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A REPORT TO
LOUISVILLE HOMES LIMITED

A HYDROGEOLOGICAL ASSESSMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT

1884 LIVERPOOL ROAD AND 1885 GLENDALE DRIVE
CITY OF PICKERING

REFERENCE NO. 2411-W164

MARCH 31, 2026

REVISION 1

DISTRIBUTION

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ISSUES REGISTRY

Modification	Date	Description of Issued and/or Changes
Final	March 19, 2026	Final Report
Revision 1 Final	March 31, 2026	Revised Final Report

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1.0 EXECUTIVE SUMMARY

Soil Engineers Ltd. (SEL) was retained by Louisville Homes Ltd. to conduct a hydrogeological assessment for the property with the municipal addresses of 1884 Liverpool Road and 1885 Glendale Drive, in the City of Pickering. (the Subject Site).

The Subject Site is located at the northwest corner of the intersection of Liverpool Road and Glenanna Road in the City of Pickering. The Subject Site is bounded by Liverpool Road to the east, Glenanna Road to the south, Glendale Drive to the west, and residential properties to the north. The Subject Site is currently occupied by a two-storey residential dwelling at 1885 Glendale Drive and a one-storey residential dwelling, a shed, and a swimming pool at 1884 Liverpool Road, along with associated grass-covered areas, mature trees, and asphalt driveways.

The existing residential dwellings are proposed to be demolished to facilitate the proposed development at the Subject Site. Based on the review of the architectural drawings set, prepared by Micacchi Architecture Inc., dated March 9, 2026, it is understood the proposed residential development at the Subject Site consists of three (3) blocks of 3-storey stacked townhouses with a single-level basement, and a shared 1-level underground parking (P1) structure.

The current investigation revealed that:

- The Subject Site is generally underlain by a strata of silt, silty clay or silty clay till and silty sand silt extending to the maximum termination depth of investigation at 14.2 metres below ground surface (mbgs).
- The highest recorded stabilized shallow groundwater level is at El. 88.8 metres above sea level (masl) at BH/MW 1 on February 7, 2025, and the lowest recorded stabilized shallow groundwater level is at El. 86.3 masl at BH/MW 5 on January 10, 2025.
- Single well response testing (SWRTs) was performed at all five (5) installation monitoring wells. The results show that the hydraulic conductivities for the silty clay unit range from 6.3×10^{-8} m/sec at BH/MW 3, and 3.8×10^{-7} m/sec at BH/MW 5. The hydraulic conductivity for the silt unit is 6.6×10^{-9} m/sec at BH/MW 1.
- The Hazen Equation method was also adopted to estimate the hydraulic conductivity (K). The results show that the hydraulic conductivity for the sand unit at BH/MW 2 is 3.0×10^{-5} m/sec, while the silty sand till unit at BH/MW 5 is 6.1×10^{-8} m/sec.
- The proposed 1-level underground parking structure of the proposed residential development is proposed below the groundwater level elevation. As such, groundwater seepage is anticipated in the open excavation box for the construction for the proposed P1 structure. The anticipated short-term construction dewatering flow rate could reach to a total flow rate of 128,500.0 L/day including groundwater seepage with a safety factor of 2.0 and the 2-year storm event. As such, filing an

EASR with the MECP is required. Also, obtaining discharge agreement from the Regional Municipality of Durham or City of Pickering is required if short-term dewatering effluent is proposed to be conveyed to the region's or city's sewer system.

- As the proposed P1 structure, including the foundation and elevator pit, is to be designed as a waterproofed, submerged "tank" structure, no long-term foundation drainage is anticipated. As such, filing PTTW with MECP is not required.
- The ZOI for any temporary construction dewatering array for the construction of the proposed P1 structure of the stacked townhouse blocks could reach up to 11.1 m away from the conceptual dewatering wells or array considered around. Considering the conceptual ZOI for dewatering:
    - The conceptual ZOI for dewatering for excavation and construction could reach up to 11.1 m for the proposed P1 structure of the proposed stacked townhouse blocks, that will be constructed partially below the shallow groundwater table, respectively. The conceptual ZOI for dewatering will not be limited to the property boundary of the Subject Site. The conceptual ZOI extends onto the Glendale Drive to the west of, Liverpool Road to the east of, and Glenanna Road to the south of the Subject Site, as well as the existing residential property to the north of the Subject Site during excavation and construction of the proposed P1 structure. As such, potential impacts related to ground settlement during dewatering are expected on the nearby road and structures. The potential impacts related to ground settlement should be assessed by a professional geotechnical engineer. However, if the dewatering process is conducted using sumps without the installation of dewatering wells or any active dewatering approach, the potential impacts will be negligible.
    - There are no records of natural features within the Subject Site. However, there is a wooded area located approximately 5.0 m north of the Subject Site, which is located within the conceptual ZOI for the temporary dewatering area for the construction of the proposed P1 structure. As such, no significant impacts to natural heritage features are anticipated pertaining to the proposed development.
    - There are eight (8) records for water supply wells that is registered within 500 m of the Subject Site. However, there is no record for water supply well located within the conceptual ZOI for the temporary dewatering area for the construction of the proposed P1 structure. Additionally, the surrounding area of the Subject Site is well developed and located in the City of Pickering, with municipal services provided. As such, potential impacts to the nearby water supply wells are not anticipated if they exist and in service.

2.0 INTRODUCTION

2.1 Site Location and Project Description

Soil Engineers Ltd. (SEL) was retained by Louisville Homes Ltd. to conduct a hydrogeological assessment for the property with the municipal addresses of 1884 Liverpool Road and 1885 Glendale Drive, in the City of Pickering (the Subject Site).

The Subject Site is located at the northwest corner of the intersection of Liverpool Road and Glenanna Road in the City of Pickering. The Subject Site is bounded by Liverpool Road to the east, Glenanna Road to the south, Glendale Drive to the west, and residential properties to the north. The Subject Site is currently occupied by a two-storey residential dwelling at 1885 Glendale Drive and a one-storey residential dwelling, a shed, and a swimming pool at 1884 Liverpool Road, along with associated grass-covered areas, mature trees, and asphalt driveways. The location of the Subject Site is shown on **Drawing 1**.

The existing residential dwellings are proposed to be demolished to facilitate the proposed development at the Subject Site. Based on the review of the architectural drawings set, prepared by Micacchi Architecture Inc., dated March 9, 2026, it is understood the proposed residential development at the Subject Site consists of three (3) blocks of 3-storey stacked townhouses with a single-level basement, and a shared 1-level underground parking (P1) structure.

2.2 Project Objectives

The current hydrogeological assessment report presents the regional and local setting of the Subject Site. The findings of the fieldwork, including subsoil investigation, groundwater level monitoring, groundwater quality assessment, and hydraulic conductivity testing are presented in the report. Potential needs for short-term dewatering and long-term foundation drainage control are assessed, and hydrogeological impacts of the proposed development to the nearby groundwater receptors including water supply wells, natural heritage features, and structures are assessed (if applicable). Potential needs for any mitigation plan during construction were discussed. Furthermore, comments and recommendations are provided on any needs for applying for a Permit to Take Water (PTTW), or posting Environmental Activity and Sector Registry (EASR) with the Ministry of the Environment, Conservation and Parks (MECP).

The current report is prepared in consideration of the Ontario Water Resource Act, Ontario Regulation (O. Reg.) 387/04.

2.3 Scope of Work

The scope of work for the hydrogeological assessment is summarized below:

- *Background Review:* Available background geological and hydrogeological information for the Subject Site including topographic mapping, surface geological, natural heritage features databases, City of Pickering official plans, Toronto and Region Conservation Authority (TRCA) regulated area plans, and MECP water well records were reviewed.
- *Fieldwork:* Fieldwork includes inspecting the Subject Site and surrounding properties with respect to the natural features, groundwater receptors, and structures, as well as installing and developing the monitoring wells. Additionally, in-situ hydraulic conductivity testing will be completed within the installed monitoring well if possible. The groundwater levels within the installed monitoring wells were monitored over three (3) monitoring events. In addition, one (1) set of groundwater samples will be collected and submitted to a CALA laboratory to characterize groundwater quality in comparison with the Regional Municipality of Durham Sewer Use By-Law parameters if possible.
- *Short-Term Dewatering Needs:* Based on a review of the available conceptual site plan, findings of the current subsurface investigation, and recommendations provided in the geotechnical investigation report (if available), short-term dewatering flow rate including groundwater seepage, and anticipated water that should be collected over potential storm events was calculated. Potential need for a mitigation plan was assessed to mitigate potential short-term dewatering impacts to the nearby groundwater receptors (including natural heritage features and water supply wells), and structures, if applicable.
- *Long-term foundation Drainage Control Requirement:* Based on a review of the available design drawings, findings of the current subsurface investigation, and recommendations provided in the geotechnical investigation report (if available), total long-term foundation drainage flow rate including groundwater seepage, and anticipated flow from infiltration source was estimated.
- *Permit Requirements:* Considering the estimated short-term construction dewatering and long-term foundation drainage flow rates, recommendations were provided on any need for applying for a PTTW or posting on the EASR with the MECP, if required.

3.0 APPLICABLE REGULATIONS AND OFFICIAL PLANS

The regulations and policies are relevant to this hydrogeological assessment and the location of the Subject Site within the official plans are summarized below.

3.1 Toronto and Region Conservation Authority (TRCA) Policies and Regulation (O. Reg. 41/24)

Under Section 28 of the Conservation Authorities Act, 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 LSRCA, through its regulatory mandate, is responsible for issuing permits under Ontario Regulation (O. Reg.) 41/24, Development, Interference with Wetlands and Alterations to Shorelines and Watercourses for development proposal or Site alteration work to shorelines and watercourses within the regulated areas.

TRCA Regulated Area online mapping was reviewed on March 13, 2026. It is our understanding that the Subject Site is not located within the TRCA Regulated Area. As such, it is anticipated that obtaining a permit from the TRCA under O. Reg. 41/24 will not be required for the proposed development.

3.2 Clean Water Act

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 Wellhead Protection Areas (WHPAs), significant groundwater recharge areas (SGRAs) and Highly Vulnerable Aquifers (HVAs) as well as the assessment of drinking water quality and quantity threats within Source Protection Regions. Source Protection Plans are developed under the CWA and include the restriction and prohibition of certain types of activities and land uses within WHPAs.

Based on a regional-scale source water protection mapping (Source Water Protection Information Atlas) provided by the MECP updated on January 30, 2026, the Subject Site is not located within a WHPA, SGRA, Issue Contributing Area, Intake Protection Zone, and Event Based Area. However, a small portion of the Subject Site along the east property boundary is located within the HVA with a score of 6.

3.3 City of Pickering Official Plan

The City of Pickering Official Plan sets up policies that deal with legislative and administrative concerns, guides physical growth, and addresses social, economic, and environmental concerns. The Official Plan provides land use planning designations and identifies areas of environmental significance where more stringent policies may apply for development applications.

City of Pickering Official Plan maps were reviewed for the current study with the results summarized below:

- Schedule I (Land Use Structure) – A review of the map, dated March 2022, indicates that the Subject Site is located within areas designated as Low Density Areas.
- Schedule III A (Resource Management: The Natural Heritage System) – A review of the map, dated March 2022, indicates that the Subject Site is not located within areas designated as Natural Heritage System, nor the Greenbelt Natural Heritage System.
- Schedule III B (Resource Management: Key Natural Heritage Features) – A review of the map, dated March 2022, indicates that the Subject Site is not located within an area designated as Key Natural Heritage Features.
- Schedule III C (Resource Management: Key Natural Heritage Features/Key Hydrologic Features) – A review of the map, dated March 2022, indicates that part of the Subject Site is not located within an area designated as Key Natural Heritage Features/Key Hydrologic Features.
- Schedule III D (Resource Management: Highly Vulnerable Aquifers, Significant Groundwater Recharge Area) – A review of the map, dated March 2022, indicates that the Subject Site is partially located within areas designated as Highly Vulnerable Aquifers (HVA).
- Schedule III F (Resource Management: Vulnerable Areas) – A review of the map, dated March 2022, indicates that the Subject Site is not located within an area designated as Vulnerable Areas.

4.0 METHODOLOGY

4.1 Borehole Advancement and Monitoring Well Installation

Drilling boreholes were conducted for geotechnical investigation, and construction of monitoring wells were conducted for the current hydrogeological investigation by SEL between December 30, 2024 and January 2, 2025. The program consisted of the drilling of the five (5) boreholes (BH) extending to depth from 11.1 to 14.2 metres below ground surface (mbgs).

All boreholes were utilized for the hydrogeological assessment of the Subject Site, and were instrumented with the monitoring wells for hydrogeological assessment purposes. The locations of the boreholes and monitoring wells are shown on **Drawing 2**.

Borehole drilling and monitoring well construction were completed by a licensed water well contractor, under the full-time supervision of SEL's geotechnical supervisor who logged the soil strata encountered during borehole advancement and collected representative soil samples for textural classification. The boreholes were drilled using a track-mounted drill rig equipped with solid stem augers and split spoons. Detailed descriptions of the encountered subsoil and groundwater conditions as well as a grain size distribution graph are provided by SEL and presented on the borehole and monitoring well logs, in the enclosed **Appendix A**.

The monitoring wells were constructed using 50-mm diameter PVC pipes for the five (5) borehole locations. 3.0 m long 10-slot well screens were installed at all monitoring well locations. All monitoring wells were equipped with monument casing at the ground surface.

The UTM coordinates and ground surface elevations at the monitoring wells' locations, as well as the monitoring well construction details, are presented in **Table 4-1**. The ground surface elevations and horizontal coordinates at the monitoring well locations were determined at the time of the investigation, using the Trimble TSC3 handheld Global Navigation Satellite System.

Table 4-1 - Monitoring Well Installation Details

Monitoring Well ID	Installation Date	UTM Coordinates (m)		Ground El. (masl)	Screen Interval (mbgs)	Soil in the Screen Interval	Casing Dia. (mm)	Protective Casing Type
		Easting	Northing					
BH/MW 1	January 2, 2025	653376	4855760	91.3	3.1 – 6.1	Silt	50	Monument
BH/MW 2	December 30, 2024	653352	4855736	89.6	3.1 – 6.1	Silty Clay	50	Monument
BH/MW 3	December 31, 2024	653331	4855748	89.2	3.1 – 6.1	Silty Clay	50	Monument
BH/MW 4	January 2, 2025	653310	4855717	88.9	3.1 – 6.1	Silty Clay	50	Monument
BH/MW 5	January 2, 2025	653282	4855728	88.1	3.1 – 6.1	Silty Clay	50	Monument

Notes:
mbgs metres below ground surface
masl metres above sea level

4.2 MECP Water Well Records Review

MECP Water Well Records (WWRs) were reviewed for the registered wells located within 500 m radius of the Subject Site (Study Area). The water well records indicate that forty-two (42) are located within the 500 m zone of influence Study Area relative to the Subject Site. The findings of the MECP well records are summarized in the **Section 5.6** and **Appendix B** of the current report.

4.3 Groundwater Monitoring

All five (5) installed monitoring wells were utilized to measure and monitor groundwater levels within and close proximity of the Subject Site. Monitoring wells were developed, and the groundwater monitoring program confirmed the stabilized groundwater level beneath the Subject Site. The stabilized groundwater levels were manually measured over three (3) monitoring events on January 10, January 24, and February 7, 2025, with the results presented in **Section 7.1**.

4.4 In-Situ Hydraulic Conductivity Test

SEL has conducted in-situ hydraulic conductivity tests (falling head) at all BH/MW locations.

The in-situ hydraulic conductivity test (falling head or rising head) provides estimated hydraulic conductivity (K) for subsoil strata at the depths of the well screens. The monitoring well was developed in advance of the tests. Well development involves the purging and removal of groundwater from each monitoring well to remove remnants of clay, silt and other debris introduced into the monitoring well during construction, and to induce the flow of formation groundwater through the well screens, thereby improving the transmissivity of the subsoil strata formation at the well screen depths.

The in-situ rising head hydraulic conductivity test involves the placement of a slug of known volume into the monitoring well, below the water table, to displace the groundwater level upward. The in-situ rising head hydraulic conductivity test involves removing a volume of water from the monitoring well to displace the groundwater level downward. The rate at which the water level recovers to static conditions (rising head/falling head) is tracked manually using a water level tape and a data logger. Slug tests in the monitoring wells with partially submerged screens may exhibit a double straight-line effect due to the filter pack drainage. Therefore, the data that represents the filter pack around the screen is eliminated during the interpretation of the slug test. The rate at which the water table recovers to static conditions is used to estimate the K value for the water-bearing strata formation at the well screen depth using the Bouwer and Rice method (1976). The findings for the hydraulic conductivity testing are presented in **Section 7.3.1** and **Appendix D** of the current report.

4.5 Hydraulic Conductivity based on Grain Size Distribution Graphs

The Hazen equation estimation method was also used to estimate the hydraulic conductivity (K) for saturated subsoils at selected depths beneath the Subject Site. The method provides alternative hydraulic conductivity (K) estimates which are derived from the grain size diameter, whereby 10% by weight of the soil particles are finer and 90% are coarser (Freeze and Cherry, 1979). The soils chosen for Hazen to estimate were selected primarily from above the well screen depths. Findings are presented in **Section 7.3.2**.

4.6 Groundwater Quality Assessment

Groundwater quality assessment was completed by SEL on February 12, 2025. One (1) set of groundwater samples was collected from one (1) selected monitoring well (BH/MW 4) to characterize its quality for evaluation against the Regional Municipality of Durham Sewer Use By-Law (By-Law No. 55-2013) parameters. This is performed to assess whether any potential dewatering effluent can be disposed of into the Regional Municipality of Durham Sanitary and/or Storm Sewer system during construction. Based on the results, recommendations for any pre-treatment for any dewatering effluent can be developed, if required.

The sample analysis was performed by SGS Canada Inc. and the results of the analysis are discussed in **Section 7.4** of the current report.

4.7 Review of Regional Data and Available Reports for the Subject Site

The maps, data, and documents provided by the MECP, Ontario Geological Survey (OGS), Ministry of Natural Resources (MNR), Oak Ridges Moraine Groundwater Program (ORMGP), and TRCA were reviewed.

5.0 REGIONAL AND LOCAL SITE SETTING

5.1 Regional Geology

The current understanding of the surface geological setting of the Subject Site is based on scientific work conducted by the OGS (OGS, 2003). The east portion of the Subject Site is located within an area mapped as Glacial deposits (5b) known as Newmarket/Northem/Bowmanville Till, comprising of stone-poor, sandy silt to silty sand-textured till, and the west portion of the Subject Site is located with an area mapped as Glacial lake deposits, also called fine-textured glaciolacustrine deposits (8a) consisting of silt and clay, minor sand and gravel. **Drawing 3** illustrates the mapped surficial geology for the Subject Site and the surrounding area.

The Oak Ridges Moraine Groundwater Program (ORMGP) produced a cross-sectional geological map to aid in the characterization of the general area. Considering the regional cross-section, it is understood that the overburden units prevalent in this area are as follows, with the youngest unit at the top:

- *Undifferentiated Sediments:* Undifferentiated sediments present at the ground surface, with an approximate thickness up to 2.1 m beneath the Subject Site.
- *Thronclif Formation:* The Thorncliffe Formation consists of glaciofluvial and glaciolacustrine sand and silt deposited approximately 30,000 to 50,000 years ago. The Thorncliffe Formation shows a considerable variation in grain size and thickness, both locally and regionally. It acts as a regional aquifer. Based on the ORMGP cross-section, the thickness of the Thorncliffe is approximately ranging from 14.0 m to 15.6 m beneath the Subject Site.
- *Sunnybrook Drift:* The Sunnybrook Drift consists of silt to silty clay materials deposited 45,000 years ago and acts as a regional aquitard. The thickness of the Sunnybrook Drift is generally less than 10 m to 20 m. Based on the ORMGP cross-section, the estimated thickness of the unit ranging from 0.6 m to 1.5 m beneath the Subject Site.
- *Scarborough Formation:* The Scarborough Formation consists of sands over silt and clay materials deposited approximately 70,000 to 90,000 years ago and acts as an aquifer. Based on the ORMGP cross-section, the Scarborough Formation layer has the thickness ranging from 0.1 m to 0.5 m beneath the Subject Site.

The underlying bedrock at the Subject Site is the Blue Mountain Formation, which consists of shale along with interbeds of limestone or calcareous siltstone (OGS, 2007). A review of the ORMGP cross-section indicates that the bedrock could be contacted approximately 17.0 metres below ground surface (mbgs) beneath the Subject Site.

5.2 Regional Physiography

The Subject Site is located within a regional physiography of Southern Ontario known as Iroquois Plain. The west portion of the Subject Site is known as Drumlins and the east portion is known as Clay Plains (Chapman and Putnam, 1984). **Drawing 4** shows the location of the Subject Site within the regional physiography map.

5.3 Regional Topography and Drainage

A review of a regional topography map presented on **Drawing 5** indicates that topography across the Subject Site is gently sloping, with elevations generally decreasing from the highest elevation located at the east boundary of the Subject Site, and gently declining toward the western portion of the Subject Site in the direction of the unknown watercourse.

The ground surface elevation ranges approximately between 91.3 and 88.1 metres above sea level (masl), based on ground surface elevations measured at the borehole and monitoring wells' locations.

5.4 Watershed Setting

The Subject Site is located within the Lake Ontario Waterfront Watershed that falls in the Toronto and Region Conservation Authority (TRCA) jurisdiction.

5.5 Local Surface Water and Natural Heritage Features

MNR database was reviewed for any natural heritage features including, watercourses, bodies of water, wetland features, Area of Natural and Scientific Interest (ANSI) and wooded areas. **Drawing 6** shows the location of the Subject Site within the surrounding Natural Heritage Features.

Record review indicates that there are no records for natural heritage features including woodlands, wetlands, waterbodies, and watercourses and ANSI within the Subject Site.

Record review indicates that the closest watercourse, an unknown tributary, is located approximately 314.3 m west of the Subject Site. The closest wooded area is approximately 5.0 m north of the Subject Site. There are also wooded areas located approximately 26.7 m south of the Subject Site. Lake Ontario is approximately 3.1 km m south of the Subject Site.

5.6 Ground Water Resources (MECP Well Records)

MECP well record database was reviewed for records located within a radius of 500 m from the approximate Subject Site (Study Area). The records indicate that forty-two (42) well records are located within the Study Area relative to the Subject Site boundaries. A summary of the final status of the records, obtained from the records review is presented in **Table 5-1**.

The locations of the well records, based on the UTM coordinates provided by the records, are shown on **Drawing 7**. Details of the MECP water well records that were reviewed are provided in **Appendix B**.

Table 5-1 - MECP Well Record Summary

Water Use - Final Status	Number of Records
Monitoring and Test Hole	10
Water Supply	8
Test Hole	8
Abandoned-Other	7
Observation Wells	4
Unknown	3
Abandoned-Supply	2

The above summary indicates that there are eight (8) records of water supply wells in close proximity of the Subject Site (Study Area).

5.7 Active Permit to Take Water Application Record Review

MECP website was reviewed for any active PTTW application records within 1.0 km radius of the Subject Site on March 14, 2026. Record review indicates there is no record of active PTTW within 1 km radius of the Subject Site.

6.0 SOIL LITHOLOGY AND SUBSURFACE INVESTIGATION

The subsoil investigation has revealed that beneath the pavement structure or a topsoil veneer, the Subject Site is generally underlain by a strata of silt, silty clay or silty clay till and silty sand silt till/sandy silt till extending to the maximum termination depth of investigation at 14.2 mbgs. Information regarding borehole logs and grain size distributions is presented in **Appendix A**. The approximate locations of boreholes are shown on **Drawing 2**. Additionally, a subsoil profile key plan and subsurface profile are presented in **Drawings 8-1** and **8-2**, respectively. Based on a review of the borehole logs, the stratigraphy beneath the investigated areas of the Subject Site generally consists of the followings:

6.1 Pavement Structure

The investigation revealed that the pavement structure consists of 50 mm of asphalt overlying 130 mm and 250 mm of granular fill at the BH/MW 2 and BH/MW 3 locations, respectively.

6.2 Topsoil

The investigation revealed that topsoil layers up to 33 cm, 25 cm, and 38 cm thick were encountered at the ground surface at BH/MW 1, BH/MW 4 and BH/MW 5 locations, respectively. At BH/MW 3 location, a 15 cm thick topsoil was encountered beneath the pavement structure. Thicker topsoil layers may be encountered in areas beyond the BH/MW locations.

6.3 Sand

Native sand deposits were encountered near the ground surface at all BH/MW locations. At the BH/MW 4 and BH/MW 5 locations, sand deposits were also encountered at greater depths beneath the silty clay and silty clay till deposit. The near-surface sand is brown in color and exhibits a relative density ranging from loose to compact. The sand deposit encountered at BH/MW 4 and BH/MW 5 is grey in color and exhibits a relative density of very loose to loose. The retrieved subsoil sample indicates a moist to wet, generally very moist condition.

Grain size analyses were performed on one (1) selected subsoil sample for sand. The estimated permeability for the sand unit encountered at BH/MW 2 at the depth of 1.0 mbgs is about 10^{-3} cm/sec. The gradations are plotted in **Appendix A** (**Figure 6**).

6.4 Silty Clay/Silty Clay Till

Native deposits of silty clay and silty clay till were contacted beneath the sand deposit, except at BH/MW 1 location, where it was encountered beneath the sand and silt deposit. It consists of a trace of sand or some sand, and occasional silt layers and cobbles. The soil is grey in color. The relative density of the deposit is very dense to hard. The retrieved subsoil sample indicates a generally very moist condition.

6.5 Silt

Native deposits of silt were encountered in BH/MW 1 and occur as seams and layers within the silty clay and silty clay till deposit. It consists of some clay. The color of the silt deposit changes from brown to grey approximately 3.0 mbgs. The relative density of the silt deposit is dense to very dense. The retrieved subsoil sample indicates a most to very moist condition.

Grain size analyses were performed on one (1) selected subsoil sample for silt. The estimated permeability for the silt unit encountered at BH/MW 1 at the depth of 6.3 mbgs is about 10^{-6} cm/sec. The gradations are plotted in **Appendix A** (**Figure 7**).

6.6 Silty Sand Till/Sandy Silt Till

Native deposits of silty sand till and sandy silt till were contacted at BH/MW 3 and BH/MW 5 locations, at the depth of 12.7 and 10.7 mbgs, respectively. It consists of some clay, a trace of gravel, occasional cobbles and boulders and shale fragments. The soil is grey in color and the relative density of the deposit is dense to very dense. The moisture content shows a generally moist condition.

Grain size analyses were performed on one (1) selected subsoil sample for silty sand till. The estimated permeability for the silty sand till unit encountered at BH/MW 5 at the depth of 12.4 mbgs is about 10^{-5} cm/sec. The gradations are plotted in **Appendix A** (**Figure 8**).

6.7 Shale Bedrock

Weathered shale bedrock was encountered in BH/MW 1 and BH/MW 3 at the depth of 12.2 and 13.7 mbgs, respectively. The shale bedrock is grey in color. Rock quality was not assessed, as rock coring was beyond the scope of the current investigation.

7.0 LOCAL HYDROGEOLOGICAL STUDY

7.1 Monitoring Well Development and Groundwater Level Monitoring

The groundwater levels in the monitoring wells were measured, manually on January 10, January 24, and February 7, 2025 to record the fluctuation of the shallow groundwater table beneath the Subject Site.

The groundwater levels were monitored over three (3) monitoring events. SEL measured the groundwater levels using an interface probe (Heron Water Tape Series #1900). A summary of the groundwater level observations and their corresponding elevations are provided in **Table 7-1**.

Table 7-1 - A Summary of Groundwater Monitoring

BH/MW ID	Unit	Groundwater Level			Fluctuation
		January 10, 2025	January 24, 2025	February 7, 2025	(m)
BH/MW 1	mbgs	4.6	3.8	2.5	2.1
	masl	86.7	87.5	**88.8**	
BH/MW 2	mbgs	1.8	2.3	2.3	0.5
	masl	87.8	87.3	87.3	
BH/MW 3	mbgs	2.4	2.4	2.5	0.1
	masl	86.8	86.8	86.7	
BH/MW 4	mbgs	2.4	2.3	2.3	0.1
	masl	86.5	86.6	86.6	
BH/MW 5	mbgs	1.9	1.8	1.8	0.1
	masl	**86.2**	86.3	86.3	

Notes:
mbgs metres below ground surface
masl metres above sea level
NA Not Applicable

As shown in **Table 7-1**, the highest stabilized recorded shallow groundwater level is at El. 88.8 masl at BH/MW 1 on February 7, 2025, and the lowest stabilized recorded shallow groundwater level is at El. 86.3 masl at BH/MW 5 on January 10, 2025.

7.2 Shallow Groundwater Flow Pattern

Groundwater level elevations measured on February 7, 2025, were considered to interpret the groundwater flow pattern beneath the Subject Site. This interpretation suggests that it flows mainly in a westerly direction. The interpreted groundwater flow pattern beneath the Subject Site is illustrated on **Drawing 9**.

7.3 Hydraulic Conductivity Testing

7.3.1 In-Situ Hydraulic Conductivity Testing

Five (5) BH/MWs underwent a single well response testing (SWRTs), to assess the hydraulic conductivity (K) for saturated shallow aquifer or water bearing unit at the depths of the well screens. The monitoring well was equipped with a digital transducer to record the fluctuation made to complete the SWRT. The results of the SWRT tests are presented in **Appendix C**, with a summary of the findings provided in **Table 7-2**.

Table 7-2 - A Summary of Falling Head Hydraulic Conductivity Testing

Well ID	Ground El. (masl)	Screen Interval (mbgs)	Screened Soil Strata	Hydraulic Conductivity (K) (m/sec)	Test Method
BH/MW 1	91.3	3.1 – 6.1	Silt	6.6×10^{-9}	Falling Head Test
BH/MW 2	89.6	3.1 – 6.1	Silty Clay	3.2×10^{-7}	Falling Head Test
BH/MW 3	89.2	3.1 – 6.1	Silty Clay	6.3×10^{-8}	Falling Head Test
BH/MW 4	88.9	3.1 – 6.1	Silty Clay	3.3×10^{-7}	Falling Head Test
BH/MW 5	88.1	3.1 – 6.1	Silty Clay	3.8×10^{-7}	Falling Head Test

Notes:
mbgs metres below ground surface
masl metres above sea level

The results show that the hydraulic conductivities for the silty clay unit range from 6.3×10^{-8} m/sec at BH/MW 3, and 3.8×10^{-7} m/sec at BH/MW 5. The hydraulic conductivity for the silt unit is 6.6×10^{-9} m/sec at BH/MW 1.

7.3.2 Hydraulic Conductivity Test Using Grain Size Distribution Graphs

The Hazen Equation method was adopted to estimate the hydraulic conductivity (K) for different soil layers which may contain groundwater during the seasonal high water table (spring) period, or if they are not encountered within the screen intervals.

The Hazen Equation method relies on the interrelationship between hydraulic conductivity and effective grain size, d10, in the soil media. This empirical relation predicts a power-law relation with K, as follow:

$$K = Ad_{10}^2$$

where;

d_{10}: Value of the soil grain size gradation curve as determined by sieve analysis, whereby 10% by weight of the soil particles are finer and 90% by weight of the soil particles are coarser.

A: Coefficient; it is equal to 1 when K in cm/sec and d10 is in mm

The Hazen Equation estimation provides an indication of the groundwater yield capacity for saturated soil strata at the depths where soils samples were selected for grain siz1e analysis. The grain size distribution

graphs prepared for the geotechnical investigation were used to estimate the hydraulic conductivity, with the details presented in **Appendix A**. The results of the Hazen equation are provided in **Table 7-2**, below.

Table 7-2 - A Summary of Hydraulic Conductivity Using Hazen Equation

Borehole/Monitoring Well ID	Soil Sample Depth (Sample Number) (mbgs)	Soil Sample Elevation (masl)	Soil Strata	Hydraulic Conductivity (m/s)
BH/MW 2	1.0 (2)	88.6	Sand	3.0×10^{-5}
BH/MW 5	12.4 (10)	75.7	Silty Sand Till	6.1×10^{-8}

Notes:
mbgs metres below ground surface
masl metres above sea level

The results show that the hydraulic conductivity for the sand unit at BH/MW 2 is 3.0×10^{-5} m/sec, while the silty sand till unit at BH/MW 5 is 6.1×10^{-8} m/sec.

7.4 Groundwater Quality

One (1) set of groundwater samples was collected for analysis from the monitoring well BH/MW 4 on February 12, 2025, by SEL to characterize their quality for evaluation against Regional Municipality of Durham Sewer Use By-Law (By-Law No. 55-2013) parameters. Upon sampling, all of the bottles were placed in a cooler for shipment to the analytical laboratory. Sample analysis was performed by SGS Canada Inc., which is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA). Results of the analysis are provided in **Appendix D**, with a discussion of the findings provided below. The chain of custody numbers for the submitted samples that underwent analysis is 042299.

The results of the analysis for the unfiltered groundwater indicate one (1) exceedance when compared and evaluated against the Regional Municipality of Durham Sanitary and Storm Sewer Use By-Law parameters. The exceedances, together with the Sanitary and Storm Sewer Use standards, are presented in **Table 7-4**.

Table 7-4 - Groundwater Quality Analysis Results Exceeded

Exceeded Parameter	Unit	Groundwater Quality Results	Region of Durham Sanitary Sewer Use	Region of Durham Storm Sewer Use Limits	Detection Limit
Total Suspended Solids	mg/L	**131**	350	**15**	2

As shown above, the concentration for Total Suspended Solids (TSS) exceeds the Regional Municipality of Durham Storm Sewer Use By-Law standard, but meets the Regional Municipality of Durham Sanitary Sewer Use By-Law standards.

This finding suggests that any short-term construction dewatering or long-term foundation drainage discharge (from a groundwater source) would not be acceptable for disposal to the region's storm sewer system without pre-treatment to reduce TSS. However, the discharge may be directed to the region's sanitary sewer system, subject to applicable approvals, and without significant pre-treatment.

The assessment above is provided solely for comparing groundwater quality against the limits set by the Regional Municipality of Durham Sewer Use By-Law limits. Any discharge should adhere to the respective policies of the jurisdiction. The final design for any dewatering effluent pre-treatment system is the responsibility of the contractors responsible for construction, or of the water treatment system design specialist, or mechanical engineer, if required, for any long-term foundation drainage system for the completed underground structure.

8.0 DISCHARGE WATER CONTROL

8.1 A review of Proposed Development Plans

The current assessment was completed based on the architectural drawings set, prepared by Micacchi Architecture Inc., and dated March 9, 2026. A review of the Site Plan (Drawing No. A006), included in the architectural drawings set, indicates that the proposed residential development consists of three (3) blocks of 3-storey stacked townhouses with a single-level basement, resting on a shared 1-level underground parking (P1) structure. The proposed development will be provided with municipal services, private access roadways, walkways and landscape areas at ground level.

A review of the Parking Plan (Drawing No. A101) included in the architectural drawing set indicates that the proposed P1 structure is approximately rectangular in shape, with a total area of 1,976 m^2 and an approximate width of 22.3 m. The corresponding excavation length is estimated to be approximately 88.6 m.

Based on the Section Block 1-3 (Drawing No. A404) included in the architectural drawings set, the proposed P1 Finished Floor Elevation (FFE) is set at El. 83.5 masl. Reviewed plans (selected drawings) are presented in **Appendix E**.

8.2 A review of Geotechnical Investigation Report

A review of the Geotechnical Investigation report prepared by SEL, dated March 2026 (SEL Reference No. 2411-W164) indicates that:

- The investigation revealed that beneath the pavement structure or a topsoil veneer, the Subject Site is underlain by a stratum of sand overlying silty clay/silty clay till and/or silt. At lower depths, deposits of silty sand till and sand were encountered and beds onto shale bedrock.
- Groundwater levels in the monitoring wells were recorded between 1.8 m and 4.6 m from existing grade, or between El. 88.8 m and 86.3 m. It is subject to seasonal fluctuation. Additional discussion on the groundwater condition within the property will be presented in the hydrogeological report under separate cover.
- The founding elevation of the proposed structure is below El. 83.86 m, where the soil consists of either very dense silt at Borehole 1 adjacent to Liverpool Road, and very soft clay beyond Borehole 1. The clay has limited capacity for foundation design.
- The existing dwellings will be demolished for the construction of the proposed development. All debris must be removed off site and any cavity must be properly backfilled and compacted to create a working platform for construction.

- Where safe sloped excavation is not feasible, temporary shoring should be provided prior to excavation. All excavation should be carried out in accordance with the Ontario Regulation 213/91.
- The groundwater level recorded in the monitoring wells ranges from El. 88.8 to 86.3 m, therefore, depending on the in-flow of groundwater around the proposed structure, the foundation, including the elevator pit, may have to be designed as a submerged 'tank' structure, which is waterproofed and designed to resist the hydrostatic pressure. The parking level slab will be poured on a granular fill above the raft where the utilities and service pipes will be laid. This can be further assessed once the hydrogeological assessment has been completed.

8.3 Construction Dewatering Requirements

Based on a review of Parking Plan (Drawing No. A101), the dimensions of 22.3 m and 88.6 m, with a total area of 1,976 m^2 are considered as the excavation box dimensions for the proposed P1 structure in the current assessment. Based on the Section Block 1-3 (Drawing No. A404), the proposed P1 FFE is at El. 83.5 masl. The existing ground surface El. 88.1 masl on the west end and El. 91.3 masl on the east end are considered for the current assessment, which are measured for the boreholes located at the west end and east end of the Subject Site, respectively. The base of the raft foundation and the bulk excavation, is considered at El. 82.0 masl (1.5 m below the P1 FFE). The base of the elevator pit was also assumed at El. 82.3 masl (1.2 m below the P1 FFE).

As a conservative approach, the highest recorded static groundwater levels of El. 86.6 masl (BH/MW 2) and El. 88.8 masl (BH/MW 1) are considered for the west and east ends of the excavation box, respectively. These groundwater levels are approximately 3.1 m and 5.3 m above the proposed P1 FFE at the west and east ends, respectively, and approximately 4.6 m and 6.8 m above the assumed base of bulk excavation. As such, groundwater seepage is anticipated during the excavation and construction of the proposed underground parking. Furthermore, the existence of earth fill material in the upper stratigraphy is expected to result in perched water during excavation, which cannot be quantified.

The hydraulic conductivity of 3.0×10^{-5} m/s (hydraulic conductivity from grain size distribution graph), 6.6×10^{-9} m/s (in-situ hydraulic conductivities from BH/MW 1), 2.2×10^{-7} m/s (geomean of in-situ hydraulic conductivities from BH/MW 2, 3, 4 and 5), and 1.0×10^{-7} m/s (interpreted from published data) were considered for sand, silt, silty clay and glacial till, respectively.

Shoring design is not available for review at the time of preparation of the current report. As such, a permeable shoring system extending along the perimeter of the proposed excavation boxes has been considered to estimate the groundwater seepage flows for the short-term dewatering flow rate. The assumptions considered for the dewatering flow rate calculations are summarized in **Table 8-1**.

Table 8-1 - Summary of Proposed Development and Assumptions

Proposed Development	Proposed P1 Dimensions (m)	Existing Ground Surface (masl)	Proposed P1 FFE (masl)	Assumed Base of Bulk Excavation and Base of Raft Foundation (masl)	Assumed Base of Elevator Pit (masl)	Shallow Groundwater Level (masl)	Assumed Shoring System
1-Level Underground Parking	22.3 x 88.6	West: 88.1 East: 91.3	83.5	82.0[1]	82.3[2]	West: 86.6 East: 88.8	Permeable Shoring

Notes:
mbgs metres below ground surface
masl metres above sea level
[1] Assumed 1.5 m below the proposed P1 FFE
[2] Assuming 1.2 m below the proposed P1 FFE

The anticipated groundwater flow rate for short-term dewatering was estimated using a numerical analysis. Slide 9.025, released October 17, 2022, developed by Rocscience Inc. was used to compute the anticipated flow rates utilizing the Finite Element Modelling (FEM) method. The estimated groundwater flow rates are presented in **Appendix F**.

A review of the intensity duration frequency curve (IDF curve) for the year 2010 for the coordinates 43° 50' 15" N, 79° 5' 44" W, the rainfall depth considering 2-year storm event over a 3-hour period per day is approximately 29.8 mm, and a 100-year storm event over a 12-hour period per day is 98.4 mm. The data was taken from the Ministry of Transportation's (MTO) website. The accumulated runoff associated with rainfall events within the anticipated excavations for the proposed underground services were calculated using the estimated rainfall depth multiplied by the estimated area of the proposed excavation footprint of the proposed development. A summary of anticipated short-term dewatering flow rates is presented in **Table 8-2**.

Table 8-2 - Summary of Anticipated Short-Term Dewatering Flow Rates

Proposed Development	Groundwater Seepage (L/day)	Groundwater Seepage -S.F. 2 (L/day)	Anticipated Storm Event (L/day)	Total Dewatering Flow Rate -S.F. 2 (L/day)
1-Level Underground Parking	34,750.0	69,500.0	59,000.0	128,500.0

Notes:
S.F. - Safety Factor

Additionally, stormwater flow considering a 100-year storm event was considered to estimate the maximum stormwater that can be collected during the excavation and construction period. The additional flow that can be expected in the occurrence of a 100-year storm event is approximately 194,500.0 L/day during the construction of the proposed P1 structures.

8.4 Zone of Influence (ZOI)

The conceptual Zone of Influence (ZOI) for dewatering, also known as Radius of Influence (R_0), was calculated based on the anticipated maximum drawdown required and the highest hydraulic conductivity recorded at the Subject Site using Sichardt's relationship. The equation used is shown as:

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

Where:

R_0: Zone of Influence for dewatering (m)
dH: the drawdown (m)
K: the hydraulic conductivity (m/s)

Using the above equation, the conceptual ZOI for the construction of the proposed P1 structure could reach to 7.9 and 11.1 m away from the excavation and dewatering areas on the west and east ends, respectively. Zone of Influence calculation details are included in **Table 8-3** below.

Table 8-3 - Summary of Zone of Influence (ZOI)

Excavation Boundary	Drawdown (m)	Hydraulic Conductivity (m/s)	Zone of Influence (ZOI) (m)
West	5.6	2.2×10^{-7}	7.9
East	7.8	2.2×10^{-7}	11.1

8.5 Long-Term Foundation Drainage

As per the Geotechnical Report prepared by SEL, dated March 2026, the proposed P1 structure, including the foundation and elevator pit, is to be designed as a waterproofed, submerged "tank" structure, therefore, no long-term foundation drainage is anticipated.

8.6 Permit Requirements

- *Short-Term Construction Dewatering:* As per the recent amendment to O. Reg. 63/16 that came into effect from July 1,2025, an Environmental Activity and Sector Registry (EASR) registration will be required if water takings of more than 50,000 L/day is required. If it is identified that an EASR is required for the Subject Site, a hydrogeological assessment report will need to be submitted in support of the application.

  A review of the total anticipated dewatering flow rate presented in **Table 8-2** and **Appendix F** indicates that a maximum dewatering flow of 128,500.0 L/day is anticipated for the construction of P1 structure of the proposed residential development, including groundwater seepage with a safety factor of 2.0 and the 2-year storm event. The estimated flow rate exceeds the MECP threshold of 50,000.0 L/day. As such, filing an EASR with MECP is required. Also, applying for a discharge

permit with Regional Municipality of Durham or City of Pickering is required if the collected water during construction is proposed to be conveyed to the region's or city's sewer system.

- *Long-Term Foundation Drainage:* As per the recent amendment to O. Reg. 387/04 that has come into effect from July 01, 2025, PTTW registration will be required if the water taking exceeds 379,000.0 L/day.

  As the proposed P1 structure, including the foundation and elevator pit, is to be designed as a waterproofed, submerged "tank" structure, no long-term foundation drainage is anticipated. As such, filing PTTW with MECP is not required.

8.7 Potential Dewatering Impacts and Mitigation Plan

8.7.1 Short-Term Discharge Water Quality

The dewatering system must be appropriately filtered to prevent the pumping of fine sand and loss of ground during the dewatering activities.

A review of the groundwater quality test results suggests the concentration for Total Suspended Solids (TSS) exceeds the Regional Municipality of Durham Storm Sewer Use By-Law standard, but meets the Regional Municipality of Durham Sanitary Sewer Use By-Law standards.

These findings suggest that any short-term construction dewatering (from a groundwater source) would not be acceptable for disposal to the Regional Municipality of Durham storm sewers without pre-treatment to lower the elevated parameter. As such, implementing specific pre-treatment to TSS to meet the Regional Municipality of Durham Storm Sewer Use By-Law standards should permit disposal of the dewatering effluent to the region's sewer system. However, the discharge may be directed to the region's sanitary sewer system, subject to applicable approvals, and without significant pre-treatment.

The assessment above is provided solely for comparing groundwater quality against the limits set by the Regional Municipality of Durham Sewer Use By-Law limits. Any discharge should adhere to the respective policies of the jurisdiction. The final design for any dewatering effluent pre-treatment system is the responsibility of the contractors responsible for construction, or of the water treatment system design specialists.

8.7.2 Ground Settlement

The conceptual ZOI for dewatering for excavation and construction could reach up to 11.1 m for the proposed P1 structure of the proposed stacked townhouse blocks, that will be constructed partially below the shallow groundwater table, respectively. The conceptual ZOI for dewatering will not be limited to the property boundary of the Subject Site. The conceptual ZOI extends onto the Glendale Drive to the west of, Liverpool Road to the east of, and Glenanna Road to the south of the Subject Site, as well as the existing residential property to the north of the Subject Site during excavation and construction of the proposed P1 structure. As such, potential impacts related to ground settlement during dewatering are expected on the nearby road and structures. The potential impacts related to ground settlement should be assessed by a professional geotechnical engineer. However, if the dewatering process is conducted using sumps without the installation of dewatering wells or any active dewatering approach, the potential impacts will be negligible.

8.7.3 Surface Water, Wetlands and Areas of Natural Significance

There are no records of natural features within the Subject Site. However, there is a wooded area located approximately 5.0 m north of the Subject Site, which is located within the conceptual ZOI for the temporary dewatering area for the construction of the proposed P1 structure. As such, no significant impacts to natural heritage features are anticipated pertaining to the proposed development.

8.7.4 Water Supply Wells and Zone of Influence

A review of the MECP well records confirmed that there are eight (8) records for water supply wells that is registered within 500 m of the Subject Site. However, there is no record for water supply well located within the conceptual ZOI for the temporary dewatering area for the construction of the proposed P1 structure. Additionally, the surrounding area of the Subject Site is well developed and located in the City of Pickering, with municipal services provided. As such, potential impacts to the nearby water supply wells are not anticipated if they exist and in service.

9.0 CONCLUSIONS AND RECOMMENDATIONS

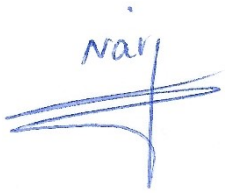
- The Subject Site is located within an area mapped as Glacial deposits (5b) known as Newmarket/Northem/Bowmanville Till, comprising of stone-poor, sandy silt to silty sand-textured till, and the west portion of the Subject Site is located with an area mapped as Glacial lake deposits, also called fine-textured glaciolacustrine deposits (8a) consisting of silt and clay, minor sand and gravel.
- The Subject Site is located within a regional physiography of Southern Ontario known as Iroquois Plain. The west portion of the Subject Site is known as Drumline and the east portion is known as Clay Plain.
- The Subject Site is located within the Lake Ontario Waterfront Watershed that falls in the Toronto and Region Conservation Authority (TRCA) jurisdiction.
- The Subject Site is generally underlain by a strata of silt, silty clay or silty clay till and silty sand silt extending to the maximum termination depth of investigation at 14.2 mbgs.
- The highest recorded stabilized shallow groundwater level is at El. 88.8 masl at BH/MW 1 on February 7, 2025, and the lowest recorded stabilized shallow groundwater level is at El. 86.3 masl at BH/MW 5 on January 10, 2025.
- Single well response testing (SWRTs) was performed at all five (5) installation monitoring wells. The results show that the hydraulic conductivities for the silty clay unit range from 6.3×10^{-8} m/sec at BH/MW 3, and 3.8×10^{-7} m/sec at BH/MW 5. The hydraulic conductivity for the silt unit is 6.6×10^{-9} m/sec at BH/MW 1.
- The Hazen Equation method was also adopted to estimate the hydraulic conductivity (K). The results show that the hydraulic conductivity for the sand unit at BH/MW 2 is 3.0×10^{-5} m/sec, while the silty sand till unit at BH/MW 5 is 6.1×10^{-8} m/sec.
- The proposed 1-level underground parking structure of the proposed residential development is proposed below the groundwater level elevation. As such, groundwater seepage is anticipated in the open excavation box for the construction for the proposed P1 structure. The anticipated short-term construction dewatering flow rate could reach to a total flow rate of 128,500.0 L/day including groundwater seepage with a safety factor of 2.0 and the 2-year storm event. As such, filing an EASR with the MECP is required. Also, obtaining discharge agreement from the Regional Municipality of Durham or City of Pickering is required if short-term dewatering effluent is proposed to be conveyed to the region's or city's sewer system.

- As per the Geotechnical Report prepared by SEL (March 2026), the proposed P1 structure, including the foundation and elevator pit, is to be designed as a waterproofed, submerged "tank" structure; therefore, no long-term foundation drainage is anticipated. As such, applying for PTTW with MECP is not required.
- The ZOI for any temporary construction dewatering array for the construction of the proposed P1 structure of the stacked townhouse blocks could reach up to 11.1 m away from the conceptual dewatering wells or array considered around. Considering the conceptual ZOI for dewatering:
    - The conceptual ZOI for dewatering for excavation and construction could reach up to 11.1 m for the proposed P1 structure of the proposed stacked townhouse blocks, that will be constructed partially below the shallow groundwater table, respectively. The conceptual ZOI for dewatering will not be limited to the property boundary of the Subject Site. The conceptual ZOI extends onto the Glendale Drive to the west of, Liverpool Road to the east of, and Glenanna Road to the south of the Subject Site, as well as the existing residential property to the north of the Subject Site during excavation and construction of the proposed P1 structure. As such, potential impacts related to ground settlement during dewatering are expected on the nearby road and structures. The potential impacts related to ground settlement should be assessed by a professional geotechnical engineer. However, if the dewatering process is conducted using sumps without the installation of dewatering wells or any active dewatering approach, the potential impacts will be negligible.
    - There are no records of natural features within the Subject Site. However, there is a wooded area located approximately 5.0 m north of the Subject Site, which is located within the conceptual ZOI for the temporary dewatering area for the construction of the proposed P1 structure. As such, no significant impacts to natural heritage features are anticipated pertaining to the proposed development.
    - There are eight (8) records for water supply wells that is registered within 500 m of the Subject Site. However, there is no record for water supply well located within the conceptual ZOI for the temporary dewatering area for the construction of the proposed P1 structure. Additionally, the surrounding area of the Subject Site is well developed and located in the City of Pickering, with municipal services provided. As such, potential impacts to the nearby water supply wells are not anticipated if they exist and in service.

10.0 CLOSURE

We trust that the above-noted information is suitable for your review. If you have any questions regarding this information, please do not hesitate to contact the undersigned.

Yours truly,
SOIL ENGINEERS LTD.



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Narjes Alijani, M.Sc., P.Geo.
Department Manager-Hydrogeological Services

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DRAWINGS

REFERENCE NO. 2411-W164

653000
653500
654000
4856000
4855500
GLOUCESTER SQUARE
MONTEAGLE LANE
CANBOROUGH CRESCENT
RIDGEWOOD COURT
MALDEN CRESCENT
KILLEY AVENUE
BOWLER DRIVE
BIGROFT COURT
ANTON SQUARE
FAYLEE CRESCENT
FIELDLIGHT BOULEVARD
ROSEFIELD ROAD
GLENGROVE ROAD
BRANDS COURT
GLENVIEW ROAD
KINGSTON ROAD
GLENANNA ROAD
DIXIE ROAD
RAWLINGS DRIVE
FOLEVET CRESCENT
WALNUT LANE
LISTOWELL CRESCENT
STORRINGTON STREET
BRONTE SQUARE
CHARLOTTE CIRCLE
GLENDALE DRIVE
LIVERPOOL ROAD
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References: Ontario Ministry of Natural Resources and Forestry
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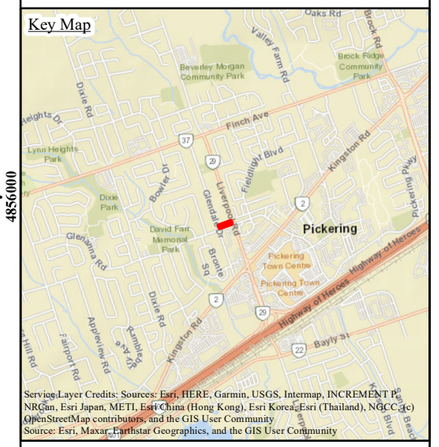
Key Map



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Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Legend

- Approximate Boundary of Subject Site
- Expressway/Freeway
- Major Road
- Local Road
- Watercourse

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Site Location Plan

Hydrogeological Assessment
Proposed Residential Development
1884 Liverpool Road and 1885 Glendale Drive
City of Pickering

Reference No. 2411-W164

Date: February 20, 2025

Scale:
0 25 50 100 150 200 250
Metres

Drawing No. 1

653200 653300 653400

4855800 4855700

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References: Ontario Ministry of Natural Resources and Forestry
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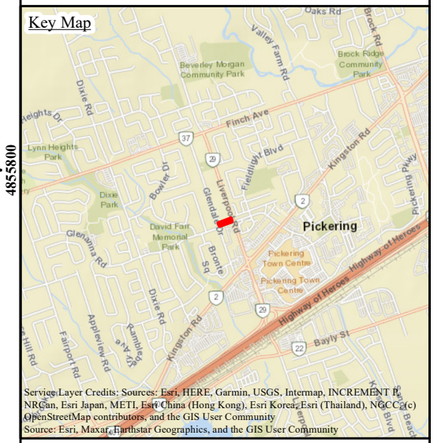
Key Map



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Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Legend

- Approximate Boundary of Subject Site
- Major Road
- Local Road
- Borehole with Monitoring Well (5)

Soil Engineers Ltd.

Borehole and Monitoring Well Location Plan

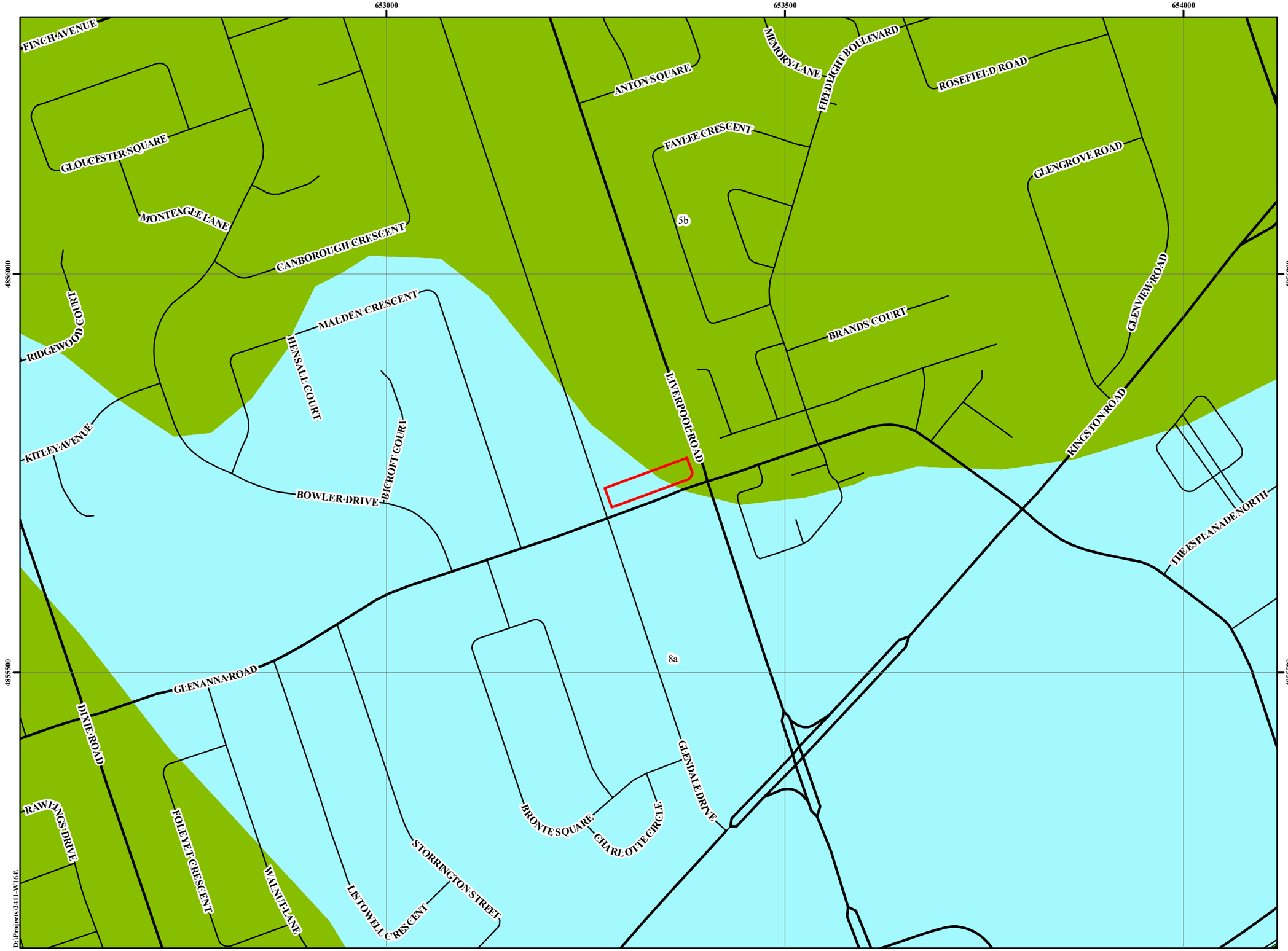
Hydrogeological Assessment
Proposed Residential Development
1884 Liverpool Road and 1885 Glendale Drive
City of Pickering

Reference No. 2411-W164

Date: February 20, 2025

Scale:
0 5 10 20 30 40 50
Metres

Drawing No. 2



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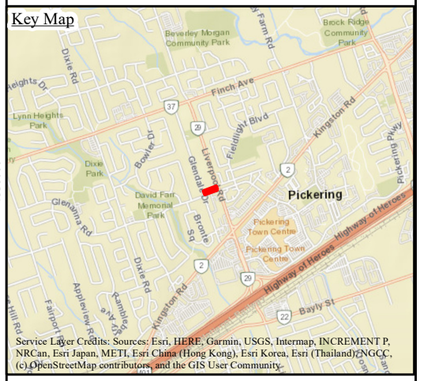
Key Map



Legend

- Approximate Boundary of Subject Site
- Expressway/Freeway
- Major Road
- Local Road
- 5b: Glacial deposits (Newmarket/Northern/Bowmanville Till); consisting of diamicton :
- 8a: Glacial lake deposits; consisting of clay, silt: foreshore/basinal

Soil Engineers Ltd.

Surface Geology Map

Hydrogeological Assessment
Proposed Residential Development
1884 Liverpool Road and 1885 Glendale Drive
City of Pickering

Reference No. 2411-W164

Date: February 20, 2025

Scale:
0 50 100 150 200 250
Metres

Drawing No. 3

653000
653500
654000
4856000
4855500

FINCH AVENUE
GLOUCESTER SQUARE
MONTEAGLE LANE
GANBOROUGH CRESCENT
MALDEN CRESCENT
RIDGEWOOD COURT
HENSALL COURT
KITLEY AVENUE
BOWLER DRIVE
BICROFT COURT
ANTON SQUARE
MEMORY LANE
FIELDLIGHT BOULEVARD
ROSEFIELD ROAD
FAYLEE CRESCENT
GLENGROVE ROAD
GLENVIEW ROAD
BRANDS COURT
LIVERPOOL ROAD
KINGSTON ROAD
THE ESPLANADE NORTH
GLENANNA ROAD
DIXIE ROAD
RAWLINGS DRIVE
FOLEYET CRESCENT
WALNUT LANE
LISTOWELL CRESCENT
STORRINGTON STREET
BRONTE SQUARE
CHARLOTTE CIRCLE
GLENDALE DRIVE

Drumlins
Iroquois Plain
Sand Plains
Clay Plains

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Source: Chapman, L.J. and Putnam, D.F. 2007. Physiography of Southern Ontario; Ontario Geological Survey, Miscellaneous Release--Data 228 ISBN 978-1-4249-5158-1

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References: © Physiography Map was Produced by Soil Engineers Ltd. under license from the Ministry of North Development and Mines (MNDM). Copyright (c) is held by the King's Printer for Ontario, 2025. Physiography of Southern Ontario, 2007, Ontario Geological Survey, Miscellaneous Release — Date 228.

Key Map

Legend

- Approximate Boundary of Subject Site
- Expressway/Freeway
- Major Road
- Local Road
- Region Boundary
- Sand Plains
- Drumlins
- Clay Plains

Soil Engineers Ltd.

Physiographic Map

Hydrogeological Assessment
Proposed Residential Development
1884 Liverpool Road and 1885 Glendale Drive
City of Pickering

Reference No. 2411-W164

Date: February 20, 2025

Scale:
0 25 50 100 150 200 250
Metres

Drawing No. 4

N

References: Ontario Ministry of Natural Resources and Forestry
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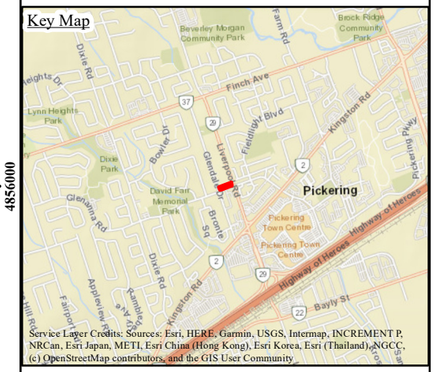
Key Map



Legend

- Approximate Boundary of Subject Site
- Expressway/Freeway
- Major Road
- Local Road
- Watercourse
- Ontario - 5 m

Soil Engineers Ltd.

Topographic Map

Hydrogeological Assessment
Proposed Residential Development
1884 Liverpool Road and 1885 Glendale Drive
City of Pickering

Reference No. 2411-W164

Date: February 20, 2025

Scale:
0 25 50 100 150 200 250
Metres

Drawing No. 5

D:\Projects\2411-W164\

653000
653500
654000
4856000
4855500
FINCH AVENUE
GLOUCESTER SQUARE
MONTEAGLE LANE
CANBOROUGH CRESCENT
RIDGEWOOD COURT
KITLEY AVENUE
MALDEN CRESCENT
HENSALL COURT
BOWLER DRIVE
BICROFT COURT
ANTON SQUARE
MEMORY LANE
FIELDLIGHT BOULEVARD
ROSEFIELD ROAD
FAYLEE CRESCENT
GLENGROVE ROAD
GLENVIEW ROAD
BRANDS COURT
LIVERPOOL ROAD
KINGSTON ROAD
THE ESPLANADE NORTH
GLENANNA ROAD
DIXIE ROAD
RAWLINGS DRIVE
FOLEYET CRESCENT
WALNUT LANE
LISTOWELL CRESCENT
STORRINGTON STREET
BRONTE SQUARE
CHARLOTTE CIRCLE
GLENDALE DRIVE
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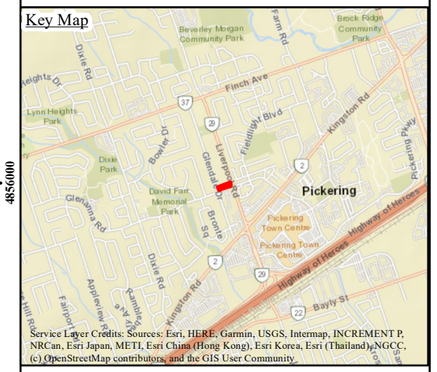
Key Map



Legend

- Approximate Boundary of Subject Site
- Expressway/Freeway
- Major Road
- Local Road
- Watercourse
- Wooded Area *Wooded Area*

Soil Engineers Ltd.

Natural Features and Protection Area Plan

Hydrogeological Assessment
Proposed Residential Development
1884 Liverpool Road and 1885 Glendale Drive
City of Pickering

Reference No. 2411-W164

Date: February 20, 2025

Scale:

0 50 100 150 200 250
Metres

Drawing No. 6

653000
653500
654000
4856000
4855500
FINCH AVENUE
GLOUCESTER SQUARE
MONTEAGLE LANE
MULMUR COURT
CANBOROUGH CRESCENT
BOWLER DRIVE
RIDGEWOOD COURT
GLENDALE DRIVE
ANTON SQUARE
MEMORY LANE
ROSEFIELD ROAD
FAYLEE CRESCENT
FIELDEIGHT BOULEVARD
GLENGROVE ROAD
GLENVIEW ROAD
LIVERPOOL ROAD
BRANDS COURT
MALDEN CRESCENT
HENSALL COURT
BICROFT COURT
KITLEY AVENUE
PINECREEK COURT
GLENANNA ROAD
KINGSTON ROAD
THE ESPLANADE NORTH
BRONTE SQUARE
STORRINGTON STREET
DIXIE ROAD
RAWLINGS DRIVE
FOLEY ET CRESCENT
WALNUT LANE
LISTOWELL CRESCENT
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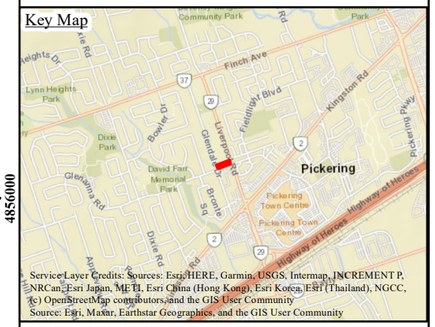
N

References: ESRI, DigitalGlobe, GeoEye, Earthstar Geograp -hics, CNES/Airbus Ds, USDA, USGS, AeroGRIS, IGN, and the GIS User Community produced by Soil Engineers Ltd. Copyright (c) King's Printer for Ontario, 2025. Water Well Information System Ministry of the Environment, Conservation and Parks, 2020

Key Map



Legend

- Approximate Boundary of Subject Site
- 500 Metres From Subject Site Boundary
- Expressway/Freeway
- Major Road
- Local Road
- Watercourse
- Unknown (3)
- Abandoned-Other (7)
- Abandoned-Supply (2)
- Monitoring and Test Hole (10)
- Observation Wells (4)
- Test Hole (8)
- Water Supply (8)

Soil Engineers Ltd.

MECP Well Location Plan

Hydrogeological Assessment
Proposed Residential Development
1884 Liverpool Road and 1885 Glendale Drive
City of Pickering

Reference No. 2411-W164

Date: February 20, 2025

Scale:
0 25 50 100 150 200 250
Metres

Drawing No. 7

N

References: Ontario Ministry of Natural Resources and Forestry
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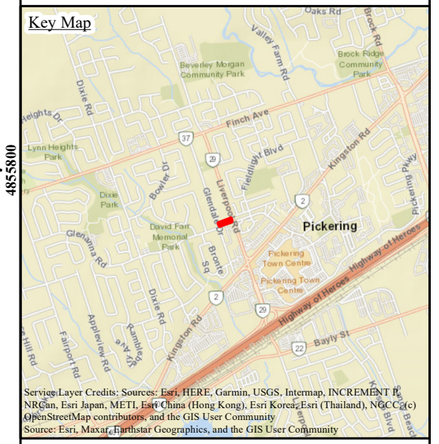
Key Map



Legend

- Approximate Boundary of Subject Site
- Cross Section
- Major Road
- Local Road
- Borehole with Monitoring Well (5)

Soil Engineers Ltd.

Subsurface Profile Cross-Section Key Plan

Hydrogeological Assessment
Proposed Residential Development
1884 Liverpool Road and 1885 Glendale Drive
City of Pickering

Reference No. 2411-W164

Date: December 12, 2025

Scale:
0 5 10 20 30 40 50
Metres

Drawing No. 8-1

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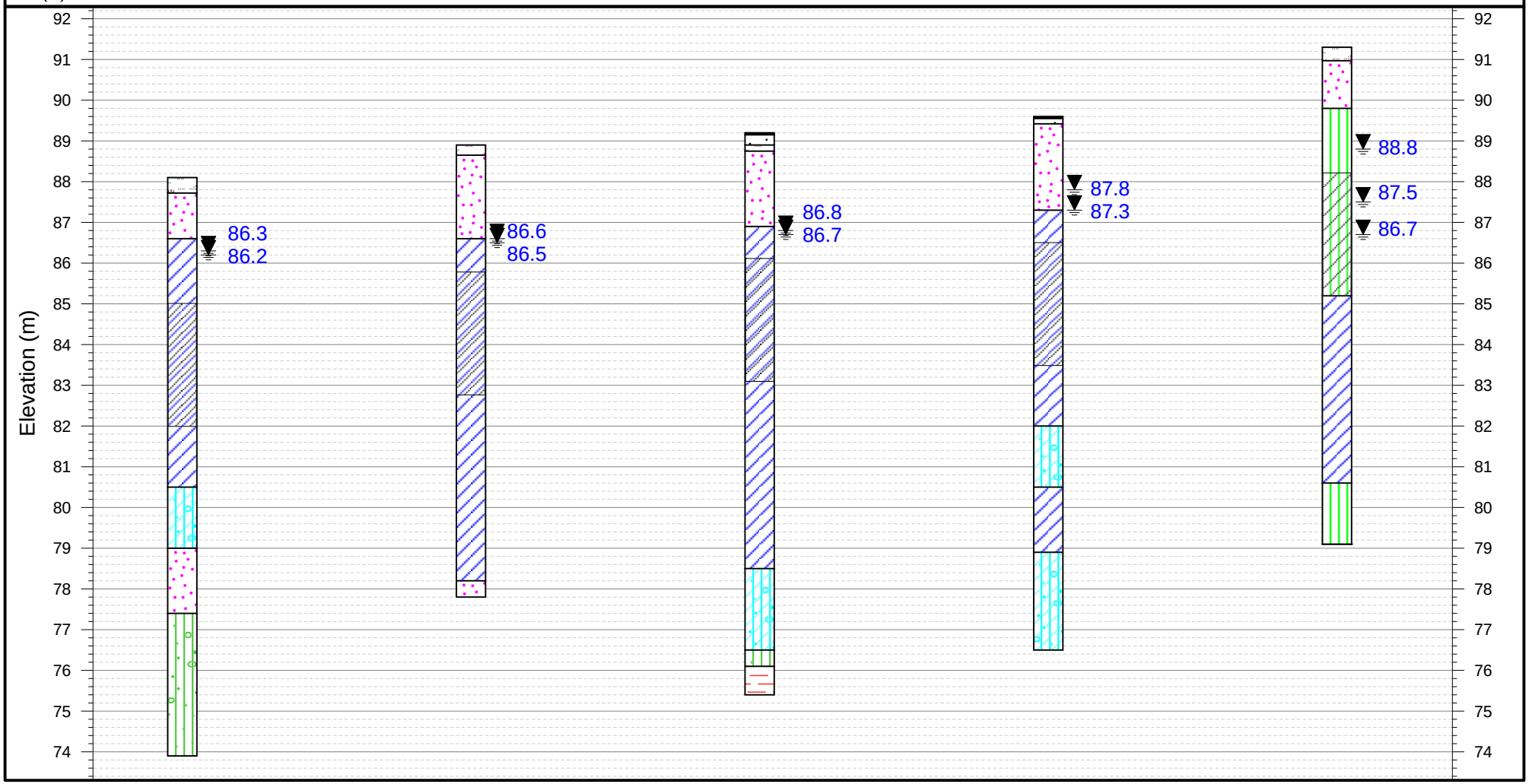
SUBSURFACE PROFILE
CROSS SECTION A-A'
DRAWING NO. 8-2
SCALE: AS SHOWN

JOB NO.: 2411-W164
REPORT DATE: December 2025
PROJECT DESCRIPTION: Proposed Residential Development
PROJECT LOCATION: 1884 Liverpool Road and 1885 Glendale Drive, City of Pickering

LEGEND

TOPSOIL, SAND, SILT, SILTY CLAY TILL
ASPHALT, SANDY SILT TILL, SILTY CLAY, SHALE
GRANULAR, SCREEN

WATER LEVEL (STABILIZED)



653280 653310 653340 653370

4855780 4855750 4855720

BH/MW 1
(88.8)

BH/MW 2
(87.3)

BH/MW 3
(86.7)

BH/MW 4
(86.6)

BH/MW 5
(86.3)

88.5 88.0 87.5 87.0 86.5 90

GLENANNA ROAD

GLENDALE DRIVE

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N

References: Ontario Ministry of Natural Resources and Forestry
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Key Map

Legend

- Approximate Boundary of Subject Site
- Borehole With Monitoring Well
- Major Road
- Local Road
- Ontario - 5 m
- Highest Interpreted Shallow Groundwater Elevation Contour
- Highest Inferred Shallow Groundwater Elevation Contour
- Interpreted Shallow Groundwater Flow Direction
- (88.8) Highest Shallow Groundwater Level Measured on February 7, 2025

Soil Engineers Ltd.

Shallow Groundwater Flow Pattern Plan

Hydrogeological Assessment
Proposed Residential Development
1884 Liverpool Road and 1885 Glendale Drive
City of Pickering

Reference No. 2411-W164

Date: March 17, 2026

Scale:

0 2 4 8 12 16 20
Metres

Drawing No. 9

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FAX: (705) 721-7864	FAX: (905) 542-2769	FAX: (905) 725-1315	FAX: (905) 881-8335	FAX: (705) 721-7864	FAX: (905) 542-2769

APPENDIX A

BOREHOLE AND MONITORING WELLS LOGS
AND
GRAIN SIZE DISTRIBUTION GRAPHS

REFERENCE NO. 2411-W164

LIST OF ABBREVIATIONS AND DESCRIPTION OF TERMS

The abbreviations and terms commonly employed on the borehole logs and figures, and in the text of the report, are as follows:

SAMPLE TYPES

AS Auger sample
CS Chunk sample
DO Drive open (split spoon)
DS Denison type sample
FS Foil sample
RC Rock core (with size and percentage recovery)
ST Slotted tube
TO Thin-walled, open
TP Thin-walled, piston
WS Wash sample

PENETRATION RESISTANCE

Standard Penetration Resistance or 'N' Value:

The number of blows of a 63.5 kg hammer falling from a height of 76 cm required to advance a 51 mm outer diameter drive open sampler 30 cm into undisturbed soil, after an initial penetration of 15 cm.

Plotted as '○'

Dynamic Cone Penetration Resistance:

A continuous profile showing the number of blows per each 30 cm of penetration of a 51 mm diameter, 90° point cone driven by a 63.5 kg hammer falling from a height of 76 cm.

Plotted as '—●—'

WH Sampler advanced by static weight
PH Sampler advanced by hydraulic pressure
PM Sampler advanced by manual pressure
NP No penetration

SOIL DESCRIPTION

Cohesionless Soils:

'N' (blows/30 cm)	Relative Density
0 to 4	very loose
4 to 10	loose
10 to 30	compact
30 to 50	dense
>50	very dense

Cohesive Soils:

Undrained Shear Strength (kPa)	'N' (blows/30 cm)	Consistency
<12	<2	very soft
12 to <25	2 to <4	soft
25 to <50	4 to <8	firm
50 to <100	8 to <15	stiff
100 to 200	15 to 30	very stiff
>200	>30	hard

Method of Determination of Undrained Shear Strength of Cohesive Soils:

x 0.0 Field vane test in borehole; the number denotes the sensitivity to remoulding
△ Laboratory vane test

METRIC CONVERSION FACTORS

1 ft = 0.3048 m
1 inch = 25.4 mm
1 lb = 0.454 kg
1 ksf = 47.88 kPa

JOB NO.: 2411-W164

LOG OF BOREHOLE:BH/MW 1

FIGURE NO.: 1

PROJECT DESCRIPTION: Proposed Stacked Townhouse Development

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 1884 Liverpool Road, City of Pickering

DRILLING DATE: December 31, 2024
January 2, 2025

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
91.3	Ground Surface							
0.0	**33 cm TOPSOIL**	1A	DO	2	0		16	
	Brown, loose to compact	1B						
	SAND weathered	2	DO	13	1		14	
89.8	fine grained, some silt to silty							
1.5	Dense to very dense	3	DO	44	2		17	
	SILT							
	some clay	4	DO	50/15			15	
	brown / grey				3		14	
		5	DO	50/15				
					4			
		6	DO	90	5		15	
85.2								
6.1	Grey, hard	7	DO	50/15	6		13	
	SILTY CLAY							
	a trace of sand				7			
	occ. silt seams and layers	8	DO	67	8		18	
					9		17	
		9	DO	54				
80.6					10			
10.7	Grey, very dense	10	DO	90	11		15	
	SILT							
	a trace to some clay							
	with shale fragments	11	DO	100/3	12		4	
79.1								
12.2	Grey, weathered				13			
12.2	**SHALE**							
	END OF BOREHOLE				14			
	Installed 50 mm Ø PVC monitoring well to 6.1 m with 3.0 m screen							
	Sand backfill from 2.4 to 6.1 m				15			
	Bentonite seal from 0.0 m to 2.4 m							
	Provided with a steel monument casing				16			
					17			
					18			

Water level reading:
W.L. @ El. 86.7 masl on Jan 10, 2025
W.L. @ El. 87.5 masl on Jan 24, 2025
W.L. @ El. 88.8 masl on Feb 07, 2025

Soil Engineers Ltd.

JOB NO.: 2411-W164

LOG OF BOREHOLE:BH/MW 2

FIGURE NO.: 2

PROJECT DESCRIPTION: Proposed Stacked Townhouse Development

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 1884 Liverpool Road, City of Pickering

DRILLING DATE: December 30, 2024

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
89.6	Pavement Surface							
0.0	**50 mm ASPHALT** **130 mm GRANULAR FILL** Brown, loose to compact **SAND** weathered fine grained, some silt to silty	1	DO	4	0		6 8	
		2	DO	7	1			
		3	DO	8	2		13	
87.3								
2.3	Grey, stiff to very soft **SILTY CLAY** a trace of sand occ. silt layers and cobbles brown wet below 4.6 m grey	4	DO	7			19	
		5	DO	7	3		23	
					4			
		6	DO	0	5	ST.5.0	27	
		7	DO	0	6		33	
					7	ST.4.0		
82.0								
7.6	Grey, very soft **SILTY CLAY TILL** some sand, a trace of gravel occ. cobbles wet	8	DO	0	8	ST.3.8	23	
80.5								
9.1	Grey, very soft **SILTY CLAY** a trace of sand occ. silt layers wet	9	DO	0	9		28	
					10	ST.7.8		
78.9								
10.7	Grey, very soft **SILTY CLAY TILL** some sand, a trace of gravel occ. cobbles wet	10	DO	0	11	ST.4.3	22	
		11	DO	0	12		22	
76.5					13	ST.3.5		
13.1	**END OF BOREHOLE**							
					14			
					15			
					16			
					17			
					18			

Installed 50 mm Ø PVC monitoring well
to 6.1 m with 3.0 m screen
Sand backfill from 2.7 to 6.1 m
Bentonite seal from 0.0 m to 2.7 m
Provided with a steel monument casing

Water level reading:
W.L. @ El. 87.8 masl on Jan 10, 2025
W.L. @ El. 87.3 masl on Jan 24, 2025
W.L. @ El. 87.3 masl on Feb 07, 2025

JOB NO.: 2411-W164

LOG OF BOREHOLE:BH/MW 3

FIGURE NO.: 3

PROJECT DESCRIPTION: Proposed Stacked Townhouse Development

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 1884 Liverpool Road, City of Pickering

DRILLING DATE: December 30/31, 2024

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)
89.2	Pavement Surface				
0.0	**50 mm ASPHALT** **250 mm GRANULAR FILL** **15 cm TOPSOIL**	1A 1B	DO	4	0
	Brown, loose to compact weathered **SAND** fine grained, some silt to silty wet below 1.5 m	2	DO	9	1
		3	DO	14	2
86.9 2.3	Grey, firm to very soft **SILTY CLAY** a trace of sand occ. silt layers wet	4	DO	4	3
		5	DO	4	
		6	DO	0	4
	silt layer	7	DO	0	5
		8	DO	0	6
		9	DO	0	7
78.5 10.7	Grey, very soft to firm **SILTY CLAY TILL** some sand, a trace of gravel occ. cobbles	10	DO	0	8
		11A 11B	DO	5	9
76.5 12.7	Grey, very dense **SANDY SILT TILL** some clay, a trace of gravel occ. shale fragments	12	DO	100/10	10
75.5 75.4 13.7 13.8	Grey, weathered **SHALE**				11
	END OF BOREHOLE Installed 50 mm Ø PVC monitoring well to 6.1 m with 3.0 m screen Sand backfill from 2.7 to 6.1 m Bentonite seal from 0.0 m to 2.7 m Provided with a steel flushmount cover				12
	Water level reading: W.L. @ El. 86.8 masl on Jan 10, 2025 W.L. @ El. 86.8 masl on Jan 24, 2025 W.L. @ El. 86.7 masl on Feb 07, 2025				13
					14
					15
					16
					17
					18

Dynamic Cone (blows/30 cm) 10 30 50 70 90

Shear Strength (kN/m²) 50 100 150 200

Penetration Resistance (blows/30 cm) 10 30 50 70 90

ST.3.3

ST.2.5

ST.2.9

Atterberg Limits PL LL

Moisture Content (%) 10 20 30 40

16 13 15 22 21 20 27 20 36 38 21 17 9 5

WATER LEVEL

JOB NO.: 2411-W164

LOG OF BOREHOLE:BH/MW 4

FIGURE NO.: 4

PROJECT DESCRIPTION: Proposed Stacked Townhouse Development

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 1884 Liverpool Road, City of Pickering

DRILLING DATE: January 2, 2025

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
88.9	Ground Surface							
0.0	**25 cm TOPSOIL**	1A			0		12	
	Brown, loose to compact **SAND** fine grained, some silt to silty weathered	1B	DO	4			15	
		2	DO	7	1			
		3	DO	7	2		13	
86.6								
2.3	Grey, firm to very soft **SILTY CLAY** a trace of sand occ. silt layers wet	4	DO	9			18	
		5	DO	9	3		19	
					4			
		6	DO	0	5	ST.3.0	27	
		7	DO	7	6		33	
					7			
		8	DO	0	8	ST.9.6	35	
					9		25	
		9	DO	0		ST.2.5		
78.2					10			
10.7	Grey, loose **SAND**	10	DO	10	11		13	
77.8								
11.1	**END OF BOREHOLE**				12			
	Installed 50 mm Ø PVC monitoring well to 6.1 m with 3.0 m screen Sand backfill from 2.7 to 6.1 m Bentonite seal from 0.0 m to 2.7 m Provided with a steel monument casing				13			
					14			
					15			
					16			
					17			
					18			

Water level reading:
W.L. @ El. 86.5 masl on Jan 10, 2025
W.L. @ El. 86.6 masl on Jan 24, 2025
W.L. @ El. 86.6 masl on Feb 07, 2025

Soil Engineers Ltd.

JOB NO.: 2411-W164

LOG OF BOREHOLE:BH/MW 5

FIGURE NO.: 5

PROJECT DESCRIPTION: Proposed Stacked Townhouse Development

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 1884 Liverpool Road, City of Pickering

DRILLING DATE: January 2, 2025

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
88.1	Ground Surface							
0.0	**38 cm TOPSOIL**	1A	DO	4	0		16	
	Brown, loose to compact	1B						
	SAND weathered	2	DO	10	1		23	
	fine grained, some silt to silty							
86.6	wet below 1.0 m						22	
1.5	Firm to very soft	3	DO	4	2			
	SILTY CLAY							
	a trace of sand							
	occ. silt layers							
	wet							
		4	DO	7	3		22	
					4			
		5	DO	0	5	ST.2	18	
					6		37	
		6	DO	0				
					7	ST.6.0		
80.5								
7.6	Grey, soft	7	DO	2	8		16	
	SILTY CLAY TILL							
	some sand, a trace of gravel							
	occ. cobbles							
79.0					9		14	
9.1	Grey, very loose	8	DO	1				
	SAND				10			
	fine to medium grained							
	some silt							
77.4								
10.7	Grey, dense to very dense	9	DO	33	11		10	
	SANDY SILT TILL							
	some clay, a trace of gravel				12		9	
	occ. cobbles and boulders	10	DO	36				
					13			
		11	DO	90	14		9	
73.9								
14.2	**END OF BOREHOLE**				15			
	Installed 50 mm Ø PVC monitoring well to 6.1 m with 3.0 m screen				16			
	Sand backfill from 2.7 to 6.1 m							
	Bentonite seal from 0.0 m to 2.7 m				17			
	Provided with a steel monument casing							
	Water level reading:				18			
	W.L. @ El. 86.2 masl on Jan 10, 2025							
	W.L. @ El. 86.3 masl on Jan 24, 2025							
	W.L. @ El. 86.3 masl on Feb 07, 2025							

Soil Engineers Ltd.

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

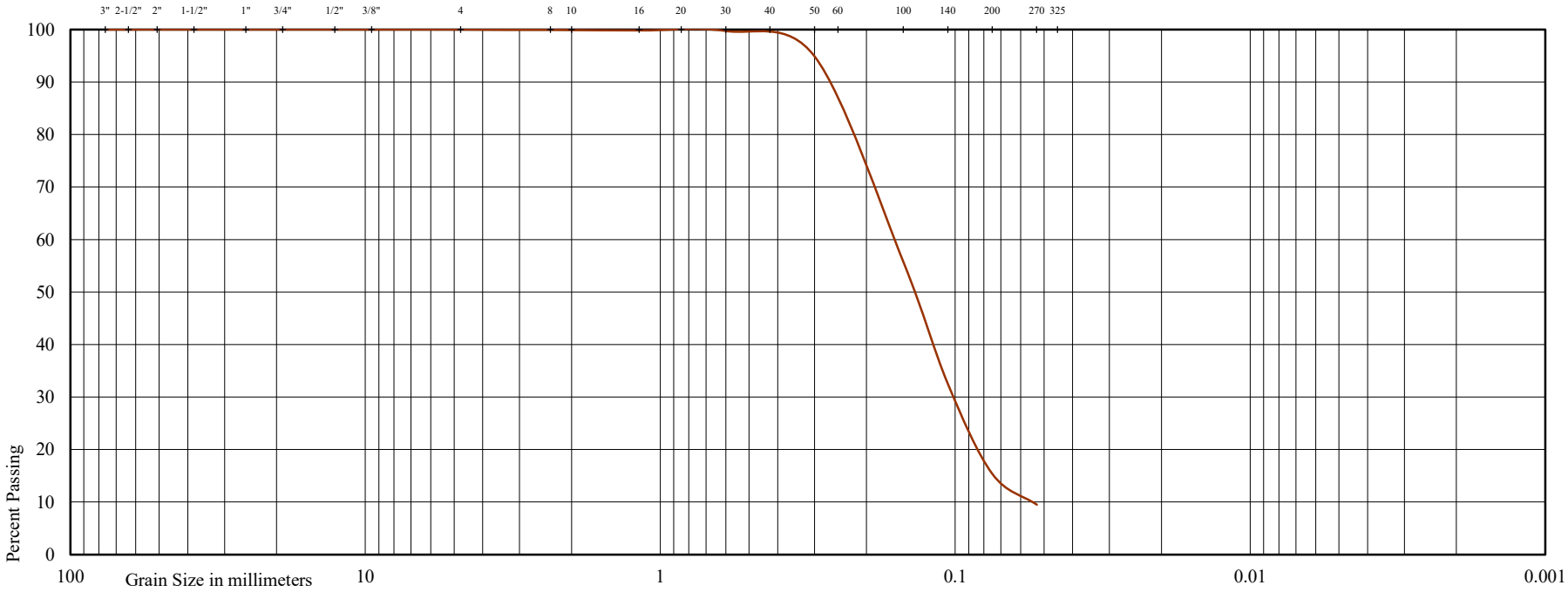
Reference No: 2411-S164

U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project: Proposed Stacked Townhouse Development

Location: 1884 Liverpool Road and 1885 Glendale Drive, City of Pickering

Borehole No: 2

Sample No: 2

Depth (m): 1.0

Elevation (m): 88.6

Liquid Limit (%) = -

Plastic Limit (%) = -

Plasticity Index (%) = -

Moisture Content (%) = 8

Estimated Permeability (cm./sec.) = 10^{-3}

Classification of Sample [& Group Symbol]: SAND
fine-grained, some silt

Figure: 6

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

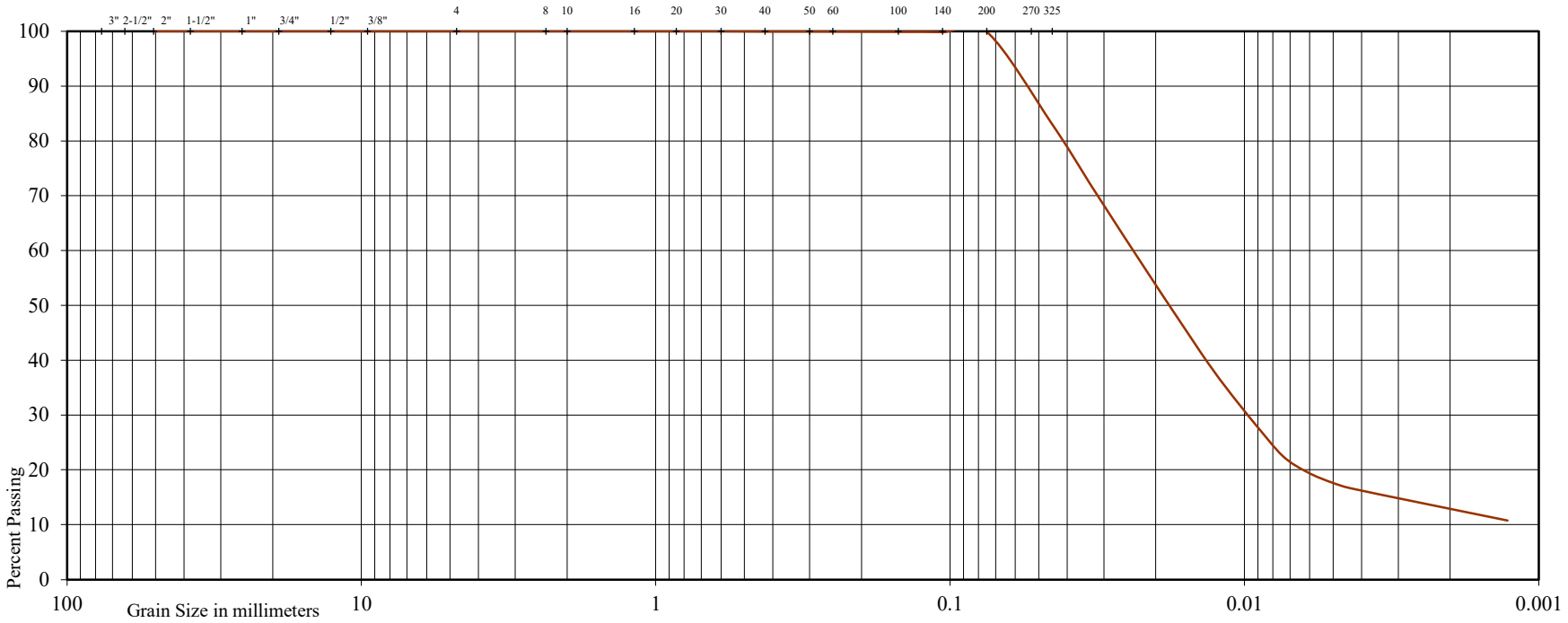
Reference No: 2411-S164

U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project: Proposed Stacked Townhouse Development

Location: 1884 Liverpool Road and 1885 Glendale Drive, City of Pickering

Borehole No: 1

Sample No: 7

Depth (m): 6.3

Elevation (m): 85.0

Liquid Limit (%) = -

Plastic Limit (%) = -

Plasticity Index (%) = -

Moisture Content (%) = 13

Estimated Permeability (cm./sec.) = 10^{-6}

Classification of Sample [& Group Symbol]: SILT
some clay

Figure: 7

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

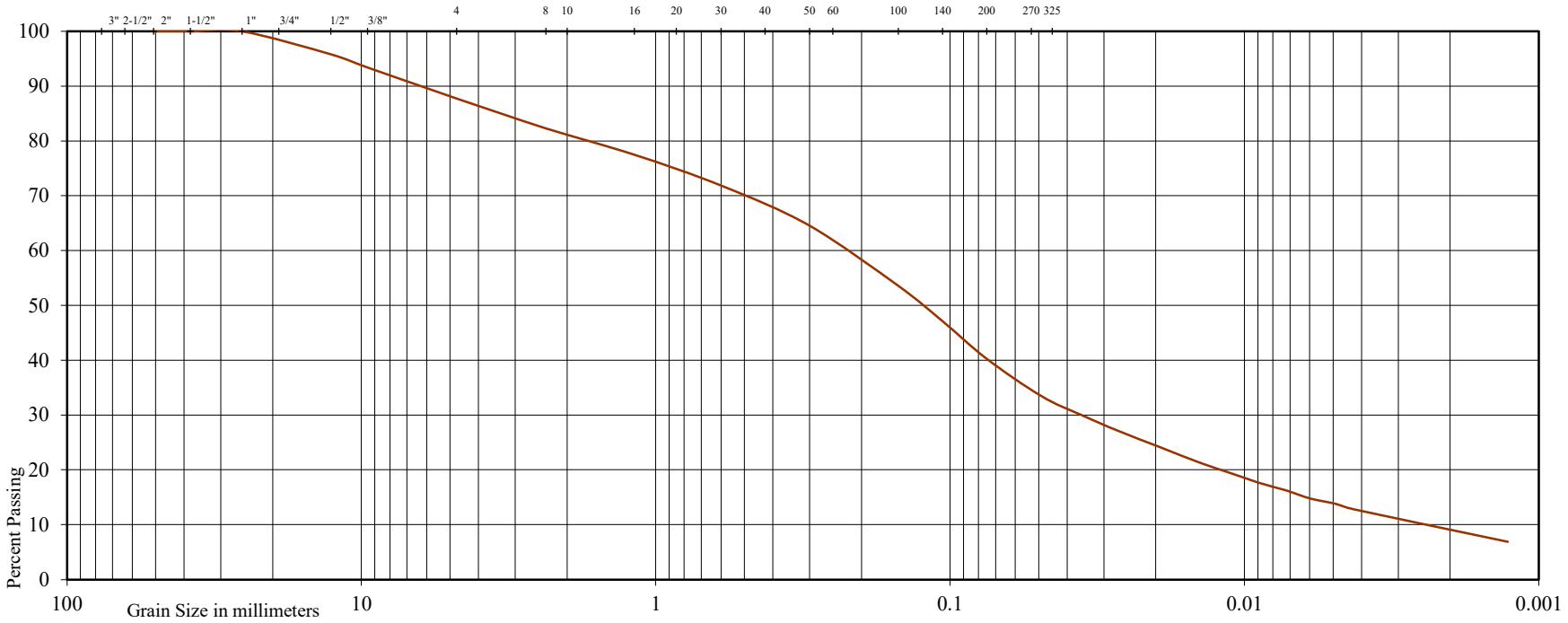
Reference No: 2411-S164

U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project: Proposed Stacked Townhouse Development

Location: 1884 Liverpool Road and 1885 Glendale Drive, City of Pickering

Borehole No: 5

Sample No: 10

Depth (m): 12.4

Elevation (m): 75.7

Liquid Limit (%) = -

Plastic Limit (%) = -

Plasticity Index (%) = -

Moisture Content (%) = 9

Estimated Permeability (cm./sec.) = 10^{-5}

Classification of Sample [& Group Symbol]: SILTY SAND TILL

some gravel, a trace of clay

Figure: 8

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FAX: (705) 721-7864	FAX: (905) 542-2769	FAX: (905) 725-1315	FAX: (905) 881-8335	FAX: (705) 721-7864	FAX: (905) 542-2769

APPENDIX B

MECP WELL RECORDS SUMMARY

REFERENCE NO. 2411-W164

MECP Well Records Summary

WELL ID	MECP* WWR ID	Construction Method	Well Depth (m)**	Well Usage		Static Water Level (m)**	Top of Screen Depth (m)**	Bottom of Screen Depth (m)**	Date Completed
				Final Status	First Use				
1	4601178	Boring	8.5	Water Supply	Domestic	3.4	-	-	1960-08-18
2	4601179	Boring	6.7	Water Supply	Domestic	4.0	-	-	1959-05-16
3	4601181	Cable Tool	35.4	Water Supply	Commercial	5.5	-	-	1964-08-03
4	4601182	Cable Tool	35.4	Water Supply	Commercial	5.5	-	-	1964-08-10
5	4601187	Boring	5.2	Water Supply	Domestic	1.8	-	-	1967-04-26
6	4601188	Boring	7.3	Water Supply	Domestic	3.0	-	-	1963-07-04
7	4601189	Boring	11.0	Water Supply	Domestic	7.6	-	-	1962-12-15
8	4601190	Cable Tool	20.7	Abandoned-Supply	-	-	-	-	1958-10-02
9	4601191	Boring	8.2	Water Supply	Domestic	6.1	-	-	1967-07-11
10	4601193	Cable Tool	28.7	Abandoned-Supply	-	-	-	-	1958-10-07
11	7125844	Boring	-	Abandoned-Other	Monitoring	-	-	-	2009-06-29
12	7130872	-	-	Test Hole	Monitoring	-	1.5	4.5	2009-08-19
13	7130872	-	-	Test Hole	Monitoring	-	1.5	4.5	2009-08-19
14	7130872	-	-	Test Hole	Monitoring	-	1.5	4.5	2009-08-20
15	7130872	-	-	Test Hole	Monitoring	-	1.5	4.5	2009-08-20
16	7130872	-	-	Test Hole	Monitoring	-	1.5	4.5	2009-08-20
17	7130872	-	-	Test Hole	Monitoring	-	1.5	4.5	2009-08-20
18	7130872	-	-	Test Hole	Monitoring	-	1.5	4.5	2009-08-19
19	7130872	-	4.5	Test Hole	Monitoring	-	1.5	4.5	2009-08-20
20	7161801	-	-	-	-	-	-	-	2011-03-10
21	7162148	-	-	Abandoned-Other	-	-	-	-	-
22	7164076	-	-	-	-	-	-	-	2011-04-27
23	7184714	-	-	Abandoned-Other	-	-	-	-	2011-10-19
24	7200616	-	4.9	Abandoned-Other	Not Used	-	-	-	2013-01-17
25	7200617	-	5.0	Abandoned-Other	Not Used	0.9	-	-	2013-01-17
26	7200618	-	6.1	Abandoned-Other	Not Used	2.4	-	-	2013-01-17
27	7200619	-	5.0	Abandoned-Other	Not Used	2.4	-	-	2013-01-17
28	7228643	Boring	6.7	-	-	-	3.7	6.7	2014-08-19
29	7328756	Boring	-	Monitoring and Test Hole	Monitoring and Test Hole	-	15.5	17.1	2019-01-03
30	7328757	Boring	-	Monitoring and Test Hole	Monitoring and Test Hole	-	3.0	4.6	2019-01-03
31	7330264	Boring	-	Monitoring and Test Hole	Monitoring and Test Hole	-	10.7	12.2	2019-02-13
32	7330265	Rotary (Convent.)	12.2	Monitoring and Test Hole	Monitoring	-	9.1	12.2	2019-02-13
33	7330266	Rotary (Convent.)	5.5	Monitoring and Test Hole	Monitoring	-	2.4	5.5	2019-02-13
34	7330267	Boring	13.1	Monitoring and Test Hole	Monitoring and Test Hole	-	10.1	13.1	2019-02-08
35	7330268	Rotary (Convent.)	6.1	Monitoring and Test Hole	Monitoring	-	3.0	6.1	2019-02-07
36	7330269	Rotary (Convent.)	12.2	Monitoring and Test Hole	Dewatering	-	9.1	12.2	2019-02-07
37	7330270	Rotary (Convent.)	6.1	Monitoring and Test Hole	Dewatering	-	3.0	6.1	2019-02-07
38	7330271	Rotary (Convent.)	6.1	Monitoring and Test Hole	Test Hole	-	3.0	6.1	2019-02-07
39	7330630	Direct Push	4.0	Observation Wells	Monitoring	-	2.5	4.0	2019-01-31

WELL ID	MECP* WWR ID	Construction Method	Well Depth (m)**	Well Usage		Static Water Level (m)**	Top of Screen Depth (m)**	Bottom of Screen Depth (m)**	Date Completed
				Final Status	First Use				
40	7336557	Other Method	9.1	Observation Wells	Monitoring	-	7.6	9.1	2019-06-07
41	7336558	Other Method	9.1	Observation Wells	Monitoring	-	7.6	9.1	2019-06-07
42	7336559	Other Method	9.1	Observation Wells	Monitoring	-	7.6	9.1	2019-06-07

Notes:
*MECP WWID: Ministry of the Environment, Conservation and Parks Water Well Records Identification
**Metres below ground surface

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FAX: (705) 721-7864	FAX: (905) 542-2769	FAX: (905) 725-1315	FAX: (905) 881-8335	FAX: (705) 721-7864	FAX: (905) 542-2769

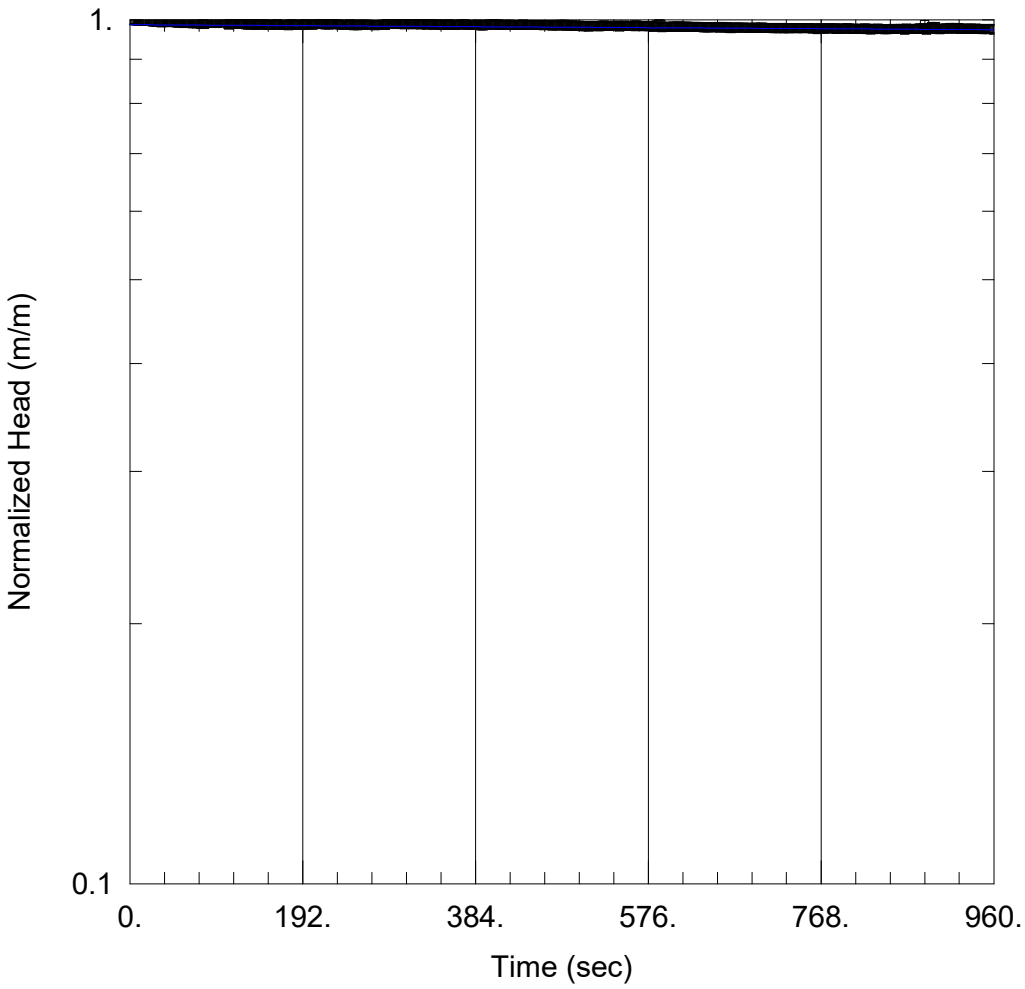
APPENDIX C

IN-SITU HYDRAULIC CONDUCTIVITY TESTING DETAILS

REFERENCE NO. 2411-W164

Falling Head SWRT of BHMW 1

Prepared By:	Prepared For:
Soil Engineers Ltd.	Louisville Homes Limited
Project:	**Location:**
2411-W164	1884 Liverpool Road, Pickering



SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 6.619E-9 m/sec y0 = 0.1209 m

AQUIFER DATA

Saturated Thickness: 2.2 m Anisotropy Ratio (Kz/Kr): 1.

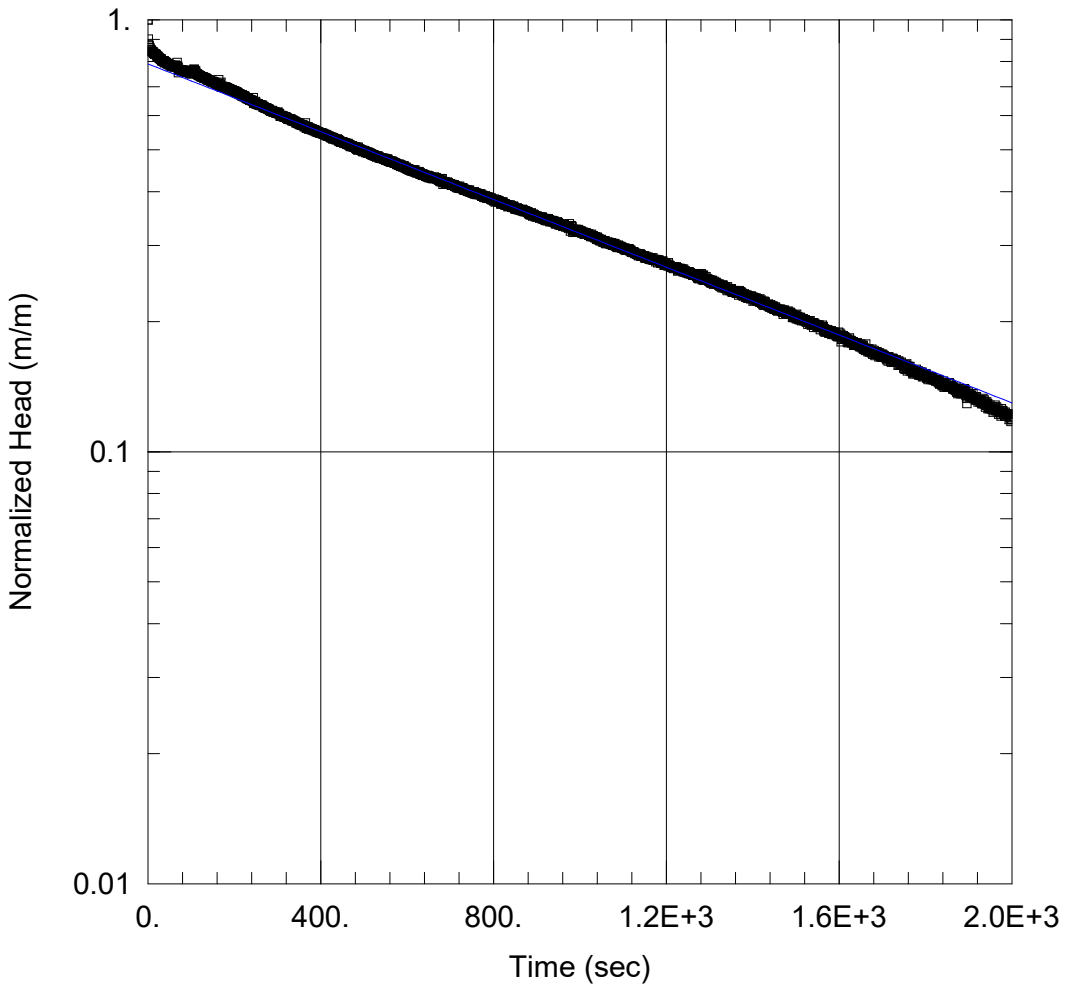
WELL DATA (BHMW 1)

Initial Displacement: 0.1225 m
Static Water Column Height: 2.2 m
Total Well Penetration Depth: 4. m
Screen Length: 3. m
Casing Radius: 0.0254 m
Well Radius: 0.0508 m

Soil Engineers Ltd.

Falling Head SWRT of BHMW 2

Prepared By:	Prepared For:
Soil Engineers Ltd.	Louisville Homes Limited
Project:	**Location:**
2411-W164	1884 Liverpool Road, Pickering



SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 3.2E-7 m/sec y0 = 0.06723 m

AQUIFER DATA

Saturated Thickness: 3.9 m Anisotropy Ratio (Kz/Kr): 1.

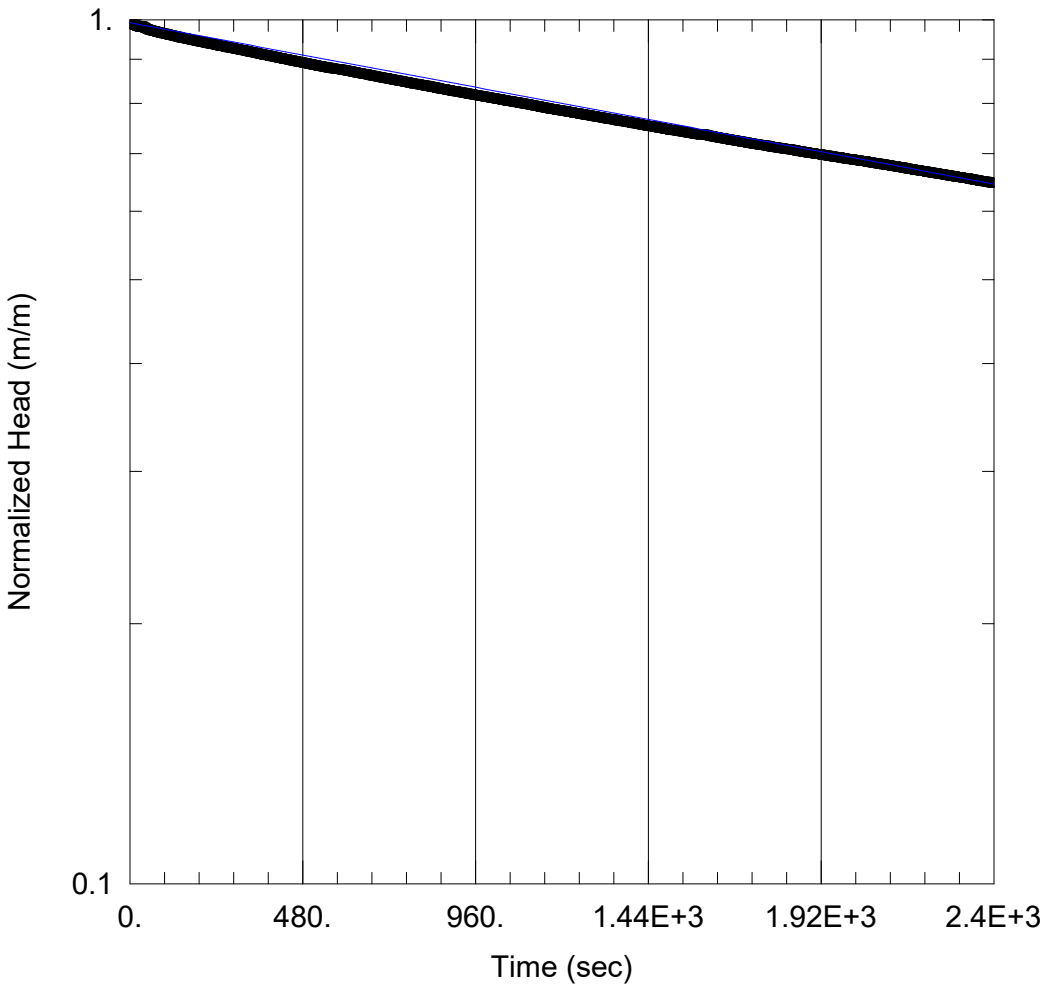
WELL DATA (BHMW 2)

Initial Displacement: 0.0851 m
Static Water Column Height: 3.9 m
Total Well Penetration Depth: 3.9 m
Screen Length: 3. m
Casing Radius: 0.0254 m
Well Radius: 0.0508 m

Soil Engineers Ltd.

Falling Head SWRT of BHMW 3

Prepared By:	Prepared For:
Soil Engineers Ltd.	Louisville Homes Limited
Project:	Location:
2411-W164	1884 Liverpool Road, Pickering



SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 6.312E-8 m/sec y0 = 0.4783 m

AQUIFER DATA

Saturated Thickness: 3.8 m Anisotropy Ratio (Kz/Kr): 1.

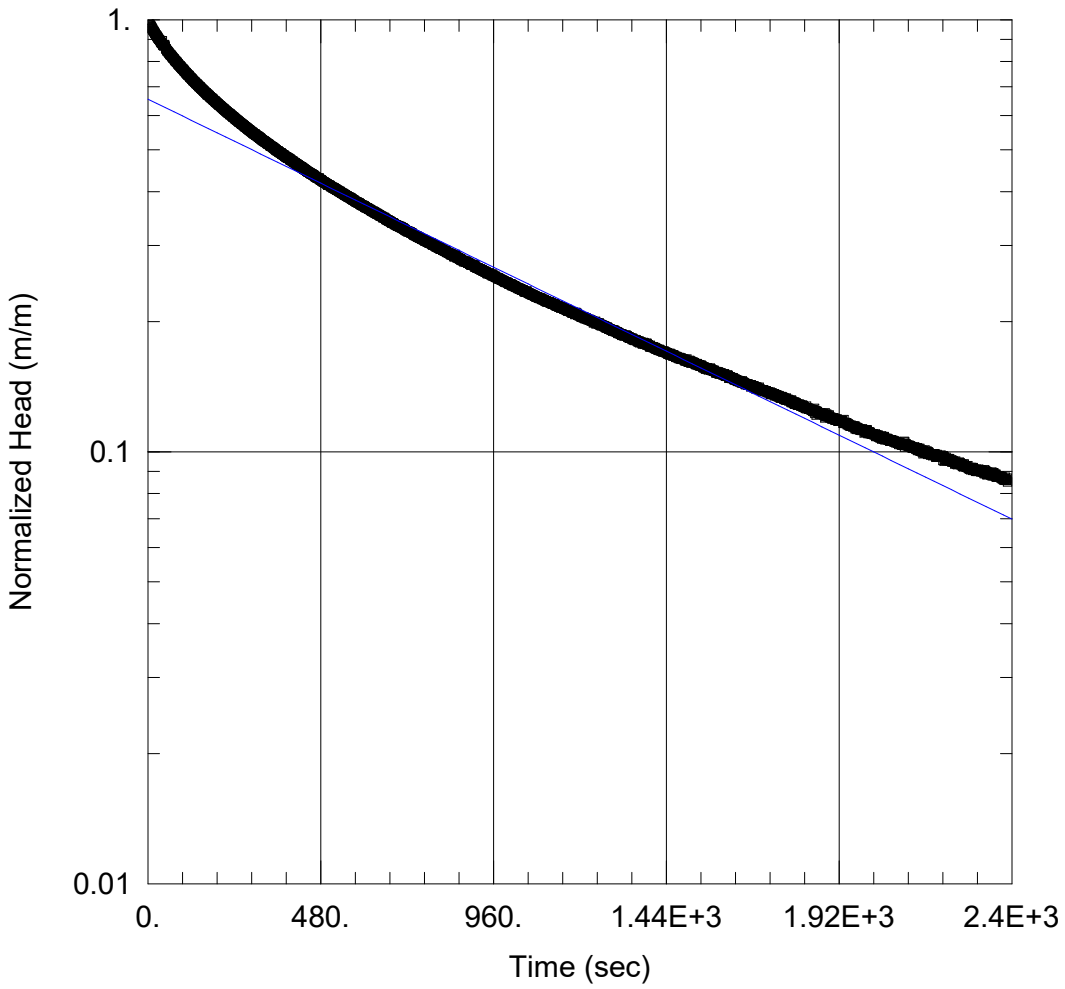
WELL DATA (BHMW 3)

Initial Displacement: 0.4822 m
Static Water Column Height: 3.8 m
Total Well Penetration Depth: 3.8 m
Screen Length: 3. m
Casing Radius: 0.0254 m
Well Radius: 0.0508 m

Soil Engineers Ltd.

Falling Head SWRT of BHMW 4

Prepared By:	Prepared For:
Soil Engineers Ltd.	Louisville Homes Limited
Project:	**Location:**
2411-W164	1884 Liverpool Road, Pickering



SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 3.305E-7 m/sec y0 = 0.1853 m

AQUIFER DATA

Saturated Thickness: 3.9 m Anisotropy Ratio (Kz/Kr): 1.

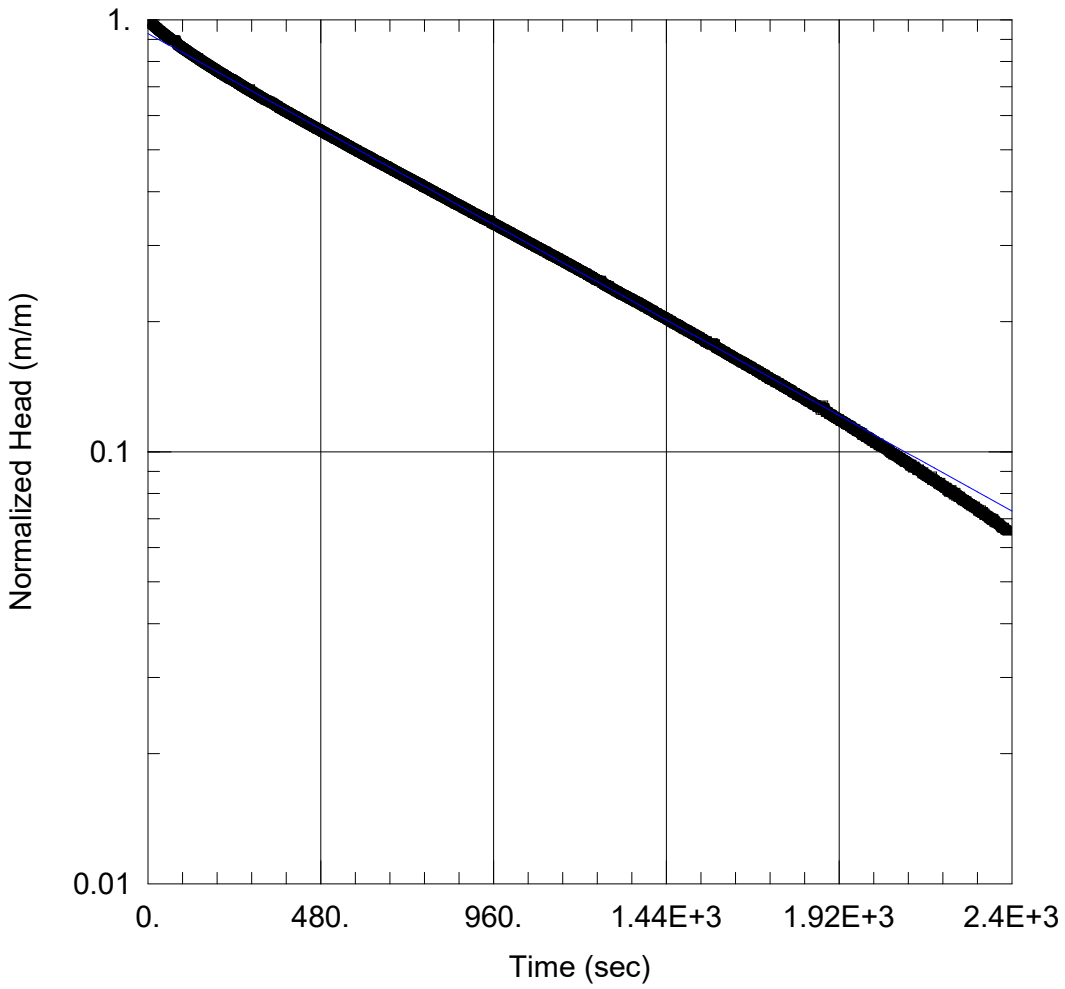
WELL DATA (BHMW 4)

Initial Displacement: 0.2831 m
Static Water Column Height: 3.9 m
Total Well Penetration Depth: 3.9 m
Screen Length: 3. m
Casing Radius: 0.0254 m
Well Radius: 0.0508 m

Soil Engineers Ltd.

Falling Head SWRT of BHMW 5

Prepared By:	Prepared For:
Soil Engineers Ltd.	Louisville Homes Limited
Project:	Location:
2411-W164	1884 Liverpool Road, Pickering



SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 3.827E-7 m/sec y0 = 0.435 m

AQUIFER DATA

Saturated Thickness: 4.3 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BHMW 5)

Initial Displacement: 0.4683 m
Static Water Column Height: 4.3 m
Total Well Penetration Depth: 4.3 m
Screen Length: 3. m
Casing Radius: 0.0254 m
Well Radius: 0.0508 m

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FAX: (705) 721-7864	FAX: (905) 542-2769	FAX: (905) 725-1315	FAX: (905) 881-8335	FAX: (705) 721-7864	FAX: (905) 542-2769

APPENDIX D

GROUNDWATER QUALITY TEST RESULTS

REFERENCE NO. 2411-W164

FINAL REPORT

CA40032-FEB25 R1

2411-W164, 1884 Liverpool Rd, Pickering

Prepared for

Soil Engineers Ltd.

FINAL REPORT

First Page

CLIENT DETAILS

Client	Soil Engineers Ltd.
Address	90 West Beaver Creek Rd Richmond, ON M1S 3A7. Canada
Contact	Daixi Zhang
Telephone	437-771-6640
Facsimile	416-754-8516
Email	Daixi.zhang@soilengineersltd.com
Project	2411-W164, 1884 Liverpool Rd, Pickering
Order Number	
Samples	Ground Water (1)

LABORATORY DETAILS

Project Specialist	Jill Campbell, B.Sc.,GISAS
Laboratory	SGS Canada Inc.
Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	2165
Facsimile	705-652-6365
Email	jill.campbell@sgs.com
SGS Reference	CA40032-FEB25
Received	02/07/2025
Approved	02/18/2025
Report Number	CA40032-FEB25 R1
Date Reported	02/21/2025

COMMENTS

RL - SGS Reporting Limit

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

Temperature of Sample upon Receipt: 5 degrees C
Cooling Agent Present: yes
Custody Seal Present: yes

Chain of Custody Number: 042325/042299

SIGNATORIES

Jill Campbell, B.Sc.,GISAS

TABLE OF CONTENTS

Client: Soil Engineers Ltd.
Project: 2411-W164, 1884 Liverpool Rd, Pickering
Project Manager: Daixi Zhang
Samplers: QA

MATRIX: WATER

L1 = SANSEW / WATER / - - Durham Sewer Use ByLaw - Sanitary Sewer Discharge - BL_55_2013

L2 = SANSEW / WATER / - - Durham Sewer Use ByLaw - Storm Sewer Discharge - BL_55_2013

Sample Number	8
Sample Name	BHMW4
Sample Matrix	Ground Water
Sample Date	12/02/2025

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	131
Total Kjeldahl Nitrogen	as N mg/L	0.5	100	1	< 0.5
Metals and Inorganics					
Sulphate	mg/L	1	1500		170
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		0.011
Antimony (total)	mg/L	0.0009	5		< 0.0009
Arsenic (total)	mg/L	0.0002	1	0.02	0.0036
Cadmium (total)	mg/L	0.000003	0.7	0.008	< 0.000003
Chromium (total)	mg/L	0.00008	2	0.08	0.00016
Cobalt (total)	mg/L	0.000004	5		0.000431
Copper (total)	mg/L	0.001	3	0.05	< 0.001
Lead (total)	mg/L	0.00009	1	0.12	< 0.00009
Manganese (total)	mg/L	0.00001	5	0.15	0.139
Molybdenum (total)	mg/L	0.0004	5		0.0008
Nickel (total)	mg/L	0.0001	2	0.08	0.0015
Phosphorus (total)	mg/L	0.003	10	0.4	0.027
Selenium (total)	mg/L	0.00004	1	0.02	0.00005
Silver (total)	mg/L	0.00005	5	0.12	< 0.00005
Tin (total)	mg/L	0.00006	5		0.00078

Client: Soil Engineers Ltd.
Project: 2411-W164, 1884 Liverpool Rd, Pickering
Project Manager: Daixi Zhang
Samplers: QA

MATRIX: WATER

L1 = SANSEW / WATER / - - Durham Sewer Use ByLaw - Sanitary Sewer Discharge - BL_55_2013

L2 = SANSEW / WATER / - - Durham Sewer Use ByLaw - Storm Sewer Discharge - BL_55_2013

Sample Number	8
Sample Name	BHMW4
Sample Matrix	Ground Water
Sample Date	12/02/2025

Parameter	Units	RL	L1	L2	Result
Metals and Inorganics (continued)					
Titanium (total)	mg/L	0.0001	5		0.0006
Zinc (total)	mg/L	0.002	2	0.04	0.003
Microbiology					
Ecoli	mpn/100mL	0		200	0
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
Oil and Grease					
Oil & Grease (total)	mg/L	2			4
Oil & Grease (animal/vegetable)	mg/L	4	150		4
Oil & Grease (mineral/synthetic)	mg/L	4	15		< 4

Client: Soil Engineers Ltd.
Project: 2411-W164, 1884 Liverpool Rd, Pickering
Project Manager: Daixi Zhang
Samplers: QA

MATRIX: WATER

Sample Number	8
Sample Name	BHMW4
Sample Matrix	Ground Water
Sample Date	12/02/2025

L1 = SANSEW / WATER / - - Durham Sewer Use ByLaw - Sanitary Sewer Discharge - BL_55_2013

L2 = SANSEW / WATER / - - Durham Sewer Use ByLaw - Storm Sewer Discharge - BL_55_2013

Parameter	Units	RL	L1	L2	Result
Other (ORP)					
pH	No unit	0.05	10.5	9	7.38
Mercury (total)	mg/L	0.00001	0.01	0.0004	< 0.00001
PCBs					
Polychlorinated Biphenyls (PCBs) - Total	mg/L	0.0001	0.001	0.0004	< 0.0001
Phenols					
4AAP-Phenolics	mg/L	0.001	1	0.008	< 0.001
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
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			< 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

Client: Soil Engineers Ltd.
Project: 2411-W164, 1884 Liverpool Rd, Pickering
Project Manager: Daixi Zhang
Samplers: QA

MATRIX: WATER

Sample Number	8
Sample Name	BHMW4
Sample Matrix	Ground Water
Sample Date	12/02/2025

L1 = SANSEW / WATER / - - Durham Sewer Use ByLaw - Sanitary Sewer Discharge - BL_55_2013

L2 = SANSEW / WATER / - - Durham Sewer Use ByLaw - Storm Sewer Discharge - BL_55_2013

Parameter	Units	RL	L1	L2	Result
VOCs - BTEX					
Benzene	mg/L	0.0005	0.01	0.002	< 0.0005
Ethylbenzene	mg/L	0.0005	0.16	0.002	< 0.0005
Toluene	mg/L	0.0005	0.27	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 Sewer Use ByLaw - Sanitary Sewer Discharge - BL_55_2013 L1	SANSEW / WATER / - - Durham Sewer Use ByLaw - Storm Sewer Discharge - BL_55_2013 L2
BHMW4					
Total Suspended Solids	SM 2540D	mg/L	131		15

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 375.4 | Internal ref.: ME-CA-[ENVIEWL-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	DIO8010-FEB25	mg/L	1	<2	0	20	103	80	120	93	75	125

Biochemical Oxygen Demand

Method: SM 5210 | Internal ref.: ME-CA-[ENVIEWL-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)	BOD0015-FEB25	mg/L	2	< 2	9	30	108	70	130	128	70	130

Cyanide by SFA

Method: SM 4500 | Internal ref.: ME-CA-[ENVISFA-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)	SKA0065-FEB25	mg/L	0.01	<0.01	ND	10	91	90	110	NV	75	125

QC SUMMARY

Fluoride by Specific Ion Electrode

Method: SM 4500 I 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	EWL0150-FEB25	mg/L	0.06	<0.06	1	10	104	90	110	NV	75	125

Mercury by CVAAS

Method: EPA 7471A/SM 3112B I 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)	EHG0015-FEB25	mg/L	0.00001	< 0.00001	ND	20	109	80	120	125	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-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)	EMS0078-FEB25	mg/L	0.00005	<0.00005	ND	20	100	90	110	83	70	130
Aluminum (total)	EMS0078-FEB25	mg/L	0.001	<0.001	1	20	98	90	110	101	70	130
Arsenic (total)	EMS0078-FEB25	mg/L	0.0002	<0.0002	2	20	99	90	110	100	70	130
Cadmium (total)	EMS0078-FEB25	mg/L	0.000003	<0.000003	3	20	99	90	110	102	70	130
Cobalt (total)	EMS0078-FEB25	mg/L	0.000004	<0.000004	2	20	96	90	110	100	70	130
Chromium (total)	EMS0078-FEB25	mg/L	0.00008	<0.00008	4	20	98	90	110	94	70	130
Copper (total)	EMS0078-FEB25	mg/L	0.001	<0.001	0	20	99	90	110	105	70	130
Manganese (total)	EMS0078-FEB25	mg/L	0.00001	<0.00001	1	20	101	90	110	102	70	130
Molybdenum (total)	EMS0078-FEB25	mg/L	0.0004	<0.0004	ND	20	96	90	110	101	70	130
Nickel (total)	EMS0078-FEB25	mg/L	0.0001	<0.0001	1	20	98	90	110	100	70	130
Lead (total)	EMS0078-FEB25	mg/L	0.00009	<0.00009	1	20	101	90	110	94	70	130
Phosphorus (total)	EMS0078-FEB25	mg/L	0.003	<0.003	0	20	99	90	110	NV	70	130
Antimony (total)	EMS0078-FEB25	mg/L	0.0009	<0.0009	5	20	108	90	110	80	70	130
Selenium (total)	EMS0078-FEB25	mg/L	0.00004	<0.00004	8	20	95	90	110	109	70	130
Tin (total)	EMS0078-FEB25	mg/L	0.00006	<0.00006	ND	20	97	90	110	NV	70	130
Titanium (total)	EMS0078-FEB25	mg/L	0.0001	<0.0001	ND	20	94	90	110	NV	70	130
Zinc (total)	EMS0078-FEB25	mg/L	0.002	<0.002	1	20	98	90	110	111	70	130

QC SUMMARY

Microbiology

Method: SM 9223B | Internal ref.: ME-CA-IENVIMIC-LAK-AN-021

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High
Ecoli	BAC9114-FEB25	mpn/100mL	-	ACCEPTED	SEE NOTE							

Nonylphenol and Ethoxylates

Method: ASTM D7065-06 | Internal ref.: ME-CA-IENVIGC-LAK-AN-015

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High
Nonylphenol diethoxylate	GCM0117-FEB25	mg/L	0.01	<0.01			85	55	120			
Nonylphenol monoethoxylate	GCM0117-FEB25	mg/L	0.01	<0.01			86	55	120			
Nonylphenol	GCM0117-FEB25	mg/L	0.001	<0.001			81	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)	GCM0122-FEB25	mg/L	2	<2	NSS	20	101	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)	GCM0179-FEB25	mg/L	4	< 4	NSS	20	114	70	130			
Oil & Grease (mineral/synthetic)	GCM0179-FEB25	mg/L	4	< 4	NSS	20	88	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	EWL0114-FEB25	No unit	0.05	NA	0		100			NA		

QC SUMMARY

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-[ENVISFA-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	SKA0098-FEB25	mg/L	0.001	<0.001	ND	10	114	80	120	108	75	125

Polychlorinated Biphenyls

Method: MOE E3400/EPA 8082A | Internal ref.: ME-CA-[ENVIGC-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	GCM0130-FEB25	mg/L	0.0001	<0.0001	NSS	30	78	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	GCM0114-FEB25	mg/L	0.002	< 0.002	NSS	30	91	50	140	NSS	50	140
di-n-Butyl Phthalate	GCM0114-FEB25	mg/L	0.002	< 0.002	NSS	30	93	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	EWL0124-FEB25	mg/L	2	< 2	0	10	101	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	SKA0074-FEB25	as N mg/L	0.5	<0.5	1	10	100	90	110	104	75	125

QC SUMMARY

Volatile Organics

Method: EPA 5030B/8260C | Internal ref.: ME-CA-[ENVIGC-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	GCM0105-FEB25	mg/L	0.0005	<0.0005	ND	30	106	60	130	121	50	140
1,2-Dichlorobenzene	GCM0105-FEB25	mg/L	0.0005	<0.0005	ND	30	104	60	130	114	50	140
1,4-Dichlorobenzene	GCM0105-FEB25	mg/L	0.0005	<0.0005	ND	30	103	60	130	112	50	140
Benzene	GCM0105-FEB25	mg/L	0.0005	<0.0005	ND	30	104	60	130	114	50	140
Chloroform	GCM0105-FEB25	mg/L	0.0005	<0.0005	ND	30	104	60	130	113	50	140
cis-1,2-Dichloroethene	GCM0105-FEB25	mg/L	0.0005	<0.0005	ND	30	105	60	130	116	50	140
Ethylbenzene	GCM0105-FEB25	mg/L	0.0005	<0.0005	ND	30	109	60	130	119	50	140
m-p-xylene	GCM0105-FEB25	mg/L	0.0005	<0.0005	ND	30	109	60	130	118	50	140
Methyl ethyl ketone	GCM0105-FEB25	mg/L	0.02	<0.02	ND	30	107	50	140	121	50	140
Methylene Chloride	GCM0105-FEB25	mg/L	0.0005	<0.0005	ND	30	103	60	130	113	50	140
o-xylene	GCM0105-FEB25	mg/L	0.0005	<0.0005	ND	30	110	60	130	121	50	140
Styrene	GCM0105-FEB25	mg/L	0.0005	<0.0005	ND	30	109	60	130	120	50	140
Tetrachloroethylene (perchloroethylene)	GCM0105-FEB25	mg/L	0.0005	<0.0005	ND	30	103	60	130	111	50	140
Toluene	GCM0105-FEB25	mg/L	0.0005	<0.0005	ND	30	103	60	130	113	50	140
trans-1,3-Dichloropropene	GCM0105-FEB25	mg/L	0.0005	<0.0005	ND	30	103	60	130	118	50	140
Trichloroethylene	GCM0105-FEB25	mg/L	0.0005	<0.0005	ND	30	103	60	130	109	50	140

QC SUMMARY

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

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

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

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

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

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

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

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

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

LEGEND

FOOTNOTES

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

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

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

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

This report supersedes all previous versions.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

No: 042299

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

Page _____ of _____

Laboratory Information Section - Lab use only

Received By: Sean Gerner | Received By (signature): [signature]
Received Date: 2 / 8 / 25 (mm/dd/yy) | Custody Seal Present: Yes ☑ No ☐ | Cooling Agent Present: Yes ☑ No ☐ Type: Ice
Received Time: 14 : 21 (hr : min) | Custody Seal Intact: Yes ☑ No ☐ | Temperature Upon Receipt (°C) 8.0 x 3 | LAB LIMS #: CA10032Feb25

REPORT INFORMATION

Company: Soil Engineers Ltd.
Contact: Daixi Zheng
Address: 90 West Beaver Creek Rd. Richmond Hill
Phone: 437-771-6640
Fax: Daixi.Zheng@Soil
Email: engineersltd.com

INVOICE INFORMATION

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

Quotation #: | P.O. #:
Project #: 2411 - W164 | Site Location/ID: 1884 Liverpool Rd. Pickering

TURNAROUND TIME (TAT) REQUIRED

☐ Client Regular TAT ☑ Regular TAT (5-7days)
TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 6pm or on weekends: TAT begins next business day

RUSH TAT (Additional Charges May Apply): ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days
PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

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

REGULATIONS

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

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

Sewer By-Law:
☑ Sanitary
☑ Storm
Municipality: 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: Metals & Inorganics (incl CrVI, CN,Hg pH,(B(HWS),EC,SAR–soil) (Cl, Na–water))	M&I: Full Metals Suite (ICP metals plus B(HWS-soil only) Hg, CrVI	M&I: ICP Metals only Sb,As,Ba,Be,B,Cd, Cr,Co,Cu,Pb,Mo,Ni,Se,Ag,Tl,U,V,Zn	SVOC: PAHs only	SVOC: SVOCs all incl PAHs, ABNs, CPs	PCB: PCBs Total ☐ Aroclor ☐	PHC: F1-F4 + BTEX	PHC: F1-F4 only no BTEX	VOC: VOCs all incl BTEX	VOC: BTEX only	Pest: Pesticides Organochlorine or specify other	Other (please specify): Sewer Use: Storm Sewer Specify pkg Cr(VI) characterization	Water Characterization Pkg General ☐ Extended ☐	SPLP: Specify tests ☐ Metals ☐ VOC ☐ 1,4-Dioxane ☐ OCP ☐ ABN	TCLP: Specify tests ☐ M&I ☐ VOC ☐ PCB ☐ B(a)P ☐ ABN ☐ Ignit.	COMMENTS:
1	BHMW4	02/07/25	1200	19	GW	N													Y			
2																						
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						
11																						
12																						

Observations/Comments/Special Instructions

Sampled By (NAME): QA	**Signature:** [signature]	Date: 02 / 07 / 25 (mm/dd/yy)	Pink Copy - Client
Relinquished by (NAME): QA	**Signature:** [signature]	Date: 02 / 07 / 25 (mm/dd/yy)	Yellow & White Copy - SGS

Revision #: 1.8
Date of Issue: 06 SEP 2024

Request for Laboratory Services and CHAIN OF CUSTODY

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

No: 042325 Page _____ of _____

Laboratory Information Section - Lab use only

Received By: Sean Gorman
Received Date: 2 / 12 / 25 (mm/dd/yy)
Received Time: 14 : 22 (hr : min)
Received By (signature):
Custody Seal Present: Yes ☑ No ☐
Custody Seal Intact: Yes ☑ No ☐
Cooling Agent Present: Yes ☑ No ☐ Type: Ice Pack
Temperature Upon Receipt (°C) 5.0
CA 40032 - Feb 24
LAB LIMS #:

REPORT INFORMATION	INVOICE INFORMATION
Company: Soil Engineers Ltd	☑ (same as Report Information)
Contact: Dawei Zhang	Company:
Address: 90 West Beaver Creek Rd. Richmond Hill.	Contact:
Phone: 437-771-6640	Address:
Fax: Dawei.Zhang@soil	Phone:
Email: engineers ltd-com	Email:

Quotation #:
Project #: 2411 - W 164
P.O. #:
Site Location/ID: 1884 Liverpool Rd. Pickering

TURNAROUND TIME (TAT) REQUIRED

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

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

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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

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☐ Table _____ Appx. _____
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☐ 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	M&I: Field Filtered (Y/N)	M&I: Metals & Inorganics (incl CrVI, CN,Hg pH,(B(HWS),EC,SAR–soil) (Cl, Na–water)	M&I: Full Metals Suite (ICP metals plus B(HWS-soil only) Hg, CrVI	M&I: ICP Metals only Sb,As,Ba,Be,B,Cd, Cr,Co,Cu,Pb,Mo,Ni,Se,Ag,Tl,U,V,Zn	SVOC: PAHs only	SVOC: SVOCs all incl PAHs, ABNs, CPs	PCB: PCBs Total ☐ Aroclor ☐	PHC: F1-F4 + BTEX	PHC: F1-F4 only no BTEX	VOC: VOCs all incl BTEX	VOC: BTEX only	Pest: Pesticides Organochlorine or specify other	Other (please specify): Sewer Use: Sanitary Storm Water Characterization Pkg ☐ General ☐ Extended	SPLP: Specify tests ☐ Metals ☐ VOC ☐ 1,4-Dioxane ☐ OCP ☐ ABN	TCLP: Specify tests ☐ M&I ☐ VOC ☐ PCB ☐ B(a)P ☐ ABN ☐ Ignit.	COMMENTS:
1	BHMW4	02/12/25	12:00	1	GW	W												✓			
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					

Observations/Comments/Special Instructions

Sampled By (NAME): DA	**Signature:**	Date: 02 / 12 / 25 (mm/dd/yy)	Pink Copy - Client
Relinquished by (NAME): DA	**Signature:**	Date: 02 / 12 / 25 (mm/dd/yy)	Yellow & White Copy - SGS

Revision #: 1.8
Date of Issue: 06 SEP 2024

Soil Engineers Ltd.
CONSULTING ENGINEERS
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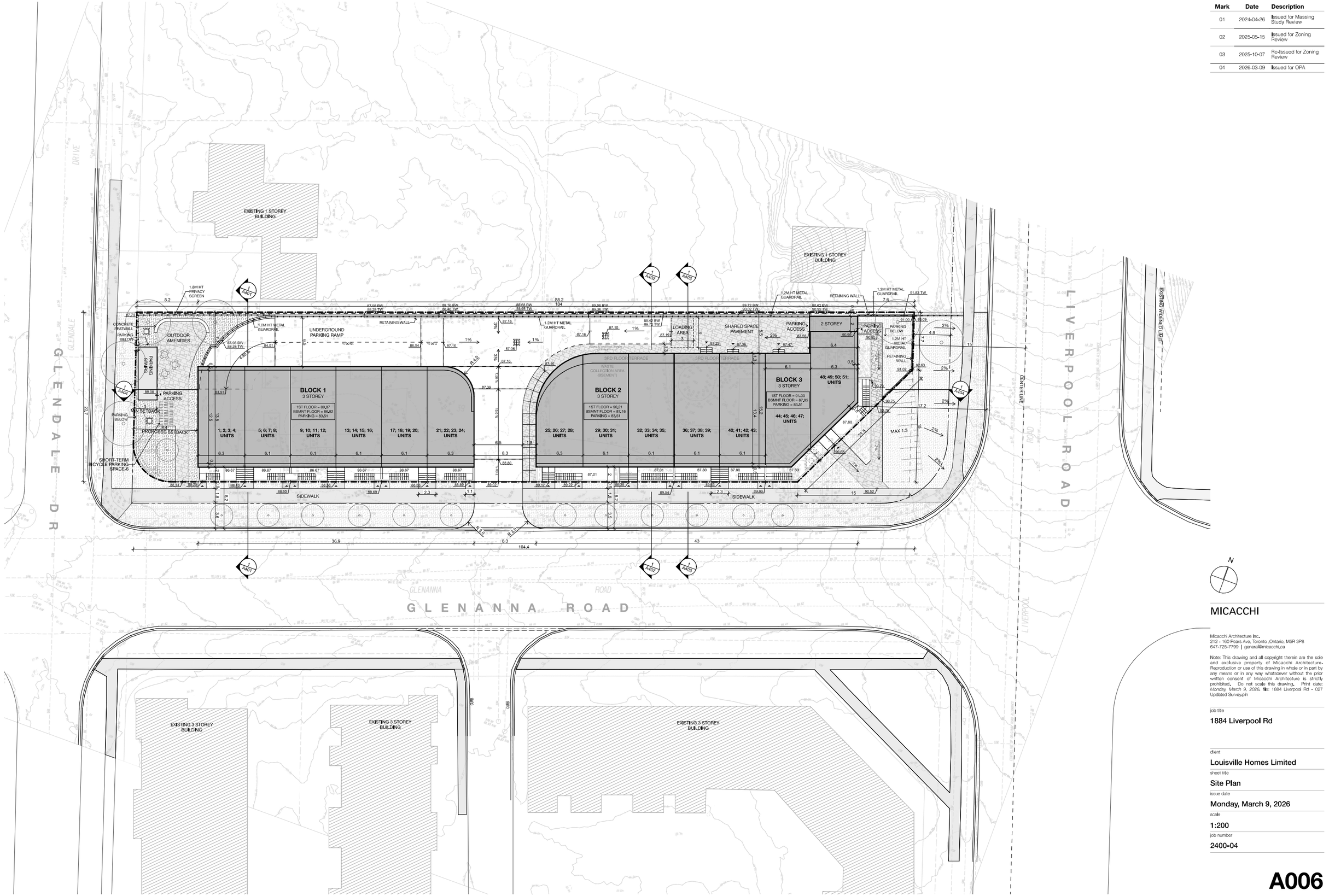
APPENDIX E

REVIEWED PLANS

REFERENCE NO. 2411-W164

Mark	Date	Description
01	2024-04-26	Issued for Massing Study Review
02	2025-05-15	Issued for Zoning Review
03	2025-10-07	Re-Issued for Zoning Review
04	2026-03-09	Issued for OPA



N

MICACCHI

Micacchi Architecture Inc.
212 - 160 Pears Ave, Toronto ,Ontario, M5R 3P8
647-725-7799 | general@micacchi.ca

job title
1884 Liverpool Rd

client
Louisville Homes Limited

sheet title
Site Plan

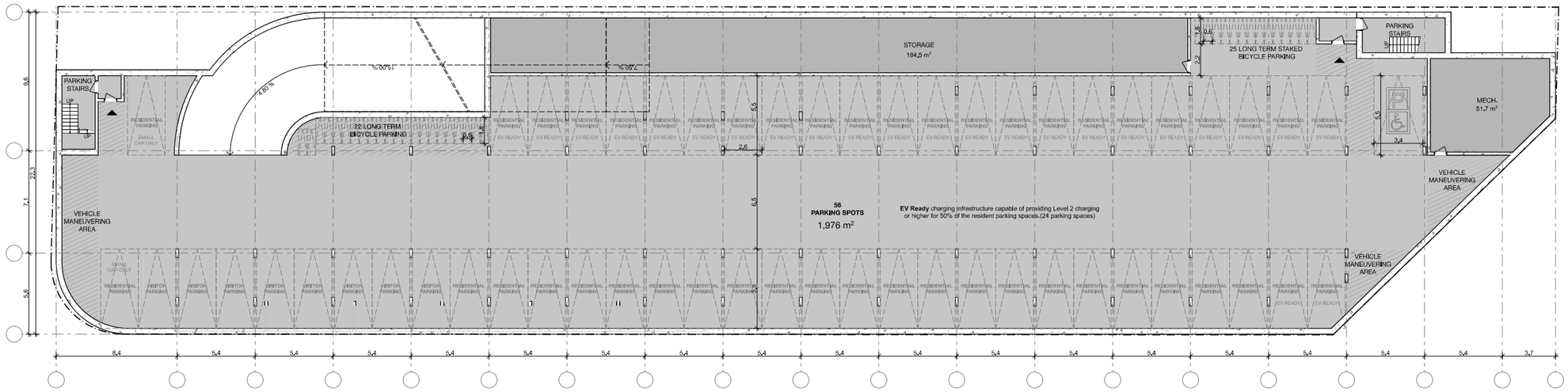
issue date
Monday, March 9, 2026

scale
1:200

job number
2400-04

A006

Mark	Date	Description
01	2024-04-26	Issued for Massing Study Review
02	2025-05-15	Issued for Zoning Review
03	2025-10-07	Re-Issued for Zoning Review
04	2026-03-09	Issued for OPA



N

MICACCHI

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job title
1884 Liverpool Rd

client
Louisville Homes Limited

sheet title
Parking Plan

issue date
Monday, March 9, 2026

scale
1:150

job number
2400-04

A101

Mark	Date	Description
04	2026-03-09	Issued for OPA

MICACCHI

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job title

1884 Liverpool Rd

client

Louisville Homes Limited

sheet title

Section Block 1-3

issue date

Monday, March 9, 2026

scale

1:150

job number

2400-04

A404

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APPENDIX F

SHORT-TERM CONSTRUCTION DEWATEIRNG FLOW RATE ESTIMATES

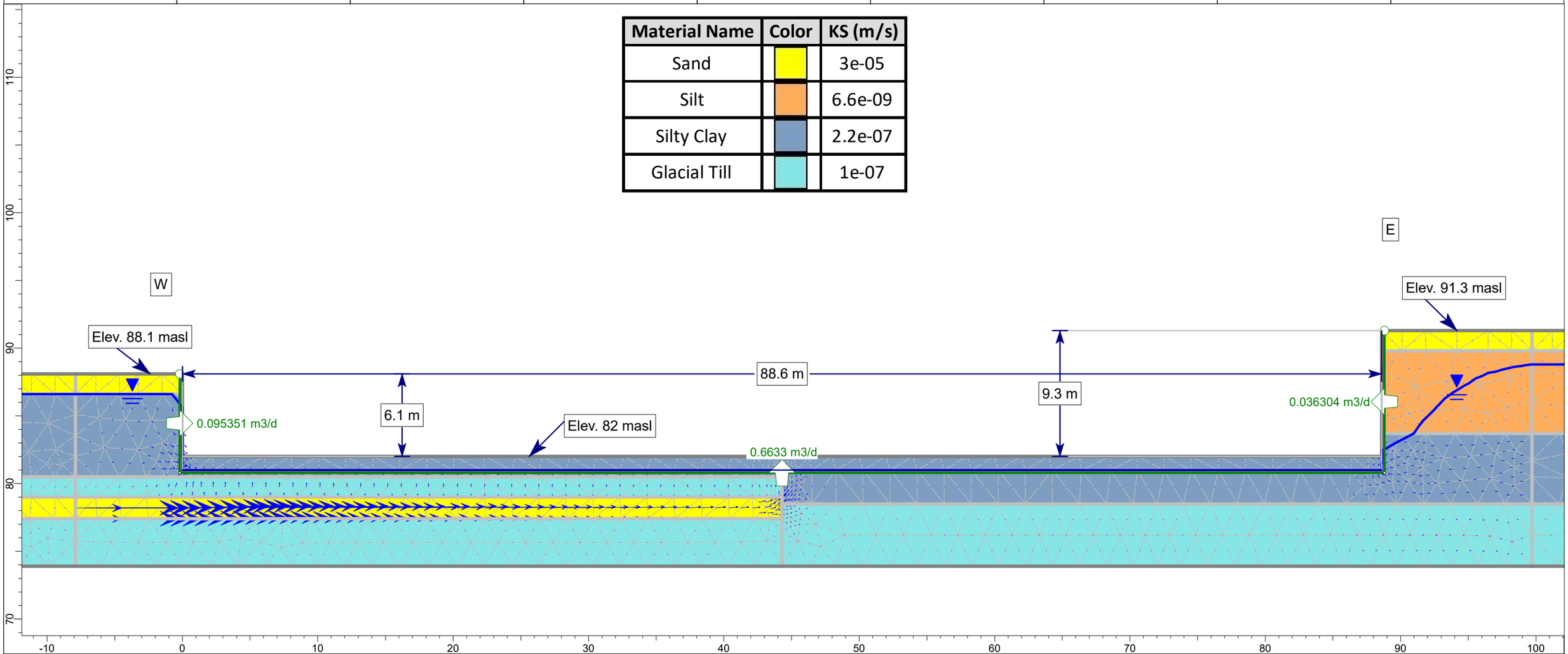
REFERENCE NO. 2411-W164

Groundwater Control Needs
Summary of Assumptions and Proposed Excavation Details

Proposed Excavation Location	1884 Liverpool Road and 1885 Glendale Drive, Pickering
Shoring System	Permeable
Excavation Dimensions (m)	22.3 x 88.6

Ground Surface Elevation (masl)	Proposed P1 Finished Floor Elevation (masl)	Assumed Base of Excavation (masl)	Assumed Base of Raft Foundation (masl)	Assumed Base of Elevator Pit (masl)	Highest Groundwater Table (masl)	Groundwater Flow Rate (L/Day) (with S.F. of 2)	Storm Event Flow Rate (L/Day)	Total Construction Dewatering Flow Rate (L/Day) (with S.F. of 2)
West: 88.1 East: 91.3	83.5	82.0	82.0	82.3	West: 86.6 East: 88.8	69,500.0	59,000.0	128,500.0

Material Name	Color	KS (m/s)
Sand		3e-05
Silt		6.6e-09
Silty Clay		2.2e-07
Glacial Till		1e-07



Soil Engineers Ltd.

Project Title	Proposed Residential Development			Load Case	Construction Dewatering
Location	1884 Liverpool Road and 1885 Glendale Drive, Pickering				
Drawn By	DZ	Checked By	NA	Scale	1:280
Date	2026-03-17, 9:49:14 AM	Reference No.	2411-W164	Drawing No.	1