22,211 L/day and 44,421 L/day with a factor of safety of two. The permanent dewatering calculations can be found in Appendix H.

The estimates were carried out using the methodology previously discussed above. It is reiterated that the dewatering estimates are for the support of draft plan only, and additional detailed analysis must be carried out to support future work within the site.

5.1.4. Permit Recommendations

The volume of water entering the excavation during construction will be based on both groundwater infiltration and precipitation events. Based on O. Reg. 63/16, the following dewatering limits and requirements are as follows:

- With the revisions of O.Reg. 63/16 that came into effect July 1, 2025, construction dewatering activities exceeding 50,000 L/d are required, with few exceptions, to be registered on the EASR system.
- In the case of permanent dewatering requirements, a Category 3 PTTW would be only required if the groundwater taking is more than 397,000 L/d.

Considering that the total anticipated dewatering rate is more than 50,000 L/d, a registration on the EASR system will be required during construction. Dewatering more than 50,000 L/day shall not take place until the proposed water taking is registered with the MECP. Temporary dewatering discharge rates will likely be higher due to higher groundwater table elevations.

Pre-consultation with MECP can also be considered to confirm the permanent dewatering approach and requirements. Approval from the Town and possibly the Toronto and Region Conservation Authority (TRCA) could also be necessary.

These regulatory requirements must be assessed further during future development stages, once detailed site plans are available and additional field investigations are completed.

It is the responsibility of the contractor to ensure dry conditions are maintained within the excavations at all times. Based on the calculated water taking rate, it is expected that sump pumping, well points and potentially deep well dewatering will be required to achieve the recommended drawdowns during

earthworks. However, the dewatering contractor is responsible for selecting the dewatering method based on their preferred means and methods after reviewing the information provided in this report. Additional pumping capacity may be required to maintain dry conditions within the excavation during and following significant precipitation events.

The maximum flow calculation is intended to provide a conservative estimate to account for unforeseeable conditions that may arise during construction. It should be noted that the dewatering estimates provided in this report are based on assumptions and details available at the time of this report. If changes to the design are implemented (e.g., increase to planned excavation depths, widening of excavations, increased length of trenching etc.), the dewatering estimates must be revised to include and reflect future changes and to ensure that any conclusions or recommendations made by GEI remain valid.

5.1.5. Remedial Dewatering Activities

The dewatering contractor will be responsible for finalizing and implementing the discharge plan, including information such as the exact discharge location, erosion control methods, method of conveyance, treatment systems, temperature of the discharged groundwater, etc. It is the contractor's responsibility to implement a treatment system to ensure that discharged groundwater meets the applicable standards. This may be done by examining the hydrogeologic conditions in a test pit (and/or a full-range pumping test by the dewatering subcontractor).

Treatment and disposal of the dewatering discharge should follow best management practices, including sediment and erosion control measures, removal of suspended solids by a decanting tank and/or filter bag, as well as water quality and quantity control monitoring programs, as mentioned earlier. The contractor should be aware that the purpose of the dewatering system is to maintain stable excavation slopes and dry working conditions during excavation.

The extent and details of the dewatering scheme (trench or well dimensions, spacing, pump levels, screen size and wick gradation, etc.) are left solely to the contractor's discretion to achieve the performance objectives for maintaining stable slopes and dry working conditions and will be based on their own interpretation and analysis of site conditions, equipment, experience, and efficiency. The contractor should also appreciate that additional dewatering means and modifications may be required as variations in site conditions are encountered. The recommended groundwater taking, and discharge plans are provided in Appendices I and J, respectively.

5.1.6. Impact Assessment for Groundwater Dewatering

The impact assessment for taking groundwater during construction is provided in the Groundwater Taking Plan in Appendix I and includes a review of settlement, impacts to nearby groundwater users or to surface water / environmental features.

6. Preliminary Water Balance

6.1. Water Balance Components

A water balance is an accounting of the water resources within a given area. The water balance equates the precipitation (P) over a given area to the summation of the change in groundwater storage (S), evapotranspiration/evaporation (ET), surface water runoff (R) and infiltration (I) using the following equation:

$$P = S + I + ET + R$$

The components of the water balance vary in space and time and depend on climatic conditions as well as the soil and land cover conditions (i.e., rainfall intensity, land slope, soil hydraulic conductivity and vegetation). For example, runoff occurs at a higher percentage during periods of snowmelt when the ground is frozen or during intense rainfall events.

Precise measurement of the water balance components is difficult, and as such, approximations and simplifications are made to characterize the water balance of a property. Field observations of the drainage conditions, land cover and soil types, groundwater levels and local climatic records are important inputs to the water balance calculations.

- Precipitation (P): For the purposes of approximating the annual precipitation at this site, the monthly rainfall between 1981 and 2010 was used based on Environment Canada historical weather data for the “Albion Field Center” weather station (Climate ID 6152695, Latitude 43°55' N, Longitude 79°50' W, Elevation 281.9 m), which is located about 13 km north of the site.
- Storage (S): Although there are groundwater storage gains and losses on a short-term basis, the net change in groundwater storage on a long-term basis is assumed to be zero.
- Evapotranspiration/Evaporation (PET): The evapotranspiration and evaporation components vary based on the characteristics of the land surface cover (i.e., type of vegetation, soil moisture conditions, perviousness of surfaces, etc.). Potential evapotranspiration refers to the water loss from a vegetated surface to the atmosphere under conditions of an unlimited water supply. Evaporation occurs from a hard surface (such as flat rooftops, asphalt, gravel parking areas, etc.).
- Water Surplus (R + I): The difference between the mean precipitation and evapotranspiration is referred to as the water surplus. The water surplus is divided into two parts: surface or overland runoff (R) and the infiltration into the surficial soil (I). The infiltration is comprised of two end member components: one component that moves vertically downward to underlying aquifers (referred to as percolation, deep infiltration or net recharge) and a second component that moves laterally through the near surface soil profile or shallow soils as interflow that re-emerges locally to surface (i.e., as runoff) at some short distance and time following precipitation.

6.2. Water Balance Approach and Methodology

The analytical approach to calculate the water balance involves monthly soil-moisture balance calculations to determine the pre-development infiltration volumes. The detailed water balance calculation is provided in Appendix K, which is summarized in this and subsequent sections of the report. The following assumptions were used as part of the soil-moisture balance calculations:

- A soil moisture balance approach assumes that soil does not release water as potential recharge while a soil moisture deficit exists.
- During wetter periods, any excess of precipitation over evapotranspiration first goes to restore soil moisture. Considering the nature of the current near surface soils and vegetation cover, a soil moisture storage capacity of 75 mm was assumed for pre-development scenarios, respectively.
- Once the soil moisture deficit is overcome, any further excess water can then pass through the soil as infiltration and either become interflow (indirect runoff) or recharge (deep infiltration).

Monthly potential evapotranspiration calculations accounting for latitude, climate and the actual evapotranspiration and water surplus components of the water balance based on the monthly precipitation and soil moisture conditions were calculated. The MECP SWM Planning and Design Manual (2003) methodology for calculating total infiltration based on topography, soil type and land cover was used, and a corresponding infiltration factor was calculated for pre-development conditions only. The water surplus was multiplied by the infiltration factor to determine both the pre-existing condition annual volumes for run-off and infiltration for the property.

The pre-development scenario was estimated from the site inspection and aerial images such that the site pre-development is considered to be 96% permeable and 4% impermeable. The water balance must be updated following final site configuration to reflect the actual plans.

The post-development land use permeable and impermeable percentages was provided by Glen Schnarr & Associates and is provided in Appendix K. It is noted that the total post-development area used for the water balance calculations was 69.85 ha.

The proposed mitigation measures, developed in coordination with Urbantech, include directing Park Block drainage to low-impact development (LID) features designed to capture a 40 mm storm event, along with a separate Pond Block LID designed to capture 12 mm storm event. Additional details of the proposed LID mitigation measures are included in Appendix K. The current site plans are subject to change; the water balance must be updated following the final site configuration.

It is noted that the infiltration and runoff values presented in Appendix K are estimates only. Single values are used for the water balance calculations, but it is important to understand that infiltration rates are dependent upon the hydraulic conductivity of the surficial soils which may vary over several orders of magnitude. As such, the margins of error for the calculated infiltration and runoff component values are potentially quite large. These margins of error are recognized, but for the purposes of this assessment, the numbers used in the water balance calculations are considered reasonable estimates based on the site-specific conditions and useful for comparison of pre- to post-development conditions.

6.3. Existing Conditions

Detailed water balance calculations are included in Appendix K. The pre-development and post-development with mitigation calculations are summarized in this section are preliminary only and must be updated once site plans are finalized.

The table below summarizes the pre-construction and post-construction water balance as per the proposed site development plans.

Table 6-1. Summary of Pre-Development and Post-Development Water Balance Conditions

Condition	Total Area (ha)	Relative Permeable Areas	Relative Impermeable Areas	Average Annual Infiltration Volume (m ³ /year)	Average Annual Runoff Volume (m ³ /year)
Pre-/Existing Development Land Use	69.85	96%	4%	105,986	104,761
Post-Development Land Use		38%	62%	42,499	336,225
Pre-to-Post Change Without Mitigation		-	-	63,487 (-60%)	231,464 (+221%)
Pre-to-Post Change Without Mitigation		-	-	-27,592 (-26%)	195,569 (+187%)

Based on the water balance infiltration will be decreased by 63,487 m³/year (-66%) and increase runoff by 231,464 m³/year (221%) from pre to post development. This means approximately 63,487 m³/year of infiltration is required to maintain the water balance on site. With the proposed mitigation for the site, the post development infiltration with mitigation measures will decrease average infiltration by about 27,592 m³/year (26% decrease) and increase runoff by 195,569 m³/year (187% increase). The potential impacts of these changes and recommended mitigation measures are discussed below.

6.4. Recommended Mitigation Measures

The three broad categories which typically need to be mitigated and accounted for are:

- Reducing the volume and speed in which additional surface water runoff occurs;
- Increasing the amount of infiltration to match pre-development conditions; and
- Ensuring that the quality of existing surface water features and groundwater will not be adversely impacted.

6.4.1. Runoff Quantity

Urban development of an area affects the natural water balance. The most significant difference is the addition of impervious surfaces as a type of surface cover (e.g., roads, parking lots, driveways, rooftops). Impervious surfaces prevent infiltration of water into the underlying soils and the removal of the vegetation reduces the evapotranspiration component of the natural water balance. The evaporation component from impervious surfaces is relatively minor (estimated to be 15% of precipitation) compared

to the evapotranspiration component that occurs with vegetation in this area (up to two thirds of precipitation). So, the net effect of the urbanization of the site is that most of the precipitation that falls onto impervious surfaces increases the surplus water resulting in more direct runoff from developed areas and reduced natural infiltration.

In conjunction with increased runoff, there is a reduction in infiltration to the shallow groundwater system. A reduction in infiltration can potentially lead to a lowering of the local water table and reduce the potential for this seasonal water table intersection and discharge.

Methods which do not necessarily increase infiltration rate, but decrease the volume and concentration of surface water runoff can be considered at this site include (but are not limited to):

- Increasing the topsoil thickness by about two times the normal thickness (up to 30 cm) to retain more water in storage; and
- Implementation of rainwater harvesting which intercepts, diverts and stores roof runoff (i.e., cisterns) for future use.

6.4.2. Mitigation Measures for Maintaining Infiltration

The increases in surface water runoff that will occur with urban development and mitigation of the potential impacts to the local water table due to reduction of infiltration may be minimized by using appropriate stormwater management and using LID measures to promote infiltration. These measures can be implemented on-site.

The basic premise for LID is to try to minimize changes to runoff and infiltration. As outlined in the MECP SWMP Design Manual (2003), Technical Guidelines for Stormwater Management Submissions published by the LSRC (2022), and Low Impact Development Stormwater Management Planning and Design Guide published by the Credit Valley Conservation (CVC) and Toronto Region Conservation Authority (TRCA (2010), and industry standard for best practices in Southern Ontario, there are a suite of techniques that may be considered to promote infiltration and reduce runoff.

In order to maintain groundwater function at the site the following LID measures have been proposed by the Water Resources Engineer (Urbantech):

- Pond LID - Infiltration chamber facility.
- Park LID - Infiltration gallery.

Implementation of LID measures will not only allow for infiltration of the surface water into the near-surface groundwater regime but will also allow for increase in natural filtration of surficial runoff, prevent sedimentation transport and potential erosion, and help reduce flooding by increasing the transit time for water on the site.

If LID infiltration measures will be designed and constructed on site, it is recommended to measure the in-situ infiltration rates by excavating test pits and conducting Guelph Permeameter tests in the exact footprints and elevations of the LID measures.

6.4.3. *Groundwater Quality*

Depending on land use, runoff from urban developments may contain a variety of dilute contaminants such as suspended solids, chloride from road salt, oil and grease, metals, pesticide residues, phosphorous, bacteria and viruses. For groundwater, generally except for the dissolved constituents such as nitrogen and salt, most contaminants are attenuated by filtration during groundwater flow through the soils.

LID measures or end treatments such as oil/grit separators or wet ponds also help to remove suspended solids and other contaminants in runoff prior to infiltration or conveying the flows off the site, especially when a treatment train approach is taken for stormwater management. Any stormwater management facilities must be designed such that the water quality is maintained or improved prior to discharging water from the site or infiltrating water into the ground.

Runoff from rooftops and landscaped areas are typically considered “clean” and can be collected and infiltrated where possible. Infiltration-based practices for runoff from paved areas may be restricted for the proposed commercial development or may require pre-treatment prior to any infiltration.

Provided only clean or pre-treated runoff will be infiltrated, the groundwater quality will not be degraded and will not impact nearby domestic wells or other nearby environmental features.

7. Limitations

The recommendations and comments provided are necessarily on-going as new information of underground conditions becomes available. More specific information with respect to the conditions between samples, or the lateral and vertical extent of materials may become apparent during excavation operations. The interpretation of the borehole information must, therefore, be validated during excavation operations. Consequently, conditions not observed during this investigation may become apparent. Should this occur, GEI should be contacted to assess the situation and additional testing and reporting may be required.

GEI should be retained for a general review of the final design drawings and specifications to verify that this report has been properly interpreted and implemented. If not accorded the privilege of making this review, GEI will assume no responsibility for interpretation of the recommendations in the report.

The comments given in this report are intended only for the guidance of the design engineers. The number of boreholes required to determine the localized underground conditions between boreholes affecting construction costs, techniques, sequencing, equipment, scheduling, etc. could be greater than has been carried out for design purposes. Contractors bidding on or undertaking the works should, in this light, decide on their own investigations, as well as their own interpretations of the factual borehole results, so that they may draw their own conclusions as to how the subsurface conditions may affect them.

This report was authorized by and prepared by GEI for TACC Developments (as provided in the signed Standard Professional Services Agreement). Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. GEI accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this project.

8. Closure

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

Yours truly,

GEI Consultants Canada Ltd.

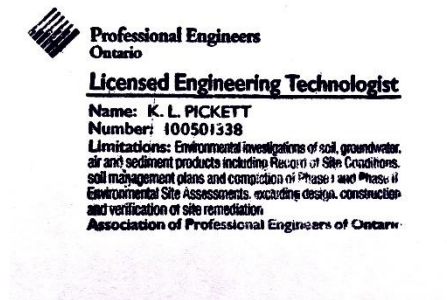
Prepared By:



Aiden Belfrage, B.E.S.
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Reviewed By:

**Review for Land Stability and Settlement in
Appendix I only:**



Kim Pickett, M. Ed., C.E.T, LET, QP_{ESA}
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Russell Wiginton, P.Eng.
Senior Geotechnical Engineer

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Figures

Figure 1. TACC Lands Site Location Plan

Figure 2. Site Concept Plan

Figure 3. Borehole / Monitoring Well

Figure 4. Well Head Protection Areas

Figure 5. Intake Protection Zones

Figure 6. Highly Vulnerable Aquifers

Figure 7. Ecologically and Significant Groundwater Recharge Areas

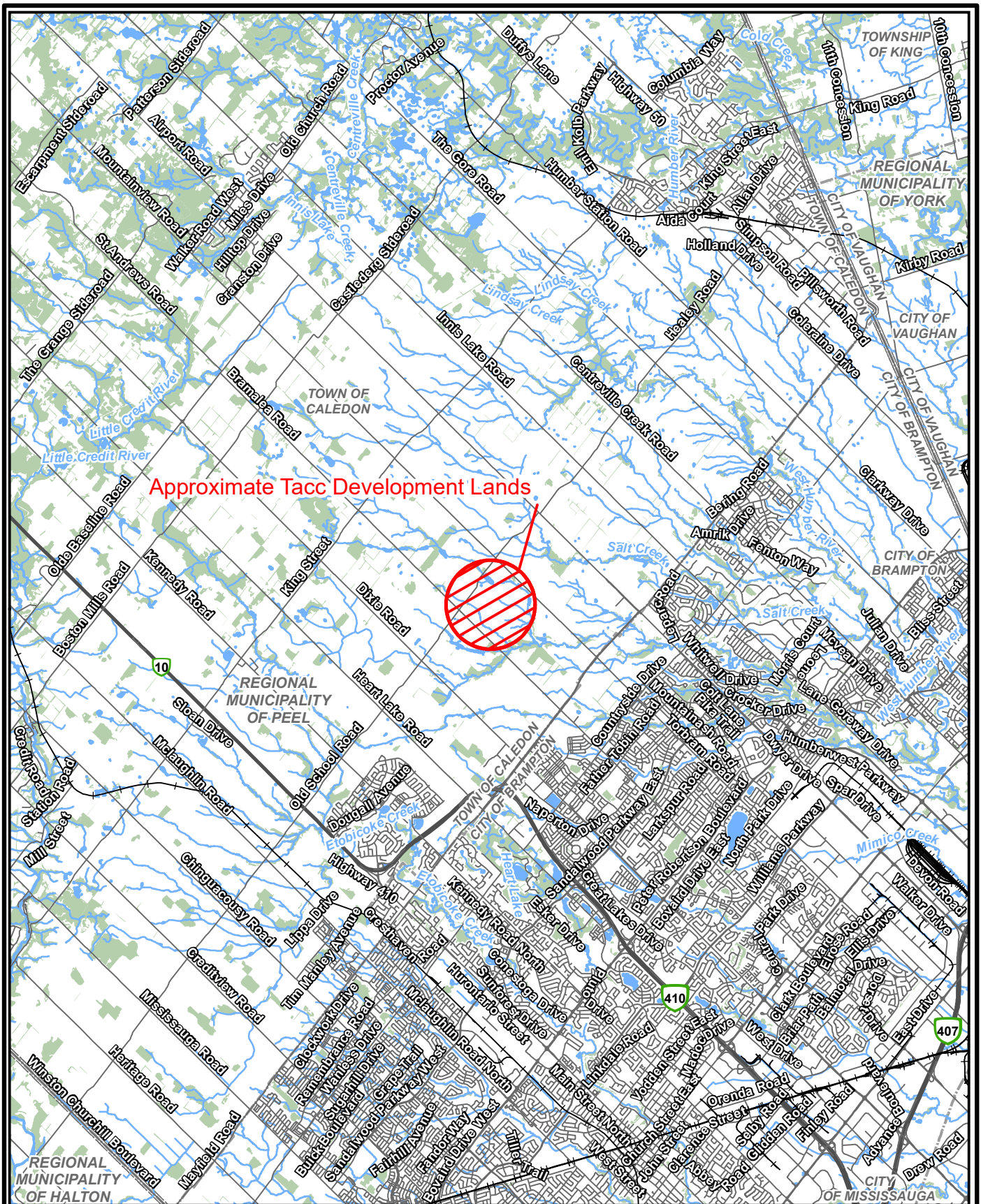
Figure 8. MECP Water Well Records

Figure 9. MECP PTTW Records

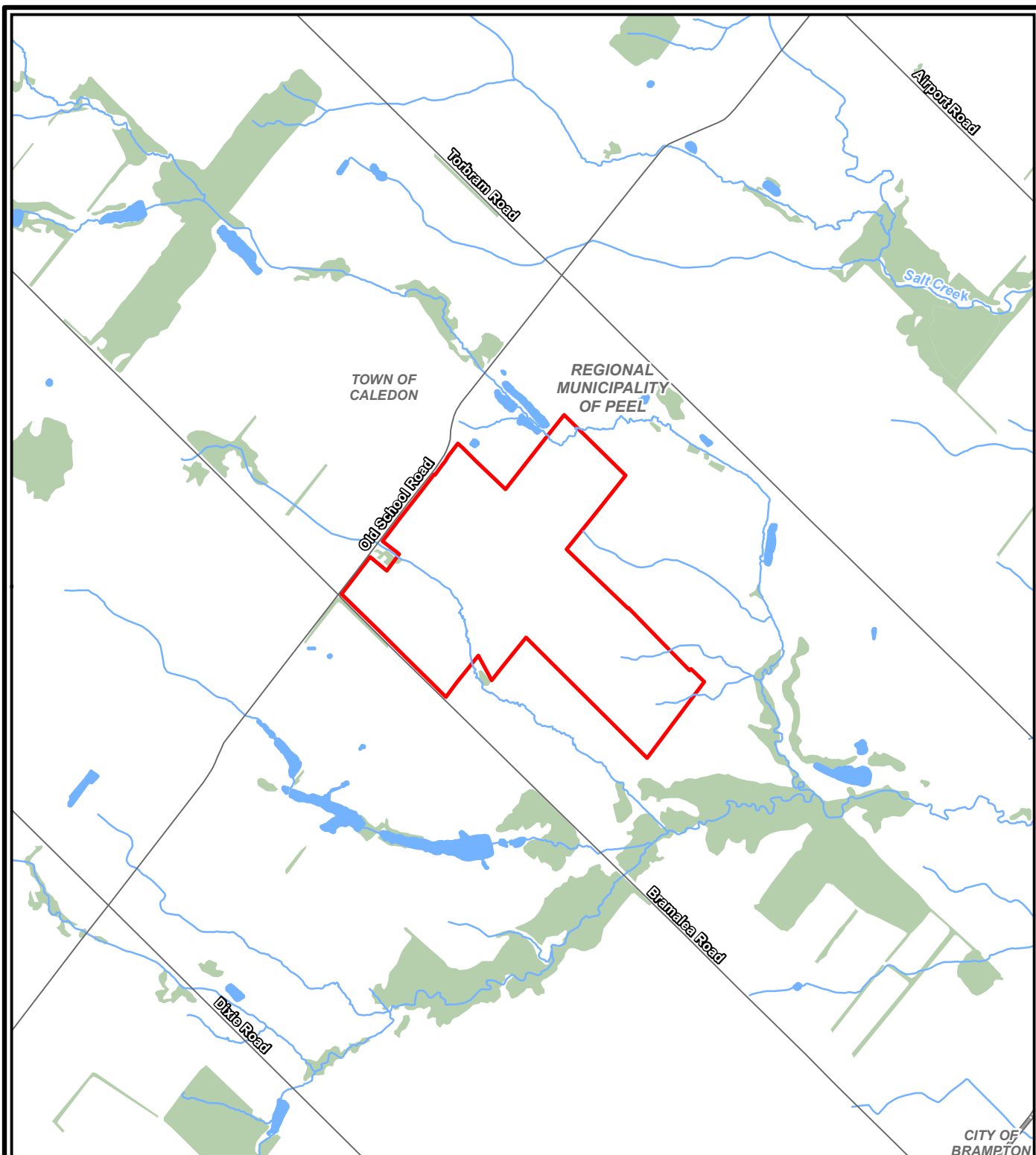
Figure 10. Geological Cross Section A-A'

Figure 11. Geological Cross Section B-B'

Figure 12. Groundwater Contour Plan



	Draft Plan of Subdivision - Hydrogeological Investigation TACC Development Lands – Bramalea Road and Old School Road, Caledon TACC Developments	Project 2407688	TACC DEVELOPMENT LANDS SITE LOCATION PLAN June 2026 Fig. 1
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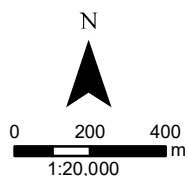


NOTES:

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Legend

- Site Location
- Waterbody
- Road
- Wooded Area
- Watercourse



Draft Plan of Subdivision -
Hydrogeological Investigation
TACC Development Lands – Bramalea
Road
and Old School Road, Caledon



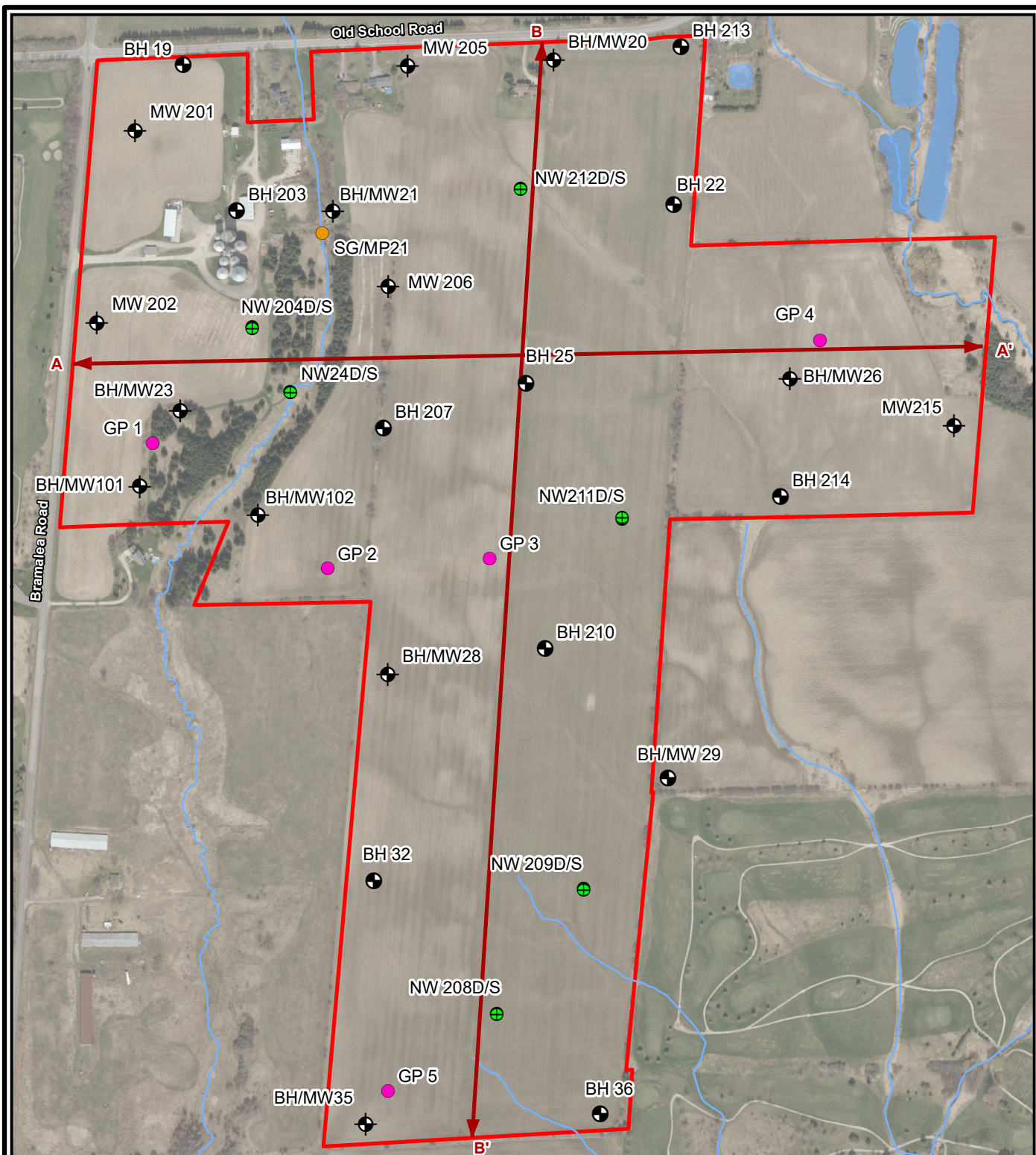
SITE CONTEXT PLAN

TACC Developments

Project 2407688

June 2026

Fig. 2

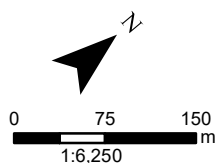


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Legend

- Site Location
- Watercourse
- Waterbody
- Borehole Location
- Borehole/Monitoring Well Location
- + Borehole/Nested Well
- Guelph Permeameter Test
- Staff Gauge/Mini Piezometer
- ↔ Cross Section



Draft Plan of Subdivision -
Hydrogeological Investigation
TACC Development Lands – Bramalea
Road
and Old School Road, Caledon

TACC Developments

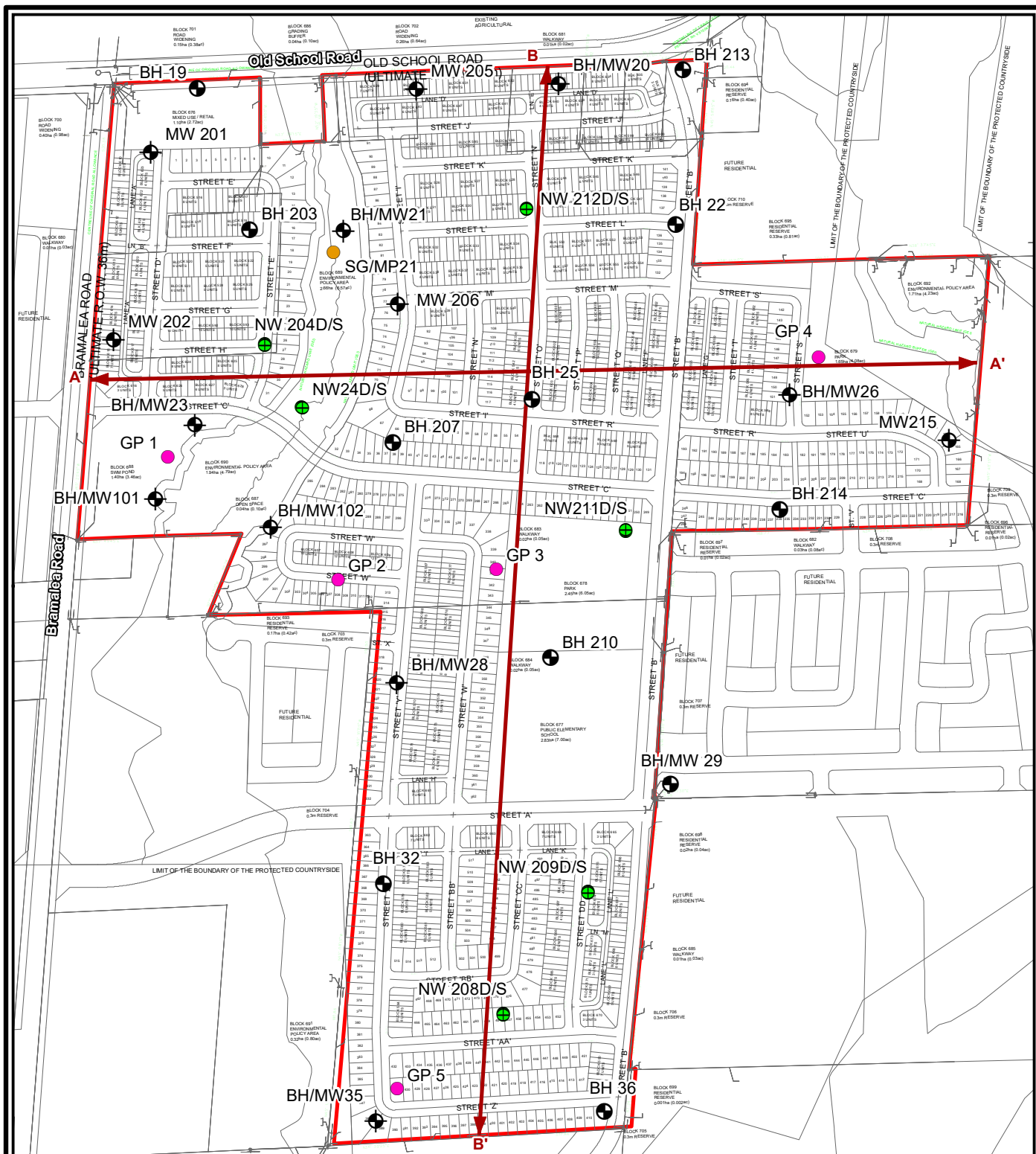


Project 2407688

**BOREHOLE LOCATION PLAN
(AERIAL)**

June 2026

Fig. 3A

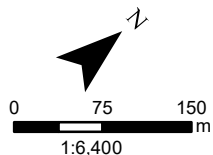


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3. Draft Plan of Subdivision, TACC Developments (Armstrong) Inc., Dated April 17, 2026, by GSAI.

Legend

- Site Location
- Concept Plan
- Borehole Location
- Borehole/Monitoring Well Location
- Borehole/Nested Well
- Guelph Permeameter Test
- Staff Gauge/Mini Piezometer
- ↔ Cross Section



Draft Plan of Subdivision -
Hydrogeological Investigation
TACC Development Lands – Bramalea
Road
and Old School Road, Caledon

TACC Developments

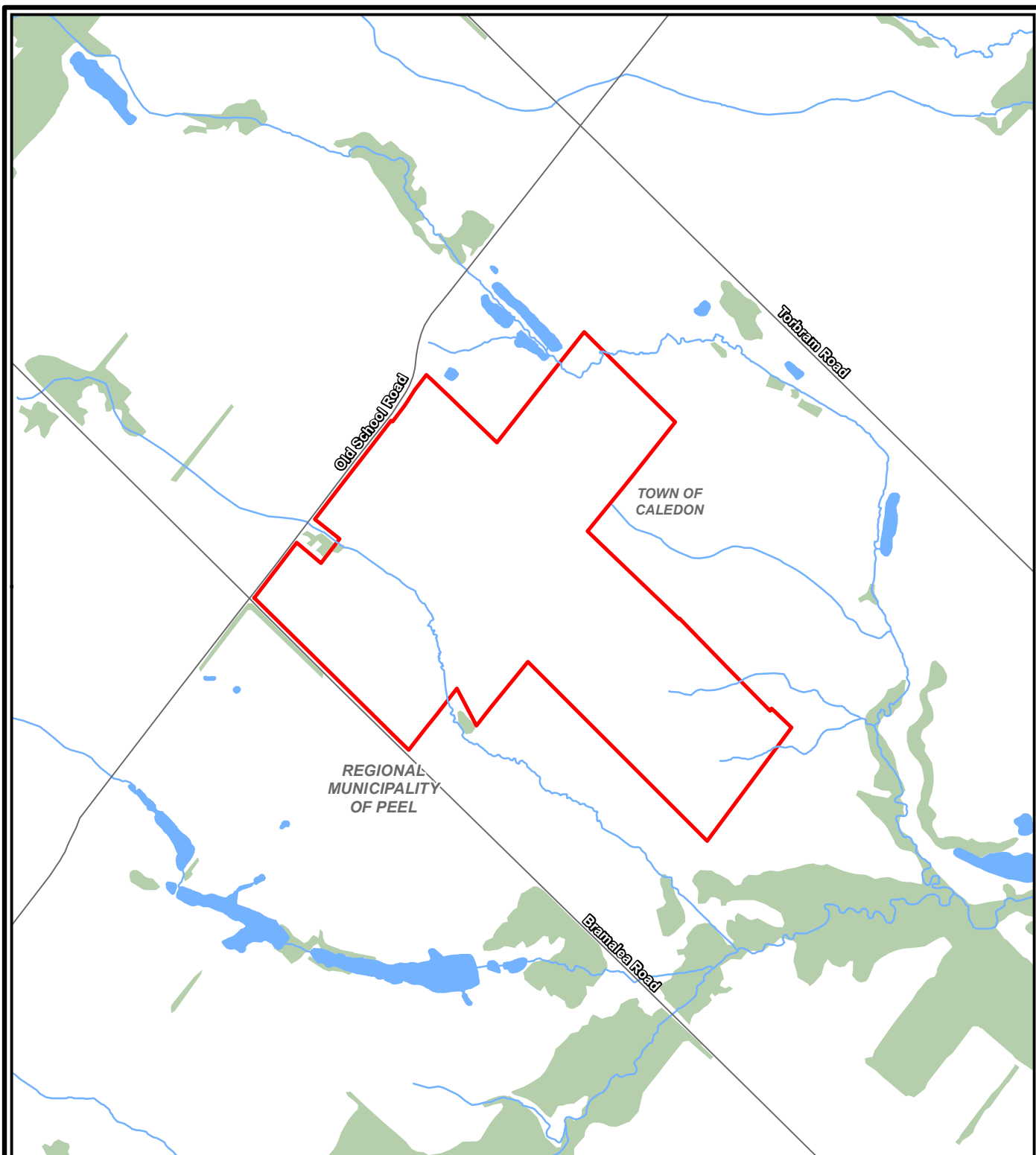
GEI Consultants

Project 2407688

**BOREHOLE LOCATION PLAN
(CONCEPT PLAN)**

June 2026

Fig. 3B



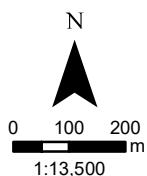
NOTES:

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Legend

 Site Location	 Wooded Area	 Zone C
 Road	Wellhead Protection Areas	 Zone D
— Watercourse	 Zone A	 WHPA Q1
 Waterbody	 Zone B	 WHPA Q2

**Site is not within a Wellhead Protection Area*



Draft Plan of Subdivision -
Hydrogeological Investigation
TACC Development Lands – Bramalea
Road
and Old School Road, Caledon



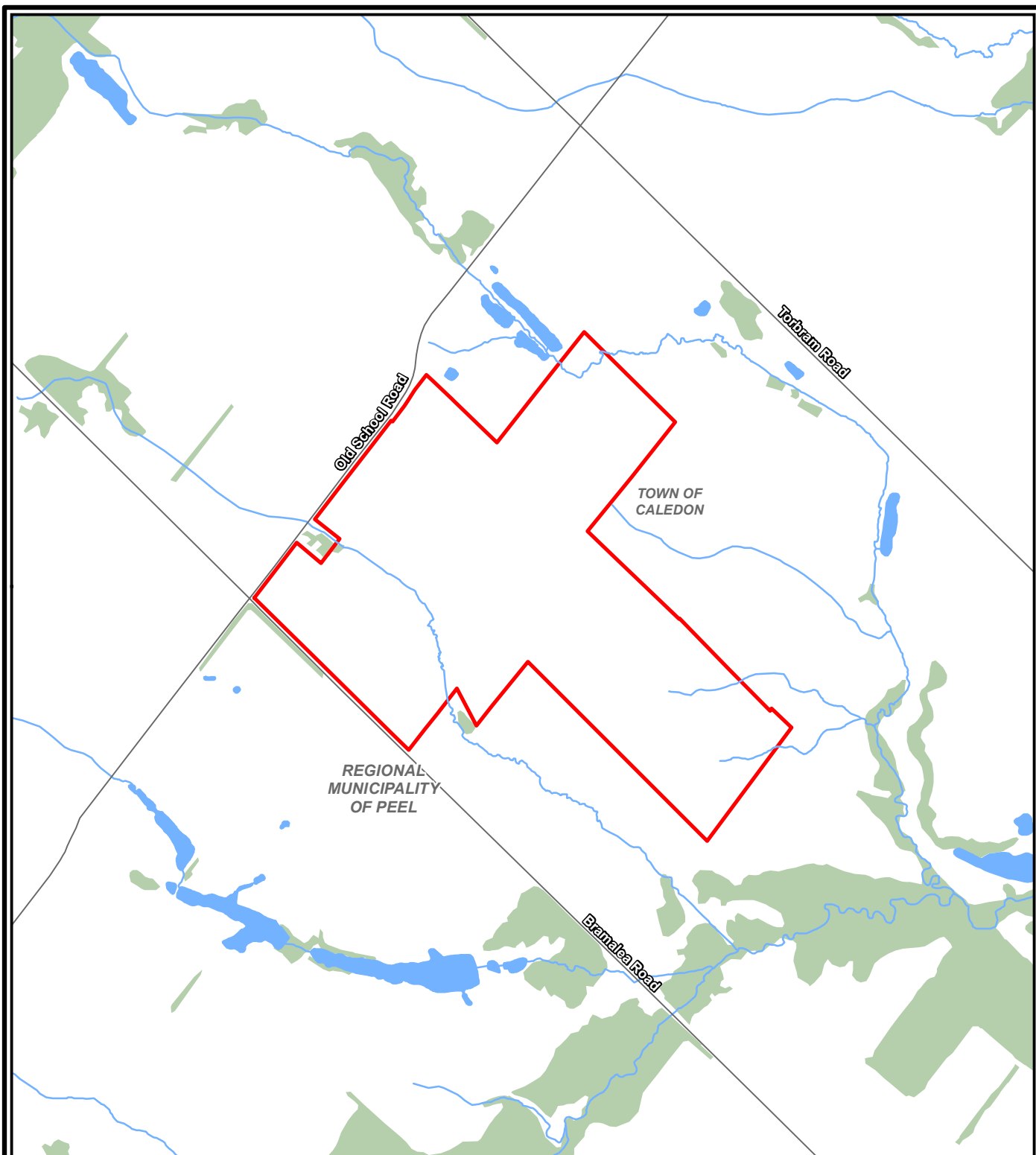
**WELLHEAD PROTECTION
AREA**

TACC Developments

Project 2407688

June 2026

Fig. 4



NOTES:

1. Coordinate System: NAD 1983 CSRS UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2026.

Legend

- Site Location
- Road
- Watercourse

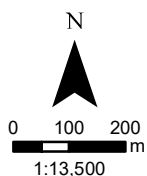
- Waterbody
- Wooded Area

Intake Protection Zones

- Zone 1
- Zone 2

Zone 3

**Site is not within an Intake Protection Zone*



Draft Plan of Subdivision -
Hydrogeological Investigation
TACC Development Lands – Bramalea
Road
and Old School Road, Caledon



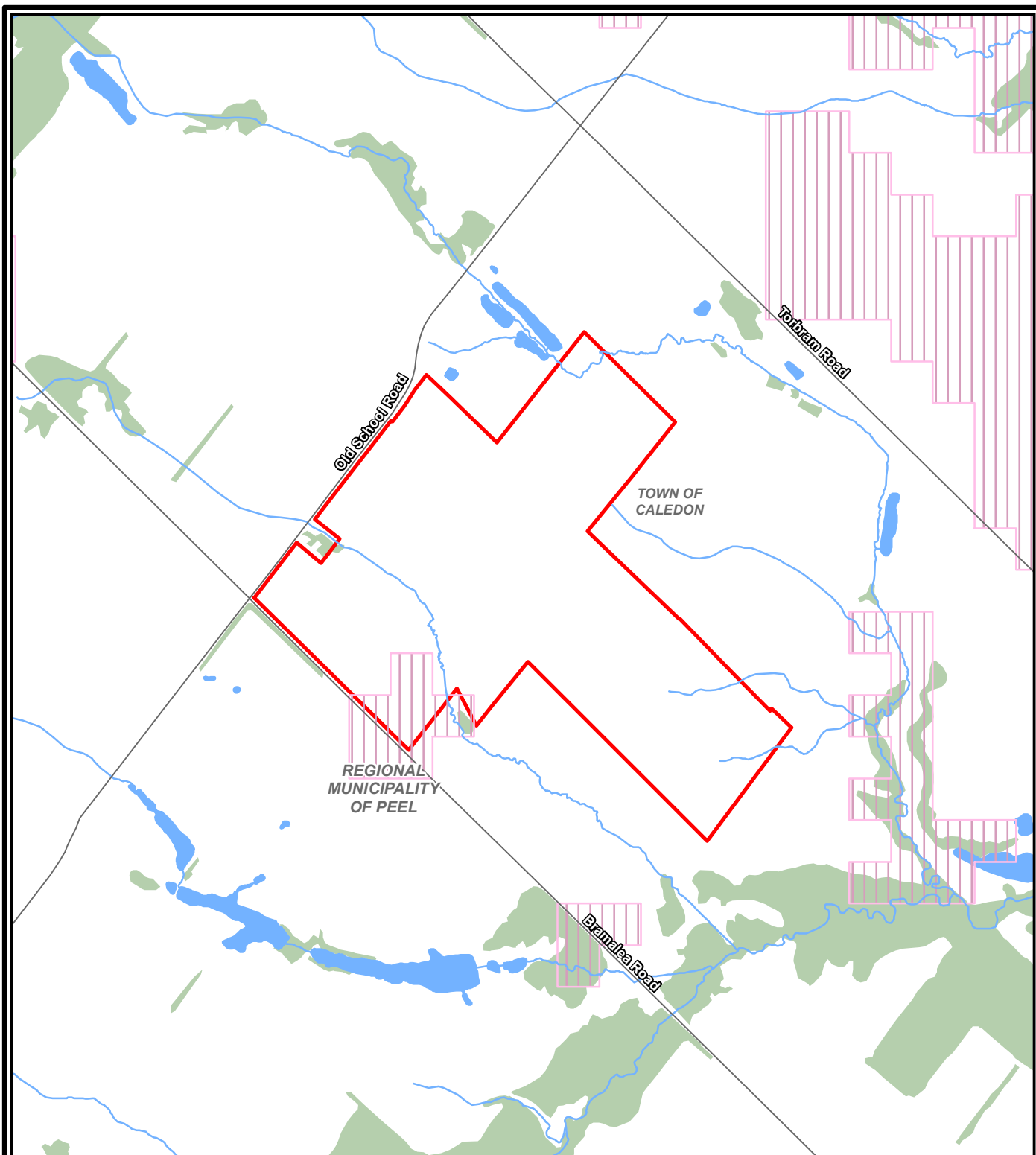
INTAKE PROTECTION ZONES

TACC Developments

Project 2407688

June 2026

Fig. 5

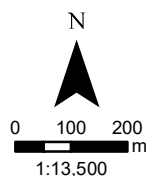


NOTES:

1. Coordinate System: NAD 1983 CSRS UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2026.

Legend

- Site Location
- Waterbody
- Road
- Wooded Area
- Watercourse
- Highly Vulnerable Aquifer



Draft Plan of Subdivision -
Hydrogeological Investigation
TACC Development Lands – Bramalea
Road
and Old School Road, Caledon



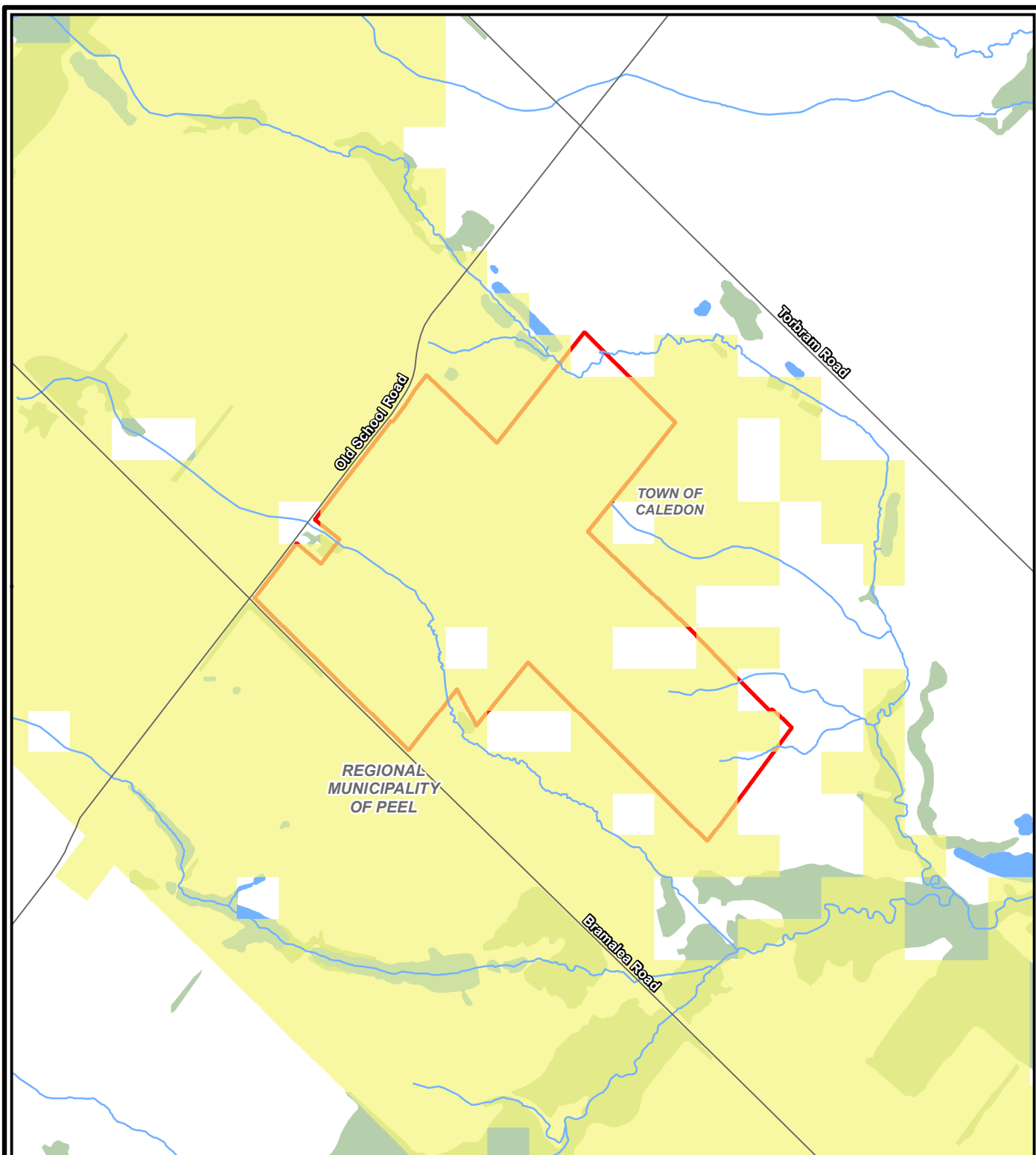
**HIGHLY VULNERABLE
AQUIFER**

TACC Developments

Project 2407688

June 2026

Fig. 6

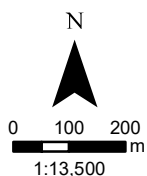


NOTES:

1. Coordinate System: NAD 1983 CSRS UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2026.

Legend

- | | |
|--|--|
| Site Location | Waterbody |
| Road | Wooded Area |
| — Watercourse | Significant Groundwater Recharge Area |



Draft Plan of Subdivision -
Hydrogeological Investigation
TACC Development Lands – Bramalea
Road
and Old School Road, Caledon



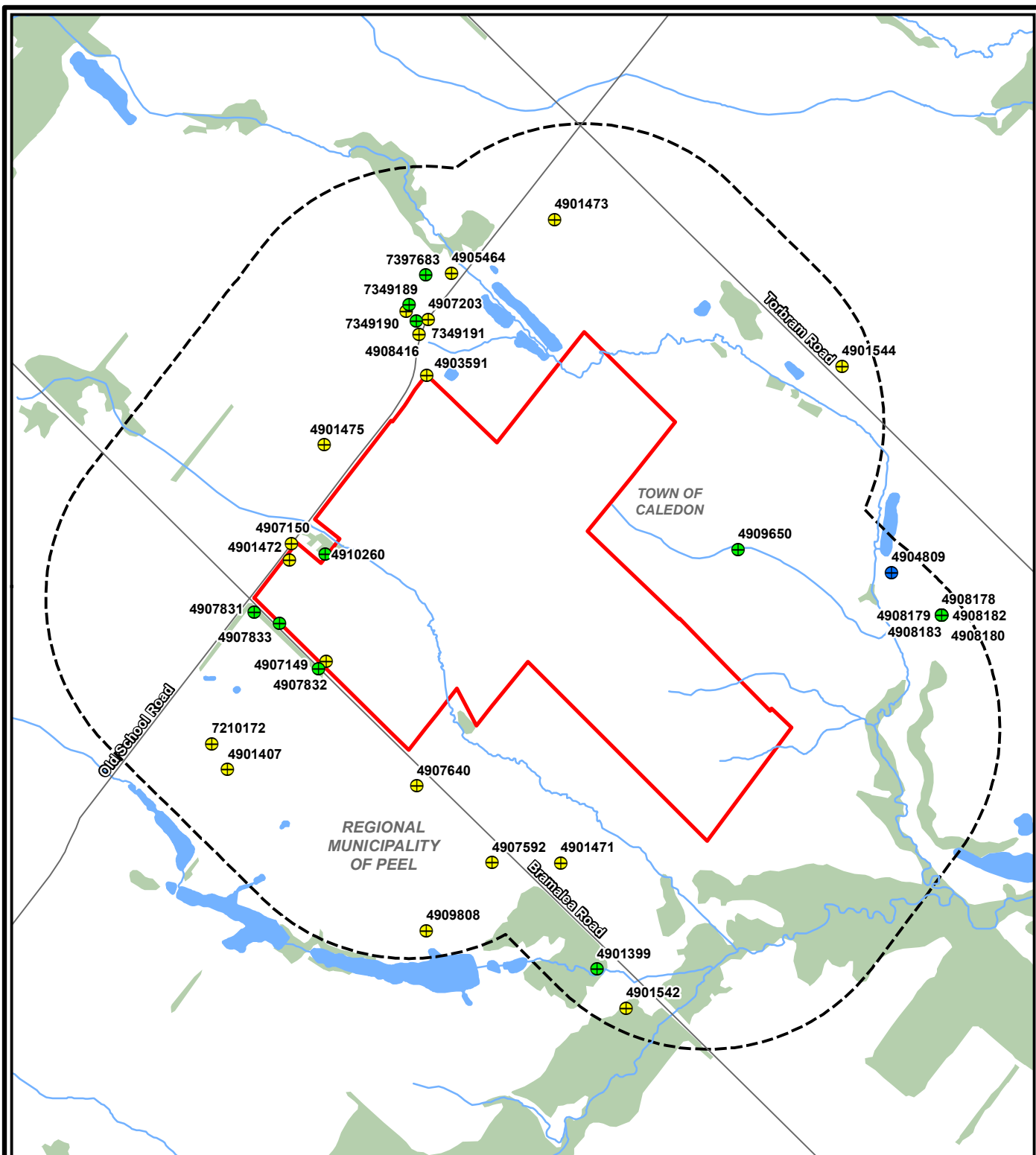
**ECOLOGICALLY
SIGNIFICANT
GROUNDWATER RECHARGE
AREA**

TACC Developments

Project 2407688

June 2026

Fig. 7



NOTES:

1. Coordinate System: NAD 1983 CSRS UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2026.

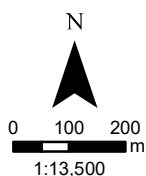
Legend

- Site Location
- Site Location +500m
- Road

- Watercourse
- Waterbody
- Wooded Area

Well Record Location and Use

- + Public
- + No Use Listed/Not Used
- + Domestic/Livestock



Draft Plan of Subdivision -
Hydrogeological Investigation
TACC Development Lands – Bramalea
Road
and Old School Road, Caledon



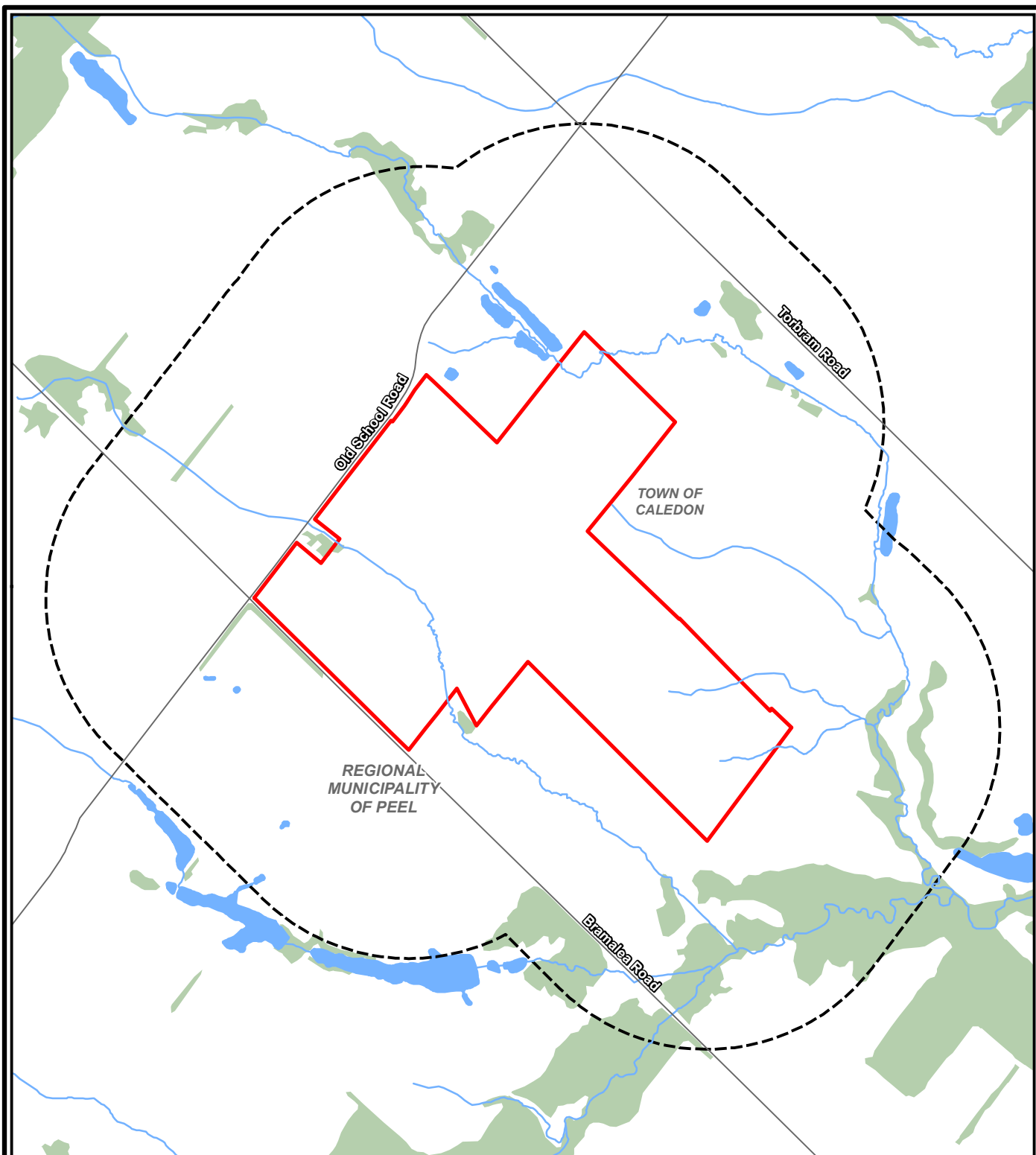
MECP WELL RECORD
LOCATIONS

TACC Developments

Project 2407688

June 2026

Fig. 8



NOTES:

1. Coordinate System: NAD 1983 CSRS UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2026.

Legend

Site Location

Site Location +500m

— Road

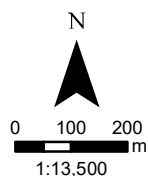
— Watercourse

Waterbody

Wooded Area

● MECP Permit to Take Water Record

**No Existing PTTW within 500m of the Site*



Draft Plan of Subdivision -
Hydrogeological Investigation
TACC Development Lands – Bramalea
Road
and Old School Road, Caledon

TACC Developments

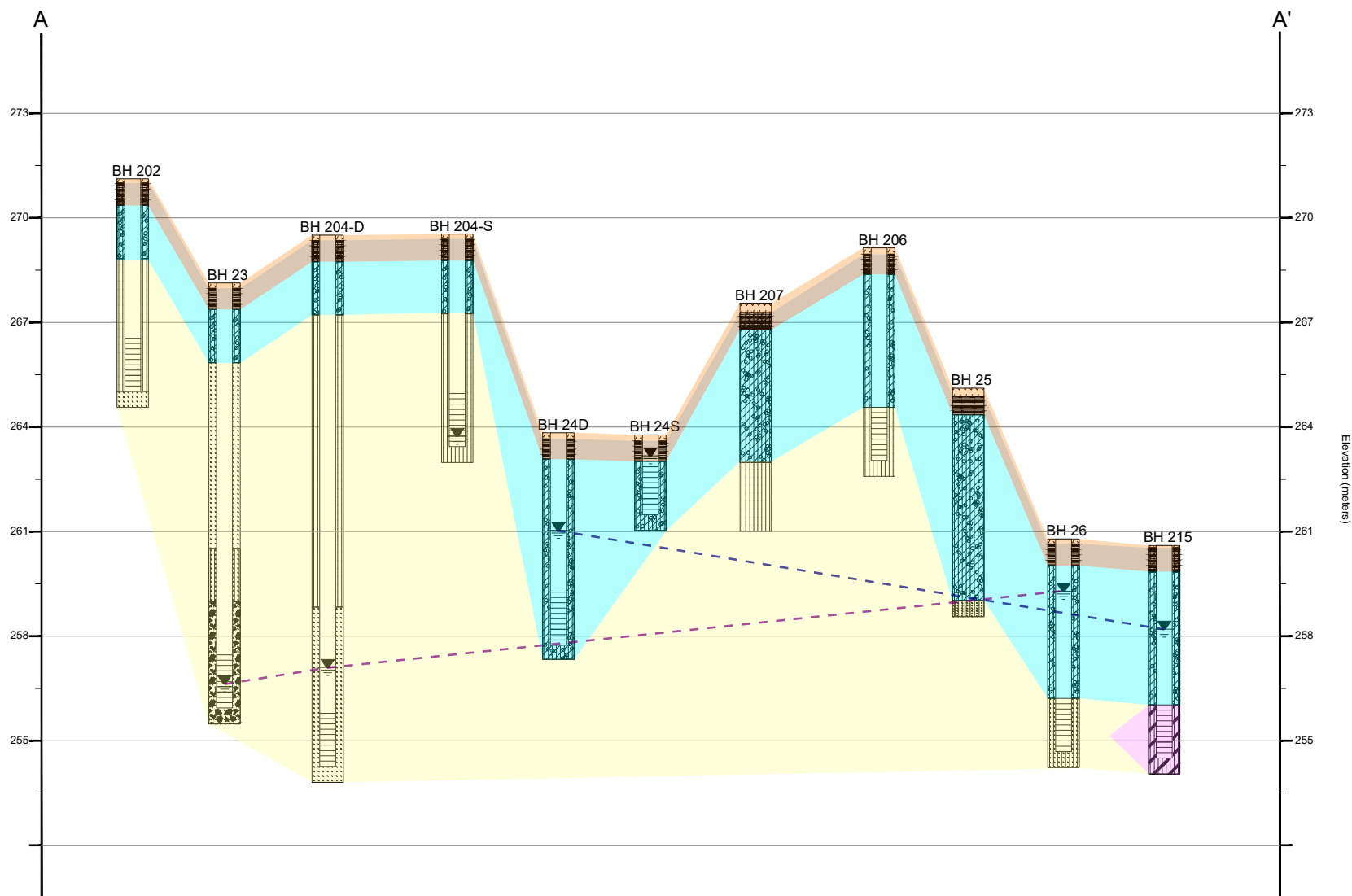


Project 2407688

MECP PTTW WELL RECORD
LOCATIONS

June 2026

Fig. 9



LEGEND:

- | | | | | |
|--|-----------------|-------------|--|--|
| Water Level in Monitoring Well Measured Mar. 6, 2025 | Topsoil | Sand | Silty Sand | Piezometric Head for Unconfined Glacial Till |
| Weathered / Disturbed Soil | Sand and Silt | Silt | Piezometric Head for Confined Sand and Silt (ORAC) | |
| Clayey Silt Glacial Till | Sand and Gravel | Clayey Silt | | |

NOTES:

1. Boreholes evenly spaced for illustrative purposes only (no horizontal scaling).

HORIZONTAL SCALE

N.T.S.

VERTICAL SCALE



MAYFIELD TULLAMORE TACC LANDS

HYDROGEOLOGICAL INVESTIGATION

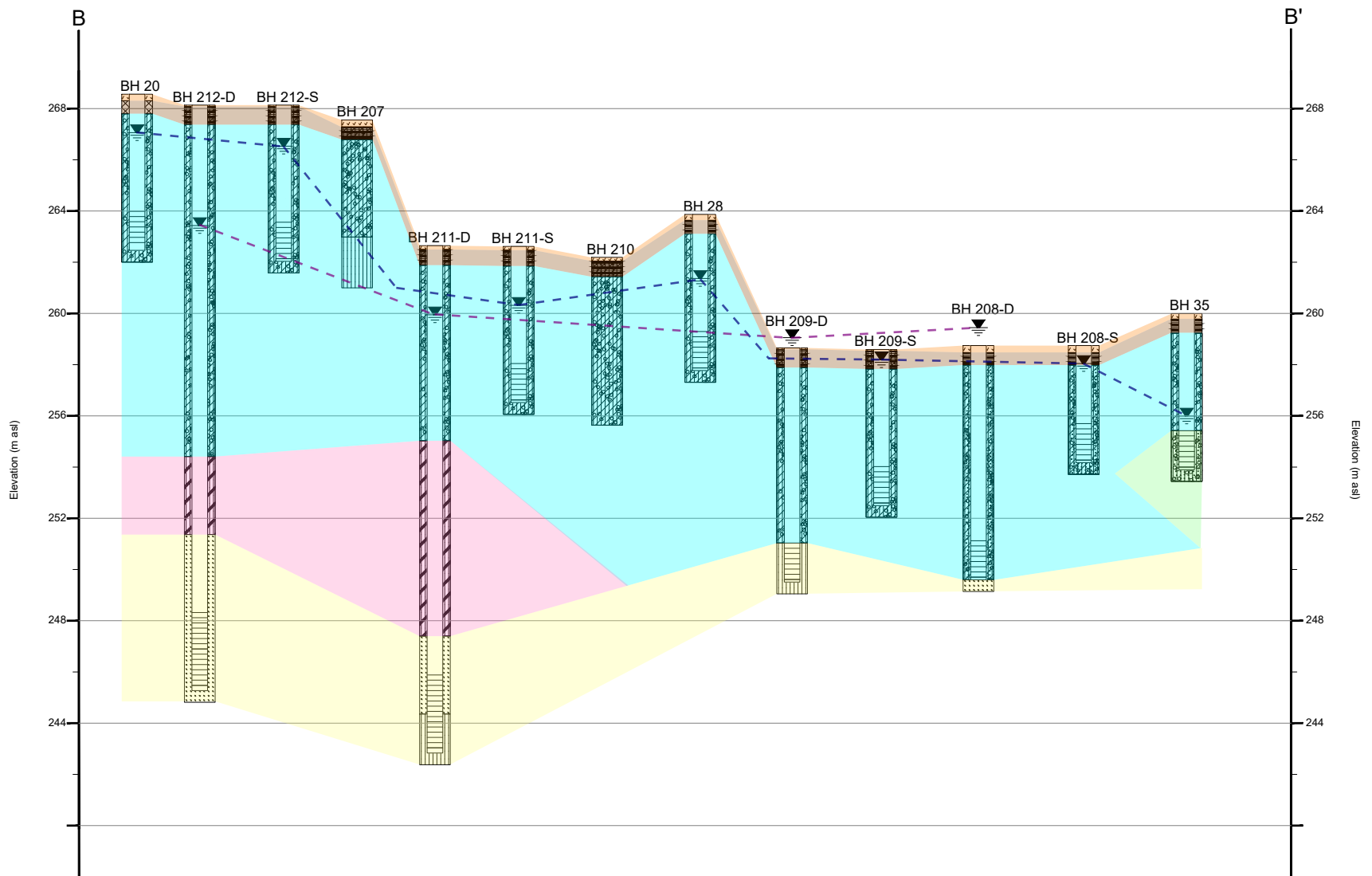


2407688

GEOLOGICAL CROSS SECTION A-A'

June 2026

Fig.10



LEGEND:

Water Level in Monitoring Well
Measured Mar. 6, 2025

Topsoil

Fill

Clayey Silt Glacial Till

Weathered / Disturbed Soil

Sandy Silt Glacial Till

Clayey Sandy Silt Glacial Till

Silt

Sand

Clayey Silt

- - - Piezometric Head for Unconfined
Glacial Till

- - - Piezometric Head for Confined
Sand and Silt (ORAC)

NOTES:

1. Boreholes evenly spaced
for illustrative purposes only
(no horizontal scaling).

HORIZONTAL SCALE

N.T.S.

VERTICAL SCALE

0 2 4
METERS

MAYFIELD TULLAMORE TACC LANDS

HYDROGEOLOGICAL INVESTIGATION

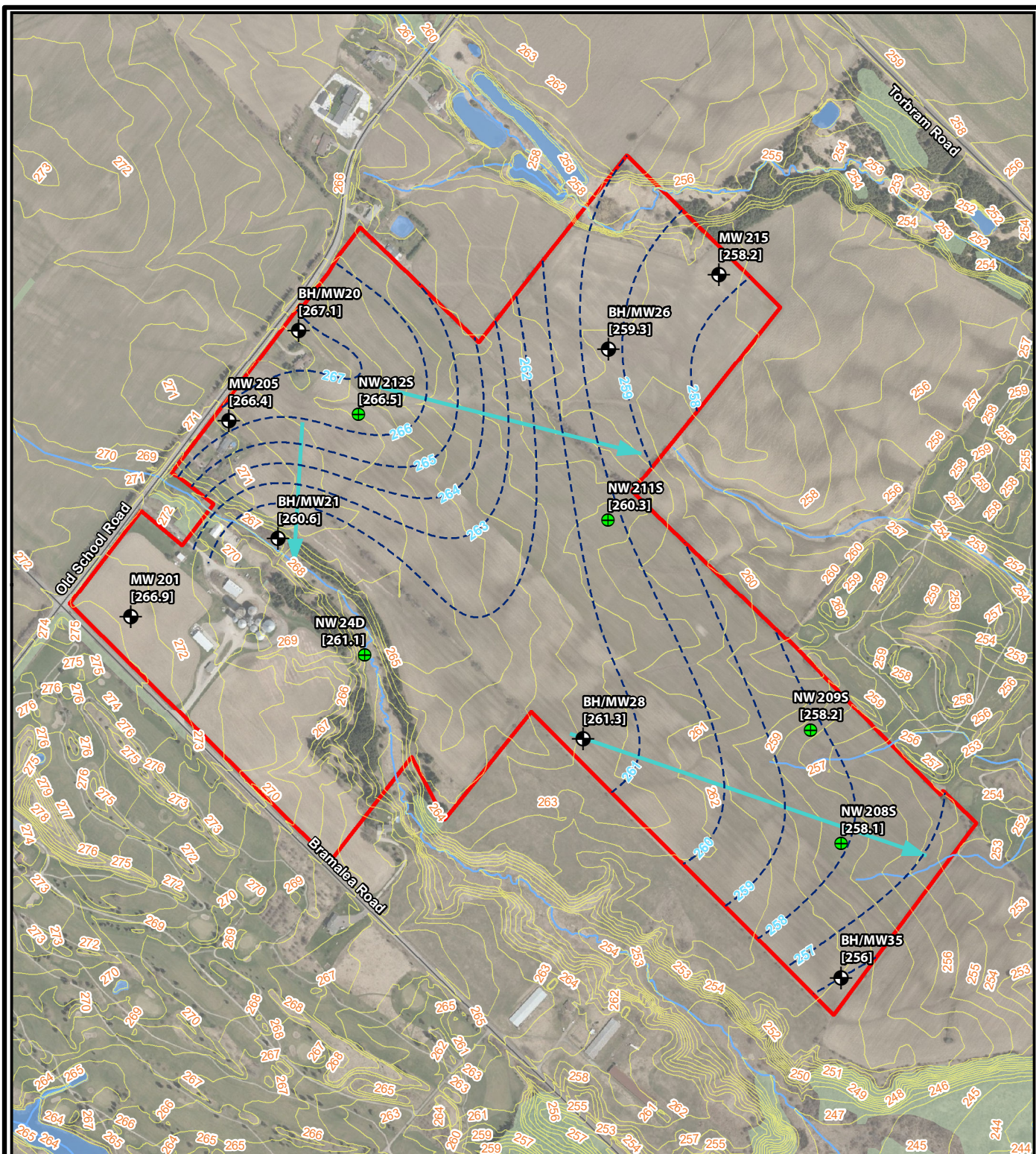


2407688

GEOLOGICAL CROSS
SECTION B-B'

June 2026

Fig. 11

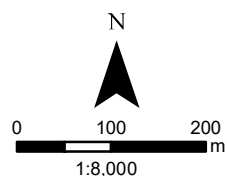


NOTES:

1. Coordinate System: NAD 1983 CSRS UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2026.
3. The groundwater contour lines are for interpretation of groundwater flow direction.
4. The groundwater contours are not to be relied on for groundwater levels as they are interpretive in nature.

Legend

- ▬ Site Location
- Road
- Watercourse
- Waterbody
- Wooded Area
- Borehole/Monitoring Well Location
- Nested Well
- Ground Water Contours
- [xxxx] Groundwater Level (m asl) (March 6, 2025)
- Interpreted Direction of Groundwater Flow
- Ground Surface Elevation



Draft Plan of Subdivision -
Hydrogeological Investigation
TACC Development Lands – Bramalea
Road
and Old School Road, Caledon

TACC Developments



Project 2407688

GROUNDWATER CONTOUR
MAP

June 2026

Fig. 12

Appendix A MECP Water Well Records

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
CALEDON TOWN (CHINGU	17 597001 484958 6 W	2004/05 6809	2				0031 10	4909650 (Z11192) A006736	LOAM 0006 SAND SLTY 0015 GREY SAND SILT CLAY 0031 SAND TILL SILT 0041
CALEDON TOWN (CHINGU 03 022	17 596254 484867 2 W	2005/06 7154	6.25	FR 0129	47/50/2 0/1:0	DO	0130 14	4909808 (Z20368) A020145	BRWN CLAY 0021 GREY CLAY SILT 0089 GREY CLAY STNS 0099 GREY FSND 0126 GREY CSND 0144
CALEDON TOWN (CHINGU HS E 04 021	17 596411 484883 5 W	1991/05 3317	6	FR 0072	37/42/1 2/1:30	DO	0072 3	4907592 (88406)	CLAY GRVL 0057 BRWN CLAY STNS 0070 GRVL SAND 0075
CALEDON TOWN (CHINGU HS E 04 021	17 595841 484943 5 W	1993/08 6809	2	FR 0050		NU	0060 5	4907831 (143779)	BRWN LOAM LOOS 0005 BRWN SAND GRVL DNSE 0065
CALEDON TOWN (CHINGU HS E 04 021	17 595995 484930 1 W	1993/08 6809	2	FR 0045		NU	0060 5	4907832 (56657)	BRWN LOAM LOOS 0005 BRWN SAND GRVL SLTY 0065
CALEDON TOWN (CHINGU HS E 04 021	17 595902 484940 8 W	1993/08 6809	2	FR 0050		NU	0060 3	4907833 (56658)	BRWN LOAM 0005 BRWN SAND SILT GRVL 0040 BRWN GRVL SNDY 0065
CALEDON TOWN (CHINGU HS E 04 021	17 596231 484901 9 W	1992/05 3108	6	FR 0054	39/55/6 0/2:0	DO	0055 6	4907640 (095307)	BRWN CLAY 0006 BRWN SAND 0014 BRWN CLAY 0019 BRWN SAND 0031 SAND GRVL 0054 SAND CLN 0061 BLUE CLAY 0085
CALEDON TOWN (CHINGU HS E 04 021	17 596662 484857 9 W	1964/07 2801	6			NU		4901399 ()	LOAM 0006 SILT MSND 0020 CLAY MSND 0045 CLAY 0055 GRVL 0056 CLAY SILT 0072 CLAY BLDR 0074 HPAN CLAY 0082 BLDR 0084 CLAY GRVL 0156 SHLE 0157

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
CALEDON TOWN (CHINGU HS E 04 022)	17 595739 484912 0 W	2013/09 7154	6.25	FR 0104	51/57/1 0/15:	DO	0104 4	7210172 (Z169287) A125463	BRWN SILT CLAY SAND 0021 BRWN SAND 0045 BRWN GRVL 0064 GREY CLAY GRVL 0099 GREY GRVL 0108
CALEDON TOWN (CHINGU HS E 04 022)	17 595778 484905 9 W	1959/01 1307	30	FR 0037	37//1/:	DO		4901407 ()	BRWN LOAM CLAY 0037 GREY CSND 0047
CALEDON TOWN (CHINGU HS E 04 023)	17 596258 485013 8 W	1989/10 3132	6 6	FR 0089	//7/8:0	DO	0088 5	4907203 (65765)	BRWN CLAY STNS DNSE 0014 BLUE CLAY STNS DNSE 0034 GREY CLAY SOFT 0072 BLUE SILT LOOS 0084 BLUE CLAY GRVL SAND 0098
CALEDON TOWN (CHINGU HS E 05 020)	17 597370 484953 0 W	1975/12 1307	30	FR 0044	20//1/1: 0	PS		4904809 ()	BRWN LOAM 0012 GREY CLAY 0042 GRVL 0044 GREY CLAY SHLE 0050
CALEDON TOWN (CHINGU HS E 05 021)	17 597489 484942 9 W	1997/01 6809	2			NU	0031 5	4908180 (159373)	BRWN TILL HARD 0010 GREY CLAY SILT 0031 GREY SILT 0036 GREY SHLE 0036
CALEDON TOWN (CHINGU HS E 05 021)	17 597489 484942 9 W	1997/01 6809	2	FR 0020		NU	0027 5	4908183 (159370)	BRWN TILL HARD 0010 GREY CLAY SILT 0027 GREY SILT 0037 GREY SHLE 0037
CALEDON TOWN (CHINGU HS E 05 021)	17 597489 484942 9 W	1997/01 6809	2	FR 0030		NU	0030 5	4908178 (159371)	BRWN TILL HARD 0010 GREY CLAY SILT 0030 GREY SILT 0035 GREY SHLE 0035
CALEDON TOWN (CHINGU HS E 05 021)	17 597489 484942 9 W	1997/01 6809	2	UK 0010		NU	0010 5	4908179 (159372)	BRWN TILL HARD 0010 GREY SILT 0015

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
CALEDON TOWN (CHINGU HS E 05 021	17 597489 484942 9 W	1997/01 6809	2	FR 0020		NU	0030 5	4908182 (159385)	BRWN TILL HARD 0011 GREY CLAY SILT 0019 GREY SILT 0023 GREY ROCK WTHD 0030
CALEDON TOWN (CHINGU HS E 05 021	17 597489 484942 9 W	1997/01 6809	2	FR 0019		NU	0030 5	4908181 (159369)	BRWN TILL HARD 0010 GREY CLAY SILT 0030 GREY SILT 0035 GREY SHLE 0035
CALEDON TOWN (CHINGU HS E 05 021	17 596576 484883 4 W	1965/08 5416	7	FR 0077	40/60/1 8/3:0	ST		4901471 ()	FILL LOAM 0010 MSND STNS 0072 MSND GRVL 0077 GRVL 0096
CALEDON TOWN (CHINGU HS E 05 022	17 596254 485000 3 W	1971/04 1307	30	FR	10/27/5 0/1:0	DO		4903591 ()	BRWN LOAM 0012 GREY CLAY 0032 GRVL 0033
CALEDON TOWN (CHINGU HS E 05 022	17 595930 484960 0 W	1989/04 5206	6	FR 0065	11/90/1 5/15:0	DO ST	0094 5	4907150 (49169)	BRWN CLAY 0065 BRWN SAND GRVL SILT 0093 GRVL SAND SILT 0099 RED SHLE 0103
CALEDON TOWN (CHINGU HS E 05 022	17 596011 484957 5 W	2006/07 4011	5		24///:			4910260 (Z49778) A	134
CALEDON TOWN (CHINGU HS E 05 022	17 596014 484931 8 W	5206	6	FR 0065	32/90/2 0/24:0	DO ST	0092 7	4907149 (49162)	BRWN CLAY 0008 BRWN CLAY TILL 0035 BRWN GRVL 0065 GRVL 0099 RED SHLE 0102
CALEDON TOWN (CHINGU HS E 05 022	17 596236 485010 2 W	1998/10 6782	8 6	FR 0093	3/48/3/ 0:0	DO		4908416 (193171)	BRWN CLAY STNS 0006 GREY CLAY SAND LYRD 0087 GREY MSND CLAY 0095

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
CALEDON TOWN (CHINGU HS E 05 022	17 595926 484956 1 W	1961/09 4813	7 7	FR 0072 FR 0114 FR 0140	36/140/ 2/2:0	ST		4901472 ()	BRWN CLAY 0008 BRWN CLAY MSND 0038 BLUE CLAY 0072 SILT 0080 SILT CLAY 0110 GRVL 0115 BLUE SHLE 0131 GREY LMSN 0145
CALEDON TOWN (CHINGU HS E 05 022	17 596562 485037 7 W	1961/11 4813	7	FR 0067	30/63/1 0/72:0	ST	0063 4	4901473 ()	BLCK LOAM 0002 BRWN CLAY 0005 BRWN CLAY MSND 0058 GREY CLAY 0066 GRVL 0067
CALEDON TOWN (CHINGU HS E 05 023	17 596314 485024 8 W	1978/06 3814	30	FR 0050	40//3/1: 0	DO		4905464 ()	UNKN 0050 SAND 0057
CALEDON TOWN (CHINGU HS E 05 023	17 596229 485013 4 W	2019/10 7523	6.25					7349190 (Z325863) A	
CALEDON TOWN (CHINGU HS E 05 023	17 596212 485017 3 W	2019/10 7523	6					7349189 (Z325864) A	
CALEDON TOWN (CHINGU HS E 05 023	17 596205 485015 7 W	2019/10 7523	6.07	FR 0092	2/21/7/ 1:	DO	0087 5	7349191 (Z325862) _NO_TAG	BLCK LOAM 0003 BRWN SAND CLAY 0020 GREY CLAY 0076 GREY SAND GRVL 0090 GREY SHLE GRVL LYRD 0095
CALEDON TOWN (CHINGU HS E 05 023	17 596008 484983 7 W	1961/12 1307	30	FR 0028	28//2/:	ST		4901475 ()	BRWN LOAM CLAY 0012 GREY CLAY 0028 GREY CSND 0043 GREY CLAY 0044
CALEDON TOWN (CHINGU HS E 05 023	17 596253 485024 4 W	2021/09 2576						7397683 (Z356718) A315308 P	

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
CALEDON TOWN (CHINGU HS E 06 020	17 596733 484848 6 W	1949/07 4620	6 6	FR 0023		DO		4901542 ()	LOAM CLAY 0002 CLAY STNS 0006 CLAY GRVL HPAN 0013 HPAN 0022 CLAY GRVL 0023 BLUE SHLE 0025
CALEDON TOWN (CHINGU HS E 06 021	17 597250 485002 5 W	1966/08 1307	30	FR 0035	25//75/:	ST DO		4901544 ()	BRWN LOAM CLAY 0012 GREY CLAY 0033 GRVL 0035

Appendix B Borehole Logs

Appendix B1: GEI's Support of Draft Plan of Subdivision

RECORD OF BOREHOLE No. 201



Project Number: **2407688**
 Project Client: **TACC Developments**
 Project Name: **Mayfield Tullamore TACC Lands- Phase**
 Project Location: **SE corner of Bramalea Rd & Old School Rd**
 Drilling Location: **Caledon, ON**
 Local Benchmark: **Elevations are Geodetic, taken using Trimble**

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **KJT** Northing: **4849452** Date Started: **Nov 25/24**
 Reviewed By: **AA** Easting: **595928** Date Completed: **Nov 25/24**

LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa)		Atterberg Limits			GR	SA	SI	CL
	TOPSOIL: 50 mm WEATHERED/DISTURBED: Some organics, stiff, dark brown, moist	SS	1	50	10	0	272.6				0	11	84	5		
	CLAYEY SILT GLACIAL TILL: Sandy, trace gravel, inferred cobbles and boulders, stiff, brown, moist	SS	2	90	14	1.5	271.9									
		SS	3	100	19	3	270									
	SILT: Some sand, trace clay, very dense, brown, moist	SS	4	100	51	4.5	268.5									
		SS	5	100	100+	6	267									
		SS	6	100	68											
		SS	7	100	94											
	Borehole Terminated at 6.6 m															

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Groundwater depth encountered on completion of drilling: Dry Cave depth after auger removal: 5.9 m.
 Groundwater depth observed on: Apr 23/25 at depth of: 5.7 m. Groundwater Elevation: 266.9 m

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

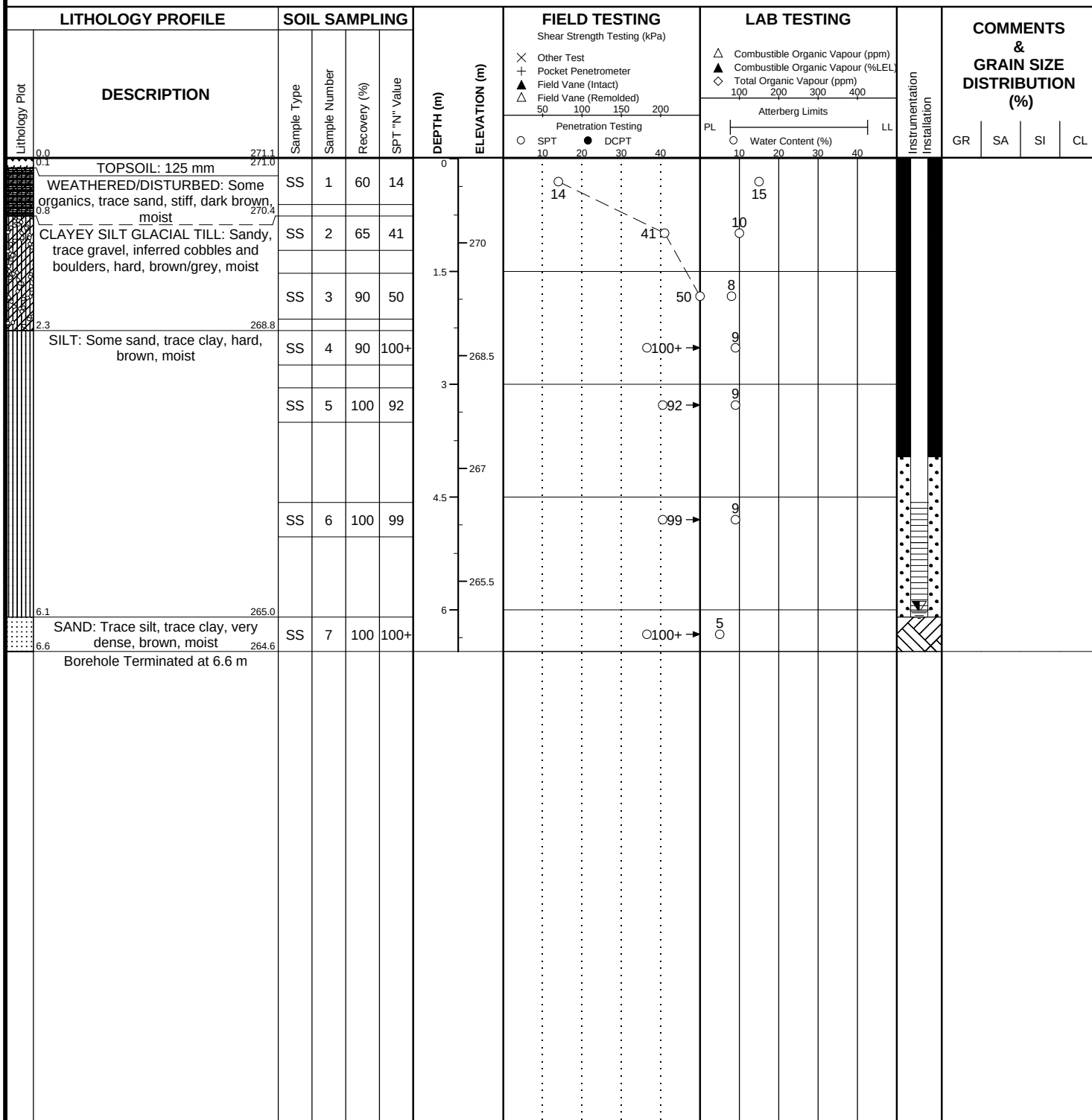
Scale: 1:75
 Page: 1 of 1

RECORD OF BOREHOLE No. 202

Project Number: **2407688**
 Project Client: **TACC Developments**
 Project Name: **Mayfield Tullamore TACC Lands- Phase**
 Project Location: **SE corner of Bramalea Rd & Old School Rd**
 Drilling Location: **Caledon, ON**
 Local Benchmark: **Elevations are Geodetic, taken using Trimble**



Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **KJT** Northing: **4849282** Date Started: **Nov 25/24**
 Reviewed By: **AA** Easting: **596064** Date Completed: **Nov 25/24**



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Groundwater depth encountered on completion of drilling: Dry Cave depth after auger removal: Open
 Groundwater depth observed on: Apr 23/25 at depth of: 6.0 m. Groundwater Elevation: 265.1 m

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

Scale: 1:75
 Page: 1 of 1

RECORD OF BOREHOLE No. 203



Project Number: **2407688**
 Project Client: **TACC Developments**
 Project Name: **Mayfield Tullamore TACC Lands- Phase**
 Project Location: **SE corner of Bramalea Rd & Old School Rd**
 Drilling Location: **Caledon, ON**
 Local Benchmark: **Elevations are Geodetic, taken using Trimble**

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **KJT** Northing: **4849481** Date Started: **Nov 26/24**
 Reviewed By: **AA** Easting: **596068** Date Completed: **Nov 26/24**

LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa)		Atterberg Limits			GR SA SI CL			
						Other Test + Pocket Penetrometer ▲ Field Vane (Intact) △ Field Vane (Remolded)	Penetration Testing ○ SPT ● DCPT	PL Water Content (%) LL	Combustible Organic Vapour (ppm) Combustible Organic Vapour (%LEL) Total Organic Vapour (ppm)							
	0.0 270.8															
	0.2 270.6	SS	1	75	20											
	0.8 270.1															
	CLAYEY SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, very stiff to hard, brown, moist	SS	2	100	20											
		SS	3	100	37											
	2.3 268.5	SS	4	100	19											
		SS	5	100	93											
	4.6 266.2	SS	6	100	86											
	6.6 264.3	SS	7	100	100+											
	Borehole Terminated at 6.6 m															

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Groundwater depth encountered on completion of drilling: Dry Cave depth after auger removal: Open
 Groundwater depth observed on: Groundwater Elevation:

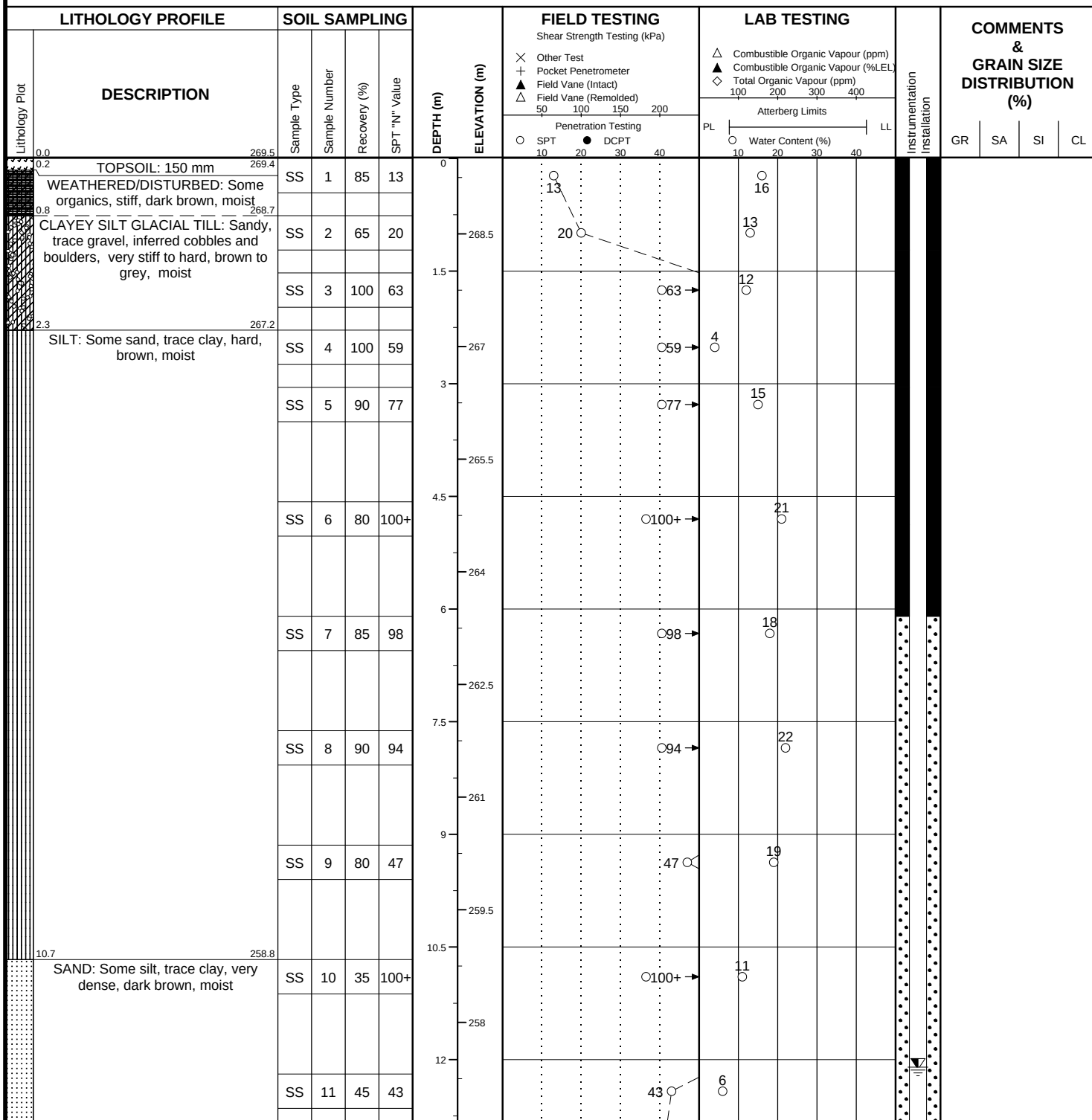
Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

Scale: 1:75
 Page: 1 of 1

RECORD OF BOREHOLE No. 204-D

Project Number: **2407688**
 Project Client: **TACC Developments**
 Project Name: **Mayfield Tullamore TACC Lands- Phase**
 Project Location: **SE corner of Bramalea Rd & Old School Rd**
 Drilling Location: **Caledon, ON**
 Local Benchmark: **Elevations are Geodetic, taken using Trimble**

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **KJT** Northing: **4849411** Date Started: **Dec 02/24**
 Reviewed By: **AA** Easting: **596180** Date Completed: **Dec 02/24**



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Groundwater depth encountered on completion of drilling: 15.4 m. Cave depth after auger removal: Open
 Groundwater depth observed on: Apr 23/25 at depth of: 12.1 m. Groundwater Elevation: 257.4 m

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

Scale: 1:75
 Page: 1 of 2

RECORD OF BOREHOLE No. 204-D

Project Number: **2407688**
 Project Client: **TACC Developments**
 Project Name: **Mayfield Tullamore TACC Lands- Phase**
 Project Location: **SE corner of Bramalea Rd & Old School Rd**
 Drilling Location: **Caledon, ON**
 Local Benchmark: **Elevations are Geodetic, taken using Trimble**



Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **KJT** Northing: **4849411** Date Started: **Dec 02/24**
 Reviewed By: **AA** Easting: **596180** Date Completed: **Dec 02/24**

LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING				Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa)		Atterberg Limits					GR	SA	SI	CL
								× Other Test + Pocket Penetrometer ▲ Field Vane (Intact) △ Field Vane (Remolded) ○ SPT ● DCPT	△ Combustible Organic Vapour (ppm) ▲ Combustible Organic Vapour (%LEL) ◇ Total Organic Vapour (ppm) ○ Water Content (%)									
	--- Wet ---	SS	12	55	39	13.5	256.5	39	20									
							255											
		SS	13	90	47	15	253.8	47	20									
	Borehole Terminated at 15.7 m																	

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Groundwater depth encountered on completion of drilling: 15.4 m. Cave depth after auger removal: Open
 Groundwater depth observed on: Apr 23/25 at depth of: 12.1 m. Groundwater Elevation: 257.40 m

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

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RECORD OF BOREHOLE No. 204-S

Project Number: 2407688

Project Client: **TACC Developments**

Project Name: **Mayfield Tullamore TACC Lands- Phase**

Project Location: SE corner of Bramalea Rd & Old School Rd

Drilling Location: **Caledon, ON**

Local Benchmark: Elevations are Geodetic, taken using Trimble

Drilling Method: **Solid Stem Augers**

Drilling Machine: **Track Mount**

Logged By: **KJT** Northing: **4849411** Date Started: **Dec 02/24**

Reviewed By: **AA** Easting: **596179** Date Completed: **Dec 02/24**

[illegible]

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	Groundwater depth encountered on completion of drilling: Dry		Cave depth after auger removal: Open
	Groundwater depth observed on: Apr 23/25 at depth of: 5.8 m.		Groundwater Elevation: 263.7 m

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

Scale: **1 : 75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 205

Project Number: **2407688**
 Project Client: **TACC Developments**
 Project Name: **Mayfield Tullamore TACC Lands- Phase**
 Project Location: **SE corner of Bramalea Rd & Old School Rd**
 Drilling Location: **Caledon, ON**
 Local Benchmark: **Elevations are Geodetic, taken using Trimble**

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **KJT** Northing: **4849730** Date Started: **Nov 26/24**
 Reviewed By: **AA** Easting: **596068** Date Completed: **Nov 26/24**



LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)					
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa)		Atterberg Limits			GR SA SI CL					
								× Other Test + Pocket Penetrometer ▲ Field Vane (Intact) △ Field Vane (Remolded)	△ Combustible Organic Vapour (ppm) ▲ Combustible Organic Vapour (%LEL) ◇ Total Organic Vapour (ppm)									
								50 100 150 200		PL LL								
								Penetration Testing										
								○ SPT 10 20 30 40	● DCPT		○ Water Content (%)							

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Groundwater depth encountered on completion of drilling: Dry Cave depth after auger removal: Open
 Groundwater depth observed on: Apr 23/25 at depth of: 1.8 m. Groundwater Elevation: 268.4 m

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

Scale: 1:75
 Page: 1 of 1

RECORD OF BOREHOLE No. 206

Project Number: **2407688**
 Project Client: **TACC Developments**
 Project Name: **Mayfield Tullamore TACC Lands- Phase**
 Project Location: **SE corner of Bramalea Rd & Old School Rd**
 Drilling Location: **Caledon, ON**
 Local Benchmark: **Elevations are Geodetic, taken using Trimble**

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **KJT** Northing: **4849556** Date Started: **Nov 26/24**
 Reviewed By: **AA** Easting: **596241** Date Completed: **Nov 26/24**



LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa)		Atterberg Limits			GR SA SI CL			
								Penetration Testing		Water Content (%)						
								○ SPT ● DCPT		PL LL						
								50 100 150 200		10 20 30 40						
								X Other Test + Pocket Penetrometer ▲ Field Vane (Intact) △ Field Vane (Remolded)		△ Combustible Organic Vapour (ppm) ▲ Combustible Organic Vapour (%LEL) ◇ Total Organic Vapour (ppm) 100 200 300 400						
								0.0								

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Groundwater depth encountered on completion of drilling: Dry Cave depth after auger removal: Open
 Groundwater depth observed on: Apr 23/25 at depth of: 6.0 m. Groundwater Elevation: 263.1 m

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

Scale: 1:75
 Page: 1 of 1

RECORD OF BOREHOLE No. 207

Project Number: **2407688**
 Project Client: **TACC Developments**
 Project Name: **Mayfield Tullamore TACC Lands- Phase**
 Project Location: **SE corner of Bramalea Rd & Old School Rd**
 Drilling Location: **Caledon, ON**
 Local Benchmark: **Elevations are Geodetic, taken using Trimble**



Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **KJT** Northing: **4849451** Date Started: **Nov 26/24**
 Reviewed By: **AA** Easting: **596358** Date Completed: **Nov 26/24**

LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING				Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa)		Atterberg Limits					GR	SA	SI	CL
								× Other Test + Pocket Penetrometer ▲ Field Vane (Intact) △ Field Vane (Remolded) 50 100 150 200	△ Combustible Organic Vapour (ppm) ▲ Combustible Organic Vapour (%LEL) ◇ Total Organic Vapour (ppm) 100 200 300 400									
	0.0 267.6					0		Penetration Testing ○ SPT ● DCPT		PL	Water Content (%)							
	0.3 267.3	SS	1	80	18			○ 18		○ 13								
	0.8 266.8																	
	CLAYEY SILT GLACIAL TILL: Sandy, trace gravel, inferred cobbles and boulders, hard, brown, moist	SS	2	55	39			○ 39		○ 8								
		SS	3	100	45			○ 45		○ 10								
		SS	4	100	46			○ 46		○ 11								
		SS	5	100	58			○ 58		○ 11								
	4.6 263.0					4.5												
	SILT: Some sand, trace clay, hard, brown, moist	SS	6	100	100+			○ 100+		○ 7								
		SS	7	100	53			○ 53		○ 18								
	6.6 261.0																	
	Borehole Terminated at 6.6 m																	

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Groundwater depth encountered on completion of drilling: Dry
 Groundwater depth observed on:
 Cave depth after auger removal: Open
 Groundwater Elevation:

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

Scale: 1:75
 Page: 1 of 1

RECORD OF BOREHOLE No. 208-D

Project Number: **2407688**

Project Client: **TACC Developments**

Project Name: Mayfield Tullamore TACC Lands- Phase

Project Location: **SE corner of Bramalea Rd & Old School Rd**

Drilling Location: **Caledon, ON**

Local Benchmark: Elevations are Geodetic, taken using Trimble

Drilling Method: Solid Stem Augers

Drilling Machine: Track Mount

Logged By: KJT

Northings: 4849129

Date Started: Nov 27/24Reviewed By: GWEasting: 596938Date Completed: **Nov 27/24**[illegible]

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	Groundwater depth encountered on completion of drilling: Dry		Cave depth after auger removal: Open
	Groundwater depth observed on: Apr 23/25 at depth of: -0.7 m.		Groundwater Elevation: 259.4 m

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

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RECORD OF BOREHOLE No. 208-S



Project Number: **2407688**
 Project Client: **TACC Developments**
 Project Name: **Mayfield Tullamore TACC Lands- Phase**
 Project Location: **SE corner of Bramalea Rd & Old School Rd**
 Drilling Location: **Caledon, ON**
 Local Benchmark: **Elevations are Geodetic, taken using Trimble**

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **KJT** Northing: **4849129** Date Started: **Nov 27/24**
 Reviewed By: **GW** Easting: **596938** Date Completed: **Nov 27/24**

LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)				
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa)	Penetration Testing	Atterberg Limits	Water Content (%)		GR	SA	SI	CL	
	0.0 258.7					0											
	0.3 258.5	SS	1	100							15						
	0.8 258.0										9						
	CLAYEY SILT GLACIAL TILL: Sandy, trace gravel, inferred cobbles and boulders, hard, brown, moist	SS	2	100		1.5										2	26 46 26
		SS	3	100													
		SS	4	100		256.5					10						
		SS	5	100		3					7						
						255											
	--- Grey, very stiff to hard ---	SS	6	100		4.5					11						
	5.0 253.7																
	Borehole Terminated at 5.0 m																

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Groundwater depth encountered on completion of drilling: Dry Cave depth after auger removal: Open
 Groundwater depth observed on: Apr 23/25 at depth of: 0.0 Groundwater Elevation:

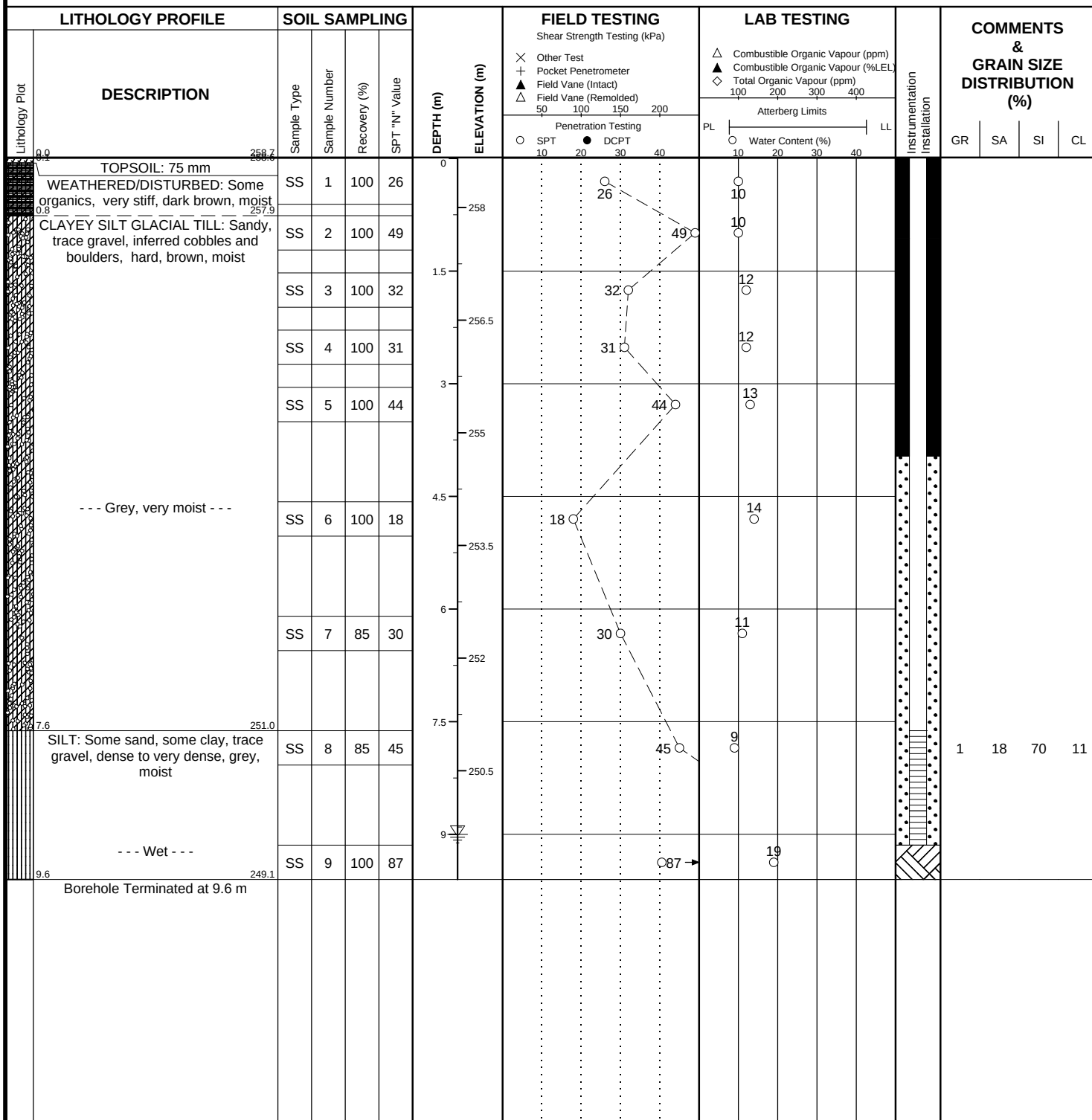
Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

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RECORD OF BOREHOLE No. 209-D

Project Number: **2407688**
 Project Client: **TACC Developments**
 Project Name: **Mayfield Tullamore TACC Lands- Phase**
 Project Location: **SE corner of Bramalea Rd & Old School Rd**
 Drilling Location: **Caledon, ON**
 Local Benchmark: **Elevations are Geodetic, taken using Trimble**

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **KJT** Northing: **4849293** Date Started: **Nov 27/24**
 Reviewed By: **GW** Easting: **596893** Date Completed: **Nov 27/24**



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Groundwater depth encountered on completion of drilling: 9.0 m. Cave depth after auger removal: Open
 Groundwater depth observed on: Apr 23/25 at depth of: -1.0 m. Groundwater Elevation: 259.7 m

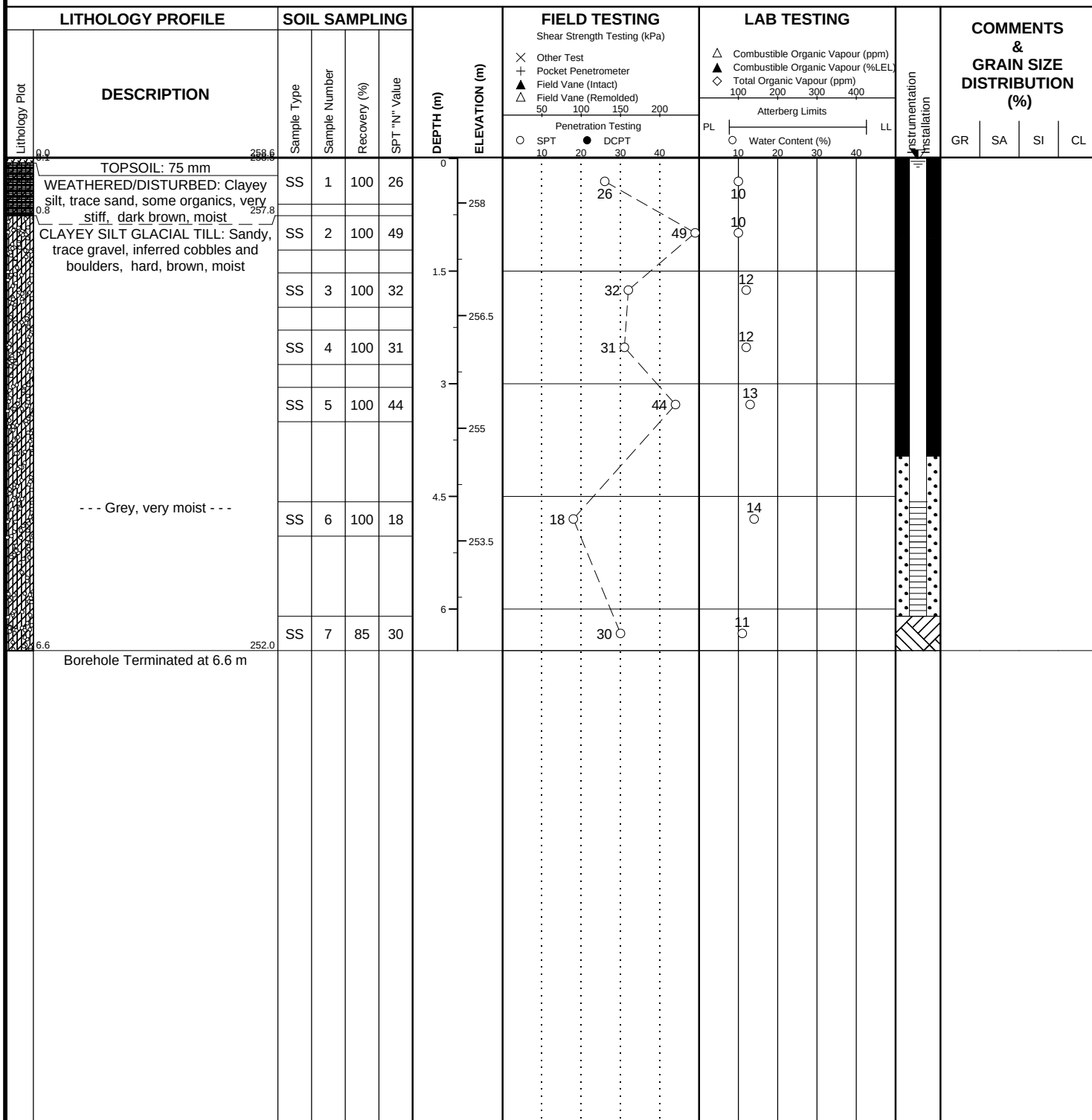
Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

Scale: 1:75
 Page: 1 of 1

RECORD OF BOREHOLE No. 209-S

Project Number: **2407688**
 Project Client: **TACC Developments**
 Project Name: **Mayfield Tullamore TACC Lands- Phase**
 Project Location: **SE corner of Bramalea Rd & Old School Rd**
 Drilling Location: **Caledon, ON**
 Local Benchmark: **Elevations are Geodetic, taken using Trimble**

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **KJT** Northing: **4849291** Date Started: **Nov 27/24**
 Reviewed By: **GW** Easting: **596894** Date Completed: **Nov 27/24**



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Groundwater depth encountered on completion of drilling: Dry
 Groundwater depth observed on: Apr 23/25 at depth of: 0.0
 Cave depth after auger removal: Open
 Groundwater Elevation:

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

Scale: 1:75
 Page: 1 of 1

RECORD OF BOREHOLE No. 210

Project Number: **2407688**

Project Client: **TACC Developments**

Project Name: Mayfield Tullamore TACC Lands- Phase

Project Location: **SE corner of Bramalea Rd & Old School Rd**

Drilling Location: **Caledon, ON**

Local Benchmark: **Elevations are Geodetic, taken using Trimble**

Drilling Method: **Solid Stem Augers**

Drilling Machine: Track Mount

Logged By: KJT Northing: 4849431 Date Started: Nov 27/24

Reviewed By: **GW** Easting: **596661** Date Completed: **Nov 27/24**

[illegible]

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 Groundwater depth encountered on completion of drilling: Dry

 Groundwater depth observed on:

Cave depth after auger removal: Open

Groundwater Elevation:

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

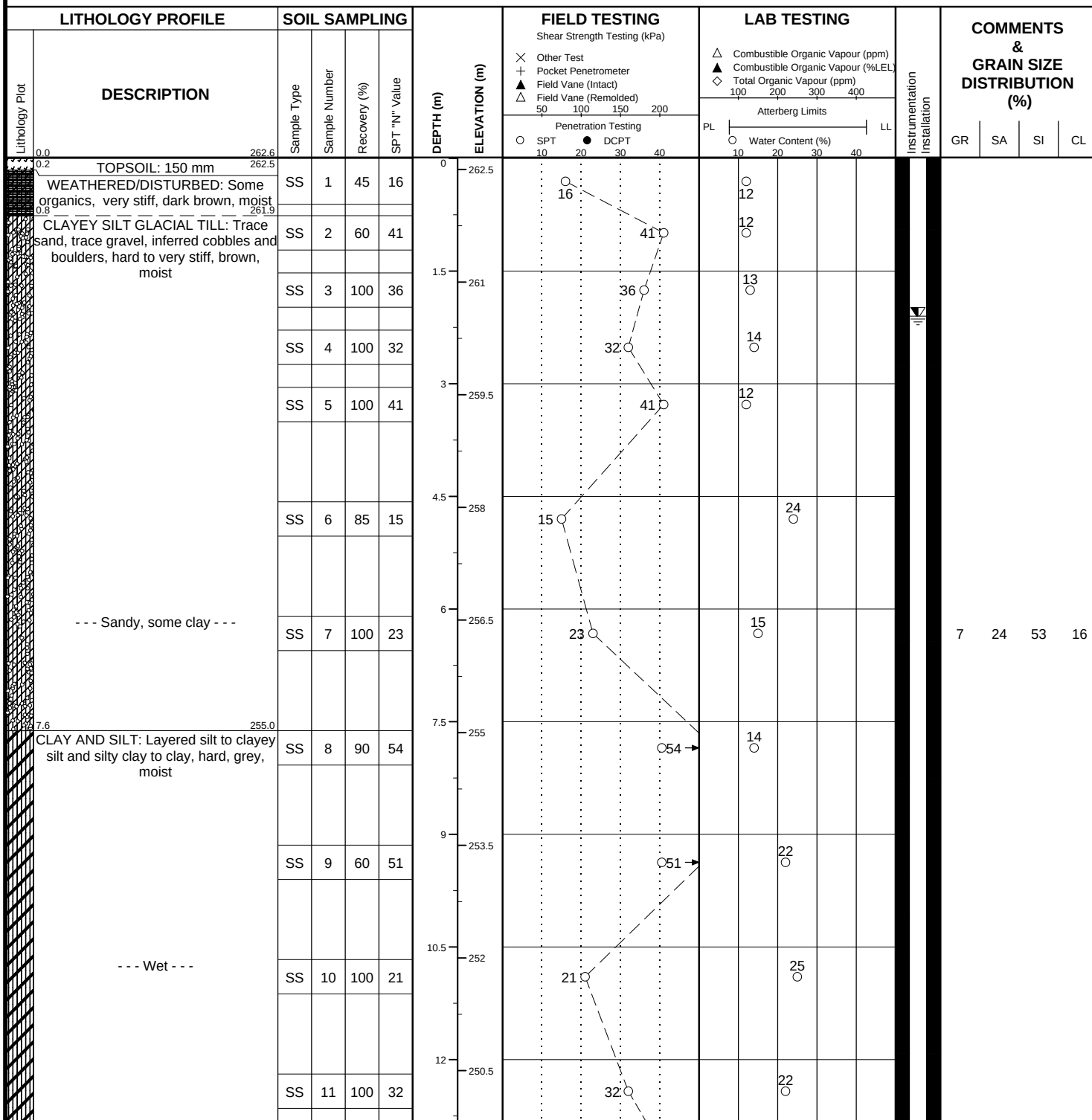
Scale: **1 : 75**

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RECORD OF BOREHOLE No. 211-D

Project Number: **2407688**
 Project Client: **TACC Developments**
 Project Name: **Mayfield Tullamore TACC Lands- Phase**
 Project Location: **SE corner of Bramalea Rd & Old School Rd**
 Drilling Location: **Caledon, ON**
 Local Benchmark: **Elevations are Geodetic, taken using Trimble**

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **KJT** Northing: **4849590** Date Started: **Dec 02/24**
 Reviewed By: **GW** Easting: **596605** Date Completed: **Dec 02/24**



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Groundwater depth encountered on completion of drilling: 18.2 m. Cave depth after auger removal: 18.4m.
 Groundwater depth observed on: Apr 23/25 at depth of: 2.1 m. Groundwater Elevation: 260.5 m

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

Scale: 1:75
 Page: 1 of 2

RECORD OF BOREHOLE No. 211-D

Project Number: **2407688**
 Project Client: **TACC Developments**
 Project Name: **Mayfield Tullamore TACC Lands- Phase**
 Project Location: **SE corner of Bramalea Rd & Old School Rd**
 Drilling Location: **Caledon, ON**
 Local Benchmark: **Elevations are Geodetic, taken using Trimble**

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **KJT** Northing: **4849590** Date Started: **Dec 02/24**
 Reviewed By: **GW** Easting: **596605** Date Completed: **Dec 02/24**



LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)						
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa)		Atterberg Limits			GR	SA	SI	CL			
								Other Test Pocket Penetrometer Field Vane (Intact) Field Vane (Remolded)	Penetration Testing SPT DCPT	Combustible Organic Vapour (ppm) Combustible Organic Vapour (%LEL) Total Organic Vapour (ppm)	Water Content (%)								
		SS	12	100	49		13.5 249				24								
	15.2 247.4	SAND: Some silt, trace clay, trace gravel, dense, grey, wet	SS	13	100	33					21							1	79
			SS	14	85	46					21								
	18.3 244.4	SILT: Some sand, trace clay, trace gravel, dense to very dense, grey, wet	SS	15	65	39					20								
	20.3 242.4		SS	16	55	57					17								
		Borehole Terminated at 20.3 m																	

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Groundwater depth encountered on completion of drilling: 18.2 m. Cave depth after auger removal: 18.4m.
 Groundwater depth observed on: Apr 23/25 at depth of: 2.1 m. Groundwater Elevation: 260.55 m

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

Scale: **1 : 75**
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RECORD OF BOREHOLE No. 211-S



Project Number: **2407688**
 Project Client: **TACC Developments**
 Project Name: **Mayfield Tullamore TACC Lands- Phase**
 Project Location: **SE corner of Bramalea Rd & Old School Rd**
 Drilling Location: **Caledon, ON**
 Local Benchmark: **Elevations are Geodetic, taken using Trimble**

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **KJT** Northing: **4849589** Date Started: **Dec 02/24**
 Reviewed By: **GW** Easting: **596606** Date Completed: **Dec 02/24**

LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING				Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa)		Atterberg Limits					GR	SA	SI	CL
								Penetration Testing		Water Content (%)								
								○ SPT	● DCPT	△ Combustible Organic Vapour (ppm)	▲ Combustible Organic Vapour (%LEL)	◇ Total Organic Vapour (ppm)						
								50 100 150 200		100 200 300 400								
										PL		LL						

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Groundwater depth encountered on completion of drilling: Dry Cave depth after auger removal: Open
 Groundwater depth observed on: Apr 23/25 at depth of: 1.3 m. Groundwater Elevation: 261.3 m

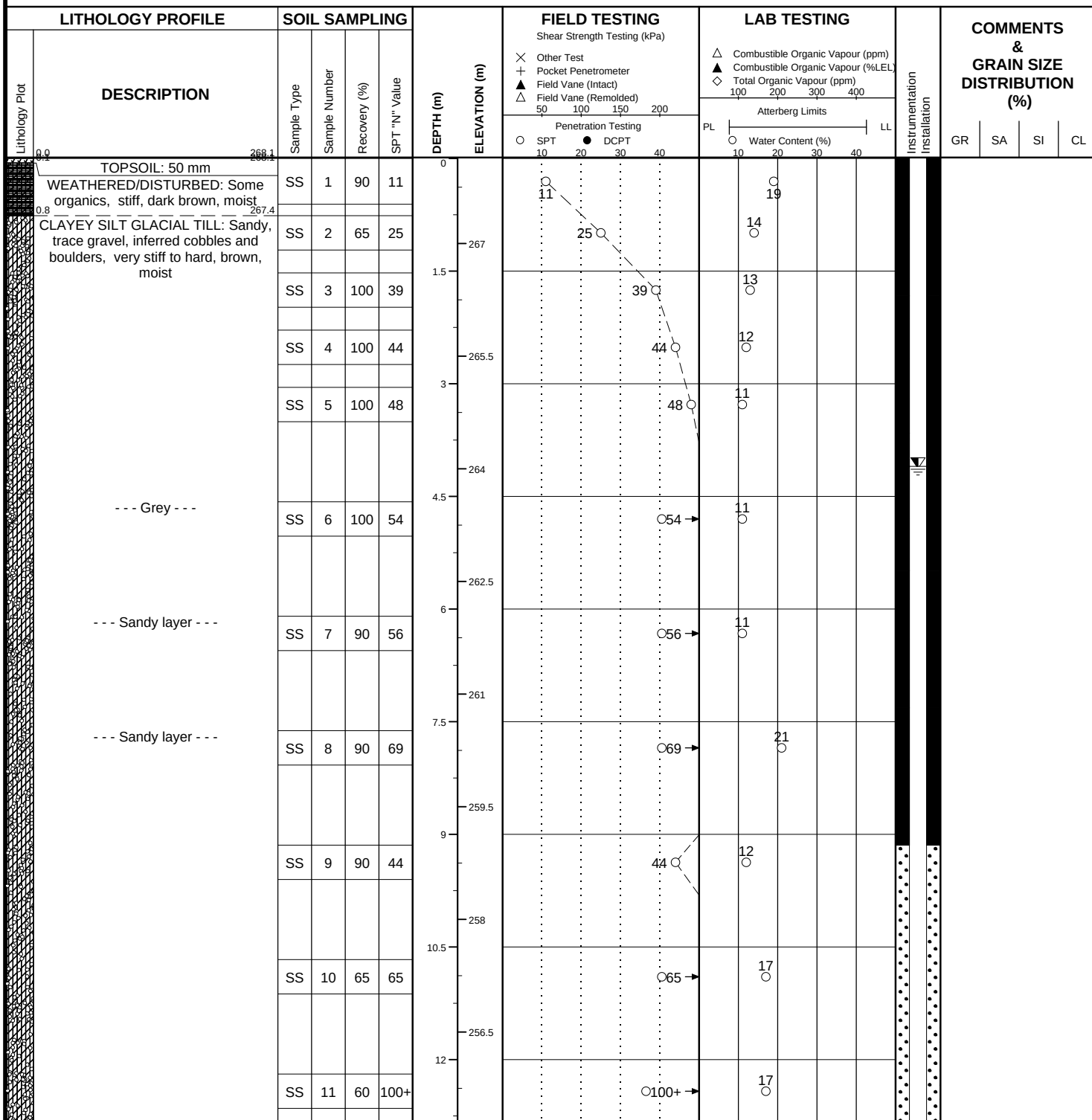
Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

Scale: 1:75
 Page: 1 of 1

RECORD OF BOREHOLE No. 212-D

Project Number: **2407688**
 Project Client: **TACC Developments**
 Project Name: **Mayfield Tullamore TACC Lands- Phase**
 Project Location: **SE corner of Bramalea Rd & Old School Rd**
 Drilling Location: **Caledon, ON**
 Local Benchmark: **Elevations are Geodetic, taken using Trimble**

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **KJT** Northing: **4849738** Date Started: **Dec 02/24**
 Reviewed By: **GW** Easting: **596253** Date Completed: **Dec 02/24**



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Groundwater depth encountered on completion of drilling: Dry Cave depth after auger removal: Open
 Groundwater depth observed on: Apr 23/25 at depth of: 4.1 m. Groundwater Elevation: 264.0 m

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

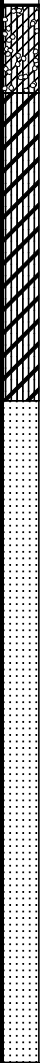
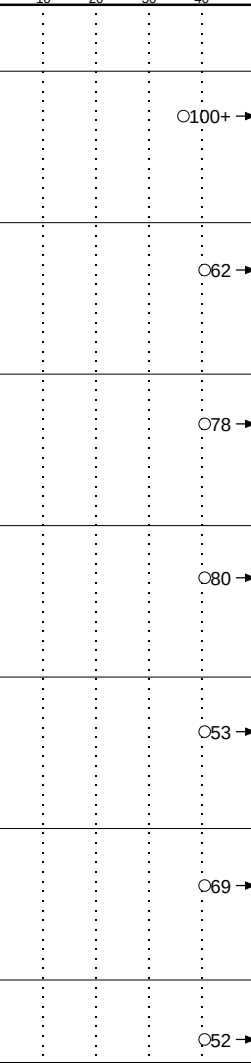
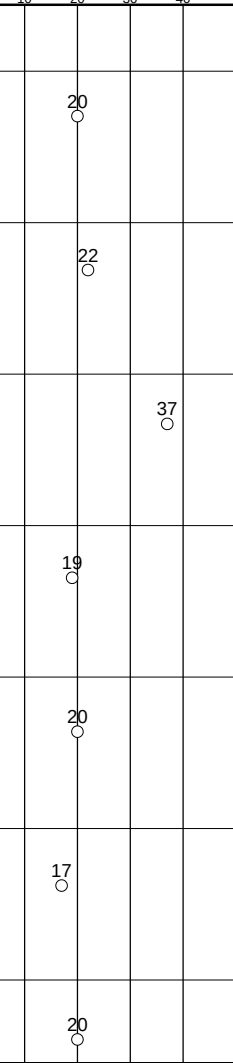
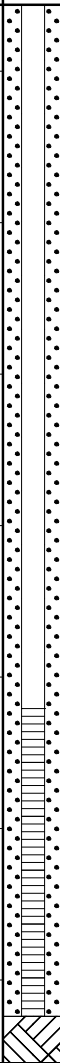
Scale: 1:75
 Page: 1 of 2

RECORD OF BOREHOLE No. 212-D

Project Number: **2407688**
 Project Client: **TACC Developments**
 Project Name: **Mayfield Tullamore TACC Lands- Phase**
 Project Location: **SE corner of Bramalea Rd & Old School Rd**
 Drilling Location: **Caledon, ON**
 Local Benchmark: **Elevations are Geodetic, taken using Trimble**

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **KJT** Northing: **4849738** Date Started: **Dec 02/24**
 Reviewed By: **GW** Easting: **596253** Date Completed: **Dec 02/24**



LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING				Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)									
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa)		Atterberg Limits		Water Content (%)			GR	SA	SI	CL						
	13.7 254.4 CLAY AND SILT: Layered silt to clayey silt and silty clay to clay, hard, grey, moist	SS	12	65	100+	13.5	255																	
	16.8 251.4 SAND: Trace sand, very dense, grey, wet	SS	14	95	78	16.5	252																	
						18	250.5																	
		SS	15	65	80	19.5	249																	
						21	247.5																	
		SS	17	95	69	22.5	246																	
	23.3 244.8 Borehole Terminated at 23.3 m	SS	18	90	52																			

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Groundwater depth encountered on completion of drilling: Dry Cave depth after auger removal: Open
 Groundwater depth observed on: Apr 23/25 at depth of: 4.1 m. Groundwater Elevation: 264.03 m

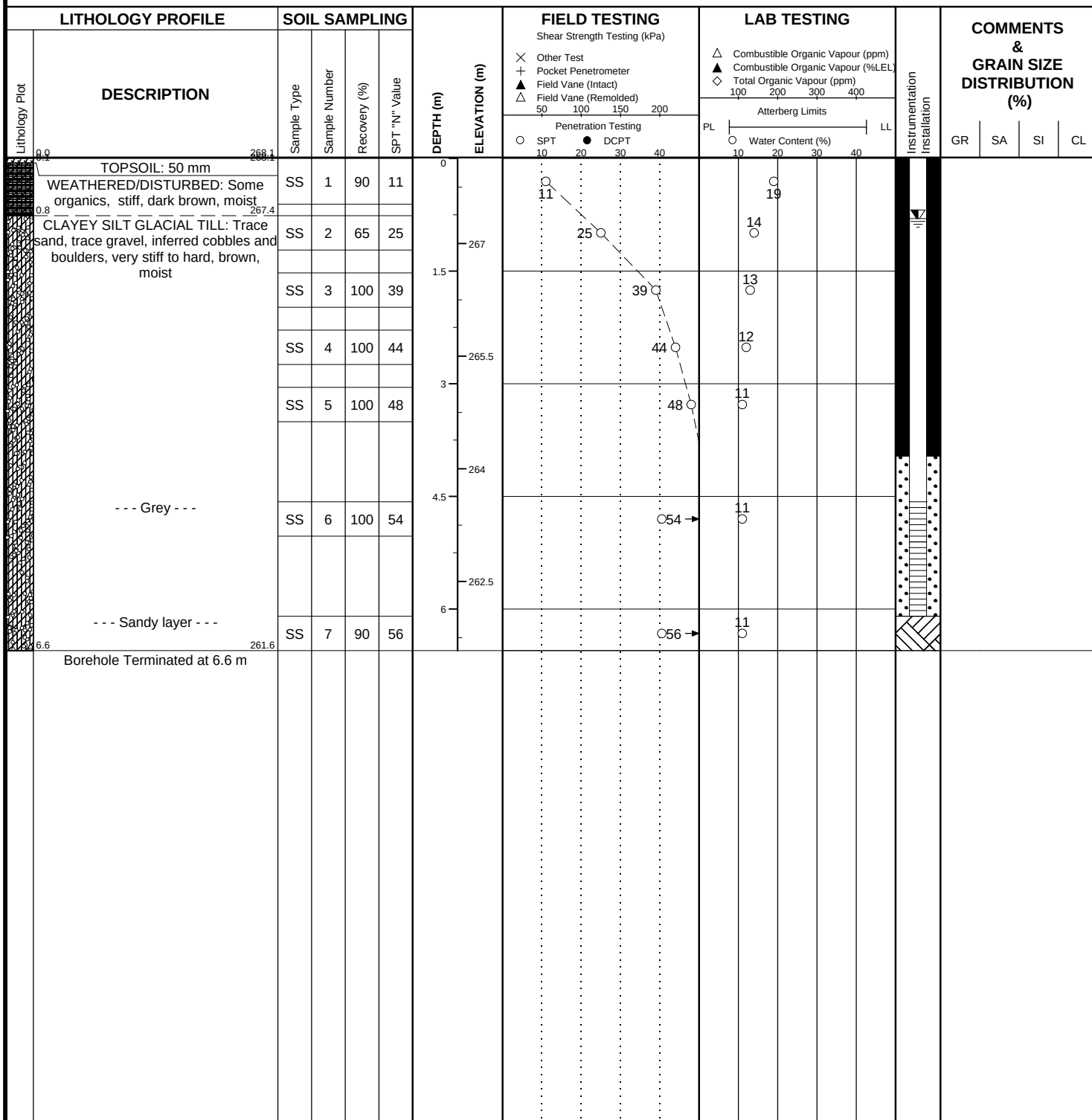
Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

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RECORD OF BOREHOLE No. 212-S

Project Number: **2407688**
 Project Client: **TACC Developments**
 Project Name: **Mayfield Tullamore TACC Lands- Phase**
 Project Location: **SE corner of Bramalea Rd & Old School Rd**
 Drilling Location: **Caledon, ON**
 Local Benchmark: **Elevations are Geodetic, taken using Trimble**

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **KJT** Northing: **4849738** Date Started: **Dec 02/24**
 Reviewed By: **GW** Easting: **596253** Date Completed: **Dec 02/24**



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Groundwater depth encountered on completion of drilling: Dry Cave depth after auger removal: Open
 Groundwater depth observed on: Apr 23/25 at depth of: 0.8 m. Groundwater Elevation: 267.3 m

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

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RECORD OF BOREHOLE No. 213

Project Number: **2407688**
 Project Client: **TACC Developments**
 Project Name: **Mayfield Tullamore TACC Lands- Phase**
 Project Location: **SE corner of Bramalea Rd & Old School Rd**
 Drilling Location: **Caledon, ON**
 Local Benchmark: **Elevations are Geodetic, taken using Trimble**

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **TA** Northing: **4849976** Date Started: **Dec 04/24**
 Reviewed By: **GW** Easting: **596246** Date Completed: **Dec 04/24**



LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa)		Atterberg Limits			GR SA SI CL			
	0.2 265.2 TOPSOIL: 50 mm	SS	1	50	9	0	265.2	9			22					
	0.8 264.5 WEATHERED/DISTURBED: Trace organics, stiff, dark brown, moist															
	CLAYEY SILT GLACIAL TILL: Sandy, trace gravel, inferred cobbles and boulders, hard, brown, moist	SS	2	90	34		264	34			15					
		SS	3	100	45	1.5		45			14					
		SS	4	100	49		262.5	49			11					
	3.0 262.2 SILT GLACIAL TILL: Some sand, trace clay, inferred cobbles and boulders, dense, light brown to brown, moist	SS	5	100	43	3		43			13					

	---	SS	6	100	47	4.5	261	47			10					

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Groundwater depth encountered on completion of drilling: Dry
 Groundwater depth observed on:
 Cave depth after auger removal: Open
 Groundwater Elevation:

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

Scale: 1:75
 Page: 1 of 1

RECORD OF BOREHOLE No. 214

Project Number: **2407688**
 Project Client: **TACC Developments**
 Project Name: **Mayfield Tullamore TACC Lands- Phase**
 Project Location: **SE corner of Bramalea Rd & Old School Rd**
 Drilling Location: **Caledon, ON**
 Local Benchmark: **Elevations are Geodetic, taken using Trimble**

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **KJT** Northing: **4849950** Date Started: **Nov 28/24**
 Reviewed By: **GW** Easting: **596450** Date Completed: **Nov 28/24**



LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING				Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa)		Atterberg Limits					GR	SA	SI	CL
						Other Test	Penetration Testing	Combustible Organic Vapour (ppm)	Combustible Organic Vapour (%LEL)	Total Organic Vapour (ppm)	Water Content (%)							
	TOPSOIL: 75 mm	SS	1	100	28	0	259.5	28		14								
	WEATHERED/DISTURBED: Trace organics, stiff, dark brown, moist	SS	2	85	47			47		15								
	CLAYEY SILT GLACIAL TILL: Sandy, trace gravel, inferred cobbles and boulders, hard to very stiff, brown, moist	SS	3	100	45	1.5	258	45		12								
	---	SS	4	100	27			27		13								
	---	SS	5	100	33	3	256.5	33		9								
	CLAY AND SILT: Layered silt to clayey silt and silty clay to clay, hard, grey, moist	SS	6	100	100+	4.5	255	100+		15								
	---	SS	7	100	98	6	253.5	98		17								
	Borehole Terminated at 6.6 m																	

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Groundwater depth encountered on completion of drilling: Dry Cave depth after auger removal: Open
 Groundwater depth observed on: Groundwater Elevation:

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

Scale: 1 : 75
 Page: 1 of 1

RECORD OF BOREHOLE No. 215



Project Number: **2407688**
 Project Client: **TACC Developments**
 Project Name: **Mayfield Tullamore TACC Lands- Phase**
 Project Location: **SE corner of Bramalea Rd & Old School Rd**
 Drilling Location: **Caledon, ON**
 Local Benchmark: **Elevations are Geodetic, taken using Trimble**

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **KJT** Northing: **4849937** Date Started: **Nov 28/24**
 Reviewed By: **GW** Easting: **596763** Date Completed: **Nov 28/24**

LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING				Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)				
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa)		Atterberg Limits					GR	SA	SI	CL	
								Other Test	Penetration Testing	PL	LL	Water Content (%)							
								×	○	△									
								+	●	▲									
								▲		◆									
								△											
								50	100	150	200								
								10	20	30	40								

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Groundwater depth encountered on completion of drilling: Dry Cave depth after auger removal: Open
 Groundwater depth observed on: Apr 23/25 at depth of: 2.2 m. Groundwater Elevation: 258.4 m

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

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Appendix B2: GEI's Mayfield Tullamore Local Subwatershed Study Phase 1

RECORD OF BOREHOLE No. 19



Project Number: **2400278**
 Project Client: **Mayfield Tullamore Landowner Group Inc.**
 Project Name: **Mayfield Tullamore LOG**
 Project Location: **Caledon, ON**
 Drilling Location: **See Borehole Location Plan**
 Local Benchmark: _____

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **TA** Northing: **4849540** Date Started: **Apr 29/24**
 Reviewed By: **RW** Easting: **595906** Date Completed: **Apr 29/24**

LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)				
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa)		Atterberg Limits			GR	SA	SI	CL	
								×	△								
								+	△								
								▲	◇								
								△	100 200 300 400								
								50 100 150 200									
								Penetration Testing									
								○ SPT	● DCPT								
								10 20 30 40									
										PL							
										○ Water Content (%)							
										LL							

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Groundwater depth encountered on completion of drilling: Dry Cave depth after auger removal: Open
 Groundwater depth observed on: Groundwater Elevation:

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

Scale 1 : 100
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RECORD OF BOREHOLE No. 20

Project Number: **2400278**
 Project Client: **Mayfield Tullamore Landowner Group Inc.**
 Project Name: **Mayfield Tullamore LOG**
 Project Location: **Caledon, ON**
 Drilling Location: **See Borehole Location Plan**
 Local Benchmark: _____

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **AG** Northing: **4849858** Date Started: **May 03/24**
 Reviewed By: **RW** Easting: **596166** Date Completed: **May 03/24**



LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)					
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa)		Atterberg Limits			GR	SA	SI	CL		
								× Other Test + Pocket Penetrometer ▲ Field Vane (Intact) △ Field Vane (Remolded) 50 100 150 200	△ Combustible Organic Vapour (ppm) ▲ Combustible Organic Vapour (%LEL) ◇ Total Organic Vapour (ppm) 100 200 300 400									
								Penetration Testing ○ SPT 10 20 30 40 ● DCPT		PL Water Content (%) LL 10 20 30 40								
	0.0 268.6 0.3 268.3 TOPSOIL: 255 mm FILL: Clayey silt, some sand, trace gravel, trace organics, trace rootlets, firm, dark brown, moist	SS	1	100	5	0	268	5		15								
	0.8 267.8 CLAYEY SILT GLACIAL TILL: Some sand to sandy, trace gravel, inferred cobbles and boulders, very stiff to hard, brown, moist	SS	2	100	27			27		16								
		SS	3	100	35	2		35		17								
		SS	4	100	49		266	49		12								
		SS	5	100	62			62	→	12								
	--- Some clay, grey ---	SS	6	100	81		264	81	→	13								
	6.6 262.0 Borehole Terminated at 6.6 m	SS	7	100	49	6		49		11								

RECORD OF BOREHOLE No. 21



Project Number: **2400278**
 Project Client: **Mayfield Tullamore Landowner Group Inc.**
 Project Name: **Mayfield Tullamore LOG**
 Project Location: **Caledon, ON**
 Drilling Location: **See Borehole Location Plan**
 Local Benchmark: _____

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **TA** Northing: **4849563** Date Started: **Apr 29/24**
 Reviewed By: **RW** Easting: **596137** Date Completed: **Apr 29/24**

LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)				
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa)		Atterberg Limits			GR	SA	SI	CL	
								Other Test	Penetration Testing	Combustible Organic Vapour (ppm)	Water Content (%)						
								○ Other Test + Pocket Penetrometer ▲ Field Vane (Intact) △ Field Vane (Remolded)	△ Combustible Organic Vapour (ppm) ▲ Combustible Organic Vapour (%LEL) ◇ Total Organic Vapour (ppm)								
								50 100 150 200	100 200 300 400								
								○ SPT ● DCPT									

Groundwater depth encountered on completion of drilling: 5.8 m. Cave depth after auger removal: 4.6 m.
 Groundwater depth observed on: Apr 23/25 at depth of: 4.7 m. Groundwater Elevation: 261.7 m

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Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

Scale 1 : 100
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RECORD OF BOREHOLE No. 22



Project Number: **2400278**
 Project Client: **Mayfield Tullamore Landowner Group Inc.**
 Project Name: **Mayfield Tullamore LOG**
 Project Location: **Caledon, ON**
 Drilling Location: **See Borehole Location Plan**
 Local Benchmark: _____

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **AG** Northing: **4849857** Date Started: **May 08/24**
 Reviewed By: **RW** Easting: **596375** Date Completed: **May 08/24**

LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING				Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa)		Atterberg Limits					GR	SA	SI	CL
								× Other Test + Pocket Penetrometer ▲ Field Vane (Intact) △ Field Vane (Remolded) 50 100 150 200	△ Combustible Organic Vapour (ppm) ▲ Combustible Organic Vapour (%LEL) ◇ Total Organic Vapour (ppm) 100 200 300 400									
								Penetration Testing ○ SPT 10 20 30 40 ● DCPT		PL Water Content (%) LL 10 20 30 40								
	0.0 264.4 0.2 264.1 TOPSOIL: 205 mm CLAYEY SILT GLACIAL TILL: Some sand to sandy, trace gravel, inferred cobbles and boulders, stiff to very stiff, brown, moist --- Hard ---	SS	1	100	9	0	264	9		18								
		SS	2	100	19			19		17								
		SS	3	100	34			34		14								
		SS	4	100	52			52		12								
		SS	5	100	47			47		12								
		--- Grey ---	SS	6	100	56			56		11							
	6.6 257.8	SS	7	100	48			48		15								
Borehole Terminated at 6.6 m																		

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Groundwater depth encountered on completion of drilling: Dry Cave depth after auger removal: Open
 Groundwater depth observed on: Groundwater Elevation:

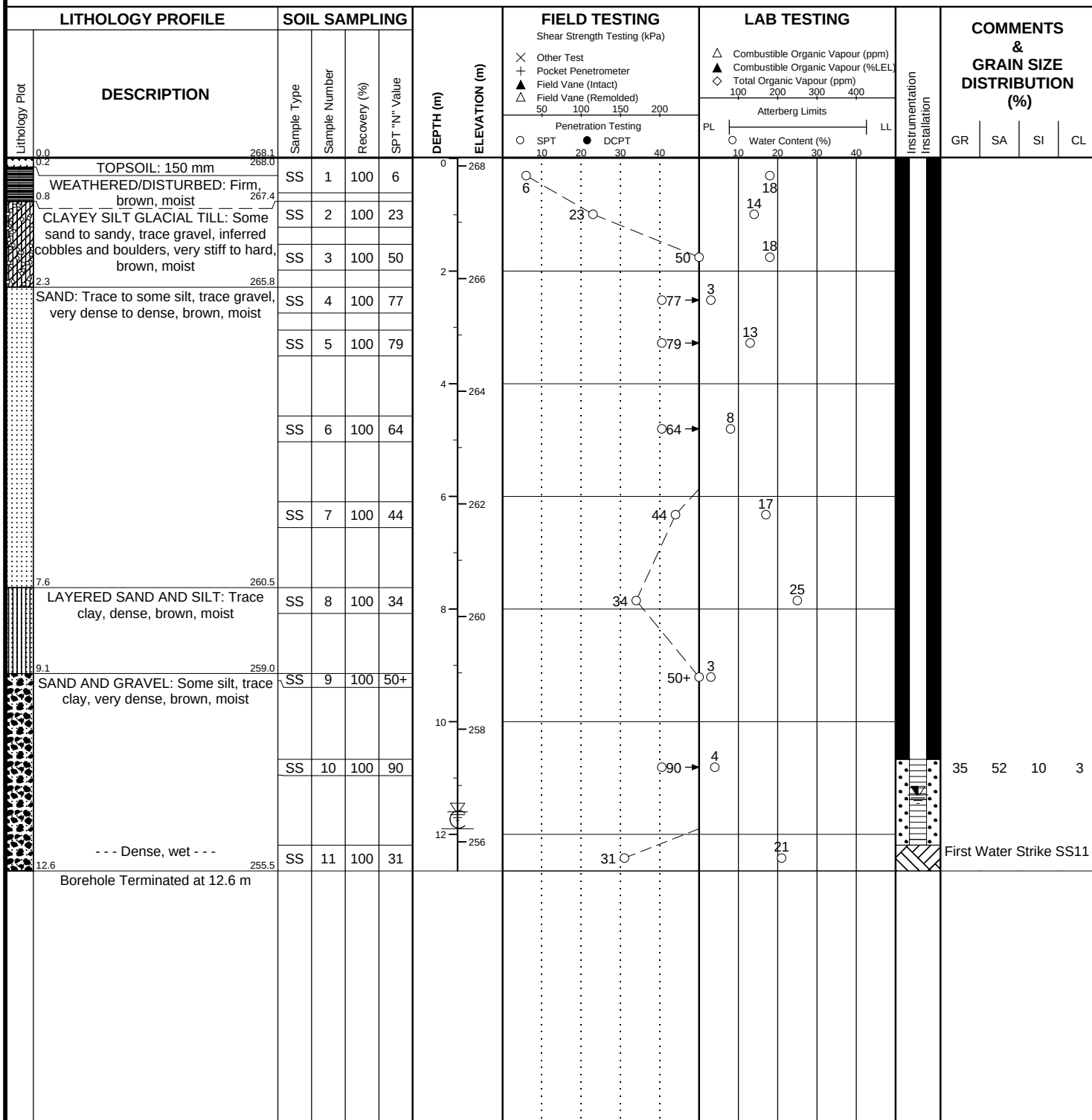
Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

Scale 1 : 100
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RECORD OF BOREHOLE No. 23

Project Number: **2400278**
 Project Client: **Mayfield Tullamore Landowner Group Inc.**
 Project Name: **Mayfield Tullamore LOG**
 Project Location: **Caledon, ON**
 Drilling Location: **See Borehole Location Plan**
 Local Benchmark: _____

Drilling Method: **Hollow Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **AG** Northing: **4849291** Date Started: **May 02/24**
 Reviewed By: **RW** Easting: **596198** Date Completed: **May 02/24**



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Groundwater depth encountered on completion of drilling: 11.6 m. Cave depth after auger removal: 11.9m.
 Groundwater depth observed on: Apr 23/25 at depth of: 11.3 m. Groundwater Elevation: 256.8 m

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

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RECORD OF BOREHOLE No. 24D

Project Number: **2400278**
 Project Client: **Mayfield Tullamore Landowner Group Inc.**
 Project Name: **Mayfield Tullamore LOG**
 Project Location: **Caledon, ON**
 Drilling Location: **See Borehole Location Plan**
 Local Benchmark: _____

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **TA** Northing: **4849398** Date Started: **Apr 29/24**
 Reviewed By: **RW** Easting: **596260** Date Completed: **Apr 29/24**



LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)					
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa)		Atterberg Limits			COMMENTS & GRAIN SIZE DISTRIBUTION (%)					
								Penetration Testing										
0.0	TOPSOIL: 180 mm	SS	1	35	6	0	263.8	6										
0.2	WEATHERED/DISTURBED: Firm, brown, moist	SS	2	100	34		263.7	34										
0.8	CLAYEY SILT GLACIAL TILL: Sandy, trace gravel, inferred cobbles and boulders, very stiff to hard, brown, moist	SS	3	85	40		262	40										
	---	SS	4	100	29			29										
	---	SS	5	80	22			22										

	---	SS	6	90	20			20										

6.5	Borehole Terminated at 6.5 m	SS	7	90	21	6	257.3	21										

RECORD OF BOREHOLE No. 24S



Project Number: **2400278**
 Project Client: **Mayfield Tullamore Landowner Group Inc.**
 Project Name: **Mayfield Tullamore LOG**
 Project Location: **Caledon, ON**
 Drilling Location: **See Borehole Location Plan**
 Local Benchmark: _____

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **TA** Northing: **4849397** Date Started: **Apr 29/24**
 Reviewed By: **RW** Easting: **596262** Date Completed: **Apr 29/24**

LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	LAB TESTING				Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa)	Atterberg Limits			Water Content (%)			GR	SA	SI
	0.0 263.8 TOPSOIL: 180 mm	SS	1	33	6	0	262	6	13								
	0.2 263.6 WEATHERED/DISTURBED: Firm, brown, moist	SS	2	100	34			34	13								
	0.8 263.0 CLAYEY SILT GLACIAL TILL: Sandy, trace gravel, inferred cobbles and boulders, very stiff to hard, brown, moist	SS	3	85	40			40	13								
	2.7 261.0 --- Grey ---	SS	4	100	29			29	10								
Borehole Terminated at 2.7 m																	

RECORD OF BOREHOLE No. 25



Project Number: **2400278**
 Project Client: **Mayfield Tullamore Landowner Group Inc.**
 Project Name: **Mayfield Tullamore LOG**
 Project Location: **Caledon, ON**
 Drilling Location: **See Borehole Location Plan**
 Local Benchmark: _____

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **AG** Northing: **4849604** Date Started: **May 07/24**
 Reviewed By: **RW** Easting: **596422** Date Completed: **May 07/24**

LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	LAB TESTING				Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)				
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa) × Other Test + Pocket Penetrometer ▲ Field Vane (Intact) △ Field Vane (Remolded) 50 100 150 200 Penetration Testing ○ SPT ● DCPT 10 20 30 40	Atterberg Limits PL Water Content (%) LL 10 20 30 40					GR	SA	SI	CL	
		0.0 0.2 0.8 CLAYEY SILT GLACIAL TILL: Some sand to sandy, trace gravel, inferred cobbles and boulders, very stiff to hard, brown, moist	SS	1	100	3	3	17	56	45	89	8	12					
TOPSOIL: 230 mm WEATHERED/DISTURBED: Soft, brown, moist		SS	2	100	17													
CLAYEY SILT GLACIAL TILL: Some sand to sandy, trace gravel, inferred cobbles and boulders, very stiff to hard, brown, moist		SS	3	100	56													
		SS	4	100	45													
		SS	5	100	89													
---		SS	6	100	82													
6.1 6.6 SILTY SAND LAYERED WITH SILT: Trace clay, very dense, grey, moist Borehole Terminated at 6.6 m		SS	7	100	86													

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Groundwater depth encountered on completion of drilling: Dry Cave depth after auger removal: Open
 Groundwater depth observed on: Groundwater Elevation:

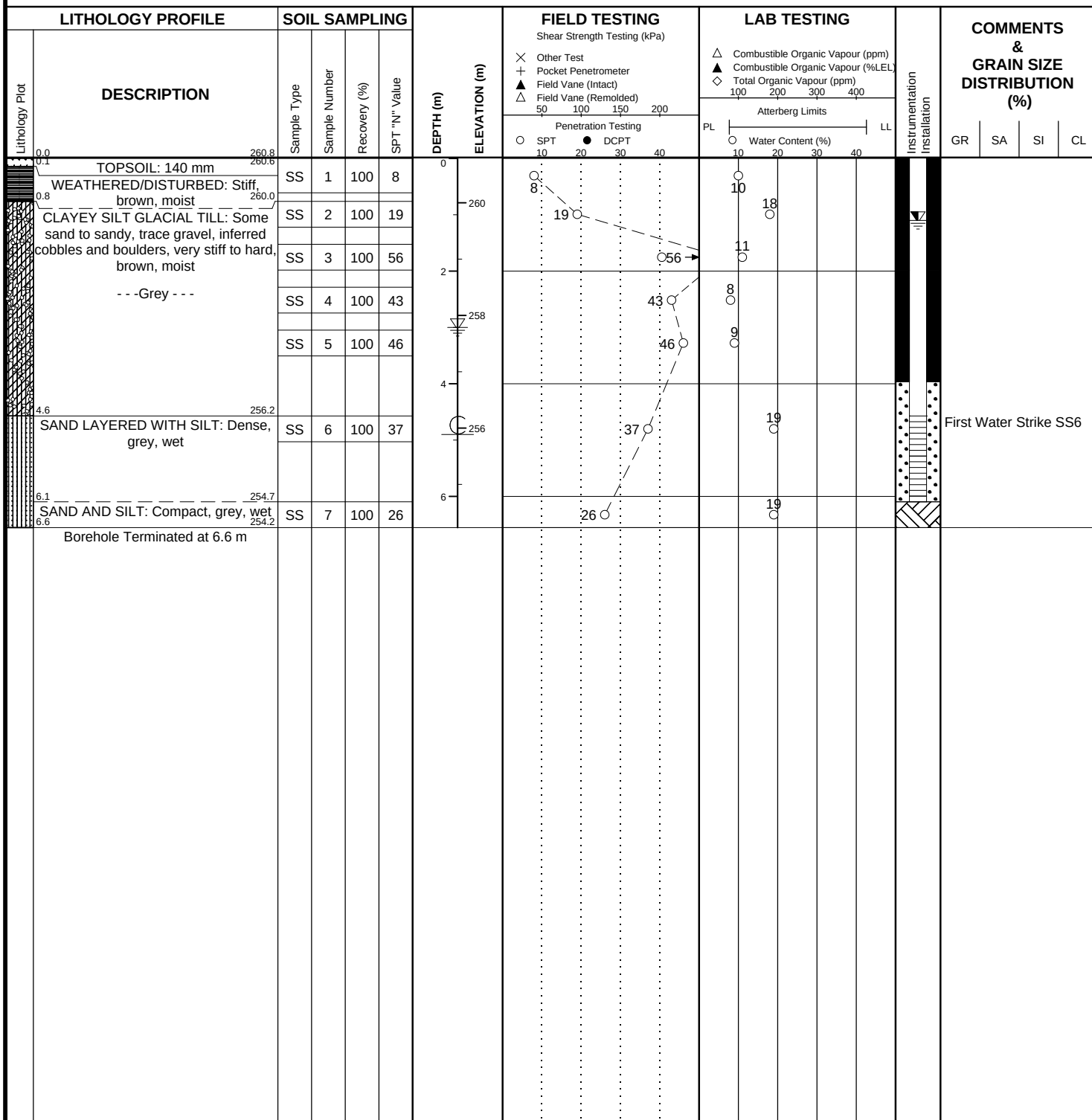
Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

Scale 1 : 100
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RECORD OF BOREHOLE No. 26

Project Number: **2400278**
 Project Client: **Mayfield Tullamore Landowner Group Inc.**
 Project Name: **Mayfield Tullamore LOG**
 Project Location: **Caledon, ON**
 Drilling Location: **See Borehole Location Plan**
 Local Benchmark: _____

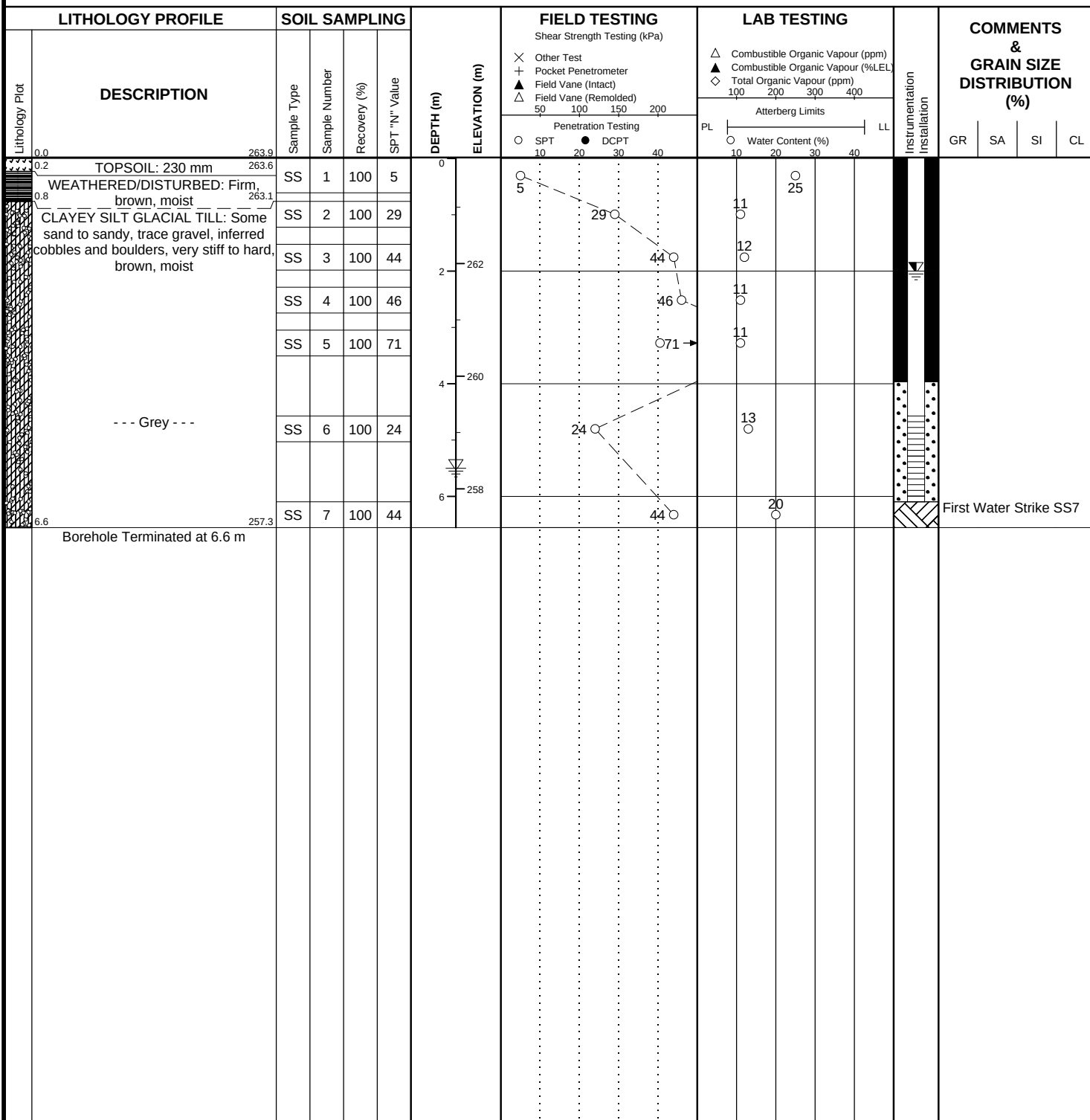
Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **AG** Northing: **4849832** Date Started: **May 07/24**
 Reviewed By: **RW** Easting: **596606** Date Completed: **May 07/24**



RECORD OF BOREHOLE No. 28

Project Number: **2400278**
 Project Client: **Mayfield Tullamore Landowner Group Inc.**
 Project Name: **Mayfield Tullamore LOG**
 Project Location: **Caledon, ON**
 Drilling Location: **See Borehole Location Plan**
 Local Benchmark: _____

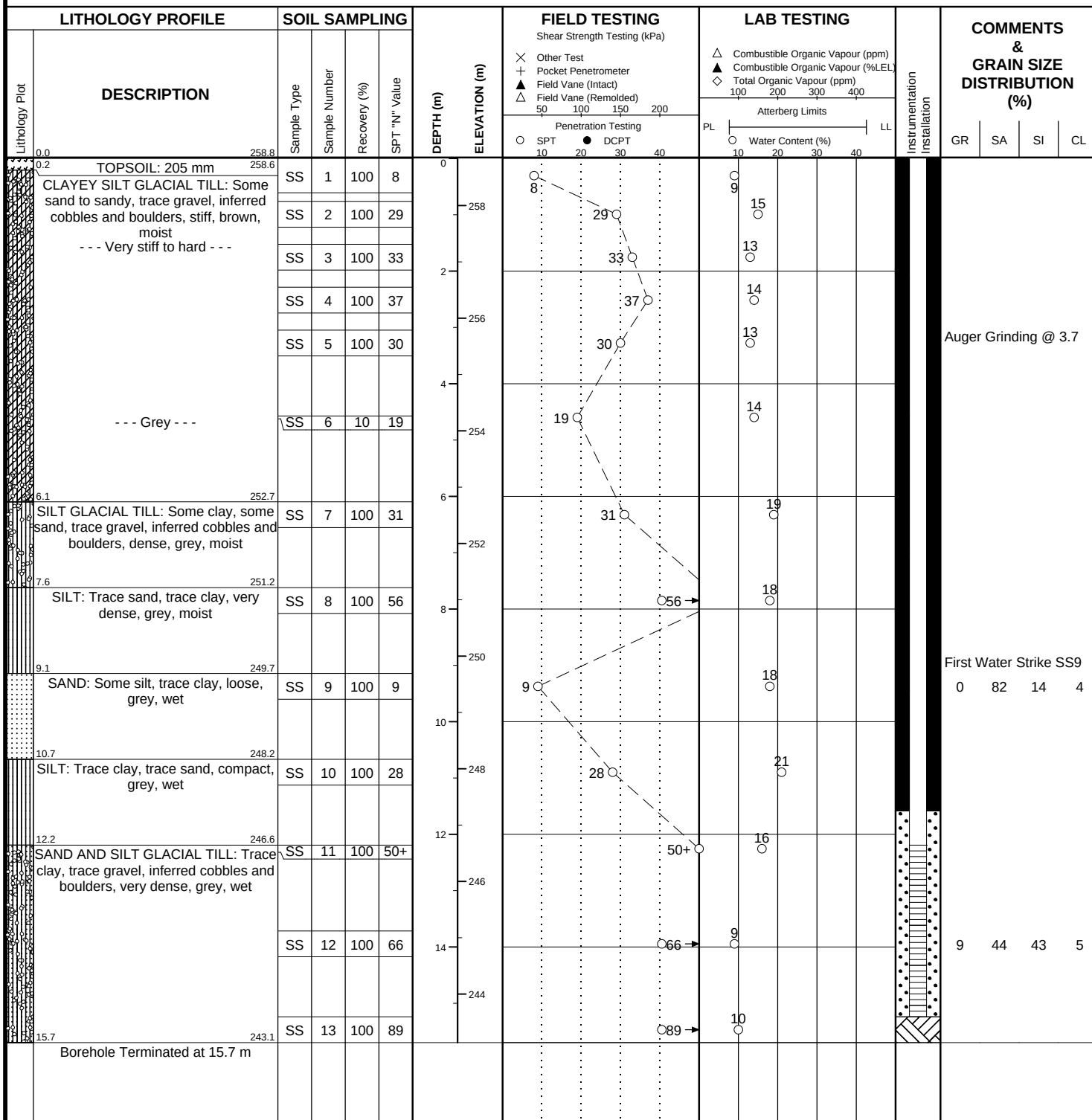
Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **AG** Northing: **4849278** Date Started: **May 02/24**
 Reviewed By: **RW** Easting: **596571** Date Completed: **May 02/24**



RECORD OF BOREHOLE No. 29

Project Number: **2400278**
 Project Client: **Mayfield Tullamore Landowner Group Inc.**
 Project Name: **Mayfield Tullamore LOG**
 Project Location: **Caledon, ON**
 Drilling Location: **See Borehole Location Plan**
 Local Benchmark: _____

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **AG** Northing: **4849443** Date Started: **May 03/24**
 Reviewed By: **RW** Easting: **596859** Date Completed: **May 03/24**



RECORD OF BOREHOLE No. 32



Project Number: **2400278**
 Project Client: **Mayfield Tullamore Landowner Group Inc.**
 Project Name: **Mayfield Tullamore LOG**
 Project Location: **Caledon, ON**
 Drilling Location: **See Borehole Location Plan**
 Local Benchmark: _____

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **AG** Northing: **4849120** Date Started: **May 02/24**
 Reviewed By: **RW** Easting: **596736** Date Completed: **May 02/24**

LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)				
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa)		Atterberg Limits			GR	SA	SI	CL	
								× Other Test + Pocket Penetrometer ▲ Field Vane (Intact) △ Field Vane (Remolded)	△ Combustible Organic Vapour (ppm) ▲ Combustible Organic Vapour (%LEL) ◇ Total Organic Vapour (ppm)								
								50 100 150 200	100 200 300 400								
								Penetration Testing									
								○ SPT 10 20 30 40	● DCPT	PL	○ Water Content (%)	LL					

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Groundwater depth encountered on completion of drilling: Dry Cave depth after auger removal: Open
 Groundwater depth observed on: Groundwater Elevation:

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

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RECORD OF BOREHOLE No. 35

Project Number: **2400278**
 Project Client: **Mayfield Tullamore Landowner Group Inc.**
 Project Name: **Mayfield Tullamore LOG**
 Project Location: **Caledon, ON**
 Drilling Location: **See Borehole Location Plan**
 Local Benchmark: _____

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **AG** Northing: **4848939** Date Started: **May 02/24**
 Reviewed By: **RW** Easting: **596937** Date Completed: **May 02/24**



LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)					
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa)	Penetration Testing	Atterberg Limits	Water Content (%)		GR	SA	SI	CL		
	0.0 260.0 TOPSOIL: 215 mm	SS	1	100	5	0	260.0	5										
	0.2 259.8 WEATHERED/DISTURBED: Firm, brown, moist	SS	2	100	25		259.8	25										
	0.8 259.2 CLAYEY SILT GLACIAL TILL: Some sand to sandy, trace gravel, inferred cobbles and boulders, very stiff to hard, brown, moist	SS	3	100	29		259.2	29										
		SS	4	100	43			43										
	--- Greyish-brown ---	SS	5	100	38			38										
	4.6 255.4 SANDY SILT GLACIAL TILL: Trace to some clay, trace gravel, inferred cobbles and boulders, dense, grey, moist	SS	6	100	38		255.4	38										
	6.6 253.4 Borehole Terminated at 6.6 m	SS	7	100	36		253.4	36										

RECORD OF BOREHOLE No. 36



Project Number: **2400278**
 Project Client: **Mayfield Tullamore Landowner Group Inc.**
 Project Name: **Mayfield Tullamore LOG**
 Project Location: **Caledon, ON**
 Drilling Location: **See Borehole Location Plan**
 Local Benchmark: _____

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **AG** Northing: **4849146** Date Started: **May 07/24**
 Reviewed By: **RW** Easting: **597096** Date Completed: **May 07/24**

LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)				
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa)		Atterberg Limits			GR	SA	SI	CL	
								× Other Test + Pocket Penetrometer ▲ Field Vane (Intact) △ Field Vane (Remolded)	△ Combustible Organic Vapour (ppm) ▲ Combustible Organic Vapour (%LEL) ◇ Total Organic Vapour (ppm)								
								50 100 150 200	100 200 300 400								
								Penetration Testing		Water Content (%)							
								○ SPT	● DCPT	PL	LL						
								10 20 30 40		10 20 30 40							

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Groundwater depth encountered on completion of drilling: 3.0 m. Cave depth after auger removal: Open
 Groundwater depth observed on: _____ Groundwater Elevation: _____

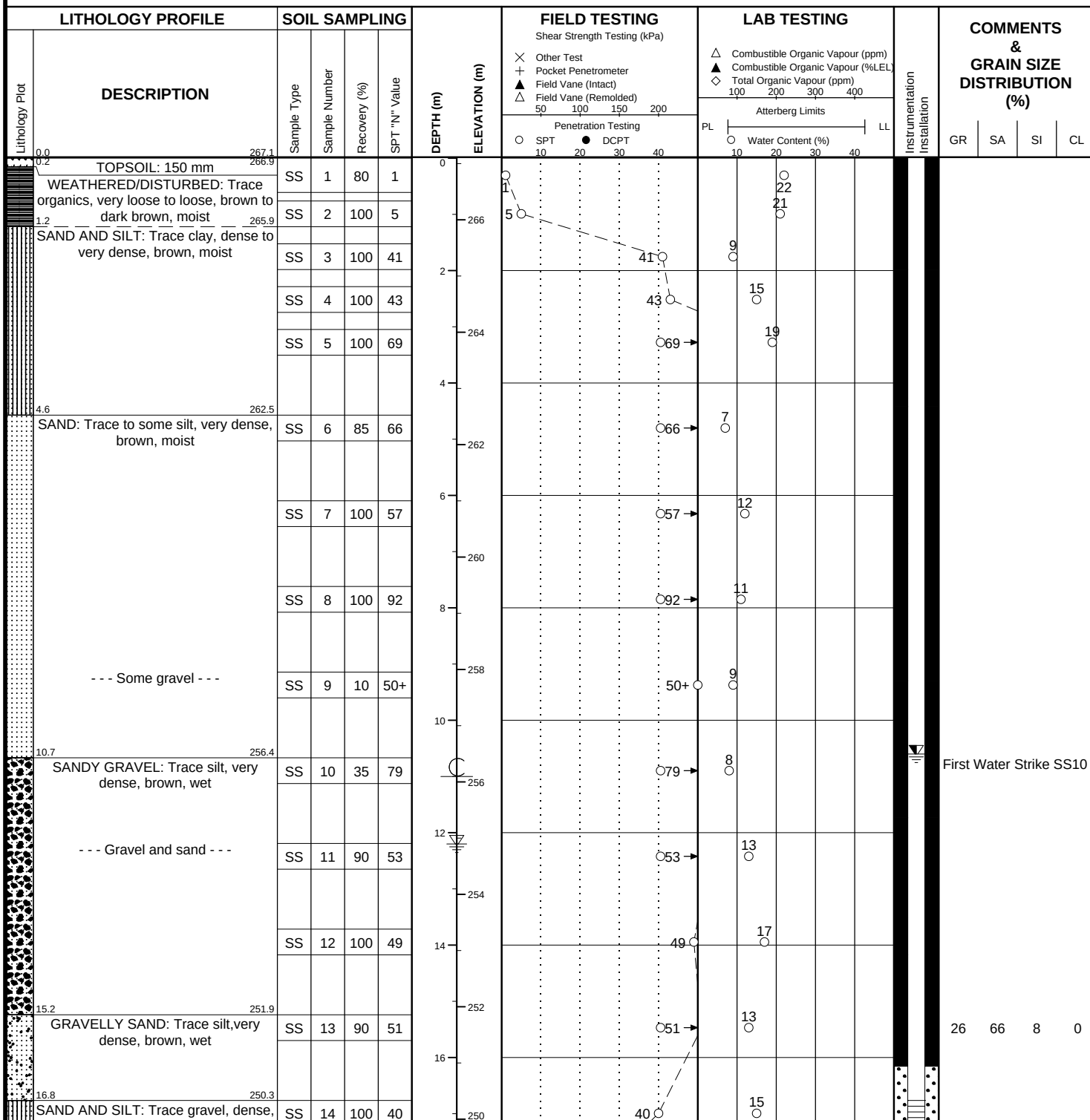
Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

Scale 1:100
 Page 1 of 1

RECORD OF BOREHOLE No. 101

Project Number: **2400278**
 Project Client: **Mayfield Tullamore Landowner Group Inc.**
 Project Name: **Mayfield Tullamore LOG**
 Project Location: **Caledon, ON**
 Drilling Location: **See Borehole Location Plan**
 Local Benchmark: _____

Drilling Method: **Hollow Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **AG** Northing: **4849202** Date Started: **Apr 30/24**
 Reviewed By: **RW** Easting: **596234** Date Completed: **Apr 30/24**



RECORD OF BOREHOLE No. 101



Project Number: **2400278**
 Project Client: **Mayfield Tullamore Landowner Group Inc.**
 Project Name: **Mayfield Tullamore LOG**
 Project Location: **Caledon, ON**
 Drilling Location: **See Borehole Location Plan**
 Local Benchmark: _____

Drilling Method: **Hollow Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **AG** Northing: **4849202** Date Started: **Apr 30/24**
 Reviewed By: **RW** Easting: **596234** Date Completed: **Apr 30/24**

LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING				Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa)		Atterberg Limits					GR	SA	SI	CL
	grey, wet					18												
	--- Trace to some gravel, compact ---	SS	15	55	18	248		18		12								
	19.8 247.3 20.3 SAND: Some silt, compact, grey, wet 246.8	SS	16	55	15	20		15		17								
	Borehole Terminated at 20.3 m																	

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Groundwater depth encountered on completion of drilling: 12.2 m. Cave depth after auger removal: 11.0m.
 Groundwater depth observed on: May 22/24 at depth of: 10.6 m. Groundwater Elevation: 256.50 m

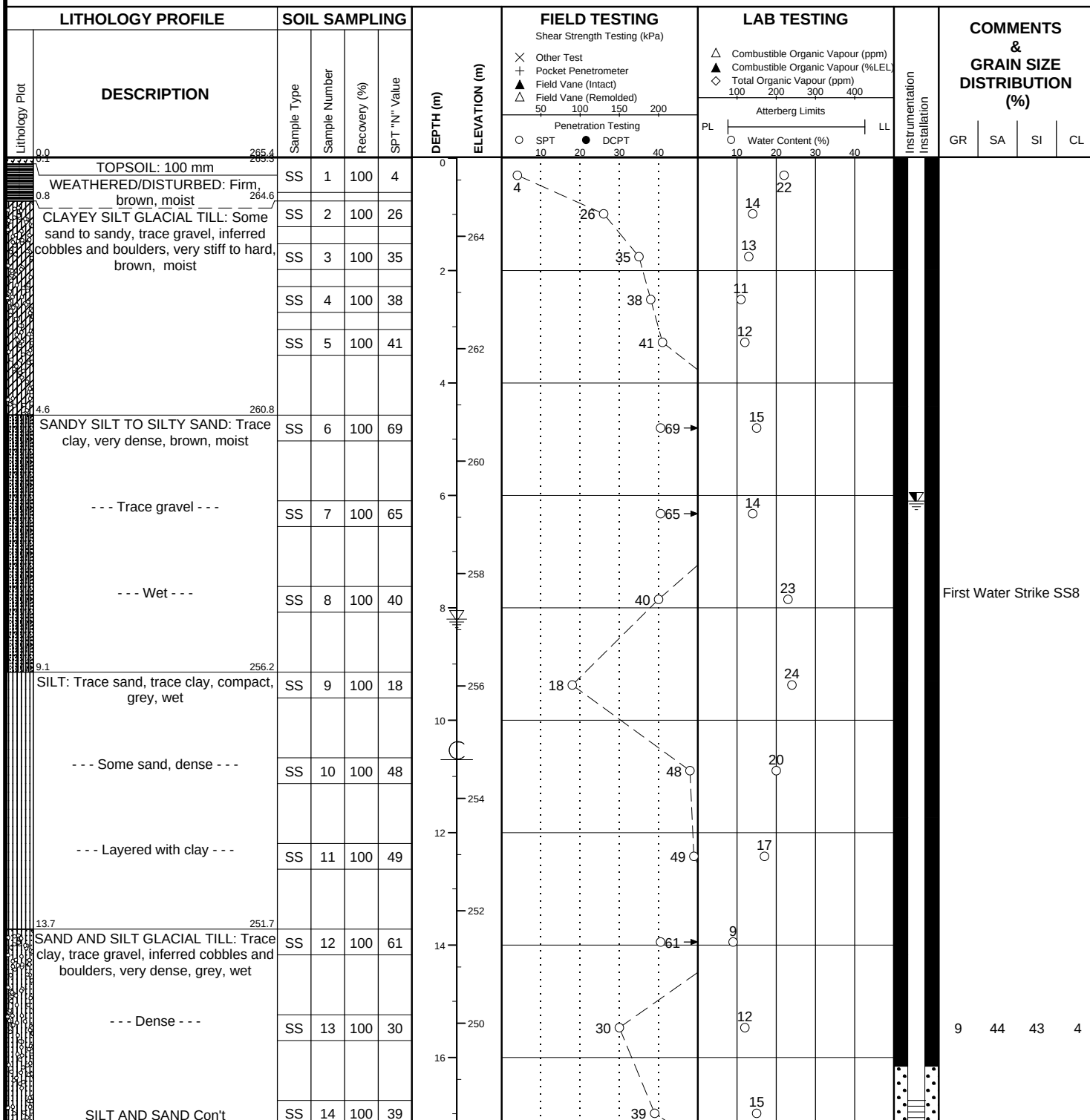
Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

Scale: **1 :100**
 Page: **2 of 2**

RECORD OF BOREHOLE No. 102

Project Number: **2400278**
 Project Client: **Mayfield Tullamore Landowner Group Inc.**
 Project Name: **Mayfield Tullamore LOG**
 Project Location: **Caledon, ON**
 Drilling Location: **See Borehole Location Plan**
 Local Benchmark: _____

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **AG** Northing: **4849282** Date Started: **May 01/24**
 Reviewed By: **RW** Easting: **596343** Date Completed: **May 01/24**



RECORD OF BOREHOLE No. 102



Project Number: **2400278**
 Project Client: **Mayfield Tullamore Landowner Group Inc.**
 Project Name: **Mayfield Tullamore LOG**
 Project Location: **Caledon, ON**
 Drilling Location: **See Borehole Location Plan**
 Local Benchmark: _____

Drilling Method: **Solid Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **AG** Northing: **4849282** Date Started: **May 01/24**
 Reviewed By: **RW** Easting: **596343** Date Completed: **May 01/24**

LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING				Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value			Shear Strength Testing (kPa)		Atterberg Limits					GR	SA	SI	CL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
								✕ Other Test + Pocket Penetrometer ▲ Field Vane (Intact) △ Field Vane (Remolded) 50100150200	△ Combustible Organic Vapour (ppm) ▲ Combustible Organic Vapour (%LEL) ◇ Total Organic Vapour (ppm) 100200300400																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
								○ SPT ● DCPT 10203040	○ Water Content (%) 10203040																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								</

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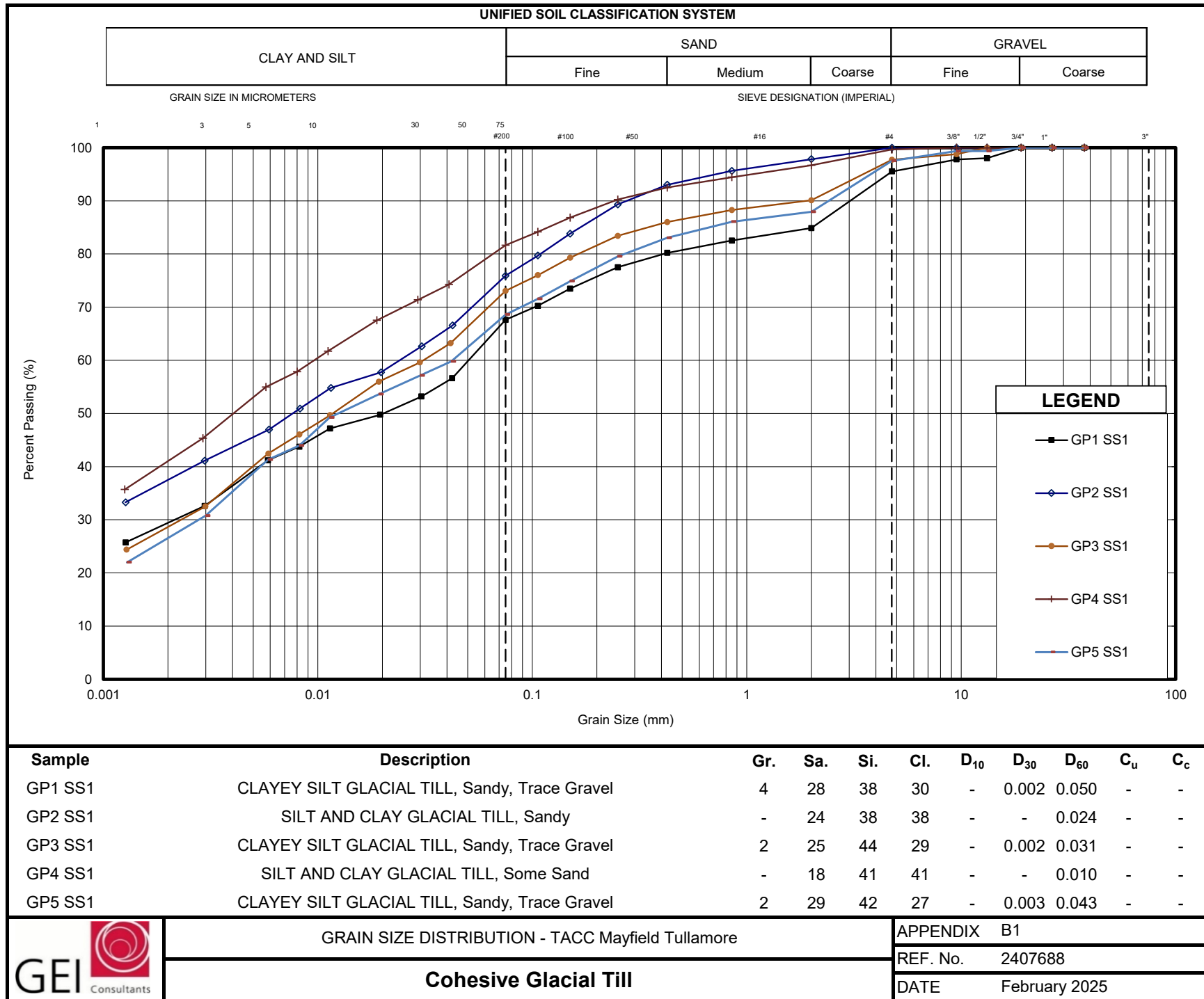
Groundwater depth encountered on completion of drilling: 8.2 m. Cave depth after auger removal: 10.7m.
 Groundwater depth observed on: May 22/24 at depth of: 6.1 m. Groundwater Elevation: 259.29 m

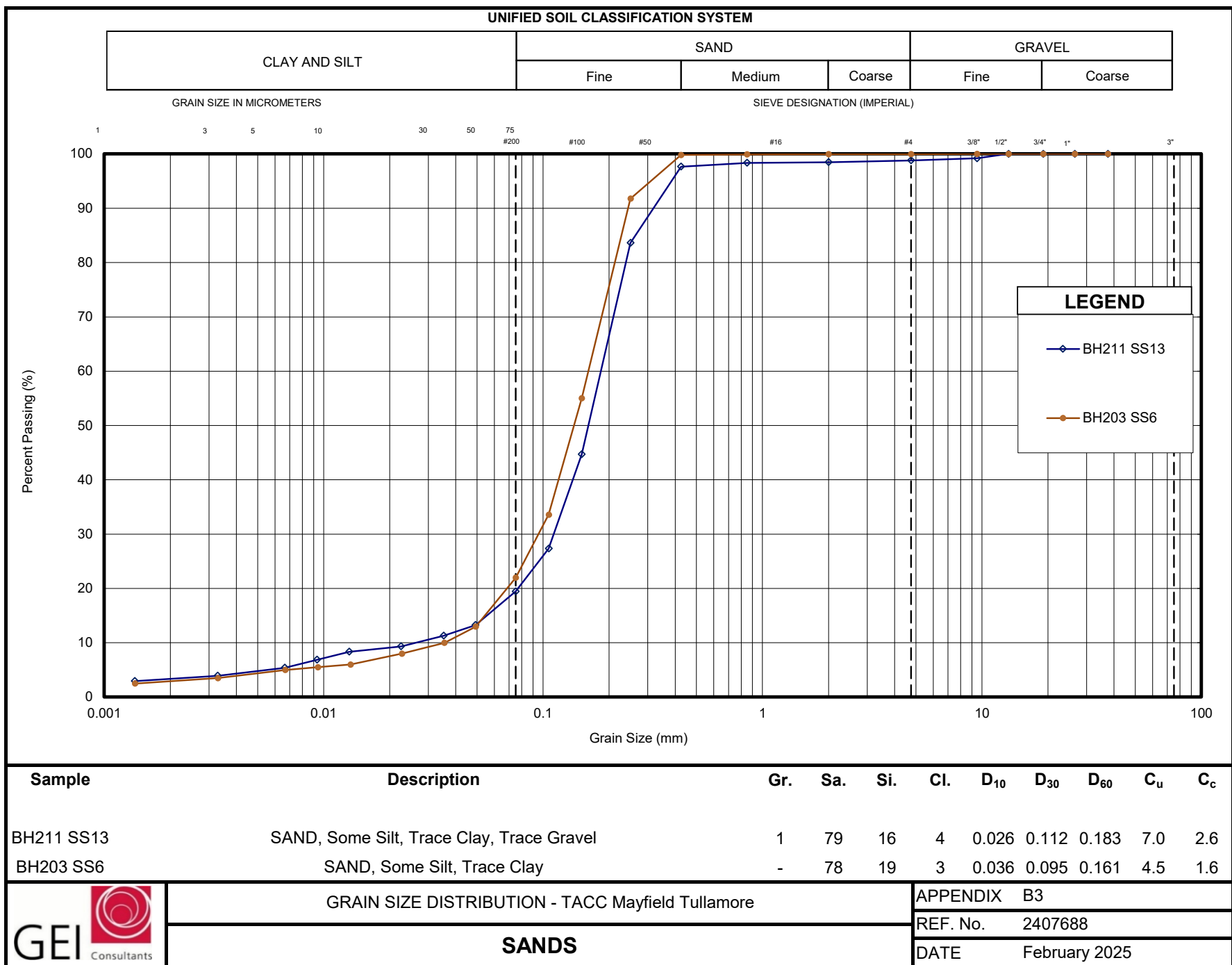
Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretive assistance from a qualified professional. Borehole information must be read in conjunction with the accompanying report and any explanation of terms provided.

Scale: **1 :100**
 Page: **2 of 2**

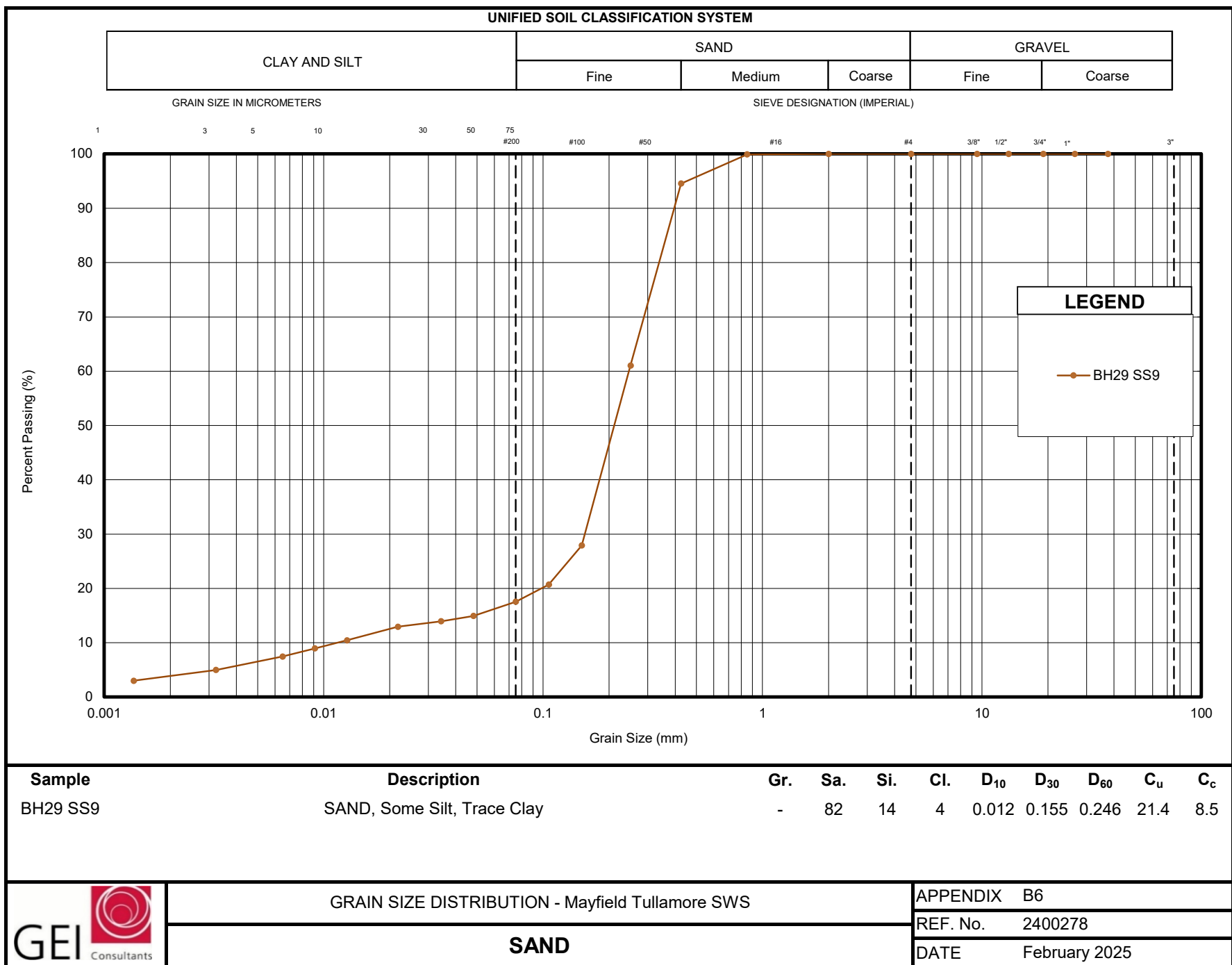
Appendix C Geotechnical Laboratory Testing

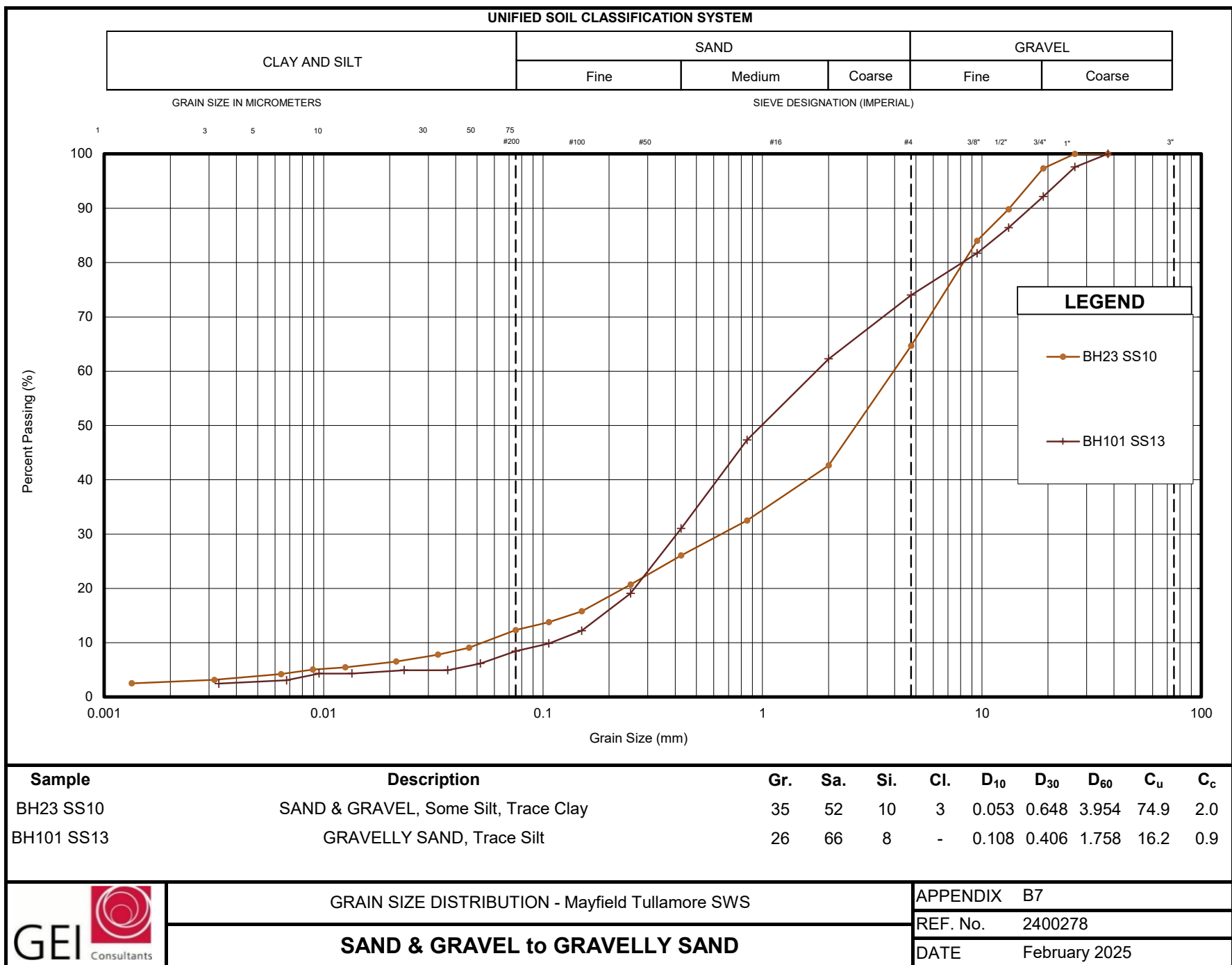
Appendix C1: GEI's Support of Draft Plan of Subdivision

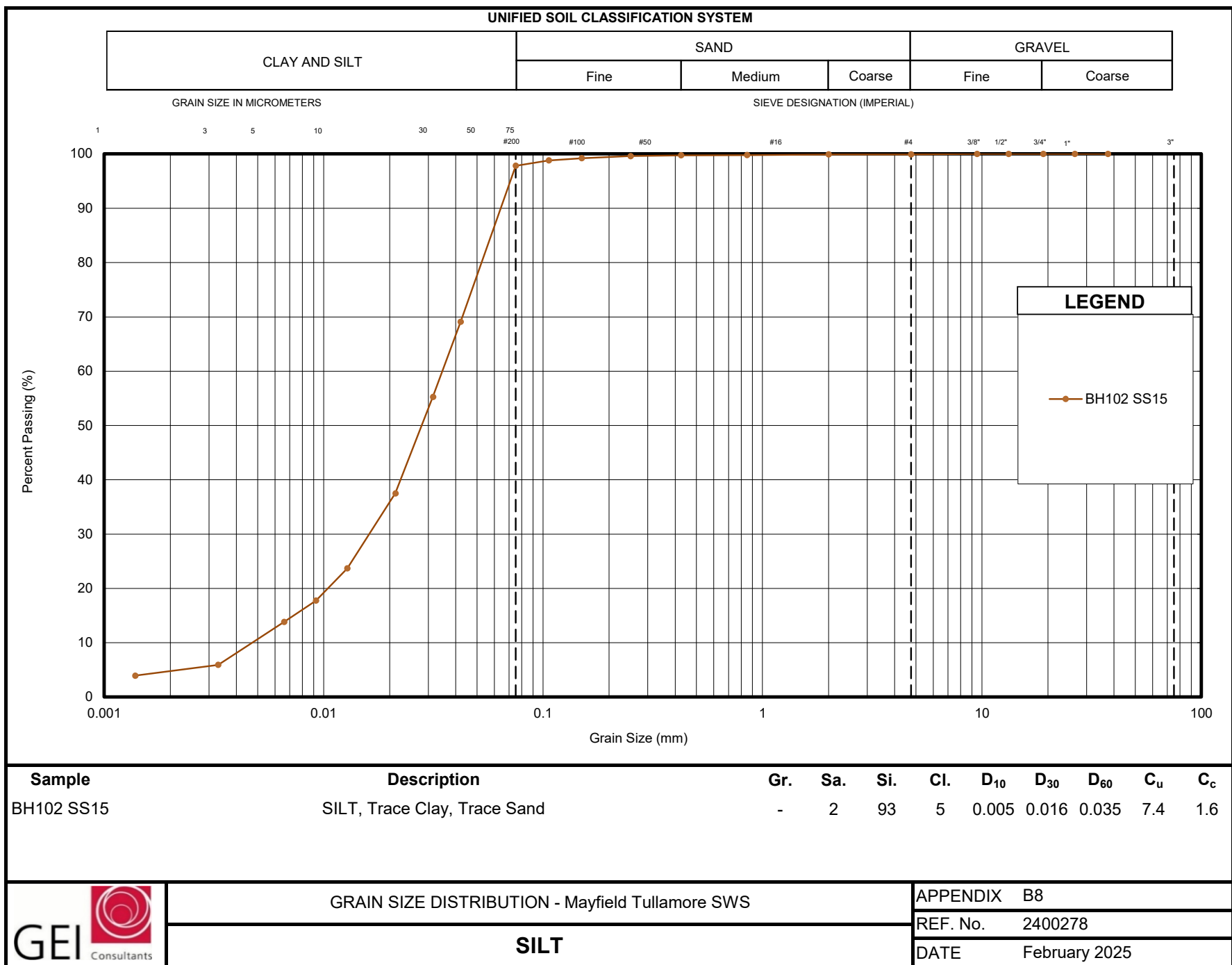




Appendix C2: GEI's Mayfield Tullamore Local Subwatershed Study Phase 1







Appendix D Groundwater Level Measurements

Details of Monitoring Wells and Groundwater Level Measurements - TAAC Monitoring Wells

[illegible]

Note

*-: Missed Monitoring Well Measurement

Details of Monitoring Wells and Groundwater Level Measurements - MTLOG Montioring Wells

Monitoring Well Details																																				
	Monitoring Well ID			MW20			MW21			MW23			MW24D			MW24S			MW26			MW28			MW29			MW35			MW101			MW102		
	Northing			4849858.0			4849562.6			4849290.9			4849397.5			4849397.5			4849831.8			4849278.4			4849442.9			4848939.2			4849202.2			4849282.2		
	Easting			596166.4			596137.4			596198.4			596260.4			596261.5			596606.4			596570.7			596859.3			596937.5			596233.7			596342.8		
	Ground EL (mast)			268.6			266.4			268.1			263.9			263.9			260.8			263.9			258.9			260.0			267.1			265.4		
	TOC EL (mast)			269.5			267.3			269.1			264.7			264.6			261.7			264.8			259.8			260.9			268.1			266.3		
	Total Depth (mbTOC)			6.8			6.9			13.8			6.9			3.2			6.2			6.8			16.0			6.9			19.4			20.5		
Total Depth (mbgs)			5.9			6.0			12.4			6.1			2.3			5.3			5.9			15.1			6.0			18.4			19.7			
Manual Groundwater Levels	Date	GW Level (mbTOC)	GW Level (mbgs)	GW Elevation (mast)	GW Level (mbTOC)	GW Level (mbgs)	GW Elevation (mast)	GW Level (mbTOC)	GW Level (mbgs)	GW Elevation (mast)	GW Level (mbTOC)	GW Level (mbgs)	GW Elevation (mast)	GW Level (mbTOC)	GW Level (mbgs)	GW Elevation (mast)	GW Level (mbTOC)	GW Level (mbgs)	GW Elevation (mast)	GW Level (mbTOC)	GW Level (mbgs)	GW Elevation (mast)	GW Level (mbTOC)	GW Level (mbgs)	GW Elevation (mast)	GW Level (mbTOC)	GW Level (mbgs)	GW Elevation (mast)	GW Level (mbTOC)	GW Level (mbgs)	GW Elevation (mast)	GW Level (mbTOC)	GW Level (mbgs)	GW Elevation (mast)		
	12/06/24	3.7	2.8	265.8	6.6	5.7	260.7	12.2	11.3	256.9	4.3	3.5	260.4	2.1	1.3	262.5	2.6	1.7	259.1	4.0	3.2	260.7	0.8	-0.1	258.9	6.3	5.3	254.6	11.6	10.7	256.4	6.2	5.3	260.1		
	03/06/25	2.4	1.5	267.1	6.7	5.8	260.6	12.4	11.5	256.7	3.6	2.8	261.1	1.4	0.6	263.2	2.4	1.5	259.3	3.4	2.5	261.3	-	-	-	4.9	4.0	256.0	11.8	10.9	256.3	6.1	5.2	260.2		
	04/23/25	2.0	1.1	267.5	5.6	4.7	261.7	12.3	11.3	256.8	3.1	2.3	261.6	1.1	0.2	263.5	2.0	1.1	259.7	2.9	2.0	261.9	0.0	-0.9	259.8	3.2	2.3	257.7	11.8	10.8	256.3	5.4	4.5	260.9		
	05/29/25	2.2	1.2	267.3	5.9	5.0	261.4	12.4	11.4	256.7	3.2	2.4	261.5	1.2	0.4	263.4	2.1	1.2	259.6	2.9	2.1	261.8	0.0	-0.9	259.8	2.5	1.5	258.4	11.7	10.7	256.4	4.6	3.7	261.7		
	06/24/25	2.6	1.6	266.9	6.1	5.2	261.2	11.4	10.5	257.7	3.7	2.8	261.0	1.6	0.7	263.1	2.3	1.4	259.4	3.3	2.5	261.4	0.0	-0.9	259.8	4.0	3.0	257.0	8.9	7.9	259.2	5.9	5.0	260.4		
	07/23/25	Missed	Missed	Missed	6.3	5.4	261.0	12.5	11.5	256.7	3.9	3.1	260.8	1.8	0.9	262.9	2.4	1.6	259.2	3.8	2.9	260.9	0.5	-0.4	259.3	4.7	3.8	256.2	Missed	Missed	Missed	Missed	Missed	Missed		
	08/19/25	3.4	2.5	266.1	6.5	5.6	260.8	dry	dry	dry	4.4	3.5	260.3	2.7	1.9	261.9	6.2	5.3	255.5	4.2	3.4	260.5	0.7	-0.2	259.1	6.8	5.9	254.1	12.0	11.1	256.1	6.2	5.3	260.1		
	09/30/25	4.0	3.1	265.5	6.7	5.8	260.6	12.7	11.7	256.4	5.0	4.2	259.7	2.7	1.8	261.9	2.8	1.9	258.9	4.7	3.9	260.0	-	-	-	6.4	5.4	254.6	12.1	11.1	256.0	6.4	5.5	259.9		
	10/21/25	4.2	3.2	265.3	6.9	6.0	260.4	13.8	12.8	255.3	5.3	4.4	259.4	3.2	2.4	261.4	2.2	1.4	259.4	4.9	4.0	259.9	0.8	-0.1	259.0	6.6	5.6	254.3	12.1	11.2	256.0	6.4	5.5	259.9		
	11/21/25	4.5	3.5	265.0	6.9	6.0	260.4	dry	dry		5.5	4.7	259.2	3.0	2.2	261.6	2.8	1.9	258.9	5.1	4.2	259.6	4.7	3.8	255.1	6.9	6.0	254.0	12.1	11.2	255.9	6.5	5.7	259.7		
	12/19/25	4.6	3.6	264.9	6.9	6.0	260.4	dry	dry		5.8	5.0	258.9	3.1	2.2	261.5	2.7	1.9	258.9	5.2	4.3	259.6	1.0	0.1	258.8	6.9	6.0	254.0	12.2	11.3	255.8	6.6	5.7	259.7		
	01/14/26	4.0	3.1	265.5	6.8	5.9	260.5	12.5	11.5	256.6	5.1	4.3	259.6	1.1	0.2	263.5	2.6	1.7	259.1	4.9	4.0	259.8	0.9	0.0	258.9	6.8	5.9	254.1	12.2	11.3	255.8	6.6	5.7	259.7		

Notes:

"-":Missed Monitoring Well Measurement

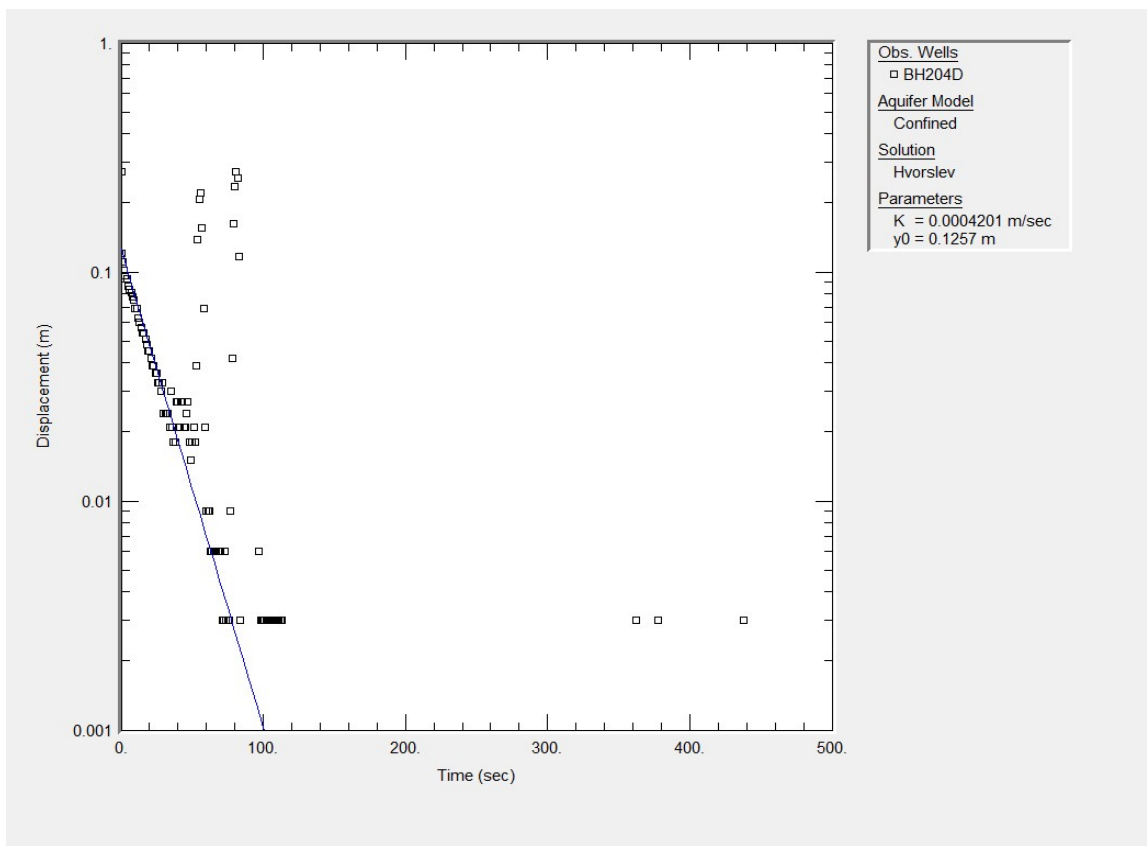
Appendix E Hydraulic Conductivity Testing

Appendix E1: GEI's Support of Draft Plan of Subdivision

Estimation of K by Slug Test, based on Horslev equation

Date:	December 17 to 18, 2024
Conducted by:	T.A.

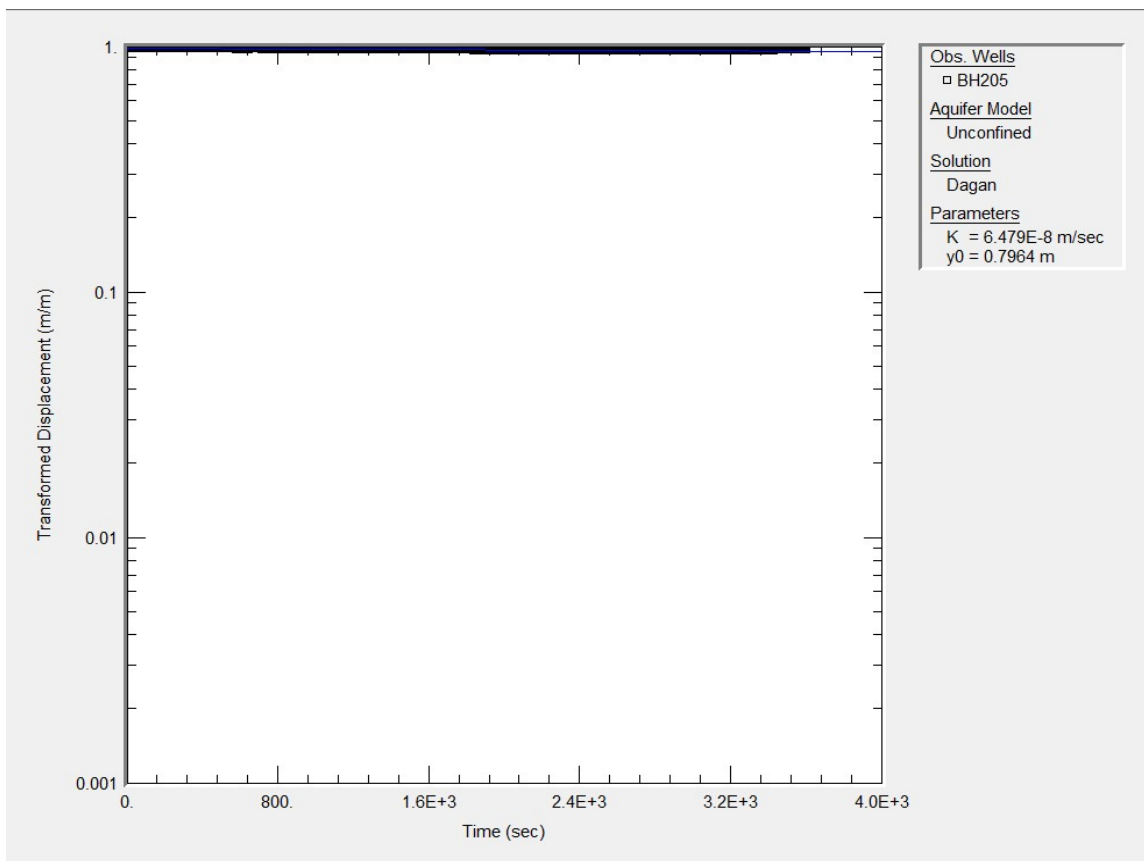
Well Number:	BH204D	
Well Screen Bottom:	15.20	mbgs
Top of Pipe:	0.90	mbgs
Well Casing Diameter:	5.08	cm
Well Elevation:	269.5	mbgs
Static Water Level:	13.09	mbgs
$K = r^2 \ln(L/R)/(2LTo) =$	4.2×10^{-4}	m/s



Estimation of K by Slug Test, based on Horslev equation

Date:	December 17 to 18, 2024
Conducted by:	T.A.

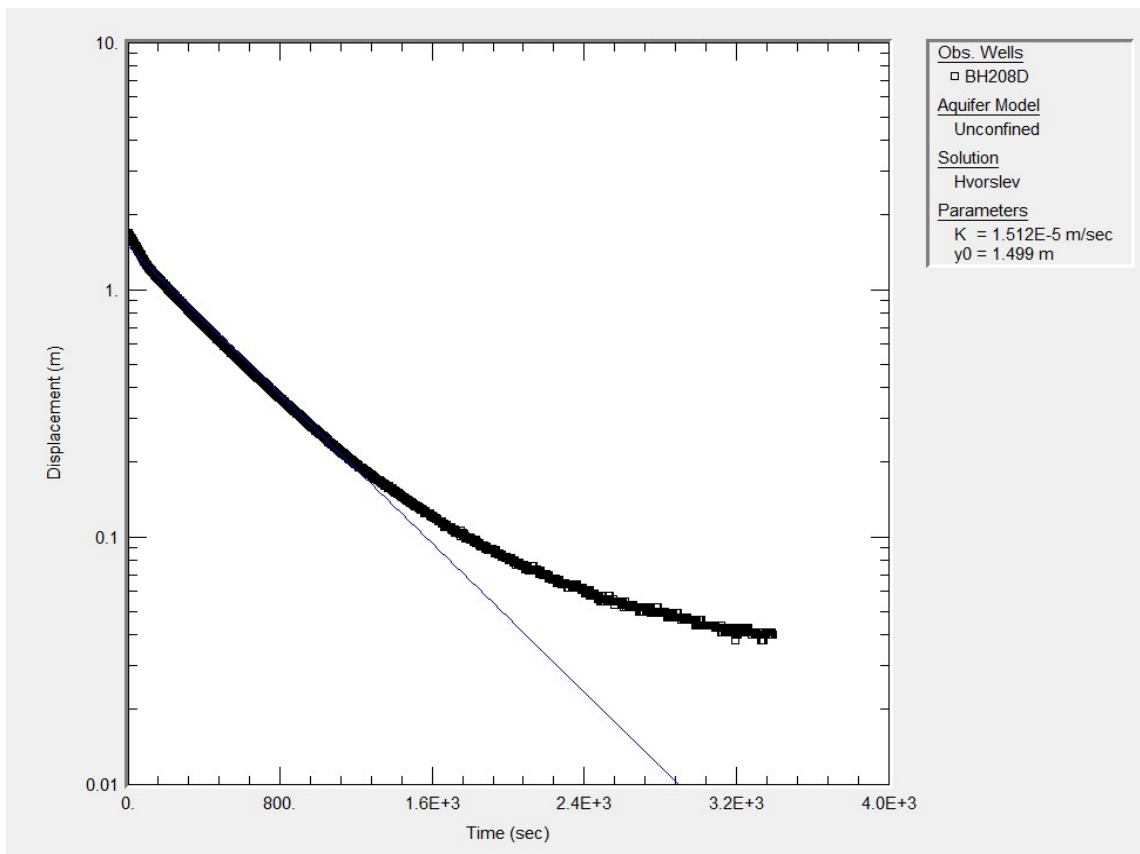
Well Number:	BH205	
Well Screen Bottom:	6.10	mbgs
Top of Pipe:	1.00	mbgs
Well Casing Diameter:	5.08	cm
Well Elevation:	270.2	mbgs
Static Water Level:	5.86	mbgs
$K = r^2 \ln(L/R)/(2LT_0) =$	6.5×10^{-8}	m/s



Estimation of K by Slug Test, based on Horslev equation

Date:	December 17 to 18, 2024
Conducted by:	T.A.

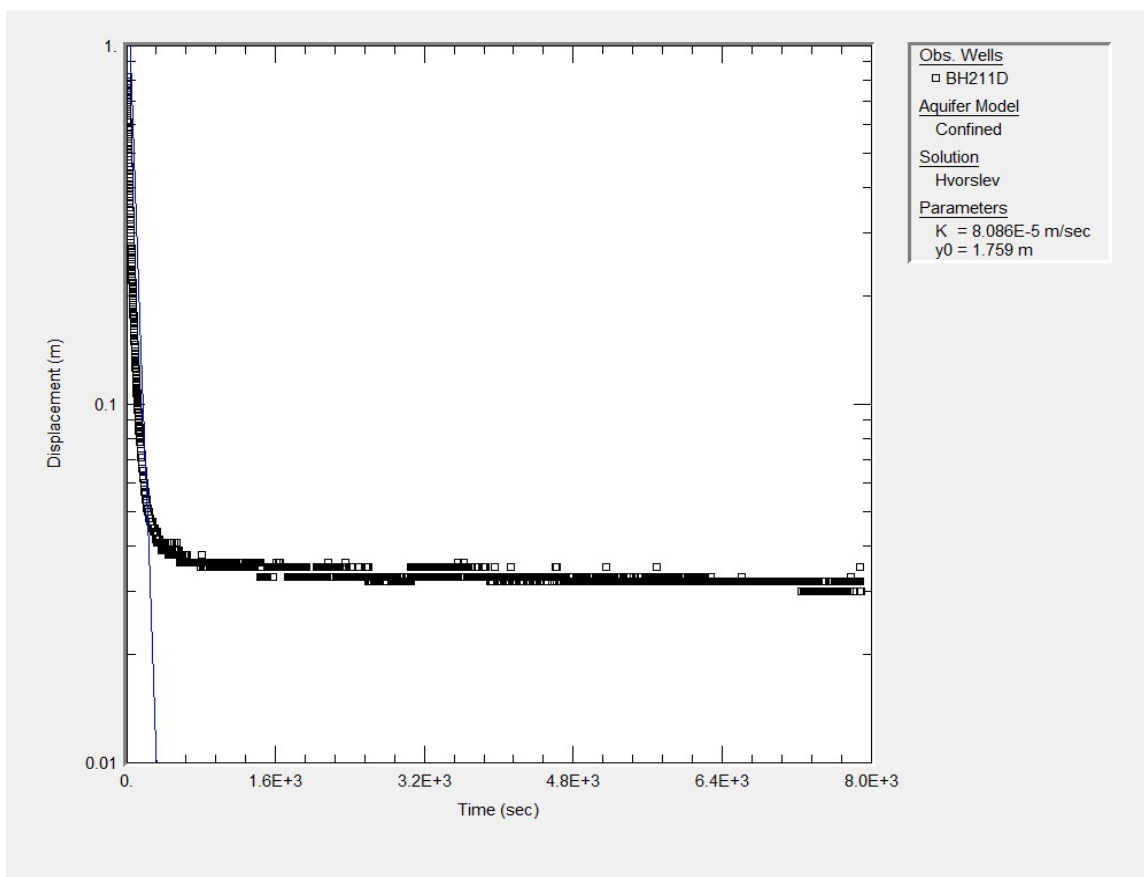
Well Number:	BH208	
Well Screen Bottom:	9.10	mbgs
Top of Pipe:	0.70	mbgs
Well Casing Diameter:	5.08	cm
Well Elevation:	258.8	mbgs
Static Water Level:	-0.70	mbgs
$K = r^2 \ln(L/R) / (2L T_o) =$	1.5×10^{-5}	m/s



Estimation of K by Slug Test, based on Hvorslev equation

Date:	December 17 to 18, 2024
Conducted by:	T.A.

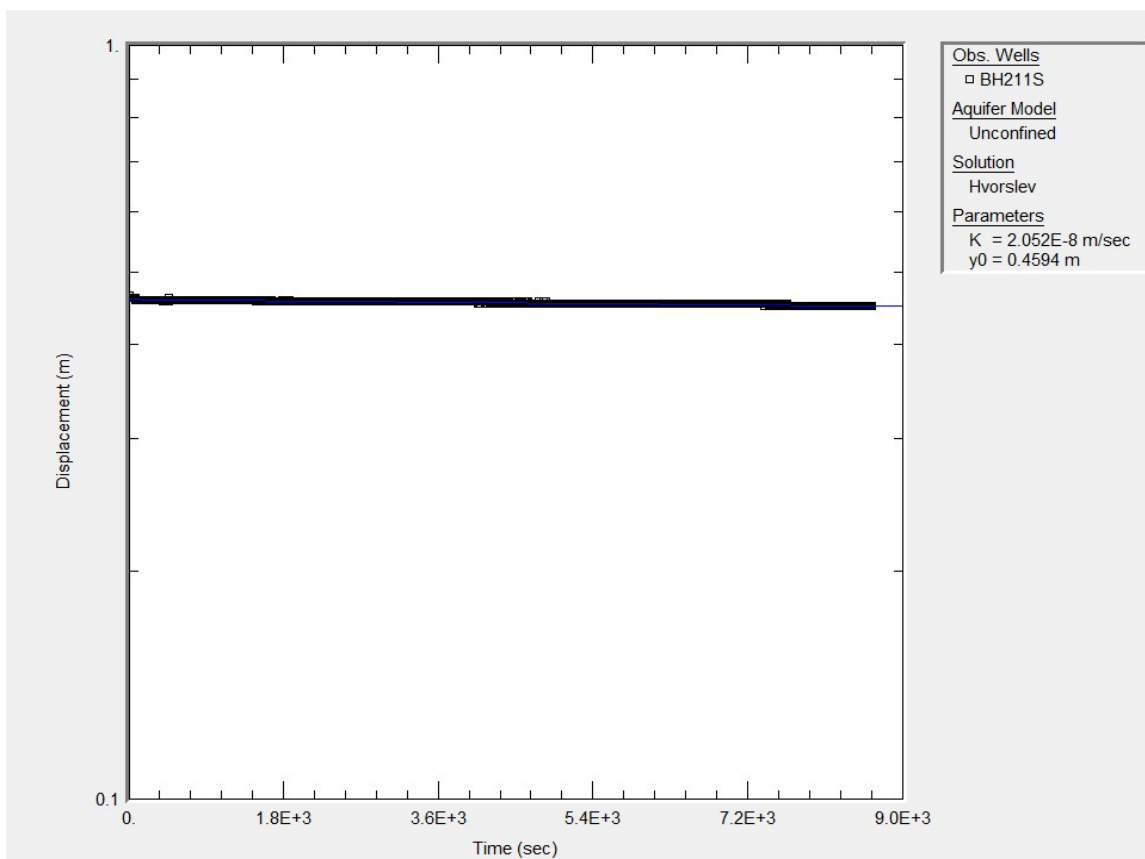
Well Number:	BH211D	
Well Screen Bottom:	19.80	mbgs
Top of Pipe:	0.90	mbgs
Well Casing Diameter:	5.08	cm
Well Elevation:	262.6	mbgs
Static Water Level:	3.70	mbgs
$K = r^2 \ln(L/R) / (2L T_0) =$	8.1×10^{-5}	m/s



Estimation of K by Slug Test, based on Hvorslev equation

Date:	December 17 to 18, 2024
Conducted by:	T.A.

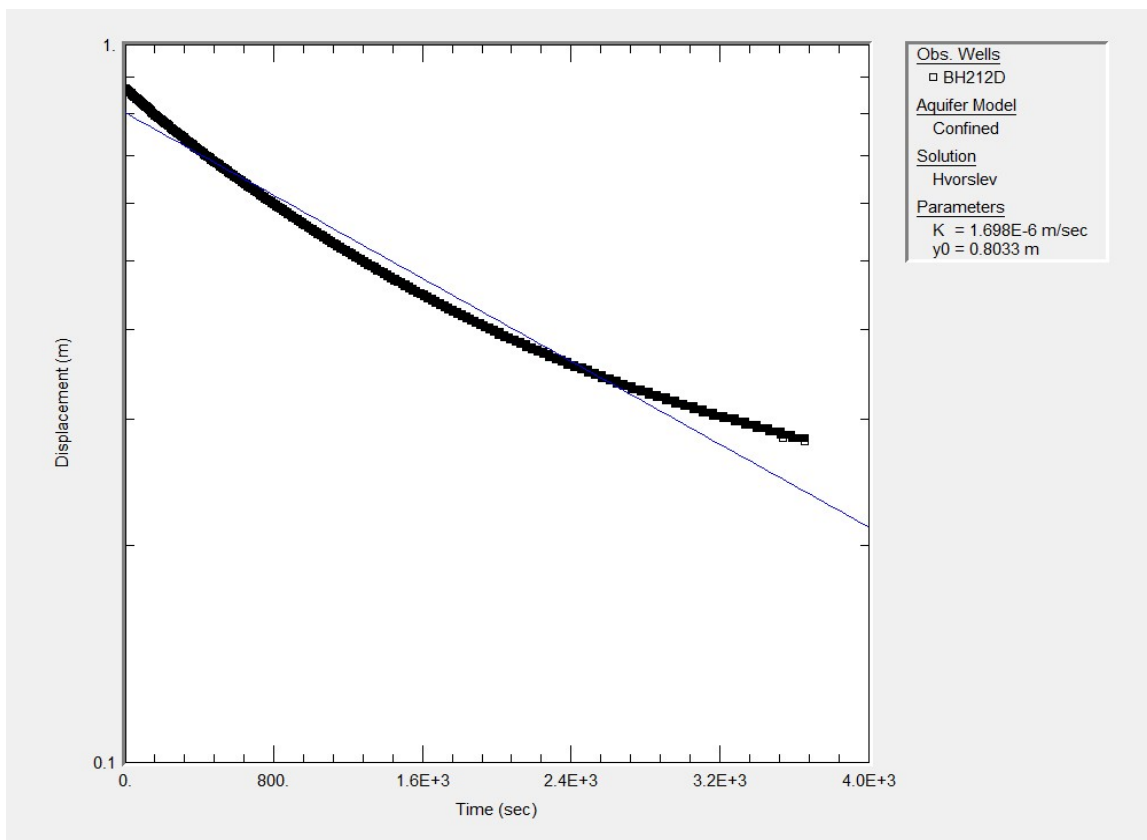
Well Number:	BH211S	
Well Screen Bottom:	6.10	mbgs
Top of Pipe:	0.90	mbgs
Well Casing Diameter:	5.08	cm
Well Elevation:	262.6	mbgs
Static Water Level:	5.11	mbgs
$K = r^2 \ln(L/R)/(2LT_0) =$	2.1×10^{-8}	m/s



Estimation of K by Slug Test, based on Hvorslev equation

Date:	December 17 to 18, 2024
Conducted by:	T.A.

Well Number:	BH212D	
Well Screen Bottom:	21.30	mbgs
Top of Pipe:	1.10	mbgs
Well Casing Diameter:	5.08	cm
Well Elevation:	268.1	mbgs
Static Water Level:	9.48	mbgs
$K = r^2 \ln(L/R) / (2L T_0) =$	1.7×10^{-6}	m/s

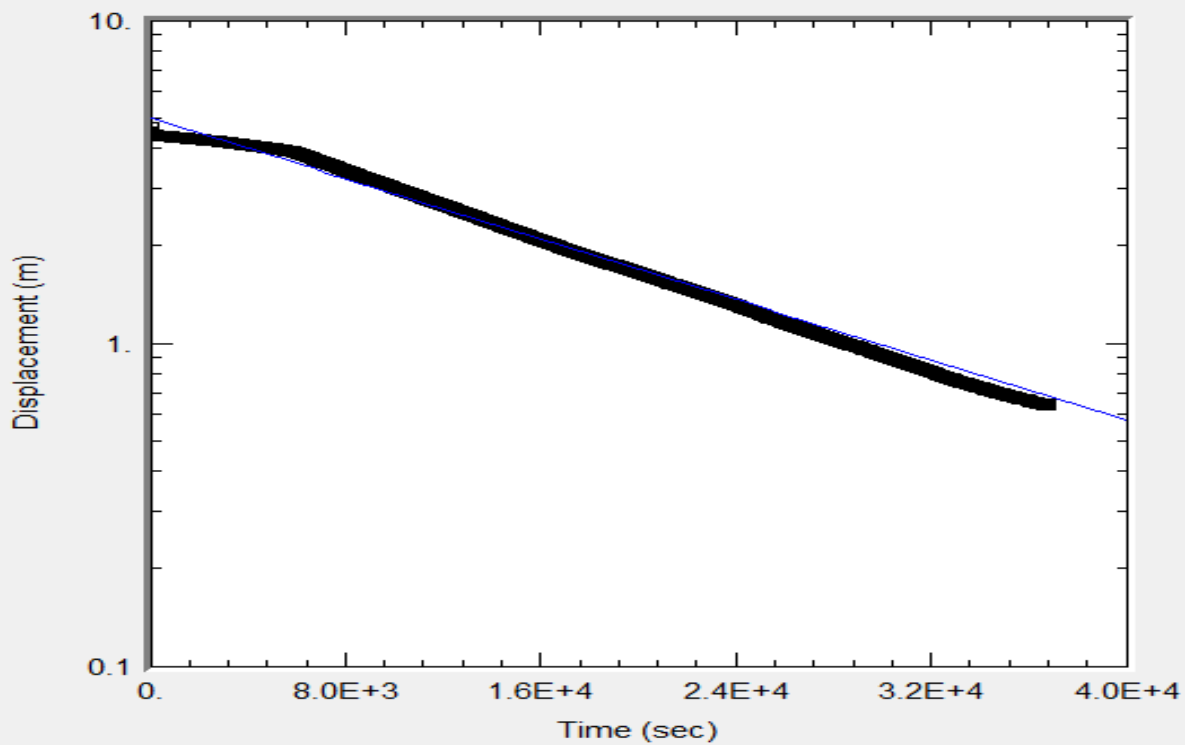


Appendix E2: GEI's Mayfield Tullamore Local Subwatershed Study Phase 1

Estimation of K by Slug Test, based on Horslev equation

Date:	May 24 to June 12, 2024
Conducted by:	B.Hwang

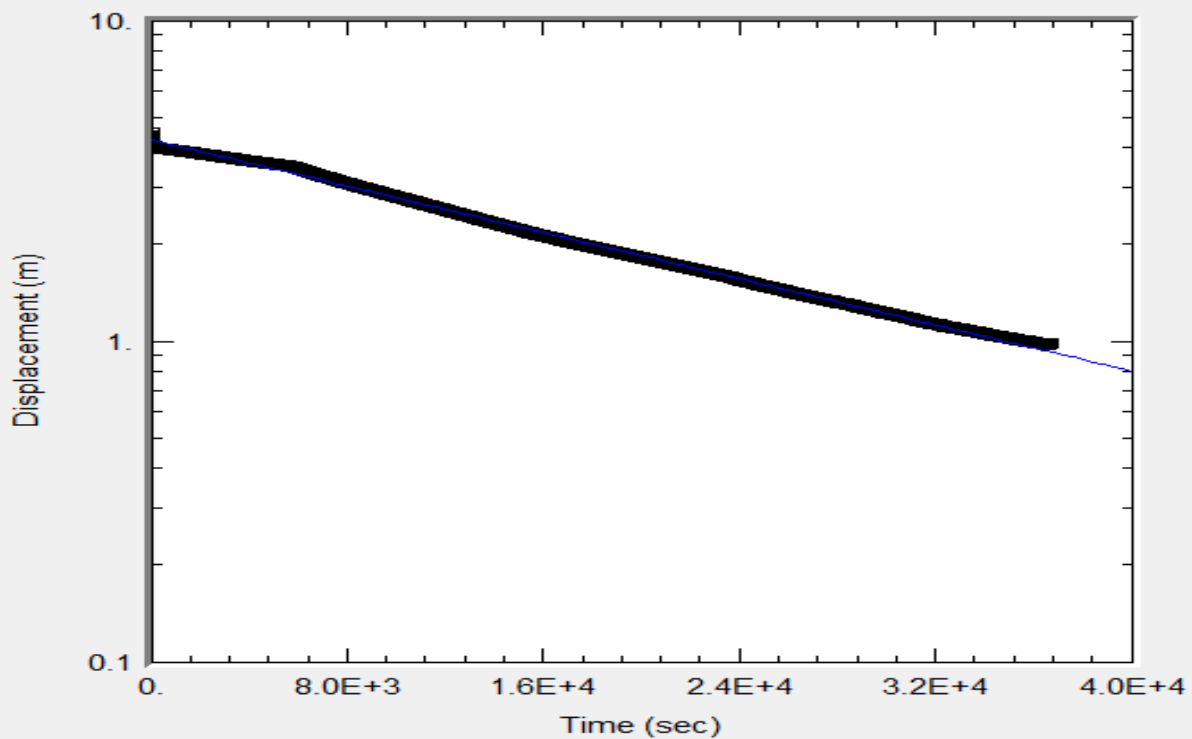
Well Number:	NW 24D	
Well Screen Bottom:	6.10	mbgs
Top of Pipe:	0.78	mags
Well Casing Diameter:	5.08	cm
Static Water Level:	0.73	mbgs
$K = r^2 \ln(L/R) / (2LT_o) =$	2.7×10^{-7}	m/s



Estimation of K by Slug Test, based on Horslev equation

Date:	May 24 to June 12, 2024
Conducted by:	B.Hwang

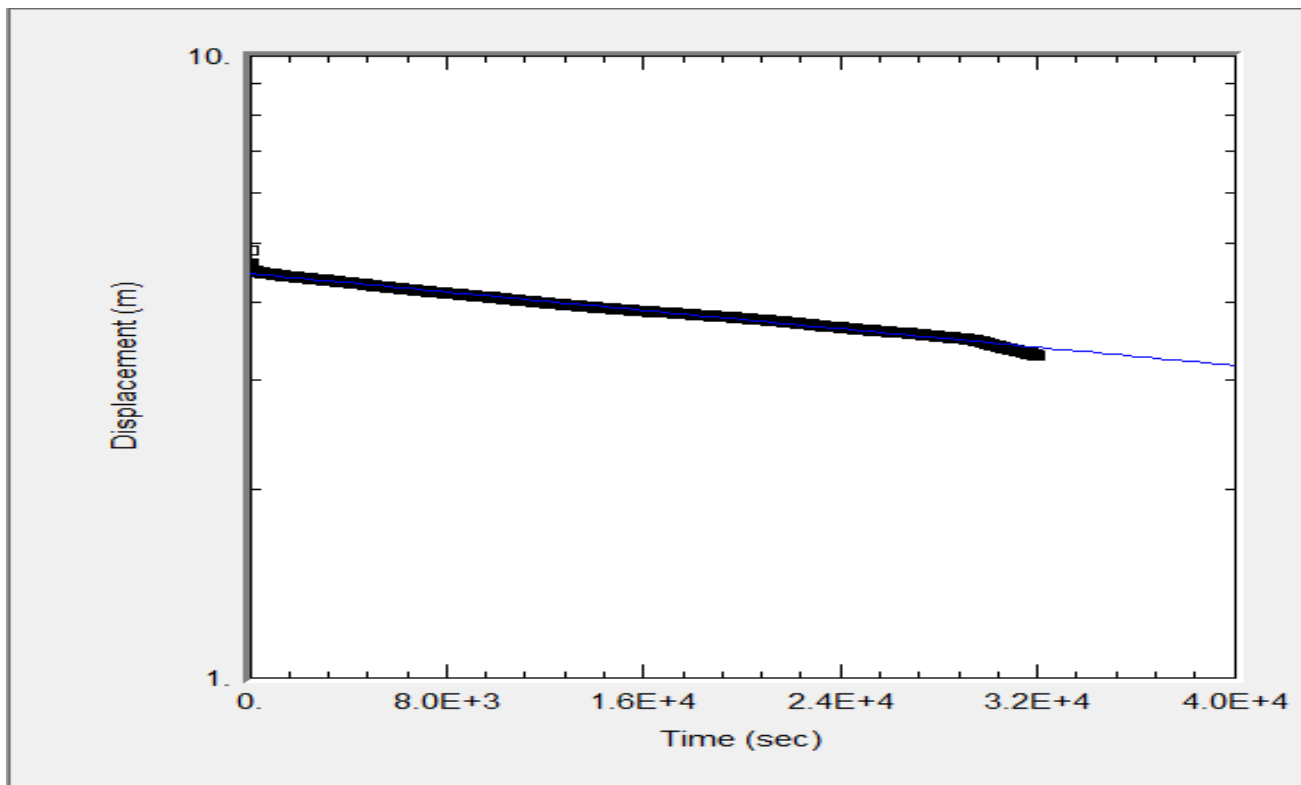
Well Number:	NW 24S	
Well Screen Bottom:	4.10	mbgs
Top of Pipe:	0.69	mags
Well Casing Diameter:	5.08	cm
Static Water Level:	1.19	mbgs
$K = r^2 \ln(L/R) / (2LT_o) =$	3.2×10^{-7}	m/s



Estimation of K by Slug Test, based on Horslev equation

Date:	May 24 to June 12, 2024
Conducted by:	B.Hwang

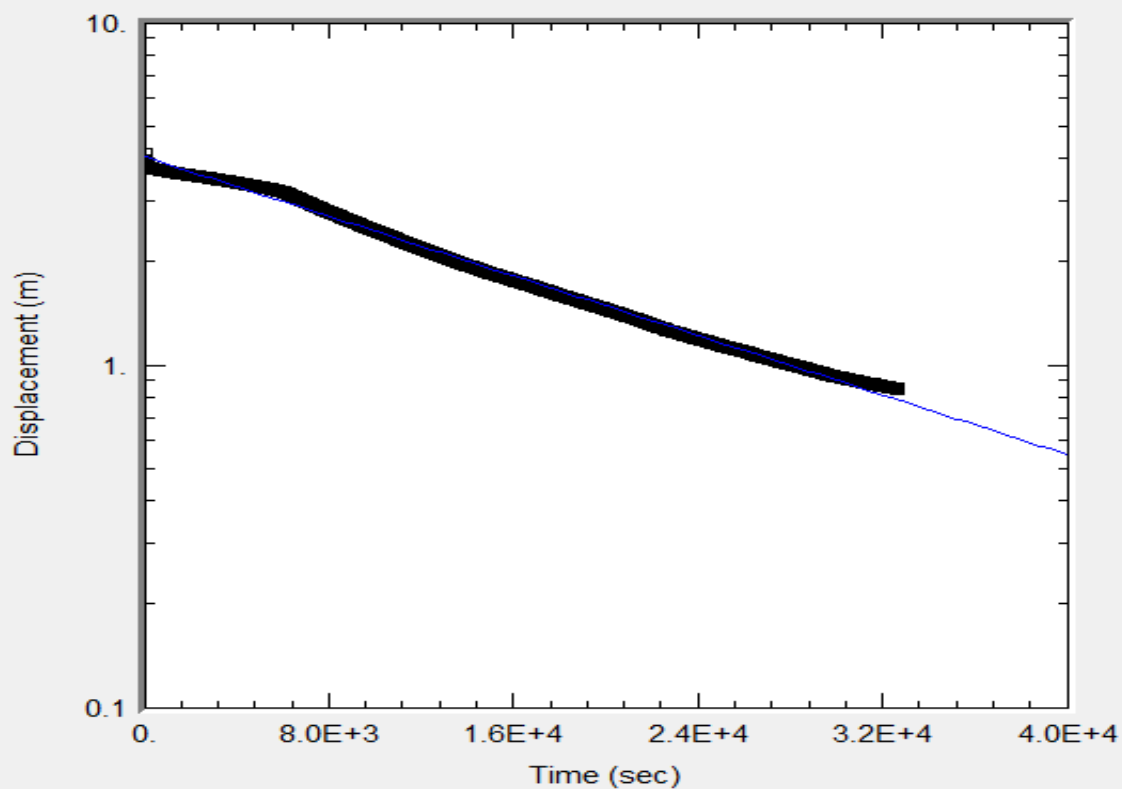
Well Number:	MW 101	
Well Screen Bottom:	6.70	mbgs
Top of Pipe:	0.75	mags
Well Casing Diameter:	5.08	cm
Static Water Level:	1.68	mbgs
$K = r^2 \ln(L/R) / (2LT_0) =$	5.6×10^{-8}	m/s



Estimation of K by Slug Test, based on Horslev equation

Date:	May 24 to June 12, 2024
Conducted by:	B.Hwang

Well Number:	MW 102	
Well Screen Bottom:	7.62	mbgs
Top of Pipe:	0.93	mbgs
Well Casing Diameter:	5.08	cm
Static Water Level:	2.85	mbgs
$K = r^2 \ln(L/R) / (2LT_0) =$	7.8×10^{-8}	m/s



Appendix F Water Quality Laboratory Certificate of Analysis & Chain of Custody

Appendix F1: GEI's Support of Draft Plan of Subdivision

Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Frankie Huang
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 3013405
Date Submitted: 2024-12-18
Date Reported: 2025-04-15
Project: 2407688
COC #: 918403

Page 1 of 5

Dear Frankie Huang:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

Revision 1: This is an amendment and supersedes all other copies of this report issued on 2024-12-24. Results for MW208-D and MW208-D (F) have been switched after client's confirmation.

APPROVAL:

Patrick Jacques, Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at: <https://directory.cala.ca/>.

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Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by the Ontario Ministry of Agriculture, Food, and Rural Affairs for specific tests in agricultural soils.

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Eurofins_multisample(L)44.rpt

Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Frankie Huang
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 3013405
Date Submitted: 2024-12-18
Date Reported: 2025-04-15
Project: 2407688
COC #: 918403

					1754711 GW 2024-12-18 MW208-D	1754712 GW 2024-12-18 MW208-D (F)	1754713 GW 2024-12-18 MW211-D (F)	1754714 GW 2024-12-18 MW211-D
Group	Analyte	MRL	Units	Guideline				
General Chemistry	Total Suspended Solids	2	mg/L		6	34	<2	10
Metals	Ag	0.0001	mg/L	PWQO 0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Al	0.01	mg/L	IPWQO 0.075	0.89*	<0.01	0.01	0.36*
	As	0.001	mg/L	PWQO 0.100	0.003	0.003	0.003	0.003
	B	0.01	mg/L	IPWQO 0.200	0.05	0.05	0.05	0.05
	Ba	0.01	mg/L		0.13	0.13	0.03	0.04
	Be	0.0005	mg/L	PWQO 0.011	<0.0005	<0.0005	<0.0005	<0.0005
	Cd	0.0001	mg/L	PWQO 0.0002	<0.0001	<0.0001	<0.0001	0.0001
	Co	0.0002	mg/L	IPWQO 0.0009	0.0007	0.0004	0.0008	0.0010*
	Cr	0.001	mg/L		0.001	<0.001	<0.001	0.001
	Cu	0.001	mg/L	IPWQO 0.005	0.001	0.001	<0.001	<0.001
	Fe	0.03	mg/L	PWQO 0.30	1.23*	0.28	<0.03	0.32*
	Hg	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001
	Mo	0.005	mg/L	IPWQO 0.040	<0.005	<0.005	0.011	0.011
	Ni	0.005	mg/L	PWQO 0.025	<0.005	<0.005	<0.005	<0.005
	Pb	0.001	mg/L	PWQO 0.005	<0.001	<0.001	<0.001	<0.001
	Sb	0.0005	mg/L	IPWQO 0.020	<0.0005	<0.0005	0.0007	0.0007
	Se	0.001	mg/L	PWQO 0.100	<0.001	<0.001	0.002	0.002
	Tl	0.0001	mg/L	IPWQO 0.0003	<0.0001	<0.0001	<0.0001	<0.0001
	U	0.001	mg/L	IPWQO 0.005	<0.001	<0.001	0.005	0.005
	V	0.001	mg/L	IPWQO 0.006	0.002	<0.001	<0.001	0.001
	W	0.002	mg/L	IPWQO 0.030	<0.002	0.002	0.004	0.004
	Zn	0.01	mg/L	PWQO 0.030	<0.01	<0.01	<0.01	<0.01
	Zr	0.002	mg/L	IPWQO 0.004	<0.002	<0.002	<0.002	<0.002

Guideline = PWQO - Ontario

* = Guideline Exceedence

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Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Certificate of Analysis

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647 Welham Rd Unit 14
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Attention: M. Frankie Huang
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Invoice to: GEI Consultants Inc.

Report Number: 3013405
Date Submitted: 2024-12-18
Date Reported: 2025-04-15
Project: 2407688
COC #: 918403

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1754715 GW 2024-12-18 MW212-S (F)	1754716 GW 2024-12-18 MW212-S
Group	Analyte	MRL	Units	Guideline			
General Chemistry	Total Suspended Solids	2	mg/L		<2	4	
Metals	Ag	0.0001	mg/L	PWQO 0.0001	<0.0001	<0.0001	
	Al	0.01	mg/L	IPWQO 0.075	<0.01	0.29*	
	As	0.001	mg/L	PWQO 0.100	<0.001	<0.001	
	B	0.01	mg/L	IPWQO 0.200	0.02	0.02	
	Ba	0.01	mg/L		0.05	0.06	
	Be	0.0005	mg/L	PWQO 0.011	<0.0005	<0.0005	
	Cd	0.0001	mg/L	PWQO 0.0002	<0.0001	<0.0001	
	Co	0.0002	mg/L	IPWQO 0.0009	0.0039*	0.0041*	
	Cr	0.001	mg/L		<0.001	<0.001	
	Cu	0.001	mg/L	IPWQO 0.005	<0.001	0.003	
	Fe	0.03	mg/L	PWQO 0.30	<0.03	0.32*	
	Hg	0.0001	mg/L		<0.0001	<0.0001	
	Mo	0.005	mg/L	IPWQO 0.040	<0.005	<0.005	
	Ni	0.005	mg/L	PWQO 0.025	<0.005	<0.005	
	Pb	0.001	mg/L	PWQO 0.005	<0.001	0.001	
	Sb	0.0005	mg/L	IPWQO 0.020	<0.0005	<0.0005	
	Se	0.001	mg/L	PWQO 0.100	<0.001	<0.001	
	Tl	0.0001	mg/L	IPWQO 0.0003	<0.0001	<0.0001	
	U	0.001	mg/L	IPWQO 0.005	0.003	0.003	
	V	0.001	mg/L	IPWQO 0.006	<0.001	<0.001	
	W	0.002	mg/L	IPWQO 0.030	<0.002	<0.002	
	Zn	0.01	mg/L	PWQO 0.030	<0.01	<0.01	
	Zr	0.002	mg/L	IPWQO 0.004	<0.002	<0.002	

Guideline = PWQO - Ontario

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Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Frankie Huang
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 3013405
Date Submitted: 2024-12-18
Date Reported: 2025-04-15
Project: 2407688
COC #: 918403

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 470365 Analysis/Extraction Date 2024-12-23 Analyst SKH Method C SM2540			
Total Suspended Solids	<2 mg/L	94	90-110
Run No 470394 Analysis/Extraction Date 2024-12-20 Analyst AaN Method EPA 200.8			
Silver	<0.0001 mg/L	117	80-120
Aluminum	<0.01 mg/L	105	80-120
Arsenic	<0.001 mg/L	96	80-120
Boron (total)	<0.01 mg/L	99	80-120
Barium	<0.01 mg/L	95	80-120
Beryllium	<0.0005 mg/L	102	80-120
Cadmium	<0.0001 mg/L	101	80-120
Cobalt	<0.0002 mg/L	107	80-120
Chromium Total	<0.001 mg/L	95	80-120
Copper	<0.001 mg/L	108	80-120
Iron	<0.03 mg/L	98	80-120
Mercury	<0.0001 mg/L	114	80-120
Molybdenum	<0.005 mg/L	105	80-120

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Report Number: 3013405
Date Submitted: 2024-12-18
Date Reported: 2025-04-15
Project: 2407688
COC #: 918403

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Nickel	<0.005 mg/L	109	80-120
Lead	<0.001 mg/L	106	80-120
Antimony	<0.0005 mg/L	81	80-120
Selenium	<0.001 mg/L	94	80-120
Thallium	<0.0001 mg/L	105	80-120
Uranium	<0.001 mg/L	94	80-120
Vanadium	<0.001 mg/L	100	80-120
W	<0.002 mg/L	95	80-120
Zinc	<0.01 mg/L	107	80-120
Zr	<0.002 mg/L	92	80-120

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Appendix F2: GEI's Mayfield Tullamore Local Subwatershed Study Phase 1



Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Road
Barrie, ON
L4N 0B7
Attention: Ms. Kim Pickett
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 3008098
Date Submitted: 2024-06-06
Date Reported: 2025-05-12
Project: 2400278
COC #: 911514

Page 1 of 9

Dear Kim Pickett:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

Revision 1: This is an amendment and supersedes all other copies of this report issued on 2024-06-13. Sample matrix has been changed as per client's request.

APPROVAL:

Patrick Jacques, Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

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Eurofins_multisample(L)44.rpt

Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Road
Barrie, ON
L4N 0B7
Attention: Ms. Kim Pickett
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 3008098
Date Submitted: 2024-06-06
Date Reported: 2025-05-12
Project: 2400278
COC #: 911514

Group	Analyte	MRL	Units	Guideline	Lab I.D.	Sample Matrix	Sample Type	Sampling Date	Sample I.D.
					1730166	1730167	1730168	1730169	
					GW	GW	GW	GW	
					2024-06-05	2024-06-05	2024-06-05	2024-06-05	
					NW8S	NW8D	MW9	MW29	
Metals	Ag	0.0001	mg/L	PWQO 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
	Al (dissolved)	0.01	mg/L	IPWQO 0.015	<0.01	0.28*	<0.01	0.01	
	As	0.001	mg/L	PWQO 0.005	<0.001	0.003	0.003	0.002	
	B	0.01	mg/L	IPWQO 0.200	0.06	0.08	0.04	0.10	
	Be	0.0005	mg/L	PWQO 0.011	<0.0005	<0.0005	<0.0005	<0.0005	
	Cd	0.0001	mg/L	PWQO 0.0001	<0.0001	<0.0001	0.0001	<0.0001	
	Co	0.0002	mg/L	IPWQO 0.0009	0.0014*	0.0048*	0.0052*	0.0012*	
	Cr	0.001	mg/L		0.002	0.006	0.006	0.005	
	Cu	0.001	mg/L	IPWQO 0.001	0.005*	0.011*	0.026*	0.005*	
	Fe	0.03	mg/L	PWQO 0.30	1.18*	5.81*	6.84*	2.85*	
	Hg Dissolved	0.0001	mg/L	PWQO 0.0002	<0.0001	<0.0001	<0.0001	<0.0001	
	Mo	0.005	mg/L	IPWQO 0.040	<0.005	0.005	<0.005	<0.005	
	Ni	0.005	mg/L	PWQO 0.025	<0.005	0.011	0.009	<0.005	
	Pb	0.001	mg/L	PWQO 0.001	<0.001	0.005*	0.005*	0.002*	
	Sb	0.0005	mg/L	IPWQO 0.020	<0.0005	<0.0005	<0.0005	<0.0005	
	Se	0.001	mg/L	PWQO 0.100	<0.001	0.004	0.002	<0.001	
	Tl	0.0001	mg/L	IPWQO 0.0003	<0.0001	<0.0001	<0.0001	<0.0001	
	U	0.001	mg/L	IPWQO 0.005	0.002	0.009*	<0.001	<0.001	
	V	0.001	mg/L	IPWQO 0.006	0.002	0.008*	0.005	0.005	
	W	0.002	mg/L	IPWQO 0.030	<0.002	<0.002	<0.002	<0.002	
	Zn	0.01	mg/L	PWQO 0.020	0.02	0.02	0.04*	0.01	
	Zr	0.002	mg/L	IPWQO 0.004	<0.002	<0.002	<0.002	0.005*	

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Certificate of Analysis

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647 Welham Road
Barrie, ON
L4N 0B7
Attention: Ms. Kim Pickett
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 3008098
Date Submitted: 2024-06-06
Date Reported: 2025-05-12
Project: 2400278
COC #: 911514

Group	Analyte	MRL	Units	Guideline	Lab I.D.	Sample Matrix	Sample Type	Sampling Date	Sample I.D.
					1730170 GW	1730171 GW	1730172 GW	1730173 GW	1730173 GW
Metals	Ag	0.0001	mg/L	PWQO 0.0001	2024-06-05 NW31S	2024-06-05 NW33D	2024-06-05 NW37S	2024-06-05 NW37D	
		0.0005	mg/L	PWQO 0.0001					<0.0005*
	Al (dissolved)	0.01	mg/L	IPWQO 0.015	<0.01	<0.01	<0.01	<0.01	<0.01
	As	0.001	mg/L	PWQO 0.005	0.008*	0.005	0.004		
		0.005	mg/L	PWQO 0.005					<0.005
	B	0.01	mg/L	IPWQO 0.200	0.06	0.07	0.20		
		0.05	mg/L	IPWQO 0.200					0.90*
	Be	0.0005	mg/L	PWQO 0.011	0.0005	<0.0005	0.0005		
		0.002	mg/L	PWQO 0.011					<0.002
	Cd	0.0001	mg/L	PWQO 0.0001	0.0002*	<0.0001	0.0001		
		0.0005	mg/L	PWQO 0.0001					<0.0005*
	Co	0.0002	mg/L	IPWQO 0.0009	0.0079*	0.0009	0.0114*		
		0.001	mg/L	IPWQO 0.0009					0.005*
	Cr	0.001	mg/L		0.008	0.002	0.011		
		0.005	mg/L						<0.005
	Cu	0.001	mg/L	IPWQO 0.001	0.025*	0.012*	0.022*		
		0.005	mg/L	IPWQO 0.001					<0.005*
	Fe	0.03	mg/L	PWQO 0.30	9.27*	3.62*	8.61*		
		0.2	mg/L	PWQO 0.30					2.1*
	Hg Dissolved	0.0001	mg/L	PWQO 0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Mo	0.005	mg/L	IPWQO 0.040	<0.005	<0.005	<0.005		
		0.02	mg/L	IPWQO 0.040					<0.02
	Ni	0.005	mg/L	PWQO 0.025	0.011	<0.005	0.017		
		0.02	mg/L	PWQO 0.025					<0.02
	Pb	0.001	mg/L	PWQO 0.001	0.008*	0.001	0.009*		

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Certificate of Analysis

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L4N 0B7
Attention: Ms. Kim Pickett
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 3008098
Date Submitted: 2024-06-06
Date Reported: 2025-05-12
Project: 2400278
COC #: 911514

Group	Analyte	MRL	Units	Guideline	Lab I.D.	Sample Matrix	Sample Type	Sampling Date	Sample I.D.
					1730170 GW	1730171 GW	1730172 GW	1730173 GW	1730173 GW
Metals	Pb	0.005	mg/L	PWQO 0.001	2024-06-05 NW31S	2024-06-05 NW33D	2024-06-05 NW37S	2024-06-05 NW37D	<0.005*
	Sb	0.0005	mg/L	IPWQO 0.020	<0.0005	<0.0005	<0.0005		
		0.002	mg/L	IPWQO 0.020					<0.002
	Se	0.001	mg/L	PWQO 0.100	0.005	<0.001	0.003		
		0.005	mg/L	PWQO 0.100					<0.005
	Tl	0.0001	mg/L	IPWQO 0.0003	<0.0001	<0.0001	<0.0001		
		0.0005	mg/L	IPWQO 0.0003					<0.0005*
	U	0.001	mg/L	IPWQO 0.005	0.001	<0.001	0.003		
		0.005	mg/L	IPWQO 0.005					<0.005
	V	0.001	mg/L	IPWQO 0.006	0.013*	0.003	0.011*		
		0.005	mg/L	IPWQO 0.006					<0.005
	W	0.002	mg/L	IPWQO 0.030	<0.002	<0.002	<0.002		
		0.01	mg/L	IPWQO 0.030					<0.01
	Zn	0.01	mg/L	PWQO 0.020	0.03*	<0.01	0.03*		
		0.05	mg/L	PWQO 0.020					<0.05*
	Zr	0.002	mg/L	IPWQO 0.004	<0.002	0.005*	<0.002		
		0.01	mg/L	IPWQO 0.004					<0.01*

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Report Number: 3008098
Date Submitted: 2024-06-06
Date Reported: 2025-05-12
Project: 2400278
COC #: 911514

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
					1730174 GW 2024-06-05 MW101
Group	Analyte	MRL	Units	Guideline	
Metals	Ag	0.0001	mg/L	PWQO 0.0001	<0.0001
	Al (dissolved)	0.01	mg/L	IPWQO 0.015	<0.01
	As	0.001	mg/L	PWQO 0.005	<0.001
	B	0.01	mg/L	IPWQO 0.200	0.04
	Be	0.0005	mg/L	PWQO 0.011	<0.0005
	Cd	0.0001	mg/L	PWQO 0.0001	<0.0001
	Co	0.0002	mg/L	IPWQO 0.0009	0.0009
	Cr	0.001	mg/L		<0.001
	Cu	0.001	mg/L	IPWQO 0.001	<0.001
	Fe	0.03	mg/L	PWQO 0.30	<0.03
	Hg Dissolved	0.0001	mg/L	PWQO 0.0002	<0.0001
	Mo	0.005	mg/L	IPWQO 0.040	<0.005
	Ni	0.005	mg/L	PWQO 0.025	<0.005
	Pb	0.001	mg/L	PWQO 0.001	<0.001
	Sb	0.0005	mg/L	IPWQO 0.020	<0.0005
	Se	0.001	mg/L	PWQO 0.100	<0.001
	Tl	0.0001	mg/L	IPWQO 0.0003	<0.0001
	U	0.001	mg/L	IPWQO 0.005	<0.001
	V	0.001	mg/L	IPWQO 0.006	<0.001
	W	0.002	mg/L	IPWQO 0.030	<0.002
	Zn	0.01	mg/L	PWQO 0.020	<0.01
	Zr	0.002	mg/L	IPWQO 0.004	<0.002

Guideline = PWQO - Ontario

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Barrie, ON
L4N 0B7
Attention: Ms. Kim Pickett
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 3008098
Date Submitted: 2024-06-06
Date Reported: 2025-05-12
Project: 2400278
COC #: 911514

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 461253 Analysis/Extraction Date 2024-06-11 Analyst AaN Method EPA 200.8			
Silver	<0.0001 mg/L	92	80-120
Al (dissolved)	<0.01 mg/L	103	80-120
Arsenic	<0.001 mg/L	96	80-120
Boron (total)	<0.01 mg/L	99	80-120
Beryllium	<0.0005 mg/L	104	80-120
Cadmium	<0.0001 mg/L	93	80-120
Cobalt	<0.0002 mg/L	99	80-120
Chromium Total	<0.001 mg/L	102	80-120
Copper	<0.001 mg/L	103	80-120
Iron	<0.03 mg/L	96	80-120
Hg Dissolved	<0.0001 mg/L	105	
Molybdenum	<0.005 mg/L	90	80-120
Nickel	<0.005 mg/L	103	80-120
Lead	<0.001 mg/L	94	80-120
Antimony	<0.0005 mg/L	94	80-120
Selenium	<0.001 mg/L	99	80-120

Guideline = PWQO - Ontario

* = Guideline Exceedence

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MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Road
Barrie, ON
L4N 0B7
Attention: Ms. Kim Pickett
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 3008098
Date Submitted: 2024-06-06
Date Reported: 2025-05-12
Project: 2400278
COC #: 911514

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Thallium	<0.0001 mg/L	94	80-120
Uranium	<0.001 mg/L	91	80-120
Vanadium	<0.001 mg/L	98	80-120
W	<0.002 mg/L	96	80-120
Zinc	<0.01 mg/L	107	80-120
Zr	<0.002 mg/L	99	80-120
Run No 461383 Analysis/Extraction Date 2024-06-13 Analyst AaN Method EPA 200.8			
Silver	<0.0001 mg/L	101	80-120
Arsenic	<0.001 mg/L	94	80-120
Boron (total)	<0.01 mg/L	97	80-120
Beryllium	<0.0005 mg/L	103	80-120
Cadmium	<0.0001 mg/L	97	80-120
Cobalt	<0.0002 mg/L	100	80-120
Chromium Total	<0.001 mg/L	102	80-120
Copper	<0.001 mg/L	103	80-120
Iron	<0.03 mg/L	98	80-120
Molybdenum	<0.005 mg/L	92	80-120

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Date Submitted: 2024-06-06
Date Reported: 2025-05-12
Project: 2400278
COC #: 911514

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Nickel	<0.005 mg/L	102	80-120
Lead	<0.001 mg/L	100	80-120
Antimony	<0.0005 mg/L	98	80-120
Selenium	<0.001 mg/L	98	80-120
Thallium	<0.0001 mg/L	99	80-120
Uranium	<0.001 mg/L	96	80-120
Vanadium	<0.001 mg/L	95	80-120
W	<0.002 mg/L	102	80-120
Zinc	<0.01 mg/L	107	80-120
Zr	<0.002 mg/L	97	80-120

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Date Submitted: 2024-06-06
Date Reported: 2025-05-12
Project: 2400278
COC #: 911514

Sample Comment Summary

Sample ID: 1730167	NW8D	Sediments not included for metals analysis.
Sample ID: 1730168	MW9	Sediments not included in metals analysis.
Sample ID: 1730170	NW31S	Sediments not included in metals analysis.
Sample ID: 1730172	NW37S	Sediments not included in metals analysis.
Sample ID: 1730173	NW37D	Sediments not included in metals analysis. Metals MRLs raised due to matrix interferences (dilution done).

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Attention: Ms. Kim Pickett
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Report Number: 3008395
Date Submitted: 2024-06-14
Date Reported: 2025-05-12
Project: 2400278
COC #: 915020

Page 1 of 5

Dear Kim Pickett:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

Revision 1: This is an amendment and supersedes all other copies of this report issued on 2024-06-21. Sample matrix has been changed as per client's request.

APPROVAL:

Patrick Jacques, Chemist

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Invoice to: GEI Consultants Inc.

Report Number: 3008395
Date Submitted: 2024-06-14
Date Reported: 2025-05-12
Project: 2400278
COC #: 915020

					1731714 GW 2024-06-12 NW 24D	1731715 GW 2024-06-12 NW 24S	1731716 GW 2024-06-12 MW 42	1731717 GW 2024-06-12 MW 49
Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. Guideline				
Metals	Ag	0.0001	mg/L	PWQO 0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Al	0.01	mg/L	IPWQO 0.015	3.17*	3.62*	7.45*	6.84*
	As	0.001	mg/L	PWQO 0.005	0.001	0.007*	0.007*	0.006*
	B	0.01	mg/L	IPWQO 0.200	0.06	0.13	0.07	0.02
	Ba	0.01	mg/L		0.20	0.19	0.37	0.28
	Be	0.0005	mg/L	PWQO 0.011	<0.0005	<0.0005	0.0009	0.0010
	Cd	0.0001	mg/L	PWQO 0.0001	<0.0001	0.0001	0.0002*	0.0003*
	Co	0.0002	mg/L	IPWQO 0.0009	0.0022*	0.0062*	0.0146*	0.0168*
	Cr	0.001	mg/L		0.006	0.012	0.017	0.012
	Cu	0.001	mg/L	IPWQO 0.001	0.005*	0.022*	0.035*	0.031*
	Fe	0.03	mg/L	PWQO 0.30	2.69*	6.45*	18.6*	18.7*
	Hg	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001
	Li	0.001	mg/L		0.044			
	Mo	0.005	mg/L	IPWQO 0.040	0.006	<0.005	<0.005	<0.005
	Ni	0.005	mg/L	PWQO 0.025	0.006	0.018	0.019	0.019
	Pb	0.001	mg/L	PWQO 0.001	0.002*	0.004*	0.018*	0.009*
	Sb	0.0005	mg/L	IPWQO 0.020	<0.0005	<0.0005	<0.0005	<0.0005
	Se	0.001	mg/L	PWQO 0.100	0.001	0.002	0.006	0.005
	Tl	0.0001	mg/L	IPWQO 0.0003	<0.0001	<0.0001	<0.0001	<0.0001
	U	0.001	mg/L	IPWQO 0.005	0.003	0.003	0.003	0.003
	V	0.001	mg/L	IPWQO 0.006	0.007*	0.011*	0.022*	0.014*
	W	0.002	mg/L	IPWQO 0.030	<0.002	<0.002	<0.002	<0.002
	Zn	0.01	mg/L	PWQO 0.020	<0.01	0.03*	0.04*	0.03*
	Zr	0.002	mg/L	IPWQO 0.004	0.003	0.003	<0.002	<0.002

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Report Number: 3008395
Date Submitted: 2024-06-14
Date Reported: 2025-05-12
Project: 2400278
COC #: 915020

					1731718 GW 2024-06-12 MW 52S	1731719 GW 2024-06-12 MW 52D	1731720 GW 2024-06-12 MW 102
Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. Guideline			
Metals	Ag	0.0001	mg/L	PWQO 0.0001	<0.0001	<0.0001	<0.0001
	Al	0.01	mg/L	IPWQO 0.015	1.56*	2.93*	0.96*
	As	0.001	mg/L	PWQO 0.005	0.002	0.004	0.005
	B	0.01	mg/L	IPWQO 0.200	0.06	0.18	0.05
	Ba	0.01	mg/L		0.14	0.17	0.13
	Be	0.0005	mg/L	PWQO 0.011	<0.0005	<0.0005	<0.0005
	Cd	0.0001	mg/L	PWQO 0.0001	<0.0001	<0.0001	<0.0001
	Co	0.0002	mg/L	IPWQO 0.0009	0.0022*	0.0049*	0.0021*
	Cr	0.001	mg/L		0.003	0.012	0.006
	Cu	0.001	mg/L	IPWQO 0.001	0.006*	0.011*	0.021*
	Fe	0.03	mg/L	PWQO 0.30	1.51*	5.87*	2.63*
	Hg	0.0001	mg/L		<0.0001	<0.0001	<0.0001
	Mo	0.005	mg/L	IPWQO 0.040	<0.005	<0.005	<0.005
	Ni	0.005	mg/L	PWQO 0.025	0.006	0.008	0.006
	Pb	0.001	mg/L	PWQO 0.001	<0.001	0.004*	0.008*
	Sb	0.0005	mg/L	IPWQO 0.020	<0.0005	<0.0005	<0.0005
	Se	0.001	mg/L	PWQO 0.100	<0.001	0.002	<0.001
	Tl	0.0001	mg/L	IPWQO 0.0003	<0.0001	<0.0001	<0.0001
	U	0.001	mg/L	IPWQO 0.005	0.004	0.003	<0.001
	V	0.001	mg/L	IPWQO 0.006	0.005	0.009*	0.003
	W	0.002	mg/L	IPWQO 0.030	<0.002	<0.002	<0.002
	Zn	0.01	mg/L	PWQO 0.020	0.01	0.02	<0.01
	Zr	0.002	mg/L	IPWQO 0.004	<0.002	<0.002	<0.002

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Attention: Ms. Kim Pickett
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Report Number: 3008395
Date Submitted: 2024-06-14
Date Reported: 2025-05-12
Project: 2400278
COC #: 915020

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 461826 Analysis/Extraction Date 2024-06-21 Analyst AaN Method EPA 200.8			
Silver	<0.0001 mg/L	96	80-120
Aluminum	<0.01 mg/L	119	80-120
Arsenic	<0.001 mg/L	97	80-120
Boron (total)	<0.01 mg/L	102	80-120
Barium	<0.01 mg/L	104	80-120
Beryllium	<0.0005 mg/L	107	80-120
Cadmium	<0.0001 mg/L	110	80-120
Cobalt	<0.0002 mg/L	110	80-120
Chromium Total	<0.001 mg/L	109	80-120
Copper	<0.001 mg/L	114	80-120
Iron	<0.03 mg/L	95	80-120
Mercury	<0.0001 mg/L	101	80-120
Li	<0.001 mg/L	103	80-120
Molybdenum	<0.005 mg/L	105	80-120
Nickel	<0.005 mg/L	114	80-120
Lead	<0.001 mg/L	112	80-120

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Date Submitted: 2024-06-14
Date Reported: 2025-05-12
Project: 2400278
COC #: 915020

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Antimony	<0.0005 mg/L	117	80-120
Selenium	<0.001 mg/L	104	80-120
Thallium	<0.0001 mg/L	113	80-120
Uranium	<0.001 mg/L	102	80-120
Vanadium	<0.001 mg/L	105	80-120
W	<0.002 mg/L	114	80-120
Zinc	<0.01 mg/L	115	80-120
Zr	<0.002 mg/L	98	80-120

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Attention: Ms. Kim Pickett
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Report Number: 3008396
Date Submitted: 2024-06-14
Date Reported: 2025-05-12
Project: 2400278
COC #: 915020

Page 1 of 5

Dear Kim Pickett:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

Revision 1: This is an amendment and supersedes all other copies of this report issued on 2024-06-21. Sample matrix has been changed as per client's request.

APPROVAL:

Patrick Jacques, Chemist

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Eurofins_multisample(L)44.rpt

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					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1731721 GW 2024-06-12 NW 24D (F)	1731722 GW 2024-06-12 MW 42 (F)	1731723 GW 2024-06-12 MW 49 (F)	1731724 GW 2024-06-12 MW 52S (F)
Group	Analyte	MRL	Units	Guideline					
Metals	Ag	0.0001	mg/L	PWQO 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
	Al	0.01	mg/L	IPWQO 0.015	<0.01	<0.01	<0.01	0.02*	
	As	0.001	mg/L	PWQO 0.005	<0.001	0.002	0.002	<0.001	
	B	0.01	mg/L	IPWQO 0.200	0.07	0.07	0.02	0.06	
	Ba	0.01	mg/L		0.19	0.16	0.09	0.11	
	Be	0.0005	mg/L	PWQO 0.011	<0.0005	<0.0005	<0.0005	<0.0005	
	Cd	0.0001	mg/L	PWQO 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
	Co	0.0002	mg/L	IPWQO 0.0009	0.0006	0.0007	0.0028*	0.0004	
	Cr	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	
	Cu	0.001	mg/L	IPWQO 0.001	0.002*	0.002*	0.006*	0.005*	
	Fe	0.03	mg/L	PWQO 0.30	<0.03	<0.03	5.85*	<0.03	
	Hg	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	
	Mo	0.005	mg/L	IPWQO 0.040	0.009	0.007	<0.005	<0.005	
	Ni	0.005	mg/L	PWQO 0.025	<0.005	<0.005	<0.005	<0.005	
	Pb	0.001	mg/L	PWQO 0.001	<0.001	<0.001	0.001	<0.001	
	Sb	0.0005	mg/L	IPWQO 0.020	<0.0005	<0.0005	<0.0005	0.0006	
	Se	0.001	mg/L	PWQO 0.100	<0.001	<0.001	<0.001	<0.001	
	Tl	0.0001	mg/L	IPWQO 0.0003	<0.0001	<0.0001	<0.0001	<0.0001	
	U	0.001	mg/L	IPWQO 0.005	0.003	0.001	0.002	0.004	
	V	0.001	mg/L	IPWQO 0.006	<0.001	<0.001	<0.001	<0.001	
	W	0.002	mg/L	IPWQO 0.030	<0.002	<0.002	<0.002	<0.002	
	Zn	0.01	mg/L	PWQO 0.020	<0.01	<0.01	<0.01	<0.01	
	Zr	0.002	mg/L	IPWQO 0.004	<0.002	<0.002	<0.002	<0.002	

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Date Submitted: 2024-06-14
Date Reported: 2025-05-12
Project: 2400278
COC #: 915020

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
					1731725 GW 2024-06-12 MW 52D (F)
Group	Analyte	MRL	Units	Guideline	
Metals	Ag	0.0001	mg/L	PWQO 0.0001	<0.0001
	Al	0.01	mg/L	IPWQO 0.015	<0.01
	As	0.001	mg/L	PWQO 0.005	0.002
	B	0.01	mg/L	IPWQO 0.200	0.19
	Ba	0.01	mg/L		0.10
	Be	0.0005	mg/L	PWQO 0.011	<0.0005
	Cd	0.0001	mg/L	PWQO 0.0001	<0.0001
	Co	0.0002	mg/L	IPWQO 0.0009	0.0004
	Cr	0.001	mg/L		<0.001
	Cu	0.001	mg/L	IPWQO 0.001	<0.001
	Fe	0.03	mg/L	PWQO 0.30	<0.03
	Hg	0.0001	mg/L		<0.0001
	Mo	0.005	mg/L	IPWQO 0.040	0.011
	Ni	0.005	mg/L	PWQO 0.025	<0.005
	Pb	0.001	mg/L	PWQO 0.001	<0.001
	Sb	0.0005	mg/L	IPWQO 0.020	0.0006
	Se	0.001	mg/L	PWQO 0.100	<0.001
	Tl	0.0001	mg/L	IPWQO 0.0003	<0.0001
	U	0.001	mg/L	IPWQO 0.005	0.002
	V	0.001	mg/L	IPWQO 0.006	<0.001
	W	0.002	mg/L	IPWQO 0.030	<0.002
	Zn	0.01	mg/L	PWQO 0.020	<0.01
	Zr	0.002	mg/L	IPWQO 0.004	<0.002

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MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Road
Barrie, ON
L4N 0B7
Attention: Ms. Kim Pickett
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 3008396
Date Submitted: 2024-06-14
Date Reported: 2025-05-12
Project: 2400278
COC #: 915020

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 461765 Analysis/Extraction Date 2024-06-20 Analyst AaN Method EPA 200.8			
Silver	<0.0001 mg/L	107	80-120
Aluminum	<0.01 mg/L	103	80-120
Arsenic	<0.001 mg/L	95	80-120
Boron (total)	<0.01 mg/L	112	80-120
Barium	<0.01 mg/L	105	80-120
Beryllium	<0.0005 mg/L	116	80-120
Cadmium	<0.0001 mg/L	107	80-120
Cobalt	<0.0002 mg/L	107	80-120
Chromium Total	<0.001 mg/L	103	80-120
Copper	<0.001 mg/L	111	80-120
Iron	<0.03 mg/L	106	80-120
Mercury	<0.0001 mg/L	104	80-120
Molybdenum	<0.005 mg/L	102	80-120
Nickel	<0.005 mg/L	110	80-120
Lead	<0.001 mg/L	110	80-120
Antimony	<0.0005 mg/L	115	80-120

Guideline = PWQO - Ontario

* = Guideline Exceedence

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

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Report Number: 3008396
Date Submitted: 2024-06-14
Date Reported: 2025-05-12
Project: 2400278
COC #: 915020

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Selenium	<0.001 mg/L	102	80-120
Thallium	<0.0001 mg/L	111	80-120
Uranium	<0.001 mg/L	106	80-120
Vanadium	<0.001 mg/L	101	80-120
W	<0.002 mg/L	102	80-120
Zinc	<0.01 mg/L	114	80-120
Zr	<0.002 mg/L	117	80-120

Guideline = PWQO - Ontario

* = Guideline Exceedence

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

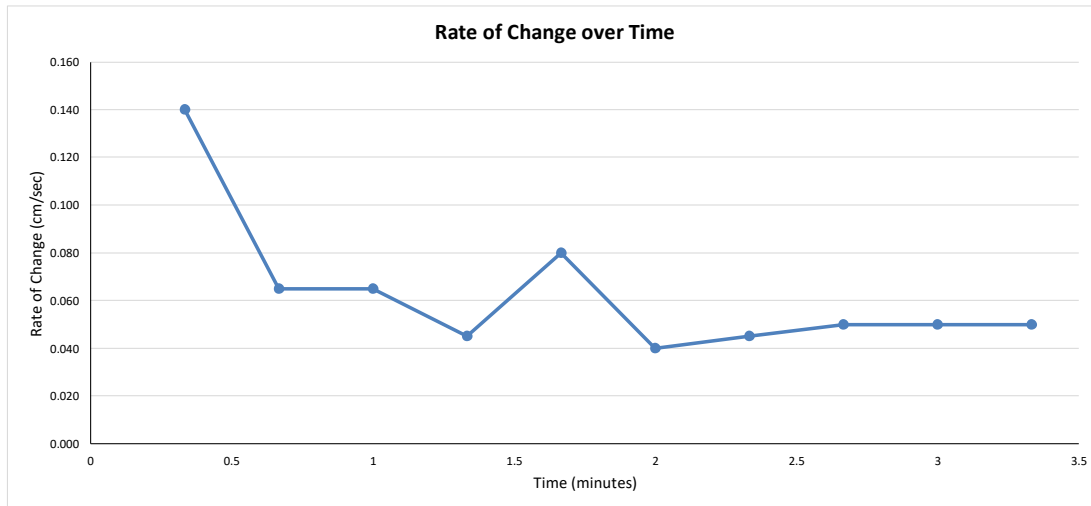
MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Appendix G Guelph Permeameter Testing

Guelph Permeameter Infiltration Rate Determination



Test Location: GP 1



INPUT PARAMETERS

α^*	0.12	cm ⁻¹
H	10	cm
a	3	cm
X	2.16	cm ²
R	0.05	cm/sec

SHAPE FACTOR

Shape Factor (1, 2 or 3) =	1
Shape Factor Value (cm ⁻¹) =	1.288

CALCULATED PARAMETERS

H _a	3.33	unitless
Q ₁	0.108	cm ³ /sec

CALCULATED DESIGN VALUES

k _{fs}	1.17E-04	cm/sec
Φ _m	9.75E-04	cm ² /s
Infiltration:	48.25	mm/hr
FOS:	2.50	unitless
Design Infiltration:	19.30	mm/hr

Variable Glossary

α^*	1) is the ratio of gravity to capillarity forces during infiltration or drainage 2) determined from table 1 on page 47 of the manual (or the adjacent table)
H	1) is the water head in the BH 2) determined by the height that the inner tube is pulled up during field operation
a	1) is the radius of the borehole 2) determined by the size of the auger
X	1) is the reservoir constant 2) determined by the reservoir knob at the top of the unit • if the knob is up X = 35.22 (outer and inner reservoir) • if the knob is down X = 2.16 (inner reservoir)
R	1) is the steady state rate of flow per minute 2) is determined by timing the drop of water in the Guelph Permeameter

Equation Glossary

H _a	is the ratio of head to borehole radius
Q ₁	is the flow rate
C _{1, 2 or 3}	is the shape factor which accounts for the saturated area of the soil • Select C ₁ if $\alpha^* \geq 0.12 \text{ cm}^{-1}$ • Select C ₂ if $\alpha^* = 0.04 \text{ cm}^{-1}$ • Select C ₃ if $\alpha^* = 0.01 \text{ cm}^{-1}$
k _{fs}	is the field saturated hydraulic conductivity of the soil
Φ _m	is an indicator of the capillary pull exerted by the unsaturated soil on the water

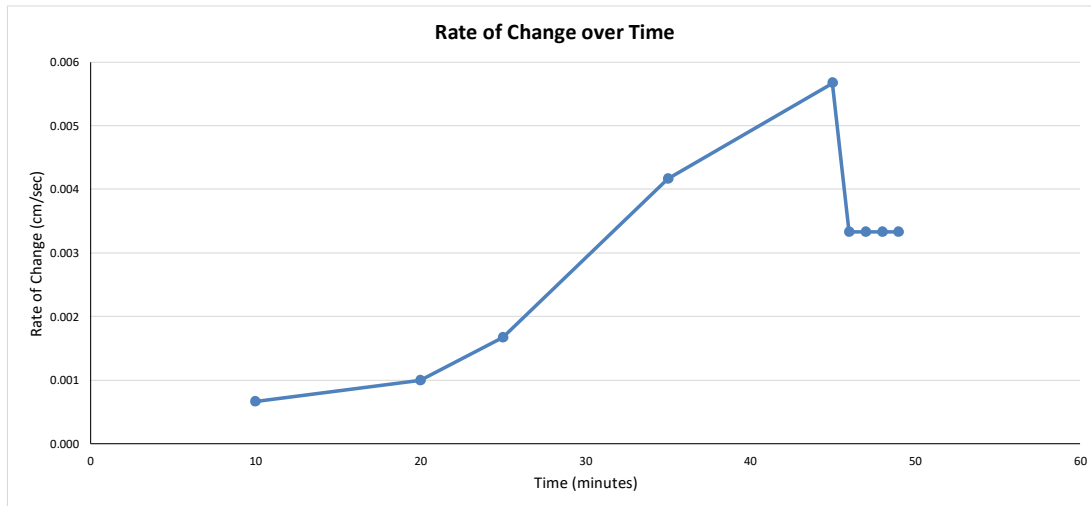
Table 1. Soil texture-structure categories for site-estimation of α^* (adapted from Elrick et al., 1989)

Soil Texture - Structure Category	α^* (cm ⁻¹)
Compacted, structureless, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.	0.01
Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.	0.04
Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.	0.12
Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc.	0.36

Guelph Permeameter Infiltration Rate Determination



Test Location: GP 2



INPUT PARAMETERS

α^*	0.12	cm ⁻¹
H	10	cm
a	3	cm
X	2.16	cm ²
R	0.003	cm/sec

SHAPE FACTOR

Shape Factor (1, 2 or 3) =	1
Shape Factor Value (cm ⁻¹) =	1.288

CALCULATED PARAMETERS

H _a	3.33	unitless
Q ₁	0.00648	cm ³ /sec

CALCULATED DESIGN VALUES

k _{fs}	7.02E-06	cm/sec
Φ _m	5.85E-05	cm ² /s
Infiltration:	22.72	mm/hr
FOS:	2.50	unitless
Design Infiltration:	9.09	mm/hr

Variable Glossary

α^*	1) is the ratio of gravity to capillarity forces during infiltration or drainage 2) determined from table 1 on page 47 of the manual (or the adjacent table)
H	1) is the water head in the BH 2) determined by the height that the inner tube is pulled up during field operation
a	1) is the radius of the borehole 2) determined by the size of the auger
X	1) is the reservoir constant 2) determined by the reservoir knob at the top of the unit • if the knob is up X = 35.22 (outer and inner reservoir) • if the knob is down X = 2.16 (inner reservoir)
R	1) is the steady state rate of flow per minute 2) is determined by timing the drop of water in the Guelph Permeameter

Equation Glossary

H _a	is the ratio of head to borehole radius
Q ₁	is the flow rate
C _(1, 2 or 3)	is the shape factor which accounts for the saturated area of the soil • Select C ₁ if $\alpha^* \geq 0.12 \text{ cm}^{-1}$ • Select C ₂ if $\alpha^* = 0.04 \text{ cm}^{-1}$ • Select C ₃ if $\alpha^* = 0.01 \text{ cm}^{-1}$
k _{fs}	is the field saturated hydraulic conductivity of the soil
Φ _m	is an indicator of the capillary pull exerted by the unsaturated soil on the water

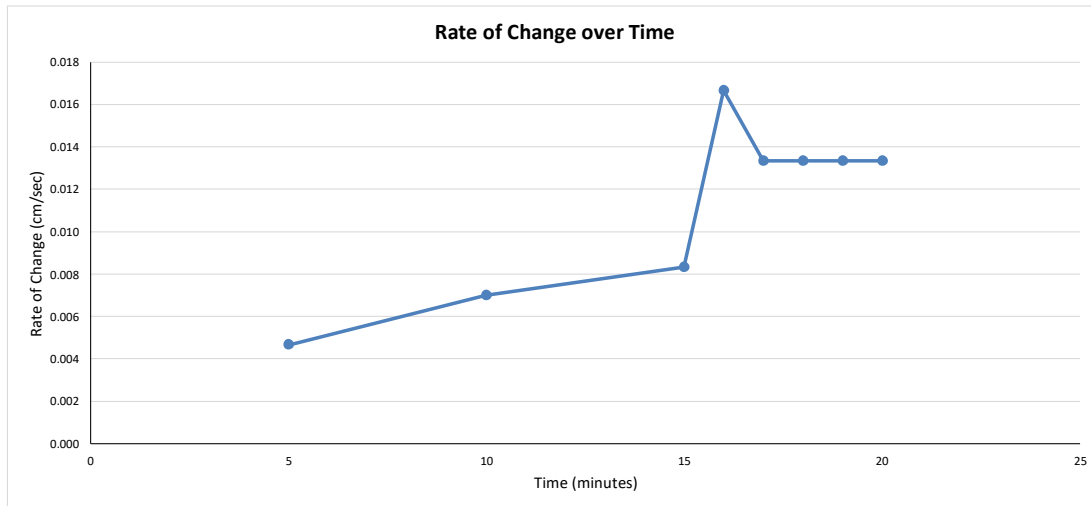
Table 1. Soil texture-structure categories for site-estimation of α^* (adapted from Elrick et al., 1989)

Soil Texture - Structure Category	α^* (cm ⁻¹)
Compacted, structureless, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.	0.01
Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.	0.04
Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.	0.12
Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc.	0.36

Guelph Permeameter Infiltration Rate Determination



Test Location: GP 3



INPUT PARAMETERS

α^*	0.12	cm ⁻¹
H	10	cm
a	3	cm
X	2.16	cm ²
R	0.013	cm/sec

SHAPE FACTOR

Shape Factor (1, 2 or 3) =	1
Shape Factor Value (cm ⁻¹) =	1.288

CALCULATED PARAMETERS

H _a	3.33	unitless
Q ₁	0.02808	cm ³ /sec

CALCULATED DESIGN VALUES

k _{fs}	3.04E-05	cm/sec
Φ _m	2.54E-04	cm ² /s
Infiltration:	33.65	mm/hr
FOS:	2.50	unitless
Design Infiltration:	13.46	mm/hr

Variable Glossary

α^*	1) is the ratio of gravity to capillarity forces during infiltration or drainage 2) determined from table 1 on page 47 of the manual (or the adjacent table)
H	1) is the water head in the BH 2) determined by the height that the inner tube is pulled up during field operation
a	1) is the radius of the borehole 2) determined by the size of the auger
X	1) is the reservoir constant 2) determined by the reservoir knob at the top of the unit • if the knob is up X = 35.22 (outer and inner reservoir) • if the knob is down X = 2.16 (inner reservoir)
R	1) is the steady state rate of flow per minute 2) is determined by timing the drop of water in the Guelph Permeameter

Equation Glossary

H _a	is the ratio of head to borehole radius
Q ₁	is the flow rate
C _(1, 2 or 3)	is the shape factor which accounts for the saturated area of the soil • Select C ₁ if $\alpha^* \geq 0.12 \text{ cm}^{-1}$ • Select C ₂ if $\alpha^* = 0.04 \text{ cm}^{-1}$ • Select C ₃ if $\alpha^* = 0.01 \text{ cm}^{-1}$
k _{fs}	is the field saturated hydraulic conductivity of the soil
Φ _m	is an indicator of the capillary pull exerted by the unsaturated soil on the water

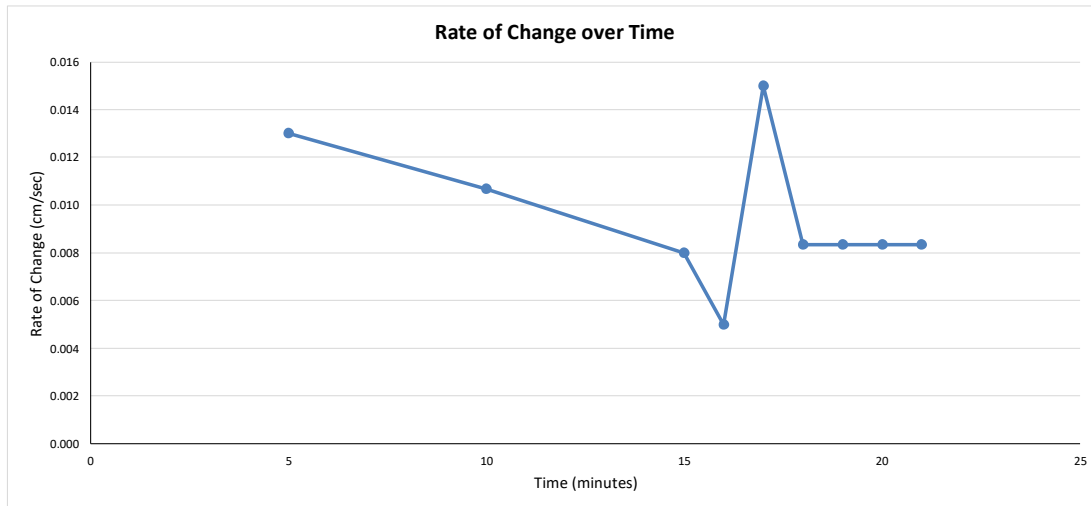
Table 1. Soil texture-structure categories for site-estimation of α^* (adapted from Elrick et al., 1989)

Soil Texture - Structure Category	α^* (cm ⁻¹)
Compacted, structureless, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.	0.01
Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.	0.04
Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.	0.12
Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc.	0.36

Guelph Permeameter Infiltration Rate Determination



Test Location: GP 4



INPUT PARAMETERS

α^*	0.12	cm ⁻¹
H	5	cm
a	3	cm
X	2.16	cm ²
R	0.008	cm/sec

SHAPE FACTOR

Shape Factor (1, 2 or 3) =	1
Shape Factor Value (cm ⁻¹) =	0.803

CALCULATED PARAMETERS

H _a	1.67	unitless
Q ₁	0.01728	cm ³ /sec

CALCULATED DESIGN VALUES

k _{fs}	3.14E-05	cm/sec
Φ _m	2.62E-04	cm ² /s
Infiltration:	33.94	mm/hr
FOS:	2.50	unitless
Design Infiltration:	13.58	mm/hr

Variable Glossary

α^*	1) is the ratio of gravity to capillarity forces during infiltration or drainage 2) determined from table 1 on page 47 of the manual (or the adjacent table)
H	1) is the water head in the BH 2) determined by the height that the inner tube is pulled up during field operation
a	1) is the radius of the borehole 2) determined by the size of the auger
X	1) is the reservoir constant 2) determined by the reservoir knob at the top of the unit • if the knob is up X = 35.22 (outer and inner reservoir) • if the knob is down X = 2.16 (inner reservoir)
R	1) is the steady state rate of flow per minute 2) is determined by timing the drop of water in the Guelph Permeameter

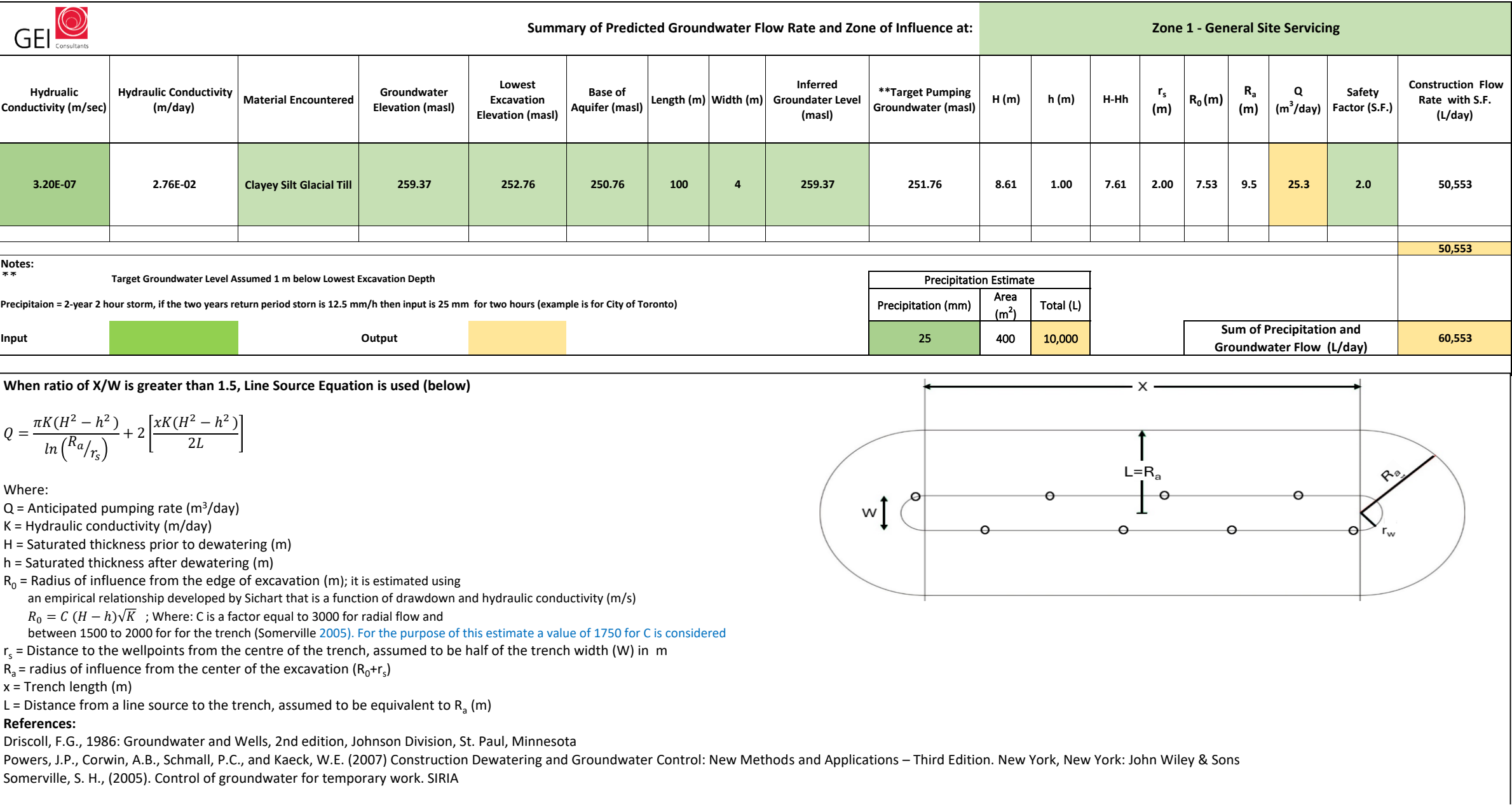
Equation Glossary

H _a	is the ratio of head to borehole radius
Q ₁	is the flow rate
C _(1, 2 or 3)	is the shape factor which accounts for the saturated area of the soil • Select C ₁ if $\alpha^* \geq 0.12 \text{ cm}^{-1}$ • Select C ₂ if $\alpha^* = 0.04 \text{ cm}^{-1}$ • Select C ₃ if $\alpha^* = 0.01 \text{ cm}^{-1}$
k _{fs}	is the field saturated hydraulic conductivity of the soil
Φ _m	is an indicator of the capillary pull exerted by the unsaturated soil on the water

Table 1. Soil texture-structure categories for site-estimation of α^* (adapted from Elrick et al., 1989)

Soil Texture - Structure Category	α^* (cm ⁻¹)
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Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.	0.04
Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.	0.12
Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc.	0.36

Appendix H Construction and Permanent Dewatering Calculations



INPUT				
Description	Symbol	Value	Unit	Explanation
Ground elevation		267.10	m asl	
Groundwater elevation		259.19	m asl	Inferred Groundwater Level
Estimated base of excavation		261.70	m asl	
Base of water bearing zone		259.70	m asl	Assumed 1.0 m below the bottom of excavation
Hydraulic conductivity	K	1.5E-05	m/s	
	K	1.3E+00	m/day	Converted to m/day
Dimensions of Excavation (Length and Width)	X	139.0	m	Estimated from design plan
	W	100.0	m	Estimated from design plan
OUTPUT				
Target water level		260.70	masl	1.0 m below the bottom of excavation
Water level above bottom of water bearing zone before dewatering	H	-0.5	m	
Water level at excavation wall	h	1.0	m	
Equivalent radius	r _s	66.5	m	Equivalent radius based on excavation geometry
Radius of influence from the edge of excavation (Sichardt Equation)	R ₀	0.0	m	where c = 3000
Radius of influence from the center of the excavation	R _a	0.0	m	(R ₀ +r _s)
Construction dewatering flow rate	Q	0.0	m ³ /day	Construction dewatering flow rate
Safety factor	S.F.	2.0	-	Enter desired safety factor
Construction dewatering flow rate (with S.F.)	Q	0.0	m ³ /day	
		0	L/day	
Precipitation = 2-year 2 hour storm, if the two years return period storm is 12.5 mm/h then input is 25 mm for two hours (example is for City of Toronto)				
Precipitation Estimates	Assumed Precip Event (mm)		Area (m ²)	Total Precipitation (Liters)
	25		13900	347,500
Sum of Precipitation and Groundwater			347,500	L/day
Note:	Input		Output	

Note:

Input

Output

When ratio of Lenth/Width is Less than 1.5, Point Source Equation is used (below)

$$Q = \frac{\pi K (H^2 - h^2)}{\ln(R_a/r_s)}$$

Where:

Q = Anticipated pumping rate (m³/day)

K = Hydraulic conductivity (m/day)

H = Saturated thickness prior to dewatering (m)

h = Saturated thickness after dewatering (m)

 R_0 = Radius of influence from the edge of excavation (m); it is estimated using an empirical relationship developed by Sichart that is a function of

drawdown and hydraulic conductivity (in m/s)

 $R_0 = C (H - h) \sqrt{K}$; Where: C is a factor equal to 3000 for radial flow and between 1500 to 2000 for for the trench (Somerville 2005). For the purpose of this estimate a value of 3000 for C is considered.

 r_s = Equivalent radius of excavation (m)

$$r_s = \sqrt{XW/\pi}$$

x = Excavation length (m)

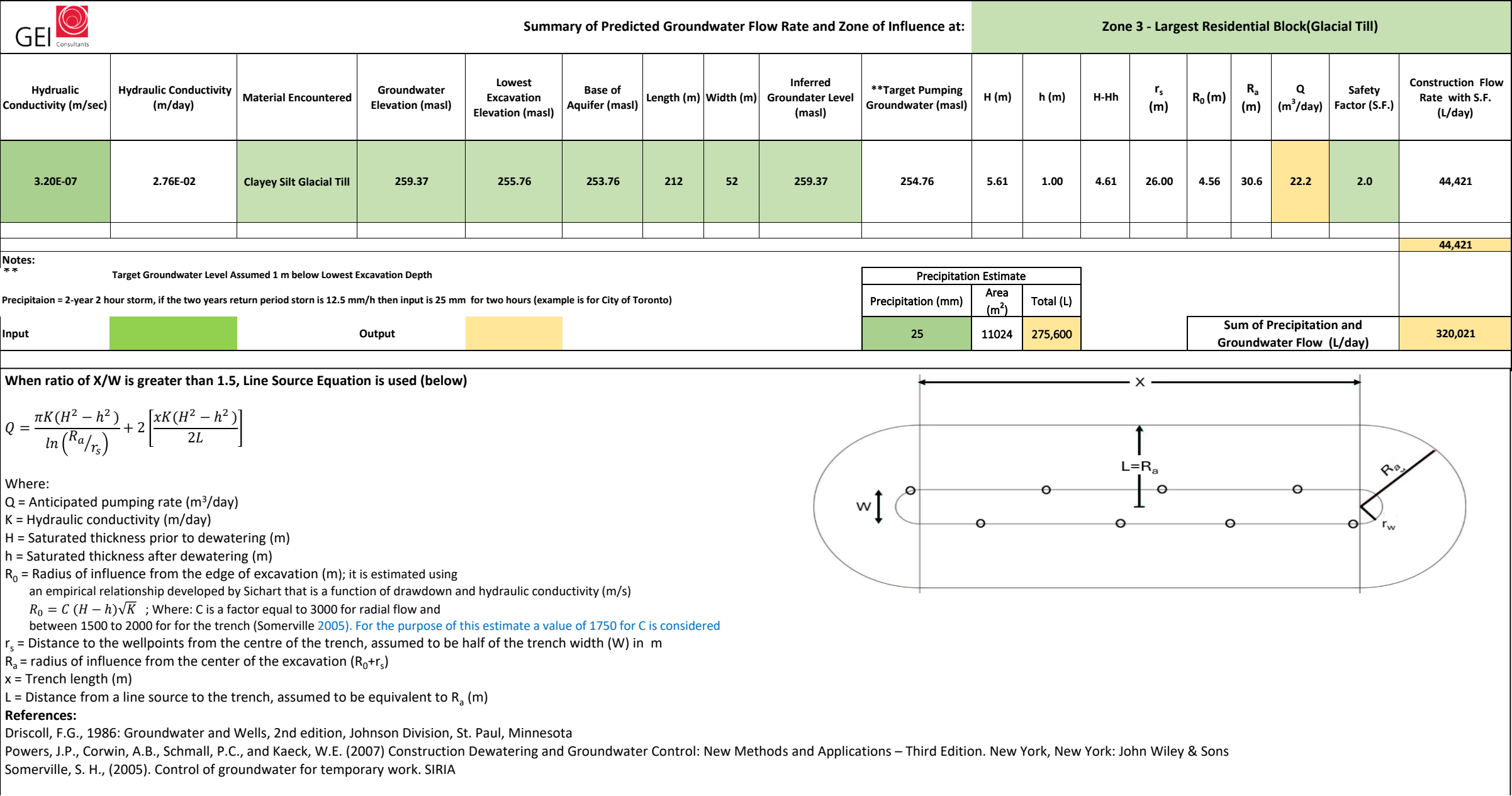
W = Excavation Width

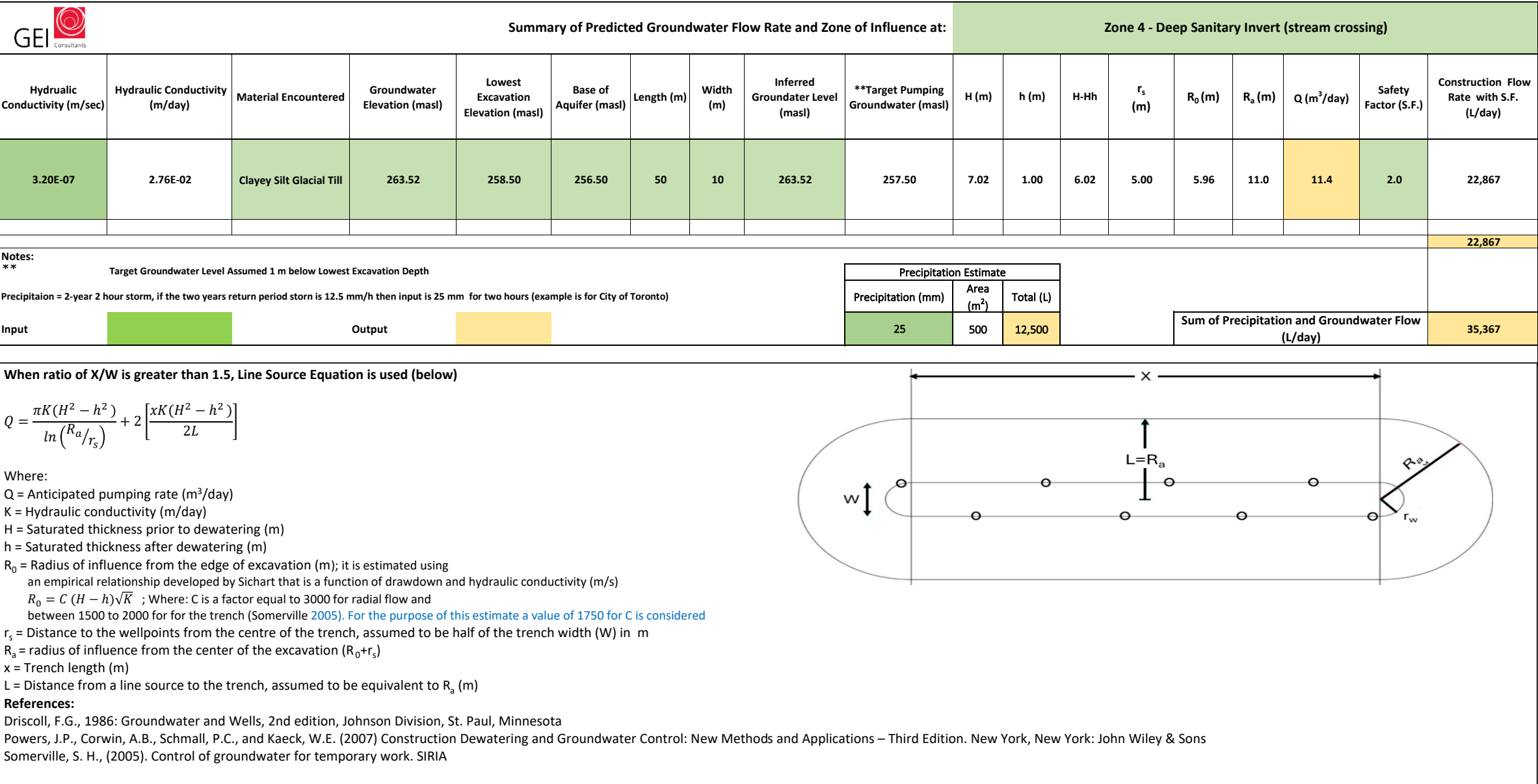
 R_a = radius of influence from the center of the excavation ($R_0 + r_s$)

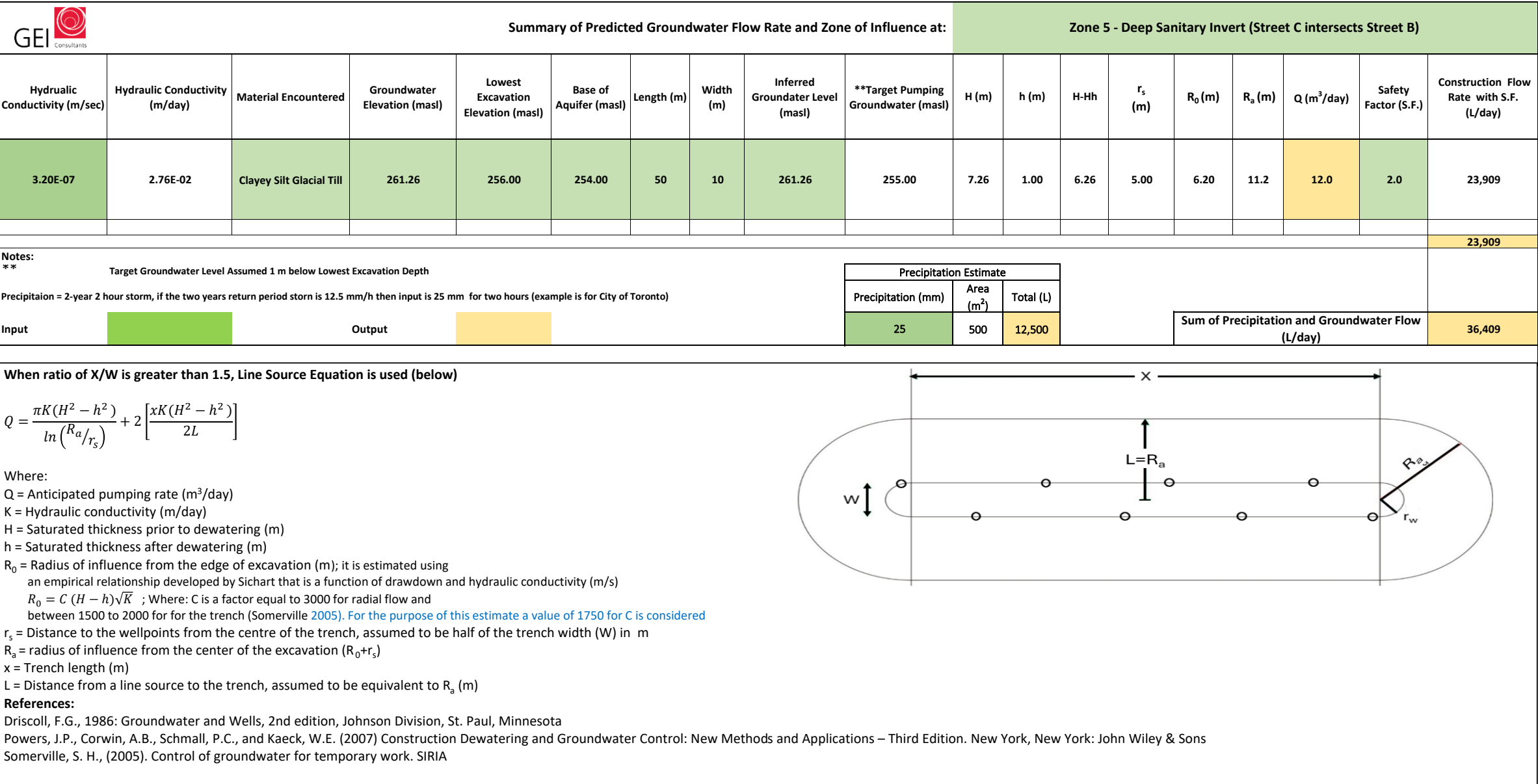
References:

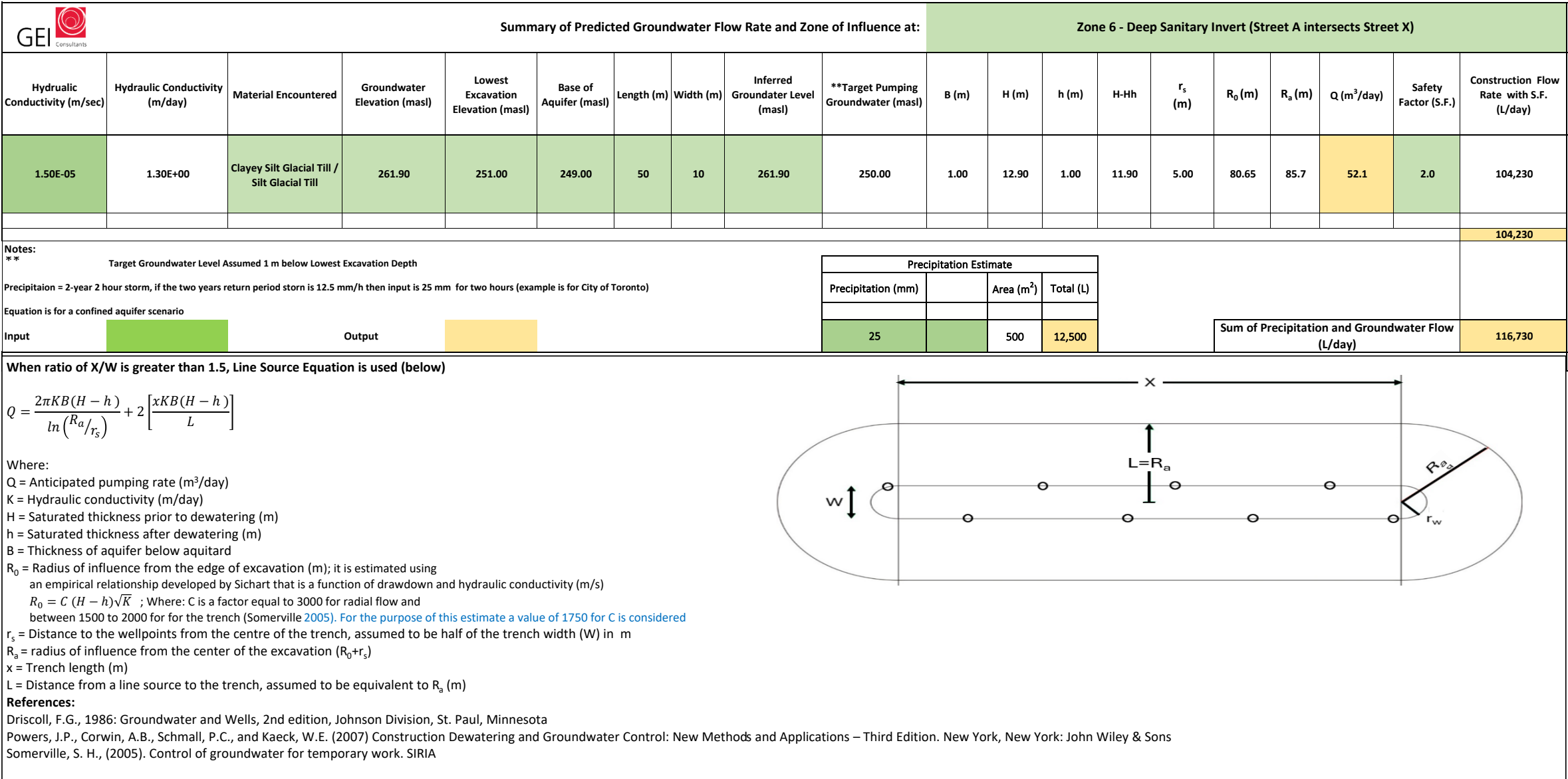
Driscoll, F.G., 1986: Groundwater and Wells, 2nd edition, Johnson Division, St. Paul, Minnesota.

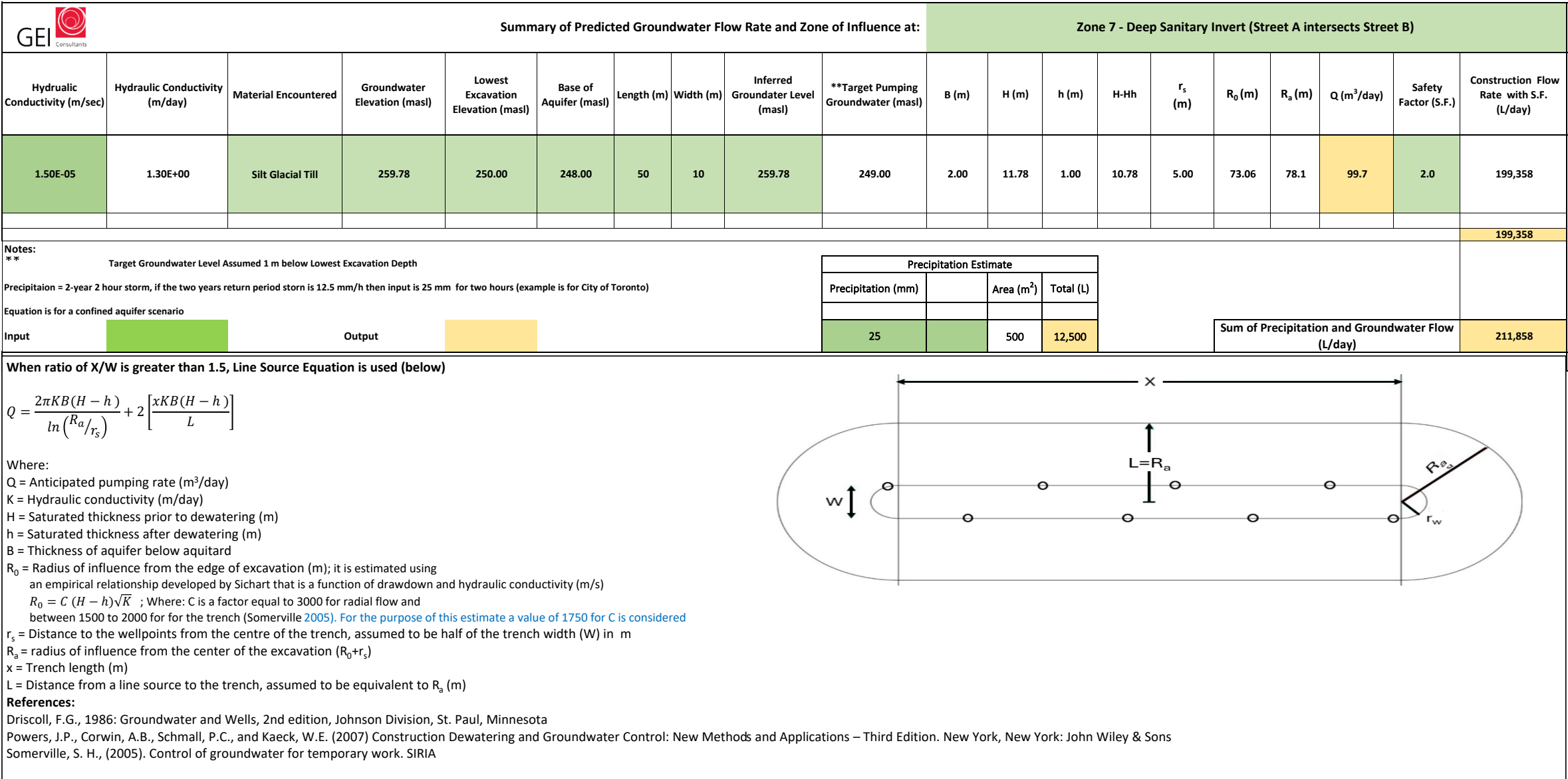
Powers, J.P., Corwin, A.B., Schmall, P.C., and Kaack, W.E. (2007) Construction Dewatering and Groundwater Control: New Methods and Applications – Third Edition. New York, New York: John Wiley & Sons.

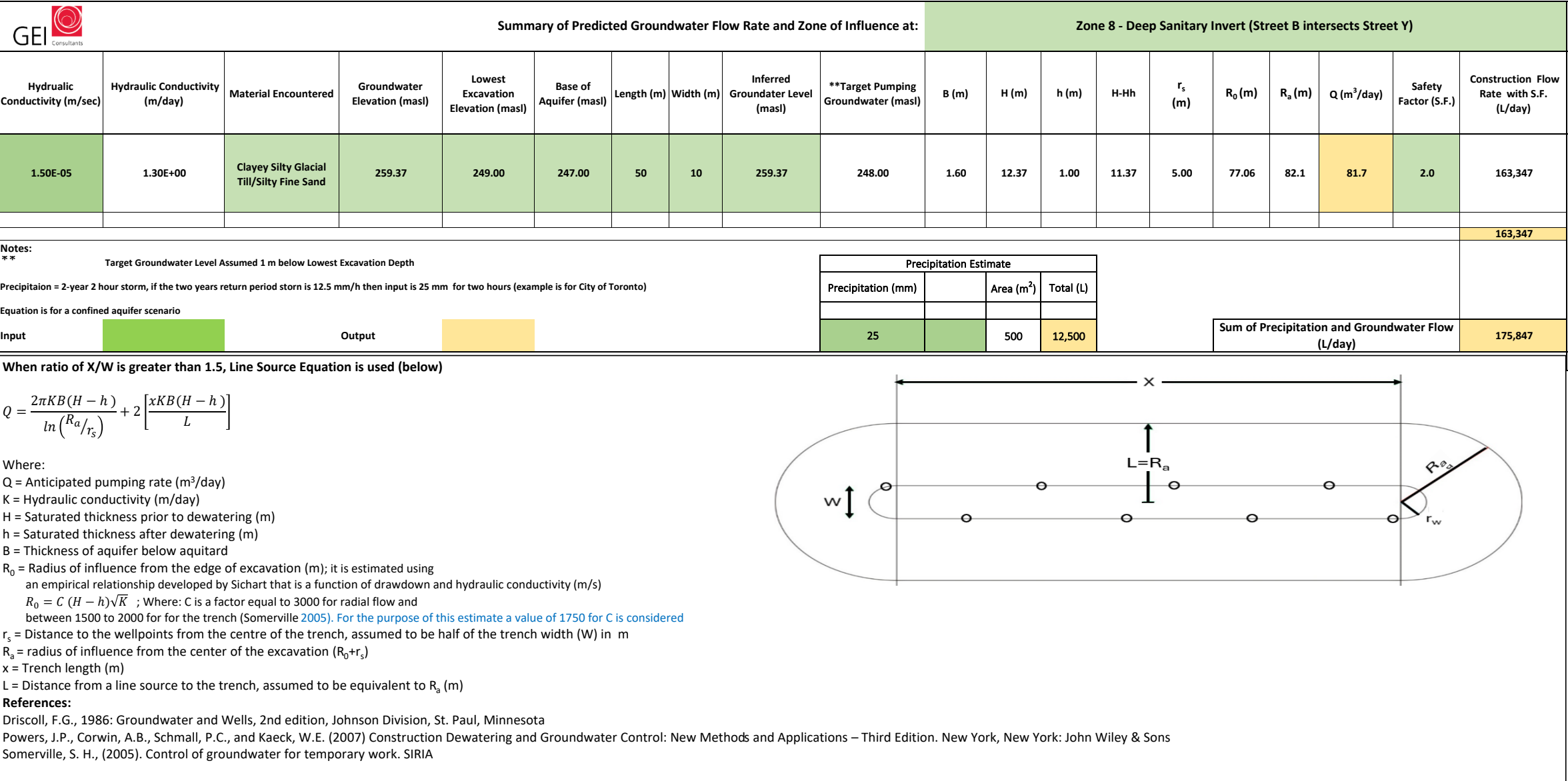


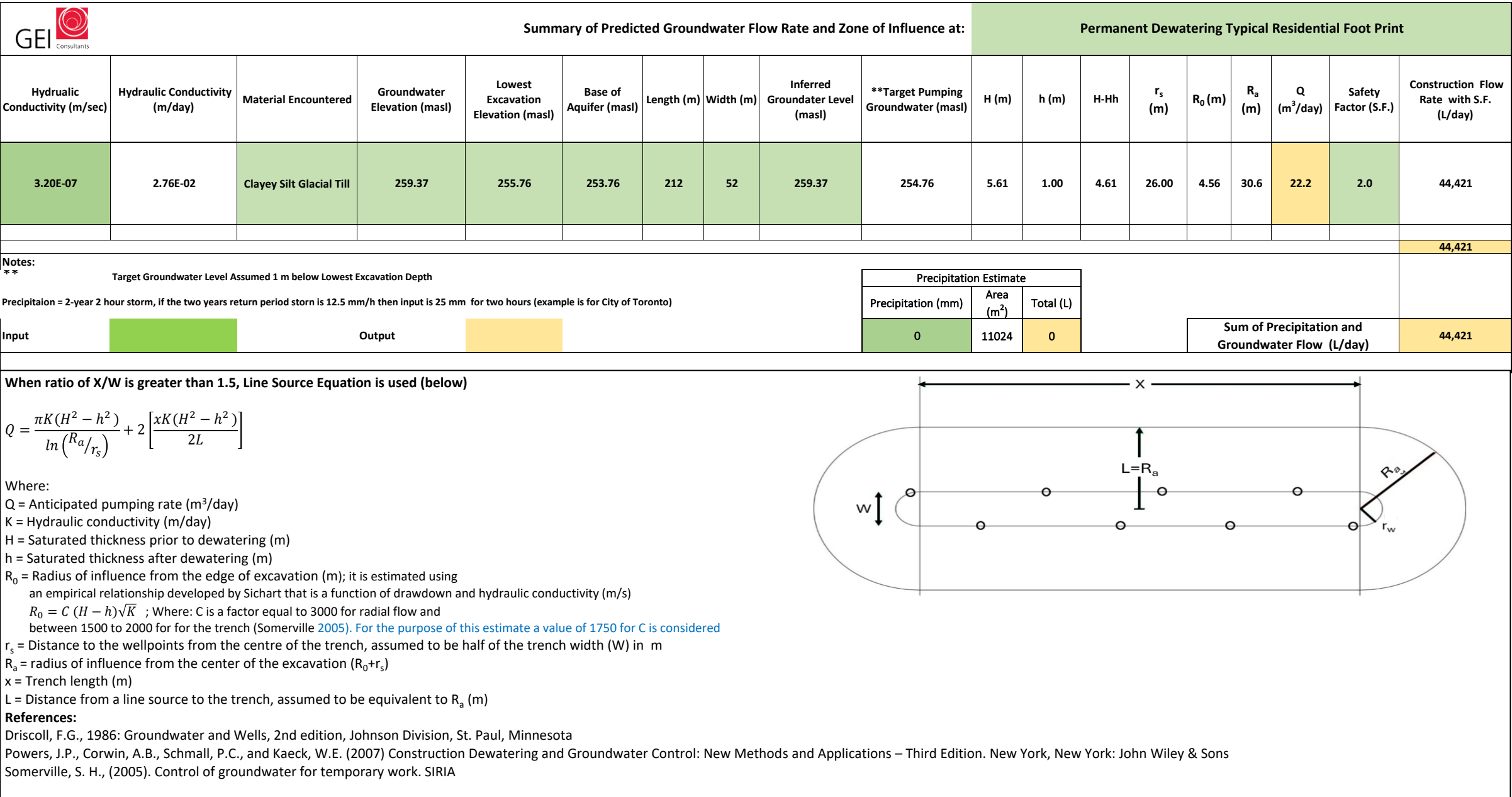












Appendix I Groundwater Taking Plan

Groundwater Taking Plan

This plan, as required under the Ontario Water Resources Act, Section 34 - 34.11 and Ontario Regulation (O. Reg.) 387/04 (Water Taking and Transfer) and/or O. Reg. 63/16 – Registration Under Part II.2 of the Act – Water Taking, provides a general outline of the dewatering plan for the site to satisfy the Environmental Activity and Sector Registry (EASR) requirements and that a detailed plan will be generated as needed by the contractor and their dewatering subcontractor that will include detailed treatment and monitoring measures.

Based on the conditions at and around the site, the target receiver for any dewatering discharge will be the surface. Should discharge be planned for either of the sewer systems, the contractor and/or its dewatering subcontractor will need to ensure that all permissions and/or permits are obtained to allow for discharge to that sewer and that all dewatering discharge meets the appropriate chemistry and discharge flow requirements imposed for that system.

Ultimately the method(s) employed to complete the dewatering will be left up to the contractor and/or its dewatering contractor to determine what will work best for them to achieve the dry working conditions that they require.

It is noted that these dewatering estimates are considered preliminary and do not reflect any current plans for the site. The following values should be used for discussion and preliminary planning purposes only until site servicing plans and/or building basement or foundation designs are available.

Construction Dewatering Discharge Rates and Zones of Influence

The Radii of Influence were estimated in Section 5.1.2 and the details are summarized below.

Dewatering Zone		Static Saturated Head	Hydraulic Conductivity	Radius of Influence From The Edge of Excavation
		Above Aquifer Bottom		
		H (m)	K (m/s)	R ₀ (m)
1	General Site Servicing	8.6	3.2 x 10 ⁻⁷	7.5
2	Excavation for Northwestern SWM Pond	-0.51	1.5 x 10 ⁻⁵	0
3	Largest Residential Block (Clayey Glacial Till)	5.6	3.2 x 10 ⁻⁷	4.6
4	Deep Sanitary Sewer invert at crossing	7.0	3.2 x 10 ⁻⁷	6.0
5	Deep Sanitary Sewer (Street 'B' x Street 'C')	7.3	3.2 x 10 ⁻⁷	6.2

Dewatering Zone		Static Saturated Head	Hydraulic Conductivity	Radius of Influence From The Edge of Excavation
		Above Aquifer Bottom		
		H (m)	K (m/s)	R ₀ (m)
6	Deep Sanitary Sewer (Street 'A' x Street 'X')	12.9	1.5 x 10 ⁻⁵	80.7
7	Deep Sanitary Sewer (Street 'A' x Street 'B')	11.8	1.5 x 10 ⁻⁵	73.1
8	Deep Sanitary Sewer (Street 'B' x Street 'Y')	12.4	1.5 x 10 ⁻⁵	77.1

The estimated water taking rates are below.

Dewatering Zone		Construction Dewatering Flow Rate		
		As Calculated	Including FOS ¹	Including FOS and Rainfall Event ^{2,3}
		L/day		
1	General Site Servicing	25,276	50,553	60,553
2	Excavation for Northwestern SWM Pond	0	0	347,500
3	Largest Residential Block (Clayey Glacial Till)	22,211	44,421	320,021
4	Deep Sanitary Sewer invert at crossing	11,434	22,867	35,367
5	Deep Sanitary Sewer (Street 'B' x Street 'C')	11,955	23,909	36,409
6	Deep Sanitary Sewer (Street 'A' x Street 'X')	52,115	104,230	116,730
7	Deep Sanitary Sewer (Street 'A' x Street 'B')	99,679	199,358	211,858
8	Deep Sanitary Sewer (Street 'B' x Street 'Y')	81,674	163,347	175,847

Notes:

1. A Factor of Safety (FOS) of 2.0 is included to account for seasonal fluctuations in the groundwater table, initial removal of groundwater from storage and variation in hydrogeological properties beyond those encountered during this study.
2. A 25 mm rainfall event was included in the water-taking calculation.
3. It is noted that under specific conditions, if the water taking is 100% storm water registration on the EASR may not be required, however if water taking consists of any mixture of storm water and groundwater typical registry or permitting is likely required.

For long-term dewatering, a PTTW is required where the water taking rates exceed 397,000 L/day. As each neighbourhood area residential unit / lot is expected to be a freehold property, the water taking

rates can be assessed individually (i.e., on a lot-by-lot basis). Based on the estimates a PTTW is not anticipated for the neighbourhood area residential lots.

Impact Assessment

Land Stability and Settlement

For the expected maximum groundwater drawdown under different dewatering scenarios, settlement of the soil within the radius of influence (ROI) can be estimated based on the increase in effective stress (10 kPa per m of drawdown) from reducing the pore water pressures. Settlement has the potential to damage buried utilities, building foundations, or cause subsidence in adjacent lands. The maximum amount of settlement will occur adjacent to the dewatering system where the maximum drawdown occurs, and the amount of settlement will decrease exponentially to zero towards the radius of influence limit.

For assumed excavations for typical site servicing or basements, the dewatering estimates in this report show the drawdown could range from about 4.6 to 7.6 m with an ROI of about 7.5 m or less from the edge of excavation. The total settlement in the soil layers related to construction dewatering is estimated to be on the order of 10 mm or less for these typical areas.

For the deeper sanitary trunk sewer, the dewatering calculations show the drawdown could range from about 6.0 to 11.9 m with an ROI of about 80.7 m or less from the edge of excavation. The total settlement in the soil layers related to construction dewatering is estimated to be on the order of 20 mm or less for the trunk sewer.

The settlement will decrease exponentially from the dewatering locations. Based on the limited settlement and rural setting of the site, settlement related impacts are not expected at this time. This assessment is preliminary and must be reviewed and updated once detailed site plans and detailed construction dewatering calculations are available.

Another cause of significant dewatering related settlement is due to pumping of fines through the system. It is critical that dewatering systems are designed and installed to prevent the pumping of fines. Adequate filtration must be provided at the entry points to avoid soil loss into the system.

Potential Impact on Nearby Groundwater Users

Thirty-four (34) water well records were identified on-site and within 500 m of the site. A summary of well records is provided below.

Well Use	Number of Records	Year(s) Installed	Depth of Water Encountered	Well Screen / Open Hole (Media & Depth)
Domestic and/or Livestock	18	1949 to 2019	7.0 to 66.8 m	Overburden: 16.8 to 43.9 m Bedrock: 26.5 to 30.2 m
Public Supply	1	1975	13.4	Unknown
Other, Not Used, and/or Not Listed	15	1964 to 2021	3.0 to 15.2 m	Overburden: 3.0 to 19.8 m Bedrock: 9.1 to 11.0 m

The stratigraphic descriptions within the MECP monitoring well records are often inaccurate due to the methodology in which they are determined (observations of cuttings without depositional context and possibly some mixture between layers, plus no consistency between descriptions of soils between drillers). While this may be the case, an overall sense of the regional stratigraphy can be determined by looking at commonalities between most stratigraphic descriptions and where the wells were terminated in an aquifer. The well records typically indicate silty sand or sandy silt (potentially glacial till in some locations), then clay, sand and silt, then sand and gravel, then shale. Bedrock was encountered in several wells at depths ranging from 9.1 to 30.2 m below existing grade. The noted domestic water supply wells were installed in sand or sand and gravel units typically screened between 16.8 to 43.9 m below existing grade. It is noted the bedrock wells were screened from 9.1 to 30.2 m below existing grade. It is expected that any existing private water supply wells (used for domestic or livestock purposes) on and/or within 500 m of the site may still be in use. Based on the well records with available well screen information the deeper sand and gravel units would most likely be part of the Oak Ridges Aquifer Complex (ORAC). A larger portion of groundwater recharge for the ORAC would most likely not come from surface water as approximately 7.6 to 57.6 m of clay and silt glacial till (Halton Till) is overlying the aquifer reducing local infiltration and recharge.

As dewatering is expected to be temporary and near the ground surface for general site servicing, residential blocks and SWMPs, it is anticipated that any water supply wells within 500 m of the site will not be affected by the temporary dewatering near the ground surface.

For dewatering of the deeper sanitary servicing the maximum drawdown of 11.9 m below existing grade and radius of influence is 80.7 m from the edge of the excavation for the section near BH 31 and MW 28. The water supply wells in the area are typically screened from 16.8 to 43.9 m below existing grade. The water well record 4907640 is the shallowest well screened at 16.8 m bgs and is approximately 400 m west of the proposed location of the deeper sanitary sewer. The water well is located outside the radius of influence of the dewatering activities. It is not anticipated that any water supply wells within 500 m of the site will not be affected by the temporary dewatering of the deeper sanitary servicing.

As a precautionary measure even though impacts to the wells are not anticipated, if private well owners issue complaints regarding shortages or other interference with their water well, the complaints will be investigated, and if the problem is deemed to be an effect of the construction dewatering, a temporary supply of water will be made available to the well owner until ground water levels recover.

Potential Impact on Nearby Waterbodies or Other Surface Water Features

Minimal impacts to groundwater levels or flow directions, headwater drainage features on site, deeper aquifers, or other environmental features are expected due to the construction dewatering being temporary (short-term), with the radii of influence for drawdown being relatively small, and only a limited area being dewatered at any given time during construction.

For long-term dewatering, each neighborhood area residential unit / lot is expected to be a freehold property, the water taking rates can be assessed individually (i.e., on a lot-by-lot basis). Based on the estimates discussed above minimal impacts to groundwater levels or flow directions, headwater drainage features on site, deeper aquifers, or other environmental features are expected due to the flow rates being relatively small for the neighborhood area residential lots.

As no Areas of Natural and Scientific Interest (ANSIs) within 500 m of the site and the water removed will be returned to the West Humber River watershed. It is not anticipated that the proposed construction dewatering or long-term dewatering activity will have a negative impact on the overall groundwater flow to the surrounding area.

Water Quantity, Quality and Groundwater Level Monitoring Program

Discharge Options

Based on the groundwater quality analysis conducted to date, the discharge from dewatering operations will be directed to the surface, provided that the groundwater quality meets the applicable PWQO guidelines during dewatering activities.

If the groundwater quality of the construction dewatering discharge fails to meet the applicable standards, treatment options should be assessed, and/or the system should be shut down.

Treatment of the dewatering discharge water by filtration (using a decantation tank and/or silt bag at a minimum) to remove sediment and fines is expected to improve water quality by reducing the concentrations of Total Suspended Solids and/or metals. However, additional treatment may be necessary for the groundwater to meet the applicable PWQO guidelines.

The purpose of sampling for PWQO metals and TSS are for the evaluation of the groundwater to discharge into the natural environment and/or into sewer systems in which municipal discharge water quality standards do not currently exist.

The contractor is responsible for designing and operating a treatment system for the collected discharge using their own methods to ensure compliance with the applicable standard. In particular, the contractor should be aware of the following parameters that may require additional treatment, depending on the discharge location selected:

- TSS
- Arsenic
- Aluminum
- Cobalt
- Copper
- Iron
- Lead
- Zinc
- Vanadium

Although Provincial Water Quality Objectives (PWQO) and interim PWQO are not legally binding standards, they serve as the foundation for establishing acceptable wastewater loading limits on a site-specific basis (such as the natural environment and/or sewer systems in which municipal discharge water quality standards do not currently exist). The Ontario Ministry of the Environment, Conservation and Parks (MECP) has acknowledged that applying PWQOs can pose challenges, especially in regard to the limits of PHCs and VOCs. These challenges include instances where PWQOs may fall below the laboratory limits of detection, or PWQOs may be more stringent than background concentrations (even in water bodies with apparently thriving aquatic ecosystems).

Should the quality groundwater discharged during dewatering exceed the PWQO, additional treatment measured from the dewatering contractor may be required before discharging to the natural environment is advisable and/or approved, and as such discharge to local sewers may be a more efficient option for groundwater discharge during dewatering operations.

If surface discharge is required, it is imperative to establish the natural background levels of parameters within nearby water bodies or features (such as the local creeks) before dewatering begins. Furthermore, continuous water quality monitoring should be conducted regularly during and after groundwater discharge activities.

Water Quality Monitoring and Potential Treatment Plan

The monitoring plan for discharge to the surface and/or sewers is outlined on Table H-1.

Groundwater Level Monitoring Program

The ground water level monitoring program is outlined on Table H-2.

Discharge Rate Monitoring

The total groundwater volume pumped must be measured and recorded daily by the dewatering contractor. The water taking rates should be measured using an electronic device, and the daily water volumes must be reported to MECP on the Water Taking and Reporting System (WTRS) or through the Regulatory Self Reporting System. The volume of water taken daily for each dewatered work area shall

be reported to the ministry on or before March 31 in each year, for each location from which water was taken in the previous calendar year. If no water is taken, then a “no taking” report must be entered.

The contractor will maintain a record of all water takings. This record will include the dates and duration of water takings, and the total measured volume of water pumped per day for each day that water is taken and will be updated and reported to the Client weekly. Daily precipitation must also be recorded by the contractor. The records must be kept up to date and available at or near the site and provided to the MECP upon request.

Summary of Qualifications

Aiden Belfrage, B.E.S.

Mr. Belfrage is a Hydrogeological Project Manager with 8 years of experience specializing in environmental, hydrogeological and geotechnical investigations. Mr. Belfrage’s environmental experience includes excess soil management, Phase One and Phase Two ESAs groundwater sampling, air sampling passive and active, sub slab vapor sampling, designated substance survey, near surface permeability testing, supervision of cleanup/remediation of soil and groundwater. His hydrogeological experience includes local and regional scale groundwater assessments, water budgets, supervising the installation, development, sampling and decommission of monitoring wells, in-situ borehole permeability testing, assessment of groundwater surface-surface water interactions, determination of ground water flow characteristics, execution of aquifer tests in water wells and preparation of hydrogeological reports. His experience in geotechnical investigations includes organization and execution of geotechnical subsurface investigations, material testing, laboratory testing and preparation of geotechnical reports.

Kim Pickett, M. Ed., C.E.T, LET

Ms. Pickett is an experienced project manager with over 20 years’ experience in both the public and private sectors. Ms. Pickett holds a Master of Education degree from Yorkville University, an undergraduate degree in Geoscience from McMaster University and a diploma in Environmental Engineering Technology from Confederation College. Ms. Pickett has been involved in numerous environmental projects and hydrogeological assessments. Ms. Pickett brings a strong balance of theoretical knowledge combined with practical on-site experience. Along with her technical abilities, Ms. Pickett is well versed in project management, proposal preparation and client liaison. In addition, due to various roles within a municipal setting, Ms. Pickett has significant experience with public consultation, public meetings, and liaising with stakeholders on a number of environmental and hydrogeological projects.

Russell Wiginton, P.Eng.

Mr. Wiginton is a senior geotechnical engineer at GEI. He has 14 years of experience in geotechnical and hydrogeological engineering, with exposure to materials testing and inspection and

environmental engineering. Mr. Wiginton has been a project manager and provided detailed geotechnical engineering services on a wide variety of projects in Ontario, including slope stability and erosion risk assessments, large commercial developments, building additions, and low and high-rise developments.

Date of Plan Preparation: This plan was prepared on the date June 9, 2026

Table H-1. Water Quality Monitoring Plan for Dewatering Discharge to Surface or Storm and/or Sanitary Sewers¹

Time Period	Monitoring Location	Parameters ²	Monitoring Frequency ³	Trigger for Mitigation	Mitigation Measures / Comments
Trial Dewatering or at the Start of Construction	Dewatering System Discharge	PWQO Metals and TSS	Once during trial dewatering or on the first day of dewatering (with rushed samples)	Exceeds the Applicable PWQO guidelines: - No - Yes – Proceed to Mitigation Measures / Comments	Modify treatment method and/or shut down.
	Upstream And Downstream Of Any Discharge Directed To Local Water Bodies / Water Courses	Turbidity	Daily until stable (minimum 5 samples) then weekly	Exceeds 8 NTU above the baseline levels: - No - Yes – Proceed to Mitigation Measures / Comments	Modify treatment method and/or shut down.
During Construction Dewatering	Dewatering System Discharge	PWQO Metals and TSS	Weekly then every four weeks after 3 consecutive weekly compliant samples	Exceeds the Applicable PWQO guidelines: - No - Yes – Proceed to Mitigation Measures / Comments	Modify treatment method and/or shut down.
	Upstream And Downstream Of Any Discharge Directed To Local Water Bodies / Water Courses	Turbidity	Daily until stable (minimum 5 samples) then weekly	Exceeds 8 NTU above the baseline levels: - No - Yes – Proceed to Mitigation Measures / Comments	
		Hydrocarbon sheen in discharge	Daily	Hydrocarbon sheen observed - No - Yes – Proceed to Mitigation Measures / Comments	Stop dewatering until the source can be determined and remediate prior to continuing to discharge.

Time Period	Monitoring Location	Parameters ²	Monitoring Frequency ³	Trigger for Mitigation	Mitigation Measures / Comments
		Total groundwater pumping / discharge rate	Daily with electronic device	Flows exceeds the permitted rate (e.g., due to heavy rainfall event) - No - Yes – Proceed to Mitigation Measures / Comments	Temporarily reduce pumping rate or shorten the length of trench being dewatered until rate drops below the permitted rate.
		Record the daily precipitation at the construction site	Daily	N/A	N/A
		Signs of erosion, sediment, or flooding	Daily	Sedimentation, erosion, flooding observed. - No - Yes – Proceed to Mitigation Measures / Comments	Reduce pumping and/or improve sediment/erosion control measures.
		Settlement / Subsidence of nearby land	Daily	Visual indication of settlement/subsidence - No - Yes – Proceed to Mitigation Measures / Comments	Reduce pumping and consult both dewatering contractor and geotechnical engineer
		N/A	N/A	Complaint received with respect to water taking and pertains to natural environment. - No - Yes – Proceed to Mitigation Measures / Comments	Document and evaluate if actually related to dewatering, implement mitigation measures. Submit complaint and mitigation measures to local MECP office

Notes: All items and observations during dewatering should be recorded in a log on site, accessible for inspection.

1. It is recommended that discharge be treated by a sediment control facility such as a decantation tank and filtration bags at a minimum. Means and methods determined by the contractor.

2. Parameters may be removed from future testing after three consecutive compliant results and with agreement by QP. If dewatering moves to a different location all initial parameters may need to be retested at the discretion of the QP. Additionally, at the discretion of the QP, parameter sets required to be sampled can be added or removed to reflect the planned/approved discharge location (such as sanitary sewer, storm sewer or to the natural environment, etc.). Additionally, parameters not applicable to the approved discharge location can be removed with the approval of the QP.
3. If dewatering moves to a different location or a non-compliant result is detected, the sampling may need to return to the initial frequency at the QP's discretion

Table H-2. Summarized Groundwater Level Monitoring Plan

Time Period	Monitoring Location	Method	Monitoring Frequency	Trigger for Mitigation	Mitigation Measures / Comments
Trial Dewatering or at the Start of Construction	On-Site Monitoring Wells Upstream And Downstream Of Any Discharge Directed To Local Water Bodies / Water Courses	Water Level Meter	At a minimum, once prior to dewatering	None.	Together with previous measurements establish baseline water levels.
During Construction	On-Site Monitoring Wells Upstream And Downstream Of Any Discharge Directed To Local Water Bodies / Water Courses	Water Level Meter	Every two weeks	Water level drops more than 2 m below the target dewatering elevation	Reduce pumping
Post-Construction	On-Site Monitoring Wells Upstream And Downstream Of Any Discharge Directed To Local Water Bodies / Water Courses	Water Level Meter	Every two weeks for four weeks, then every four weeks until 90% recovery	Water level recovery less than 90% of baseline level	Continue monitoring

Appendix J Groundwater Discharge Plan

Discharge Plan

This plan, as required under the Ontario Water Resources Act, Section 34 - 34.11 and Ontario Regulation (O.Reg.) 387/04 (Water Taking and Transfer) and/or O.Reg. 63/16 – Registration Under Part II.2 of the Act – Water Taking, provides a general outline of the discharge plan for the site to satisfy the EASR requirements and that a detailed plan will be generated as needed by the contractor and their dewatering subcontractor that will include detailed treatment and monitoring measures.

Based on the conditions at and around the site, the target receiver for any dewatering discharge will be the surface and that all dewatering discharge meets the appropriate chemistry and discharge flow requirements imposed for that system.

Ultimately the treatment and discharge method(s) employed during dewatering will be left up to the contractor and/or its dewatering contractor to determine.

It is noted that these dewatering estimates are considered preliminary and do not reflect any current plans for the site. The following values should be used for discussion and preliminary planning purposes only until site servicing plans and/or building basement or foundation designs are available.

Construction Dewatering Discharge Rate

The temporary-dewatering discharge rates were estimated in Section 5.1.3 and the details are summarized below.

Dewatering Zone		Construction Dewatering Flow Rate		
		As Calculated	Including FOS ¹	Including FOS and Rainfall Event ^{2,3}
		L/day		
1	General Site Servicing	25,276	50,553	60,553
2	Excavation for Northwestern SWM Pond	0	0	347,500
3	Largest Residential Block (Clayey Glacial Till)	22,211	44,421	320,021
4	Deep Sanitary Sewer invert at crossing	11,434	22,867	35,367
5	Deep Sanitary Sewer (Street 'B' x Street 'C')	11,955	23,909	36,409
6	Deep Sanitary Sewer (Street 'A' x Street 'X')	52,115	104,230	116,730
7	Deep Sanitary Sewer	99,679	199,358	211,858

Dewatering Zone		Construction Dewatering Flow Rate		
		As Calculated	Including FOS ¹	Including FOS and Rainfall Event ^{2,3}
		L/day		
	(Street 'A' x Street 'B')			
8	Deep Sanitary Sewer (Street 'B' x Street 'Y')	81,674	163,347	175,847

Notes:

1. A Factor of Safety (FOS) of 2.0 is included to account for seasonal fluctuations in the groundwater table, initial removal of groundwater from storage and variation in hydrogeological properties beyond those encountered during this study.
2. A 25 mm rainfall event was included in the water-taking calculation.
3. It is noted that under specific conditions, if the water taking is 100% storm water registration on the EASR may not be required, however if water taking consists of any mixture of storm water and groundwater typical registry or permitting is likely required.

Proposed Discharge Method and Location

It is understood that the preferred discharge location would be the surface. Dewatering discharge will be directed by hose or pipe from the dewatering system to any pre-treatment systems (such as a sediment tank and silt bag), and then by hose or pipe to the preferred discharge location.

In the event of a significant rainfall event (100-year storm event), on-site excavation will cease until the dewatering system can be re-evaluated and/or storm water flow subsides.

Erosion and Sediment Control Measures

The construction dewatering setup will include sediment and erosion control measures, and sufficient filtration to ensure removal of suspended solids prior to discharge in accordance with typical Best Management Practices and to be sufficient to meet relevant receptor requirements.

Statements

If discharge is directed to the surface with adherence to the water quantity and quality monitoring program outlined in the Water Taking Plan in Appendix I, no adverse effect on the environment is expected.

The discharge water temperature was considered in determining the method of transfer and discharge and is not expected to have an adverse impact.

Summary of Qualifications

Aiden Belfrage, B.E.S.

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air sampling passive and active, sub slab vapor sampling, designated substance survey, near surface permeability testing, supervision of cleanup/remediation of soil and groundwater. His hydrogeological experience includes local and regional scale groundwater assessments, water budgets, supervising the installation, development, sampling and decommission of monitoring wells, in-situ borehole permeability testing, assessment of groundwater surface-surface water interactions, determination of ground water flow characteristics, execution of aquifer tests in water wells and preparation of hydrogeological reports. His experience in geotechnical investigations includes organization and execution of geotechnical subsurface investigations, material testing, laboratory testing and preparation of geotechnical reports.

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Date of Plan Preparation: This plan was prepared on the date June 9, 2026

Appendix K Preliminary Water Balance Calculations

Pre-Development Water Balance

MONTHLY AND YEARLY WATER BALANCE COMPONENTS (PRE-DEVELOPMENT CONDITION)														
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Potential Evapotranspiration Calculation	Average Temperature: T (°C)	-7.0	-5.9	-1.4	6.1	12.4	17.3	19.9	19.1	14.3	8.1	2.1	-3.1	6.8
	Heat Index: $i=(T/5)^{1.514}$	0.00	0.00	0.00	1.35	3.96	6.55	8.10	7.61	4.91	2.08	0.27	0.00	34.8
	Unadjusted Daily Potential Evapotranspiration: U (mm)	0.0	0.0	0.0	28.9	60.8	86.3	100.0	95.8	70.7	38.9	9.4	0.0	490.8
	Adjusting Factor for U (Latitude 44 degrees N)	0.81	0.81	1.02	1.13	1.27	1.28	1.30	1.20	1.04	0.94	0.80	0.76	-
	Adjusted Potential Evapotranspiration - PET (mm)	0.0	0.0	0.0	32.6	77.3	110.5	130.0	114.9	73.5	36.5	7.5	0.0	582.9
Pervious Components	Precipitation: P (mm)	60.4	50.2	50.3	67	76.1	75.5	81.8	77.4	75	68.3	81.7	57.7	821.4
	Adjusted Potential Evapotranspiration: PET (mm)	0.0	0.0	0.0	32.6	77.3	110.5	130.0	114.9	73.5	36.5	7.5	0.0	582.9
	P - PET	60.4	50.2	50.3	34.4	-1.2	-35.0	-48.2	-37.5	1.5	31.8	74.2	57.7	238.5
	Change in Soil Moisture Storage (mm)	0.0	0.0	0.0	0.0	-1.2	-35.0	-48.2	-37.5	1.5	31.8	0.0	0.0	-
	Water Holding Capacity (max. mm)	75.0	75.0	75.0	75.0	73.8	38.9	0.0	0.0	1.5	33.3	75.0	75.0	-
	Water Surplus Available for Infiltration or Runoff	60.4	50.2	50.3	34.4	0.0	0.0	0.0	0.0	0.0	0.0	32.4	57.7	285.4
Impervious Components	Precipitation: P (mm)	-												821.4
	Potential Evaporation: PE (mm), Assume 15%	-												123.2
	Potential Surface Water Runoff: P - PE (mm)	-												698.2

PRE-DEVELOPMENT WATER BALANCE												
		Total Land Area (m ²)	Impervious Factor	Pervious Area (m ²)	Impervious Area (m2)	Infiltration Factor	Runoff Factor	Infiltration From Pervious Area (mm/annum)	Runoff From Pervious Area (mm/annum)	Runoff from Impervious Area (mm/annum)	Total Infiltration (m ³ /annum)	Total Runoff (m3/annum)
Existing Land Use (Pre-Development)	Meadow	30572.9	0%	30572.90	0.00	0.55	0.45	157.0	128.4	0.0	4799.7	3927.0
	Marsh Wetland	4609.0	0%	4608.99	0.00	0.75	0.25	214.1	71.4	0.0	986.7	328.9
	Tree cover on tablelands	27396.9	0%	27396.86	0.00	0.60	0.40	171.3	114.2	0.0	4692.1	3128.0
	Agriculture	592865.9	0%	592865.94	0.00	0.55	0.45	157.0	128.4	0.0	93074.8	76152.1
	Buildings/Residential	43046.3	64%	15496.68	27549.65	0.55	0.45	157.0	128.4	698.2	2432.8	21225.4
	TOTAL	698,491	4%	670,941	27,550	0.55	0.45	158	128	43	105,986	104,761

Notes

- Both potential infiltration and surface water runoff are independent of temperature
- Assumption is in January maximum soil moisture storage value is present (75mm)
- Water Holding Capacity & Infiltration Factors taken from Table 3.1 of MOE SWMPDM, 2003
- Average Temp. and Precip. taken from Environment Canada station

Pre-to-Post Development Water Balance

MONTHLY AND YEARLY WATER BALANCE COMPONENTS (PRE-DEVELOPMENT CONDITION)														
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Potential Evapotranspiration Calculation	Average Temperature: T (°C)	-7.0	-5.9	-1.4	6.1	12.4	17.3	19.9	19.1	14.3	8.1	2.1	-3.1	6.8
	Heat Index: $i=(T/5)^{1.514}$	0.00	0.00	0.00	1.35	3.96	6.55	8.10	7.61	4.91	2.08	0.27	0.00	34.8
	Unadjusted Daily Potential Evapotranspiration: U (mm)	0.0	0.0	0.0	28.9	60.8	86.3	100.0	95.8	70.7	38.9	9.4	0.0	490.8
	Adjusting Factor for U (Latitude 44 degrees N)	0.81	0.81	1.02	1.13	1.27	1.28	1.30	1.20	1.04	0.94	0.80	0.76	-
	Adjusted Potential Evapotranspiration - PET (mm)	0.0	0.0	0.0	32.6	77.3	110.5	130.0	114.9	73.5	36.5	7.5	0.0	582.9
Pervious Components	Precipitation: P (mm)	60.4	50.2	50.3	67	76.1	75.5	81.8	77.4	75	68.3	81.7	57.7	821.4
	Adjusted Potential Evapotranspiration: PET (mm)	0.0	0.0	0.0	32.6	77.3	110.5	130.0	114.9	73.5	36.5	7.5	0.0	582.9
	P - PET	60.4	50.2	50.3	34.4	-1.2	-35.0	-48.2	-37.5	1.5	31.8	74.2	57.7	238.5
	Change in Soil Moisture Storage (mm)	0.0	0.0	0.0	0.0	-1.2	-35.0	-48.2	-37.5	1.5	31.8	0.0	0.0	-
	Water Holding Capacity (max. 75 mm)	75.0	75.0	75.0	75.0	73.8	38.9	0.0	0.0	1.5	33.3	75.0	75.0	-
	Water Surplus Available for Infiltration or Runoff	60.4	50.2	50.3	34.4	0.0	0.0	0.0	0.0	0.0	0.0	32.4	57.7	285.4
Impervious Components	Precipitation: P (mm)													821.4
	Potential Evaporation: PE (mm), Assume 15%													123.2
	Potential Surface Water Runoff: P - PE (mm)													698.2

MONTHLY AND YEARLY WATER BALANCE COMPONENTS (POST-DEVELOPMENT CONDITION)														
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Potential Evapotranspiration Calculation	Average Temperature: T (°C)	-7.0	-5.9	-1.4	6.1	12.4	17.3	19.9	19.1	14.3	8.1	2.1	-3.1	6.8
	Heat Index: $i=(T/5)^{1.514}$	0.00	0.00	0.00	1.35	3.96	6.55	8.10	7.61	4.91	2.08	0.27	0.00	34.8
	Unadjusted Daily Potential Evapotranspiration: U (mm)	0.0	0.0	0.0	28.9	60.8	86.3	100.0	95.8	70.7	38.9	9.4	0.0	490.8
	Adjusting Factor for U (Latitude 44 degrees N)	0.81	0.81	1.02	1.13	1.27	1.28	1.30	1.20	1.04	0.94	0.80	0.76	-
	Adjusted Potential Evapotranspiration - PET (mm)	0.0	0.0	0.0	32.6	77.3	110.5	130.0	114.9	73.5	36.5	7.5	0.0	582.9
Pervious Components	Precipitation: P (mm)	60.4	50.2	50.3	67	76.1	75.5	81.8	77.4	75	68.3	81.7	57.7	821.4
	Adjusted Potential Evapotranspiration: PET (mm)	0.0	0.0	0.0	32.6	77.3	110.5	130.0	114.9	73.5	36.5	7.5	0.0	582.9
	P - PET	60.4	50.2	50.3	34.4	-1.2	-35.0	-48.2	-37.5	1.5	31.8	74.2	57.7	238.5
	Change in Soil Moisture Storage (mm)	0.0	0.0	0.0	0.0	-1.2	-35.0	-48.2	-37.5	1.5	31.8	0.0	0.0	-
	Water Holding Capacity (max. 75 mm)	75.0	75.0	75.0	75.0	73.8	38.9	0.0	0.0	1.5	33.3	75.0	75.0	-
	Water Surplus Available for Infiltration or Runoff	60.4	50.2	50.3	34.4	0.0	0.0	0.0	0.0	0.0	0.0	32.4	57.7	285.4
Impervious Components	Precipitation: P (mm)													821.4
	Potential Evaporation: PE (mm), Assume 15%													123.2
	Potential Surface Water Runoff: P - PE (mm)													698.2

Notes

- Both potential infiltration and surface water runoff are independent of temperature
- Assumption is in January maximum soil moisture storage value is present (75mm)
- Water Holding Capacity & Infiltration Factors taken from Table 3.1 of MOE SWMPDM, 2003
- Average Temp. and Precip. taken from Environment Canada station
Albion Field Center (6150103)
- Adjusting Factor for U based on Lorente, 1961

Pre-to-Post Development Water Balance

PRE- AND POST-DEVELOPMENT WATER BALANCE (NO MITIGATION)									
		Total Land Area (m ²)	Impervious Factor	Pervious Area (m ²)	Impervious Area (m ²)	Infiltration Factor	Runoff Factor	Infiltration (m ³ /year)	Runoff (m ³ /year)
Existing Land Use (Pre-Development)	Meadow	30572.9	0%	30572.90	0.00	0.55	0.45	4799.7	3927.0
	Marsh Wetland	4609.0	0%	4608.99	0.00	0.75	0.25	986.7	328.9
	Tree cover on tablelands	27396.9	0%	27396.86	0.00	0.60	0.40	4692.1	3128.0
	Agriculture	592865.9	0%	592865.94	0.00	0.55	0.45	93074.8	76152.1
	Buildings/Residential	43046.3	64%	15496.68	27549.65	0.55	0.45	2432.8	21225.4
	TOTAL	698,491	4%	670,941	27,550	0.55	0.45	105,986	104,761
Proposed Land Use (Post-Development Mitigation)	Single Detached 11.0 & 12.8 m	128100.0	64%	46116.00	81984.00	0.50	0.50	6581.6	63822.1
	Single Detached 9.15 m	41000.0	64%	14760.00	26240.00	0.50	0.50	2106.5	20427.0
	Street Townhouse 6.1 m	85500.0	79%	17955.00	67545.00	0.50	0.50	2562.5	49721.8
	Back-To-Back Townhouse 6.4 m	21500.0	79%	4515.00	16985.00	0.50	0.50	644.4	12503.1
	Rear Lane Townhouse 6.1 m	51000.0	79%	10710.00	40290.00	0.50	0.50	1528.5	29658.6
	Mixed-Use/Retail	11000.0	100%	0.00	11000.00	0.50	0.50	0.0	7680.1
	Public Elementary School	28300.0	79%	5943.00	22357.00	0.50	0.50	848.2	16457.6
	Neighbourhood Park	41000.0	7%	38130.00	2870.00	0.50	0.50	5441.9	7445.7
	Walkway Block	1000.0	7%	930.00	70.00	0.50	0.50	132.7	181.6
	Grading Buffer	400.0	7%	372.00	28.00	0.50	0.50	53.1	72.6
	Open Space	400.0	7%	372.00	28.00	0.50	0.50	53.1	72.6
	SWM Pond	13900.0	50%	6950.00	6950.00	0.55	0.45	1091.1	5745.1
	Greenbelt / NHS	66200.0	0%	66200.00	0.00	0.75	0.25	14172.0	4724.0
	Residential Reserve	6900.0	64%	2484.00	4416.00	0.50	0.50	354.5	3437.7
	Road Widening	8100.0	100%	0.00	8100.00	0.50	0.50	0.0	5655.3
	8.0 & 10.0 m Lanway	13300.0	75%	3325.00	9975.00	0.50	0.50	474.5	7439.0
	18.0 m Local R.O.W.	138600.0	75%	34650.00	103950.00	0.50	0.50	4945.2	77522.1
	20.0 m Local R.O.W.	13400.0	75%	3350.00	10050.00	0.50	0.50	478.1	7494.9
	23.5 m Local R.O.W.	20100.0	75%	5025.00	15075.00	0.50	0.50	717.2	11242.4
	26.0 m Local R.O.W.	8800.0	75%	2200.00	6600.00	0.50	0.50	314.0	4922.0
	TOTAL	698,500	62%	263,987	434,513	0.52	0.48	42,499	336,225
Proposed Land Use (Post-Development with Mitigation)	Single Detached 11.0 & 12.8 m	128100.0	64%	46116.00	81984.00	0.50	0.50	6581.6	63822.1
	Single Detached 9.15 m	41000.0	64%	14760.00	26240.00	0.50	0.50	2106.5	20427.0
	Street Townhouse 6.1 m	85500.0	79%	17955.00	67545.00	0.50	0.50	2562.5	49721.8
	Back-To-Back Townhouse 6.4 m	21500.0	79%	4515.00	16985.00	0.50	0.50	644.4	12503.1
	Rear Lane Townhouse 6.1 m	51000.0	79%	10710.00	40290.00	0.50	0.50	1528.5	29658.6
	Mixed-Use/Retail	11000.0	100%	0.00	11000.00	0.50	0.50	0.0	7680.1
	Public Elementary School	28300.0	79%	5943.00	22357.00	0.50	0.50	848.2	16457.6
	Neighbourhood Park	41000.0	7%	38130.00	2870.00	0.50	0.50	5441.9	7445.7
	Walkway Block	1000.0	7%	930.00	70.00	0.50	0.50	132.7	181.6
	Grading Buffer	400.0	7%	372.00	28.00	0.50	0.50	53.1	72.6
	Open Space	400.0	7%	372.00	28.00	0.50	0.50	53.1	72.6
	SWM Pond	13900.0	50%	6950.00	6950.00	0.55	0.45	1091.1	5745.1
	Greenbelt / NHS	66200.0	0%	66200.00	0.00	0.75	0.25	14172.0	4724.0
	Residential Reserve	6900.0	64%	2484.00	4416.00	0.50	0.50	354.5	3437.7
	Road Widening	8100.0	100%	0.00	8100.00	0.50	0.50	0.0	5655.3
	8.0 & 10.0 m Lanway	13300.0	75%	3325.00	9975.00	0.50	0.50	474.5	7439.0
	18.0 m Local R.O.W.	138600.0	75%	34650.00	103950.00	0.50	0.50	4945.2	77522.1
	20.0 m Local R.O.W.	13400.0	75%	3350.00	10050.00	0.50	0.50	478.1	7494.9
	23.5 m Local R.O.W.	20100.0	75%	5025.00	15075.00	0.50	0.50	717.2	11242.4
	26.0 m Local R.O.W.	8800.0	75%	2200.00	6600.00	0.50	0.50	314.0	4922.0
	Park Block LID	8800.0	31.8%	6000.00	2800.00	0.50	0.50	2811.2	-2811.2
	Pond Block LID	74000.0	81.6%	13600.00	60400.00	0.50	0.50	33083.7	-33083.7
	TOTAL	698,500	62%	263,987	434,513	0.52	0.48	78,394	300,330

SUMMARY				
	Infiltration		Runoff	
	m ³ /year	%	m ³ /year	%
Pre-to-Post Change Without Mitigation	-63,487	-60	+ 231464	+ 221
Required to Meet Pre-Development Conditions	+ 63487	-	-231,464	-
Pre-to-Post Change With Mitigation	-27,592	-26	+195569	+187

- Notes
- Both potential infiltration and surface water runoff are independent of temperature
 - Assumption is in January maximum soil moisture storage value is present (75mm)
 - Water Holding Capacity & Infiltration Factors taken from Table 3.1 of MOE SWMPDM, 2003
 - Average Temp. and Precip. taken from Environment Canada station
Albion Field Center (6150103)
 - Adjusting Factor for U based on Lorente, 1961