Geotechnical Investigation
Proposed Residential Development
522 Cambridge Street South, Ottawa, Ontario

Client:
522 Cambridge Ltd.
187 Chemin Old Chelsea, Suite 101
Chelsea, Quebec
J9B 1J3

Type of Document:
Final Report

Project Number:
OTT-25011403-B0

Prepared By:
EXP Services Inc.
100-2650 Queensview Drive
Ottawa, Ontario K2B 8H6

Date Submitted:
April 28, 2026

1. Contents

List of Figures

List of Tables

List of Appendices

Executive Summary

EXP Services Inc. (EXP) is pleased to present the results of the geotechnical investigation completed for the proposed residential development to be located at 522 Cambridge Street South, Ottawa, Ontario. (Figure 1). Terms and conditions of the assignment have been outlined in EXP's Proposal dated December 11, 2025. Authorization to proceed with the work was given by 522 Cambridge Ltd.

EXP understands that the existing residence will be demolished and the property will be redeveloped with a 4-storey residential apartment building with one basement level. The design elevation of the basement floor, ground floor and final exterior grades were not available at the time of this geotechnical investigation.

EXP completed a Phase One Environmental Site Assessment (ESA) and Soil Characterization Report (SCR) in conjunction with this geotechnical investigation and the results are provided in separate reports.

The fieldwork for the geotechnical investigation was undertaken on March 20, and 23, 2026 and comprised the drilling of one (1) borehole (Borehole No. BH/MW26-01) extending to termination depth of 5.9 m below existing grade and excavation of six (6) test pits extending to bucket refusal depths ranging from 0.3 m to 1.1 m below existing grade.

The borehole information indicates the subsurface conditions at the site consist of a surficial topsoil up to 300 mm thick over heterogeneous fill that extends to 0.4 m to 1.4 m depth (Elevation 77.0 m to Elevation 76.3 m) underlain by localized glacial till which extends to depths of 0.6 m to 1.1 m (Elevation 76.9 m to Elevation 76.4 m) overlying limestone bedrock contacted at 0.3 m to 1.4 m depths (Elevation 77.2 m to Elevation 76.3 m). Based on a review of the groundwater level measurements, the groundwater level is at 3.0 m depth (Elevation 74.66 m).

Since compressible clay was not encountered on the site, there is no restriction to raising the grades at the site from a geotechnical perspective.

For footings founded on sound limestone bedrock and based on Table 4.1.8.4.-B of the 2024 Ontario Building Code (OBC), the site classification and designation for seismic design would be Site Class C and Site Designation X_c. A higher site class and designation may be available if a seismic shear wave survey is conducted on the site and provided the underside of the footings recommended in this report to support the proposed building are founded on the sound limestone bedrock. Since the construction of the basement would require the excavation and removal of all soils down to the bedrock, the determination as to whether or not the soils are liquefiable during a seismic event does not need to be considered in the design of the proposed development.

The geotechnical investigation has revealed that the subsurface conditions at the site are well suited to supporting the proposed building by strip and spread footings set on the competent sound limestone bedrock free of loose pieces (soil and bedrock) and soft seams and located below any weathered and fractured/detached zones of the bedrock. Footings founded on the competent sound bedrock may be designed for a factored geotechnical resistance at ultimate limit state (ULS) of 2000 kPa. Settlements of footing designed for the above recommended factored geotechnical resistance at ULS and properly constructed are expected to be less than 10 mm.

The depth to competent sound bedrock away from the test hole locations may vary from those indicated on the borehole log and test pit logs. For example, the fill thickness and depth to bedrock may be deeper or shallower than shown on the bore hole or test pit logs close to and/or within the footprint of the existing building and underground service trenches. Sub-excavation below the design elevation of the underside of new footings to reach the competent sound bedrock may be backfilled from the sound bedrock to the design elevation of the underside of the footing with structural concrete having a compressive strength of 15 MPa. In this case, an allowance should be made in the contract for the use of structural concrete. Alternatively, the footings may be stepped down to the competent sound bedrock.

The basement floor slab of the proposed building may be designed as a slab-on-grade provided it is set on a bed of well compacted 19 mm clear stone at least 200 mm thick placed directly on the competent sound bedrock. The clear stone would prevent the capillary rise of moisture to the floor slab. Alternatively, the clear stone layer may be replaced with Ontario Provincial Standard Specification (OPSS) Granular A compacted to 98 percent standard Proctor maximum dry density (SPMDD) and overlain by a vapour barrier. Adequate saw cuts should be provided in the floor slab to control cracking.

The lowest floor level for the proposed building is anticipated to be within 1 m of the groundwater table. Therefore, perimeter and underfloor drainage systems are required to be installed for the proposed basement slab.

Excavation of the fill may be undertaken using conventional equipment. All excavation work should be completed in accordance with the Occupational Health and Safety Act (OHSA). Excavations within the fill soil may be undertaken as open cut provided the sidewalls of the excavation are cut back at 1H:1V from the bottom of the excavation.

Excavation of the limestone bedrock may be undertaken using a hoe ram for removal of small quantities of the bedrock; however, this process is expected to be very slow. Alternatively, the bedrock may be excavated by line drilling and blasting technique. Contractors bidding on this project should decide on their own the most preferred rock removal method; hoe ramming or line drilling and blasting. However, it is possible that blasting may not be permitted at this site due to proximity to nearby structures and municipal installations.

The sound bedrock may be excavated at near vertical slope, subject to examination by a geotechnical engineer. Depending on the excavation depth within the bedrock, rock slope stabilization measures such as rock bolting in combination with a wire mesh system and/or shotcrete may be required.

Excavations may be dewatered by conventional sump pumping method.

It is anticipated that all material required for backfilling purposes in the interior and exterior of the proposed building and in the service trenches will need to be imported and should preferably conform to the specifications provided in the attached geotechnical report.

The above and other related considerations are discussed in greater detail in the attached geotechnical report.

This executive summary is a brief synopsis of the report and should not be read in lieu of reading the attached geotechnical report in its entirety.

1.0 Introduction

EXP Services Inc. (EXP) is pleased to present the results of the geotechnical investigation completed for the proposed residential development to be located at 522 Cambridge Street South, Ottawa, Ontario. (Figure 1). Terms and conditions of the assignment have been outlined in EXP's Proposal dated December 11, 2025. Authorization to proceed with the work was given by 522 Cambridge Ltd.

EXP understands that the existing residence will be demolished and the property will be redeveloped with a 4-storey residential apartment building with one basement level. The design elevation of the basement floor, ground floor and final exterior grades were not available at the time of this geotechnical investigation.

EXP completed a Phase One Environmental Site Assessment (ESA) and Soil Characterization Report (SCR) in conjunction with this geotechnical investigation and the results are provided in separate reports.

This geotechnical investigation was undertaken to:

a) Establish the subsurface soil, bedrock and groundwater conditions at one (1) borehole and six (6) test pits located on site,
b) Classify the site for seismic site response in accordance with the requirements of the 2024 Ontario Building Code (OBC) and assess the potential for liquefaction of the subsurface soils during a seismic event,
c) Comment on grade-raise restrictions for the site,
d) Make recommendations on the most suitable type of foundations, founding depth and bearing pressure at Serviceability Limit State (SLS) and factored geotechnical resistance at Ultimate Limit State (ULS) of the founding strata and comment on the anticipated total and differential settlements of the recommended foundation type for the proposed building,
e) Comment on slab-on-grade construction and permanent drainage requirements,
f) Provide lateral earth pressure parameters (for static and seismic conditions) for the subsurface basement walls of the proposed building,
g) Discuss excavation conditions and dewatering requirements during construction,
h) Comment on pipe bedding requirements for the proposed underground services,
i) Comment on backfilling requirements and suitability of the on-site soils for backfilling purposes, and
j) Comment on subsurface concrete requirements and corrosion potential of subsurface soil and bedrock to buried metal structures/members.

The comments and recommendations given in this report are based on the assumption that the above-described design concept will proceed into construction. If changes are made either in the design phase or during construction, this office must be retained to review these modifications. The result of this review may be a modification of our recommendations or it may require additional field or laboratory work to check whether the changes are acceptable from a geotechnical viewpoint.

2.0 Site Description

The subject site is located at 522 Cambridge Street South, Ottawa, Ontario and is currently occupied by a detached 1.5-storey residence with one basement level. The remainder of the lot is occupied by an asphalt driveway and landscaped areas. The existing building will be demolished to allow for the construction of the proposed building. The site borders on Cambridge Street South to the east, and residential properties to the north, west, and south.

The site is generally flat with ground surface elevations ranging from Elevation 77.66 m to Elevation 77.44 m at the test hole locations. The ground surface gently slopes in a westerly direction away from Cambridge Street South.

3.0 Procedure

The fieldwork for the geotechnical investigation was undertaken on March 20, and 23, 2026 and comprised the drilling of one (1) borehole (Borehole No. BH/MW26-01) extending to termination depth of 5.9 m below existing grade and excavation of six (6) test pits extending to bucket refusal depth of 0.3 m to 1.1 m below existing grade. The fieldwork was supervised on a full-time basis by a representative from EXP.

The borehole and test pit locations and geodetic elevations were determined on site by EXP. The borehole locations are shown on the Test Hole Location Plan, Figure 2.

Prior to the fieldwork, the borehole and test pit locations were cleared of public and private underground services.

The borehole was drilled using a CME-55 truck-mounted drill rig equipped with soil sampling and rock coring capabilities. Standard penetration tests (SPTs) were performed in the borehole at ground surface and 0.75 m depth intervals and soil samples were retrieved by the split-barrel sampler. The presence of the bedrock was proven in the borehole by conventional coring techniques using an HQ sized core barrel. A record of the wash water return, colour of wash water and any sudden drops of the core barrel were kept during rock coring operation.

The test pits were completed using a rubber-tired backhoe and grab samples were collected from the open pit at selected intervals based on visually observed changes in the soil properties.

The subsurface soil conditions in each test hole were logged and each soil sample placed in labelled plastic bags. Similarly, the bedrock cores were visually examined, placed in core boxes, identified and logged.

A 50 mm diameter monitoring well was installed in Borehole No. 26-01 for long-term monitoring of the groundwater level and for potential groundwater sampling. The monitoring well was installed in accordance with EXP standard practice, and the installation configuration is documented on the respective borehole log. The test holes were backfilled upon completion of drilling or excavating and the installation of the monitoring well.

On completion of the fieldwork, all the soil samples and rock cores were transported to the EXP laboratory located in Ottawa, Ontario. The soil samples were classified by their main constituents using soil group name and symbol in accordance with the Unified Soil Classification System (USCS) and by the modified Burmister soil classification method for the classification of the minor constituents of the soil using adjectives and modifiers such as trace and some.

The bedrock cores were logged in general accordance with the 2023 Fifth Edition of the Canadian Foundation Engineering Manual (CFEM).

The laboratory testing program for the soil samples and rock cores is shown in Table I.

Table I: Summary of Laboratory Testing Program	
Type of Test	**Number of Tests Completed**
Soil Samples	
Moisture Content Determination	14
Grain Size Analysis	1
Atterberg Limits Determination	1
Bedrock Cores	
Unit Weight Determination	3
Unconfined Compressive Strength Test	3
Corrosion Analyses (pH, sulphate, chloride and resistivity)	1

4.0 Subsurface Conditions

A detailed description of the subsurface conditions encountered in the seven (7) test holes is given on the borehole and test pit logs, Figure Nos. 3 to 9. The test hole logs and related information depict subsurface conditions only at the specific locations and times indicated. Subsurface conditions and water levels at other locations may differ from conditions at the locations where sampling was conducted. The passage of time also may result in changes in the conditions interpreted to exist at the locations where sampling was conducted.

Test holes were completed to provide representation of subsurface conditions as part of a geotechnical exploration program and are not intended to provide evidence of potential environmental conditions. Reference is made to the Phase One ESA and SCR regarding the environmental condition of the subsurface soils and groundwater.

It should be noted that the soil and bedrock boundaries indicated on the borehole and test pit logs are inferred from observations during drilling operations. These boundaries are intended to reflect approximate transition zones for the purpose of geotechnical design and should not be interpreted as exact planes of geological change. The "Notes on Sample Descriptions" preceding the borehole and test pit logs form an integral part of this report and should be read in conjunction with this report.

A review of the borehole and test pit logs indicates the following subsurface soil and bedrock conditions with depth and groundwater levels.

4.1 Topsoil

A surficial topsoil layer was contacted in Borehole No. BH26-01 and Test Pit Nos. TP26-01 to TP26-03 and TP26-05 to TP26-06. The topsoil has a thickness of 100 mm to 300 mm.

4.2 Paving Stones

50 mm thick paving stones were present at the surface of Test Pit No. TP26-04.

4.3 Fill

At Borehole No. BH26-01 and Test Pit Nos. TP26-01 to TP26-04 and TP26-06, underlying the topsoil or paving stones is heterogeneous fill material consisting of silty clay to silty sand and containing topsoil inclusions, gravel and cobbles, as well as pieces of brick, glass, metal and plastic. The fill extends to depths of 0.4 m to 1.4 m (Elevation 77.0 m to Elevation 76.3 m) at test hole locations where it was encountered. The fill is in a loose state based on SPT N-values of 6 and 8 at Borehole 26-01. The moisture content of the fill is 12 percent to 24 percent.

4.4 Glacial Till

At Test Pit Nos. TP26-01 and TP26-03, underlying the fill is glacial till consisting of sandy silt with gravel, trace clay. The glacial till extends to depths of 0.6 m and 1.1 m (Elevation 76.9 m and Elevation 76.4 m) at Test Pit No. TP26-03 and TP26-01, respectively. The moisture content of the glacial till is 8 percent and 17 percent.

Grain size analysis was conducted on one (1) sample of the glacial till which was retrieved from Test Pit No TP26-01. The grain size curve is shown in Figure 10 and the results are summarized in Table II.

Table II: Summary of Results from Grain-size Analysis – Granular Fill Sample						
Test hole No. (TP) - Sample No. (GS)	Depth (m)	Grain-size Analysis (%)				Soil Classification (USCS)
		Gravel	Sand	Silt	Clay	
TP26-01 – GS2	0.8 – 1.0	27	39	27	7	Silty Sand with Gravel, Trace Clay (SM)

Based on a review of the results from the grain size analysis, the glacial till may be classified as silty sand with gravel, trace clay (SM).

4.5 Limestone Bedrock

Refusal to augers and to backhoe bucket on bedrock surface was met in all the boreholes and test pits at depths ranging between 0.3 m to 1.4 m depths (Elevation 77.2 m to Elevation 76.3 m).

The presence of the bedrock was confirmed by coring in Borehole No. BH26-01 at 1.4 m depth (Elevation 76.3 m). A summary of the bedrock depth (elevation) in all test holes is presented in Table III.

Table III: Summary of Bedrock Depths (Elevations)			
Borehole/Test Pit No. (BH/TP)	Ground Surface Elevation (m)	Bedrock Depth (m)	Bedrock Elevation (m)
BH26-01	77.66	1.4	76.3
TP26-01	77.53	1.1	76.4
TP26-02	77.51	0.7	76.8
TP26-03	77.50	0.6	76.9
TP26-04	77.58	0.6	77.0
TP26-05	77.49	0.3	77.2
TP26-06	77.44	0.4	77.0

The bedrock geology map (Map 1508A – Generalized Bedrock Geology, Ottawa-Hull, Ontario and Quebec, Geological Survey of Canada, printed by the Surveys and Mapping Branch, 1979) indicates the site is underlain by limestone bedrock (with some shaley partings) of the Ottawa formation.

Based on examination of the bedrock cores, the Total Core Recovery (TCR) ranges from 99 percent to 100 percent and the Rock Quality Designation (RQD) ranges from 86 percent to 96 percent indicating the bedrock quality is good to excellent. Photographs of the rock cores are shown in Appendix A.

Results of the unconfined compressive strength and unit weight determination tests conducted on three (3) selected sections of rock cores are summarized in Table IV.

Table IV: Unconfined Compressive Strength and Unit Weight of Rock Core Sections			
Borehole/Monitoring Well No. (BH/MW) RUN No.	Depth (m)	Unconfined Compressive Strength (MPa)	Unit Weight (kN/m^3)
BH26-01 – Run 1	2.1 – 2.3	110.6	26.3
BH26-01 – Run 2	3.4 – 3.6	112.9	26.5
BH26-01 – Run 3	4.4 – 4.6	110.7	26.6

The unconfined compressive strength test results range from 110 MPa to 113 MPa and the rock may be classified as very strong (R5) in accordance with the 2023 Fifth Edition of the Canadian Foundation Engineering Manual (CFEM).

4.6 Groundwater Levels

The groundwater level measurement taken in the monitoring well installed in Borehole No. BH26-01 on March 23, 2026, is summarized in Table V.

Table V: Summary of Groundwater Level Measurements			
Borehole/Monitoring Well No. (BH/MW)	Ground Surface Elevation (m)	Date of Measurement (Elapsed Time in Days from Date of Installation)	Groundwater Depth Below Ground Surface (Elevation), m
BH/MW26-01	77.66	April 2, 2026 (11 days)	3.0 (74.66)

Based on a review of the groundwater level measurements, the groundwater level was at 3.0 m depths (Elevation 74.66 m) on April 2, 2026.

Water levels were determined in the boreholes at the times and under the conditions stated in this report. Note that fluctuations in the level of groundwater may occur due to a seasonal variation such as precipitation, snowmelt, rainfall activities, and other factors not evident at the time of measurement and therefore may be at a higher level during wet weather periods.

5.0 Grade Raise Restrictions

Since compressible clays were not encountered at the site, there is no restriction to raising the grades at the site from a geotechnical perspective.

6.0 Seismic Site Classification and Liquefaction Potential of Subsurface Soils

6.1 Site Classification

Based on a review of the borehole information, it is considered feasible to support the proposed four storey building with one level of basement by strip and spread footings founded on the competent sound limestone bedrock that is free of soil seams, weathered zones and loose material (soil and bedrock pieces).

For footings founded on sound limestone bedrock and based on Table 4.1.8.4.-B of the 2024 Ontario Building Code (OBC), the site classification and designation for seismic design would be Site Class C and Site Designation X_c.

A higher site class and designation may be available if a seismic shear wave survey is conducted on the site and provided the underside of the footings recommended in this report to support the proposed building are founded on the sound limestone bedrock.

6.2 Liquefaction Potential of Subsurface Soils

Since the construction of the basement would require the excavation and removal of all soils down to the bedrock, the determination as to whether or not the soils are liquefiable during a seismic event does not need to be considered in the design of the proposed development.

7.0 Site Grading

The proposed building may be founded directly on the sound limestone bedrock surface.

Site grading at the proposed location of the building should consist of the removal of all overburden material (topsoil, fill, and glacial till) and any weathered bedrock zones down to the sound limestone bedrock. The exposed bedrock should be inspected by a geotechnician. Once the subgrade has been approved, the drainage layer for the slab-on-grade may be constructed in accordance with section 9 of this report.

Site grading underlying pavement areas should consist of the removal of the existing surficial topsoil layer and organic stained soils down to the suitable subgrade fill material. The fill should be inspected and proof-rolled in the presence of a geotechnician. Any soft or otherwise unsuitable material should be removed. Following the approval of the subgrade, the grades within the pavement areas may be raised to the design subgrade level of the pavement structure (to the underside of the sub-base material of the pavement structure) using OPSS Granular B Type II or SSM material, with each lift compacted to 95 percent SPMDD. In place density tests should be performed on each lift of placed material to ensure that it has been compacted to the project specifications.

8.0 Foundation Considerations

The geotechnical investigation revealed that the subsurface conditions at the site are well suited to support the proposed building by strip and spread footings set on the competent sound limestone bedrock contacted in the test holes at 0.3 m to 1.4 m depths (Elevation 77.2 m to Elevation 76.3 m).

Strip and spread footings founded on the competent sound limestone bedrock that is free of loose pieces (soil and bedrock) and soft seams and is located below any weathered and fractured/detached zones of the bedrock, may be designed for a factored geotechnical resistance at ultimate limit state (ULS) of 2000 kPa. The factored geotechnical resistance value at ULS includes a resistance factor of 0.5. The Serviceability Limit State (SLS) bearing pressure of the bedrock, required to produce 25 mm settlement of the structure will be much larger than the recommended value for factored geotechnical resistance at ULS. Therefore, the factored geotechnical resistance at ULS will govern the design.

Settlements of footings designed for the above recommended factored geotechnical resistance at ULS and properly constructed are expected to be less than 10 mm.

The depth to competent sound bedrock away from the borehole locations may vary from that indicated on the borehole logs. For example, the fill thickness and depth to bedrock may be deeper or shallower than shown on the borehole logs close to and/or within the footprint of the existing building and underground service trenches. Sub-excavation below the design elevation of the underside of new footings to reach the competent sound bedrock may be backfilled from the competent sound bedrock to the design elevation of the underside of the footing with structural concrete having a compressive strength of at least 15 MPa. In this case, an allowance should be made in the contract for the use of structural concrete. Alternatively, the footings may be stepped down to the competent sound bedrock.

All the footing beds should be examined by a geotechnical engineer to ensure that the founding surfaces are capable of supporting the recommended factored ULS value and that the footing beds have been properly prepared.

A minimum of 1.2 m of earth cover for heated structures should be provided to the footings founded on sound bedrock to protect them from damage due to frost penetration. The frost cover should be increased to 1.5 m for unheated structures if snow will not be removed from their vicinity. If snow will be removed from the vicinity of the unheated structures, the frost cover should be increased to 1.8 m. Equivalent rigid insulation may be used instead of the required soil cover or a combination of rigid insulation and soil cover may be used to achieve the required frost protection.

9.0 Floor Slab and Drainage Requirements

The basement floor slab of the proposed building may be designed as a slab-on-grade provided it is set on a bed of well compacted 19 mm clear stone at least 200 mm thick placed directly on the competent sound bedrock. The clear stone would prevent the capillary rise of moisture to the floor slab. Alternatively, the clear stone layer may be replaced with Ontario Provincial Standard Specification (OPSS) Granular A compacted to 98 percent standard Proctor maximum dry density (SPMDD) and overlain by a vapour barrier. Adequate saw cuts should be provided in the floor slab to control cracking.

The lowest floor level for the proposed building is anticipated to be within 1 m of the groundwater table. Therefore, perimeter and underfloor drainage systems are required to be installed for the proposed basement slab.

The underfloor drainage system may consist of 100 mm diameter perforated pipe or equivalent placed in parallel rows at 5 m to 6 m centres and at least 300 mm below the underside of the floor slab. The drains should be set on 100 mm thick bed of 19 mm sized clear stone and covered on top and sides with 150 mm thick clear stone that is fully wrapped with an approved porous geotextile membrane, such as Terrafix 270R or equivalent. The perimeter drains may also consist of 100 mm diameter perforated pipe set on the footings and surrounded with 150 mm thick clear stone fully wrapped with a geotextile membrane. The perimeter and underfloor drains should be connected to separate sumps equipped with backup pumps and generators in case of mechanical failure and/or power outage, so that at least one system would be operational should the other fail.

The finished ground floor should be set at least 150 mm higher than the finished exterior grade.

The finished exterior grade should be sloped away from the building to prevent ponding of surface water close to the exterior walls of the building.

10.0 Lateral Earth Pressure Against Subsurface Walls

The subsurface basement walls should be backfilled with free-draining granular material, such as OPSS Granular B Type II material and equipped with a perimeter drainage system.

If the space between the subsurface basement walls and the rock face is to be backfilled, the subsurface walls will be subjected to lateral static earth pressure as well as lateral dynamic earth pressure during a seismic event. The lateral static earth pressure that the subsurface walls would be subjected to may be computed from equations (i) and (ii) below and the lateral dynamic earth force from equation (iii) given below.

The equations given below assume that the backfill against the subsurface walls will be free-draining granular material and that a perimeter drainage system will be provided to prevent build-up of hydrostatic pressure. Equation (i) will be applicable to the portion of the subsurface wall in the overburden (soil). Equation (ii) will be applicable to the portion of the subsurface wall in the bedrock where the earth pressure will be considerably reduced due to the narrow backfill between the subsurface wall and the rock face resulting in an arching effect (Spangler & Handy, 1984). The weight of the overburden (soil) and any surcharge applied at the ground surface should be considered as surcharge when computing lateral pressure using equation (ii).

Lateral static earth pressure, p:

$p = k(\gamma h + q)$ ---------- (i)

where:

k = lateral earth pressure coefficient for 'at rest' condition = 0.50

γ = unit weight of backfill = 22 kN/m^3

h = depth of interest below ground surface (m)

q = any surcharge acting at ground surface (kPa)

Lateral static earth pressure due to narrow earth backfill between subsurface wall and rock face at depth z; σ_n:

$$\sigma_n = \frac{\gamma B}{2\tan\delta}\left(1 - e^{-2k\frac{z}{B}\tan\delta}\right) + kq \text{ ---------- (ii)}$$

where:

γ = unit weight of backfill = 22 kN/m^3

B = backfill width (m)

z = depth from top of wall (m)

δ = friction angle between the backfill and wall and rock (assumed to be equal) = 17 degrees

k = lateral earth pressure coefficient for 'at rest' condition = 0.50

q = surcharge pressure including pressures from overburden (soil), traffic at ground surface and foundations from existing adjacent buildings (kPa)

The lateral dynamic earth force (dynamic thrust) due to seismic loading may be computed from the equation given below:

$$\Delta_{Pe} = \gamma h^2 \frac{a_h}{g} F_b \quad \text{---------- (iii)}$$

where:

Δ_{Pe}	=	dynamic thrust in kN/m of wall
h	=	height of basement wall against soil above the bedrock surface (m)
γ	=	unit weight of soil = 22 kN/m^3
$\frac{a_h}{g}$	=	seismic coefficient = 0.351 (2025 NBCC)
F_b	=	thrust factor = 1.0

The dynamic thrust acts approximately at 0.63h.

For basement walls cast directly against the bedrock, a vertical drainage membrane or board such as Terrain 200 or equivalent should be installed on the face of the bedrock and connected to the perimeter drainage system. The top of the drainage board should be covered with a filter fabric to prevent the loss of overlying soil into the drainage board.

All subsurface walls should be damp-proofed.

11.0 Excavations and Dewatering Requirements

11.1 Excess Soil Management

Ontario Regulation 406/19 specifies protocols that are required for the management and disposal of excess soils. As set forth in the regulation, specific analytical testing protocols need to be implemented and followed based on the volume of soil to be managed and the requirements of the receiving site. The testing protocols are specific as to whether the soils are stockpiled or in situ. In either scenario, the testing protocols are far more onerous than have been historically carried out as part of standard industry practices. These decisions should be factored in and accounted for prior to the initiation of the project-defined scope of work. EXP would be pleased to assist with the implementation of a soil management and testing program that would satisfy the requirements of Ontario Regulation 406/19.

For the environmental aspects of the subsurface soils, reference is made to the EXP SCR report.

11.2 Excavations

Excavations for the construction of the proposed building are anticipated to extend through the topsoil, fill, glacial till and into the limestone bedrock and may or may not be below the groundwater level.

Following the demolition of the existing building on site, excavations should include the excavation and removal of existing items such as foundations, foundation walls and floor slab and disposal off site.

The excavation of the overburden may be undertaken using conventional equipment capable of removing cobbles and debris within the fill.

All excavation work should be completed in accordance with the Occupational Health and Safety Act (OHSA). Excavations within the soil may be undertaken as open cut provided the sidewalls of the excavation are cut back at 1H:1V from the bottom of the excavation.

If space restrictions prevent open cut excavations, the excavations may be undertaken within the confines of a prefabricated support system (trench box) for the installation of underground services and an engineered support system (shoring system) for the proposed building excavations.

Excavation of the limestone bedrock may be undertaken using a hoe ram for removal of small quantities of the bedrock; however, this process is expected to be very slow. Alternatively, the bedrock may be excavated by line drilling and blasting technique. Contractors bidding on this project should decide on their own the most preferred rock removal method; hoe ramming or line drilling and blasting. However, due to proximity of the proposed construction to existing structures and municipal infrastructure, it is likely that blasting may not be permitted at this site.

The sound bedrock may be excavated at near vertical slope, subject to examination by a geotechnical engineer. Depending on the excavation depth within the bedrock, rock slope stabilization measures such as rock bolting in combination with a wire mesh system and/or shotcrete may be required.

To prevent damage to adjacent surrounding structures and infrastructure, the hoe ramming and blasting operations (if permitted) should be carefully planned and closely monitored. For blasting, it is recommended that the blasting contractor should retain the services of a blasting specialist to provide a blasting plan. The contractor should have a licensed blaster on site at all times during the blasting operations and a vibration engineer on retainer.

Vibration monitoring during the blasting operations should be carried out in the adjacent surrounding structures and infrastructure to ensure that the blasting meets the limiting vibration criteria at all times. Blasting operations should be

carried out in accordance with City of Ottawa Special Provisions (S.P.) No. F-1201, which also provides limiting vibration criteria. A pre-construction and pre-blast condition survey of all adjacent surrounding structures and infrastructure should be conducted prior to start of construction and blasting operations. If adjacent structures are deemed to be heritage buildings, special limiting vibration criteria is required.

11.3 Dewatering Requirements

Seepage of surface water and subsurface water into the excavations are anticipated. It should be possible to collect water entering the excavations at low points and to remove it by conventional sump pumping techniques. In areas of high infiltration or in areas where more permeable soils may exist, a higher seepage rate should be anticipated. Therefore, high-capacity pumps to keep the excavation dry may be required.

For construction dewatering, an Environmental Activity and Sector Registry (EASR) approval may be obtained for water takings greater than 50 m^3 and less than 400 m^3 per day. If more than 400 m^3 per day of groundwater are generated for dewatering purposes, then a Category 3 Permit to Take Water (PTTW) must be obtained from the Ministry of the Environment, Conservation and Parks (MECP). A Category 3 PTTW would require a complete hydrogeological assessment and would take at least 90 days for the MECP to process once the application is submitted.

Many geologic materials deteriorate rapidly upon exposure to meteorological elements. Unless otherwise specifically indicated in this report, walls and floors of excavations must be protected from moisture, desiccation, and frost action throughout the course of construction.

Although this investigation has estimated the groundwater levels at the time of the field work, and commented on de-watering and general construction problems, conditions may be present that are difficult to establish from standard boring techniques. These conditions may affect the type and nature of de-watering procedures used by the contractor. These conditions include local and seasonal fluctuations in the groundwater table, erratic changes in the soil profile, thin layers of soil with large or small permeabilities compared with the soil mass, fissures or seams in rock, etc. Only carefully controlled tests using pumped wells and observation wells will yield the quantitative data on groundwater volumes and pressures that are necessary to adequately engineer construction de-watering systems.

12.0 Backfilling Requirements and Suitability of On-Site Soils for Backfilling Purposes

The material to be excavated from the site is anticipated to consist of topsoil, fill, glacial till, and limestone bedrock. These soils can only be used in landscaped areas

Therefore, it is anticipated that all material required for backfilling purposes in the interior and exterior of the proposed building and in the service trenches will need to be imported and should preferably conform to the OPSS 1010 requirement for Granular A or Granular B Type II which should be placed in 300 mm lift and each lift compacted to 98 percent of the SMPDD in the interior of the building and to 95 % in the exterior of the building and in service trenches.

13.0 Pipe Bedding Requirements

It is anticipated that underground municipal services will be founded to a maximum depth of 3.0 m below existing grade and the subgrade will consist of limestone bedrock.

It is recommended that the bedding for the underground services including material specifications, thickness of cover material and compaction requirements conform to municipal requirements and/or Ontario Provincial Standard Specification and Drawings (OPSS and OPSD).

The pipe bedding should consist of 150 mm thick of OPSS Granular A bedding material. The bedding material should be compacted to at least 98 percent SPMDD.

14.0 Subsurface Concrete Requirements and Corrosion Potential of Subsurface Materials

Chemical tests limited to pH, sulphate, chloride and resistivity were undertaken on a selected section of the bedrock cores and the results are shown in Table VI. The laboratory test certificate is provided in Appendix B.

Table VI: Results of pH, Sulphate, Chloride, and Resistivity Tests on Rock Samples

Borehole No. - Sample No.	Material	Depth (m)	pH	Sulphate (%)	Chloride (%)	Resistivity (ohm.cm)
BH26-01 – Run1	Limestone	1.5 – 1.6	8.97	0.0007	0.0028	6130

The results indicate that the limestone bedrock has a sulphate and chloride content of less than 0.001 percent and 0.003 percent respectively. These concentrations of sulphate and chloride would have a negligible potential of sulphate and chloride attack on subsurface concrete. The concrete should be in accordance with Table Nos. 3 and 6 of CSA A.23.1-14. However, the concrete should be dense, well compacted and cured.

The results of the resistivity test indicates that the limestone bedrock is mildly corrosive to bare steel. Care should be taken to protect buried steel elements from corrosion.

15.0 Tree Planting Restrictions

Since sensitive marine clay soils were not encountered on the site, the 2017 City of Ottawa Guidelines for tree planting do not apply for this site.

16.0 General Comments

The comments and recommendations given in this report are based on the assumption that the above-described design concepts will proceed into construction. If changes are made either in the design phase or during construction, this office must be retained to review these modifications. The result of this review may be a modification of our recommendations or it may require additional field or laboratory work to check whether the changes are acceptable from a geotechnical viewpoint.

The information contained in this report is not intended to reflect on environmental aspects of the soils. Reference is made to the EXP Phase One ESA and Soil Characterization Report completed for this site by EXP and presented in separate reports.

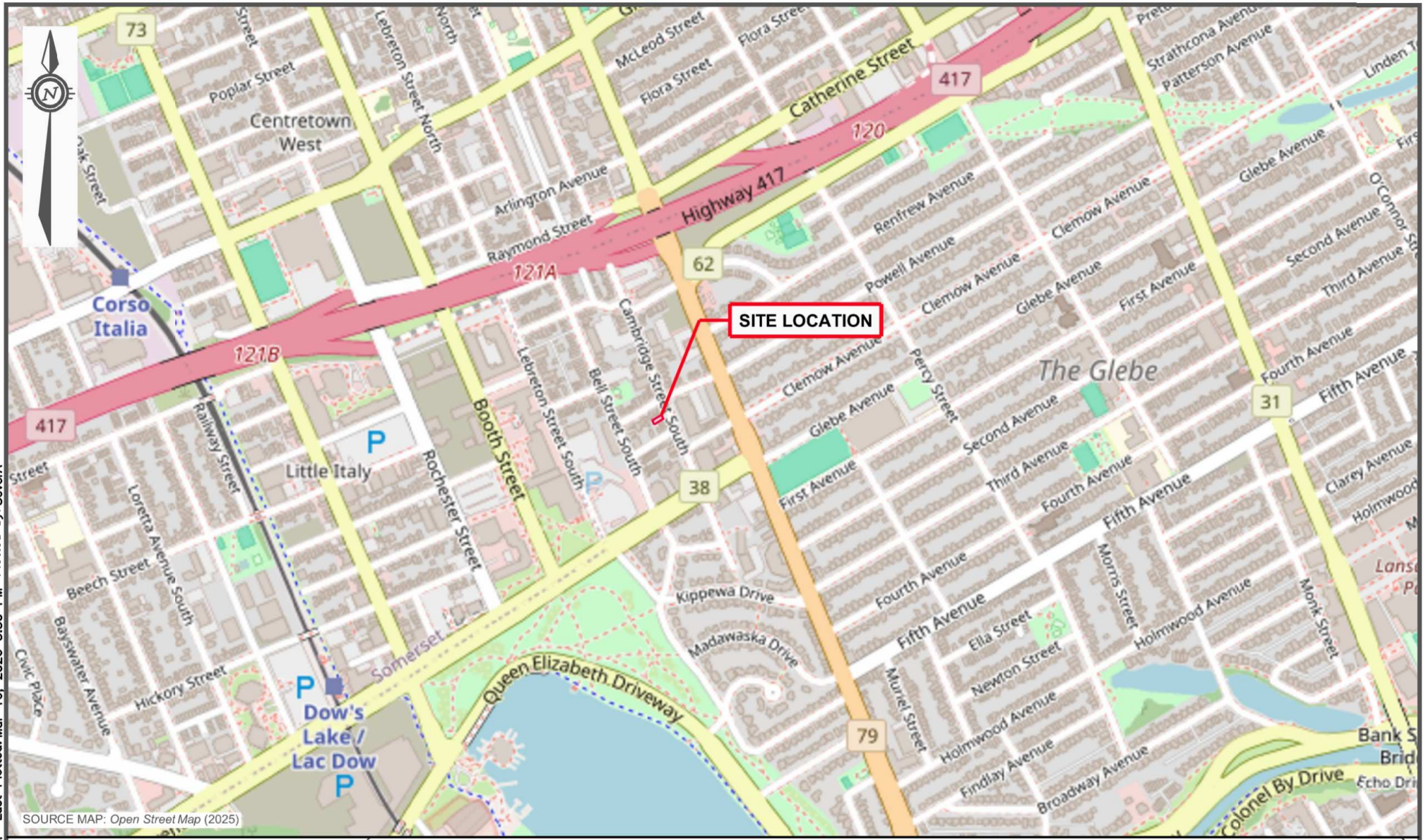
We trust that the information contained in this geotechnical report will be satisfactory for your purposes. Should you have any questions, please do not hesitate to contact this office.

Sincerely,

Matthew Zammit, M.A.Sc., P.Eng..
Geotechnical Engineer
Earth and Environment

Ismail Taki, M.Eng., P.Eng.
Senior Manager
Earth and Environment

Figures



LEGEND

APPROXIMATE PROPERTY BOUNDARY

ORIGINAL SHEET SIZE = 11" X 8.5"

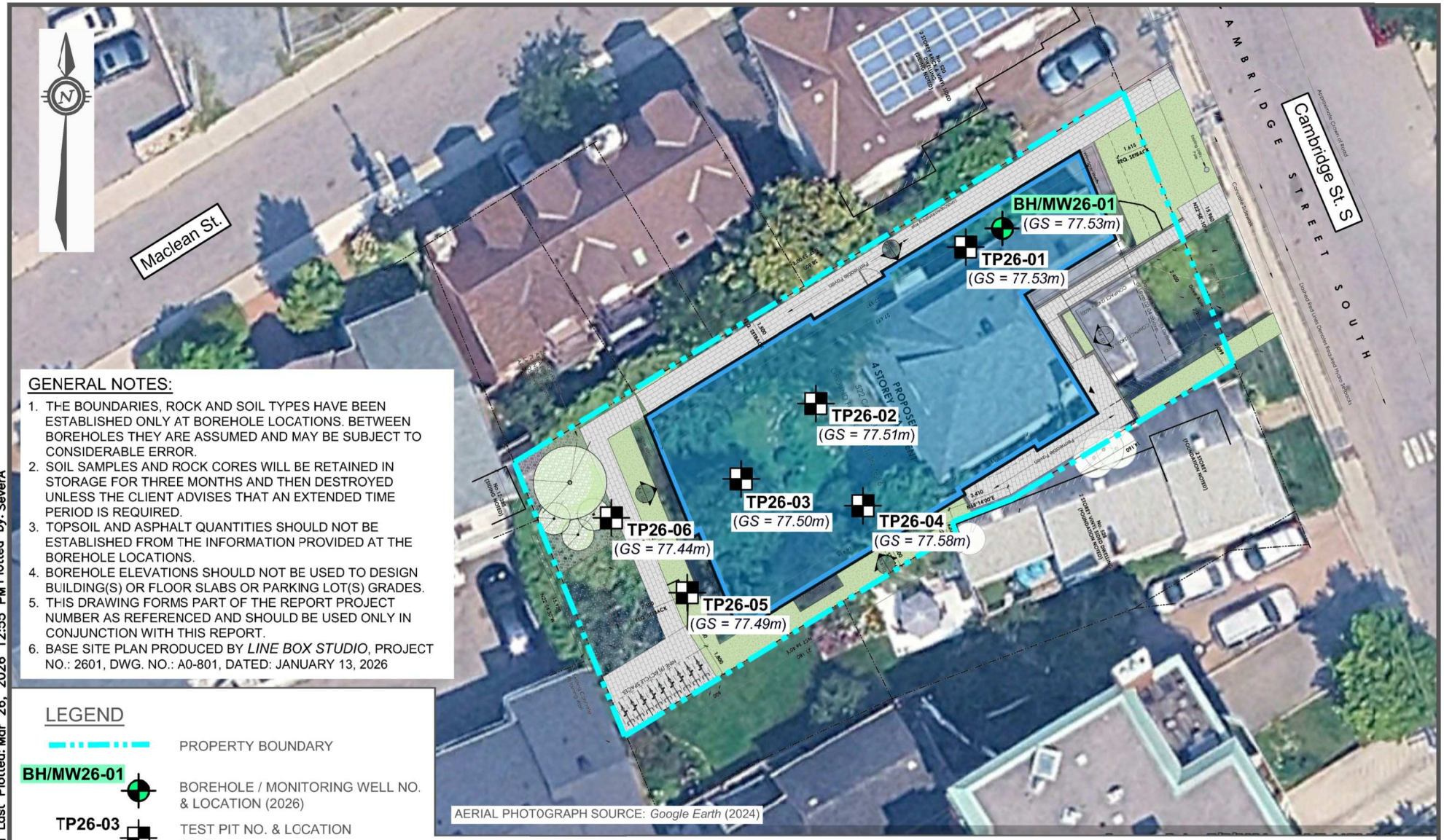
0 100m 200m 400m

HORIZONTAL 1:10,000

EXP Services Inc. www.exp.com
t: +1.613.688.1899 | f: +1.613.225.7337
2650 Queensview Drive, Suite 100
Ottawa, ON K2B 8H6, Canada

DATE: MARCH 2026	PROJECT: SOIL CHARACTERIZATION REPORT + GEOTECHNICAL INVESTIGATION 522 CAMBRIDGE STREET SOUTH, OTTAWA, ONTARIO		project no. OTT-25011403-B0
DESIGN: LW / DC	CHECKED: CK / IT		scale: 1:10,000
DRAWN BY: MS / AS	TITLE: SITE LOCATION PLAN		FIG 1

Filename: E:\OTT\OTT-25011403-B0\60 Execution\65 Drawings\CAD\OTT-25011403-B0_522 Cambridge-St-S_SCR.dwg
Last Saved: Mar 16, 2026 3:48 PM Last Plotted: Mar 16, 2026 3:50 PM Plotted by: SeverA



AERIAL PHOTOGRAPH SOURCE: *Google Earth* (2024)

GENERAL NOTES:

1. THE BOUNDARIES, ROCK AND SOIL TYPES HAVE BEEN ESTABLISHED ONLY AT BOREHOLE LOCATIONS. BETWEEN BOREHOLES THEY ARE ASSUMED AND MAY BE SUBJECT TO CONSIDERABLE ERROR.
2. SOIL SAMPLES AND ROCK CORES WILL BE RETAINED IN STORAGE FOR THREE MONTHS AND THEN DESTROYED UNLESS THE CLIENT ADVISES THAT AN EXTENDED TIME PERIOD IS REQUIRED.
3. TOPSOIL AND ASPHALT QUANTITIES SHOULD NOT BE ESTABLISHED FROM THE INFORMATION PROVIDED AT THE BOREHOLE LOCATIONS.
4. BOREHOLE ELEVATIONS SHOULD NOT BE USED TO DESIGN BUILDING(S) OR FLOOR SLABS OR PARKING LOT(S) GRADES.
5. THIS DRAWING FORMS PART OF THE REPORT PROJECT NUMBER AS REFERENCED AND SHOULD BE USED ONLY IN CONJUNCTION WITH THIS REPORT.
6. BASE SITE PLAN PRODUCED BY *LINE BOX STUDIO*, PROJECT NO.: 2601, DWG. NO.: A0-801, DATED: JANUARY 13, 2026

LEGEND

- PROPERTY BOUNDARY
- **BH/MW26-01** — BOREHOLE / MONITORING WELL NO. & LOCATION (2026)
- **TP26-03** — TEST PIT NO. & LOCATION (2026)
- *(GS = 77.53m)* — GROUND SURFACE ELEVATION (m)
- NEW BUILDING APPROX. FOOTPRINT

ORIGINAL SHEET SIZE = 11" X 8.5"

0 3m 6m 12m

HORIZONTAL 1:300

EXP Services Inc. **www.exp.com**
t: +1.613.688.1899 | f: +1.613.225.7337
2650 Queensview Drive, Suite 100
Ottawa, ON K2B 8H6, Canada

DATE: MARCH 2026	PROJECT: SOIL CHARACTERIZATION REPORT + GEOTECHNICAL INVESTIGATION 522 CAMBRIDGE STREET SOUTH, OTTAWA, ONTARIO		project no. OTT-25011403-B0
DESIGN: LW / DC	CHECKED: CK / IT		scale: 1:300
DRAWN BY: MS / AS	TITLE: TEST HOLE LOCATION PLAN		FIG 2

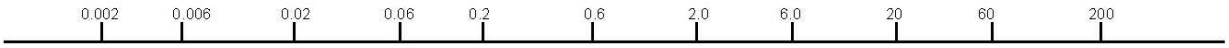
Filename: E:\OTT\OTT-25011403-B0\60 Execution\65 Drawings\CAD\OTT-25011403-B0_522-Cambridge-St-S_SCR.dwg
Last Saved: Mar 26, 2026 12:53 PM Last Plotted: Mar 26, 2026 12:55 PM Plotted by: SeverA

Notes On Sample Descriptions

1. All sample descriptions included in this report follow the Canadian Foundations Engineering Manual soil classification system. This system follows the standard proposed by the International Societv for Soil Mechanics and Foundation Engineering. Laboratory grain size analyses provided by **exp** Services Inc. also follow the same system. Different classification systems may be used by others; one such system is the Unified Soil Classification. Please note that, with the exception of those samples where a grain size analysis has been made, all samples are classified visually. Visual classification is not sufficiently accurate to provide exact grain sizing or precise differentiation between size classification systems.

ISSMFE SOIL CLASSIFICATION

CLAY	SILT			SAND			GRAVEL			COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE		



EQUIVALENT GRAIN DIAMETER IN MILLIMETRES

CLAY (PLASTIC) TO	FINE	MEDIUM	CRS.	FINE	COARSE
SILT (NONPLASTIC)	SAND			GRAVEL	

UNIFIED SOIL CLASSIFICATION

2. Fill: Where fill is designated on the borehole log it is defined as indicated by the sample recovered during the boring process. The reader is cautioned that fills are heterogeneous in nature and variable in density or degree of compaction. The borehole description may therefore not be applicable as a general description of site fill materials. All fills should be expected to contain obstruction such as wood, large concrete pieces or subsurface basements, floors, tanks, etc., none of these may have been encountered in the boreholes. Since boreholes cannot accurately define the contents of the fill, test pits are recommended to provide supplementary information. Despite the use of test pits, the heterogeneous nature of fill will leave some ambiguity as to the exact composition of the fill. Most fills contain pockets, seams, or layers of organically contaminated soil. This organic material can result in the generation of methane gas and/or significant ongoing and future settlements. Fill at this site may have been monitored for the presence of methane gas and, if so, the results are given on the borehole logs. The monitoring process does not indicate the volume of gas that can be potentially generated nor does it pinpoint the source of the gas. These readings are to advise of the presence of gas only, and a detailed study is recommended for sites where any explosive gas/methane is detected. Some fill material may be contaminated by toxic/hazardous waste that renders it unacceptable for deposition in any but designated land fill sites; unless specifically stated the fill on this site has not been tested for contaminants that may be considered toxic or hazardous. This testing and a potential hazard study can be undertaken if requested. In most residential/commercial areas undergoing reconstruction, buried oil tanks are common and are generally not detected in a conventional geotechnical site investigation.

3. Till: The term till on the borehole logs indicates that the material originates from a geological process associated with glaciation. Because of this geological process the till must be considered heterogeneous in composition and as such may contain pockets and/or seams of material such as sand, gravel, silt or clay. Till often contains cobbles (60 to 200 mm) or boulders (over 200 mm). Contractors may therefore encounter cobbles and boulders during excavation, even if they are not indicated by the borings. It should be appreciated that normal sampling equipment cannot differentiate the size or type of any obstruction. Because of the horizontal and vertical variability of till, the sample description may be applicable to a very limited zone; caution is therefore essential when dealing with sensitive excavations or dewatering programs in till materials.

Log of Borehole BH/MW 26-01

Project No: OTT-25011403-B0

Project: Proposed 4-Story Residential Apartment Building

Location: 522 Cambridge Street South, Ottawa, Ontario

Figure No. 3

Page. 1 of 1

Date Drilled: 'March 23, 2026

Drill Type: CME 55 Truck-Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: P.O Checked by: I.T

Split Spoon Sample
Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Shear Strength by Vane Test (S)

Combustible Vapour Reading
Natural Moisture Content
Atterberg Limits
Undrained Triaxial at % Strain at Failure
Shear Strength by Penetrometer Test

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		TOPSOIL ~ 120 mm thick	77.66	0				
		FILL Sandy silt, some gravel, topsoil inclusions, roots, brown, moist, no odours, no stains, (loose)	77.5		6		SS1	
				1	8		SS2	
			76.3					
		LIMESTONE BEDROCK Grey, very good to excellent quality		2			RUN 1	
▼			74.66	3			RUN 2	
				4				
				5			RUN 3	
			71.8					
		Borehole Terminated at 5.9 m Depth						

Standard Penetration Test N Value: 20 40 60 80
Shear Strength: 50 100 150 200 kPa
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % / Atterberg Limits (% Dry Weight): 20 40 60

NOTES:
1. Borehole data requires interpretation by EXP before use by others
2. A 50 mm diameter monitoring well installed as shown.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-25011403-B0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
Upon Completion	Core water	No cave-in
'April 2, 2026	3.0	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %
1	1.4 - 3	99	86
2	3 - 4.4	100	95
3	4.4 - 5.9	100	96

LOG OF BOREHOLE 522 CAMBRIDGE.GPJ TROW OTTAWA.GDT 4/13/26

Log of Test Pit TP26-01

Project No: OTT-25011403-B0

Project: Proposed 4-Story Residential Apartment Building

Location: 522 Cambridge Street South, Ottawa, Ontario

Figure No. 4

Page. 1 of 1

Date Drilled: 'March 20, 2026

Drill Type: Rubber-Tired Backhoe

Datum: Geodetic Elevation

Logged by: P.O. Checked by: M.Z.

Split Spoon Sample ⊠ | Auger Sample ◧ | SPT (N) Value ○ | Dynamic Cone Test —— | Shelby Tube ■ | Shear Strength by Vane Test +S

Combustible Vapour Reading □ | Natural Moisture Content × | Atterberg Limits ⊢○ | Undrained Triaxial at % Strain at Failure ⊕ | Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		TOPSOIL ~ 100 mm thick	77.53	0				
			77.4					
		GEOTEXTILE	77.4					
		FILL Mixture of silty sand and silty clay, with topsoil inclusions, cobbles, brick and metal pieces, plastic drainage tile, brown, moist, no odours, no stains				×	GS1	
			76.7					
		GLACIAL TILL Silty sand with gravel, trace clay, brown, moist, no odours, no stains		1		×	GS2	
			76.4					
		Bucket Refusal at 1.1 m Depth						

Standard Penetration Test N Value: 20 40 60 80

Shear Strength kPa: 50 100 150 200

Combustible Vapour Reading (ppm): 250 500 750

Natural Moisture Content % / Atterberg Limits (% Dry Weight): 20 40 60

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Test pit backfilled upon completion.
3. Field work was supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-25011403-B0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	no water	no cave-in

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT 522 CAMBRIDGE-TESTPIT GINT LOGS.GPJ TROW OTTAWA.GDT 4/20/26

Log of Test Pit TP26-02

Project No: OTT-25011403-B0

Project: Proposed 4-Story Residential Apartment Building

Location: 522 Cambridge Street South, Ottawa, Ontario

Figure No. 5

Page. 1 of 1

Date Drilled: 'March 20, 2026

Drill Type: Rubber-Tired Backhoe

Datum: Geodetic Elevation

Logged by: P.O. Checked by: M.Z.

Split Spoon Sample ⊠
Auger Sample ◧
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value (20 40 60 80) / Shear Strength kPa (50 100 150 200)	Combustible Vapour Reading (ppm) (250 500 750) / Natural Moisture Content % Atterberg Limits (% Dry Weight) (20 40 60)	SAMPLES	Natural Unit Wt. kN/m³
		TOPSOIL ~ 200 mm thick	77.51	0			GS1	
		FILL Silty clay with gravel and cobbles, topsoil inclusions, roots, brown, moist, no odours, no stains	77.3				GS2	
		Bucket Refusal at 0.7 m Depth	76.8					

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Test pit backfilled upon completion.
3. Field work was supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-25011403-B0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	no water	no cave-in

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT 522 CAMBRIDGE-TESTPIT GINT LOGS.GPJ TROW OTTAWA.GDT 4/20/26

Log of Test Pit TP26-03

Project No: OTT-25011403-B0

Project: Proposed 4-Story Residential Apartment Building

Location: 522 Cambridge Street South, Ottawa, Ontario

Figure No. 6

Page. 1 of 1

Date Drilled: 'March 20, 2026

Drill Type: Rubber-Tired Backhoe

Datum: Geodetic Elevation

Logged by: P.O. Checked by: M.Z.

Split Spoon Sample ⊠
Auger Sample ◧
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits |—○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth 0	Standard Penetration Test N Value 20 40 60 80 / Shear Strength 50 100 150 200 kPa	Combustible Vapour Reading (ppm) 250 500 750 / Natural Moisture Content % Atterberg Limits (% Dry Weight) 20 40 60	SAMPLES	Natural Unit Wt. kN/m³
		TOPSOIL ~ 150 mm thick	77.5				GS1	
			77.4					
		FILL Silty sand trace gravel, topsoil inclusions, roots, glass pieces, brown, moist, no odours, no stains					GS2	
			77.0					
		GLACIAL TILL Sandy silt with gravel, brown, moist, no odours, no stains	76.9				GS3	
		Bucket Refusal at 0.6 m Depth						

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Test pit backfilled upon completion.
3. Field work was supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-25011403-B0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	no water	no cave-in

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT 522 CAMBRIDGE-TESTPIT GINT LOGS.GPJ TROW OTTAWA.GDT 4/20/26

Log of Test Pit TP26-04

Project No: OTT-25011403-B0

Project: Proposed 4-Story Residential Apartment Building

Location: 522 Cambridge Street South, Ottawa, Ontario

Figure No. 7

Page. 1 of 1

Date Drilled: 'March 20, 2026

Drill Type: Rubber-Tired Backhoe

Datum: Geodetic Elevation

Logged by: P.O. Checked by: M.Z.

Split Spoon Sample ⊠
Auger Sample ◧
SPT (N) Value ○
Dynamic Cone Test —
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		PAVING STONES ~ 50 mm thick	77.58	0	20 40 60 80 / 50 100 150 200 kPa	250 500 750 / 20 40 60		
		FILL Sandy silt some gravel, trace clay, topsoil inclusions, roots, brown, moist, no odours, no stains	77.5				GS1	
							GS2	
		Bucket Refusal at 0.6 m Depth	77.0					

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Test pit backfilled upon completion.
3. Field work was supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-25011403-B0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	no water	no cave-in

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT 522 CAMBRIDGE-TESTPIT GINT LOGS.GPJ TROW OTTAWA.GDT 4/20/26

Log of Test Pit TP26-05

Project No: OTT-25011403-B0

Project: Proposed 4-Story Residential Apartment Building

Location: 522 Cambridge Street South, Ottawa, Ontario

Figure No. 8

Page. 1 of 1

Date Drilled: 'March 20, 2026

Drill Type: Rubber-Tired Backhoe

Datum: Geodetic Elevation

Logged by: P.O. Checked by: M.Z.

Split Spoon Sample ⊠
Auger Sample ◧
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		TOPSOIL ~300 mm thick	77.49	0	20 40 60 80 / 50 100 150 200	250 500 750 / 20 40 60	GS1	
			77.2					
		Bucket Refusal at 0.3 m Depth						

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Test pit backfilled upon completion.
3. Field work was supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-25011403-B0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	no water	no cave-in

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT 522 CAMBRIDGE-TESTPIT GINT LOGS.GPJ TROW OTTAWA.GDT 4/20/26

Log of Test Pit TP26-06

Project No: OTT-25011403-B0

Project: Proposed 4-Story Residential Apartment Building

Location: 522 Cambridge Street South, Ottawa, Ontario

Figure No. 9

Page. 1 of 1

Date Drilled: 'March 20, 2026

Drill Type: Rubber-Tired Backhoe

Datum: Geodetic Elevation

Logged by: P.O. Checked by: M.Z.

Split Spoon Sample ⊠
Auger Sample ◧
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits |—⊖
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		TOPSOIL ~300 mm thick	77.44	0				
			77.1			×	GS1	
		FILL Sandy silt, with gravel, weathered rock fragments, brown, moist, no odours, no stains	77.0			×	GS2	
		Bucket Refusal at 0.4 m Depth						

NOTES:
1. Borehole/Test Pit data requires Interpretation by exp. before use by others
2. Test pit backfilled upon completion.
3. Field work was supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-25011403-B0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Upon Completion	no water	no cave-in

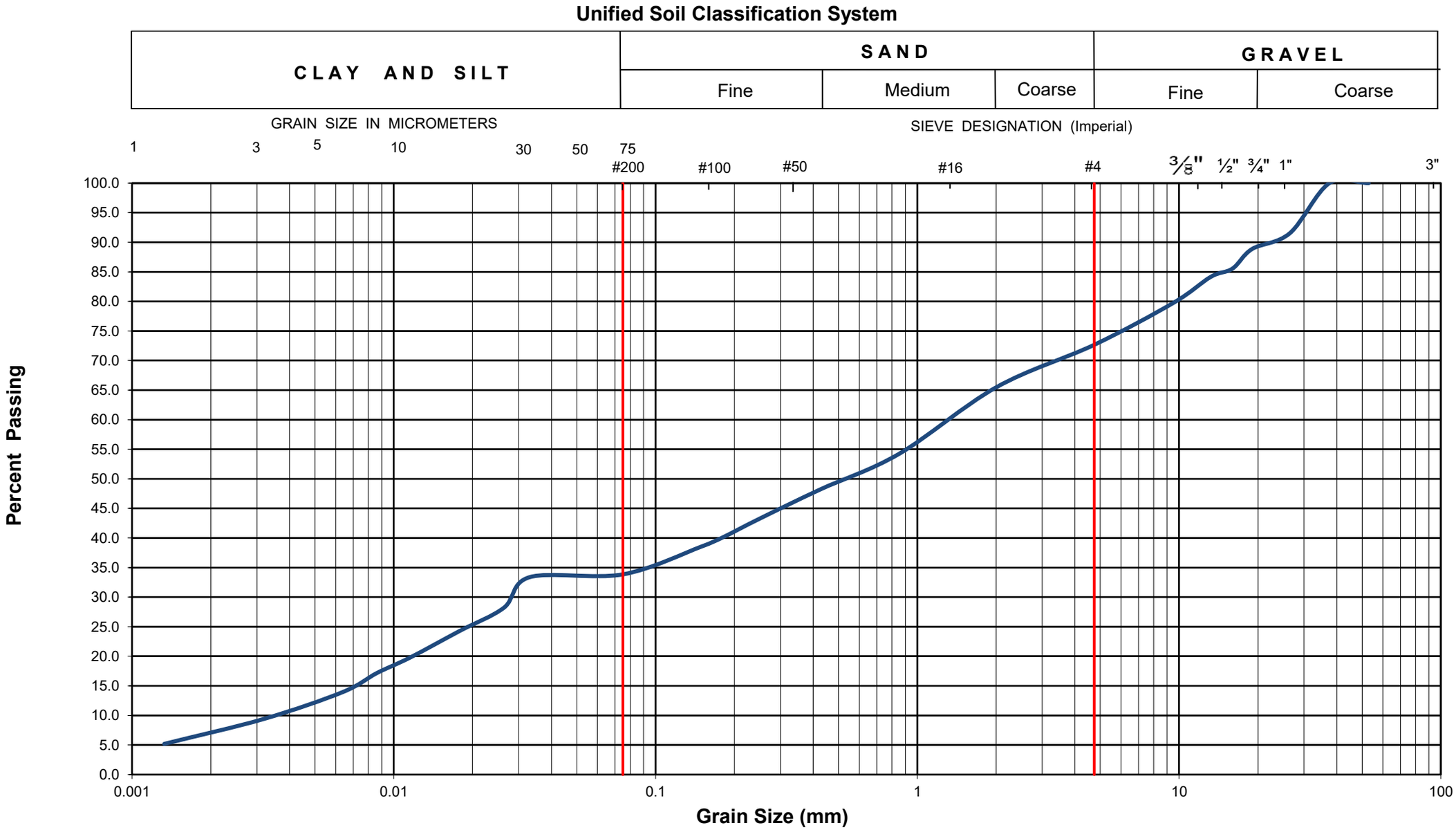
CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF TEST PIT 522 CAMBRIDGE-TESTPIT GINT LOGS.GPJ TROW OTTAWA.GDT 4/20/26

EXP Services Inc.
100-2650 Queensview Drive
Ottawa, ON K2B 8H6

Grain-Size Distribution Curve
Method of Test For Particle Size Analysis of Soil
ASTM C-136/ASTM D422



EXP Project No.:	**OTT-25011403-B0**	**Project Name :**	**Proposed 4-Story Residential Apartment Building**						
Client :	**522 Camrbidge Ltd.**	**Project Location :**	**522 Cambridge Street South, Ottawa**						
Date Sampled :	**March 20, 2026**	**Borehole No:**	**TP26-01**		**Sample No.:**	**GS2**		**Depth (m) :**	**0.8 - 1.0**
Sample Description :		**% Silt and Clay**	**34**	**% Sand**	**39**	**% Gravel**	**27**	**Figure :**	**10**
Sample Description :	**GLACIAL TILL: Silty Sand with Gravel, Trace Clay (SM)**								

Appendix A: Bedrock Core Photographs

DRY BEDROCK CORES

EXP Services Inc. www.exp.com
t: +1.613.688.1899 | f: +1.613.225.7337
2650 Queensview Drive, Suite 100
Ottawa, ON K2B 8H6, Canada

Borehole No:	Core Runs	project	Project N0:
BH26-01	Run 1: 1.4 m - 3.0 m Run 2: 3.0 m - 4.4 m Run 3: 4.4 m - 5.9 m	Proposed 4-Story Residential Apartment Building - 522 Cambridge Street, Ottawa, Ontario.	OTT-25011403-B0
Date Cored Mar 23, 2026		Rock Core Photographs	FIG A-1

WET BEDROCK CORES

EXP Services Inc. www.exp.com
t: +1.613.688.1899 | f: +1.613.225.7337
2650 Queensview Drive, Suite 100
Ottawa, ON K2B 8H6, Canada

Borehole No:	Core Runs	project	Project N0:
BH26-01	Run 1: 1.4 m - 3.0 m Run 2: 3.0 m - 4.4 m Run 3: 4.4 m - 5.9 m	Proposed 4-Story Residential Apartment Building - 522 Cambridge Street, Ottawa, Ontario.	OTT-25011403-B0
Date Cored Mar 23, 2026		Rock Core Photographs	FIG A-2

Appendix B: Laboratory Certificate of Analysis

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
http://www.agatlabs.com

CLIENT NAME: **EXP SERVICES INC**
2650 QUEENSVIEW DRIVE, UNIT 100
OTTAWA, ON K2B8H6
(613) 688-1899

ATTENTION TO: **Matthew Zammit**

PROJECT: **OTT-25011403-B0**

AGAT WORK ORDER: **26Z420948**

SOIL ANALYSIS REVIEWED BY: **Nivine Basily, Inorganic Team Lead**

DATE REPORTED: **Apr 21, 2026**

PAGES (INCLUDING COVER): **6**

VERSION+: **1**

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

+Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Services Representative for details.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *Any certificate of analysis issued by AGAT shall not be altered or reproduced except in full, without the written consent of the laboratory. Interpretation and use of the test results are the sole responsibility of the Client. AGAT will not be liable for any manipulation or alteration of the results or information contained within certificates of analyses by the Client or third party.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information is available on request from AGAT Laboratories, in accordance with ISO/IEC 17025:2017, ISO/IEC 17025:2005 (Quebec), DR-12-PALA and/or NELAP Standards.*
- *This document is signed by an authorized signatory who meets the requirements of the MELCCFP, CALA, SCC and NELAP.*
- *For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized*

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 26Z420948

PROJECT: OTT-25011403-B0

CLIENT NAME: EXP SERVICES INC

ATTENTION TO: Matthew Zammit

SAMPLING SITE:522 Cambridge St., Ottawa

SAMPLED BY:EXP

(Soil) Inorganic Chemistry

DATE RECEIVED: 2026-04-14 **DATE REPORTED: 2026-04-21**

				BH26-01 Run
		SAMPLE DESCRIPTION:		4'10"-5'1"
		SAMPLE TYPE:		Rock
		DATE SAMPLED:		2026-03-23
Parameter	Unit	G / S	RDL	7636936
Chloride (2:1)	µg/g		2	28
Sulphate (2:1)	µg/g		2	7
pH (2:1)	pH Units		NA	8.97
Electrical Conductivity (2:1)	mS/cm		0.005	0.163
Resistivity (2:1) (Calculated)	ohm.cm		1	6130

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7636936 EC, pH, Chloride and Sulphate were determined on the extract obtained from the 2:1 leaching procedure (2 parts DI water: 1 part soil). Resistivity is a calculated parameter.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
NIVINE BASILY
CHEMIST

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: EXP SERVICES INC
AGAT WORK ORDER: 26Z420948
PROJECT: OTT-25011403-B0
ATTENTION TO: Matthew Zammit
SAMPLING SITE:522 Cambridge St., Ottawa
SAMPLED BY:EXP

Soil Analysis

Report Date: Apr 21, 2026			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
(Soil) Inorganic Chemistry															
Chloride (2:1)	7594246		43	42	2.4%	< 2	94%	70%	130%	103%	80%	120%	104%	70%	130%
Sulphate (2:1)	7594246		14	14	0.0%	< 2	98%	70%	130%	100%	80%	120%	101%	70%	130%
pH (2:1)	7650133		5.71	5.98	4.6%	NA	95%	80%	120%						
Electrical Conductivity (2:1)	7636936	7636936	0.163	0.151	7.6%	< 0.005	106%	80%	120%						

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
http://www.agatlabs.com

Method Summary

CLIENT NAME: EXP SERVICES INC

AGAT WORK ORDER: 26Z420948

PROJECT: OTT-25011403-B0

ATTENTION TO: Matthew Zammit

SAMPLING SITE:522 Cambridge St., Ottawa

SAMPLED BY:EXP

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Chloride (2:1)	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate (2:1)	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
pH (2:1)	INOR 93-6031	modified from EPA 9045D and MCKEAGUE 3.11	PH METER
Electrical Conductivity (2:1)	INOR-93-6075	modified from MSA PART 3, CH 14 and SM 2510 B	PC TITRATE
Resistivity (2:1) (Calculated)	INOR-93-6036	McKeague 4.12, SM 2510 B,SSA #5 Part 3	CALCULATION

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
http://www.agatlabs.com

Accreditations and Associations

CLIENT NAME: EXP SERVICES INC

AGAT WORK ORDER: 26Z420948

PROJECT: OTT-25011403-B0

ATTENTION TO: Matthew Zammit

SAMPLING SITE:522 Cambridge St., Ottawa

SAMPLED BY:EXP

Accreditations

AGAT Laboratories is accredited, certified, or licensed to applicable standards for specific tests, parameters, and matrices, as listed in the individual laboratory's current scope(s) of accreditation by the following organizations:

Standards Council of Canada (SCC)
Canadian Association for Laboratory Accreditation (CALA)
Canadian Council of Independent Laboratories (CCIL)
American Association for Laboratory Accreditation (A2LA)
ANSI National Accreditation Board (ANAB)
Arizona Department of Health Services (ADHS) – Tempe AZ0851 / AZR000526095, Calgary 2910 AZ0845 / CN00931, Calgary 2420 AZ0843 / CN00932, Mississauga Coopers AZ0847 / CN00929, Mississauga McAdam AZ0848 / CN00930
Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs (MELCCFP)
Ontario Ministry of the Environment, Conservation and Parks (MECP)
New York State Department of Health (NYS DOH)

The tests on this report may not necessarily be included on the scope of accreditation, which are available at the websites for the individual organizations listed above, or linked on our Accreditations page.

Associations

As a leader in science and technology, AGAT Laboratories is proud to hold a number of professional partnerships with key industry organizations and associations. Following is a list of just some of the organizations with which we are currently involved. Association memberships may be limited to specific locations and/or personnel. Please contact AGAT Laboratories for specifics regarding association memberships.

Association des firmes de génie-conseil du Québec (AFG)
Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Association Québécois de Vérification (AQVE)
British Columbia Environmental Industry Association (BCEIA)
Canadian Energy Geoscience Association (CEGA)
Canadian Land Reclamation Association (CLRA)
Conseil des entreprises en technologies environnementales du Québec (CETEQ)
Conseil Patronal de l'Environnement du Québec (CPEQ)
Energy NL
Environmental Services Association of Alberta (ESAA)/ Environmental Services Association Maritimes (ESAM)
Ontario Environmental Industry Association (ONEIA)
Réseau Environnement
The NELAC Institute (TNI)

AGAT Laboratories

5535 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Have feedback? Scan here for a quick survey!

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #: 2674209 48

Cooler Quantity: n/a - no ice packs

Arrival Temperatures: N/A

Depot Temperatures:

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes:

Report Information:

Company: EXP Services Inc

Contact: Matthew Zammit

Address: 2650 Queensview Drive, Suite 100
Ottawa, Ontario, K2B 8H6

Phone: 613-688-1899 Fax:

Reports to be sent to:

1. Email: matthew.zammit@exp.com
2. Email: ryan.digiuseppe@exp.com

Regulatory Requirements:

(Please check all applicable boxes)

☐ Regulation 153/04
Table _____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture

Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Regulation 406
Table _____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture

☐ Regulation 558

☐ CCME

☐ Sewer Use
☐ Sanitary ☐ Storm
_____ *Region*

☐ Prov. Water Quality Objectives (PWQO)

☐ Other
_____ *Indicate One*

Is this submission for a **Record of Site Condition (RSC)**? ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT

**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CSR

Project Information:

Project: OTT-25011403-B0

Site Location: 522 Cambridge St, Ottawa

Sampled By: EXP

AGAT Quote #: PO:

Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐

Company:

Contact:

Address:

Email:

Legal Sample ☐

Sample Matrix Legend

GW	Ground Water	**SD**	Sediment
O	Oil	**SW**	Surface Water
P	Paint	**R**	Rock/Shale
S	Soil		

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC Y / N	O. Reg 153: Metals & Inorganics	O. Reg 153: Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	O. Reg 153: BTEX, F1-F4 PHCs	VOC	PAHs	PCBs: Aroclors ☐	O. Reg 406: Regulation 406 Characterization Package pH, Metals, BTEX, F1-F4	O. Reg 406: EC, SAR	O. Reg 406: Regulation 406 SPLP Rainwater Leach mSPLP: ☐ Metals ☐ VOCs ☐ SVOCs ☐ OC	O. Reg 558: Landfill Disposal Characterization TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	Corrosivity: ☐ Moisture ☐ Sulphide	pH	Sulphates	Chlorides	Resistivity/Conductivity			Potentially Hazardous or High Concentration (Y/N)
1. BH26-01 Run1 4'10"-5'1"	Mar 23	AM PM	1															☑	☑	☑	☑			
2.		AM PM																						
3.		AM PM																						
4.		AM PM																						
5.		AM PM																						
6.		AM PM																						
7.		AM PM																						
8.		AM PM																						
9.		AM PM																						
10.		AM PM																						
11.		AM PM																						

APR 15 26 AM 10 18

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
			C. Griffiths	04/14/26	13h22
CC to Dave	04/14/26	15h00	Dave		

Page _____ of _____

N°:

Legal Notification

This report was prepared by EXP Services Inc. for the account of **522 Cambridge Ltd.**.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. EXP Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this project.

List of Distribution

Report Distributed To:

Luis Josue, In-Harmony Developments: luis.josue@inharmony-dev.com