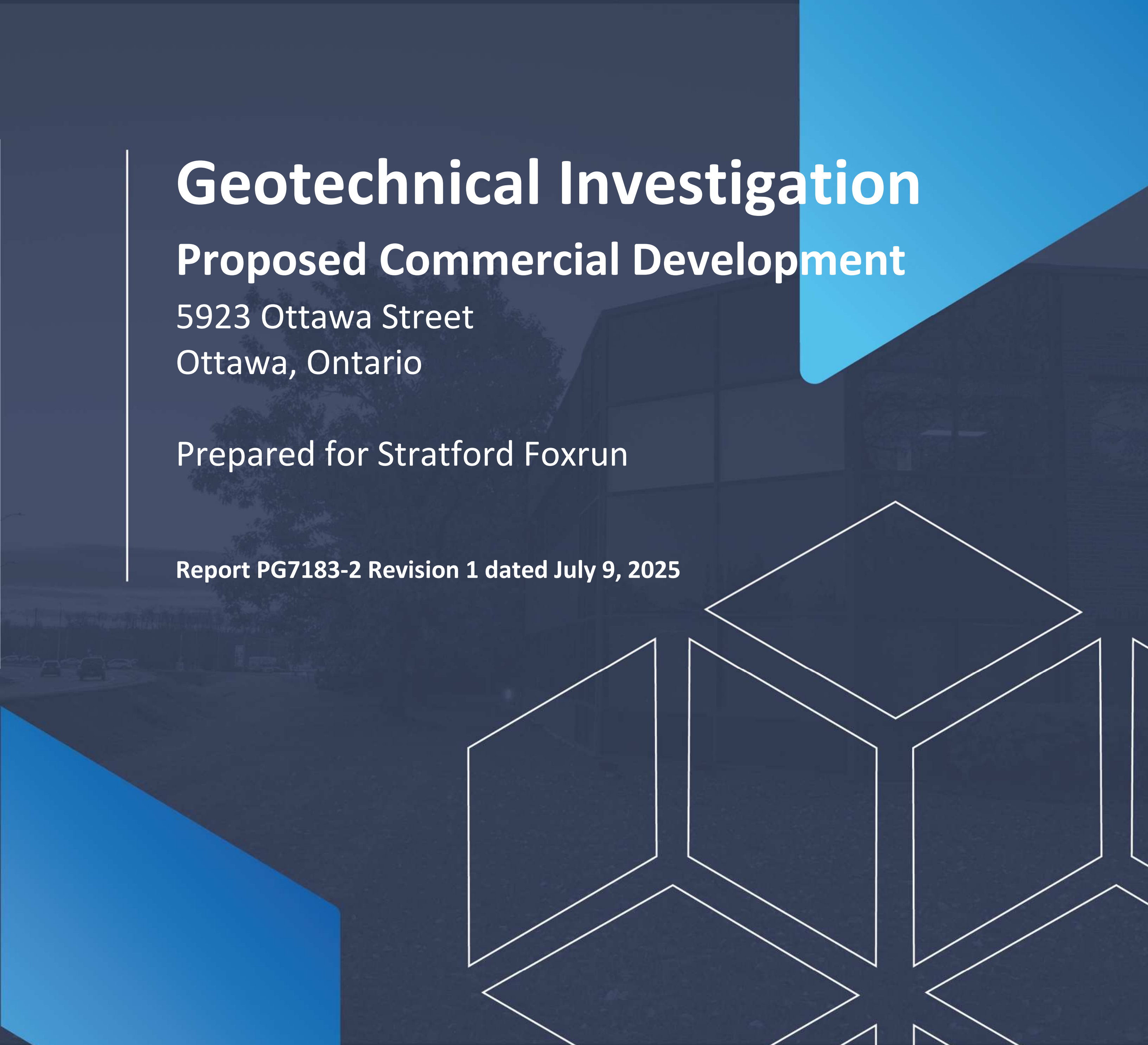
PATERSON GROUP



Geotechnical Investigation

Proposed Commercial Development

5923 Ottawa Street
Ottawa, Ontario

Prepared for Stratford Foxrun

Report PG7183-2 Revision 1 dated July 9, 2025

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Appendices

Appendix 1	Soil Profile and Test Data Sheets Symbols and Terms Atterberg Limits Testing Results Shrinkage Limit Testing Results Grain Size Distribution and Hydrometer Testing Results Analytical Testing Results
Appendix 2	Figure 1 - Key Plan Drawing PG7183-2 - Test Hole Location Plan

1.0 Introduction

Paterson Group (Paterson) was commissioned by Stratford Foxrun to conduct a geotechnical investigation for the proposed development to be located at 5923 Ottawa Street in the City of Ottawa (refer to Figure 1 - Key Plan in Appendix 2 of this report for the general site location).

The objectives of the geotechnical investigation were to:

- ☐ Determine the subsoil and groundwater conditions at this site by means of boreholes, and to

- ☐ Provide geotechnical recommendations for the design of the proposed development including construction considerations which may affect the design.

The following report has been prepared specifically and solely for the aforementioned project which is described herein. It contains our findings and includes geotechnical recommendations pertaining to the design and construction of the subject development as they are understood at the time of writing this report.

2.0 Proposed Development

Based on the available site plan, the proposed development will consist of a single-storey industrial building with a slab-on-grade and an approximate footprint of 925 m². Further, it is understood that the proposed building will generally be surrounded by asphalt-paved parking areas and access lanes.

It is also understood that the proposed development will be serviced with a private septic system.

3.0 Method of Investigation

3.1 Field Investigation

Field Program

The current geotechnical investigation was carried out on April 17, 2025, and consisted of a total of 3 boreholes advanced to a maximum depth of 6.7 m below the existing grade. The borehole locations were distributed in a manner to provide general coverage of the subject site, taking into consideration underground services and available access. A previous geotechnical investigation was completed by Paterson at the subject site in June 2024, during which 1 borehole was advanced to a maximum depth of 6.6 m below the existing ground elevation. The approximate locations of the boreholes are shown on Drawing PG7183-2 - Test Hole Location Plan included in Appendix 2.

The boreholes were advanced using a track-mounted drill rig operated by a two-person crew. All fieldwork was conducted under the full-time supervision of Paterson personnel under the direction of a senior engineer. The drilling procedure consisted of augering to the required depths at the selected borehole locations, and sampling and testing the overburden.

Sampling and In Situ Testing

The borehole samples were recovered from the auger flights and using a 50 mm diameter split-spoon sampler. The samples were initially classified on site, placed in sealed plastic bags, and transported to our laboratory. The depths at which the auger and split-spoon samples were recovered from the boreholes are shown as AU and SS, respectively, on the Soil Profile and Test Data sheets in Appendix 1.

The Standard Penetration Test (SPT) was conducted in conjunction with the recovery of the split-spoon samples. The SPT results are recorded as “N” values on the Soil Profile and Test Data sheets. The “N” value is the number of blows required to drive the split-spoon sampler 300 mm into the soil after a 150 mm initial penetration using a 63.5 kg hammer falling from a height of 760 mm.

Groundwater

Flexible polyethylene standpipes were installed in all boreholes to permit monitoring of groundwater level subsequent to the completion of the sampling program. Groundwater level observations are discussed in Section 4.3 and are presented in the Soil Profile and Test Data Sheets in Appendix 1.

3.2 Field Survey

The borehole locations, and the ground surface elevation at each borehole location, were surveyed by Paterson using a GPS unit with respect to a geodetic datum. The locations of the boreholes, and ground surface elevation at each borehole location, are presented on Drawing PG7183 -2 - Test Hole Location Plan in Appendix 2.

3.3 Laboratory Review

Soil samples were recovered from the subject site and visually examined in our laboratory to review the results of the field logging. A total of 1 Atterberg limits test, 1 shrinkage limit test, and 1 grain size distribution test were completed on selected soil samples obtained from the current geotechnical investigation.

All samples from the current investigation will be stored in the laboratory for 1 month after this report is completed. They will then be discarded unless we are otherwise directed.

3.4 Analytical Testing

One (1) soil sample was submitted for analytical testing to assess the corrosion potential for exposed ferrous metals and the potential of sulphate attacks against subsurface concrete structures. The sample was submitted to determine the concentration of sulphate and chloride, the resistivity, and the pH of the sample. The results are presented in Appendix 1 and are discussed further in Section 6.7.

4.0 Observations

4.1 Surface Conditions

The southern portion of the subject site is currently vacant and covered with grass, and the northern portion is forested with trees and dense vegetation. The site is bordered by railway tracks to north, Ottawa Street to the south, and commercial properties to the east and west.

The existing ground surface across the site is generally level at approximate geodetic elevation 94 m.

4.2 Subsurface Profile

Overburden

Generally, the subsurface profile at the borehole locations consists of an approximate 0.1 to 0.3 m thickness of topsoil underlain by a very stiff, brown silty clay / clayey silt followed by a glacial till deposit.

The glacial till deposit consists of compact to very dense, brown silty sand with varying amounts of gravel, cobbles, boulders and clay, and was encountered in all boreholes at depths ranging from 0.4 to 1.4 m below the existing ground surface.

Practical DCPT refusal was encountered at a depth of about 8.1 m below the existing ground surface at borehole BH 3-25.

Reference should be made to the Soil Profile and Test Data Sheets in Appendix 1 for details of the soil profile encountered at each borehole location.

Bedrock

Based on available geological mapping, the bedrock at the subject site consists of dolomite of the Oxford formation with a drift thickness ranging from 10 to 15 m.

Grain Size Distribution and Hydrometer Testing

Grain size distribution (sieve and hydrometer analysis) was completed on 1 selected soil sample . The results of the grain size analysis are summarized in Table 1 on next page and are presented in Appendix 1.

Table 1 – Summary of Grain Size Distribution Analysis

Borehole	Sample	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BH 3-25	SS2	0	8.4	73.6	18
BH 2-24*	SS3	19.2	40.5	40.3	

Notes:
* - Denotes grain size results from previous investigation

Atterberg Limit Tests

1 silty clay sample was submitted for Atterberg Limits testing. The test results indicate that the silty clay is generally classified as an Inorganic Clay of Low Plasticity (CL). The results, including moisture contents, are summarized in Table 2 below and are provided on the Atterberg Limits Results sheet in Appendix 1.

Table 2 – Summary of Atterberg Limits Results

Borehole	Sample	Depth (m)	LL (%)	PL (%)	PI (%)	MC (%)	Classification
BH 1-25	SS2	0.76 – 1.37	36	24	12	24.2	CL

Notes: LL: Liquid Limit; PL: Plastic Limit; PI: Plasticity Index; CL: Inorganic Clay of Low Plasticity MC: Moisture Content

Shrinkage Test

Linear shrinkage test was completed on 1 selected soil sample . The results of the Linear shrinkage are summarized in Table 3 given below and are presented in Appendix 1.

Table 3 – Summary of Shrinkage Results

Borehole	Sample	Depth (m)	Shrinkage Limit	Shrinkage ratio
BH 3-25	SS2	0.76 – 1.37	18.43	1.826
BH 2-24*	SS2	0.76 – 1.37	18.42	1.794

Notes:

* - Denotes grain size results from previous investigation

4.3 Groundwater

The observed groundwater levels are summarized in Table 4 below, and are also provided on the Soil Profile and Test Data sheets in Appendix 1.

Table 4 – Summary of Groundwater Level Readings

Test Hole Number	Ground Surface Elevation (m)	Groundwater Level (m)	Groundwater Elevation (m)	Recording Date
BH 1-25	94.07	1.24	92.83	April 24, 2025
BH 2-25	94.07	0.97	93.10	
BH 3-25	94.07	1.00	93.07	
BH2-24	93.69	Water at surface	93.69	

Note: The ground surface elevation at each borehole location was surveyed by Paterson using a handheld GPS and was referenced to a geodetic datum.

The groundwater level readings were recorded during the spring season and are considered representative of the seasonal high groundwater level.

It should be noted that groundwater levels are subject to seasonal fluctuations, therefore, the groundwater levels could vary at the time of construction.

5.0 Discussion

5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site is suitable for the proposed development. It is recommended that the proposed building be founded on conventional spread footings placed on the undisturbed, compact to very dense glacial till.

The above and other considerations are discussed in the following paragraphs.

5.2 Site Grading and Preparation

Stripping Depth

Topsoil and fill, such as those containing organic or deleterious materials, should be stripped from under any buildings, paved areas, pipe bedding and other settlement sensitive structures

Fill Placement

Engineered fill used for grading beneath the proposed building should consist of clean imported granular fill, such as Ontario Provincial Standard Specifications (OPSS) Granular A or Granular B Type II. This material should be tested and approved prior to delivery to the site. The fill should be placed in lifts no greater than 300 mm thick and compacted using suitable compaction equipment for the lift thickness. Fill placed beneath the building and paved areas should be compacted to at least 98% of the material's standard Proctor maximum dry density (SPMDD).

Non-specified existing fill, along with site-excavated soil, can be used as general landscaping fill where settlement of the ground surface is of minor concern. This material should be spread in thin lifts and at least compacted by the tracks of the spreading equipment to minimize voids. If this material is to be used to build up the subgrade level for areas to be paved, it should be compacted in thin lifts to at least 95% of the material's SPMDD.

5.3 Foundation Design

Footings placed on undisturbed, compact to very dense glacial till, can be designed using a bearing resistance value at serviceability limit states (SLS) of **200 kPa** and a factored bearing resistance value at ultimate limit states (ULS) of **300 kPa**.

A geotechnical factor of 0.5 was incorporated into the bearing resistance value at ULS.

An undisturbed soil bearing surface consists of one from which all topsoil and deleterious materials, such as loose or disturbed soil, have been removed, in the dry, prior to placement of concrete footings.

The above-noted bearing resistance values at SLS for soil bearing surfaces will be subjected to potential post-construction total and differential settlements of 25 and 20 mm, respectively.

Lateral Support

The bearing medium under footing-supported structures is required to be provided with adequate lateral support with respect to excavations and different foundation levels. Above the groundwater level, adequate lateral support is provided to the in-situ bearing medium soils when a plane extending down and out from the bottom edge of the footing at a minimum of 1.5H:1V passes only through in-situ soil.

5.4 Design for Earthquakes

The subject site has been assigned seismic site designation $\mathbf{X_D}$ in accordance with Table 4.1.8.4.A. of the Ontario Building Code (OBC) 2024. The soils underlying the site are not susceptible to liquefaction. Reference should be made to the latest revision of the Ontario Building Code (OBC) 2024 for a full discussion of the earthquake design requirements.

The soils below the underside of footing (USF) elevation, consisting of the glacial till deposit, have been evaluated for liquefaction potential in accordance with the "Liquefaction Resistance of Soils" document prepared by Youd et al. (2001), and were determined to have suitable factors of safety exceeding 1.1 against liquefaction. Accordingly, soils underlying the subject site are not susceptible to liquefaction.

5.5 Slab on Grade Construction

With the removal of all topsoil, containing significant amounts of deleterious or organic materials, the silty clay or glacial till subgrade, approved by the geotechnical consultant at the time of excavation, will be considered an acceptable subgrade surface on which to commence backfilling for slab-on-grade construction.

It is recommended that the upper 200 mm of sub-floor fill consists of OPSS Granular A crushed stone. All backfill material within the footprints of the proposed buildings should be placed in maximum 300 mm thick loose layers and compacted to at least 98% of its SPMDD.

5.6 Pavement Design

Car only parking areas, access lanes, heavy truck parking and loading areas are proposed as part of the development at this site. The recommended pavement structures are shown in Tables 5 and 6 below.

Table 5 - Recommended Pavement Structure – Car Only Parking Areas

Thickness (mm)	Material Description
50	**Wear Course -** HL-3 or Superpave 12.5 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
300	**SUBBASE** - OPSS Granular B Type II
SUBGRADE - Either in situ soil, bedrock or OPSS Granular B Type I or II material placed over in situ soil or bedrock	

Table 6 - Recommended Pavement Structure – Access Lanes and Heavy Truck Parking

Thickness (mm)	Material Description
40	**Wear Course -** HL-3 or Superpave 12.5 Asphaltic Concrete
50	**Binder Course** - HL-8 or Superpave 19.0 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
450	**SUBBASE** - OPSS Granular B Type II
SUBGRADE - Either in situ soil, bedrock or OPSS Granular B Type I or II material placed over in situ soil or bedrock	

Minimum Performance Graded (PG) 58-34 asphalt cement should be used for this project, where an asphalt-paved structure is used.

If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated and replaced with OPSS Granular B Type II material.

The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 99% of the material's SPMDD using suitable vibratory equipment.

6.0 Design and Construction Precautions

6.1 Foundation Backfill

Backfill against the exterior sides of the foundation walls should consist of free draining, non-frost susceptible granular materials. Imported granular materials, such as clean sand or OPSS Granular B Type I granular material, can be used for this purpose.

Excavated on-site glacial till could also be re-used for backfilling the exterior sides of the foundation walls. However, this material would need to be maintained in an unfrozen state and at a suitable moisture content for compaction if it is to be re-used for this purpose.

6.2 Protection of Footings Against Frost Action

Perimeter foundations of heated structures are recommended to be insulated against the deleterious effects of frost action. Generally, a minimum 1.5 m thick soil cover, or an equivalent combination of soil cover and foundation insulation, should be provided in this regard.

6.3 Excavation Side Slopes

The side slopes of excavations in the overburden materials should either be cut back at acceptable slopes or should be retained by shoring systems from the start of the excavation until the structure is backfilled. It is expected that sufficient room will be available for the greater part of the excavation to be undertaken by open-cut methods (i.e., unsupported excavations).

The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be cut back at 1H:1V or flatter. The flatter slope is required for excavation below groundwater level. Excavations below the groundwater level should be cut back at a maximum slope of 1.5H:1V.

The subsoil at this site is considered to be mainly a Type 3 soil according to the Occupational Health and Safety Act and Regulations for Construction Projects.

Excavated soil should not be stockpiled directly at the top of excavations and heavy equipment should be kept away from the excavation sides.

Slopes in excess of 3 m in height should be periodically inspected by the geotechnical consultant in order to detect if the slopes are exhibiting signs of distress.

It is recommended that a trench box be used at all times to protect personnel working in trenches with steep or vertical sides. It is expected that services will be installed by "cut and cover" methods and excavations will not be left open for extended periods of time.

6.4 Pipe Bedding and Backfill

Bedding and backfill materials should be in accordance with the most recent material specifications and standard detail drawings from the department of public works and services, infrastructure services branch of the City of Ottawa.

A minimum of 150 mm of OPSS Granular A should be placed for bedding for private sewer or water pipes when placed on a soil subgrade. The bedding should extend to the spring line of the pipe. Cover material, from the spring line to a minimum of 300 mm above the obvert of the pipe, should consist of OPSS Granular A (concrete or PSM PVC pipes) or sand (concrete pipe). The bedding and cover materials should be placed in maximum 300 mm thick lifts and compacted to 98% of the SPMDD.

Where hard surface areas are considered above the trench backfill, the trench backfill material within the frost zone (about 1.8 m below finished grade) and above the cover material, should match the soils exposed at the trench walls to minimize differential frost heaving. The trench backfill should be placed in maximum 300 mm thick loose lifts and compacted to a minimum of 95% of the material's SPMDD. All cobbles larger than 200 mm in their longest direction should be segregated from re-use as trench backfill.

6.5 Groundwater Control

Based on the results of the geotechnical investigation, it is anticipated that groundwater infiltration into the excavation should be low to moderate and controllable using open sumps. The contractor should be prepared to direct water away from all subgrades, regardless of the source, to prevent disturbance to the founding medium.

Groundwater Control for Building Construction

A temporary Ministry of Environment, Conservation and Parks (MECP) permit to take water (PTTW) may be required if more than 400,000 L/day of ground and/or surface water are to be pumped during the construction phase. At least 4 to 5 months should be allowed for completion of the application and issuance of the permit by the MECP.

For typical ground or surface water volumes being pumped during the construction phase, typically between 50,000 to 400,000 L/day, it is required to register on the Environmental Activity and Sector Registry (EASR). A minimum of two to four weeks should be allotted for completion of the EASR registration and the Water Taking and Discharge Plan to be prepared by a Qualified Persons as stipulated under O.Reg. 63/16.

Impacts to Neighbouring Properties

It is expected that nearby structures will be found on the relatively shallow glacial till, which is not susceptible to settlement from dewatering. Therefore, no adverse effects to neighbouring properties are expected as a result of dewatering.

6.6 Winter Construction

Precautions must be taken if winter construction is considered for this project. The subsoil conditions at this site consist of frost susceptible materials. In the presence of water and freezing conditions, ice could form within the soil mass. Heaving and settlement upon thawing could occur.

In the event of construction during below zero temperatures, the founding stratum should be protected from freezing temperatures using straw, propane heaters and tarpaulins or other suitable means. In this regard, the base of the excavations should be insulated from sub-zero temperatures immediately upon exposure and until such time as heat is adequately supplied to the building and the footings are protected with sufficient soil cover to prevent freezing at founding level.

Trench excavations and pavement construction are also difficult activities to complete during freezing conditions without introducing frost into the subgrade or in the excavation walls and bottoms. Precautions should be taken if such activities are to be carried out during freezing conditions. Additional information could be provided, if required.

6.7 Corrosion Potential and Sulphate

One (1) sample was submitted for testing. The analytical test results of the soil sample indicate that the sulphate content is less than 0.1%. These results along with the chloride and pH value are indicative that Type 10 Portland cement (Type GU) would be appropriate for this site. The chloride content and the pH of the sample indicate they are not significant factors in creating a corrosive environment for exposed ferrous metals at this site, whereas the resistivity is indicative of a mild to non-aggressive environment.

6.8 Tree Planting Restrictions

The footings for the proposed building will bear on the glacial till, and below the depth of any silty clay/clayey silt. Therefore, no tree planting setbacks are applicable for the proposed building.

7.0 Recommendations

It is a requirement for the foundation data provided herein to be applicable that the following materials testing, and observation program be performed by the geotechnical consultant.

☐ Observation of all bearing surfaces prior to the placement of concrete.

☐ Sampling and testing of the concrete and fill materials.

☐ Periodic observation of the condition of unsupported excavation side slopes in excess of 3 m in height, if applicable.

☐ Observation of all subgrades prior to backfilling.

☐ Field density tests to determine the level of compaction achieved.

☐ Sampling and testing of the bituminous concrete including mix design reviews.

A report confirming that these works have been conducted in general accordance with our recommendations could be issued upon request, following the completion of a satisfactory material testing and observation program by geotechnical consultant.

All excess soils, with the exception of engineered crushed stone fill, generated by construction activities that will be transported on-site or off-site should be handled as per ***Ontario Regulation 406/19: On-Site and Excess Soil Management***.

8.0 Statement of Limitations

The recommendations provided herein are in accordance with the present understanding of the project. Paterson requests permission to review the recommendations when the drawings and specifications are completed.

A soils investigation is a limited sampling of a site. Should any conditions at the site be encountered which differ from those at the test pit locations, Paterson requests immediate notification to permit reassessment of our recommendations.

The recommendations provided herein should only be used by the design professionals associated with this project. They are not intended for contractors bidding on or undertaking the work. The latter should evaluate the factual information provided in this report and determine the suitability and completeness for their intended construction schedule and methods. Additional testing may be required for their purposes.

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein or by person(s) other than Stratford Foxrun, or their agents, is not authorized without review by Paterson for the applicability of our recommendations to the alternative use of the report.

Paterson Group Inc.

LICENSED PROFESSIONAL ENGINEER
July 9, 2025
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Scott Dennis
PROVINCE OF ONTARIO

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Scott S. Dennis, P.Eng.

Report Distribution:

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APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

ATTERBERG LIMITS TESTING RESULTS

SHRINKAGE LIMIT TESTING RESULTS

GRAIN SIZE DISTRIBUTION AND HYDROMETER TESTING RESULTS

ANALYTICAL TESTING RESULTS

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

5923 Ottawa Street, Ottawa, Ontario

PATERSON GROUP

COORD. SYS.: MTM ZONE 9 **EASTING:** 358355.92 **NORTHING:** 5006024.43 **ELEVATION:** 94.07

PROJECT: Proposed Commercial Development

ADVANCED BY: Track Mounted Drill Rig

REMARKS:

DATE: April 17, 2025

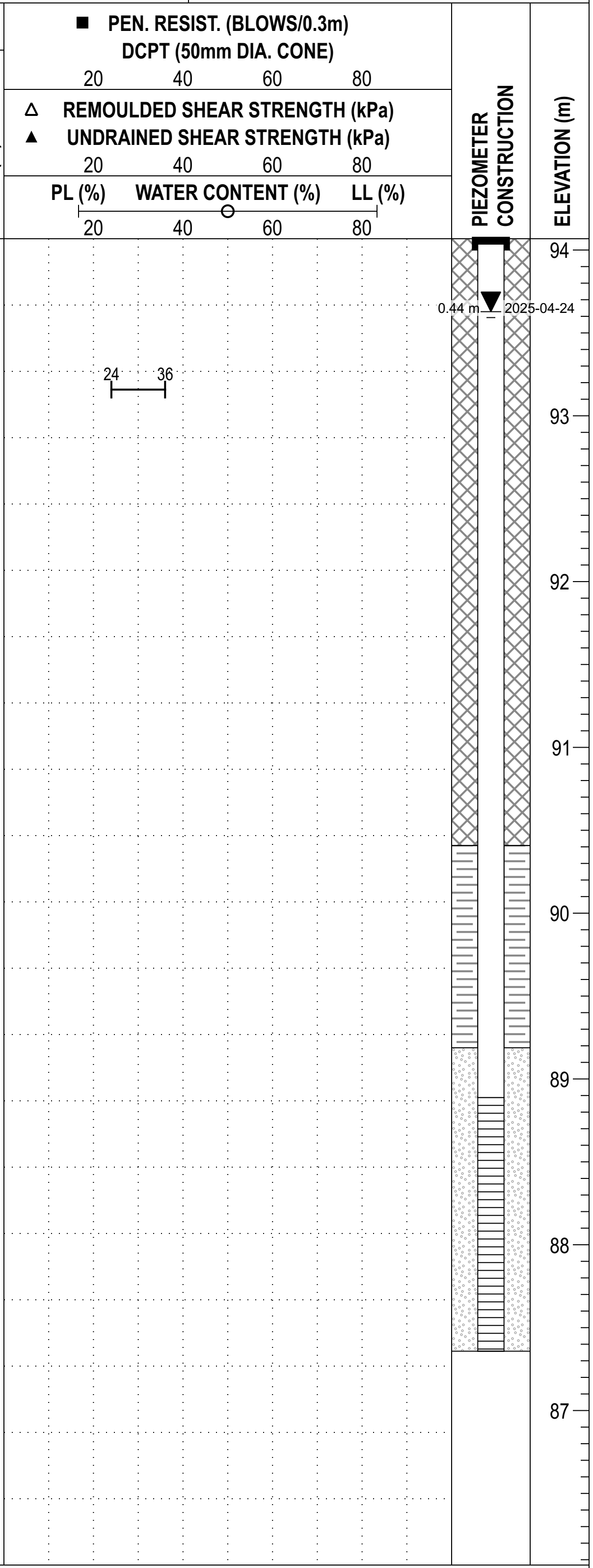
FILE NO. : PG7183

HOLE NO. : BH 1-25

SAMPLE DESCRIPTION	
GROUND SURFACE	
CLAYEY TOPSOIL	0.41m [93.66m]
Very stiff, brown **SILTY CLAY**, trace sand	1.07m [93.00m]
GLACIAL TILL: Compact, brown clayey silt, with gravel, trace to some sand, occasional cobbles and boulders	1.45m [92.62m]
GLACIAL TILL: Dense to compact, brown silty sand, with gravel, occasional cobbles and boulders	3.73m [90.34m]
GLACIAL TILL: Loose to compact, grey silty sand, some gravel, trace clay, occasional cobbles and boulders	6.35m [87.72m]
GLACIAL TILL: Compact, grey **SANDY SILT**, some gravel, trace clay, occasional cobbles and boulders	6.71m [87.36m]
End of Borehole	
(GWL at 0.44 m depth - April 24, 2025)	

TYPE AND NO.	RECOVERY (%)	N OR RQD	WATER CONTENT (%)
AU 1			
SS 2	83	2-3-5-12 8	
SS 3	83	12-24-16-17 40	
SS 4	83	15-11-11-44 22	
SS 5	75	11-11-10-7 21	
SS 6	50	3-3-3-6 6	
SS 7	58	3-3-3-2 6	
SS 8	50	5-5-6-6 11	
SS 9	100	4-6-15-11 21	

DEPTH (m): 1, 2, 3, 4, 5, 6, 7, 8



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation

5923 Ottawa Street, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 358380.22 **NORTHING:** 5006016.15 **ELEVATION:** 94.07

PROJECT: Proposed Commercial Development

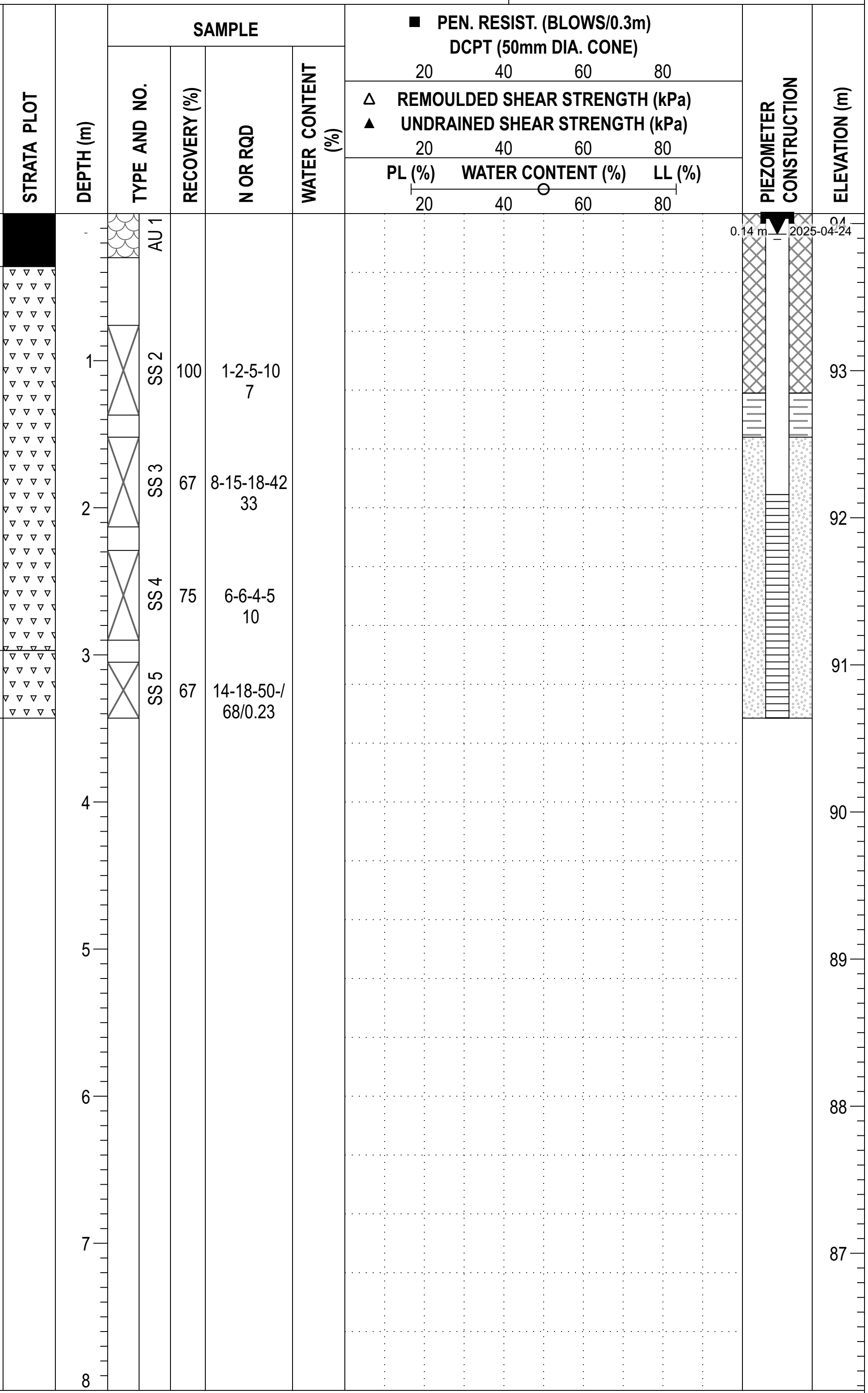
ADVANCED BY: Track Mounted Drill Rig

REMARKS:

DATE: April 17, 2025

FILE NO. : PG7183

HOLE NO. : BH 2-25



SAMPLE DESCRIPTION	TYPE AND NO.	RECOVERY (%)	N OR RQD	WATER CONTENT (%)
GROUND SURFACE				
CLAYEY TOPSOIL	AU 1			
0.36m [93.71m]				
GLACIAL TILL: Loose to dense, brown silty sand, with gravel, some clay, occasional cobbles and boulders	SS 2	100	1-2-5-10 7	
	SS 3	67	8-15-18-42 33	
	SS 4	75	6-6-4-5 10	
2.97m [91.10m]				
GLACIAL TILL: Dense, grey sandy silt, with gravel, occasional cobbles and boulders	SS 5	67	14-18-50-/ 68/0.23	
3.43m [90.64m]				

End of Borehole

Practical refusal to augering at 3.43 m depth

(GWL at 0.14 m depth - April 24, 2025)

PATERSON GROUP

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

5923 Ottawa Street, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 358388.50 **NORTHING:** 5005993.41 **ELEVATION:** 94.07

PROJECT: Proposed Commercial Development

ADVANCED BY: Track Mounted Drill Rig

REMARKS:

DATE: April 17, 2025

FILE NO. : **PG7183**

HOLE NO. : **BH 3-25**

■ PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80

△ REMOULDED SHEAR STRENGTH (kPa)
▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80

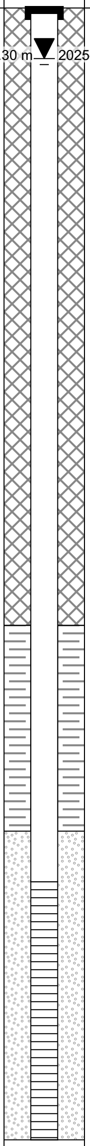
PL (%) WATER CONTENT (%) LL (%) 20 40 60 80

SAMPLE DESCRIPTION	TYPE AND NO.	RECOVERY (%)	N OR RQD	WATER CONTENT (%)
GROUND SURFACE				
CLAYEY TOPSOIL	AU 1			
0.41m [93.66m]				
Compact, brown **CLAYEY SILT**, trace sand	SS 2	83	5-7-9-17 16	
1.35m [92.72m]				
GLACIAL TILL: Dense to compact, brown silty sand, with gravel, occasional cobbles and boulders, trace clay	SS 3	75	6-11-21-14 32	
	SS 4	92	9-8-6-9 14	
3.35m [90.72m]				
GLACIAL TILL: Compact to dense, grey silty sand, some gravel, occasional cobbles and boulders	SS 5	83	7-8-7-11 15	
	SS 6	100	7-8-16-14 24	
- Trace clay by 4.6 m depth	SS 7	75	10-9-8-18 17	
	SS 8	83	4-18-17-16 35	
	SS 9	75	11-16-23-25 39	
6.71m [87.36m]				
End of Borehole (GWL at 0.30 m depth - April 24, 2025)				

DEPTH (m): 1, 2, 3, 4, 5, 6, 7, 8

ELEVATION (m): 94, 93, 92, 91, 90, 89, 88, 87

PIEZOMETER CONSTRUCTION



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

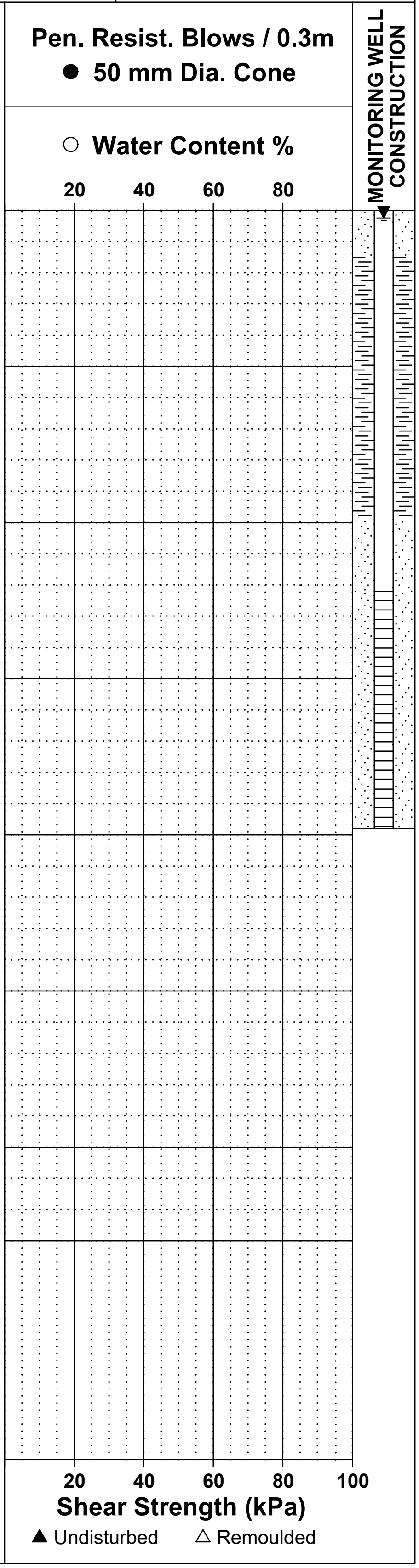
Geotechnical Investigation
5923 Ottawa Street
Ottawa, Ontario

EASTING: 358409.319 **NORTHING:** 5005999.639 **ELEVATION:** 93.69
DATUM: Geodetic
REMARKS:
BORINGS BY: CME 55 Power Auger **DATE:** June 17, 2024

FILE NO. PG7183
HOLE NO. BH 2-24

SAMPLE DESCRIPTION	Depth to base (m)	TYPE	NUMBER	% RECOVERY	N VALUE or RQD
GROUND SURFACE					
TOPSOIL and organics	0.08				
Hard to very stiff brown **SILTY CLAY**		AU	1		
	1.45	SS	2	100	9
GLACIAL TILL: Dense brown silty sand with gravel, cobbles and boulders, trace clay - Clay content decreasing with depth		SS	3	67	27
		SS	4	58	20
	3.73	SS	5	83	24
GLACIAL TILL: Dense to very dense grey silty sand to sandy silt with gravel, cobbles and boulders		SS	6	58	20
		SS	7	100	38
		SS	8	92	33
	6.60	SS	9	100	+50
End of Borehole (GWL at 0.05 m - June 25, 2024)					

DEPTH (m)	ELEV. (m)
0	93.69
1	92.69
2	91.69
3	90.69
4	89.69
5	88.69
6	87.69



SYMBOLS AND TERMS

SOIL DESCRIPTION

Behavioural properties, such as structure and strength, take precedence over particle gradation in describing soils. Terminology describing soil structure are as follows:

Desiccated	-	having visible signs of weathering by oxidation of clay minerals, shrinkage cracks, etc.
Fissured	-	having cracks, and hence a blocky structure.
Varved	-	composed of regular alternating layers of silt and clay.
Stratified	-	composed of alternating layers of different soil types, e.g. silt and sand or silt and clay.
Well-Graded	-	Having wide range in grain sizes and substantial amounts of all intermediate particle sizes (see Grain Size Distribution).
Uniformly-Graded	-	Predominantly of one grain size (see Grain Size Distribution).

The standard terminology to describe the relative strength of cohesionless soils is the compactness condition, usually inferred from the results of the Standard Penetration Test (SPT) ‘N’ value. The SPT N value is the number of blows of a 63.5 kg hammer, falling 760 mm, required to drive a 51 mm O.D. split spoon sampler 300 mm into the soil after an initial penetration of 150 mm. An SPT N value of “P” denotes that the split-spoon sampler was pushed 300 mm into the soil without the use of a falling hammer.

Compactness Condition	‘N’ Value	Relative Density %
Very Loose	<4	<15
Loose	4-10	15-35
Compact	10-30	35-65
Dense	30-50	65-85
Very Dense	>50	>85

The standard terminology to describe the strength of cohesive soils is the consistency, which is based on the undisturbed undrained shear strength as measured by the in situ or laboratory shear vane tests, unconfined compression tests, or occasionally by the Standard Penetration Test (SPT). Note that the typical correlations of undrained shear strength to SPT N value (tabulated below) tend to underestimate the consistency for sensitive silty clays, so Paterson reviews the applicable split spoon samples in the laboratory to provide a more representative consistency value based on tactile examination.

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

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

Cohesive soils can also be classified according to their “sensitivity”. The sensitivity, S_t, is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil. The classes of sensitivity may be defined as follows:

Low Sensitivity:	$S_t < 2$
Medium Sensitivity:	$2 < S_t < 4$
Sensitive:	$4 < S_t < 8$
Extra Sensitive:	$8 < S_t < 16$
Quick Clay:	$S_t > 16$

ROCK DESCRIPTION

The structural description of the bedrock mass is based on the Rock Quality Designation (RQD).

The RQD classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be a result of closely-spaced discontinuities (resulting from shearing, jointing, faulting, or weathering) in the rock mass and are not counted. RQD is ideally determined from NQ or larger size core. However, it can be used on smaller core sizes, such as BQ, if the bulk of the fractures caused by drilling stresses (called “mechanical breaks”) are easily distinguishable from the normal in situ fractures.

RQD %	**ROCK QUALITY**
90-100	Excellent, intact, very sound
75-90	Good, massive, moderately jointed or sound
50-75	Fair, blocky and seamy, fractured
25-50	Poor, shattered and very seamy or blocky, severely fractured
0-25	Very poor, crushed, very severely fractured

SAMPLE TYPES

SS	-	Split spoon sample (obtained in conjunction with the performing of the Standard Penetration Test (SPT))
TW	-	Thin wall tube or Shelby tube, generally recovered using a piston sampler
G	-	"Grab" sample from test pit or surface materials
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size BQ, NQ, HQ, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

SYMBOLS AND TERMS (continued)

PLASTICITY LIMITS AND GRAIN SIZE DISTRIBUTION

WC% - Natural water content or water content of sample, %
LL - Liquid Limit, % (water content above which soil behaves as a liquid)
PL - Plastic Limit, % (water content above which soil behaves plastically)
PI - Plasticity Index, % (difference between LL and PL)

Dxx - Grain size at which xx% of the soil, by weight, is of finer grain sizes
These grain size descriptions are not used below 0.075 mm grain size
D10 - Grain size at which 10% of the soil is finer (effective grain size)
D60 - Grain size at which 60% of the soil is finer

Cc - Concavity coefficient = $(D30)^2$ / (D10 x D60)
Cu - Uniformity coefficient = D60 / D10

Cc and Cu are used to assess the grading of sands and gravels:
Well-graded gravels have: 1 < Cc < 3 and Cu > 4
Well-graded sands have: 1 < Cc < 3 and Cu > 6
Sands and gravels not meeting the above requirements are poorly-graded or uniformly-graded.
Cc and Cu are not applicable for the description of soils with more than 10% silt and clay (more than 10% finer than 0.075 mm or the #200 sieve)

CONSOLIDATION TEST

p'_o - Present effective overburden pressure at sample depth
p'_c - Preconsolidation pressure of (maximum past pressure on) sample
Ccr - Recompression index (in effect at pressures below p'_c)
Cc - Compression index (in effect at pressures above p'_c)

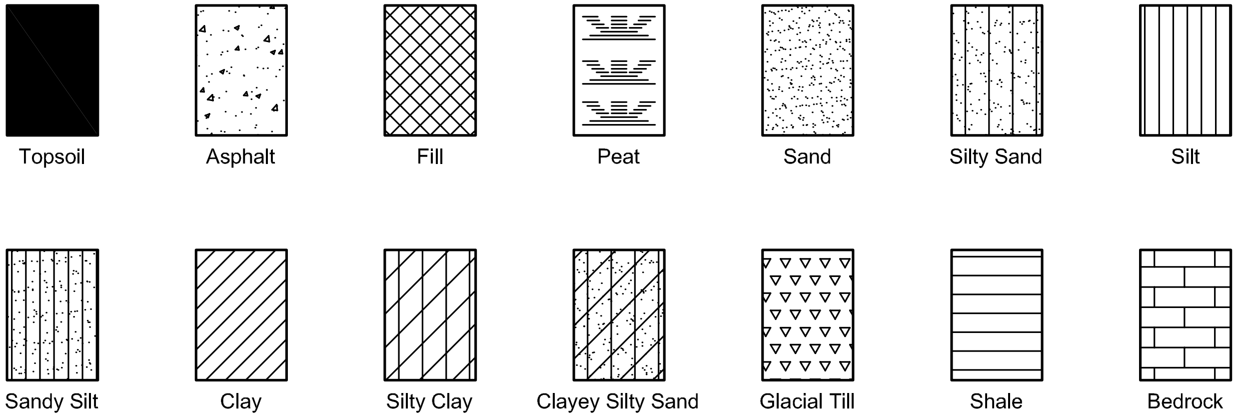
OC Ratio Overconsolidaton ratio = p'_c / p'_o
Void Ratio Initial sample void ratio = volume of voids / volume of solids
Wo - Initial water content (at start of consolidation test)

PERMEABILITY TEST

k - Coefficient of permeability or hydraulic conductivity is a measure of the ability of water to flow through the sample. The value of k is measured at a specified unit weight for (remoulded) cohesionless soil samples, because its value will vary with the unit weight or density of the sample during the test.

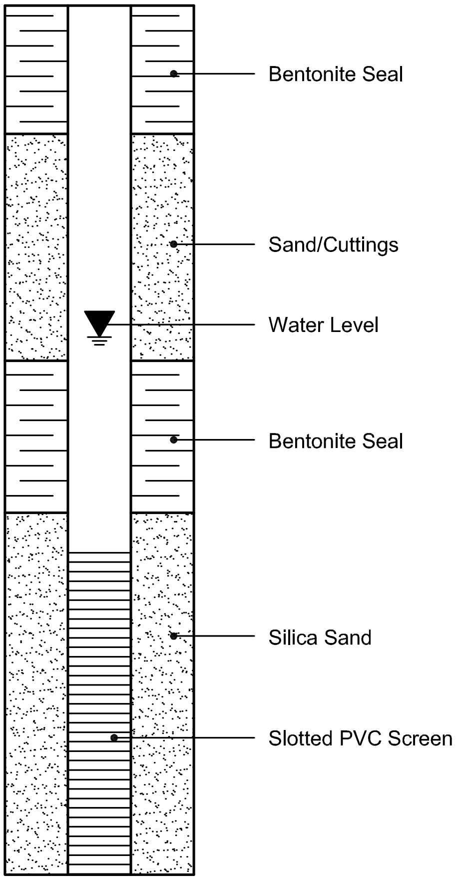
SYMBOLS AND TERMS (continued)

STRATA PLOT

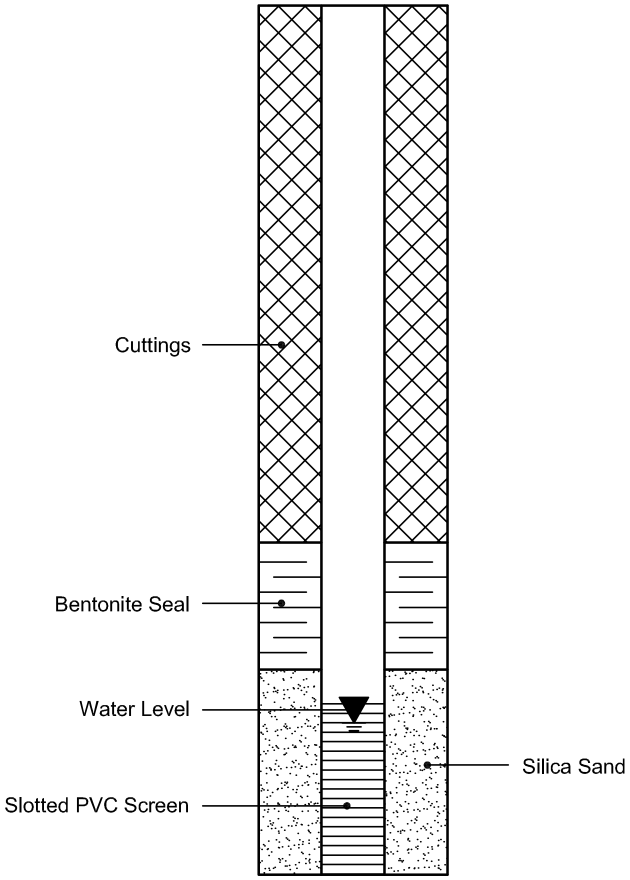


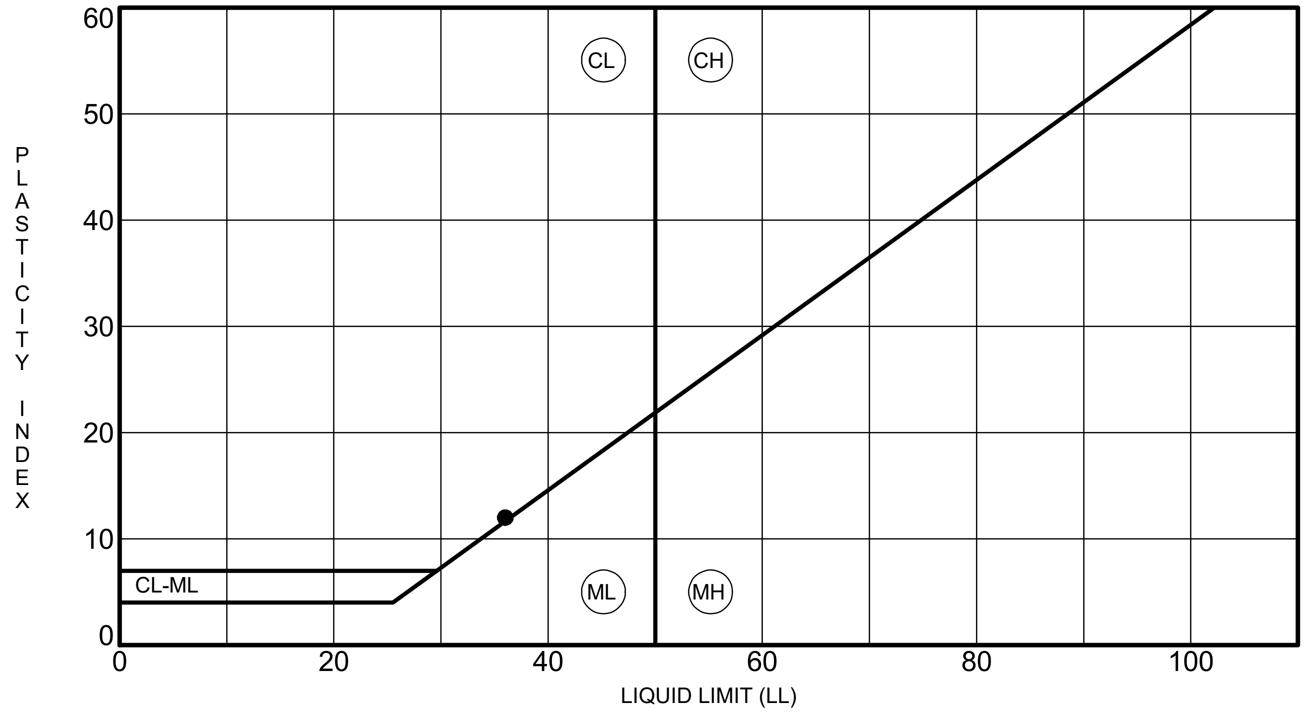
MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION





Specimen Identification		LL	PL	PI	MC	Classification
●	**BH 1-25 SS2 (top)**	**36**	**24**	**12**	**24.2**	**CL - Inorganic clays of low plasticity**

CLIENT **Stratford Foxrun**

PROJECT **Geotechnical Investigation - 5923 Ottawa Street**

FILE NO. **PG7183**

DATE **28 Apr 25**

PATERSON
GROUP

9 Auriga Drive
Ottawa, Ontario
K2E 7T9
TEL: (613) 226-7381

ATTERBERG LIMITS' RESULTS

PATERSON GROUP

Linear Shrinkage
ASTM D4943-02

CLIENT:	Stratford Foxrun	DEPTH	-	FILE NO.:	PG7183
PROJECT:	5923 Ottawa Street, Ottawa, ON	BH OR TP No:	BH3-25 SS2	DATE SAMPLED	17-Apr-25
LAB No:	59251	TESTED BY:	C.P	DATE RECEIVED	21-Apr-25
SAMPLED BY:	C.A.	DATE REPORTED:	28-Apr-25	DATE TESTED	21-Apr-25

LABORATORY INFORMATION & TEST RESULTS

Moisture	No. of Blows(7)	Calibration (Two Trials)		Tin NO.(A1)
Tare	4.64	Tin	4.46	4.47
Soil Pat Wet + Tare	76.99	Tin + Grease	4.64	4.65
Soil Pat Wet	72.35	Glass	43.25	43.2
Soil Pat Dry + Tare	59.77	Tin + Glass + Water	85.12	85.12
Soil Pat Dry	55.13	Volume	37.23	37.27
Moisture	**31.24**	**Average Volume**	**37.25**	

Soil Pat + String	55.3
Soil Pat + Wax + String in Air	61.53
Soil Pat + Wax + String in Water	24.34
Volume Of Pat (Vdx)	37.19

RESULTS:

Shrinkage Limit	**18.43**
Shrinkage Ratio	**1.826**
Volumetric Shrinkage	**23.385**
Linear Shrinkage	**6.764**

REVIEWED BY:	**Curtis Beadow**	**Joe Forsyth, P. Eng.**

PATERSON GROUP

Linear Shrinkage
ASTM D4943-02

CLIENT:	Stratford Foxrun	DEPTH	-	FILE NO.:	PG7183
PROJECT:	5923 Ottawa St.	BH OR TP No:	BH2-24 SS2	DATE SAMPLED	-
LAB No:	53404	TESTED BY:	C.P	DATE RECEIVED	20-Jun-24
SAMPLED BY:	Adam E.	DATE REPORTED:	5-Jul-24	DATE TESTED	20-Jun-24

LABORATORY INFORMATION & TEST RESULTS

Moisture	No. of Blows(8)	Calibration (Two Trials)	Tin NO.(x21)	
Tare	4.91	Tin	4.74	4.75
Soil Pat Wet + Tare	73.59	Tin + Grease	4.91	4.92
Soil Pat Wet	68.68	Glass	43.23	43.23
Soil Pat Dry + Tare	54.85	Tin + Glass + Water	85.52	85.52
Soil Pat Dry	49.94	Volume	37.38	37.37
Moisture	**37.53**	**Average Volume**	**37.38**	

Soil Pat + String	50.03
Soil Pat + Wax + String in Air	56.05
Soil Pat + Wax + String in Water	21.45
Volume Of Pat (Vdx)	34.6

RESULTS:

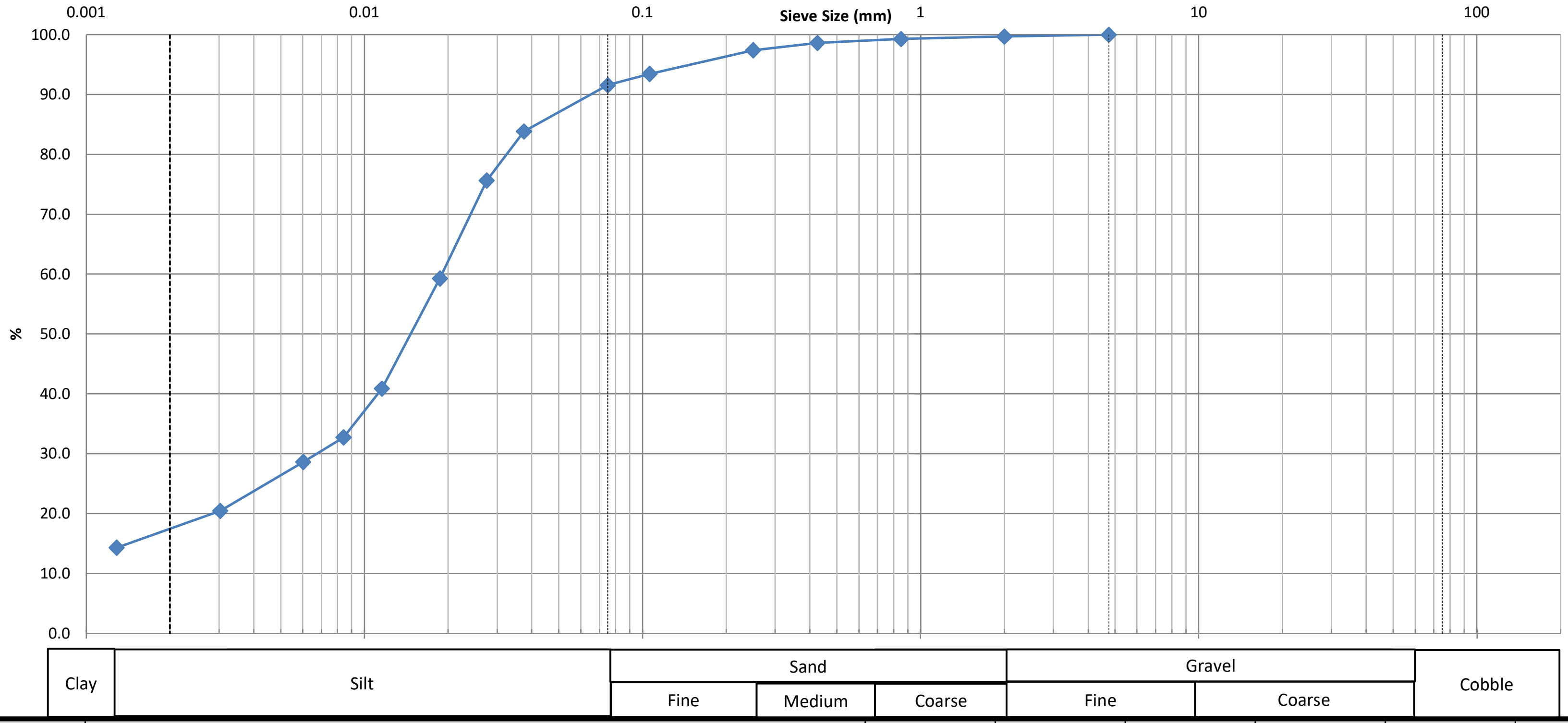
Shrinkage Limit	**18.42**
Shrinkage Ratio	**1.794**
Volumetric Shrinkage	**34.269**
Linear Shrinkage	**9.355**

REVIEWED BY:	**Curtis Beadow**	**Joe Forsyth, P. Eng.**

PATERSON GROUP

SIEVE ANALYSIS
ASTM C136

CLIENT:	Stratford Foxrun	DEPTH:	BH3-25 SS2	FILE NO:	PG7183
CONTRACT NO.:		BH OR TP No.:	-	LAB NO:	59250
PROJECT:	5923 Ottawa Street			DATE RECEIVED:	21-Apr-25
				DATE TESTED:	21-Apr-25
DATE SAMPLED:	17-Apr-25			DATE REPORTED:	28-Apr-25
SAMPLED BY:	C.A.			TESTED BY:	D.K



Identification	**Soil Classification**	**MC(%)**	**LL**	**PL**	**PI**	**Cc**	**Cu**
		23.9%					

	D100	D60	D30	D10	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
					0.0	8.4	73.6	18.0

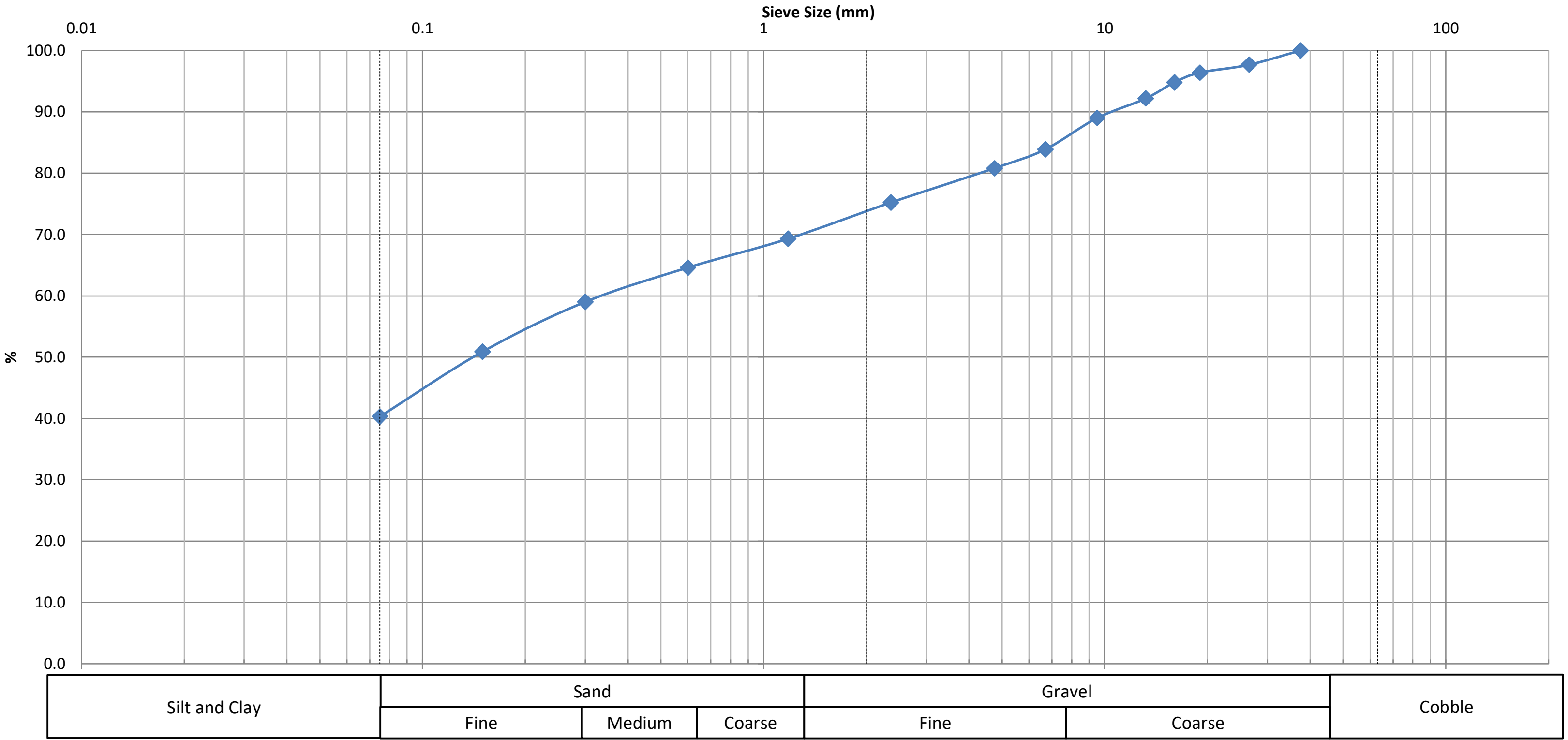
Comments:

REVIEWED BY:	**Curtis Beadow**	**Joe Forsyth, P. Eng.**

PATERSON GROUP

SIEVE ANALYSIS
ASTM C136

CLIENT:	Stratford Foxrun	DESCRIPTION:	Silty Sand w Gravel	FILE NO:	PG7183
CONTRACT NO.:	-	SPECIFICATION:	**Silty Sand w Gravel**	LAB NO:	53405
PROJECT:	5293 Ottawa Street	INTENDED USE:	-	DATE RECEIVED:	20-Jun-24
		PIT OR QUARRY:	-	DATE TESTED:	20-Jun-24
DATE SAMPLED:	-	SOURCE LOCATION:	BH2-24 SS3	DATE REPORTED:	5-Jul-24
SAMPLED BY:	Adam E.	SAMPLE LOCATION:	-	TESTED BY:	CP



Identification	Soil Classification	MC(%)	LL	PL	PI	Cc	Cu
						0.24	22.7
	D100	D60	D30	D10	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
	37.5	0.34	0.035	0.015	19.2	40.5	40.3	

Comments:

REVIEWED BY:	**Curtis Beadow**	**Joe Fosyth, P. Eng.**

Certificate of Analysis

Report Date: 26-Jun-2024

Client: **Paterson Group Consulting Engineers (Ottawa)**

Order Date: 20-Jun-2024

Client PO: 60475

Project Description: PG7183

	Client ID:	BH1-24 SS3	-	-	-		
	Sample Date:	17-Jun-24 09:00	-	-	-	-	-
	Sample ID:	2425456-01	-	-	-		
	Matrix:	Soil	-	-	-		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	91.4	-	-	-	-	-
General Inorganics							
pH	0.05 pH Units	7.67	-	-	-	-	-
Resistivity	0.1 Ohm.m	124	-	-	-	-	-
Anions							
Chloride	10 ug/g	<10	-	-	-	-	-
Sulphate	10 ug/g	<10	-	-	-	-	-

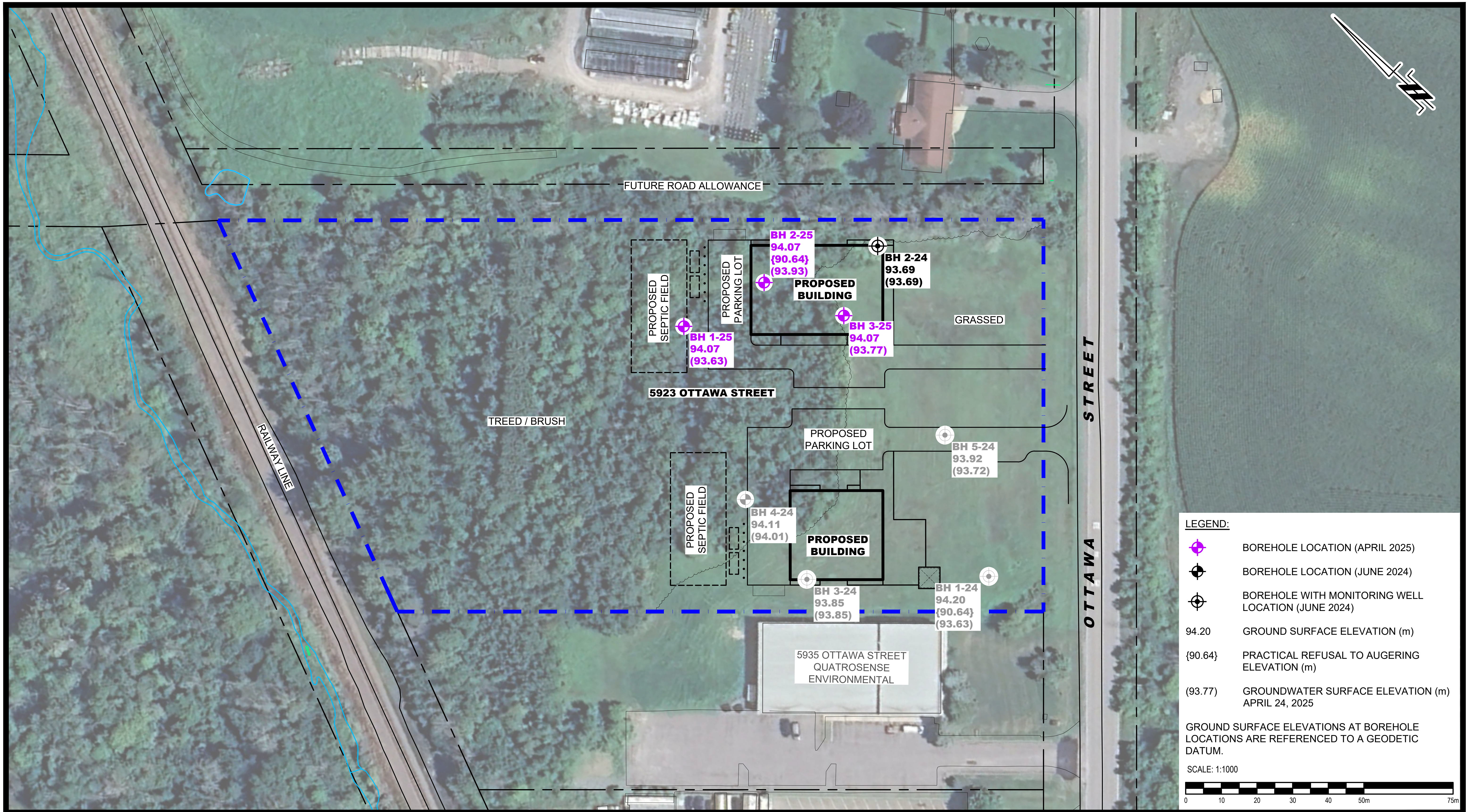
APPENDIX 2

FIGURE 1 - KEY PLAN

DRAWING PG7183-2 - TEST HOLE LOCATION PLAN

FIGURE 1

KEY PLAN



LEGEND:

⌖	BOREHOLE LOCATION (APRIL 2025)
⌖	BOREHOLE LOCATION (JUNE 2024)
⌖	BOREHOLE WITH MONITORING WELL LOCATION (JUNE 2024)
94.20	GROUND SURFACE ELEVATION (m)
{90.64}	PRACTICAL REFUSAL TO AUGERING ELEVATION (m)
(93.77)	GROUNDWATER SURFACE ELEVATION (m) APRIL 24, 2025

GROUND SURFACE ELEVATIONS AT BOREHOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM.

SCALE: 1:1000

0 10 20 30 40 50m 75m

PATERSON GROUP

9 AURIGA DRIVE
OTTAWA, ON
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TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	UPDATED CONCEPTUAL PLAN	15/08/2025	SD

STRATFORD FOXRUN
GEOTECHNICAL INVESTIGATION
PROPOSED COMMERCIAL DEVELOPMENT
5923 OTTAWA STREET

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:1000	Date: 04/2025
Drawn by: GK	Report No.: PG7183-2
Checked by: DR	Dwg. No.: PG7183-2
Approved by: SD	Revision No.: 1

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11x17