TIL TorontoInspection LTD.
GEO-ENVIRONMENTAL CONSULTANTS

PRELIMINARY HYDROGEOLOGICAL INVESTIGATION
181 TORONTO STREET SOUTH
UXBRIDGE, ONTARIO

REPORT NO.: 5555-21-HD
REPORT DATE: APRIL 19, 2022

PREPARED FOR:
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1 Introduction

1.1 Project Background

Toronto Inspection Ltd. (TIL) was retained by Man Holdings Ltd. (the Client) to conduct a hydrogeological investigation for the property at 181 Toronto Street South in the Township of Uxbridge, Ontario (the Site).

The physical address of the Site is as follows:

181 Toronto Street South,
Uxbridge, Ontario L9P 1R1

The Site is owned by the Client. Relevant information of the Client is as follows:

174 Dinnick Crescent,
Toronto, Ontario M4N 1M3

Based on a review of the Conceptual Site Plan prepared by John G. Williams Ltd. Architect (JGW) dated February 23, 2022, the proposed development at the Site consists of two, 3-storey buildings with a total of ten townhouse units, an amenity space to the south, and a laneway and parking area to the east. Each building is also understood to have a basement level which is assumed to extend to approximately 2.5 metres below ground surface (mbgs) (8 ft). The Site will connect to municipal water and wastewater services on Toronto Street South. The Conceptual Site Plan prepared by JGW (2022) is provided in **Appendix A**.

1.2 Site Description

The Site is located immediately east of Toronto Street South, west of Fred Barnard Way, and approximately 50 m south of the intersection of these two roads. The Site covers an area of approximately 0.515 ha and near rectangular in shape. The Site is currently vacant and covered by grass, weeds, and scattered trees. Land uses adjacent to the Site include residential.

The location of the Site is shown in **Figure 1**.

1.3 Objectives of the Hydrogeological Investigation

The objectives of this hydrogeological investigation were to identify regulations applicable to the development of the Site, characterize the existing geological and hydrogeological conditions at the Site, identify dewatering requirements for the during and post-construction phases, and quantify potential impacts to underlying aquifers and surrounding receptors resulting from construction and potential dewatering activities.

1.4 Scope of Work

1.4.1 Conceptual Understanding

A conceptual understanding of the regional and local geological and hydrogeological systems was developed through the review of existing reports and available geological information. The reviewed data included the following:

- Mapping and reports by Lake Simcoe Region Conservation Authority (LSRCA);
- Geological information from Ontario Geological Survey (OGS);
- Geological and hydrogeological data from the Oak Ridges Moraine Groundwater Program (ORMGP);
- Mapping from Ontario Ministry of Natural Resources and Forestry (MNRF);
- Source water protection information for the Lake Simcoe Source and Couchiching-Black River Source Protection Region;
- Ministry of the Environment, Conservation, and Parks (MECP) Water Well Information System (WWIS) and Permit to Take Water (PTTW) Databases; and
- Geotechnical Investigation Report for 181 Toronto Street South, Uxbridge, ON prepared by TIL dated May 11, 2021.

1.4.2 Field Investigation

The local scale geological and hydrogeological settings of the Site were characterized using a network of eight boreholes drilled by TIL in April of 2021. Boreholes were completed to depths ranging from 6.55 mbgs to 6.71 mbgs.

Monitoring wells were installed in three of the boreholes completed at the Site. Monitoring wells were constructed of 0.51 m (2 inch) diameter polyvinyl chloride (PVC) riser pipe and 3.05 m (10 foot) long slotted screen, to a depth of 6.10 mbgs. The monitoring wells constructed on-Site were be used to measure groundwater levels, to collect representative groundwater quality samples, and to conduct in-situ single well response testing.

Monitoring wells were installed according to the relevant provisions of Reg. 903 by a licensed drilling contractor with TIL field staff in attendance. Once it is determined that monitoring wells installed on the Site are no longer required, they should be decommissioned by a licensed well contractor as per Reg. 903.

1.4.3 Data Analysis

The data analysis component of this study included the following items:

- Determination of soil stratigraphy and hydrostratigraphy;
- Determination of groundwater elevations;
- Determination of the hydraulic conductivity of soils;
- Assessment of groundwater quality,
- Evaluation of potential dewatering requirements during and after construction; and
- Evaluation of potential impacts to surrounding receptors within the anticipated dewatering and construction zones of influence.

2 Relevant Regulations and Policies

Environmental regulations and policies, which may be relevant to the development of the Site, are listed below and discussed briefly:

- Township of Uxbridge Official Plan – Office Consolidation January 2014;
- The Regional Municipality of Durham Official Plan – Office Consolidation May 2020;
- The Regional Municipality of Durham Sewer Use By-Law No. 55-2013;
- LSRCA Watershed Development Guidelines (Reg. 179/06)
- Lake Simcoe Protection Plan (2009);
- Ontario Water Resource Act (1990);
- Reg. 387/04: Water Taking and Transfer;
- The Clean Water Act (2006); and
- South Georgian Bay Lake Simcoe Source Protection Plan (2021).

Township of Uxbridge Official Plan

The Township of Uxbridge (the Town) Official Plan identifies development and land-use objectives within the Town and conforms to Durham Region's Official Plan. Based on the Official Plan mapping Schedule 'A', the Site falls within a Residential Area.

The Site is located in the Oak Ridges Moraine planning area. The Town's Official Plan was brought into conformity with the Oak Ridges Moraine Conservation Plan (ORMCP) (Reg. 140/02), as required by the Oak Ridges Moraine Conservation Act, 2001. Based on a review of the Oak Ridges Moraine Conservation Plan Land Use Designation Map, the Site falls within the Settlement Area. Per the Town's Official Plan mapping Schedule 'B', the southern tip of the Site falls within the Significant Woodlands area, and the southern portion and eastern tip of the Site are located within the Minimum Vegetation Protection Zone.

The Regional Municipality of Durham Official Plan

The Regional Municipality of Durham (Durham Region) Official Plan identifies development and land-use objectives for the long-term growth of Durham Region. Based on a review of the Official Plan mapping Schedule 'A' – Map 'A2', the Site is located within the Living Areas of the Region's Urban Area.

Durham Region Sewer Use By-Law Number 55-2013

Durham Region, under the provisions and powers of *Sewer Use By-Law Number 55-2013*, is responsible for managing sewer discharges that enter the Region's land drainage works or sewer system. Should a sewer extension be approved and installed, any private water on the Site requiring discharge to the Region's sewer systems, will require approval from Durham Region prior to discharge and discharge must meet water quality limits under *Sewer Use By-Law Number 55-2013.* Durham Region will review short-term and long-term discharge plans, discharge water quality, and estimated flows to determine if sewers can accommodate the proposed private water discharge flows.

LSRCA Policies and Regulations (Reg. 179/06)

Under Section 28 of the Conservation Authorities Act, the local conservation authorities are mandated to protect the health and integrity of the regional greenspace system and to maintain or improve the hydrological and ecological functions performed by valley and stream corridors. The Lake Simcoe Region Conservation Authority (LSRCA), through its regulatory mandate, is responsible for issuing permits under Ontario Regulation (Reg.) 179/06, Development, Interference with Wetlands and Alterations to Shorelines and Watercourses for development proposals or site alteration work within the LSRCA regulated areas.

A preliminary review indicates that the Site falls within an LSRCA regulated area which is associated with a nearby watercourse approximately 100 m to the east. The watercourse traverses through the Uxbridge Brook Headwater Wetland Complex, which is a Provincially Significant Wetland. Any development of land within the LSRCA regulated area requires a permit under Reg. 179/06.

Lake Simcoe Protection Plan

The Lake Simcoe Protection Plan (LSPP) was prepared following the establishment of the Lake Simcoe Protection Act in 2008. The objective of the Lake Simcoe Protection Act and of the LSPP, is to safeguard the ecological health and function of Lake Simcoe and its tributaries. Among other goals, the LSPP requires applications for major development (> 500 m^2 impervious area) within the Lake Simcoe Watershed to provide a stormwater management plan accompanied by a climate-based water balance and a phosphorus balance to evaluate, where applicable, the post-construction infiltration deficit and increases to phosphorus loadings to Lake Simcoe, respectively.

As per the requirements of the LSPP, a climate-based water balance analysis and phosphorus balance analysis have been included as components of this hydrogeological investigation to:

- Evaluate the pre- and post-development water balance, and demonstrate how any changes to the water balance will be minimized; and
- Evaluate the pre- and post-development phosphorus loadings and demonstrate how any changes to the phosphorus balance will be minimized.

In light of the above-listed development requirements, the LSRCA developed and implemented the Water Balance Recharge Policy for the Lake Simcoe Protection Plan (LSRCA, 2021a) and the Phosphorus Offsetting Policy (LSRCA, 2021b) which further refine the requirements on major development in the Lake Simcoe Watershed and provide options for compensation where an infiltration deficit or phosphorous surplus following new major development may be realized.

It is our understanding that the water balance study and phosphorus budget analysis are being completed by Counterpoint Engineering and that the results of these assessments have indicated a resultant infiltration surplus when considering on-Site infiltration and only a small residual phosphorus loading which may require offsetting compensation. Further information and conclusions of the water balance analysis and phosphorus budget analysis completed for the development Site may be referenced from the Stormwater Management Report prepared by Counterpoint Engineering.

Ontario Water Resource Act (1990)

Under Section 34 of the OWRA, a PTTW is required from the MECP for any water taking that is greater than 50,000 L/day. For construction site dewatering or road construction, water takings of more than 50,000 L/day but less than 400,000 L/day may be registered on the Environmental Activity and Sector Registry (EASR) under O.Reg. 63/16: *Registrations Under Part II.2 of the Act – Water Taking*. Water takings during construction that will exceed more than 400,000 L/day will require a PTTW issued by the MECP as will water takings post-construction that will exceed 50,000 L/day.

O.Reg. 387/04: Water Taking and Transfer Regulation

O.Reg. 387/04 under the OWRA outlines prohibited water taking and transfer activities, which must be evaluated by the MECP prior to issuing a PTTW or applicants who are self-registering on the EASR. The regulation also clarifies which activities are exempt from water taking permit requirements and outlines the data collection and reporting commitments for PTTW and EASR registration holders. Any water taking activity that is regulated by the OWRA will need to be undertaken in accordance with O.Reg. 387/04.

The Clean Water Act (2006)

The MECP mandates the protection of existing and future sources of drinking water under the Clean Water Act, 2006 (CWA). Initiatives under the CWA include the delineation of vulnerable areas for drinking water quality, i.e., Wellhead Protection Areas (WHPAs), Significant Groundwater Recharge Areas (SGRAs), Intake Protection Zones (IPZs) and Highly Vulnerable Aquifers (HVAs); and drinking water quantity, i.e., WHPA-Q1, WHPA-Q2 and IPZ-Q. Additionally, Source Protection Plans are developed under the CWA outlining the restriction, regulation, and prohibition of certain land use activities within vulnerable drinking water quality/quantity areas. A brief discussion of the Approved Source Protection Plan is provided in the next section.

Based on a review of the MECP Source Water Protection Information Atlas (MECP, 2022a), the Site falls within the Lake Simcoe and Couchiching/Black Area of the South Georgian Bay Lake Simcoe (SGBLS) Source Protection Region (SPR). The entire Site is found to be located within the following vulnerable drinking water areas (MECP, 2022a):

- WHPA-Q1 and WHPA-Q2;
- HVA;
- IPZ-3; and
- WHPA-D.

Land use policies per the Approved Source Protection Plan would apply for the Site. No prohibitive development policies are anticipated to apply for the proposed future residential uses of the Site. The mapped vulnerable drinking areas are illustrated in **Figure 11**.

South Georgian Bay Lake Simcoe Source Protection Plan

This South Georgian Bay Lake Simcoe Source Protection Plan (SPP) describes the processes for source protection planning for the South Georgian Bay Lake Simcoe Source Protection Region and outlines the actual policies to be implemented as part of the CWA. Within the South Georgian Bay Lake Simcoe Source Protection Region, various policies have been put in place under the SPP to manage and regulate threats to drinking water quality and quantity. The local municipalities and regional government bodies are required under the CWA to implement the SPPs within their jurisdictions and integrate them into planning policies and activities.

Based on a review of the MECP Source Water Protection Information Atlas, the Site falls within the Lake Simcoe and Couchiching/Black River Source Protection Area (SPA) within the South Georgian Bay Lake Simcoe Source Protection Region.

3 Regional Geological and Hydrogeological Understanding

3.1 Topography and Drainage

Regional topography slopes from the topographic highs associated with the Oak Ridges Moraine to the south, to the topographic lows of the Lake Simcoe shoreline in the north. The majority of the Site gradually slopes towards the northeast, falling from 279 masl to 277 masl. A topographic map of the Site and surrounding area is shown in **Figure 2**.

The Site is located within the Perfferlaw-Uxbridge Brook Subwatershed which has an approximate drainage area of 466.2 km^2 and is located in the Lake Simcoe Watershed,. The subwatershed traverses a distance of approximately 77 km from its headwaters in the wetland areas of the southern flank of the Oak Ridges Moraine to its discharge into Lake Simcoe in the north (LSRCA, 2012).

A tributary of Uxbridge Brook is located approximately 100 m east of the Site, draining towards Pefferlaw River and ultimately to Lake Simcoe. The tributary traverses through the Uxbridge Book Headwater Wetland Complex which extends from the south to the north through the town of Uxbridge. The Uxbridge Brook Headwater Wetland Complex is a registered PSW according to the Ontario Wetland Evaluation System (OWES). The hydrologic features are illustrated in **Figure 10**.

3.2 Physiography

The Site is located within the Oak Ridges Moraine (ORM) physiographic Region. The ORM was deposited approximately 12,000 to 13,000 years before present (B.P.) and is a prominent geological feature within the Perfferlaw-Uxbridge Brook Subwatershed. The deposits of the ORM generally consist of layers of sand and gravel (Chapman and Putnam, 1984). Off of the topographic highs of the ORM and within the subwatershed, the physiography is described as consisting of surficial sand and gravel deposits, however, select areas may be characterized by thick deposits of silt covered in places by a relatively thin layer of till (LSRCA, 2012).

A physiographic map of the Site and the surrounding area is shown in **Figure 3**.

3.3 Surficial Geology

Surficial geology mapping by the OGS (2010), indicates that the Site may be primarily underlain by older alluvial deposits. Those alluvial deposits may consist of a range of material textures the and sizes, including gravels, sands, silts, and clays deposited in the floodplain of the nearby watercourse.

The regional surficial geology of the Site and the surrounding area is presented in **Figure 4**.

3.4 Bedrock Geology

Regional geological mapping from the OGS (Armstrong and Dodge, 2007), indicates that shale bedrock of the Blue Mountain Formation underlies the overburden soils in this area. The top of bedrock elevation is approximately at 177 masl, which is approximately 100 mbgs (ORMGP, 2022).

The regional bedrock geology of the Site and the surrounding area is presented in **Figure 5.**

3.5 Hydrogeology

The current understanding of the regional hydrogeology is based on work completed for the York, Peel, Durham, Toronto and The Conservation Authorities Moraine Coalition (YPDT-CAMC) as part of the ORMGP. The following discussion is based on information provided by Earthfx Inc. (2010) and the ORGMP (2022).

3.5.1 Hydrostratigraphy

The following hydrostratigraphic units overlie the bedrock (from youngest to oldest) in the area of the Site:

A. Recent Deposits
B. Halton Till (Aquitard)
C. Oak Ridges Moraine (Aquifer)
D. Newmarket Till (Aquitard)
E. Thorncliffe Formation (Aquifer)
F. Sunnybrook Drift (Aquitard)
G. Scarborough Formation (Aquifer)

The regional hydrostratigraphy is depicted on a west to east cross-section along Brock Street West, in **Figure 6**. The section is offset from the Site by approximately 1.5 km north. A description of each hydrostratigraphic unit is provided below.

- **Recent Deposits** – This unit consists of a thin veneer of glaciolacustrine deposits of fine sands, silts, and clays or modern alluvial or organic deposits. Locally, recent deposits can reach several meters thick, however; at the Site this unit is interpreted to be present in limited amounts.

- **Halton Till** – The Halton Till was deposited approximately 13,000 years before present (B.P.) during the last glacial advance in the area. The Halton Till is comprised of sandy silt till to clayey silt till. The Halton Till is not expected to be present at the Site.

- **Oak Ridges Moraine** – The Oak Ridges Moraine Aquifer was deposited approximately 12,000 to 13,000 years B.P. Regionally, the aquifer is 160 km long and 5 to 20 km wide with a thickness of approximately 150 m. The unit consists of fine sands and silt materials, with coarse sand and gravel occurring locally. Based on ORMGP mapping, the characteristic deposits of the Oak Ridges Moraine Aquifer are not expected to be present at the Site.

- **Newmarket Till** – The Newmarket Till was deposited by the Laurentide ice sheet approximately 18,000 to 20,000 years B.P. It consists of mainly sandy silt to silty sand with limestone clasts and north of the ORM may be differentiated by 3 distinct hydrostratigraphic sequences, including upper till deposits; an intermediate assembly of coarser-grained sands and silts; and finally a lower till deposits. The Newmarket Till formation within the study area, like many other areas of southern Ontario, is marked by a period of glaciofluvial erosion which has incised deep grooves into the formation. The grooves were subsequently infilled by a fining-upward sequence of alluvial deposits which today comprise "tunnel channels". In the area of the Site, tunnel channel silts have been mapped in the area of the Site but are considered hydrostratigraphically equivalent to the lower till deposits. The Newmarket Till formation is expected to be encountered below the fill encountered at the Site.

- **Thorncliffe Formation** – The Thorncliffe Formation was deposited approximately 45,000 years B.P. and consists of glaciofluvial deposits of sand and silty sand. Regionally, it acts as an aquifer with variable grain size and thickness. The Thorncliffe formation is estimated to be encountered at 235 - 239 masl at the proposed development area at the Site.
- **Sunnybrook Drift** – The Sunnybrook Drift was deposited approximately 45,000 years B.P. It is interpreted to be a silt and clay formation with a thickness of 10 m to 20 m, where present. The Sunnybrook Drift is expected to be encountered at 209 masl at the proposed development area at the Site.
- **Scarborough Formation** – The Scarborough Formation was deposited during the Wisconsin glaciation approximately 70,000 years to 90,000 years B.P. The Scarborough Formation is an aquifer of regional extent and it is interpreted to be a fluvial-deltaic system consisting of sand, silt, and clay deposits. The Scarborough Formation is estimated to be encountered at 194 masl at the proposed development at the Site.

3.5.2 Regional Groundwater Flow

At a regional scale, groundwater flows from the topographic highs associated with the Oak Ridges Moraine, south of the Site, towards Lake Simcoe in the north. Shallow groundwater flow in the subwatershed may be influence by surface water features such as watercourses and wetlands where there is groundwater discharge. Areas nearby municipal groundwater wells may be locally influenced at times by the operation of the groundwater well.

4 Local Geology and Hydrogeology

The current understanding of the Site geology and hydrogeology is based on the geotechnical and hydrogeological investigations conducted by TIL in 2021 and 2022.

4.1 Overburden

The overburden encountered during TIL's drilling program was as follows: disturbed soil up to a depth of 0.2 mbgs, followed by fill to a depth of up to 2.5 mbgs, and silty sand deposits to the terminal depth of investigation at 6.71 mbgs. Layers of gravelly sand were observed at 21BH-4 and 21BH-6 within the silty sand deposit, between 2.3 mbgs and 3.7 mbgs. For a detailed description of soil stratigraphy encountered in all boreholes completed at the Site, reference should be made to the borehole logs from TIL's concurrent geotechnical investigation which are attached in **Appendix B**.

4.2 Bedrock

Bedrock was not encountered at the terminal depth of 6.71 mbgs. Bedrock is expected to be encountered at approximately 177 masl (100 mbgs).

4.3 Groundwater Conditions

4.3.1 On-Site Monitoring Network

Monitoring well locations are illustrated together with static water level elevations from a monitoring event on March 16, 2021, in plan view and in a south to north oriented cross-section in **Figure 7** and **Figure 8**, respectively. A summary of the monitoring well construction details is provided in **Table 4-1**.

Table 4-1 Monitoring Well Construction Details

Well ID	Ground Elevation	Screen Interval	Well Diameter	Screen Length	Screened Unit
	(masl)	(mbgs / masl)	(m)	(m)	
21BH-1 (MW)	278.99	2.70 – 5.75 /276.29 - 273.24	0.051	3.048	Silty Sand
21BH-4 (MW)	278.71	2.89 – 5.90 / 275.86 – 272.81	0.051	3.048	Sand
21BH-8 (MW)	277.39	2.95 - 6.00 / 274.44 - 271.39	0.051	3.048	Silty Sand

4.3.2 Groundwater Levels

A summary of static water level measurements is presented in **Table 4-2** in mbgs and in **Table 4-3** in masl, respectively. Groundwater level measurements are presented for October of 2021 to March of 2022. A long-term groundwater level monitoring program is currently underway at the Site to measure and record spring water levels which may be representative of seasonal high groundwater table elevations at the Site.

Considering the groundwater elevations recorded on March 16, 2022, the groundwater table ranged in elevation from a low of 274.91 masl (2.48 mbgs) in 21BH-8 (MW) in the north corner of the Site, to a high of 276.19 masl (2.80 mbgs) in 21BH-1 (MW) in the south corner of the Site. Groundwater table elevations measured to date have identified a consistently downward sloping gradient in the groundwater table from south to north on the Site.

It should be noted that the shallow groundwater table at the Site will fluctuate coincidentally with seasonal trends in precipitation and snowmelt, which both supply recharge to the groundwater system. Correspondingly, the groundwater table is typically highest in the spring, when recharge is higher, and lowest in the summer and late fall/early winter, when recharge is comparatively lower. Variability in groundwater levels is Site-specific and is influenced by several factors, including geography, underlying soil types and their hydraulic properties, and connectivity to surrounding surface water features. The interpretation of groundwater levels may be further refined based on information collected over the period of long-term monitoring.

The results of groundwater level monitoring should be considered in the design and construction of the Low Impact Development (LID) features designed for infiltration where typically a 1 m separation from the seasonal high groundwater table is required. Further, the design should incorporate the results of in-situ infiltration testing conducted at the proposed elevation of infiltration from LIDs to confirm the infiltration capacity of native deposits at those elevations. Typically, an unfactored infiltration rate of 15 mm/hr is considered the minimum which is appropriate for effective infiltration within a 24-48 hour period.

Table 4-2 Groundwater Levels (mbgs)

Well ID	Screen Interval	25-Oct-21	7-Jan-22	16-Mar-22
	(mbgs)	(mbgs)	(mbgs)	(mbgs)
21BH-1 (MW)	2.70 – 5.75	2.92	2.85	2.80
21BH-4 (MW)	2.89 – 5.90	2.82	2.77	2.72
21BH-8 (MW)	2.95.- 6.00	2.54	2.53	2.48

Note – water levels measured from existing ground surface

Table 4-3 Groundwater Elevations (masl)

Well ID	Screen Interval	7-Dec-20	5-Jan-21	16-Mar-22
	(masl)	(masl)	(masl)	(masl)
21BH-1(MW)	276.29 - 273.24	276.07	276.14	276.19
21BH-4(MW)	275.86 – 272.81	275.89	275.94	275.99
21BH-8(MW)	274.44 - 271.39	274.85	274.86	274.91

4.3.3 Hydraulic Conductivity

Single well hydraulic response testing (slug testing) in the form of rising-head tests was conducted at all installed monitoring wells in October of 2021, to measure the in-situ hydraulic conductivity (K) of the screened overburden materials. Prior to testing, each well was developed in order to mitigate the influence of native, near-well materials disturbed during the drilling program.

During the rising head test, a pseudo-instantaneous drop in the water level was achieved by extracting water from the well using a manual inertial pump. The water level recovery was measured by a datalogger taking readings at pre-programmed intervals. Recovery levels were recorded by the data logger every 10 seconds, 60 seconds, and 3600 seconds for the first minute, following hour, and each successive hour thereafter, respectively. For the purposes of concluding the test, water level recovery to at or above approximately 85% of the pre-test water column was considered sufficient.

The hydraulic conductivity was estimated using the Hvorslev (1951) method with the data recorded by the dataloggers. Grain size analyses were performed on 21BH-2 and 21BH-3, and from these analysis the hydraulic conductivity was estimated using the Hazen (1911) method. The corresponding analyses are presented in **Appendix C**. A summary of hydraulic conductivities is presented in **Table 4-4**.

Table 4-4 Summary of Hydraulic Conductivity Calculations

Well ID	Screen Interval / Grainsize Sample Depth (mbgs/masl)	Material Tested	Hvorslev Method K (m/s)	Hazen Method K (m/s)
21BH-1(MW)	2.70 – 5.75 /276.29 - 273.24	Silty Sand	6.6×10^{-7}	
	3.0 / 275.99			1.6×10^{-5}
21BH-4(MW)	2.89 – 5.90 / 275.86 – 272.81	Sand	9.8×10^{-7}	-
21BH-8(MW)	2.95 - 6.00 / 274.44 - 271.39	Silty Sand	7.0×10^{-7}	-

Notes:

1. – indicates test not applicable.

The results of the in-situ hydraulic conductivity testing showed that the hydraulic conductivity of the screened silty sand and sand materials ranges from 4.1×10^{-7} m/s to 9.8×10^{-7} m/s with a geometric mean of 7.7×10^{-7} m/s. The results of grainsize correlation from a sample collected in the screen interval of 21BH-1 (MW) was 1.6×10^{-5} m/s. The Hazen (1911) method provides an estimate of the isotropic permeability of the fine-grained fraction (D10) of a disturbed soil sample; therefore, it should be understood that results from this analysis may not have strong correlation to results of in-situ testing. The range from both in-situ testing and estimates from grain-size analysis for hydraulic conductivity fall within the expected values for sandy silt material, which can vary between 10^{-3} and 10^{-7} (Freeze and Cherry, 1979).

Based on the findings of this analysis, where the sandy silt and sand materials are saturated below the groundwater table, the bulk hydraulic conductivity of these materials can be considered approximately equivalent to the geometric mean hydraulic conductivity of in-situ testing, which was 7.7×10^{-7} m/s.

4.3.4 Groundwater Flow

Based on the water levels observed on-Site, the direction of local groundwater flow is considered to be to the north. The interpretation of groundwater flow direction may be further refined based on information collected over the period of long-term monitoring.

4.3.5 Groundwater Quality

Unfiltered groundwater quality samples were collected from 21BH-4 (MW) on October 25, 2021. The collected samples were sent to SGS Environmental Services (SGS), in Lakefield, Ontario for analysis. The sample results were compared to Durham Region By-Law Number 55-2013, Table 1 – Limits for Sanitary Sewer Discharge and Table 2 – Limits for Storm Sewer Discharge in **Table 4-5**. The laboratory certificates of analyses are provided in **Appendix D**.

Based on laboratory analyses, no parameters failed the discharge criteria outlined in *Table 1 Sanitary Sewer Limits* of the *Durham Region By-Law Number 55-2013*. However, the groundwater quality of the parameters analyzed exceeded the criteria for Total Kjeldahl Nitrogen (TKN) and Total Manganese of *Table 2 Storm Sewer Limits* of the *Durham Region By-Law Number 55-2013.*

Table 4-5 Groundwater Quality Results

Sample ID	Units	Durham By-law 55-2013 Table 1 (Sanitary) Limit	Durham By-law 55-2013 Table 2 (Storm) Limit	RL	21BH-4 (MW) 25-Oct-21
E. Coli	cfu/100mL	---	200		< 2
pH	No unit	6.0-10.5	6.0-9.0		6.94
Biochemical Oxygen Demand (BOD5)	mg/L	300	15	2	< 4
Total Suspended Solids	mg/L	350	15	2	14
Oil & Grease (animal/vegetable)	mg/L	150	---	4	< 4
Oil & Grease (mineral/synthetic)	mg/L	15	---	4	< 4
4AAP-Phenolics	mg/L	1	0.008	0.002	0.004
Total Kjeldahl Nitrogen	as N mg/L	100	1	0.5	4.0
Sulphate	mg/L	1500	---	2	41
Cyanide (total)	mg/L	2	0.02	0.01	< 0.01
Fluoride	mg/L	10	---	0.06	< 0.06
Mercury (total)	mg/L	0.01	0.004	0.00001	< 0.00001
Aluminum (total)	mg/L	50	---	0.001	0.010
Antimony (total)	mg/L	5	---	0.0009	< 0.0009
Arsenic (total)	mg/L	1	0.02	0.0002	0.0046
Cadmium (total)	mg/L	0.7	0.008	0.000003	0.000006
Chromium (total)	mg/L	2	0.08	0.00008	0.00091
Cobalt (total)	mg/L	5	---	0.000004	0.00285
Copper (total)	mg/L	3	0.05	0.0002	0.0005
Lead (total)	mg/L	1	0.12	0.00001	0.00010
Manganese (total)	mg/L	5	0.15	0.00001	3.45
Molybdenum (total)	mg/L	5	---	0.00004	0.00021
Nickel (total)	mg/L	2	0.08	0.004	0.0046
Phosphorus (total)	mg/L	10	0.4	0.003	0.016

Sample ID	Units	Durham By-law 55-2013 Table 1 (Sanitary) Limit	Durham By-law 55-2013 Table 2 (Storm) Limit	RL	21BH-4 (MW) 25-Oct-21
Selenium (total)	mg/L	1	0.02	0.00004	0.00009
Silver (total)	mg/L	5	0.12	0.00005	0.00009
Tin (total)	mg/L	5	---	0.02	0.00013
Titanium (total)	mg/L	5	---	0.00005	0.00048
Zinc (total)	mg/L	2	0.04	0.002	< 0.002
Polychlorinated Biphenyls (PCBs) - Total	mg/L	0.001	0.0004	0.0001	< 0.0001
Benzene	mg/L	0.01	0.002	0.0005	< 0.0005
Chloroform	mg/L	0.04	0.002	0.0005	< 0.0005
1,2-Dichlorobenzene	mg/L	0.05	0.0056	0.0005	< 0.0005
1,4-Dichlorobenzene	mg/L	0.08	0.0068	0.0005	< 0.0005
cis-1,2-Dichloroethene	mg/L	4	0.0056	0.0005	< 0.0005
trans-1,3-Dichloropropene	mg/L	0.14	0.0056	0.0005	< 0.0005
Ethylbenzene	mg/L	0.16	0.002	0.0005	< 0.0005
Methylene Chloride	mg/L	2	0.0052	0.0005	< 0.0005
1,1,2,2-Tetrachloroethane	mg/L	1.4	0.017	0.0005	< 0.0005
Tetrachloroethylene (perchloroethylene)	mg/L	1	0.0044	0.0005	< 0.0005
Toluene	mg/L	0.27	0.002	0.0005	< 0.0005
Trichloroethylene	mg/L	0.4	0.008	0.0005	< 0.0005
Xylene (total)	mg/L	1.4	0.0044	0.0005	< 0.0005
Methyl ethyl ketone	mg/L	8	---	0.02	< 0.02
Styrene	mg/L	0.2	---	0.0005	< 0.0005
Nonylphenol	mg/L	0.02	---	0.001	< 0.001
Nonylphenol Ethoxylates	mg/L	0.2	---	0.01	< 0.01
di-n-Butyl Phthalate	mg/L	0.08	0.015	0.002	< 0.002
Bis(2-ethylhexyl)phthalate	mg/L	0.012	0.0088	0.002	< 0.002

Notes:

1. RL: the laboratory reportable limit for the analysis
2. Yellow shaded cells indicate an exceedance of Durham Region By-Law 55-2013, Table 2 criteria;

5 Calculation of Dewatering Rates and Estimation of Zone of Influence

Dewatering rates were estimated based on TIL's interpretation of the hydrogeological conditions of the Site and the proposed development details outlined in the Site Plan and Architectural Drawings provided by the Client which are included in **Appendix A**.

Dewatering rate estimates are based on water levels observed during monitoring events and the hydraulic properties of the soils determined by in-situ hydraulic conductivity tests. This section does not provide a design of dewatering operations nor a recommendation of the most appropriate method of dewatering for the anticipated soil and groundwater conditions, instead, it provides an estimate of the expected dewatering rates required to obtain a theoretical level of groundwater control and conditions within excavations. The most effective dewatering measures for the prevalent ground conditions and the design of the dewatering operations are the sole responsibility of the dewatering contractor on-Site.

Should the dimensions of the excavations required for construction change following submission of this report, this office should be notified such that any potential implications related to dewatering rate estimates can be addressed prior to application for potential permits.

5.1 Aquifer Characteristics

The underlying geology of the Site was determined to consist of overlying layer of fill with silty sand and sand at depths beyond 2 mbgs. Elevations of the groundwater table measured in the silt and sandy silt unit were observed to range between a low of 274.91 masl (2.48 mbgs) and a high of 276.19 masl (2.80 mbgs). Considering the groundwater levels collected to date and the locations of the proposed buildings, an average groundwater elevation of 276 masl was assumed for the area of excavation. To account for potential seasonal variability in groundwater levels for the spring season, an additional 0.5 m was added to the current estimate of the average groundwater level. Therefore, the groundwater table elevation considered in the current analysis was 276.50 masl. Requirements for groundwater control should be confirmed by groundwater levels recorded in the spring season which are expected to be representative of the seasonal high groundwater table conditions for the Site.

Based on the estimates of hydraulic conductivity, the mean hydraulic conductivity of the saturated sandy silt to sand overburden as measured by in-situ testing to be considered in the estimation of dewatering rates is 6.6×10^{-7} m/s.

5.2 Required Drawdown

For the purposes of the dewatering calculations, it assumed that excavations for Building 1 and Building 2 will be completed in one phase with one excavation to be opened for both buildings. To assess the potential need for groundwater control a few simplifying assumptions are made in the analysis, these include:

- There will be 1 basement level, with a basement floor elevation of 276.50 masl. An additional 0.5 m will be added to the top of slab depth to account for the construction of foundation footings. The excavation will therefore be to 276.0 masl;
- The sanitary service located along the western site boundary will be constructed in an open-cut trench excavation approximately 40 m long by 1 m wide and to an elevation of 274.5 masl;

- The proposed infiltration trench taking roof runoff will have a base of infiltration of 277 masl and will therefore not require groundwater control during construction;
- The underground stormwater management tank located on the north boundary will be founded at 276 masl and require an excavation of approximately 20 m x 5 m for construction;
- It may be desirable to control the groundwater level to 0.5 m below the bottom of the excavations; and
- All excavations will be opened simultaneously such that management of groundwater seepage may be needed in all open excavations concurrently.

The dewatering requirements for the Site are summarized in **Table 5-1** below.

Table 5-1 Summary of Dewatering Requirements

Scenario	Approx. Ground Surface (masl)	Depth of Excavation (masl)	Width of Excavation (m)	Length of Excavation (m)	Groundwater Elevation (masl)	Dewatered Groundwater Level (masl)	Maximum Required Drawdown (m)
Building 1 + 2	278	276.00	15	60	276.50	275.50	1
Sanitary Service	278	274.50	1	40	276.50	274.00	2.5
Stormwater Tank	278	276.00	5	20	276.5	275.50	1

5.3 Radius of Influence

5.3.1 Unconfined Aquifers

An estimate of the Distance of Influence (DOI) for dewatering excavations in unconfined aquifers can be calculated using the following equation (Powrie and Preene, 1994):

$$L_0 = \sqrt{\frac{12HK}{S_y}t}$$

where,

L_0 = Distance of influence to line source of recharge (m)
H = Distance from initial static water level to assumed bottom of saturated aquifer contributing flows (m)
S_y = Specific Yield of the aquifer formation (based on Johnson (1967))
t = Time, in seconds, required to draw the static groundwater level to the desired level (assumed to be equivalent to 14 days for foundations and 7 days for services)
K = Hydraulic Conductivity of aquifer formation (m/s)

A summary of the Zone of Influence (ZOI) estimations for the dewatering calculations is presented in **Table 5-2**.

Table 5-2 ZOI Estimate

Scenario	H (m)	S_y	K (m/s)	t (s)	L_0 (m)
Building 1 + 2	6	0.20	7.7×10^{-7}	1,209,600	18
Sanitary Service	7	0.20	7.7×10^{-7}	604,800	14
Stormwater Tank	6	0.20	7.7×10^{-7}	604,800	13

5.4 Dewatering Rate Calculations

5.4.1 Short-Term Dewatering

Dewatering calculations are based on equations of radial and planar flow where the system can be approximated as a well with equivalent radius and/or by an equivalent line of wells. The dewatering equations referenced in the completion of this analysis are provided in *Construction Dewatering and Groundwater Control: New Methods and Applications – Third Edition* (Powers et. al., 2007). The equations and a summary of variables considered in the current analysis can be found in **Appendix E**.

The dewatering assessment assumes steady-state flow into an open excavation; however, it should be recognized that a transient condition may exist at the start of dewatering. During this time, flows may be higher but will dissipate over time to steady-state conditions as aquifer storage is depleted. The equations of radial and planar flow in the context of the current dewatering analysis have the following assumptions:

- Ideal aquifer conditions (homogeneous, isotropic, uniform thickness, and has infinite areal extent);
- Fully penetrating pumping well(s);
- Horizontal flow to pumping well(s); and
- A constant pumping rate with the flow to the pumping well(s) corresponding to steady-state conditions.

To account for uncertainties and natural variability in the range of hydraulic conductivity and water levels, the calculated short-term dewatering rates for groundwater control were multiplied by a factor of safety of 2. Incorporating the factor of safety also provides flexibility to the dewatering contractor in meeting project schedules and helps to account for the initial pumping period under transient conditions when dewatering volumes are expected to be higher.

5.4.2 Allowance for Precipitation

While the excavations remain open, it is anticipated that it will be necessary to dewater incident stormwater from direct precipitation over the excavation. Incorporating additional discharge requirements for rainfall is considered to provide an estimate of the worst-case dewatering scenario for applying for dewatering discharge permits and approvals. To account for additional dewatering volumes from precipitation, a design storm with a 24-hour depth of accumulation of 10 mm was considered.

5.4.3 Long Term Dewatering

It is understood that the basements will be constructed with a foundation system. This system may be constructed at or slightly below the assumed seasonal high groundwater elevation considered in the current analysis, as such, long-term control of groundwater around the foundation is expected. In this case, it is estimated that the volume of groundwater to be controlled over the long-term will be one-third the rate of short-term dewatering.

5.5 Summary

To determine total dewatering rates, the anticipated dewatering volumes for groundwater control were added to the estimated dewatering volumes for contributions from direct precipitation into the open excavations. Dewatering rate estimates have been prepared for permitting requirements only. Dewatering calculation sheets can be found in **Appendix E**. A summary of the estimated dewatering rates is presented in **Table 5-3** below.

Table 5-3 Dewatering Rate Summary

Building	H	h	K	ZOI	Short-Term Pumping Rate Q			Long-Term Pumping Rate Q
	m	m	m/s	m	m^3/day	L/day	L/s	L/day
Building 1 + 2	6	5	7.7 x 10^{-7}	18				
	Groundwater				5.500	5,500	0.06	1,800
	Precipitation				9.000	9,000	0.10	-
	Sub-Total				14.500	14,500	0.16	1,800
Sanitary Service	7	5	7.7 x 10^{-7}	14				
	Groundwater				14.500	14,500	0.17	N/A
	Precipitation				0.400	400	0.005	N/A
	Sub-Total				14.900	14,900	0.175	N/A
Stormwater Tank	6	5	7.7 x 10^{-7}	13				
	Groundwater				2.600	2,600	0.03	N/A
	Precipitation				1.000	1,000	0.01	N/A
	Sub-Total				3.600	3,600	0.04	N/A
Total Groundwater					22.600	22,600	0.26	1,800
Total Precipitation					10.400	10,400	0.11	-
Total					32.000	32,000	0.37	1,800

Notes:
1. NA indicates not applicable.
2. Groundwater rates include a factor of safety of 2.
3. Dewatering rates are rounded to the nearest 100 L.

5.6 Options for Dewatering Discharge and Permitting

5.6.1 Dewatering Permit Requirements

The estimated maximum dewatering rate required during construction to achieve the desired drawdown is 22,600 L/day. Additionally, it is recommended to account for incident precipitation when applying for potential dewatering and discharge approvals to ensure there is contingency available for maintaining a dry excavation during periods of rain. An accumulation of 10 mm over 24 hours within the excavation was considered in this investigation, and requires accounting for an additional 10,400 L/day above the estimated groundwater dewatering rates.

Considering both groundwater and stormwater control requirements, the cumulative rate of dewatering is then 32,000 L/day. Since this rate is less than 50,000 L/day short-term (construction) dewatering activities for the Site do not need to be registered on the Environmental Activity and Sector Registry (EASR).

Since the foundations of the proposed buildings may extend below the groundwater table, it is anticipated that a method of groundwater control will be required to manage groundwater seepage over the long-term. If a foundation drainage is proposed to collect perimeter and underfloor drainage, the estimated rate of dewatering for the combination of Building 1 and Building 2 in the long-term will be approximately 1/3rd the rate of dewatering during construction, or approximately 1,800 L/day. As the estimated rate of dewatering in the long-term is less than 50,000 L/day in each case, a PTTW from the MECP will not be required.

5.6.2 Disposal Options for Discharge Water

Short-Term (During Construction)

Current analytical results from unfiltered groundwater quality samples collected at the Site do not meet the storm sewer discharge criteria. As such, where there is no change in groundwater quality, pre-treatment would be required for the discharge of groundwater to the Town’s storm sewers. However, no pre-treatment would be needed for groundwater discharge to the Town’s sanitary sewers. Where discharge to the Town’s sewers is proposed, a peak discharge rate should be considered for a discharge duration less than the 24 hour period considered in this analysis to provide dewatering contractors with the flexibility to manage dewatering effluent more efficiently during construction. Pre-consultation with the Town of Uxbridge is recommended where the discharge of groundwater to municipal storm or sanitary services is required.

Alternatively, excess groundwater may be pumped to holding tanks and later removed from the Site by a licensed hauler to an MECP licensed facility that can accept the effluent.

Regardless of the approach, disposal options for excess groundwater and stormwater accumulated on-Site should be considered prior to construction as a consultation with the Township of Uxbridge may be required for review and approval prior to discharge.

Long-term (Site Occupancy)

Since all excavations are anticipated to extend below the water table at the Site, it may be necessary to control groundwater seepage and hydrostatic pressure by way of waterproofing barriers or a Private Water Drainage System (PWDS). If a PWDS is proposed that requires a connection to Town sewers, approval for the connection will need to be obtained from the Township of Uxbridge which will be contingent on the quality and quantity of this discharge. Where discharge to the Town’s sewers is proposed over the long-term, a peak discharge rate should be considered for a discharge duration less than the 24 hour period considered in this analysis to provide greater flexibility to the foundation drainage system to manage dewatering effluent more efficiently.

As an alternative to discharge of groundwater to municipal sewers, the options of on-Site infiltration of water collected by a foundation drainage system may be considered.

6 Potential Receptors and Impacts

6.1 Potential Receptors

As part of this program, potential groundwater receptors including domestic or permitted water supplies were identified. Additionally, the surrounding area was evaluated for potential ecological receptors to construction activities including dewatering.

An understanding of typical groundwater usage in the area was obtained by:

- Querying MECP water well records (2022b) within a 500 m radius of the Site;
- Querying MECP PTTW records (2022c) within a 500 m radius of the Site; and
- Reviewing the MNRF (2022) Natural Heritage Areas mapping portal to identify potential ecological receptors within a 500 m radius of the Site.

6.1.1 MECP Water Well Record Search

A search of the MECP (2022b) water well records database was conducted within a 500 m radius of the Site boundary. The search results returned a total of 105 well records within the search area. The Site and surrounding areas have municipal water supplies available for use.

Well usage details are summarized in **Table 6-1**. **Appendix F** provides the list of MECP water well records returned by the search. **Figure 9** shows the location of MECP water well records within the 500 m search radius.

Table 6-1 Water Well Records within 500 m Buffer

Primary Well Use	Number of Wells within 500 m Buffer of Study Area	Percentage of Total
Water Supply - Domestic	48	46%
Water Supply – Public	1	1%
Water Supply – Commercial	1	1%
Water Supply - Industrial	2	2%
Test Hole/Monitoring/Observation	15	14%
Abandoned/Unknown	38	36%
Total	105	100%

Water supply wells comprise 50% of the total well records found within a 500 m buffer of the Site, with 46% representing domestic water supplies. The records show these wells have been installed between 1960 and 2011. The Municipal water supply in Uxbridge is also sourced from groundwater. Considering surrounding land uses, not all records identified are anticipated to remain active where they are located immediately adjacent to the Site. The nearest municipal well, Well #6, is located approximately 300 m to the northwest and is screened at approximately 58.2 mbgs. No private or municipal wells are located within the estimated zone of influence of dewatering activities.

6.1.2 Permitted Water Users

A search was conducted of the MECP (2022c) PTTW database to identify the permitted groundwater takers within 500 m of the Site boundary. There is one active groundwater PTTW within 500 m, used for municipal water supply by The Regional Municipality of Durham.

6.1.3 Ecological Receptors

Based on a review of MNRF's Natural Heritage Areas mapping portal (MNRF, 2022), the Site is not located within 500 m of Areas of Natural Scientific Interest (ANSI). The Site is 20 m west of woodlands, and the Uxbridge Brook Headwater Wetland Complex, a PSW, is found east of the Site, along with a tributary to the Uxbridge Brook.

A map of the ecological receptors is provided in **Figure 10**.

6.2 Vulnerable Drinking Water Areas

Based on a review of the source water protection mapping, the proposed development is located within a WHPA-D area associated with Uxbringe-MW6 as illustrated in **Figure 11**. Further, the Site is located within WHPA-Q1 and WHPA-Q2 recharge management areas as well as an HVA area and IPZ-3 area.

Based on our review of the land-use policies of the SPP in context with the land uses proposed in the built-out condition of the Site, there are no restrictive land use policies under the SPP that are shown to apply, excepting LUP-12. Pursuant to LUP-12, proposals for major development shall maintain pre-existing annual groundwater recharge rates to the extent possible at the Site.

It is our understanding that the water balance study is being completed by Counterpoint Engineering and that the results of their assessment have indicated a resultant infiltration surplus when considering on-Site infiltration. Further information and conclusions of the water balance analysis completed for the development Site may be referenced from the Stormwater Management Report prepared by Counterpoint Engineering.

7 Impact Assessment and Mitigation

7.1 Potential Short-Term Impacts

Groundwater System

Impacts to the groundwater system during construction can include a temporary lowering of the groundwater table during construction dewatering or the introduction of contamination to the groundwater system through a reduction in ground cover and exposed native soils nearer to the groundwater table which are susceptible to dry and wet weather spills. Construction on Site may store potential sources of contamination in the short-term and the release of these to the exposed ground can contribute to groundwater contamination.

A Spill Prevention and Response Plan is recommended during construction to mitigate potential spills and it is recommended that potentially hazardous materials be stored in designated areas with appropriate containment as well as away from areas of high vehicle traffic.

Surface Water System

Short-term impacts to the surface water system include changes in the hydrologic regime caused by land grading changes or the deposition of sediment, hazardous materials, or other deleterious substances into waterbodies and watercourses.

Potential impacts are anticipated to be effectively mitigated where a Site-specific Spill Prevention and Response Plan as well as an Erosion and Sediment Control (ESC) Plan are in place. Routine monitoring of ESC measures will ensure the form and function of these controls in preventing off-Site impacts to the sensitive surface water system adjacent to the Site.

Other Groundwater Users

Impacts to other groundwater users include impacts to both the quantity and quality of groundwater available to private water supplies as well as permitted groundwater takers through the reduction in recharge or introduction of contamination to the water supply aquifer.

There are not anticipated to be any private groundwater users immediately adjacent to the development Site. With control in place to mitigate the impact of spills on groundwater during construction, no impacts to other groundwater users are anticipated.

7.2 Potential Long-Term Impacts

Groundwater System

Long-term impacts to the groundwater system include reductions in annual recharge which have a compounding effect on groundwater levels as well as from land-uses where high-risk activities are proposed, including, for example, industrial and commercial areas where hazardous materials may be stored/used, where hazardous waste is generated, and where significant quantities of road salt are used for winter ice management.

Based on the preliminary results of the water balance analysis by Counterpoint, it is anticipated that an infiltration deficit will be realized following construction due to the increase in impervious area. However, with the implementation of on-Site LIDs, it has been demonstrated that there will be a resultant infiltration surplus. The LID mitigation plan, including the depth of proposed infiltration and the infiltration capacity of native soils there, should be confirmed following the completion of long-term groundwater level monitoring to verify the typical minimum requirements for infiltration LIDs.

The development area will be occupied for residential purposes, which, as it concerns the groundwater system, is generally associated with low-risk activities. As the Site is nearby a municipal well, it is recommended that “Smart About Salt” contractors and best management practices related to de-icing and snow management are used as part of the long-term occupancy of the Site.

Surface Water System

Potential long-term impacts to the surface water system can include reductions in the catchments which are tributary to the system as well as reductions in groundwater recharge where the groundwater contributes baseflow in the system or supports ecologically sensitive habitats in the system.

Based on the current findings of the phosphorus balance analysis, there will be a small surplus in phosphorus loadings from the Site following development. It is our understanding that offsetting compensation will be pursue with the LSRCA per their Phosphorus Offsetting Policy (LSRCA, 2021b).

Potential Long-Term Impacts to Other Groundwater Users

The local area water supply is sourced from groundwater from a deep water supply aquifer and there are not anticipated to be any other groundwater uses immediately adjacent to the Site. Considering the low risk land uses proposed for the Site, no impacts to other groundwater users are anticipated.

8 Summary

A summary of the hydrogeological investigation, completed in support of the proposed development at 181 Toronto Street South, Uxbridge, Ontario, is as follows:

- The Site falls within Lake Simcoe and Couchiching/Black River Source Protection Area. The entire Site is located within a WHPA-Q1, WHPA-Q2 and HVA and within an IPZ-3, WHPA-D (MECP, 2022a).
- The Site is located within the Pefferlaw-Uxbridge Brook Subwatershed of the Lake Simcoe Watershed, which is under the jurisdiction of the LSRCA. A tributary of Uxbridge Brook is located approximately 100 m east of the Site. The Site is located in an LSRCA regulated area; therefore, a permit from the LSRCA will be required for construction.
- The proposed development area of the Site slopes towards the northeast from approximately 279 masl to 277 masl.
- The Site is situated in the Oak Ridges Moraine (ORM) physiographic region. The overburden material consists of soil up to a depth of 0.2 mbgs, followed by fill to a depth of up to 2.5 mbgs, and silty sand deposits to the terminal depth of investigation at 6.71 mbgs. Layers of gravelly sand were observed at 21BH-4 and 21BH-6 within the silty sand deposit, between 2.3 mbgs and 3.7 mbgs.
- Groundwater levels have been recorded on-Site between October of 2021 to March of 2022. Groundwater elevations were observed to be highest in March of 2022, with a high of 276.19 masl (2.80 mbgs) at 21BH-1 (MW) and a low of 274.91 masl (2.48 mbgs) in 21BH-8 (MW). A long-term groundwater level monitoring program is underway to record spring water levels which may be representative of seasonal high groundwater table conditions at the Site.
- The results of the in-situ hydraulic conductivity testing showed that the hydraulic conductivity hydraulic conductivity ranged between 6.6×10^{-7} m/s and 9.8×10^{-6} m/s , with a geometric mean of 7.7×10^{-7} m/s.
- Unfiltered groundwater quality samples were collected from 21BH-4 (MW) on October 25, 2021. Based on laboratory analyses, no parameters failed the discharge criteria outlined in *Table 1 Sanitary Sewer Limits of the Durham Region By-Law Number 55-2013*. However, the parameters Total Kjeldahl Nitrogen (TKN) and Total Manganese exceeded the discharge criteria of *Table 2 Storm Sewer Limits* of the *Durham Region By-Law Number 55-2013.*
- The estimated maximum groundwater dewatering rate required during construction to achieve the desired conditions within the excavation is 22,600 L/day. However, the worst-case construction dewatering scenario that should be considered when applying for dewatering permits or approvals is estimated to be 32,000 L/day, which includes additional discharge flows for an accumulated rainfall depth within the excavation of 10 mm over a 24-hour period; adding approximately 10,400 L/day. Since the rate of construction dewatering for the Site is less than 50,000 L/day, an EASR nor a PTTW will be required to facilitate construction dewatering.

- If foundation drains are proposed as a management practice in the long-term to control groundwater seepage around the foundations of Building 1 and Building 2, the estimated rate of dewatering in the long-term will be approximately 1/3rd the rate of dewatering during construction, or approximately 1,800 L/day. Since the anticipated rate of dewatering in the post-construction phase is less than 50,000 L/day, a PTTW will not be required if water takings are proposed following construction.
- A search of the MECP well records for a 500 m radius of the Study Area returned 105 records and one active PTTW for a municipal groundwater taking. The primary well usage in the area was for domestic water supply purposes (48%); and
- There are no anticipated short-term or long-term impacts to the groundwater system, surface water system, or other groundwater users resulting from development of the Site.

Based on the findings of the current report, the following recommendations are offered:

- Requirements for long-term groundwater control be reassessed following the completion of long-term groundwater level monitoring at the Site and that where long-term groundwater control is required, that an option for discharge be evaluated.
- A spring water level monitoring program is currently underway at the Site. The information collected from this program should be considered in the final design and implementation of infiltration LIDs on-Site.
- Per the requirements of the LSRCA, it recommended that infiltration rates at the locations and depths of proposed infiltration from LIDs be determined by in-situ infiltration testing to confirm infiltration capacity. The information and observations collected from in-situ infiltration should be considered in the final design and implementation of infiltration LIDs on-Site.
- It is recommended to implement a Site-specific Spill Prevention and Response Plan and a Site-specific Erosion and Sediment Control Plan as construction best management practices to manage debris and potential sources of contamination that may impact groundwater during construction.

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10 General Statement of Limitation

The comments presented in this report are based on the soil and groundwater samples gathered from the borehole/monitoring well locations indicated on the plan of this report. There is no warranty expressed or implied or representations made by Toronto Inspection Ltd. that this program has discovered all potential environmental risks or liabilities associated with the subject site.

Although we consider this report to be representative of the subsurface conditions at the subject property in the areas investigated, any interpretation of factual data or unexpected soil conditions which exhibit noticeable discolouration, odour, etc. in areas not investigated in this report, should be discussed in consultation with us prior to any initiation of activity. Our responsibility is limited to an accurate assessment of the soil condition prevailing at the locations investigated at the time of the study.

To the fullest extent permitted by law, the client's maximum aggregate recovery against Toronto Inspection Ltd., its directors, employees, sub-contractors and representatives, for any and all claims by Man Holding Ltd. for all causes including, but not limited to, claims of breach of contract, breach of warranty and/or negligence, shall be the amount of fees paid to Toronto Inspection Ltd. for its professional engineering services rendered with respect to the particular site which is the subject of the claim by the client.

Any use and/or interpretation of the data presented in this report, and any decisions made on it by the third party are responsibility of the third party. Toronto Inspection Ltd. accepts no responsibility for loss of time and damages, if any, suffered by the third party as a result of decisions or actions based on this report.

Any legal actions arising directly or indirectly from this work and/or Toronto Inspection Ltd.'s performance of the services shall be filed no longer than two years from the date of Toronto Inspection Ltd.'s substantial completion of the services. Toronto Inspection Ltd. shall not be responsible to the client for lost revenues, loss of profits, cost of content, claims of customers, or other special indirect, consequential, or punitive damages.

Yours truly,

Toronto Inspection Ltd.

LICENSED PROFESSIONAL ENGINEER
I. A. GARDINER
100518178
2022-04-19
PROVINCE OF ONTARIO

Sanjay Goel, B.E.S.
Environmental Scientist
Vice-President

Ian Gardiner, B.A.Sc., P.Eng.
Project Engineer

/vm

FIGURES

TorontoInspection LTD

GEO-ENVIRONMENTAL CONSULTANTS

110 Konrad Crescent, Unit 16, Markham, On L3R 9X2
Tel: 905-940 8509 Fax: 905-940 8192

TITLE: Site Location		
LOCATION: 181 Toronto Street South, Uxbridge, Ontario		
PROJECT NO. 5555-21-HD	DATE: April 2022	FIGURE NO. 1

REFERENCE
Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, and Earthstar Geographics.
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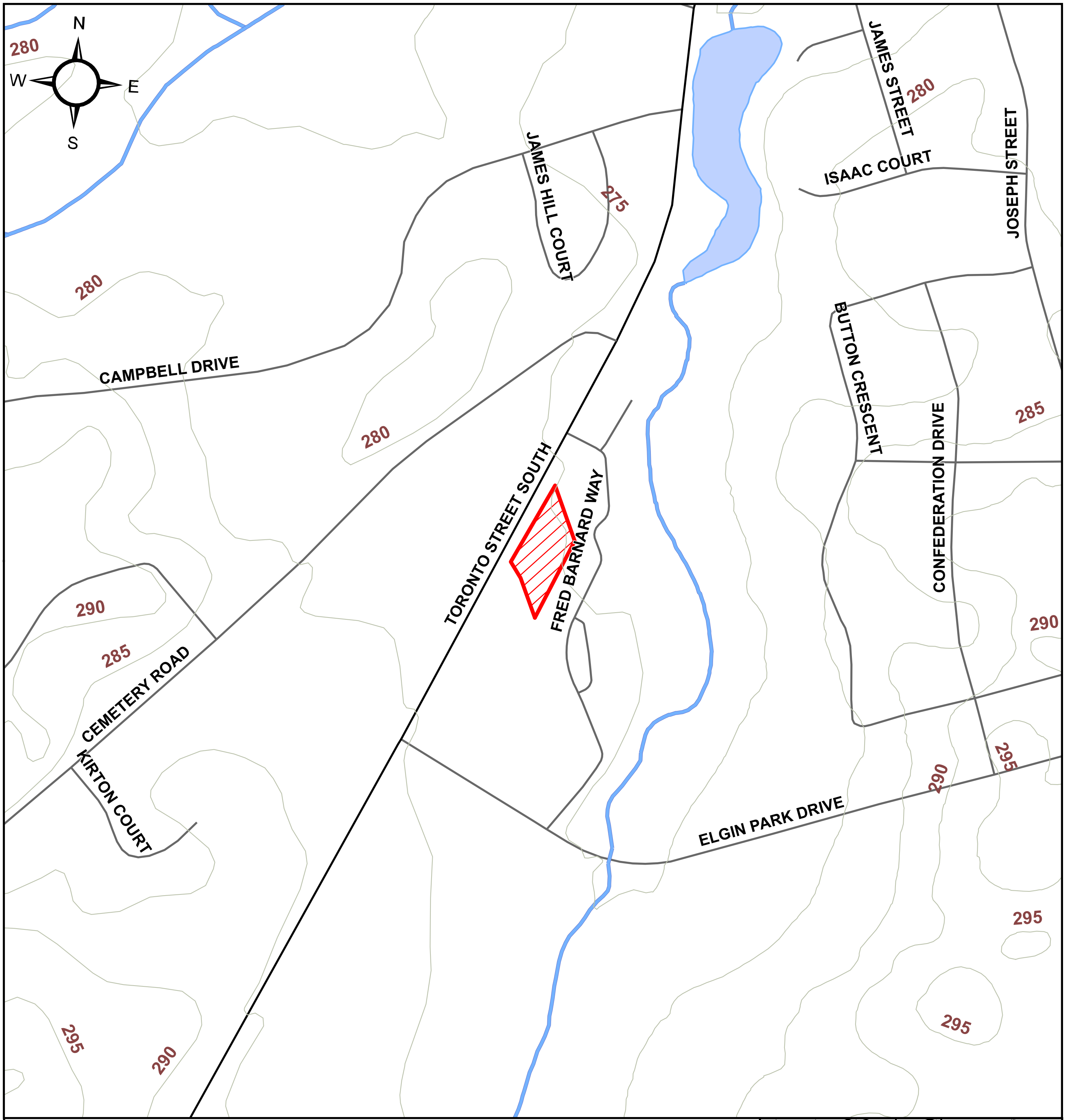


Legend

🟥 Highway

— Arterial Road

— Local Road

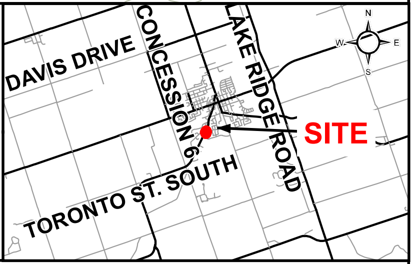
Ground Surface Topography (5m Contour)

Waterbody

Watercourse

▨ Site Location

0 25 50 100 150 200
m
1:5,000



TorontoInspection LTD
GEO-ENVIRONMENTAL CONSULTANTS
110 Konrad Crescent, Unit 16, Markham, On L3R 9X2
Tel: 905-940 8509 Fax: 905-940 8192

TITLE: Topography

LOCATION: 181 Toronto Street South, Uxbridge, Ontario

PROJECT NO. 5555-21-HD

DATE: April 2022

FIGURE NO. 2

REFERENCE
Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, and Earthstar Geographics.
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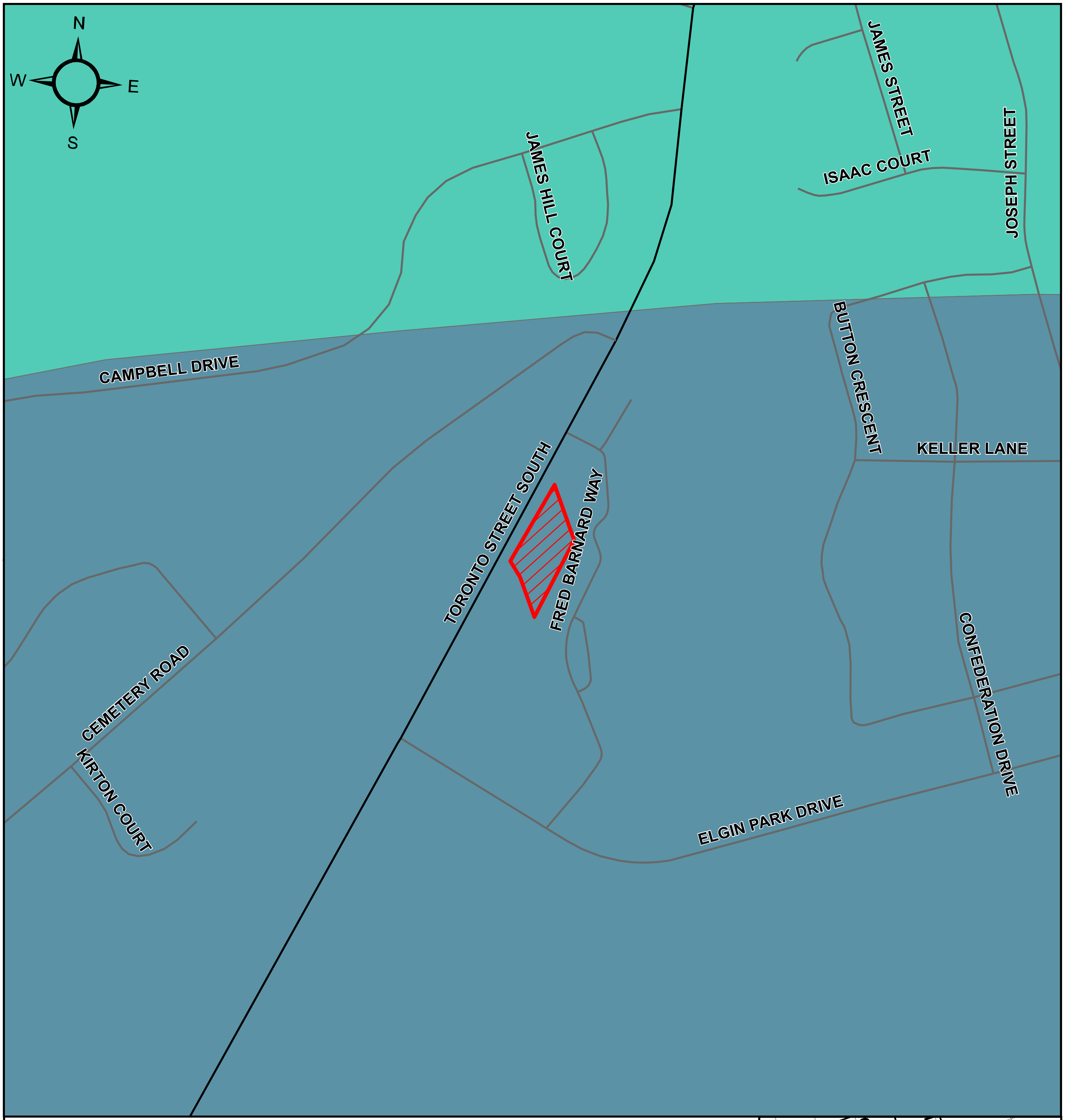
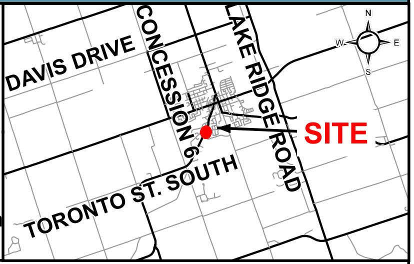


Legend

━	Highway	**Physiography**	
━	Arterial Road	🟦	Oak Ridges Moraine
━	Local Road	🟩	Peterborough Drumlin Field
▨	Site Location		

0 25 50 100 150 200 m

1:5,000



TorontoInspection LTD.
GEO-ENVIRONMENTAL CONSULTANTS
110 Konrad Crescent, Unit 16, Markham, On L3R 9X2
Tel: 905-940 8509 Fax: 905-940 8192

TITLE: Physiography

LOCATION: 181 Toronto Street South, Uxbridge, Ontario

PROJECT NO. 5555-21-HD

DATE: April 2022

FIGURE NO. 3

REFERENCE
Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, and Earthstar Geographics.
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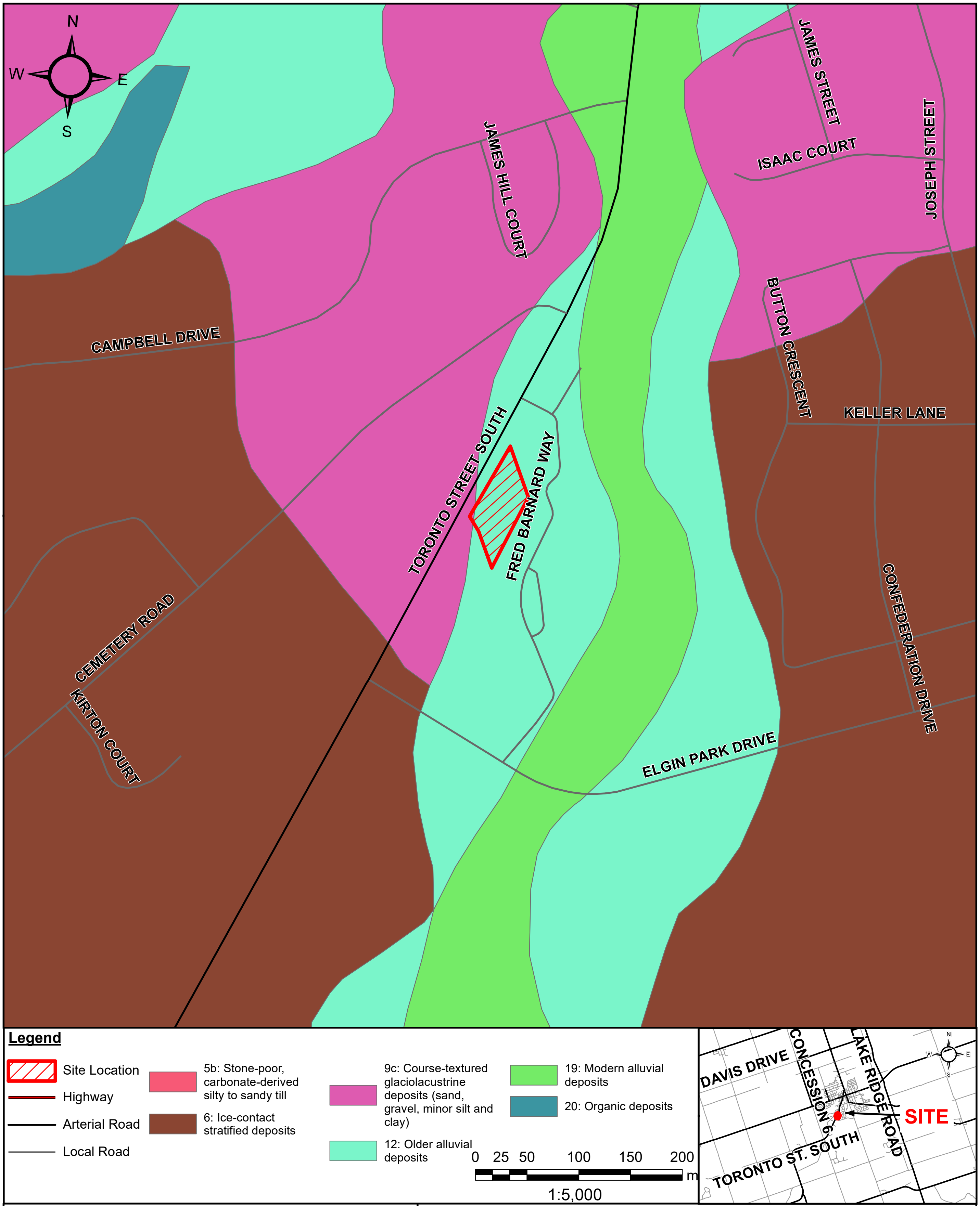

TorontoInspection Ltd.
GEO-ENVIRONMENTAL CONSULTANTS

110 Konrad Crescent, Unit 16, Markham, On L3R 9X2
Tel: 905-940 8509 Fax: 905-940 8192

TITLE:	Surficial Geology
LOCATION:	181 Toronto Street South, Uxbridge, Ontario

PROJECT NO.	DATE:	FIGURE NO.
5555-21-HD	April 2022	5

REFERENCE
Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, and Earthstar Geographics.
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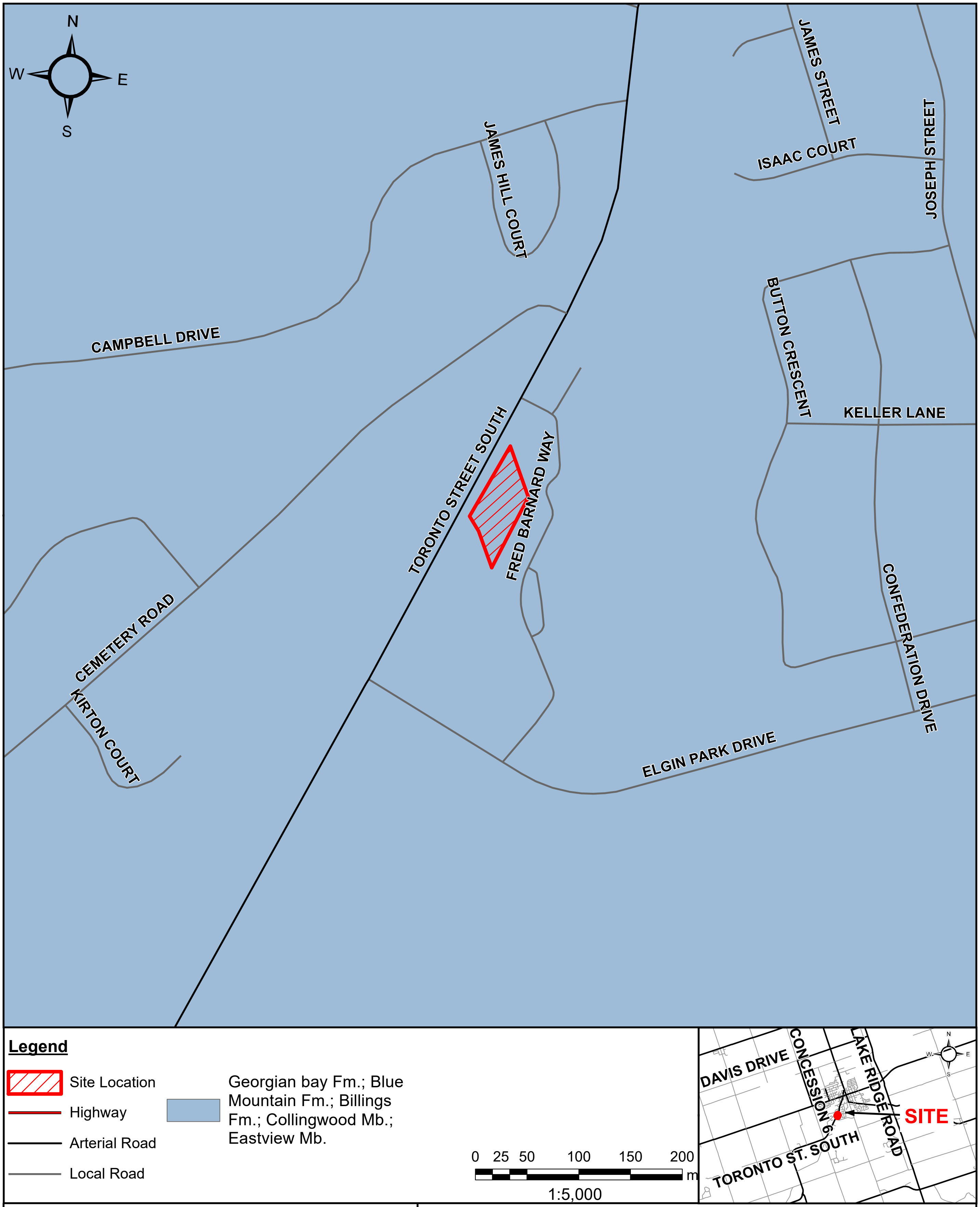

TorontoInspection LTD.
GEO-ENVIRONMENTAL CONSULTANTS
110 Konrad Crescent, Unit 16, Markham, On L3R 9X2
Tel: 905-940 8509 Fax: 905-940 8192

TITLE:	Bedrock Geology
LOCATION:	181 Toronto Street South, Uxbridge, Ontario

PROJECT NO.	DATE:	FIGURE NO.
5555-21-HD	April 2022	5

REFERENCE
Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, and Earthstar Geographics.
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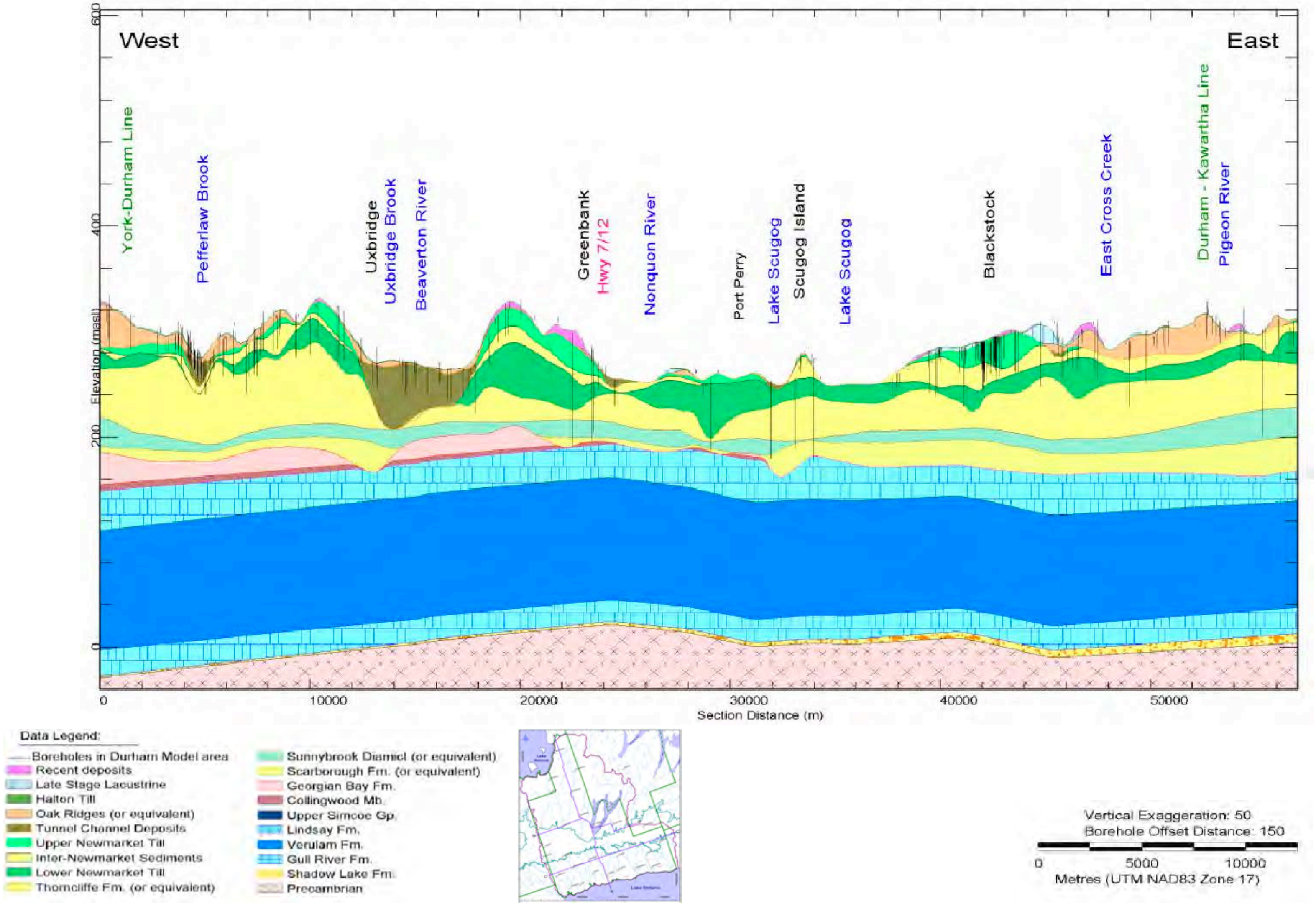
Northern Durham Cross Section, West - East



York, Peel, Durham, Toronto (YPDT) and Conservation Authorities Moraine Colaition (CAMC) Groundwater Management Program. 2010. Groundwater Model of the Regional Municipality of Durham. Prepared by Earthfx Inc.

TorontoInspection LTD.
GEO-ENVIRONMENTAL CONSULTANTS

110 Konrad Crescent,
Unit 16
Markham, Ontario
L3R 9X2

Tel: 905-940 8509 Fax: 905-940 8192 Email : TIL@torontoinspection.com

TITLE:	Regional Hydrostratigraphic Cross-Section
LOCATION:	181 Toronto Street South, Uxbridge, Ontario

PROJECT NO.	DATE :	FIGURE NO :
5555-21-HD	April 2022	6

Source: Durham Region Interactive Map

LEGEND:

⌖/⌖ Borehole and Monitoring Well Location Plan	● Percolation Test Location	— — — Site Boundary	*276.19 masl* Water Levels Observed on March 16, 2022

NOT TO SCALE

TorontoInspection LTD.
GEO-ENVIRONMENTAL CONSULTANTS

110 Konrad Crescent,
Unit 16
Markham, Ontario
L3R 9X2

Tel: 905-940 8509 Fax: 905-940 8192 Email : TIL@torontoinspection.com

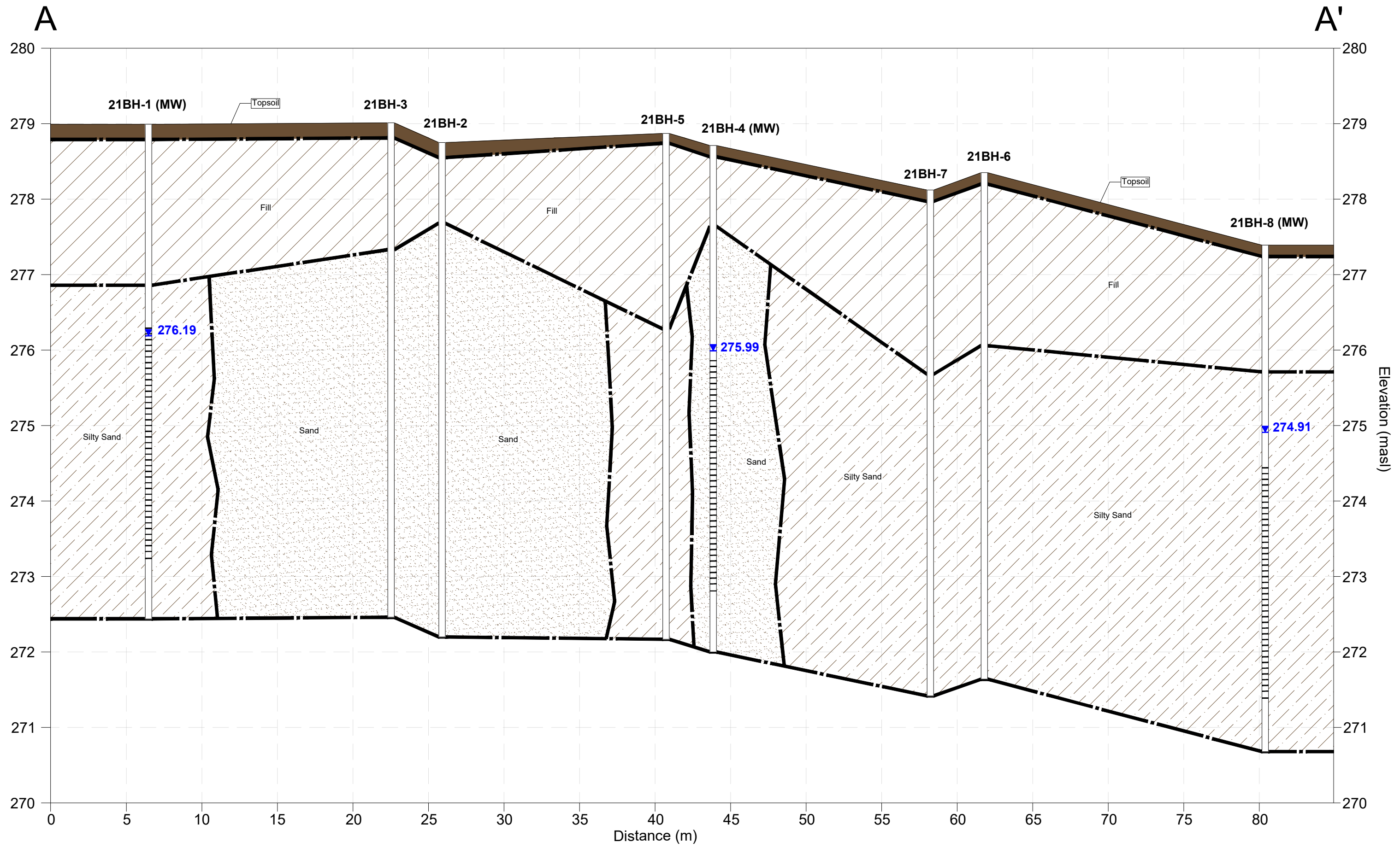
TITLE: Borehole and Monitoring Well Location Plan

LOCATION: 181 Toronto Street South, Uxbridge, Ontario

PROJECT NO. 5555-21-GC

DATE : April 2021

DRAWING NO: 1



LEGEND:

🟫	Topsoil	⊕	Borehole and Monitoring Well Location
▨	Fill	— —	Site Boundary
▨	Silty Sand	A●—●A'	Section A-A'
▨	Sand	▼	Water Level Measurement (masl) Measured on March 16, 2022
—·—	Inferred Geological Boundary	⊟	Monitoring Well Screen

DRAWING NOTES:

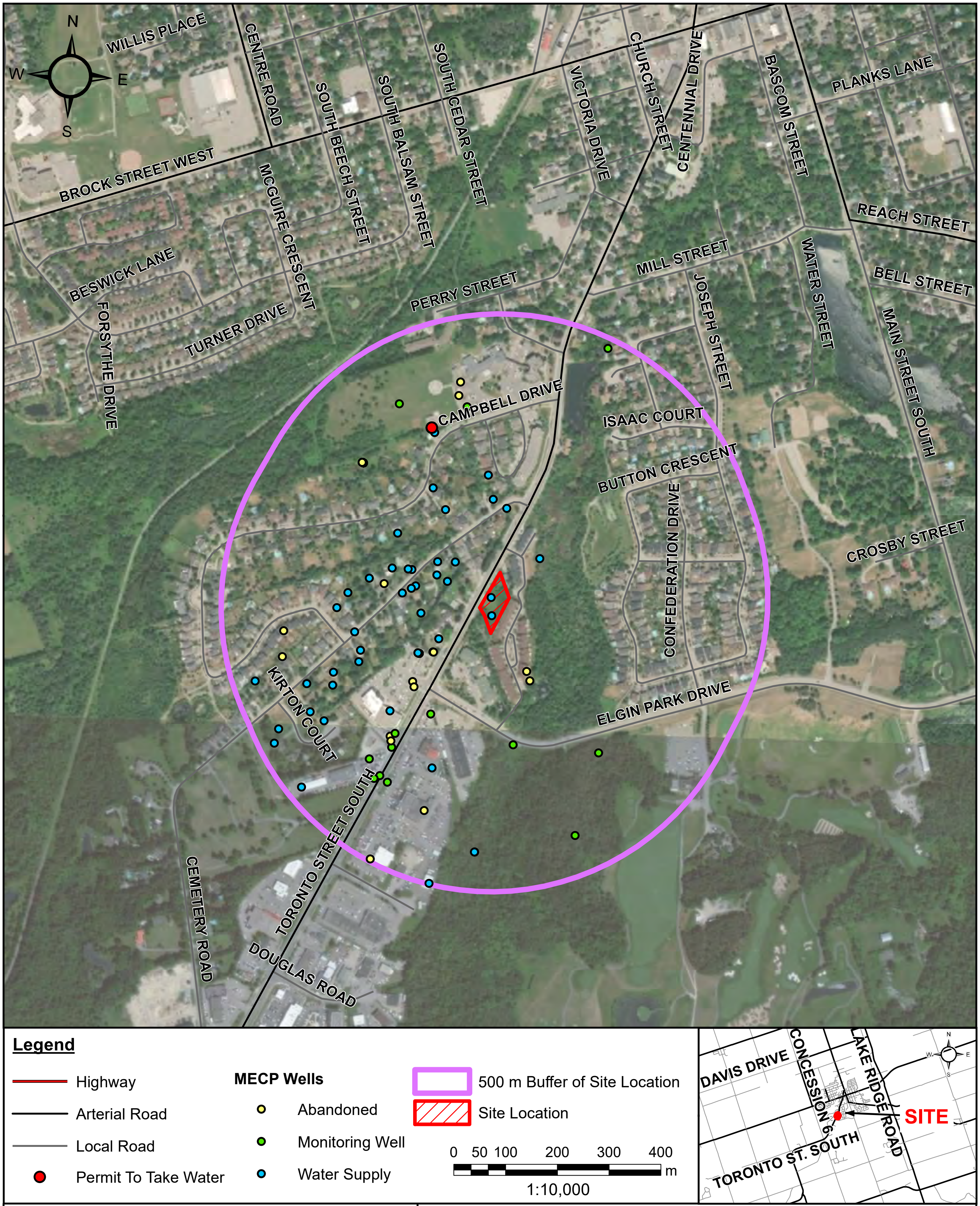
Vertical Exaggeration: 5x

TorontoInspection LTD.
GEO-ENVIRONMENTAL CONSULTANTS

110 Konrad Crescent,
Unit 16
Markham, Ontario
L3R 9X2

Tel: 905-940 8509 Fax: 905-940 8192 Email : TIL@torontoinspection.com

TITLE:	Section A-A'
LOCATION:	181 Toronto Street South, Uxbridge, Ontario
PROJECT NO.	5555-21-HD
DATE :	April 2022
FIGURE NO:	8



TorontoInspection LTD
GEO-ENVIRONMENTAL CONSULTANTS
110 Konrad Crescent, Unit 16, Markham, On L3R 9X2
Tel: 905-940 8509 Fax: 905-940 8192

TITLE:	MECP Water Wells and Pemits To Take Water
LOCATION:	181 Toronto Street South, Uxbridge, Ontario

PROJECT NO.	DATE:	FIGURE NO.
5555-21-HD	April 2022	9

REFERENCE
Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, and Earthstar Geographics.
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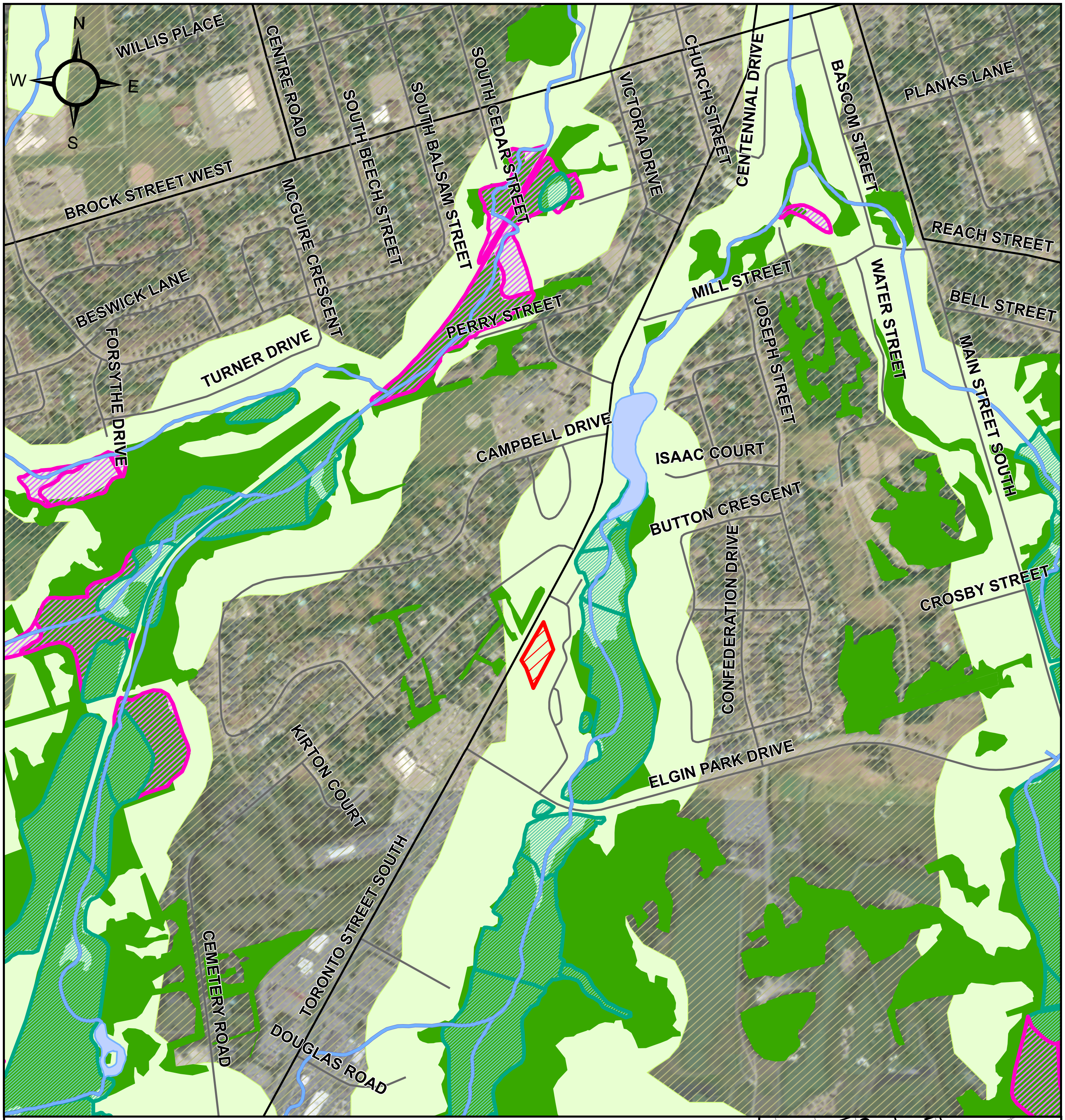
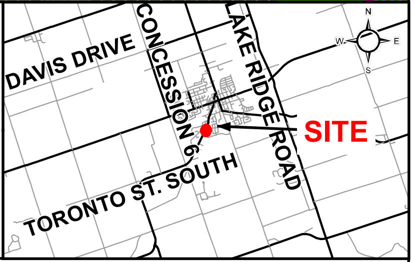


Legend

🟥	Highway
—	Arterial Road
—	Local Road
▨	Site Location
●	Waterbody
～	Watercourse
🟩	Wooded Area
▢	LSRCA Regulated Area
▨	Provincially Significant Wetlands
▨	Not Evaluated Wetlands
▨	Highly Vulnerable Aquifer

0 50 100 200 300 400 m

1:10,000



TorontoInspection Ltd
GEO-ENVIRONMENTAL CONSULTANTS

110 Konrad Crescent, Unit 16, Markham, On L3R 9X2
Tel: 905-940 8509 Fax: 905-940 8192

TITLE: Environmental Features

LOCATION: 181 Toronto Street South, Uxbridge, Ontario

PROJECT NO.	DATE:	FIGURE NO.
5555-21-HD	April 2022	10

REFERENCE
Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, and Earthstar Geographics.
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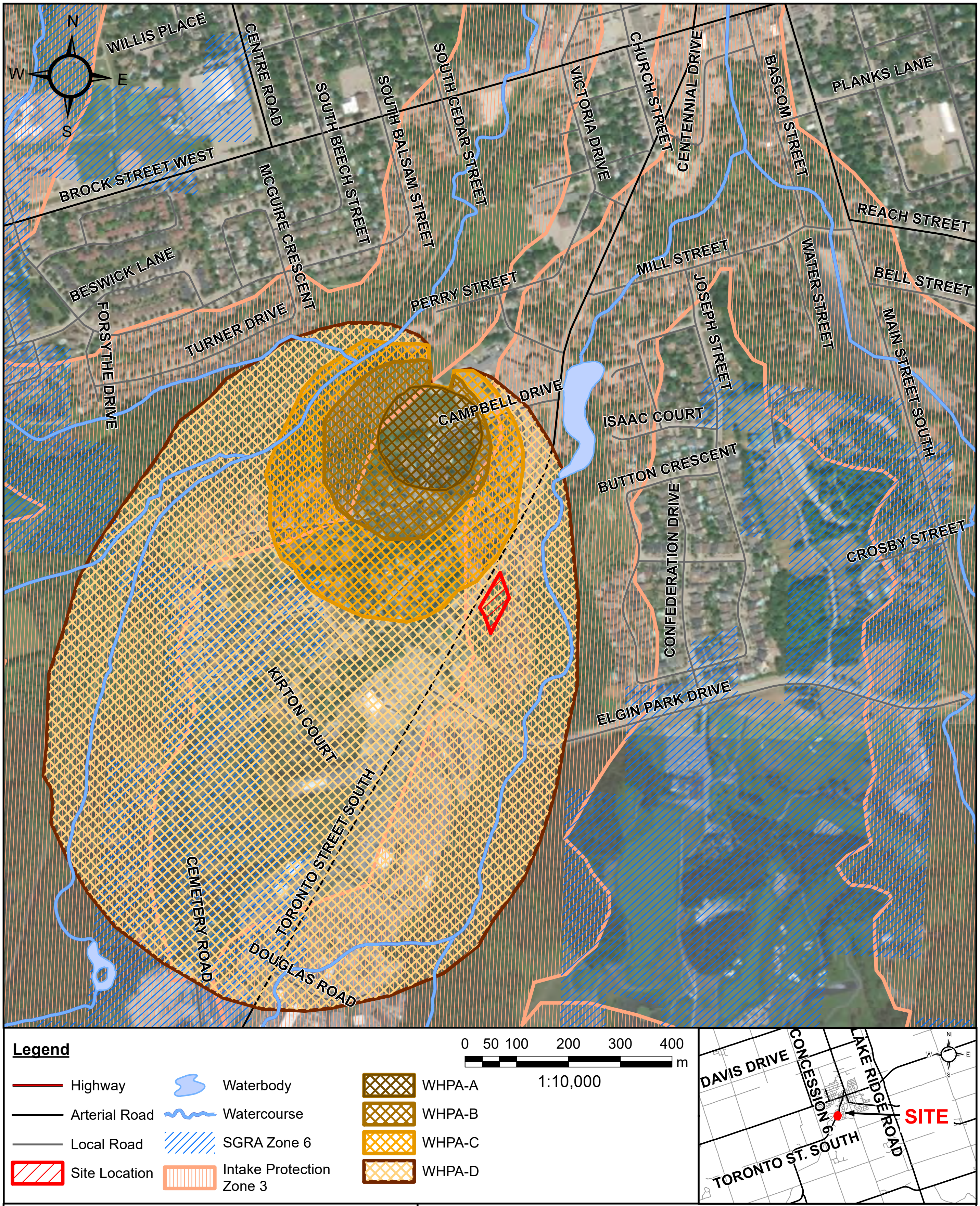

TorontoInspection LTD.
GEO-ENVIRONMENTAL CONSULTANTS

110 Konrad Crescent, Unit 16, Markham, On L3R 9X2
Tel: 905-940 8509 Fax: 905-940 8192

TITLE: Groundwater Resources		
LOCATION: 181 Toronto Street South, Uxbridge, Ontario		
PROJECT NO. 5555-21-HD	DATE: April 2022	FIGURE NO. 11

REFERENCE
Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, and Earthstar Geographics.
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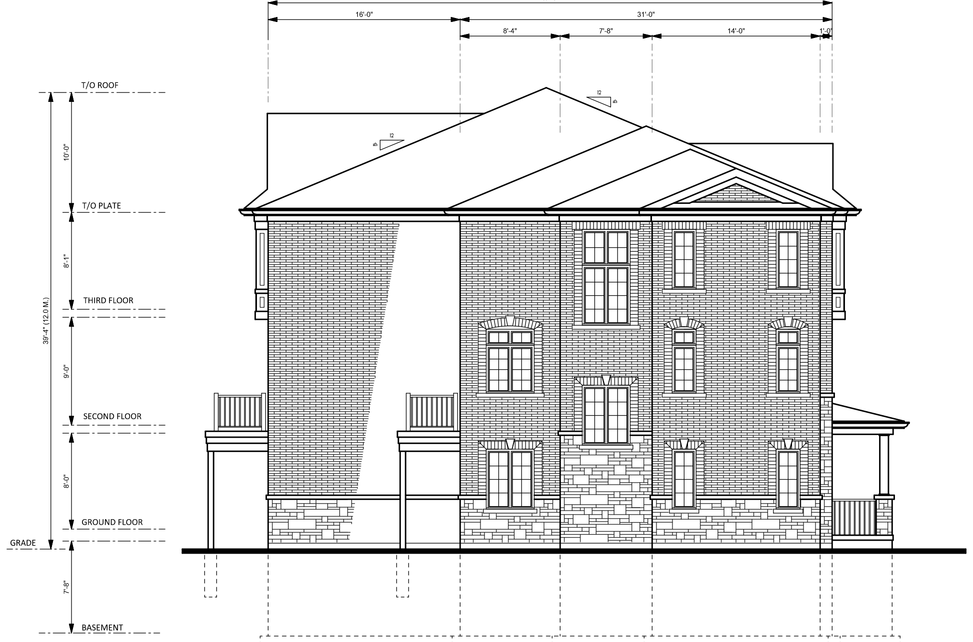
APPENDIX A

Site Plan

BUILDING 1 - FRONT ELEVATION

BUILDING 2 - FRONT ELEVATION

BUILDING 1 - REAR ELEVATION



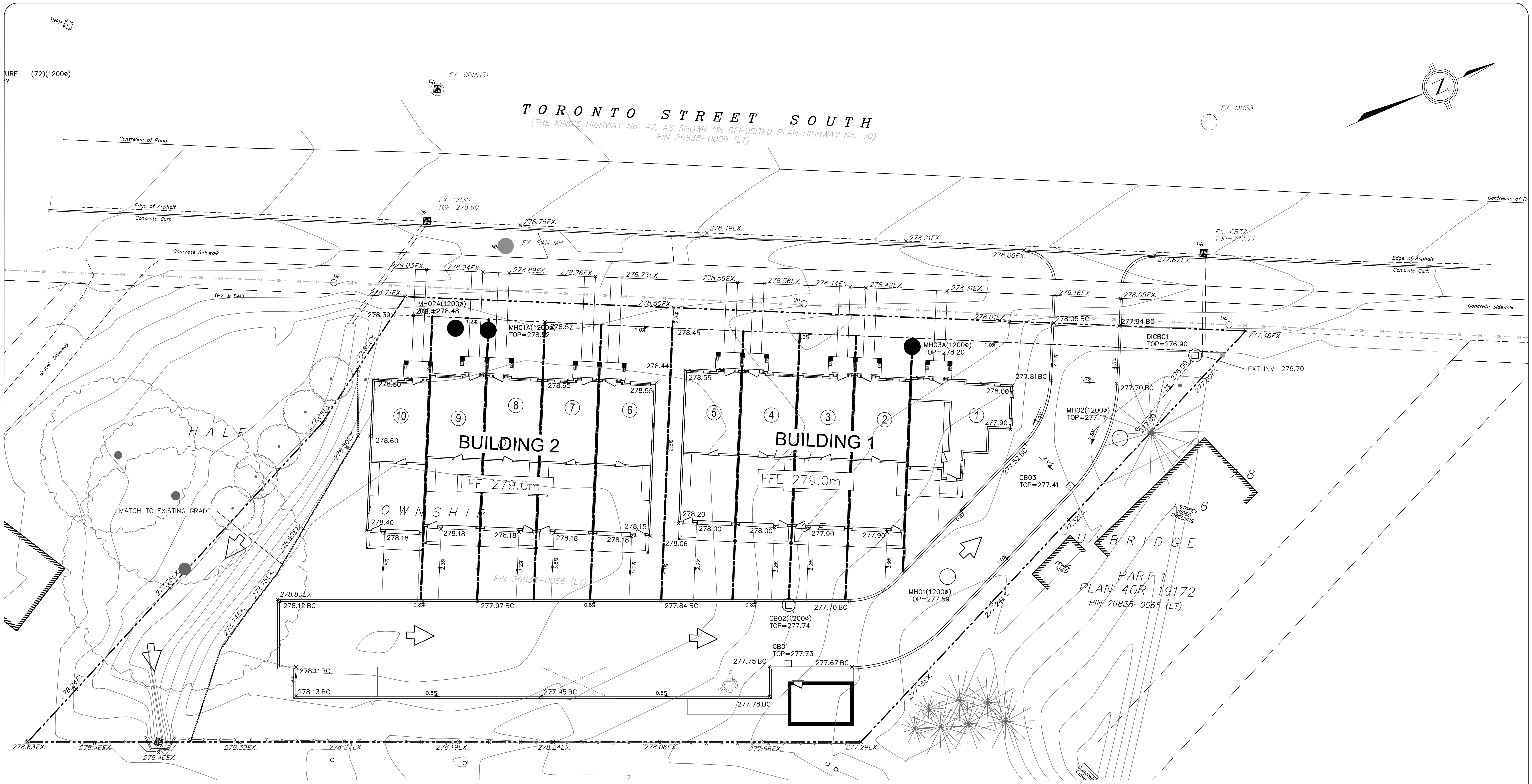
BUILDING 1 - FLANKAGE ELEVATION

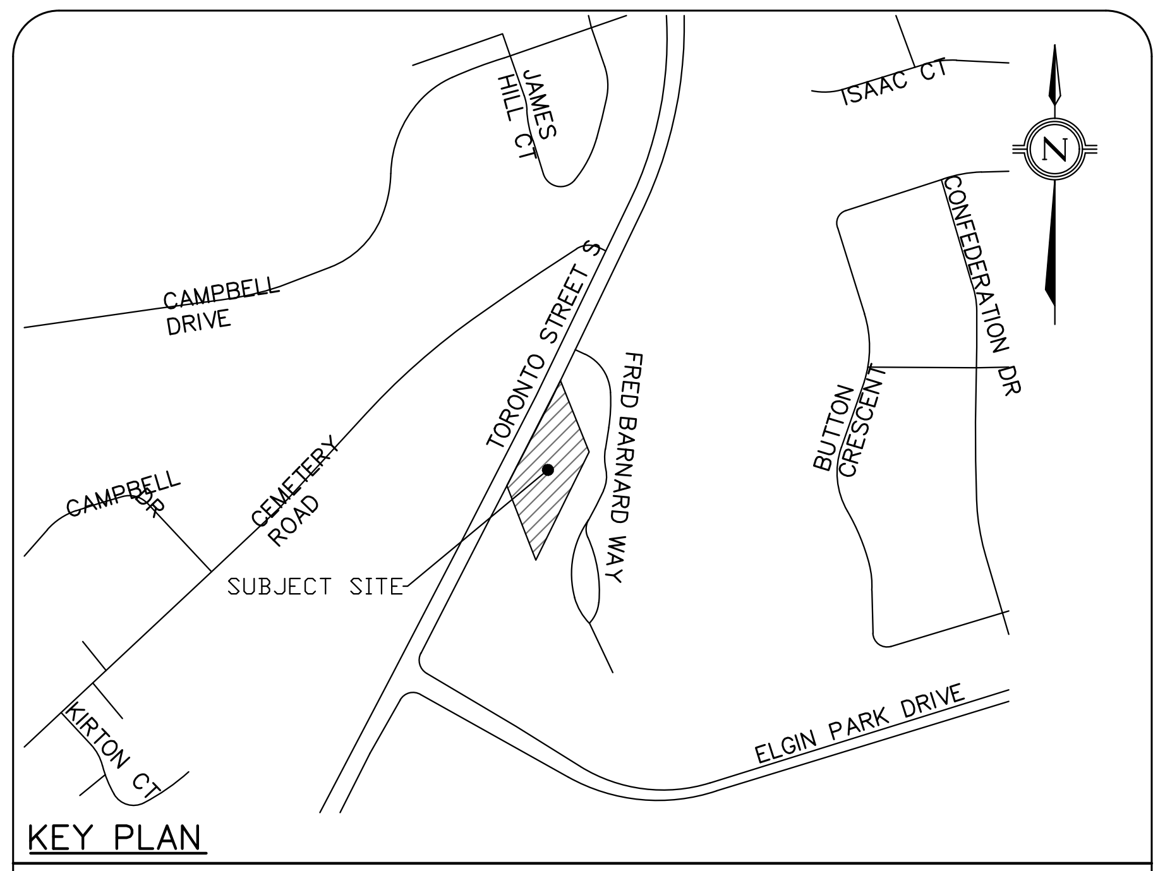
CONCEPTUAL ELEVATIONS

PROPOSED RESIDENTIAL DEVELOPMENT
197 TORONTO STREET SOUTH, UXBRIDGE
W-2471 (NOVEMBER 22 2021)

JOHN G. WILLIAMS LIMITED
ARCHITECT

40 Vogell Road, Unit 46, Richmond Hill, Ontario L4B 3N6
905-780-0500 info@williamsarch.com williamsarch.com





KEY PLAN

LEGEND

⊕	EXISTING HYDRANT
─ · ─ ➤ ○	EXISTING STORM SEWER
– – – ➤ ●	EXISTING SANITARY SEWER
─ · ─ · ─	EXISTING WATERMAIN
──➤ ○	PROPOSED STORM SEWER AND MH
──➤ ●	PROPOSED SANITARY SEWER AND MH
H&V ⊕	PROPOSED HYDRANT AND VALVE
V&B ⧓	PROPOSED VALVE AND BOX
× XXX.XXEX.	EXISTING ELEVATION
XXX.XX	EXISTING CONTOUR
×XXX.XX	PROPOSED ELEVATION
⇦	OVERLAND FLOW ROUTE
───	PROPOSED WATERMAIN
━ ━ ━	PROPERTY LINE
	PROPOSED SWALE

CONSTRUCTION NOTES

GENERAL NOTES

1. THE CONTRACTOR IS ADVISED THAT WORKS BY OTHERS MAY BE ONGOING DURING THE PERIOD OF THIS CONTRACT. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES WITH ALL OTHER CONTRACTORS AND PREVENT CONSTRUCTION CONFLICTS.
2. THE INFORMATION SHOWN FOR EXISTING UTILITIES WAS PROVIDED BY OTHERS. THE INFORMATION IS SHOWN FOR GENERAL INFORMATION ONLY AND THE ACCURACY OR COMPLETENESS OF THE PROVIDED INFORMATION HAS NOT BEEN CONFIRMED BY COUNTERPOINT ENGINEERING INC. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL UTILITIES DURING CONSTRUCTION. ALL EXISTING UTILITIES MUST BE LOCATED AND VERIFIED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF WORK. ANY VARIANCE IS TO BE IMMEDIATELY REPORTED TO THE ENGINEER. LOST TIME DUE TO FAILURE OF THE CONTRACTOR TO CONFIRM UTILITY LOCATIONS AND NOTIFY THE ENGINEER OF POSSIBLE CONFLICTS PRIOR TO CONSTRUCTION WILL BE AT THE CONTRACTOR'S EXPENSE.
3. THIS PLAN SHOULD BE READ IN CONJUNCTION WITH ALL OTHER CONSULTANTS PLANS. ANY DISCREPANCIES SHALL BE CLARIFIED PRIOR TO CONSTRUCTION. INFORMATION RELATED TO DIMENSIONS FOR PRIVATE ROADS, PARKING, CURBING, BUILDING LOCATION AND SETBACKS SHALL BE TAKEN FROM THE SITE PLAN PREPARED BY THE SITE ARCHITECT.
4. INSPECTIONS: ALL WORK IN THE MUNICIPAL RIGHT OF WAY AND EASEMENTS IS TO BE INSPECTED BY THE TOWNSHIP PRIOR TO BACKFILLING. ALL WORK RELATING TO WATERMAINS AND SEWERS TO BE INSPECTED BY THE CITY AS PER THE SITE PLAN AGREEMENT.
5. ALL DISTURBED GRASSED AREAS TO BE RESTORED WITH MINIMUM 150mm TOPSOIL AND No. 1 NURSERY SOD.
6. A MINIMUM HORIZONTAL CLEARANCE OF 1.0m SHALL BE MAINTAINED BETWEEN ALL ABOVE GROUND SERVICES AND UTILITIES.
7. THE CONTRACTOR SHALL NOTIFY THE TOWNSHIP A MINIMUM OF 48 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION, UNLESS OTHERWISE NOTED HEREON OR PURSUANT TO CONDITIONS OF PERMIT APPROVALS. WHERE APPLICABLE, THE CONTRACTOR SHALL OBTAIN CITY ROAD OCCUPANCY PERMIT A MINIMUM OF 48 HOURS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
8. ALL DIMENSIONS AND ELEVATIONS TO BE VERIFIED PRIOR TO CONSTRUCTION AND ANY DISCREPANCIES FOUND PRIOR TO OR DURING CONSTRUCTION SHALL BE CLARIFIED WITH THE ENGINEER.
9. ALL TRENCHING SHALL BE IN ACCORDANCE WITH THE OCCUPATIONAL HEALTH AND SAFETY ACT. TRENCH SIDES SHALL BE FLATTENED IN ACCORDANCE WITH DIRECTIONS FROM THE GEOTECHNICAL ENGINEER. CONSTRUCTION OF SHORING, BRACING AND PROTECTION SCHEMES SHALL CONFORM TO OPSS 538 & 539.
10. ALL TRAFFIC CONTROL AND SIGNAGE SHALL BE IN ACCORDANCE WITH MTO'S "ONTARIO TRAFFIC MANUAL".

GRADING NOTES

1. ALL DISTURBED GRASSED AREAS OUTSIDE OF PROPERTY LIMITS SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER, WITH SOD ON MINUMUM 100mm TOPSOIL. ALL TREE AND SHRUB RELOCATION SUBJECT TO APPROVAL BY THE LANDSCAPE ARCHITECT.
2. ALL UNSUITABLE SOIL OR SURPLUS MATERIAL OBTAINED FROM EXCAVATIONS TO BE DISPOSED OF OFF–SITE TO AN APPROVED DISPOSAL FACILITY THAT MEETS ALL ENVIRONMENTAL REGULATIONS AND GUIDELINES.
3. EXCEPT WHERE INDICATED, ALL DIFFERENCES IN GRADE BETWEEN THIS SITE AND ADJOINING LANDS ARE TO BE TAKEN UP ON OWNER'S LAND WITH A MAXIMUM SLOPE OF ONE (1) VERTICAL AND THREE (3) HORIZONTAL, SODDED AND/OR PAVED.
4. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING VEGETATION AND TREE PRESERVATION HOARDING IN AN APPROVED AND FUNCTIONING CONDITION AS REQUIRED.

CONFORMANCE REQUIREMENTS

1. THE FOLLOWING ITEMS ARE TO BE PROVIDED TO COUNTERPOINT NO LESS THAN 10 WORKING DAYS PRIOR TO THE REQUEST FOR A LETTER OF GENERAL CONFORMANCE/FINAL CERTIFICATION. THE DOCUMENTS MUST INDICATE THAT THE SITE HAS BEEN CONSTRUCTED IN GENERAL CONFORMANCE WITH THE APPROVED DESIGN;
   - AS–CONSTRUCTED TOPOGRAPHIC/UNDERGROUND SURVEY COMPLETED BY A REGISTERED LAND SURVEYOR AS PER THE SPECIFICATIONS OUTLINED WITHIN THE CONTRACT DOCUMENT;
   - GEOTECHNICAL ENGINEER CERTIFICATION LETTER, WHICH INCLUDES SUB–GRADE COMPACTION RESULTS, BEDDING AND BACKFILL COMPACTION AND MATERIAL ACCEPTANCE, GRANULAR, ASPHALT, SITE CONCRETE MATERIAL ACCEPTANCE AND COMPACTION RESULTS;
   - CCTV INSPECTION OF FLUSHED STORM AND SANITARY PIPES AND STRUCTURES;
   - AIR/MANDREL TEST RESULTS FOR SANITARY SEWER (IF REQUIRED);
   - WATERMAIN PRESSURE, CHLORINATION AND BACTERIAL TEST RESULTS AND MUNICIPAL APPROVAL IF AVAILABLE.
2. SHOULD THE SUBMITTED MATERIALS INDICATE NON–CONFORMANCE OR DEFICIENCIES, THEY MUST BE ADDRESSED TO COUNTERPOINT'S SATISFACTION WITH AN UPDATED SUBMITTAL PRIOR TO ISSUANCE OF A LETTER OF GENERAL CONFORMANCE/FINAL CERTIFICATION.
3. COUNTERPOINT MUST ALSO COMPLETE ALL NECESSARY SITE INSPECTIONS AS OUTLINED IN THE APPROVED SERVICE PROGRAM, WITH ALL DEFICIENCIES ADDRESSED TO COUNTERPOINT'S SATISFACTION.

LEGAL & TOPOGRAPHY

PROVIDED BY: BARICH GRENKIE
297 HWY No. 8 (UNIT 101)
STONEY CREEK, ON, L8G 1E5
PHONE:(905) 662–6767

BENCHMARK AND ELEVATION

ELEVATIONS SHOWN ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD–1928: 1978) AND ARE DERIVED FROM THE TOWNSHIP OF UXBRIDGE BENCHMARK No. 0011931U517S, HAVING AN ELEVATION OF 272.439 METERS.

BEARINGS ARE UTM GRID, DERIVED FROM OBSERVED REFERENCE BY REAL TIME NETWORK (RTN) OBSERVATIONS. UTM ZONE 17 (81°00' WEST LONGITUDE) NAD83 (CSRS) (2010.0). ORP 1 – NORTHING (4884511.823), EASTING (649875.665).

No.	REVISIONS/ISSUED	DATE	BY	CITY
1.	ISSUED FOR DRAFT 1st SUBMISSION	2022/03/17		

counterpoint ENGINEERING
COUNTERPOINT ENGINEERING INC.
8395 Jane St., Suite 100, Vaughan, ON L4K 5Y2 Phone 905.326.1404 Fax 905.326.1405

ENGINEER'S STAMP

APPLICANT:
MANSOUR ARAB/MAN HOLDINGS LTD
174 DINNICK CRESCENT
TORONTO, ONTARIO
M4N 1M3

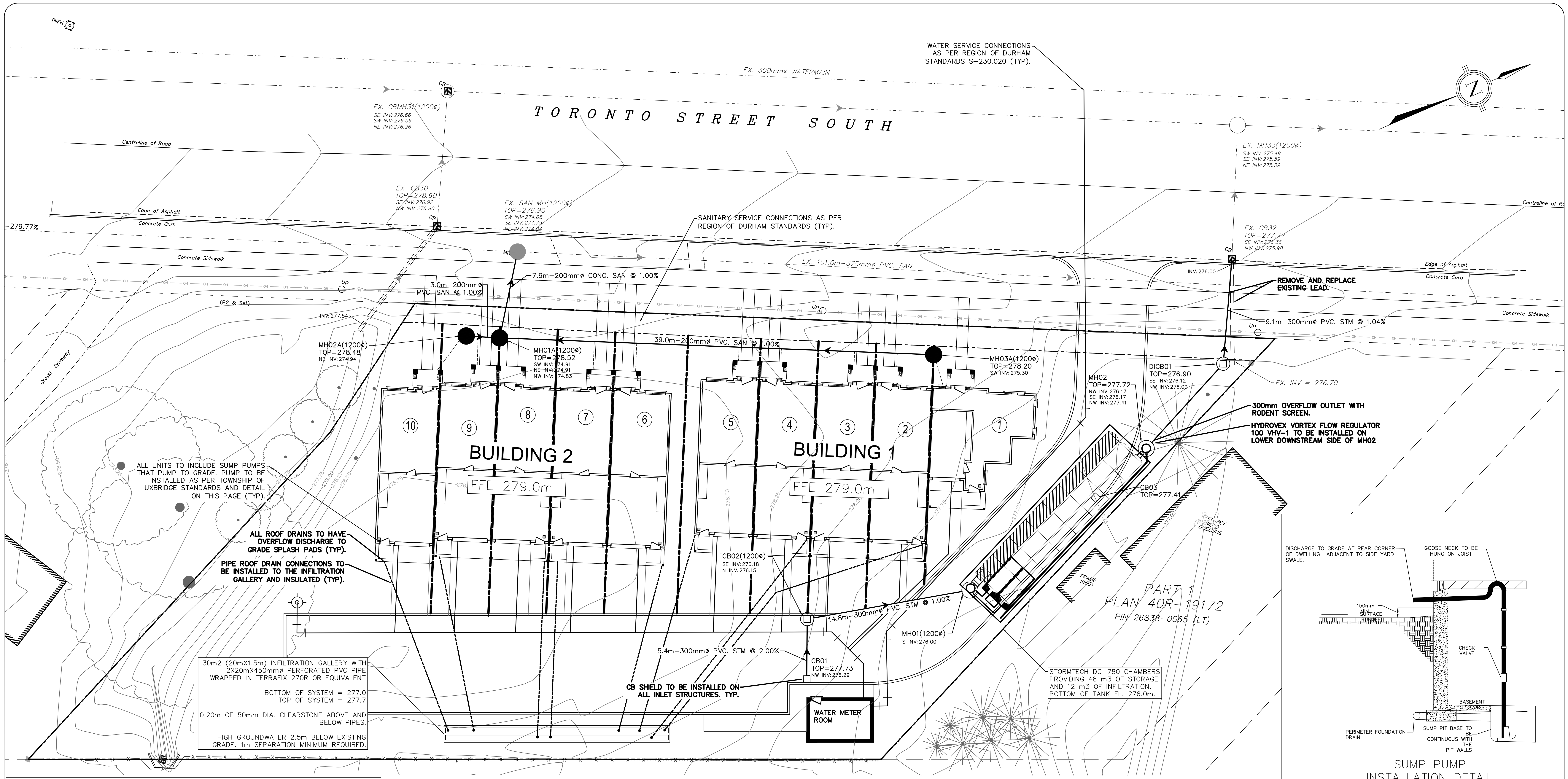
SITE LOCATION:
181 TORONTO STREET SOUTH
UXBRIDGE, ONTARIO

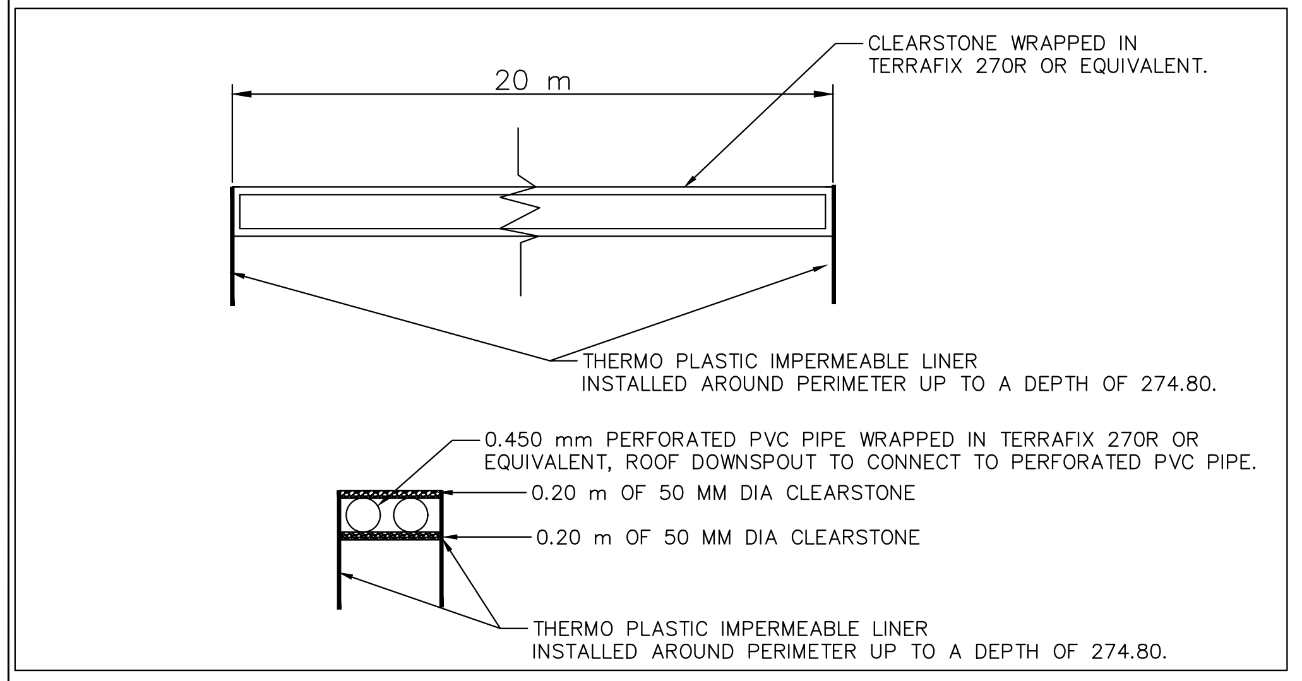
SITE PLAN FILE No.:

GRADING PLAN

DESIGNED BY:	CHECKED BY:	DATE: APRIL 2021
DRAWING BY:	CHECKED BY:	PROJECT NO. 21026
SWM BY:	CHECKED BY:	
SCALE: 1:200m 0m 4m 8m 12m		DRAWING NO. C-1

REGION FILE No.:





INFILTRATION GALLERY DETAIL (N.T.S.)

CONSTRUCTION NOTES

GENERAL NOTES

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5. ALL DISTURBED GRASSED AREAS TO BE RESTORED WITH MINIMUM 150mm TOPSOIL AND No. 1 NURSERY SOD.
6. A MINIMUM HORIZONTAL CLEARANCE OF 1.0m SHALL BE MAINTAINED BETWEEN ALL ABOVE GROUND SERVICES AND UTILITIES.
7. THE CONTRACTOR SHALL NOTIFY THE TOWNSHIP A MINIMUM OF 48 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION, UNLESS OTHERWISE NOTED HEREON OR PURSUANT TO CONDITIONS OF PERMIT APPROVALS. WHERE APPLICABLE, THE CONTRACTOR SHALL OBTAIN CITY ROAD OCCUPANCY PERMIT A MINIMUM OF 48 HOURS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
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10. ALL TRAFFIC CONTROL AND SIGNAGE SHALL BE IN ACCORDANCE WITH MTO'S "ONTARIO TRAFFIC MANUAL".

STORM AND SANITARY SEWER

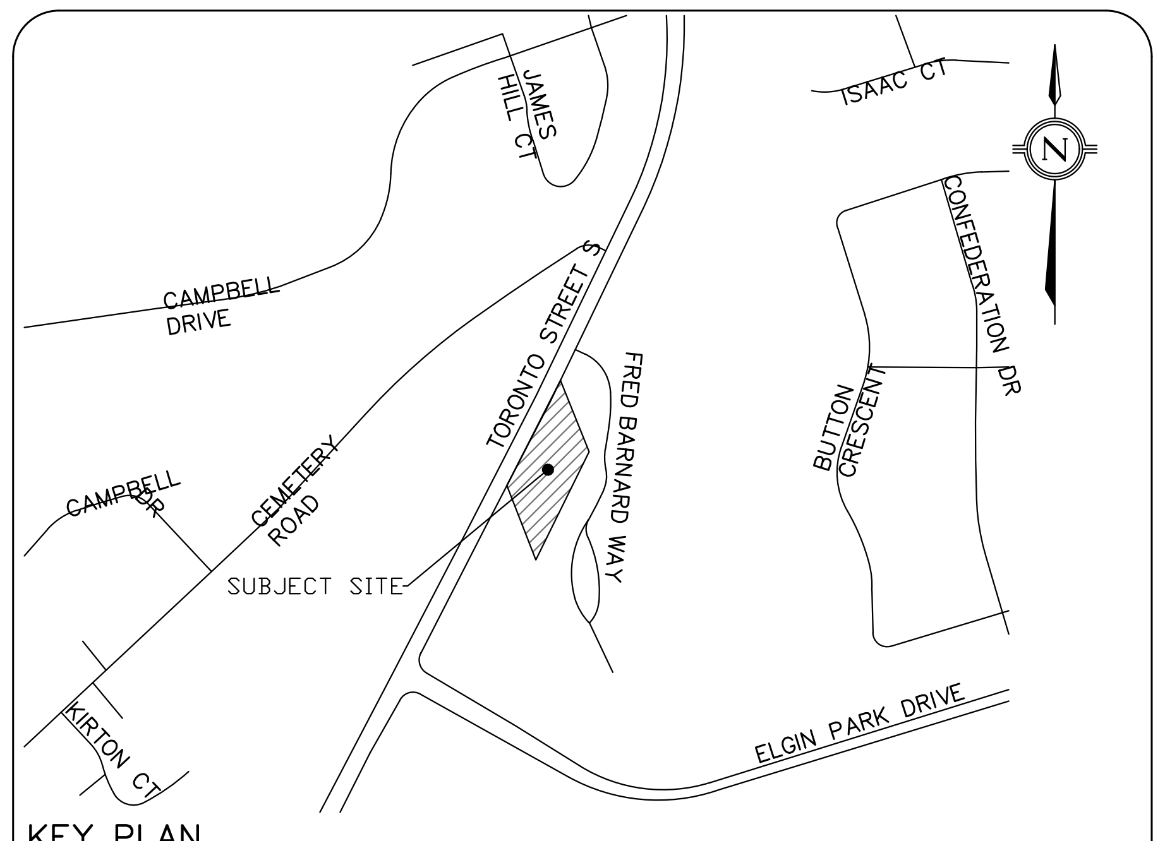
1. FOR CONSTRUCTION DETAILS NOT SHOWN ON PLANS, REFERENCE SHALL BE MADE TO REGION OF DURHAM STANDARDS AND SPECIFICATIONS, AND ONTARIO PROVINCIAL STANDARDS DRAWINGS AND SPECIFICATIONS.
2. ALL STORM MANHOLES SHALL BE AS PER OPSD 701.010 TO 701.014 (SIZE AS SHOWN) WITH FRAME AND COVER AS PER OPSD 401.010. ALL CATCHBASIN MANHOLES TO HAVE FRAME AND GRATE AS PER OPSD 400.020 UNLESS OTHERWISE SPECIFIED. SAFETY PLATFORMS TO BE INSTALLED IN ALL MANHOLES WHERE DEPTHS EXCEED 5.0m. THE MAXIMUM SPACING BETWEEN SAFETY GRATING SHALL NOT EXCEED 4.5m.
3. ALL STORM SEWERS UP TO 450mm DIA., INCLUDING CATCHBASIN LEADS, SHALL BE PVC SDR–35 SEWER PIPE AND SHALL BE IN COMPLIANCE WITH OPSS 1841, CSA B182.2, CSA B182.3. SEALING GASKETS MUST MEET THE REQUIREMENTS OF ASTM D3034 OR ASTM F1760, CSA B182.2 OR CSA B182.7. IN ADDITION, THE PIPE JOINTS MUST BE ABLE TO WITHSTAND A MINIMUM HYDROSTATIC PRESSURE OF 345 kPa WITHOUT LEAKAGE. INJECTION–MOLDED GASKETED PVC FITTING SHALL MEET THE REQUIREMENTS OF ASTM D3034 AND ASTM F1336 AND SHALL BE CERTIFIED TO CSA B182.1 OR CSA B182.2. FABRICATED FITTINGS MUST CONFORM TO ASTM F1336 AND CSA B182.2.
4. ALL STORM SEWERS 525mm OR LARGER SHALL BE REINFORCED CONCRETE COMPLYING WITH WITH C.S.A. SPECIFICATION A257.2. STANDARD MINIMUM CLASS OF CONCRETE SEWER SHALL BE AS PER OPSD 807.010 AND 807.030. RIGID PIPE REQUIRES CONCRETE ENCASEMENT FOR THE FIRST PIPE LENGTH CONNECTING TO ANY APPURTENANCES. WHERE CONCRETE PIPE SMALLER THAN 525mm IS SPECIFIED CLASS SHALL BE 100–D.
5. PVC STORM SEWER BEDDING SHALL BE CLASS "P" BEDDING AS PER REGIONAL MUNICIPALITY OF DURHAM STANDARD S–200.010. CONCRETE STORM SEWER BEDDING SHALL BE OPSS GRANULAR 'A' AS PER OPSD 802.030 CLASS 'B'. ALL BEDDING AND COVER MATERIAL ARE TO BE COMPACTED TO MINIMUM 95% SPMDD WITH A MINIMUM 300mm SAND COVER OVER THE PIPE. WITHIN 0.5m OF SUBGRADE ELEVATION, BACKFILL TO BE COMPACTED TO 98% SPMDD.
6. SINGLE AND DOUBLE CATCH BASINS TO BE PRECAST AS PER OPSD 705.010 AND OPSD 705.020, WITH FRAME AND GRATE AS PER OPSD 400.020.
7. CATCHBASIN LEADS TO HAVE MIN. COVER OF 1.5m BELOW FINISHED GRADE UNLESS OTHERWISE SPECIFIED.
8. ALL SANITARY MANHOLES SHALL BE 1200mmø AS PER OPSD 701.010 AND WATERTIGHT FRAME AND COVER AS PER OPSD 401.050.
9. ALL SANITARY SEWERS SHALL BE PVC SDR 28 SEWER PIPE FOR 150mm DIA, & PVC SDR 35 SEWER PIPE FOR 200mm DIA, AND SHALL BE IN COMPLIANCE WITH ASTM D3034 OR ASTM F1760 AND THIRD PARTY CERTIFIED TO CSA B182.2 OR CSA B182.7. SEALING GASKETS MUST MEET THE REQUIREMENTS OF ASTM D3034 OR ASTM F1760, CSA B182.2 OR CSA B182.7. IN ADDITION, THE PIPE JOINTS MUST BE ABLE TO WITHSTAND A MINIMUM HYDROSTATIC PRESSURE OF 345 kPa WITHOUT LEAKAGE. INJECTION–MOLDED GASKETED PVC FITTING SHALL MEET THE REQUIREMENTS OF ASTM D3034 AND ASTM F1336 AND SHALL BE CERTIFIED TO CSA B182.1 OR CSA B182.2. FABRICATED FITTINGS MUST CONFORM TO ASTM F1336 AND CSA B182.2.
10. BEDDING FOR SANITARY SEWERS SHALL BE 19mm CRUSHER RUN LIMESTONE COMPACTED TO 98% PROCTOR DENSITY FROM 100mm BELOW INVERT TO OBVERT, WITH 300mm SAND COVER ABOVE COMPACTED TO 98% PROCTOR DENSITY AS PER REGION STANDARD S–200.010 (CLASS 'P'). WITHIN 0.5m OF SUBGRADE ELEVATION, BACKFILL TO BE COMPACTED TO 100% SPMDD.
11. ALL MANHOLE AND CATCHBASIN EXCAVATIONS TO BE BACKFILLED WITH OPSS 1010 GRANULAR "B"–TYPE 2 COMPACTED TO 98% SPMDD. WITHIN 0.5m OF SUBGRADE ELEVATION, BACKFILL TO BE COMPACTED TO 100% SPMDD.
12. MANHOLES SHALL BE BENCHED ACCORDING TO OPSD 701.021. STORM MANHOLES SHALL BE BENCHED TO SPRING LINE UNLESS OTHERWISE SPECIFIED. CATCHBASIN TYPE MANHOLES TO BE PROVIDED WITH A MIN. 0.30m SUMP. SANITARY MANHOLES SHALL BE BENCHED TO OBVERT.
13. "MODULOC" OR APPROVED PRE–CAST MANHOLE AND CATCH BASIN ADJUSTERS TO BE USED TO SET STRUCTURES TO FINAL GRADE. PARGE ADJUSTING UNITS ON THE OUTSIDE ONLY.
14. SERVICES TO BUILDINGS TO BE TERMINATED 1.5m FROM THE STREELINE UNLESS OTHERWISE NOTED.
15. DROP STRUCTURES AS PER DURHAM REGION STANDARD DETAIL S–100.08, TYPE 'B'.
16. VERTICAL AND HORIZONTAL LASER ALIGNMENT CONTROL TO BE UTILIZED ON ALL SEWER INSTALLATIONS.
17. THE CONTRACTOR IS TO FLUSH AND PROVIDE CCTV CAMERA INSPECTIONS OF ALL SANITARY AND STORM SEWERS, INCLUDING PICTORIAL REPORT AND TWO (2) CD's, TO COUNTERPOINT ENGINEERING, PRIOR TO PLACEMENT OF ASPHALT AT PRELIMINARY ACCEPTANCE, AND AT FINAL ACCEPTANCE.
18. SANITARY SERVICE CONNECTIONS TO BE 100mmø GREEN PVC, INSTALLED TO THE REGION OF DURHAM STANDARD DRAWING S–230.010.

WATER SERVICING NOTES

1. WATERMAINS AND APPURTENANCES SHALL BE AS PER REGION OF DURHAM STANDARDS AND SPECIFICATIONS.
2. WATERMAINS SHALL BE POLYVINYL CHLORIDE (PVC) CLASS 150, DR 18 CONFORMING TO AWWA C–900,
3. ALL PIPE FITTINGS SHALL BE CAST IRON, CEMENT LINED MECHANICAL JOINT, SHORT BODY CONFIRMING TO AWWA C110 IRON FITTINGS OR AWWA C135 FOR DUCTILE IRON FITTINGS. FITTINGS SHALL BE SUPPLIED WITH MECHANICAL JOINT TYPE ENDS AWWA C111.
4. WATERMAIN BEDDING SHALL BE 19mm CRUSHER RUN LIMESTONE COMPACTED TO 98% PROCTOR DENSITY FROM 100mm BELOW INVERT TO OBVERT, WITH 300mm SAND COVER ABOVE COMPACTED TO 98% PROCTOR DENSITY AS PER REGION STANDARD S–200.010 (CLASS 'P'). WITHIN 0.5m OF SUBGRADE ELEVATION, BACKFILL TO BE COMPACTED TO 100% SPMDD.
5. ALL BENDS, TEES, JOINTS, ETC., ARE TO BE RESTRAINED WITH THRUST BLOCKS AS PER OPSD 1103.010 & OPSD 1103.020.
6. TRACER WIRE SHALL BE INSTALLED ON ALL PVC WATERMAIN AS PER REGION STANDARD DRAWING S–201.030. TRACER WIRE SHALL BE No. 12 GAUGE (CANADIAN WIRE STRANDED T.W.V., 75C 600V OR APPROVED EQUIVALENT).
7. ANODES FOR METAL FITTING TO BE 5.4 Kg. ZINC AS PER REGION SPECIFICATIONS. CATHODIC PROTECTION FOR WATERMAINS TO BE PER REGION STANDARD DRAWING S–201.030. CATHODIC PROTECTION SHALL BE PROVIDED ON ALL BURIED METAL PIPES AND FITTINGS.
8. WATERMAINS AND/OR WATER SERVICES ARE TO HAVE A MINIMUM COVER OF 1.8m FROM PROPOSED GRADES WITH A MINIMUM HORIZONTAL SPACING OF 2.5m HORIZ FROM STORM AND SANITARY SEWERS AND 2.0m HORIZ FROM GAS MAINS AND OTHER WIRE CONDUITS. IN PRE–GRADE OR EXISTING UNDEVELOPED AREAS COVER SHALL BE FROM PRE–GRADE EXISTING ELEVATIONS.
9. WATERMAIN SEPERATION AS PER MOE REQUIREMENTS CONTAINED IN MOE DOCUMENT PROCEDURE F–6–1, PROCEDURES TO GOVERN THE SEPERATION OF SEWERS AND WATERMAINS. UNDER NORMAL CONDITIONS, WATERMAINS SHOULD BE LAID WITH AT LEAST 2.5 METERS HORIZONTAL SEPERATION FROM ANY SEWER OR SEWER MANHOLE; THE DISTANCE SHALL BE MEASURED FROM THE NEAREST EDGES. UNDER NORMAL CONDITIONS, WATERMAINS SHALL CROSS ABOVE SEWERS WITH SUFFICIENT VERTICAL SEPERATION TO ALLOW FOR PROPER BEDDING AND STRUCTURAL SUPPORT OF THE WATERMAIN AND SEWER MAIN. WHEN IT IS NOT POSSIBLE FOR THE WATERMAIN TO CROSS ABOVE THE SEWER, THE WATERMAIN PASSING UNDER A SEWER SHALL BE PROTECTED BY PROVIDING:
   - A VERTICAL SEPERATION OF AT LEAST 0.5 METRES BETWEEN THE INVERT OF THE SEWER AND THE CROWN OF THE WATERMAIN.
   - ADEQUATE STRUCTURAL SUPPORT FOR THE SEWERS TO PREVENT EXCESSIVE DEFLECTION OF JOINTS AND SETTLING.
   - THAT THE LENGTH OF WATER PIPE SHALL BE CENTRED AT THE POINT OF CROSSING SO THAT THE JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE SEWER.
10. ALL PROPOSED WATER PIPING MUST BE ISOLATED FROM EXISTING SYSTEMS IN ORDER TO ALLOW INDEPENDENT PRESSURE TESTING AND CHLORINATING IN ACCORDANCE WITH THE REGION OF DURHAM REQUIREMENTS.
11. ALL WATERMAINS AND FIREMAINS SHALL BE BACTERIOLOGICALLY TESTED IN ACCORDANCE WITH ALL LOCAL MUNICIPAL AND PROVINCIAL REQUIREMENTS. DISPOSAL OF CHLORINATED WATER TO BE IN ACCORDANCE WITH MUNICIPAL REQUIREMENTS.
12. WATER SERVICE CONNECTIONS TO BE 19mmø TYPE "K" COPPER, INCLUDING CURB STOPS AND VALVE BOXES LOCATED AT THE PROPERTY LINE.

CONFORMANCE REQUIREMENTS

1. THE FOLLOWING ITEMS ARE TO BE PROVIDED TO COUNTERPOINT NO LESS THAN 10 WORKING DAYS PRIOR TO THE REQUEST FOR A LETTER OF GENERAL CONFORMANCE/FINAL CERTIFICATION. THE DOCUMENTS MUST INDICATE THAT THE SITE HAS BEEN CONSTRUCTED IN GENERAL CONFORMANCE WITH THE APPROVED DESIGN;
   - AS–CONSTRUCTED TOPOGRAPHIC/UNDERGROUND SURVEY COMPLETED BY A REGISTERED LAND SURVEYOR AS PER THE SPECIFICATIONS OUTLINED WITHIN THE CONTRACT DOCUMENT;
   - GEOTECHNICAL ENGINEER CERTIFICATION LETTER, WHICH INCLUDES SUB–GRADE COMPACTION RESULTS, BEDDING AND BACKFILL COMPACTION AND MATERIAL ACCEPTANCE, GRANULAR, ASPHALT, SITE CONCRETE MATERIAL ACCEPTANCE AND COMPACTION RESULTS;
   - CCTV INSPECTION OF FLUSHED STORM AND SANITARY PIPES AND STRUCTURES;
   - AIR/MANDREL TEST RESULTS FOR SANITARY SEWER (IF REQUIRED);
   - WATERMAIN PRESSURE, CHLORINATION AND BACTERIAL TEST RESULTS AND MUNICIPAL APPROVAL IF AVAILABLE.
2. SHOULD THE SUBMITTED MATERIALS INDICATE NON–CONFORMANCE OR DEFICIENCIES, THEY MUST BE ADDRESSED TO COUNTERPOINT'S SATISFACTION WITH AN UPDATED SUBMITTAL PRIOR TO ISSUANCE OF A LETTER OF GENERAL CONFORMANCE/FINAL CERTIFICATION.
3. COUNTERPOINT MUST ALSO COMPLETE ALL NECESSARY SITE INSPECTIONS AS OUTLINED IN THE APPROVED SERVICE PROGRAM, WITH ALL DEFICIENCIES ADDRESSED TO COUNTERPOINT'S SATISFACTION.



KEY PLAN

LEGEND

⊙	EXISTING HYDRANT
—·—▶○	EXISTING STORM SEWER
---▶●	EXISTING SANITARY SEWER
—·—·—	EXISTING WATERMAIN
——▶○	PROPOSED STORM SEWER AND MH
——▶●	PROPOSED SANITARY SEWER AND MH
H&V ⊙	PROPOSED HYDRANT AND VALVE
V&B ⧓	PROPOSED VALVE AND BOX
——	PROPOSED WATERMAIN
▬▬	PROPERTY LINE

LEGAL & TOPOGRAPHY

PROVIDED BY: BARICH GRENKIE
297 HWY No. 8 (UNIT 101)
STONEY CREEK, ON, L8G 1E5
PHONE: (905) 662–6767

BENCHMARK AND ELEVATION

ELEVATIONS SHOWN ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD–1928: 1978) AND ARE DERIVED FROM THE TOWNSHIP OF UXBRIDGE BENCHMARK No. 0011931U517S, HAVING AN ELEVATION OF 272.439 METERS.

BEARINGS ARE UTM GRID, DERIVED FROM OBSERVED REFERENCE BY REAL TIME NETWORK (RTN) OBSERVATIONS. UTM ZONE 17 (81°00' WEST LONGITUDE) NAD83 (CSRS) (2010.0). ORP 1 – NORTHING (4884511.823), EASTING (649875.665).

1.	ISSUED FOR DRAFT 1st SUBMISSION	2022/03/17		
No.	REVISIONS/ISSUED	DATE	BY	CITY

counterpoint ENGINEERING
COUNTERPOINT ENGINEERING INC.
8395 Jane St., Suite 100, Vaughan, ON L4K 5Y2 Phone 905.326.1404 Fax 905.326.1405

ENGINEER'S STAMP

APPLICANT:
MANSOUR ARAB/MAN HOLDINGS LTD
174 DINNICK CRESCENT
TORONTO, ONTARIO
M4N 1M3

SITE LOCATION:
181 TORONTO STREET SOUTH
UXBRIDGE, ONTARIO

SITE PLAN FILE No.:

SERVICING PLAN

DESIGNED BY:	CHECKED BY:	DATE: APRIL 2021
DRAWING BY:	CHECKED BY:	PROJECT NO. 21026
SWM BY:	CHECKED BY:	
SCALE: 1:200m 0m 4m 8m 12m		DRAWING NO. C-2

REGION FILE No.:

APPENDIX B

Borehole Logs

Project No. 5555-21-GC

Log of Borehole 21BH-1 (MW)

Dwg No. 2

Project: Geotechnical Investigation

Sheet No. 1 of 1

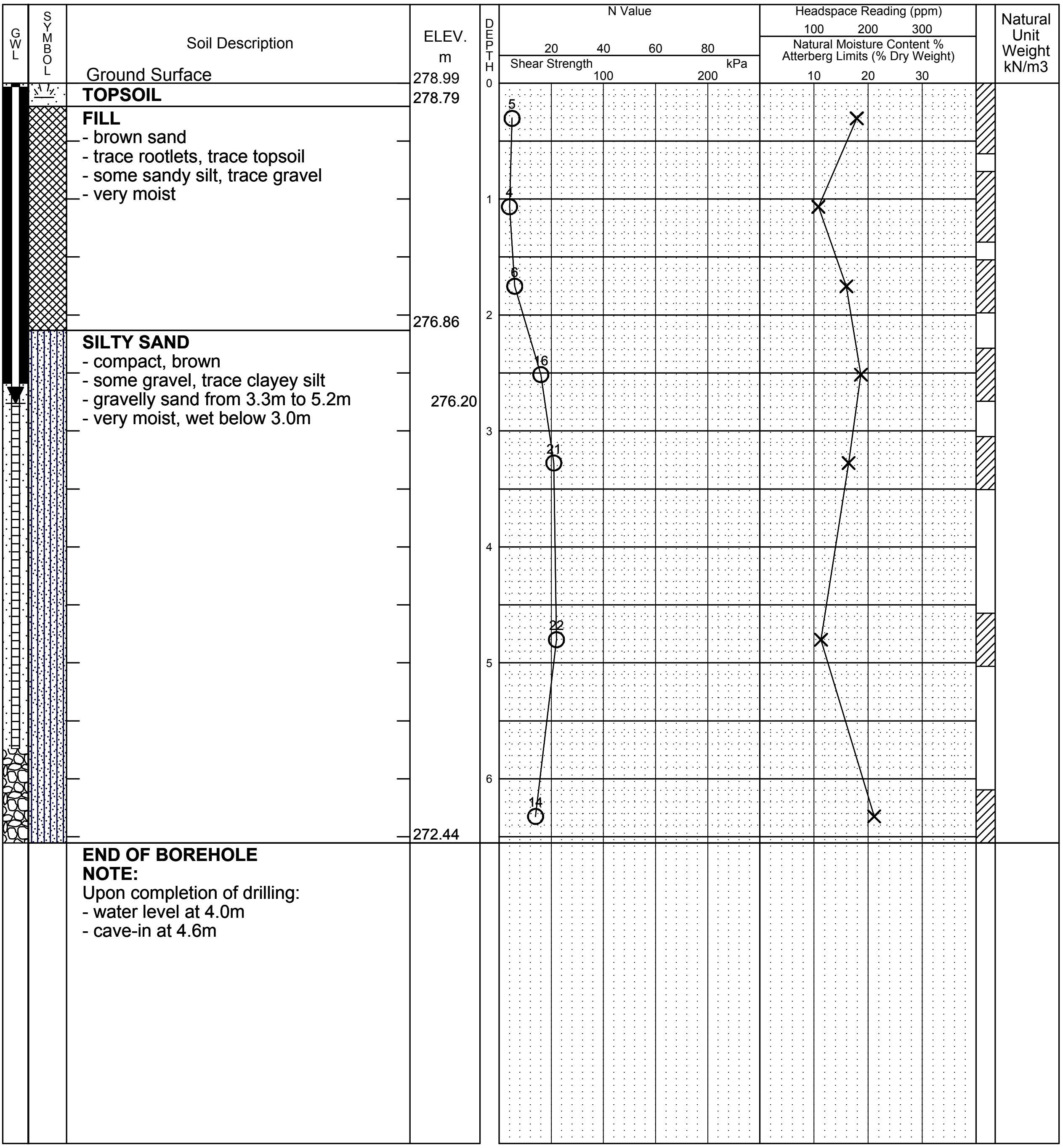
Location: 181 Toronto Street South, Uxbridge, Ontario

Date Drilled: 4/8/21

Drill Type: Track Mounted Drill Rig

Datum: Geodetic

Auger Sample	☒
SPT (N) Value	○ ▨
Dynamic Cone Test	—
Shelby Tube	■
Field Vane Test	✚ S
Headspace Reading (ppm)	●
Natural Moisture	×
Plastic and Liquid Limit	├─┤
Unconfined Compression % Strain at Failure	⊗
Penetrometer	▲



Soil Description	ELEV. m
Ground Surface	278.99
TOPSOIL	278.79
FILL - brown sand - trace rootlets, trace topsoil - some sandy silt, trace gravel - very moist	276.86
SILTY SAND - compact, brown - some gravel, trace clayey silt - gravelly sand from 3.3m to 5.2m - very moist, wet below 3.0m	276.20
	272.44
END OF BOREHOLE **NOTE:** Upon completion of drilling: - water level at 4.0m - cave-in at 4.6m	

LGBE3 5555-21-GC.GPJ 4/28/21

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)
April 16, 2021	2.8m	

Project No. 5555-21-GC

Log of Borehole 21BH-2

Dwg No. 3

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 181 Toronto Street South, Uxbridge, Ontario

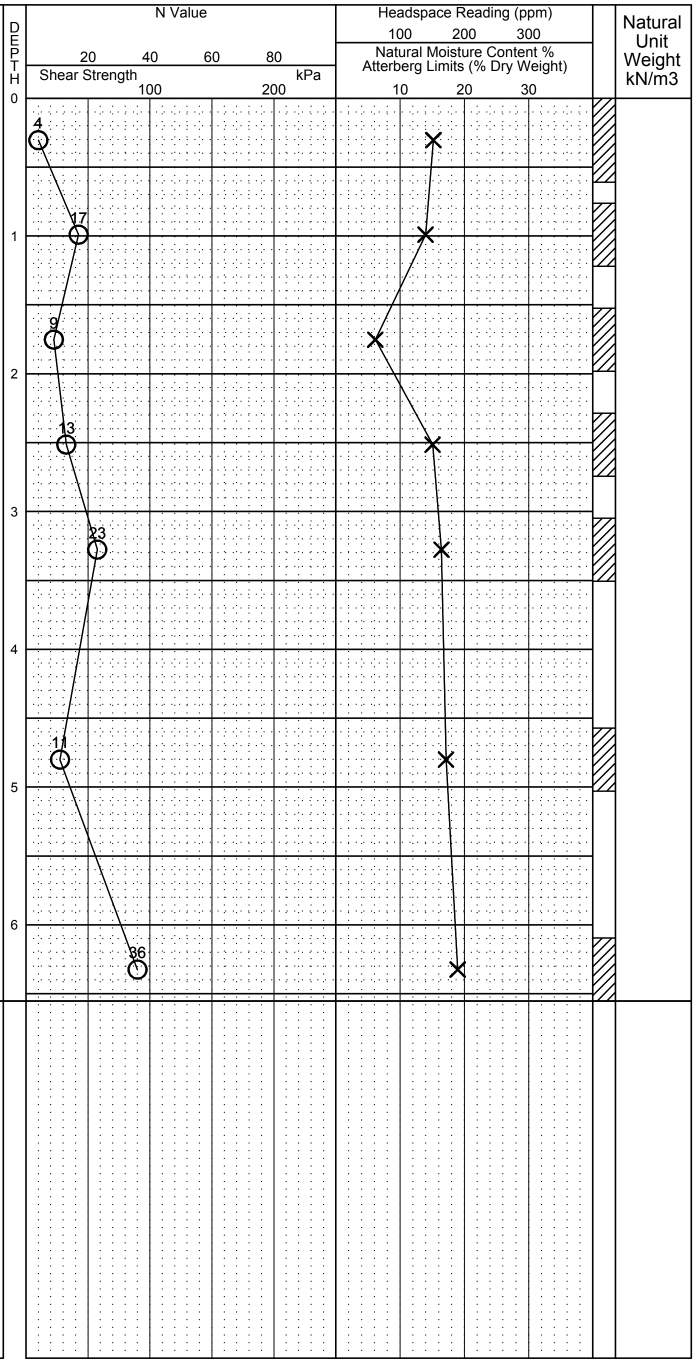
Date Drilled: 4/8/21

Drill Type: Track Mounted Drill Rig

Datum: Geodetic

Auger Sample	☒
SPT (N) Value	○ ▨
Dynamic Cone Test	—
Shelby Tube	■
Field Vane Test	✚ S
Headspace Reading (ppm)	●
Natural Moisture	×
Plastic and Liquid Limit	├─┤
Unconfined Compression % Strain at Failure	⊗
Penetrometer	▲

GWL	Soil Description	ELEV. m
	Ground Surface	278.75
	TOPSOIL	278.55
	FILL - brown sandy silt - trace rootlets, pockets of topsoil - trace clayey silt, trace gravel - very moist	277.68
	SAND - loose to dense, brown - fine to medium grained - some silt, trace gravel - moist to very moist, wet below 2.3m	
▼		276.05
		272.20
	END OF BOREHOLE **NOTE:** Upon completion of drilling: - water level at 2.7m - cave-in at 3.7m	



LGBE3 5555-21-GC.GPJ 4/28/21

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

Project No. 5555-21-GC

Log of Borehole 21BH-3

Dwg No. 4

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 181 Toronto Street South, Uxbridge, Ontario

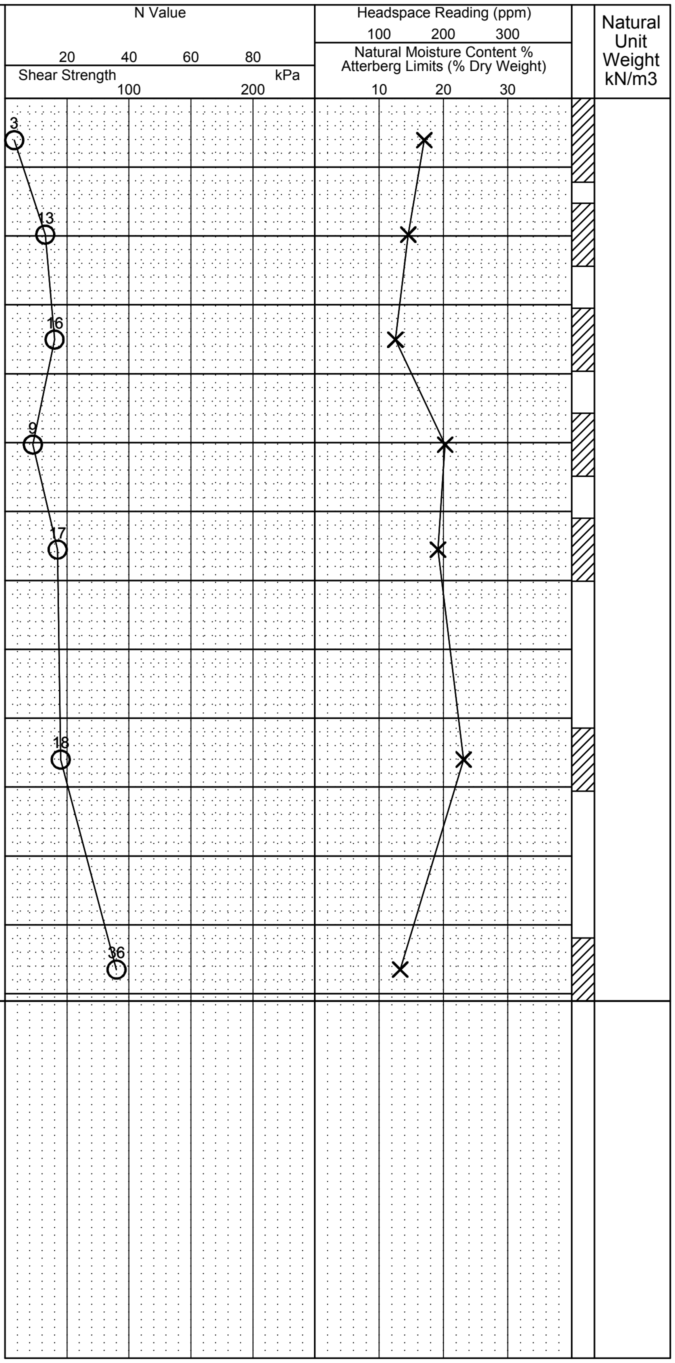
Date Drilled: 4/8/21

Drill Type: Track Mounted Drill Rig

Datum: Geodetic

Auger Sample	☒	Headspace Reading (ppm)	●
SPT (N) Value	○ ▨	Natural Moisture	×
Dynamic Cone Test	—	Plastic and Liquid Limit	├─┤
Shelby Tube	■	Unconfined Compression % Strain at Failure	⊗
Field Vane Test	✚ S	Penetrometer	▲

GWL	Soil Description	ELEV. m	DEPTH
	Ground Surface	279.01	0
	TOPSOIL	278.81	
	FILL - brown sandy silt - trace rootlets, pockets of topsoil - trace gravel - very moist		1
	SAND - loose to dense, brown - fine to medium grained - some silt, trace gravel - very moist, wet between 2.3m to 5.0m	277.33	2 3
▼		275.31	4 5 6
	END OF BOREHOLE **NOTE:** Upon completion of drilling: - water level at 3.7m - cave-in at 4.0m	272.46	



NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

Project No. 5555-21-GC

Log of Borehole 21BH-4 (MW)

Dwg No. 5

Project: Geotechnical Investigation

Sheet No. 1 of 1

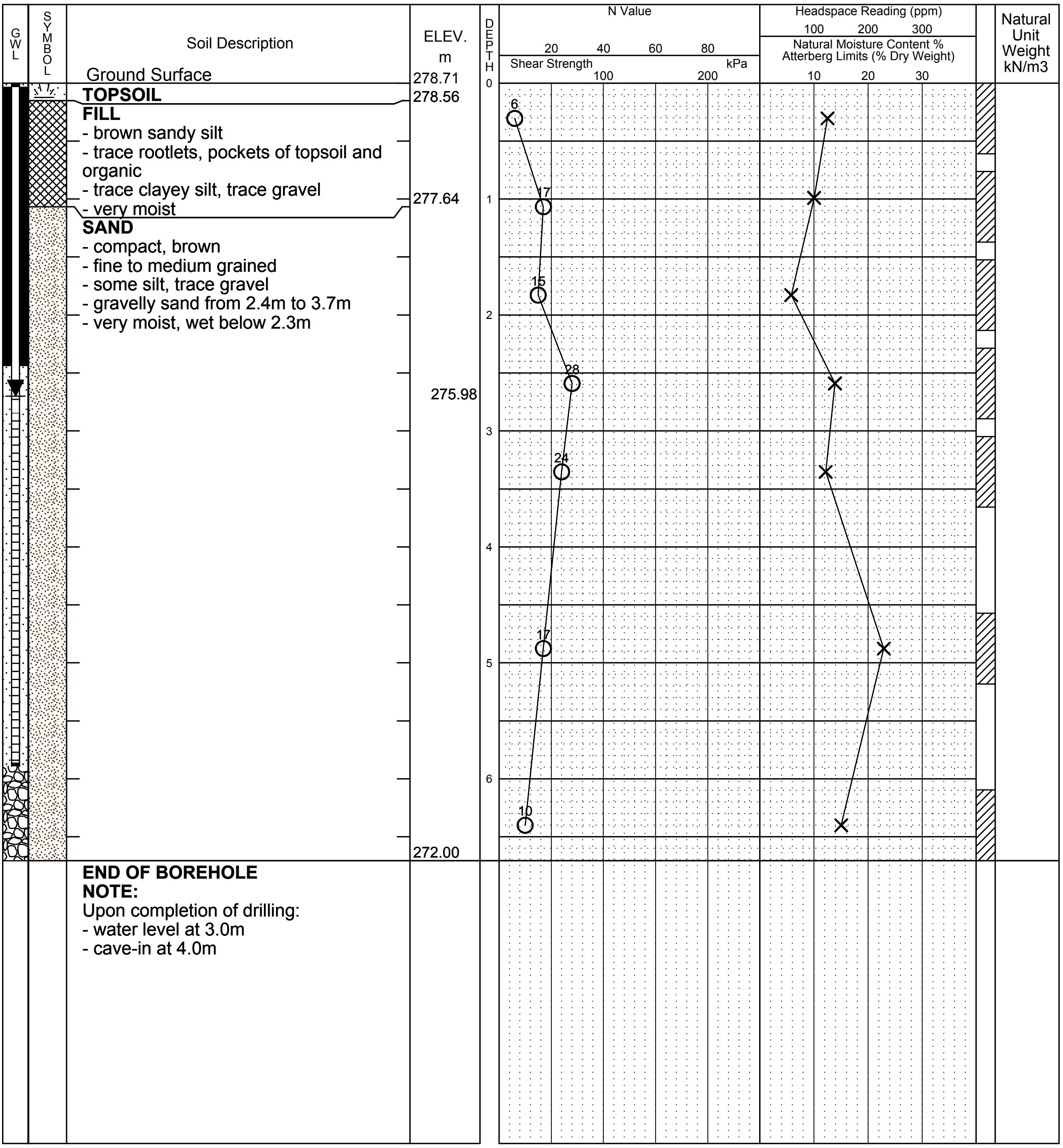
Location: 181 Toronto Street South, Uxbridge, Ontario

Date Drilled: 4/9/21

Drill Type: Track Mounted Drill Rig

Datum: Geodetic

Auger Sample	☒
SPT (N) Value	○ ▨
Dynamic Cone Test	—
Shelby Tube	■
Field Vane Test	✚ S
Headspace Reading (ppm)	●
Natural Moisture	×
Plastic and Liquid Limit	├─┤
Unconfined Compression % Strain at Failure	⊗
Penetrometer	▲



TOPSOIL

FILL
- brown sandy silt
- trace rootlets, pockets of topsoil and organic
- trace clayey silt, trace gravel
- very moist

SAND
- compact, brown
- fine to medium grained
- some silt, trace gravel
- gravelly sand from 2.4m to 3.7m
- very moist, wet below 2.3m

END OF BOREHOLE

NOTE:

Upon completion of drilling:
- water level at 3.0m
- cave-in at 4.0m

LGBE3 5555-21-GC.GPJ 4/28/21

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)
April 16, 2021	2.7m	

Project No. 5555-21-GC

Log of Borehole 21BH-5

Dwg No. 6

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 181 Toronto Street South, Uxbridge, Ontario

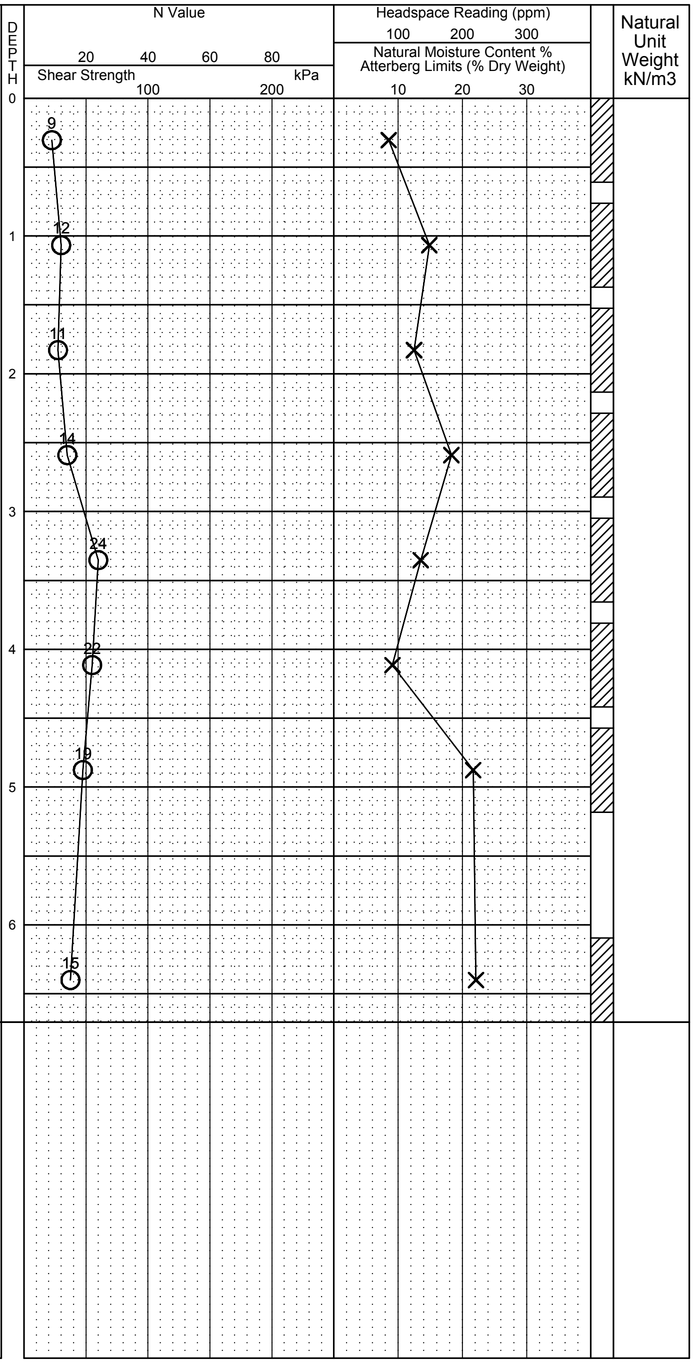
Date Drilled: 4/8/21

Drill Type: Track Mounted Drill Rig

Datum: Geodetic

Auger Sample	☒
SPT (N) Value	○ ▨
Dynamic Cone Test	—
Shelby Tube	■
Field Vane Test	✚ S
Headspace Reading (ppm)	●
Natural Moisture	×
Plastic and Liquid Limit	├─┤
Unconfined Compression % Strain at Failure	⊗
Penetrometer	▲

GWL	Soil Description	ELEV. m
	Ground Surface	278.87
	TOPSOIL	278.74
	FILL - brown sandy silt - trace rootlets and topsoil - some clayey silt, trace gravel - asphalt pieces at 0.6m - a layer of dark sandy silt with topsoil from 2.3m to 2.5m - moist to very moist, wet pockets	
	SILTY SAND - compact, brown - trace gravel - moist to wet	276.28
▼		275.47
		272.17
	END OF BOREHOLE **NOTE:** Upon completion of drilling: - water level at 3.4m - cave-in at 3.7m	



LGBE3 5555-21-GC.GPJ 4/28/21

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

Project No. 5555-21-GC

Log of Borehole 21BH-6

Dwg No. 7

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 181 Toronto Street South, Uxbridge, Ontario

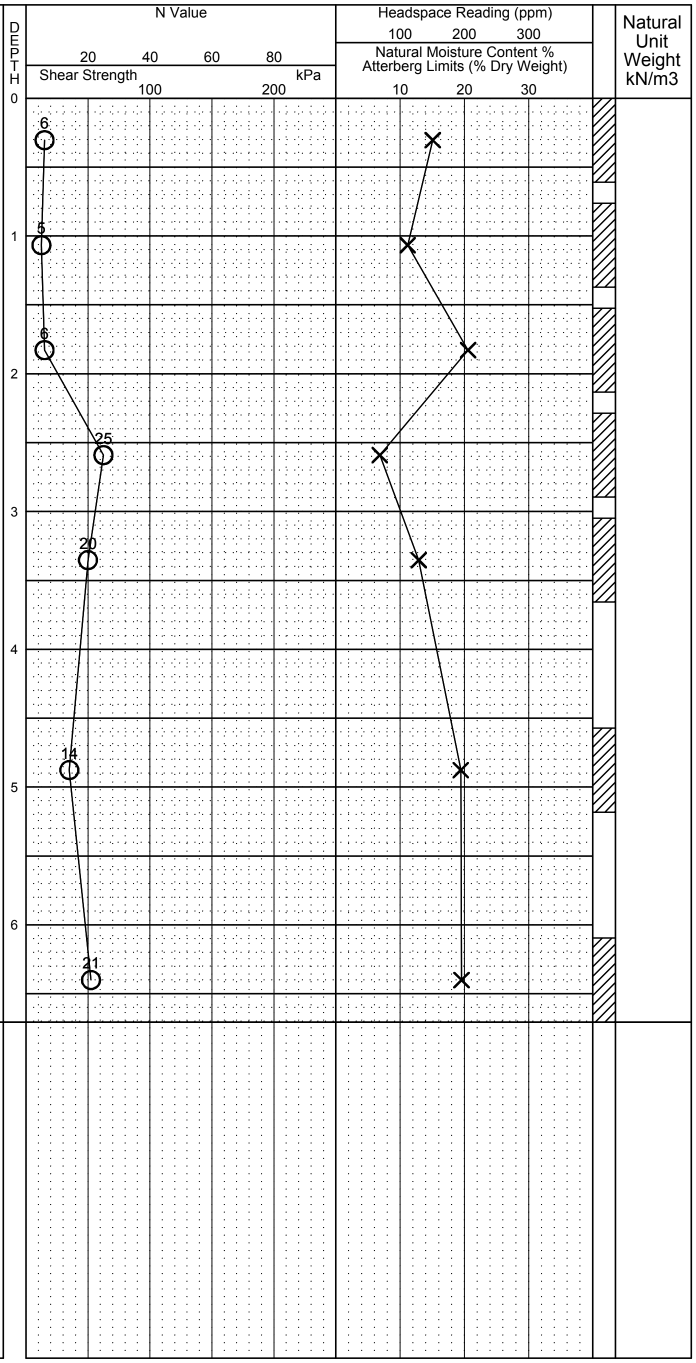
Date Drilled: 4/9/21

Drill Type: Track Mounted Drill Rig

Datum: Geodetic

Auger Sample	☒
SPT (N) Value	○ ▨
Dynamic Cone Test	——
Shelby Tube	■
Field Vane Test	✚ S
Headspace Reading (ppm)	●
Natural Moisture	×
Plastic and Liquid Limit	├─┤
Unconfined Compression % Strain at Failure	⊗
Penetrometer	▲

GWL	SYMBOL	Soil Description	ELEV. m
		Ground Surface	278.35
		TOPSOIL	278.20
		FILL - brown sandy silt - trace rootlets, trace organics - some sand, trace gravel - a layer of dark sandy silt with minor rootlets at 2.0m, 150mm in thickness - very moist	
		SILTY SAND - loose to compact, brown - fine grained - trace gravel - gravelly sand from 2.3m to 3.7m - moist to very moist, wet below 3.0m	276.06
▼			274.55
		END OF BOREHOLE **NOTE:** Upon completion of drilling: - water level at 3.8m - cave-in at 4.0m	271.64



NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

Project No. 5555-21-GC

Log of Borehole 21BH-7

Dwg No. 8

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 181 Toronto Street South, Uxbridge, Ontario

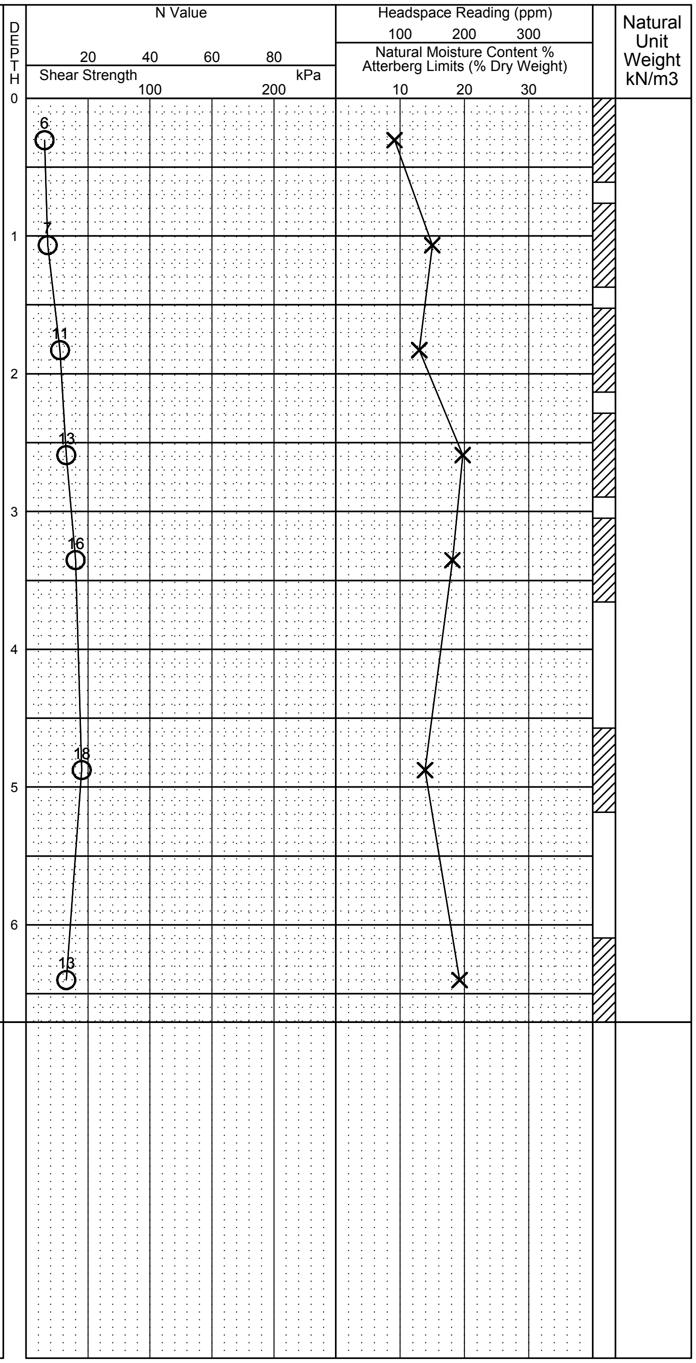
Date Drilled: 4/8/21

Drill Type: Track Mounted Drill Rig

Datum: Geodetic

Auger Sample	☒
SPT (N) Value	○ ▨
Dynamic Cone Test	—
Shelby Tube	■
Field Vane Test	✚ S
Headspace Reading (ppm)	●
Natural Moisture	×
Plastic and Liquid Limit	├─┤
Unconfined Compression % Strain at Failure	⊗
Penetrometer	▲

GWL	SYMBOL	Soil Description	ELEV. m
		Ground Surface	278.12
		TOPSOIL	277.97
		FILL - brown sandy silt - trace rootlets, pockets of topsoil or organics - a thin layer of black sandy silt with minor topsoil at 2.1m - trace clayey silt, trace gravel - very moist	
		SILTY SAND - compact, brown - trace gravel - wet	275.68
▼			274.42
			271.42
		END OF BOREHOLE **NOTE:** Upon completion of drilling: - water level at 3.7m - cave-in at 4.0m	



LGBE3 5555-21-GC.GPJ 4/28/21

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

Project No. 5555-21-GC

Log of Borehole 21BH-8 (MW)

Dwg No. 9

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 181 Toronto Street South, Uxbridge, Ontario

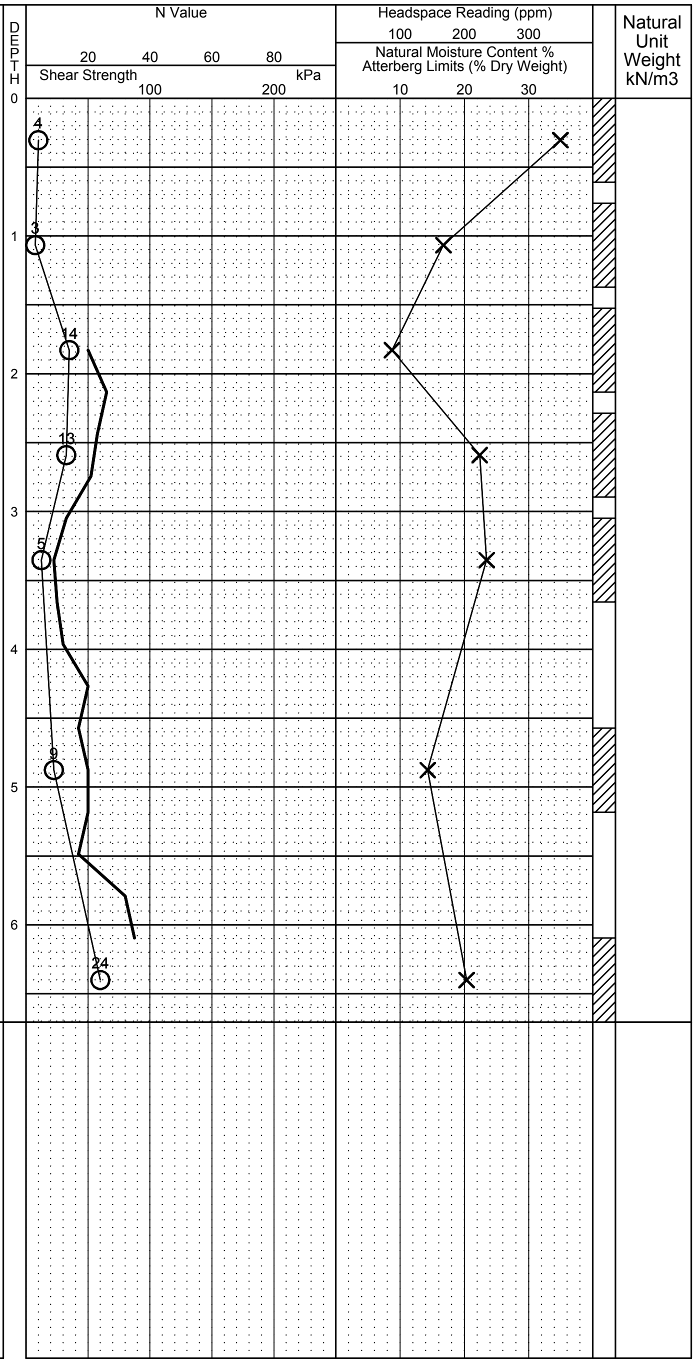
Date Drilled: 4/8/21

Drill Type: Track Mounted Drill Rig

Datum: Geodetic

Auger Sample	☒
SPT (N) Value	○ ▨
Dynamic Cone Test	—
Shelby Tube	■
Field Vane Test	✚ S
Headspace Reading (ppm)	•
Natural Moisture	×
Plastic and Liquid Limit	├─┤
Unconfined Compression % Strain at Failure	⊗
Penetrometer	▲

Soil Description	ELEV. m
Ground Surface	277.39
TOPSOIL	277.24
FILL - brown silty sand - trace rootlets - trace gravel - moist to very moist	
SILTY SAND - loose to compact, brown - trace to some gravel - moist, wet below 2.3m	275.71
	274.94
	270.68
END OF BOREHOLE **NOTE:** Upon completion of drilling: - water level at 3.7m - cave-in at 4.0m	



LGBE3 5555-21-GC.GPJ 4/28/21

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

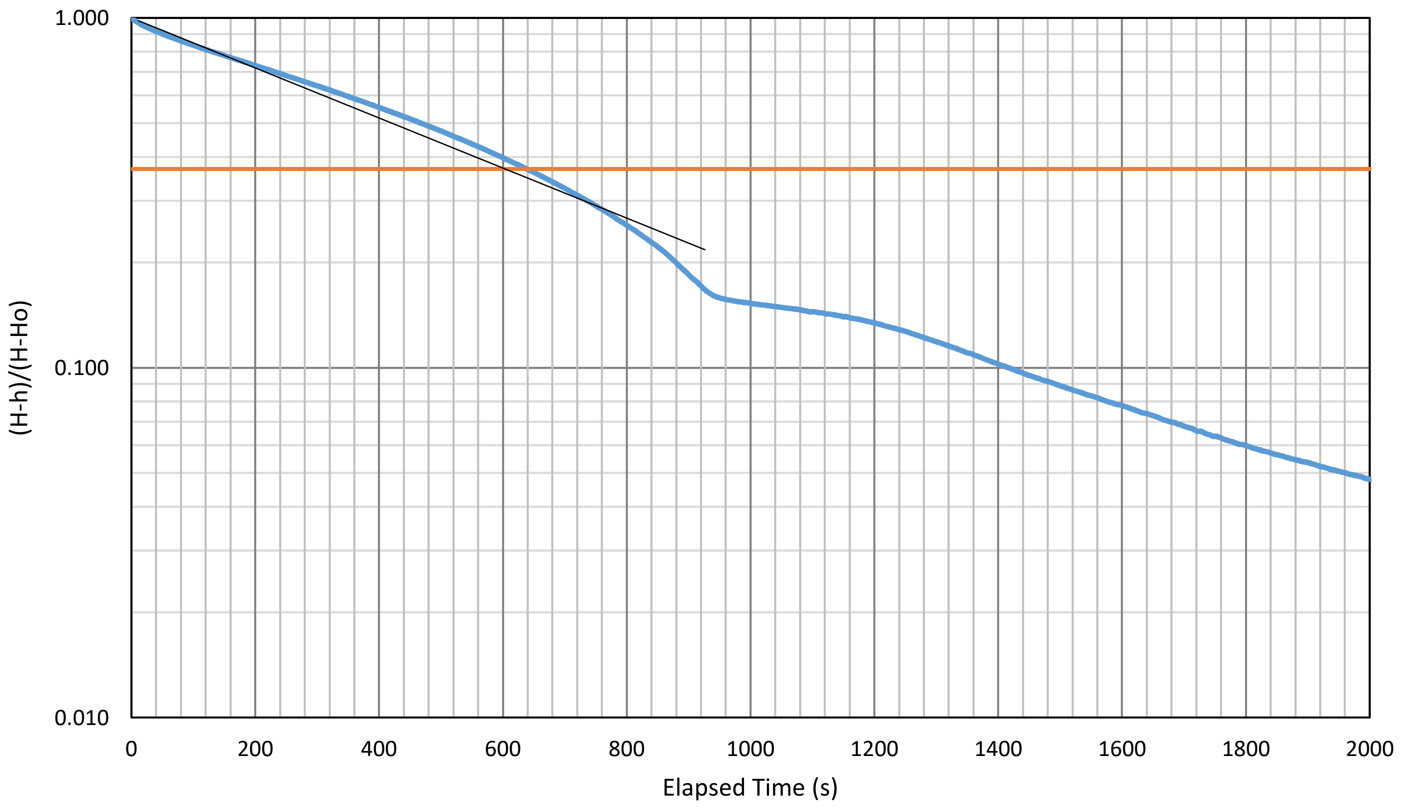
Time	Water Level (m)	Depth to Cave (m)
April 16, 2021	2.4m	

APPENDIX C

Hydraulic Conductivity Analysis

In-Situ Hydraulic Conductivity Analyses: **21BH-1 (MW)**

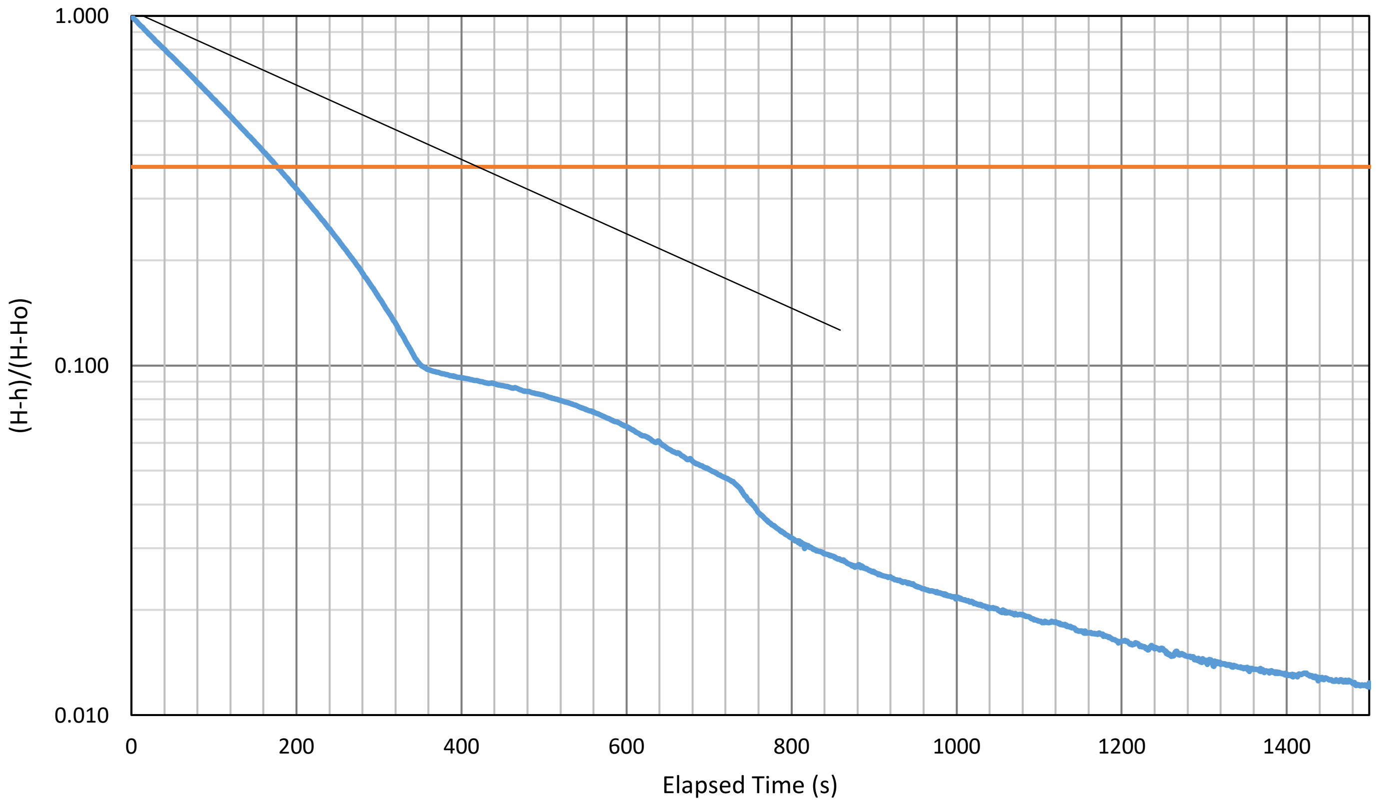
Company:	TIL
Client:	Man Holdings Ltd
Project:	5555
Location:	181 Toronto Street South, Uxbridge
Test Well:	21BH-1 (MW)
Test Date:	October 29, 2021
Test Conducted By:	PG
Test Analyzed By:	YL



Effective Well Depth (mbgs):	6.10	**Screened Unit:**	Silty Sand
Initial Water Level (mbgs) (H):	2.87	**Screen Length (m) (L_e):**	3.048
Available Drawdown (m):	3.23	**Head at Time = 0 (m) (H_o):**	2.73
Borehole Radius (m) (R_b):	0.0762	**Monitoring Well Radius (m) (R_c):**	0.026
Solution Method:	Hvorslev (1951) ▼	**Recovery (%):**	100%
Early K (m/s)	NA	**Early To (s):**	NA
Mid K (m/s)	6.6E-07	**Mid To (s):**	950
Late K (m/s)	NA	**Late To (s):**	NA

In-Situ Hydraulic Conductivity Analyses: 21BH-4 (MW)

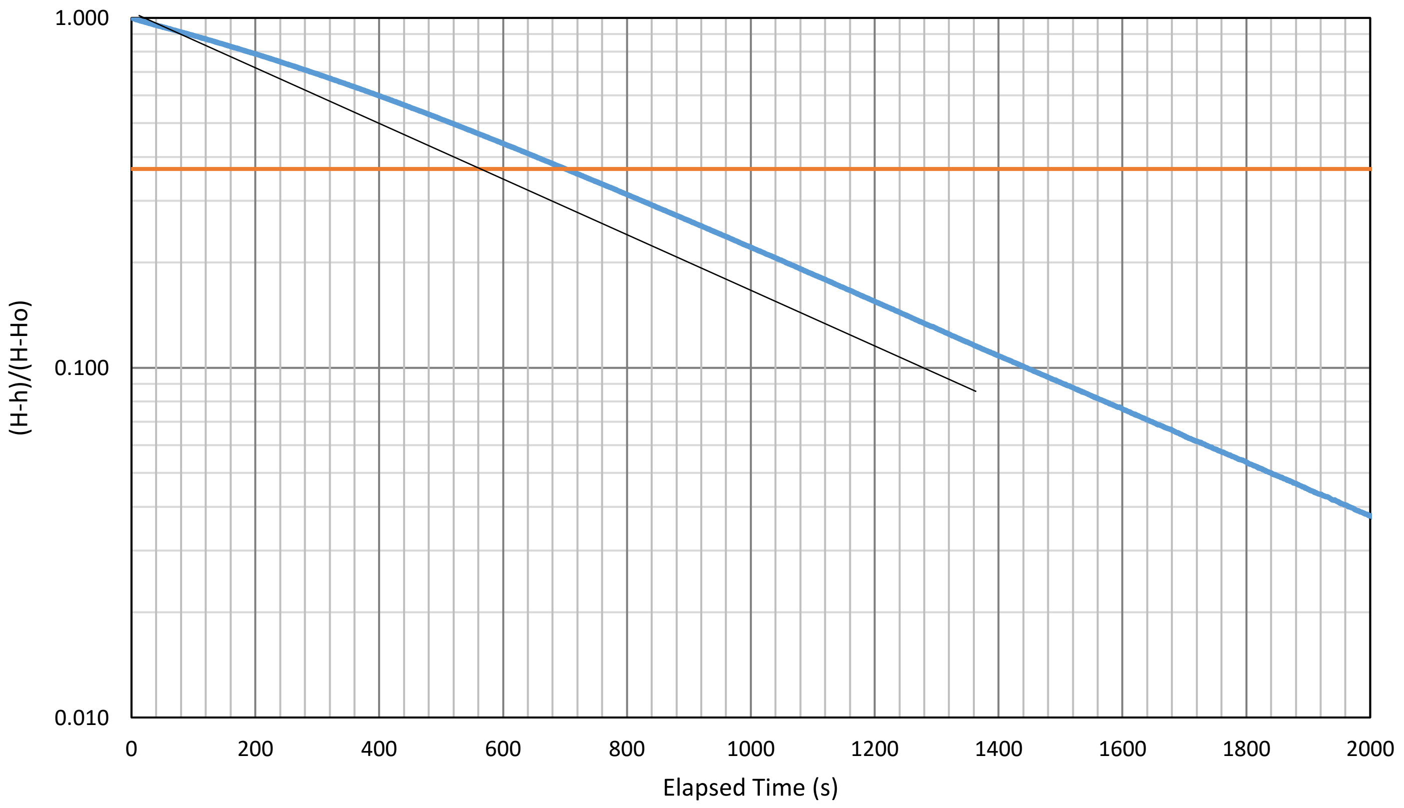
Company:	TIL
Client:	Man Holdings Ltd
Project:	5555
Location:	181 Toronto Street South, Uxbridge
Test Well:	21BH-4 (MW)
Test Date:	October 29, 2021
Test Conducted By:	PG
Test Analyzed By:	YL



Effective Well Depth (mbgs):	6.10	**Screened Unit:**	Sand
Initial Water Level (mbgs) (H):	2.78	**Screen Length (m) (L_e):**	3.048
Available Drawdown (m):	3.32	**Head at Time = 0 (m) (H_o):**	2.77
Borehole Radius (m) (R_b):	0.0762	**Monitoring Well Radius (m) (R_c):**	0.026
Solution Method:	Hvorslev (1951) ▼	**Recovery (%):**	100%
Early K (m/s)	NA	**Early To (s):**	NA
Mid K (m/s)	9.8E-07	**Mid To (s):**	400
Late K (m/s)	NA	**Late To (s):**	NA

In-Situ Hydraulic Conductivity Analyses: 21BH-8 (MW)

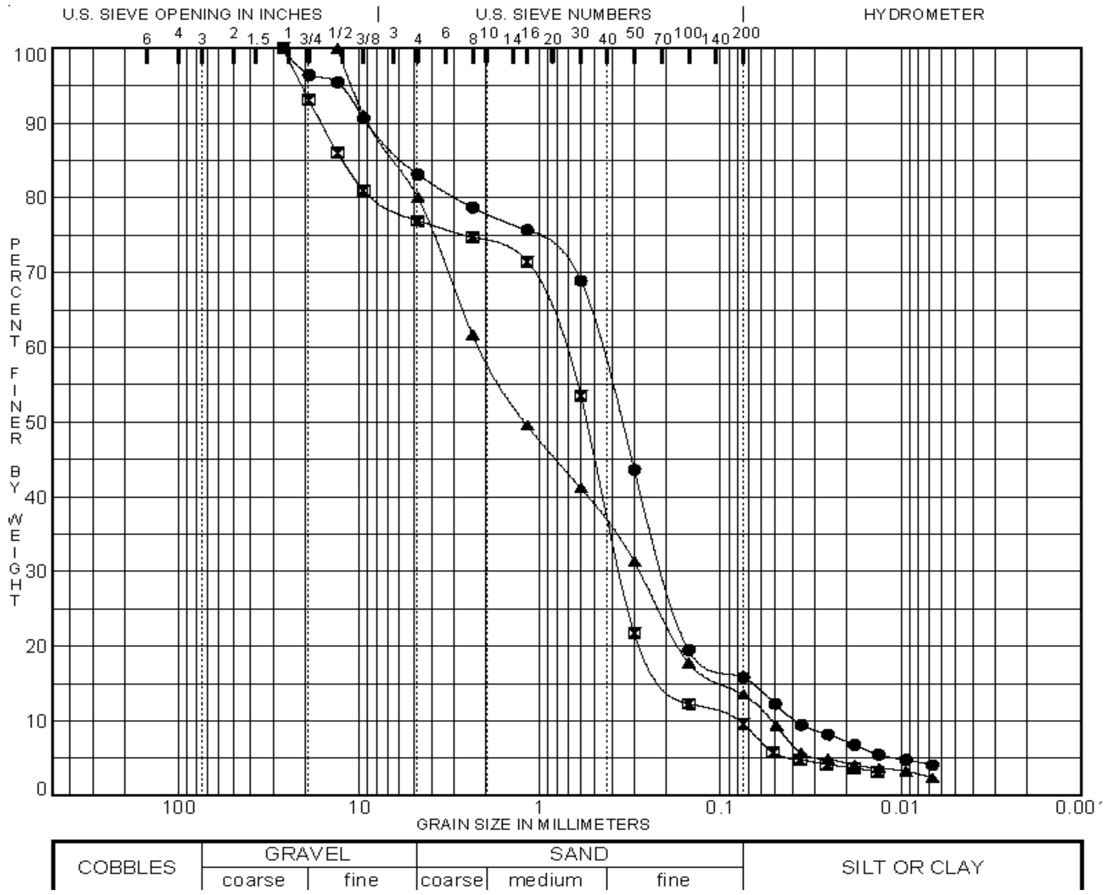
Company:	TIL
Client:	Man Holdings Ltd
Project:	5555
Location:	181 Toronto Street South, Uxbridge
Test Well:	21BH-8 (MW)
Test Date:	October 29, 2021
Test Conducted By:	PG
Test Analyzed By:	YL



Effective Well Depth (mbgs):	6.10	**Screened Unit:**	Silty Sand
Initial Water Level (mbgs) (H):	2.50	**Screen Length (m) (L_e):**	3.048
Available Drawdown (m):	3.60	**Head at Time = 0 (m) (H_o):**	3.26
Borehole Radius (m) (R_b):	0.0762	**Monitoring Well Radius (m) (R_c):**	0.026
Solution Method:	Hvorslev (1951) ▼	**Recovery (%):**	100%
Early K (m/s)	NA	**Early To (s):**	NA
Mid K (m/s)	7.0E-07	**Mid To (s):**	560
Late K (m/s)	NA	**Late To (s):**	NA

Grainsize Analyses: **21BH-1 (MW)**

Company: TIL
Client: Man Holdings Ltd
Project: 5555
Location: 181 Toronto Street South, Uxbridge
Test Well: 21BH-1 (MW)
Test Date:
Test Conducted By:



Legend: ● 21BH-1 (MW)

Sampled Unit:	Silty Sand	**Sampled Depth (mbgs):**	3
% Gravel	16.9	**D100:**	26.5000
% Sand	67.3	**D60**	0.4700
% Silt	15.8	**D30:**	0.2030
% Clay		**D10:**	0.0379
K (m/s)	1.6E-05	**Temperature (°C):**	10

APPENDIX D

Groundwater Quality Certificate of Analysis

FINAL REPORT

CA40368-OCT21 R1

5555

Prepared for

Toronto Inspection Ltd.

FINAL REPORT

First Page

CLIENT DETAILS | LABORATORY DETAILS

Client	Toronto Inspection Ltd.	Project Specialist	Maarit Wolfe, Hon.B.Sc
		Laboratory	SGS Canada Inc.
Address	110 Konrad Crescent, Unit 16 Markham, ON L3R 9X2. Canada	Address	185 Concession St., Lakefield ON, K0L 2H0
Contact	Peining Guan	Telephone	705-652-2000
Telephone	905-940-8509	Facsimile	705-652-6365
Facsimile	905-940-8192	Email	Maarit.Wolfe@sgs.com
Email	lab@torontoinspection.com	SGS Reference	CA40368-OCT21
Project	5555	Received	10/25/2021
Order Number		Approved	11/03/2021
Samples	Ground Water (1)	Report Number	CA40368-OCT21 R1
		Date Reported	11/03/2021

COMMENTS

RL - SGS Reporting Limit

Nonylphenol Ethoxylates is the sum of nonylphenol monoethoxylate and nonylphenol diethoxylate.

Total PAH is the sum of anthracene, benzo(a)pyrene, benzo(a)anthracene, benzo(e)pyrene, benzo(b,j)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, dibenzo(a,i)pyrene, dibenzo(a,j)acridine, 7H-dibenzo(c,g)carbazole, fluoranthene, indeno(1,2,3-c,d)pyrene, perylene, phenanthrene and pyrene..

Temperature of Sample upon Receipt: 4 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: 023145

SIGNATORIES

Maarit Wolfe, Hon.B.Sc

TABLE OF CONTENTS

PACKAGE: **SANSEW - General Chemistry** (WATER)

Sample Number 8
Sample Name 21BH4 (MW)
Sample Matrix Ground Water
Sample Date 25/10/2021

L1 = SANSEW / WATER / - - Durham Table 1 - Sanitary Sewer Discharge - BL_55_2013
L2 = SANSEW / WATER / - - Durham Table 2 - Storm Sewer Discharge - BL_55_2013

Parameter	Units	RL	L1	L2	Result
General Chemistry					
Biochemical Oxygen Demand (BOD5)	mg/L	2	300	15	< 4↑
Total Suspended Solids	mg/L	2	350	15	14
Total Kjeldahl Nitrogen	as N mg/L	0.5	100	1	4.0

PACKAGE: **SANSEW - Metals and Inorganics** (WATER)

Sample Number 8
Sample Name 21BH4 (MW)
Sample Matrix Ground Water
Sample Date 25/10/2021

L1 = SANSEW / WATER / - - Durham Table 1 - Sanitary Sewer Discharge - BL_55_2013
L2 = SANSEW / WATER / - - Durham Table 2 - Storm Sewer Discharge - BL_55_2013

Parameter	Units	RL	L1	L2	Result
Metals and Inorganics					
Sulphate	mg/L	2	1500		41
Cyanide (total)	mg/L	0.01	2	0.02	< 0.01
Fluoride	mg/L	0.06	10		< 0.06
Aluminum (total)	mg/L	0.001	50		0.010
Antimony (total)	mg/L	0.0009	5		< 0.0009
Arsenic (total)	mg/L	0.0002	1	0.02	0.0046
Cadmium (total)	mg/L	0.000003	0.7	0.008	0.000006
Chromium (total)	mg/L	0.00008	2	0.08	0.00091
Cobalt (total)	mg/L	0.000004	5		0.00285
Copper (total)	mg/L	0.0002	3	0.05	0.0005

PACKAGE: **SANSEW - Metals and Inorganics** (WATER)

Sample Number 8

Sample Name 21BH4 (MW)

Sample Matrix Ground Water

Sample Date 25/10/2021

L1 = SANSEW / WATER / - - Durham Table 1 - Sanitary Sewer Discharge - BL_55_2013

L2 = SANSEW / WATER / - - Durham Table 2 - Storm Sewer Discharge - BL_55_2013

Metals and Inorganics (continued)

Parameter	Units	RL	L1	L2	Result
Lead (total)	mg/L	0.00009	1	0.12	0.00010
Manganese (total)	mg/L	0.00001	5	0.15	3.45
Molybdenum (total)	mg/L	0.00004	5		0.00021
Nickel (total)	mg/L	0.0001	2	0.08	0.0046
Phosphorus (total)	mg/L	0.003	10	0.4	0.016
Selenium (total)	mg/L	0.00004	1	0.02	0.00009
Silver (total)	mg/L	0.00005	5	0.12	0.00009
Tin (total)	mg/L	0.00006	5		0.00013
Titanium (total)	mg/L	0.00005	5		0.00048
Zinc (total)	mg/L	0.002	2	0.04	< 0.002

PACKAGE: **SANSEW - Microbiology** (WATER)

Sample Number 8
Sample Name 21BH4 (MW)
Sample Matrix Ground Water
Sample Date 25/10/2021

L1 = SANSEW / WATER / - - Durham Table 1 - Sanitary Sewer Discharge - BL_55_2013
L2 = SANSEW / WATER / - - Durham Table 2 - Storm Sewer Discharge - BL_55_2013

Parameter	Units	RL	L1	L2	Result
Microbiology					
E. Coli	cfu/100mL	-		200	< 2↑

PACKAGE: **SANSEW - Nonylphenol and Ethoxylates** (WATER)

Sample Number 8
Sample Name 21BH4 (MW)
Sample Matrix Ground Water
Sample Date 25/10/2021

L1 = SANSEW / WATER / - - Durham Table 1 - Sanitary Sewer Discharge - BL_55_2013
L2 = SANSEW / WATER / - - Durham Table 2 - Storm Sewer Discharge - BL_55_2013

Parameter	Units	RL	L1	L2	Result
Nonylphenol and Ethoxylates					
Nonylphenol	mg/L	0.001	0.02		< 0.001
Nonylphenol Ethoxylates	mg/L	0.01	0.2		< 0.01
Nonylphenol diethoxylate	mg/L	0.01			< 0.01
Nonylphenol monoethoxylate	mg/L	0.01			< 0.01

PACKAGE: **SANSEW - Oil and Grease** (WATER)

Sample Number 8
Sample Name 21BH4 (MW)
Sample Matrix Ground Water
Sample Date 25/10/2021

L1 = SANSEW / WATER / - - Durham Table 1 - Sanitary Sewer Discharge - BL_55_2013
L2 = SANSEW / WATER / - - Durham Table 2 - Storm Sewer Discharge - BL_55_2013

Parameter	Units	RL	L1	L2	Result
Oil and Grease					
Oil & Grease (total)	mg/L	2			< 2
Oil & Grease (animal/vegetable)	mg/L	4	150		< 4
Oil & Grease (mineral/synthetic)	mg/L	4	15		< 4

PACKAGE: **SANSEW - Other (ORP)** (WATER)

L1 = SANSEW / WATER / - - Durham Table 1 - Sanitary Sewer Discharge - BL_55_2013

L2 = SANSEW / WATER / - - Durham Table 2 - Storm Sewer Discharge - BL_55_2013

Sample Number 8
Sample Name 21BH4 (MW)
Sample Matrix Ground Water
Sample Date 25/10/2021

Parameter	Units	RL	L1	L2	Result
Other (ORP)					
pH	No unit	0.05	10.5	9	6.94
Mercury (total)	mg/L	0.00001	0.01	0.004	< 0.00001

PACKAGE: **SANSEW - PCBs** (WATER)

L1 = SANSEW / WATER / - - Durham Table 1 - Sanitary Sewer Discharge - BL_55_2013

L2 = SANSEW / WATER / - - Durham Table 2 - Storm Sewer Discharge - BL_55_2013

Sample Number 8
Sample Name 21BH4 (MW)
Sample Matrix Ground Water
Sample Date 25/10/2021

Parameter	Units	RL	L1	L2	Result
PCBs					
Polychlorinated Biphenyls (PCBs) - Total	mg/L	0.0001	0.001	0.0004	< 0.0001

PACKAGE: **SANSEW - Phenols** (WATER)

L1 = SANSEW / WATER / - - Durham Table 1 - Sanitary Sewer Discharge - BL_55_2013

L2 = SANSEW / WATER / - - Durham Table 2 - Storm Sewer Discharge - BL_55_2013

Sample Number 8
Sample Name 21BH4 (MW)
Sample Matrix Ground Water
Sample Date 25/10/2021

Parameter	Units	RL	L1	L2	Result
Phenols					
4AAP-Phenolics	mg/L	0.002	1	0.008	0.004

PACKAGE: **SANSEW - SVOCs** (WATER)

L1 = SANSEW / WATER / - - Durham Table 1 - Sanitary Sewer Discharge - BL_55_2013

L2 = SANSEW / WATER / - - Durham Table 2 - Storm Sewer Discharge - BL_55_2013

Sample Number 8
Sample Name 21BH4 (MW)
Sample Matrix Ground Water
Sample Date 25/10/2021

Parameter	Units	RL	L1	L2	Result

PACKAGE: **SANSEW - SVOCs** (WATER)

Sample Number 8
Sample Name 21BH4 (MW)
Sample Matrix Ground Water
Sample Date 25/10/2021

L1 = SANSEW / WATER / - - Durham Table 1 - Sanitary Sewer Discharge - BL_55_2013

L2 = SANSEW / WATER / - - Durham Table 2 - Storm Sewer Discharge - BL_55_2013

Parameter	Units	RL	L1	L2	Result
SVOCs					
di-n-Butyl Phthalate	mg/L	0.002	0.08	0.015	< 0.002
Bis(2-ethylhexyl)phthalate	mg/L	0.002	0.012	0.0088	< 0.002

PACKAGE: **SANSEW - VOCs** (WATER)

Sample Number 8
Sample Name 21BH4 (MW)
Sample Matrix Ground Water
Sample Date 25/10/2021

L1 = SANSEW / WATER / - - Durham Table 1 - Sanitary Sewer Discharge - BL_55_2013

L2 = SANSEW / WATER / - - Durham Table 2 - Storm Sewer Discharge - BL_55_2013

Parameter	Units	RL	L1	L2	Result
VOCs					
Chloroform	mg/L	0.0005	0.04	0.002	< 0.0005
1,2-Dichlorobenzene	mg/L	0.0005	0.05	0.0056	< 0.0005
1,4-Dichlorobenzene	mg/L	0.0005	0.08	0.0068	< 0.0005
cis-1,2-Dichloroethene	mg/L	0.0005	4	0.0056	< 0.0005
trans-1,3-Dichloropropene	mg/L	0.0005	0.14	0.0056	< 0.0005
Methylene Chloride	mg/L	0.0005	2	0.0052	< 0.0005
1,1,2,2-Tetrachloroethane	mg/L	0.0005	1.4	0.017	< 0.0005
Tetrachloroethylene (perchloroethylene)	mg/L	0.0005	1	0.0044	< 0.0005
Trichloroethylene	mg/L	0.0005	0.4	0.008	< 0.0005
Methyl ethyl ketone	mg/L	0.02	8		< 0.02
Styrene	mg/L	0.0005	0.2		< 0.0005

FINAL REPORT

Client: Toronto Inspection Ltd.
Project: 5555
Project Manager: Peining Guan
Samplers: Peining Guan

PACKAGE: **SANSEW - VOCs - BTEX** (WATER)

L1 = SANSEW / WATER / - - Durham Table 1 - Sanitary Sewer Discharge - BL_55_2013
L2 = SANSEW / WATER / - - Durham Table 2 - Storm Sewer Discharge - BL_55_2013

Sample Number 8
Sample Name 21BH4 (MW)
Sample Matrix Ground Water
Sample Date 25/10/2021

VOCs - BTEX

Parameter	Units	RL	L1	L2	Result
Benzene	mg/L	0.0005	0.01	0.002	< 0.0005
Ethylbenzene	mg/L	0.0005	0.16	0.002	< 0.0005
Toluene	mg/L	0.0005	0.27	0.002	< 0.0005
Xylene (total)	mg/L	0.0005	1.4	0.0044	< 0.0005
m-p-xylene	mg/L	0.0005			< 0.0005
o-xylene	mg/L	0.0005			< 0.0005

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	SANSEW / WATER / - - Durham Table 1 - Sanitary Sewer Discharge - BL_55_2013 L1	SANSEW / WATER / - - Durham Table 2 - Storm Sewer Discharge - BL_55_2013 L2
21BH4 (MW)					
Manganese	SM 3030/EPA 200.8	mg/L	3.45		0.15
Total Kjeldahl Nitrogen	SM 4500-N C/4500-NO3- F	mg/L	4.0		1

QC SUMMARY

Anions by discrete analyzer

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Sulphate	DIO5081-OCT21	mg/L	2	<2	ND	20	111	80	120	113	75	125

Biochemical Oxygen Demand

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0047-OCT21	mg/L	2	< 2	10	30	90	70	130	86	70	130

Cyanide by SFA

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Cyanide (total)	SKA0279-OCT21	mg/L	0.01	<0.01	ND	10	95	90	110	NV	75	125

QC SUMMARY

Fluoride by Specific Ion Electrode

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

Parameter	**QC batch Reference**	**Units**	**RL**	**Method Blank**	**Duplicate**		**LCS/Spike Blank**			**Matrix Spike / Ref.**		
					RPD	**AC (%)**	**Spike Recovery (%)**	**Recovery Limits (%)**		**Spike Recovery (%)**	**Recovery Limits (%)**	
								Low	**High**		**Low**	**High**
Fluoride	EWL0585-OCT21	mg/L	0.06	<0.06	4	10	99	90	110	89	75	125

Mercury by CVAAS

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

Parameter	**QC batch Reference**	**Units**	**RL**	**Method Blank**	**Duplicate**		**LCS/Spike Blank**			**Matrix Spike / Ref.**		
					RPD	**AC (%)**	**Spike Recovery (%)**	**Recovery Limits (%)**		**Spike Recovery (%)**	**Recovery Limits (%)**	
								Low	**High**		**Low**	**High**
Mercury (total)	EHG0035-OCT21	mg/L	0.00001	< 0.00001	ND	20	105	80	120	123	70	130

FINAL REPORT

QC SUMMARY

Metals in aqueous samples - ICP-MS

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (total)	EMS0186-OCT21	mg/L	0.00005	<0.00005	ND	20	96	90	110	91	70	130
Aluminum (total)	EMS0186-OCT21	mg/L	0.001	<0.001	6	20	93	90	110	84	70	130
Arsenic (total)	EMS0186-OCT21	mg/L	0.0002	<0.0002	2	20	104	90	110	108	70	130
Cadmium (total)	EMS0186-OCT21	mg/L	0.000003	<0.000003	ND	20	96	90	110	106	70	130
Cobalt (total)	EMS0186-OCT21	mg/L	0.000004	<0.000004	4	20	99	90	110	102	70	130
Chromium (total)	EMS0186-OCT21	mg/L	0.00008	<0.00008	ND	20	97	90	110	112	70	130
Copper (total)	EMS0186-OCT21	mg/L	0.0002	<0.0002	ND	20	95	90	110	95	70	130
Manganese (total)	EMS0186-OCT21	mg/L	0.00001	<0.00001	1	20	92	90	110	99	70	130
Molybdenum (total)	EMS0186-OCT21	mg/L	0.00004	<0.00004	ND	20	103	90	110	101	70	130
Nickel (total)	EMS0186-OCT21	mg/L	0.0001	<0.0001	1	20	98	90	110	105	70	130
Lead (total)	EMS0186-OCT21	mg/L	0.00009	<0.00001	11	20	105	90	110	92	70	130
Phosphorus (total)	EMS0186-OCT21	mg/L	0.003	<0.003	ND	20	110	90	110	NV	70	130
Antimony (total)	EMS0186-OCT21	mg/L	0.0009	<0.0009	ND	20	100	90	110	94	70	130
Selenium (total)	EMS0186-OCT21	mg/L	0.00004	<0.00004	ND	20	99	90	110	73	70	130
Tin (total)	EMS0186-OCT21	mg/L	0.00006	<0.00006	ND	20	105	90	110	NV	70	130
Titanium (total)	EMS0186-OCT21	mg/L	0.00005	<0.00005	ND	20	108	90	110	NV	70	130
Zinc (total)	EMS0186-OCT21	mg/L	0.002	<0.002	1	20	104	90	110	84	70	130

QC SUMMARY

Microbiology

Method: SM 9222D | Internal ref.: ME-CA-[ENV]MIC-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
E. Coli	BAC9424-OCT21	cfu/100mL	-	ACCEPTED	ACCEPTED							

Nonylphenol and Ethoxylates

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nonylphenol diethoxylate	GCM0511-OCT21	mg/L	0.01	<0.01			76	55	120			
Nonylphenol Ethoxylates	GCM0511-OCT21	mg/L	0.01	< 0.01								
Nonylphenol monoethoxylate	GCM0511-OCT21	mg/L	0.01	<0.01			76	55	120			
Nonylphenol	GCM0511-OCT21	mg/L	0.001	<0.001			70	55	120			

QC SUMMARY

Oil & Grease

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Oil & Grease (total)	GCM0546-OCT21	mg/L	2	<2	NSS	20	105	75	125			

Oil & Grease-AV/MS

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Oil & Grease (animal/vegetable)	GCM0546-OCT21	mg/L	4	< 4	NSS	20	NA	70	130			
Oil & Grease (mineral/synthetic)	GCM0546-OCT21	mg/L	4	< 4	NSS	20	NA	70	130			

pH

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0579-OCT21	No unit	0.05	NA	0		100			NA		

QC SUMMARY

Phenols by SFA

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0278-OCT21	mg/L	0.002	<0.002	0	10	110	80	120	NV	75	125

Polychlorinated Biphenyls

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Polychlorinated Biphenyls (PCBs) - Total	GCM0467-OCT21	mg/L	0.0001	<0.0001	NSS	30	79	60	140	NSS	60	140

QC SUMMARY

Semi-Volatile Organics

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Bis(2-ethylhexyl)phthalate	GCM0039-NOV21	mg/L	0.002	< 0.002	NSS	30	113	50	140	NSS	50	140
di-n-Butyl Phthalate	GCM0039-NOV21	mg/L	0.002	< 0.002	NSS	30	110	50	140	NSS	50	140

Suspended Solids

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0618-OCT21	mg/L	2	< 2	0	10	96	90	110	NA		

Total Nitrogen

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen	SKA0290-OCT21	as N mg/L	0.5	<0.5	8	10	109	90	110	76	75	125

QC SUMMARY

Volatile Organics

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
1,1,2,2-Tetrachloroethane	GCM0507-OCT21	mg/L	0.0005	<0.0005	ND	30	87	60	130	93	50	140
1,2-Dichlorobenzene	GCM0507-OCT21	mg/L	0.0005	<0.0005	ND	30	83	60	130	94	50	140
1,4-Dichlorobenzene	GCM0507-OCT21	mg/L	0.0005	<0.0005	ND	30	83	60	130	92	50	140
Benzene	GCM0507-OCT21	mg/L	0.0005	<0.0005	ND	30	86	60	130	96	50	140
Chloroform	GCM0507-OCT21	mg/L	0.0005	<0.0005	ND	30	82	60	130	93	50	140
cis-1,2-Dichloroethene	GCM0507-OCT21	mg/L	0.0005	<0.0005	ND	30	82	60	130	96	50	140
Ethylbenzene	GCM0507-OCT21	mg/L	0.0005	<0.0005	ND	30	85	60	130	96	50	140
m-p-xylene	GCM0507-OCT21	mg/L	0.0005	<0.0005	ND	30	87	60	130	99	50	140
Methyl ethyl ketone	GCM0507-OCT21	mg/L	0.02	<0.02	ND	30	95	50	140	98	50	140
Methylene Chloride	GCM0507-OCT21	mg/L	0.0005	<0.0005	ND	30	83	60	130	95	50	140
o-xylene	GCM0507-OCT21	mg/L	0.0005	<0.0005	ND	30	84	60	130	98	50	140
Styrene	GCM0507-OCT21	mg/L	0.0005	<0.0005	ND	30	83	60	130	99	50	140
Tetrachloroethylene (perchloroethylene)	GCM0507-OCT21	mg/L	0.0005	<0.0005	ND	30	86	60	130	94	50	140
Toluene	GCM0507-OCT21	mg/L	0.0005	<0.0005	ND	30	84	60	130	93	50	140
trans-1,3-Dichloropropene	GCM0507-OCT21	mg/L	0.0005	<0.0005	ND	30	84	60	130	95	50	140
Trichloroethylene	GCM0507-OCT21	mg/L	0.0005	<0.0005	ND	30	85	60	130	91	50	140

QC SUMMARY

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

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

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

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

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

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

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

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

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

LEGEND

FOOTNOTES

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

Samples analysed as received. Solid samples expressed on a dry weight basis. “Temperature Upon Receipt” is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act” published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated. This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at http://www.sgs.com/terms_and_conditions.htm. The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents.

This report must not be reproduced, except in full. This report supersedes all previous versions.

-- End of Analytical Report --

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

Request for Laboratory Services and CHAIN OF CUSTODY

No: 023145
Page 1 of 1

Laboratory Information Section - Lab use only

ed By: B Conrash
ed Date: 10 26 21 (mm/dd/yy)
ed Time: 18 48 (hr : min)

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

Cooling Agent Present: Yes ☑ No ☐ Type: ICE
Temperature Upon Receipt (°C) 5, 4, 4

LAB LIMS #: CA40368-OCT21

REPORT INFORMATION

pany: TI
act: Peining
ress: Unit 16 110 Konrad Crescent, Markham
one: 905-940-8509
x:
mail: lab@torontoinspection.com

INVOICE INFORMATION

☐ (same as Report Information)
Company:
Contact: Shannon
Address:
Phone:
Email: shannon@torontoinspection.com

Quotation #:
Project #: 5555
P.O. #:
Site Location/ID:

TURNAROUND TIME (TAT) REQUIRED

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

☑ Regular TAT (5-7days)

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

PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date:

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

REGULATIONS

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

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

Sewer By-Law:
☑ Sanitary
☑ Storm
Municipality: Durham

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	Field Filtered (Y/N)	M & I			SVOC		PCB	PHC		VOC		Pest	Other (please specify)						SPLP	TCLP	COMMENTS:
							Metals & Inorganics incl CrVI, CN, Hg pH,(B(HWS),EC,SAR-soil) (Cl, Na-water)	Full Metals Suite ICP metals plus B(HWS-soil only) Hg, CrVI	ICP Metals only Sb,As,Ba,Be,B,Cd,Cr,Co,Cu,Pb,Mo,Ni,	PAHs only	SVOCs all incl PAHs, ABNs, CPs	PCBs ☐ Total ☐ Aroclor	F1-F4 + BTEX	F1-F4 only no BTEX	VOCs all incl BTEX	BTEX only	Pesticides Organochlorine or specify other					Sewer Use: Sani & Sewer Specify pkg: Durham Region	Water Characterization Pkg General ☐ Extended ☐	Specify tests ☐ Metals ☐ VOC ☐ 1,4-Dioxane ☐ OCP ☐ ABN	Specify tests ☐ M&I ☐ VOC ☐ PCB ☐ B(a)P ☐ ABN ☐ Ignit.	
1	21BH-4GW	10/25/21	10:45	17	GW	N																✓				
2																										
3																										
4																										
5																										
6																										
7																										
8																										
9																										
10																										
11																										
12																										

Observations/Comments/Special Instructions

Sampled By (NAME): Peining Guan Signature: Date: 10/25/21 (mm/dd/yy)
Relinquished by (NAME): Peining Guan Signature: Date: 10/25/21 (mm/dd/yy)

Note: Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may a shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. This document is issued by the Company under its General C request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

APPENDIX E

Dewatering Calculations

Details of Excavation

GS = Ground Surface (masl)
WL = Assumed Depth of Groundwater (m/masl)
a = Length of excavation (m)
b = Width of excavation (m)
D = Depth of Excavation (m/masl)

Parameter	Value	Units
GS	279.00	**masl**
WL	2.50	**m**
	276.50	**masl**
a	60	**m**
b	15	**m**
D	3.00	**m**
	276.00	**masl**

Project Details

Location: 181 Toronto Street South, Uxbridge, ON - Building 1 + 2
Project No.: 2021-103
Date: April 18, 2022
Prepared By: VM
Checked By: IG

Distance of Influence Formula (Cashman, P. and Preene, M., 2013):

$$L_0 = \sqrt{\frac{12HK}{S_y}t}$$

Where:
L0 = Distance of influence to line source of recharge (m)
H = Distance from initial static water level to bottom of saturated aquifer (m)
K = Hydraulic conductivity (m/s)
S_y = Specific yield of the aquifer formation [-]
t = Time (s) required to draw the static groundwater level to the desired level (assumed to be equivalent to 14 days)

Parameter	Value	Units	
L0	18	**m**	
H	6	**m**	
K	7.7E-07	**m/s**	
$\mathbf{S_y}$	0.20	**[-]**	(Johnson, 1967)
t	1,209,600	**s**	

Dewatering Rate Formula for Planar Flow to All Sides of Excavation (Powers et al., 2007):

$$Q = \frac{\pi K(H^2 - h^2)}{\ln((L_0 + r_e)/r_e)} + 2\left[\frac{aK(H^2 - h^2)}{2L_0}\right]$$

Where:
Q = Anticipated unfactored pumping rate (m^3/day)
K = Hydraulic Conductivity (m/day)
H = Distance from initial static water level to bottom of the saturated aquifer (m)
h = Depth of water in the well while pumping (m)
r_e Hide this row, re not applicable
L0 = Distance of influence to line source of recharge (m)
x = Length (m)
b = Width (m)

Parameter	Value	Units
Q	2.77	**m^3/day**
	0.032	**L/s**
K	6.7E-02	**m/day**
H	6	**m**
h	5	**m**
$\mathbf{r_e}$	Hide Row	**m**
L0	18	**m**
a	60	**m**
b	15	**m**

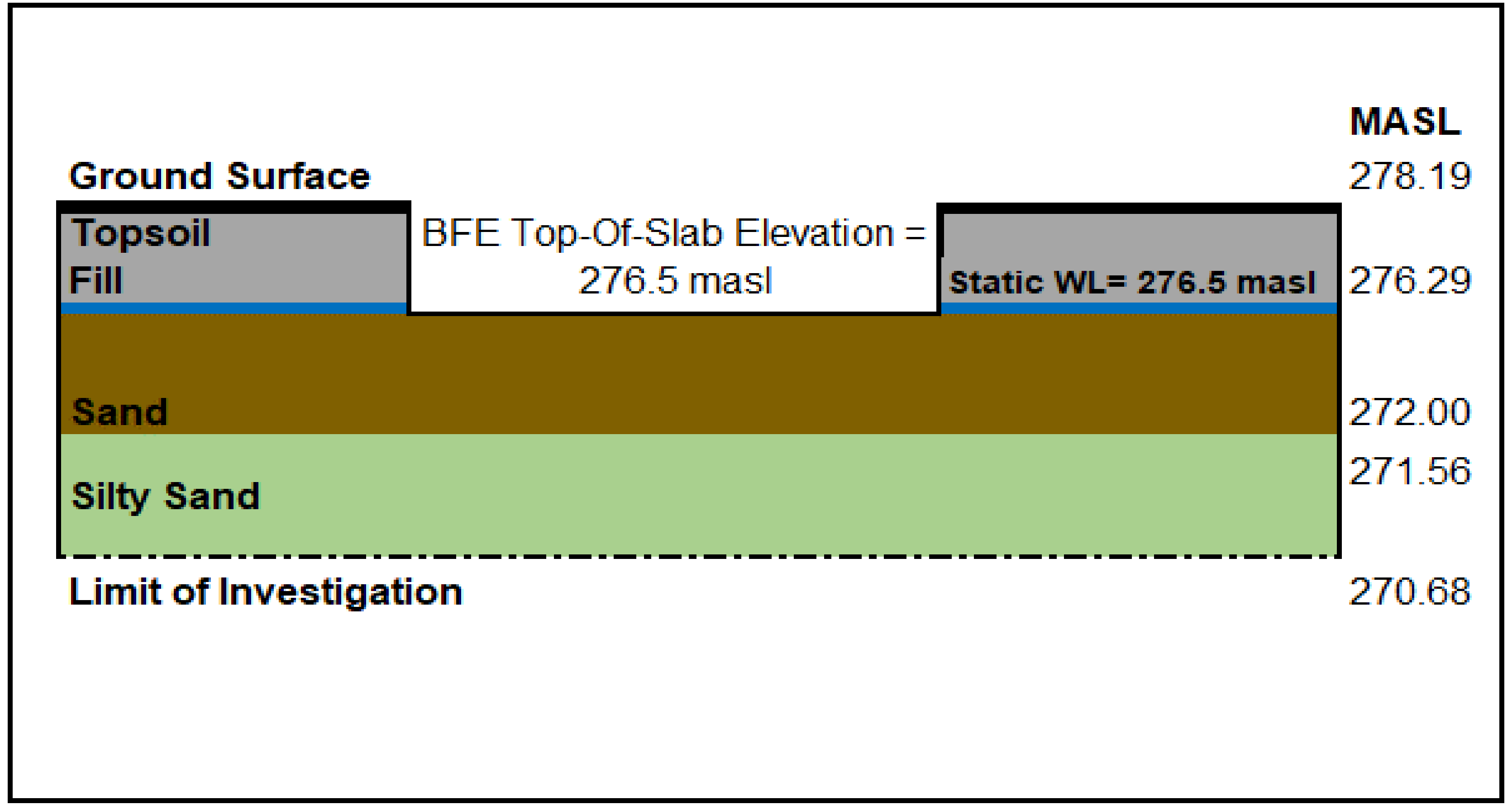
Incident Precipitation		
Design Event =	10	mm in 24-hours
Area =	900	m^2
Volume =	9.000	m^3/day
	9,000	L/day

Summary

Summary	**Short-Term Pumping Rate Q**			**Long-Term Pumping Rate Q**
	m^3/day	**L/day**	**L/s**	**L/day**
Groundwater	5.500	5,500	0.06	1,800
Precipitation	9.000	9,000	0.10	-
Total	14.500	14,500	0.16	1,800

Notes:
1. Considering a groundwater factor of safety of: **2**
2. Long-term pumping rate approximately 1/3rd short-term groundwater rate.
3. Rates rounded to the nearest 100L

Simplified Dewatering Schematic (not to scale)



Details of Excavation

GS = Ground Surface (masl)
WL = Assumed Depth of Groundwater (m/masl)
a = Length of excavation (m)
b = Width of excavation (m)
D = Depth of Excavation (m/masl)

Parameter	Value	Units
GS	278.00	**masl**
WL	1.50	**m**
	276.50	**masl**
a	40	**m**
b	1	**m**
D	3.50	**m**
	274.50	**masl**

Project Details

Location: 181 Toronto Street South, Uxbridge, ON - Sanitary Service
Project No.: 2021-103
Date: April 18, 2022
Prepared By: VM
Checked By: IG

Distance of Influence Formula (Cashman, P. and Preene, M., 2013):

$$L_0 = \sqrt{\frac{12HK}{S_y}t}$$

Where:

L0 = Distance of influence to line source of recharge (m)
H = Distance from initial static water level to bottom of saturated aquifer (m)
K = Hydraulic conductivity (m/s)
S_y = Specific yield of the aquifer formation [-]
t = Time (s) required to draw the static groundwater level to the desired level (assumed to be equivalent to 14 days)

Parameter	Value	Units	
L0	14	**m**	
H	7	**m**	
K	7.7E-07	**m/s**	
S_y	0.20	**[-]**	(Johnson, 1967)
t	604,800	**s**	

Dewatering Rate Formula for Planar & Radial Flow to Rectangular Excavation in Unconfined Aquifer (Powers et al., 2007):

$$Q = \frac{\pi K(H^2 - h^2)}{\ln((L_0 + r_e)/r_e)} + 2\left[\frac{aK(H^2 - h^2)}{2L_0}\right]$$

Where:

Q = Anticipated unfactored pumping rate (m^3/day)
K = Hydraulic Conductivity (m/day)
H = Distance from initial static water level to bottom of the saturated aquifer (m)
h = Depth of water in the well while pumping (m)
r_e = Equivalent well radius. Approximately equivalent to half the width of excavation b (m)
L0 = Distance of influence to line source of recharge (m)
a = Length (m)
b = Width (m)

Parameter	Value	Units
Q	7.25	**m^3/day**
	0.084	**L/s**
K	6.7E-02	**m/day**
H	7	**m**
h	5	**m**
r_e	1	**m**
L0	14	**m**
a	40	**m**
b	1	**m**

Incident Precipitation

Design Event =	10	mm in 24-hours
Area =	40	m^2
Volume =	0.400	m^3/day
	400	L/day

Simplified Dewatering Schematic (not to scale)

Summary

Summary	**Short-Term Pumping Rate Q**			**Long-Term Pumping Rate Q**
	m^3/day	**L/day**	**L/s**	**L/day**
Groundwater	14.500	14,500	0.17	NA
Precipitation	0.400	400	0.005	NA
Total	14.900	14,900	0.17	NA

Notes:

1. Considering a groundwater factor of safety of: **2**
2. Long-term dewatering not required for a service.
3. Rates rounded to the nearest 100L

Details of Excavation

GS = Ground Surface (masl)
WL = Assumed Depth of Groundwater (m/masl)
a = Length of excavation (m)
b = Width of excavation (m)
D = Depth of Excavation (m/masl)

Parameter	Value	Units
GS	278.00	**masl**
WL	1.50	**m**
	276.50	**masl**
a	20	**m**
b	5	**m**
D	2.00	**m**
	276.00	**masl**

Project Details

Location: 181 Toronto Street South, Uxbridge, ON - Stormwater Tank
Project No.: 2021-103
Date: April 18, 2022
Prepared By: VM
Checked By: IG

Distance of Influence Formula (Cashman, P. and Preene, M., 2013):

$$L_0 = \sqrt{\frac{12HK}{S_y}t}$$

Where:
L0 = Distance of influence to line source of recharge (m)
H = Distance from initial static water level to bottom of saturated aquifer (m)
K = Hydraulic conductivity (m/s)
S_y = Specific yield of the aquifer formation [-]
t = Time (s) required to draw the static groundwater level to the desired level (assumed to be equivalent to 14 days)

Parameter	Value	Units	
L0	13	**m**	
H	6	**m**	
K	7.7E-07	**m/s**	
S_y	0.20	**[-]**	(Johnson, 1967)
t	604,800	**s**	

Dewatering Rate Formula for Planar Flow to All Sides of Excavation (Powers et al., 2007):

$$Q = 2\left[\frac{aK(H^2-h^2)}{2L_0}\right] + 2\left[\frac{bK(H^2-h^2)}{2L_0}\right]$$

Where:
Q = Anticipated unfactored pumping rate (m^3/day)
K = Hydraulic Conductivity (m/day)
H = Distance from initial static water level to bottom of the saturated aquifer (m)
h = Depth of water in the well while pumping (m)
L0 = Distance of influence to line source of recharge (m)
a = Length (m)
b = Width (m)

Parameter	Value	Units
Q	1.28	**m^3/day**
	0.015	**L/s**
K	6.7E-02	**m/day**
H	6	**m**
h	5	**m**
L0	13	**m**
a	20	**m**
b	5	**m**

Incident Precipitation

Design Event =	10	mm in 24-hours
Area =	100	m^2
Volume =	1.000	m^3/day
	1,000	L/day

Simplified Dewatering Schematic (not to scale)

Summary

Summary	**Short-Term Pumping Rate Q**			**Long-Term Pumping Rate Q**
	m^3/day	**L/day**	**L/s**	**L/day**
Groundwater	2.600	2,600	0.03	NA
Precipitation	1.000	1,000	0.01	NA
Total	3.600	3,600	0.04	NA

Notes:
1. Considering a groundwater factor of safety of: **2**
2. Long-term dewatering not required for a service.
3. Rates rounded to the nearest 100L

APPENDIX F

Water Well Records

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
GEORGINA TOWNSHIP (N CON 09 012	17 649806 4884447 W	2007-06 1413	36		2///:			7046906 (Z57510) A	
UXBRIDGE TOWN	17 649740 4884286 W	2008-02 5459	2	FR 0087	///:	NU		7103265 (Z75624) A063140	BRWN FSND PCKD 0080 BRWN MSND FSND LOOS 0087 GREY CLAY STNS HARD 0088
UXBRIDGE TOWN	17 649733 4884271 W	2008-02 5459	0.79		///:			7103266 (Z75648) A063131 A	
UXBRIDGE TOWN	17 649715 4884203 W	2009-04 6370		FR 0010		NU		7123913 (Z48973) A043801	BRWN SAND SAND 0026
UXBRIDGE TOWN	17 649731 4884280 W	2007-12 7230	1.97			NU	0015 10	7101858 (Z70160) A	BRWN SAND SILT LOOS 0015 BRWN SAND SILT DNSE 0026
UXBRIDGE TOWN 001	17 649508 4884255 W	2007-08 6170	6.21		20/25/4/1:0	DO		7050048 (Z72383) A045672	
UXBRIDGE TOWNSHIP (U	17 650412 4885003 W	2019-12 6988						7355979 (C45784) A276630 P	
UXBRIDGE TOWNSHIP (U	17 650098 4884107 W	2019-08 7472	2		///:	MO	0015 5	7344310 (Z308705) A271664	BRWN CLAY SILT PCKD 0010 GREY SAND SILT WBRG 0020
UXBRIDGE TOWNSHIP (U	17 649829 4884945 W	2020-04 7329						7356676 (Z330916) A	
UXBRIDGE TOWNSHIP (U	17 649846 4884924 W	2019-02 7247	2	UT 0019	///:	MT	0015 10	7341715 (Z307797) A174103	---- 0000 BRWN FILL SAND GRVL 0005 BRWN FILL SAND GRVL 0008 BRWN SILT CLAY SAND 0025
UXBRIDGE TOWNSHIP (U	17 649807 4884327 W	2012-01 7247	2	UT 0010		MT	0010 10	7177289 (Z140548) A124053	0001 BRWN SAND SILT FILL 0002 BRWN SAND SILT 0020
UXBRIDGE TOWNSHIP (U	17 649969 4884276 W	2011-08 7247	2	UT		MT	0018 5	7173093 (Z136620) A119021	BLCK PEAT WDFR LOOS 0012 BRWN SAND SILT LOOS 0017 GREY SILT CLAY DNSE 0022 GREY SILT SAND DNSE 0025
UXBRIDGE TOWNSHIP (U	17 649693 4884234 W	2013-11 7383	2			MO MO	0018 10	7214689 (Z166148) A151144	
UXBRIDGE TOWNSHIP (U	17 650135 4884269 W	2019-08 7472	2		///:	MO	0010 5	7344309 (Z308706) A271663	GREY CLAY SILT PCKD 0010 GREY SAND SILT WBRG 0015
UXBRIDGE TOWNSHIP (U	17 649800 4884975 W	2019-10 7247						7366696 (C47139) A275278 P	
UXBRIDGE TOWNSHIP (U	17 650112 4885051 W	2013-01 7241	1.5			MT	0014 10	7197204 (Z165618) A143698	BRWN SAND 0004 GREY CLAY 0024
UXBRIDGE TOWNSHIP (U	17 649704 4884197 W	2013-11 7383	2			MO	0018 10	7214688 (Z166147) A151275	
UXBRIDGE TOWNSHIP (U	17 649730 4884191 W	2013-11 7383	2	0023		MO	0018 10	7214687 (Z166149) A151272	
UXBRIDGE TOWNSHIP (U	17 649831 4884971 W	2020-04 7329						7356677 (Z330917) A	
UXBRIDGE TOWNSHIP (U	17 649673 4884237 W	2013-11 7383	2	0018			0017 10	7219037 (Z185300) A151226	BLCK 0000 BRWN SAND 0027
UXBRIDGE TOWNSHIP (U 06 028	17 649995 4884401 W	2006-12 3108				NU		7039920 (Z30636) A	0013
UXBRIDGE TOWNSHIP (U CON 06 022	17 649789 4884764 W	1987-12 1413	5	FR 0225	80/90/12/2:3	DO	0221 4	1908850 (24808)	BRWN SAND PCKD 0020 BRWN CLAY HARD 0080 BRWN SAND CLAY LYRD 0100 GREY CLAY HARD 0200 GREY GRVL SAND CLN 0225
UXBRIDGE TOWNSHIP (U CON 06 026	17 649515 4884423 W	1980-06 1413			///:	NU DO		1905765 () A	BRWN SAND DRY 0008 BRWN CLAY DNSE 0023 GREY CLAY DNSE 0040 GREY SILT SOFT 0046

UXBRIDGE TOWNSHIP (U CON 06 027	17 649805 4884596 W	1995-11 3136	8 6	FR 0028	8/43/10/1:0	DO	0046 8	1912654 (165154)	BRWN LOAM 0001 BRWN CLAY SNDY PCKD 0018 BRWN SAND SLTY 0028 BRWN FSND 0055
UXBRIDGE TOWNSHIP (U CON 06 027	17 649906 4884065 L	1985-11 1672	6	FR 0060	18/44/10/0:0	DO	0053 4	1907592 ()	LOAM 0002 SAND GRVL 0010 SAND 0056 SAND FGVL 0060
UXBRIDGE TOWNSHIP (U CON 06 027	17 649905 4884065 L	2000-04 1413	6	FR 0102	30/92/10/1:	DO	0094 8	1914533 (214724)	BRWN SAND PCKD 0027 BRWN SAND CLAY SOFT 0050 BRWN FSND 0075 GREY FSND 0102
UXBRIDGE TOWNSHIP (U CON 06 028	17 649615 4884523 W	1969-08 1413	5	FR 0067	23/60/7/2:0	DO	0067 8	4604116 ()	BRWN MSND 0020 RED MSND CLAY 0060 RED FSND 0075
UXBRIDGE TOWNSHIP (U CON 06 028	17 649718 4884605 W	1967-10 3109	30	FR 0025	5///:	DO		4602991 ()	LOAM 0002 BRWN CLAY MSND 0024 MSND 0027
UXBRIDGE TOWNSHIP (U CON 06 028	17 649675 4884583 W	1973-04 1413	5	FR 0061	12/25/9/1:30	DO	0045 8	4605428 ()	PRDG 0019 BRWN SAND SILT 0050 GREY SAND 0061
UXBRIDGE TOWNSHIP (U CON 06 028	17 649665 4884443 W	1971-11 1413	5	FR 0083	20/76/9/3:30	DO	0075 4 0079 4	4604891 ()	BRWN MSND 0020 GREY SILT 0071 RED FSND 0083
UXBRIDGE TOWNSHIP (U CON 06 028	17 649839 4884623 W	1974-07 1350	6	FR 0035	10/35/6/2:0	DO	0037 5	4605933 ()	SAND CLAY 0012 CLAY 0017 SILT CLAY SAND 0035 SAND 0045
UXBRIDGE TOWNSHIP (U CON 06 028	17 649912 4884558 W	1975-12 4743	6	FR 0040	8/35/15/1:0	DO	0040 8	4606386 ()	BLCK LOAM 0001 GREY CLAY SAND 0040 GREY SAND 0048 GREY FSND CLAY 0052 GREY GRVL 0054 BLUE CLAY GRVL 0062
UXBRIDGE TOWNSHIP (U CON 06 028	17 650002 4884638 W	1975-12 4743	6	FR 0056	3/20/15/3:0	DO	0057 3	4606390 ()	BLCK LOAM 0001 GREY CLAY GRVL 0020 BRWN CLAY SAND 0038 GREY FSND 0046 GREY GRVL 0060
UXBRIDGE TOWNSHIP (U CON 06 028	17 649728 4884329 W	1975-02 1413	5	FR 0072	33/50/7/2:30	IN	0064 8	4606180 ()	BRWN SAND 0033 BLUE SAND SILT 0057 RED FSND 0072
UXBRIDGE TOWNSHIP (U CON 06 028	17 649826 4884585 W	1961-08 1415	6	FR 0106	6/40/20/0:30	DO		4602989 ()	GRVL MSND 0004 FSND 0090 MSND CLAY 0100 MSND GRVL 0106 GRVL 0107
UXBRIDGE TOWNSHIP (U CON 06 028	17 649779 4884443 L	2000-03 5459	6	FR 0055	8/35/30/1:30	DO	0052 3	1914417 (211656)	BRWN CLAY SNDY 0026 BRWN FSND 0055 BRWN MSND 0060
UXBRIDGE TOWNSHIP (U CON 06 028	17 649988 4884419 W	2006-12 3108				NU		7039921 (Z30635) A	
UXBRIDGE TOWNSHIP (U CON 06 028	17 649804 4884140 W	2006-06 5459	6					1918347 (Z35910) A016067 A	
UXBRIDGE TOWNSHIP (U CON 06 028	17 649779 4884443 L	1995-02 5459				DO		1912335 (141584) A	PGVL 0120
UXBRIDGE TOWNSHIP (U CON 06 028	17 649779 4884443 L	1999-07 5459						1914209 (195550) A	BRWN SAND SLTY 0062 BRWN SAND SILT STNS 0089 GREY CLAY STNS 0117 GREY SAND STNS 0127 GREY CLAY SAND STNS 0158
UXBRIDGE TOWNSHIP (U CON 06 028	17 649778 4884521 W	1991-05 4743	6	FR 0066	7/50/10/2:0	DO	0066 3	1911068 (73178)	BRWN LOAM BLDR LOOS 0003 BRWN CLAY SOFT 0015 GREY CLAY HARD 0027 GREY SAND LOOS 0032 BRWN SAND 0069
UXBRIDGE TOWNSHIP (U CON 06 028	17 649776 4884444 L	2000-10 6874	30	FR 0020	17/26/25/2:	DO		1914838 (222356)	UNKN CMTD 0012 BRWN SAND 0026
UXBRIDGE TOWNSHIP (U CON 06 028	17 649779 4884443 L	1999-10 5459	6	UK 0048			0054 3	1914300 (211615)	BRWN CLAY 0028 BRWN SAND CLAY 0043 BRWN CLAY 0048 BRWN SAND SILT 0057
UXBRIDGE TOWNSHIP (U CON 06 028	17 649933 4884732 W	1988-07 4743	6	FR 0069	4/50/10/2:30	DO	0069 4	1909390 (31453)	BRWN LOAM SOFT 0002 BRWN SAND SOFT 0027 GREY CLAY GRVL SAND 0068 BRWN CSND LOOS LOOS 0073
UXBRIDGE TOWNSHIP (U CON 06 028	17 649779 4884443 L	1986-02 4743	6 5	FR 0047	15/40/8/1:30	DO	0050 7	1907591 ()	BRWN CLAY SAND 0015 YLLW CLAY SAND PCKD 0047 BRWN FSND 0057 BRWN CLAY SAND LYRD 0064 GREY CLAY STNS HPAN 0077

UXBRIDGE TOWNSHIP (U CON 06 028	17 649465 4884373 W	1984-08 4743	6	FR 0045	14/33/7/2:30	DO	0049 4	1907210 ()	BRWN CLAY SAND LOOS 0012 BRWN SAND 0045 BRWN SAND CLN 0053
UXBRIDGE TOWNSHIP (U CON 06 028	17 649615 4884373 W	1981-07 2407	6	FR 0076	25/68/5/2:30		0076 3	1906286 ()	BRWN LOAM 0001 BRWN CLAY 0020 BLUE CLAY 0067 BLUE FSND 0078
UXBRIDGE TOWNSHIP (U CON 06 028	17 649815 4884473 W	1979-04 4743	6	FR 0063	23/60/6/2:0	DO	0066 4	1905323 ()	BRWN SAND LOOS 0023 YLLW CLAY 0047 GREY CLAY SOFT 0063 GREY SAND CLAY 0066 GREY FSND 0070
UXBRIDGE TOWNSHIP (U CON 06 028	17 649815 4884223 W	1983-04 4738	6	FR 0040	10/41/12/3:0	CO	0059 3	1906661 ()	BRWN SAND LOOS 0040 GREY FSND VERY 0056 GREY FSND 0062
UXBRIDGE TOWNSHIP (U CON 06 028	17 649906 4884748 W	1987-10 4743	6	FR 0076	16/26/10/2:15	DO		1908683 (18839)	BRWN LOAM 0007 BLCK BLDR HARD 0010 GREY CLAY SOFT 0035 GREY CLAY SAND 0045 GREY CLAY SAND LYRD 0050 GREY CLAY SOFT 0076 GREY GRVL SAND 0079 GREY GRVL CLN 0090
UXBRIDGE TOWNSHIP (U CON 06 028	17 649749 4884605 W	1986-12 4743	6 5	FR 0048	8/55/10/2:30	DO	0050 4	1908083 (NA)	BLCK LOAM 0002 BRWN SAND CLAY LYRD 0038 BRWN SAND LOOS 0046 GREY CLAY 0048 BRWN SAND CLN FSND 0058 GREY CLAY STKY 0062
UXBRIDGE TOWNSHIP (U CON 06 028	17 649565 4884173 W	1980-10 2407	6	FR 0074	25/64/9/2:0	DO	0074 3	1905951 ()	BLUE LOAM 0001 BLUE CLAY SAND 0032 BLUE CLAY 0074 BLUE SAND 0077
UXBRIDGE TOWNSHIP (U CON 06 028	17 649756 4884604 W	1986-05 4743	6	FR 0052	11/45/10/1:30	DO	0068 4	1907669 ()	BLCK LOAM 0004 BRWN LOAM 0006 BRWN CLAY GRVL LOOS 0012 YLLW SAND DRTY 0048 BRWN CLAY SOFT 0052 BRWN SAND CLN 0072
UXBRIDGE TOWNSHIP (U CON 06 028	17 649615 4884398 W	1971-11 1413	5	FR 0081	20/79/9/1:30	DO	0073 8	4604894 ()	BRWN SAND 0020 GREY SILT 0071 RED SAND 0081
UXBRIDGE TOWNSHIP (U CON 06 028	17 649779 4884443 L	1999-08 5459						1914210 (195536) A	BRWN SAND SILT 0062 BRWN SAND STNS SILT 0089 GREY SAND STNS 0117 GREY SAND STNS 0123
UXBRIDGE TOWNSHIP (U CON 06 028	17 649757 4884568 W	1992-09 4743	6 5	FR 0050	13/40/6/4:30	DO	0050 9	1911649 (110978)	BRWN CLAY 0012 BRWN SAND CLAY LYRD 0026 BRWN CLAY SOFT 0051 BRWN SAND FSND 0060 GREY CLAY SILT 0070 GREY CLAY STNS HARD 0070
UXBRIDGE TOWNSHIP (U CON 06 028	17 649565 4884373 W	1978-09 4743	6	FR 0063	16/56/7/1:30	DO	0066 4	1905135 ()	YLLW SAND CLAY PCKD 0012 BRWN CLAY SAND 0045 BLUE CLAY 0063 BRWN FSND CLN 0070
UXBRIDGE TOWNSHIP (U CON 06 028	17 649602 4884303 W	1967-11 3102	30	FR 0015	15//2/:	DO		4602990 ()	LOAM 0001 MSND 0025
UXBRIDGE TOWNSHIP (U CON 06 028	17 649779 4884443 L	1995-01 5459	6	FR 0201	18/201/2/5:0	DO	0201 3	1912334 (141583)	BRWN CLAY SNDY 0016 GREY CLAY STNS 0022 BRWN SAND SILT 0031 GREY CLAY STNS ROCK 0189 GREY SAND SILT 0195 GREY CLAY SILT 0201 GREY SAND CLN 0206
UXBRIDGE TOWNSHIP (U CON 06 028	17 649776 4884444 L	2000-08 5459						1914797 (221525) A	BRWN LOAM SOFT 0003 BRWN FSND SOFT 0075 GREY CLAY STNS HARD 0080 GREY CLAY STNS HARD 0280 GREY CLAY SILT STNS 0360 BLCK SHLE HARD 0370
UXBRIDGE TOWNSHIP (U CON 06 028	17 649894 4884794 W	1959-10 4102	30	FR 0020	15///:	DO		4602988 ()	FSND 0025
UXBRIDGE TOWNSHIP (U CON 06 028	17 649635 4884553 W	1968-11 1413	5	FR 0037	8/18/9/6:0	DO		4603776 ()	BRWN CLAY MSND 0030 FSND 0034 CLAY 0036 MSND GRVL 0037
UXBRIDGE TOWNSHIP (U CON 06 028	17 649515 4884283 W	1976-01 1413	6	FR 0091	26/60/10/2:30	DO	0083 8	4606427 ()	BRWN SAND CLAY SILT 0077 RED FSND LOOS 0091

UXBRIDGE TOWNSHIP (U CON 06 028	17 649915 4884523 W	1978-01 4743	6	FR 0040	12/35/8/1:0	DO	0042 4	1904966 ()	BRWN SAND 0040 BRWN SAND WBRG 0046
UXBRIDGE TOWNSHIP (U CON 06 028	17 649515 4884473 W	1980-06 1413			///:	NU		1905766 () A	BRWN SAND DRY 0008 BRWN CLAY DNSE 0023 GREY CLAY DNSE 0040 GREY SILT SOFT 0046 GREY CLAY STNS HARD 0100
UXBRIDGE TOWNSHIP (U CON 06 028	17 649415 4884173 W	1984-05 1413	6	FR 0052	15/33/8/1:30	DO	0045 7	1906959 ()	BRWN SAND PCKD 0012 BRWN CLAY DNSE 0043 BRWN SAND LOOS 0052
UXBRIDGE TOWNSHIP (U CON 06 028	17 649574 4884319 W	2011-07 1413	6.25	FR 0087	28/65/40/1:	DO	0084 3	7170061 (Z128142) A108387	BRWN SAND LOOS 0027 BRWN FSND SILT 0075 BRWN FSND CLN 0087
UXBRIDGE TOWNSHIP (U CON 06 028	17 649704 4884574 W	2012-05 5459						7182315 (Z141291) A	
UXBRIDGE TOWNSHIP (U CON 06 028	17 649765 4884573 W	1976-09 2407	6	FR 0069	22/72/5/1:0	DO	0069 6	1904518 ()	BLUE LOAM 0001 BLUE CLAY 0032 BLUE SAND QSND 0060 BLUE CLAY 0062 BLUE SAND 0075
UXBRIDGE TOWNSHIP (U CON 06 028	17 649776 4884444 L	2000-08 5459						1914799 (221528) A	GREY GRVL FILL 0001 BRWN CLAY SLTY STNS 0022 GREY CLAY SILT 0075 GREY CLAY SAND DNSE 0150 GREY CLAY STNS SILT 0367 BLCK SHLE HARD 0370
UXBRIDGE TOWNSHIP (U CON 06 029	17 649650 4884806 L	2001-01 2662	6 2				0165 10	1915255 (228240)	BLCK LOAM 0005 BRWN CLAY SNDY GRVL 0013 GREY CLAY GRVL 0022 GREY SAND SLTY 0043 GREY CLAY GRVL 0052 GREY CLAY SNDY GRVL 0081 GREY SAND SLTY GRVL 0093 GREY CLAY SNDY GRVL 0166 GREY GRVL SAND WBRG 0182
UXBRIDGE TOWNSHIP (U CON 06 029	17 649649 4884806 L	2003-09 5459	6	FR 0117	-10/100/20/2:	DO	0129 6	1916695 (264133)	BRWN SAND 0017 BRWN CLAY FILL 0040 GREY SAND SILT 0048 GREY CLAY 0074 GREY SAND GRVL 0078 GREY CLAY STNS 0103 GREY SAND GRVL 0105 GREY CLAY 0117 GREY SAND GRVL 0135
UXBRIDGE TOWNSHIP (U CON 06 029	17 649649 4884806 L	2003-08 5459	10 6	FR 0110	-14/-14/60/0:(	DO	0110 6	1916658 (264125)	BRWN SAND STNS 0036 GREY CLAY STNS 0075 GREY CLAY SLTY 0081 GREY CLAY STNS 0086 GREY CLAY SLTY 0089 GREY CLAY STNS SILT 0101 GREY SAND STNS 0121
UXBRIDGE TOWNSHIP (U CON 06 029	17 649652 4884805 L	1998-08 5459						1913766 (195367) A	
UXBRIDGE TOWNSHIP (U CON 06 029	17 649652 4884805 L	1998-08 5459						1913768 (195369) A	
UXBRIDGE TOWNSHIP (U CON 06 029	17 649652 4884805 L	1996-05 3136				NU		1912850 (165175) A	
UXBRIDGE TOWNSHIP (U CON 06 029	17 649652 4884805 L	1996-05 3136				NU		1912848 (165173) A	
UXBRIDGE TOWNSHIP (U CON 06 029	17 649652 4884805 L	1996-05 3136				NU		1912846 (165171) A	
UXBRIDGE TOWNSHIP (U CON 06 029	17 649786 4884871 W	1990-10 2801	24 12		9/29/600/12:(	PS	0171 21	1911055 (58011)	CLAY GRVL 0022 GRVL CLAY 0030 SAND GRVL 0064 GRVL CLAY SAND 0074 GRVL CLAY 0080 CGVL BLDR 0091 CGVL CLAY 0092 FGVL BLDR 0101 CLAY CGVL HARD 0118 GRVL CLAY 0121 CLAY GRVL HARD 0126 GRVL CLAY SOFT 0147 CLAY GRVL HARD 0156 FGVL CGVL SAND 0171 FGVL CGVL CLAY

UXBRIDGE TOWNSHIP (U CON 06 029	17 649725 4884673 W	1973-11 4743	6	FR 0030 FR	18/50/8/6:0	DO	0048 4 0052 4	4605641 ()	BRWN CLAY 0013 YLLW SAND CLAY 0030 YLLW FSND 0038 YLLW CLAY SAND MUCK 0050 BRWN FSND 0056 GREY SILT 0059
UXBRIDGE TOWNSHIP (U CON 06 029	17 649663 4884421 W	1995-12 3136	8 6	UK 0030 FR	17/60/10/1:0	DO	0071 5	1912671 (165179)	BRWN LOAM 0003 BRWN CLAY SNDY PCKD 0018 BRWN FSND 0044 GREY CLAY SNDY SILT 0056 BRWN FSND 0078
UXBRIDGE TOWNSHIP (U CON 06 029	17 649652 4884805 L	1998-08 5459						1913770 (195371) A	
UXBRIDGE TOWNSHIP (U CON 06 029	17 649650 4884806 L	2001-07 2801				NU		1915204 (232021) A	
UXBRIDGE TOWNSHIP (U CON 06 029	17 649652 4884805 L	1988-07 5459	6	FR 0200	30/206/2/8:0	DO	0200 6	1909176 (NA)	BRWN SAND 0010 BLUE CLAY STNS 0080 BLUE CLAY SOFT 0140 BLUE CLAY STNS 0200 GREY GRVL CMTD 0206
UXBRIDGE TOWNSHIP (U CON 06 029	17 649715 4884923 W	1979-08 2801	2	FR 0070 FR	///:	MN	0182 70	1905440 ()	BRWN CLAY GRVL LOOS 0007 BRWN CLAY SAND SOFT 0019 GREY CLAY SOFT 0029 GREY SAND SILT CLAY 0052 GREY SILT SAND CLAY 0062 BRWN SAND GRVL CLAY 0070 BRWN SAND FGVL CGVL 0096 GREY CLAY GRVL 0163 GREY SAND GRVL PCKD 0195 GREY SAND GRVL CLAY 0215
UXBRIDGE TOWNSHIP (U CON 06 029	17 649574 4884494 W	2005-12 4743						1917954 (Z26838) A032314 A	
UXBRIDGE TOWNSHIP (U CON 06 029	17 649570 4884498 W	2005-11 4743						1917953 (Z26837) A032316 A	
UXBRIDGE TOWNSHIP (U CON 06 029	17 649735 4884259 W	2004-05 7154	6.21 0.27	FR 0080 UK 0090 FR 0280		MN	0080 10	1917061 (Z06854) A006823	BRWN MSND 0089 GREY MSND 0105 GREY CLAY SLTY STNS 0212 GREY CLAY STNS SLTY 0300
UXBRIDGE TOWNSHIP (U CON 06 029	17 649652 4884805 L	1999-10 5459				NU		1914299 (211611) A	
UXBRIDGE TOWNSHIP (U CON 06 029	17 649652 4884805 L	1999-08 5459	6	FR 0198	45/190/10/1:	DO	0200 6	1914163 (195534)	BRWN SAND SILT 0062 BRWN SAND STNS SILT 0089 GREY CLAY STNS 0117 GREY SAND STNS SILT 0127 GREY CLAY STNS STNS 0198 GREY SAND STNS 0211
UXBRIDGE TOWNSHIP (U CON 06 029	17 649652 4884805 L	1995-06 4743	6	FR 0083	16/40/20/2:0	DO	0084 6	1912475 (152130)	BLCK LOAM 0001 BRWN CLAY SAND LYRD 0021 BRWN SAND LOOS 0025 GREY CLAY SOFT 0059 BRWN FSND 0083 BRWN SAND GRVL CLN 0090
UXBRIDGE TOWNSHIP (U CON 06 029	17 649805 4884622 W	1995-12 3136	8 6	FR 0029	14/64/6/1:0	DO	0063 5	1912655 (165176)	BRWN LOAM 0003 BRWN CLAY SNDY 0027 BRWN FSND 0047 GREY FSND 0069 GREY CLAY 0069
UXBRIDGE TOWNSHIP (U CON 06 029	17 649649 4884806 L	2003-09 5459				NU		1916696 (264138) A	
UXBRIDGE TOWNSHIP (U CON 06 029	17 649652 4884805 L	1996-05 3136				NU		1912847 (165170) A	
UXBRIDGE TOWNSHIP (U CON 06 029	17 649815 4884723 W	1973-07 5459	6	FR 0208	55/125/6/3:0	DO	0214 3	4605526 ()	BRWN SAND 0045 GRVL CLAY 0070 BLUE CLAY STNS 0170 CLAY GRVL 0208 SAND GRVL 0214
UXBRIDGE TOWNSHIP (U CON 06 029	17 649652 4884805 L	1996-05 3136				NU		1912849 (165174) A	
UXBRIDGE TOWNSHIP (U CON 06 029	17 649652 4884805 L	1998-08 5459						1913769 (195370) A	
UXBRIDGE TOWNSHIP (U CON 06 029	17 649652 4884805 L	1998-08 5459						1913767 (195368) A	
UXBRIDGE TOWNSHIP (U CON 06 029	17 649652 4884478 W	1995-12 3136	8 6	UK 0019 FR	9/61/8/1:0	DO	0066 5	1912672 (165177)	BRWN LOAM 0002 BRWN CLAY SNDY 0019 BRWN SAND 0073 GREY CLAY 0073

UXBRIDGE TOWNSHIP (U CON 06 029	17 649740 4884558 W	1995-11 3136	8 6	FR 0034	13/62/5/1:0	DO	0063 4	1912653 (165155)	BRWN LOAM 0002 BRWN CLAY SNDY 0016 GREY CLAY SNDY 0027 GREY CLAY SNDY 0034 BRWN FSND 0068 GREY CLAY 0068
UXBRIDGE TOWNSHIP (U CON 06 029	17 649652 4884805 L	1989-02 5459	6	FR 0206	/206/15/3:0	DO	0203 3	1909625 (37847)	BRWN CLAY SNDY 0021 BRWN SAND 0026 GREY CLAY SNDY 0127 GREY SAND STNS 0147 GREY CLAY SAND 0187 GREY CLAY SILT 0198 GREY SAND STNS 0209
UXBRIDGE TOWNSHIP (U CON 06 029	17 649650 4884806 L	2001-08 2801						1915308 (232024) A	
UXBRIDGE TOWNSHIP (U CON 06 030	17 649769 4884388 W	2007-06 1413	32		2///:			7046900 (Z57504) A	
UXBRIDGE TOWNSHIP (U CON 06 030	17 649772 4884378 W	2007-06 1413	6.25					7046901 (Z57505) A	
UXBRIDGE TOWNSHIP (U CON 06 030	17 649805 4884447 W	2007-06 1413	42		4///:			7046902 (Z57506) A	

Notes:

UTM: UTM in Zone, Easting, Northing and Datum is NAD83; L: UTM estimated from Centroid of Lot; W: UTM not from Lot Centroid
DATE CNTR: Date Work Completed and Well Contractor Licence Number
CASING DIA: .Casing diameter in inches
WATER: Unit of Depth in Feet. See Table 4 for Meaning of Code
PUMP TEST: Static Water Level in Feet / Water Level After Pumping in Feet / Pump Test Rate in GPM / Pump Test Duration in Hour : Minutes
WELL USE: See Table 3 for Meaning of Code
SCREEN: Screen Depth and Length in feet
WELL: WEL (AUDIT #) Well Tag. A : Abandonment; P: Partial Data Entry Only
FORMATION: See Table 1 and 2 for Meaning of Code

Table 1. Core Material and Descri

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

Notes (Cont'd):

Table 2. Core Colour

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

Table 3. Well Use

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

Table 4. Water Detail

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