Geotechnical Investigation

Proposed Commercial Development

15 Tradesman Road
Ottawa, Ontario

Prepared for Broder Electric

Report PG7185-1 dated July 25, 2024

Table of Contents

Appendices

1.0 Introduction

Paterson Group (Paterson) was commissioned Broder Electric, to conduct a geotechnical investigation for the proposed commercial building, which is located at 15 Tradesman Road, in the city of Ottawa, Ontario (refer to Figure 1 - Key Plan in Appendix 2 of this report).

The objective of the geotechnical investigation was to:

- Determine the subsoil conditions at this site by means of boreholes.
- 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.

Investigating the presence or potential presence of contamination on the subject property was not a part of the scope of the present investigation. Therefore, the present report does not address environmental issues.

2.0 Proposed Development

Based on the available conceptual plan, it is understood that the proposed development will consist of a prefabricated commercial building for storage and office use, with an approximate area of 298 m^2, to be located within the northwestern portion of the site. The proposed building will be surrounded by vehicle parking areas, equipment storage areas and some landscaped areas.

3.0 Method of Investigation

3.1 Field Investigation

Field Program

The field program for the geotechnical investigation was carried out on June 21, 2024. At that time, a total of five (5) boreholes were completed across the subject site, of which, two (2) boreholes were advanced within the proposed building and three (3) boreholes were advanced within the proposed parking lot and storage areas surrounding the building. The boreholes were distributed in a manner to provide general coverage of the subject site. The locations of the boreholes are shown on Drawing PG7185-1 - Test Hole Location Plan included in Appendix 2.

All boreholes were excavated using a low clearance drilling 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 drilling to the required depths at the selected locations, and sampling and testing the overburden.

Sampling and In Situ Testing

Soil samples were collected from the boreholes using two different techniques, namely, sampled directly from the auger flights (AU) or collected using a 50 mm diameter split spoon (SS) sampler. All samples were visually inspected and initially classified on site. The auger and split-spoon samples were placed in sealed plastic bags and transported to our laboratory for further examination and classification. 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 presented 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.

The subsurface conditions observed in the test holes were recorded in detail in the field. The soil profiles are logged on the Soil Profile and Test Data sheets in Appendix 1 of this report.

Groundwater

As part of the current program, three (3) monitoring wells and two (2) flexible standpipe piezometers were installed within boreholes, to permit monitoring groundwater levels.

3.2 Field Survey

The borehole locations were determined by Paterson personnel taking into consideration the presence of underground and aboveground services. The location and ground surface elevation at each borehole location was surveyed by Paterson personnel. The boreholes were surveyed with respect to a geodetic datum. Borehole locations and ground surface elevations at the borehole locations are presented on Drawing PG7185-1 - Test Hole Location Plan in Appendix 2.

3.3 Laboratory Testing

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 one (2) Atterberg limits tests, one (1) grain size distribution and hydrometer test, and one (1) shrinkage test was completed on selected soil samples. Furthermore, all the recovered samples were submitted to the lab for moisture content testing. The test results have been logged on the Soil Profile and Test Data sheets in Appendix 1 of this report.

All samples will be stored in the laboratory for a period of one (1) month after issuance of this report. 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 Subsection 6.9.

4.0 Observations

4.1 Surface Conditions

The subject site is currently occupied by an existing one storey commercial building within the southwestern portion of the site. All the topsoil was observed to be stripped off the site, at the time of drilling. The site was mainly covered in a sandy gravelly pad used for parking and access lanes. The subject site is bordered by Tradesman Road to the west, one storey commercial garage structures to the northwest, soil fill piles and construction material stockpiles to the northeast and treed areas to the south. The ground surface is relatively flat and is approximately at grade with the adjacent Tradesman Road.

4.2 Subsurface Profile

Subsurface conditions noted at the borehole locations were recorded in detail in the field and recovered soil samples were reviewed in our laboratory. Generally, the subsurface profile encountered at the borehole locations consist of a brown silty sand fill with gravel and crushed stone, underlain by a compact to loose brown silty sand.

Approximately 0.6 to 1.2 m thick, soft to firm reddish brown silty clay crust was observed underlying the silty sand layer. Underlying the reddish-brown silty clay crust a reddish-grey silty clay was generally encountered within the boreholes. Traces of sand and gravel were encountered at depths approximately 3.1 to 3.8 m below the ground surface within all the boreholes, except for BH1-24 and 4-24.

Underlying the reddish grey silty clay deposit, approximately 400 mm thick, silty sand layer was encountered at BH 1-24 and 2-24, which was followed by soft to firm grey to reddish grey silty clay. Traces of sand and gravel were encountered within the grey silty clay layer at 5.3 and 6.1 m below the ground level at BH2-24.

Bedrock

Based on available geological mapping, bedrock in the area of the subject site consists of shale of the Carlsbad Formation with an overburden drift thickness of 15 to 25 m.

Grain Size Distribution and Hydrometer Testing

One (1) hydrometer test was completed to further classify selected soil samples. The results are summarized in Table 1 on the next page and are presented in Appendix 1.

Table 1 – Summary of Grain Size Distribution Analysis						
Borehole Number	**Sample**	**Depth (m)**	**Gravel (%)**	**Sand (%)**	**Silt (%)**	**Clay (%)**
BH 2-24	SS3	1.5 - 2.1	0.0	12.7	47.3	40.0

Atterberg Limit Tests

A total of 2 silty clay samples were submitted for Atterberg Limits testing. The test results and the soil classification based on the test results have been summarized in Table 2 below. These classifications are in accordance with the Unified Soil Classification System.

Table 2 – Summary of Atterberg Limits Results						
Borehole Number	**Sample**	**Depth (m)**	**LL (%)**	**PL (%)**	**PI (%)**	**Classification**
BH 1-24	SS3	1.5 – 2.1	48	20	28	CL
BH 4-24	SS4	2.3 - 2.9	56	21	35	CH
Notes: LL: Liquid Limit; PL: Plastic Limit; PI: Plasticity Index; CL: Inorganic Clay of Low Plasticity; CH: Inorganic Clay of High Plasticity						

Shrinkage Test

Linear shrinkage testing was completed on 1 soil sample recovered from borehole BH 3-24 at approximate depth of 1.5 – 2.1 m. The shrinkage limit and shrinkage ratio of the tested silty clay sample were found to be 16.33% and 1.842, respectively.

4.3 Groundwater

Three (3) monitoring wells and two (2) standpipe piezometers were installed as part of our current investigation. Groundwater level measurements were recorded, and our findings are presented in Table 3 on the next page.

Table 3 – Summary of Groundwater Levels

Test Hole Number	Ground Surface Elevation (m)	Measured Groundwater Level		Dated Recorded
		Depth (m)	Elevation (m)	
*BH 1-24	76.79	1.37	75.42	June 28, 2024
BH 2-24	76.84	0.39	76.45	
*BH 3-24	76.84	0.42	76.42	
BH 4-24	76.95	0.35	76.60	
*BH 5-24	77.14	0.96	76.18	

Note:
- The ground surface elevations are referenced to a geodetic datum.
- * Boreholes with groundwater monitoring well

It should be noted that surface water can become trapped within a backfilled borehole that can lead to higher than typical groundwater level observations. Based on our field observations, experience with the local area and the colouring of the recovered samples, it is expected that the long-term groundwater level is between 1.5 to 2.5 m below the existing grade.

However, 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

The subject site is considered suitable for the proposed development from a geotechnical perspective. It is expected that the proposed structure will be founded over conventional shallow footings or a slab on grade foundation bearing on a soft to firm silty clay.

Due to the presence of a silty clay deposit a permissible grade raise has been proposed to the subject site. Permissible grade raise discussions are discussed in Section 5.3.

The above and other considerations are further discussed in the following sections.

5.2 Site Grading and Preparation

Stripping Depth

Any existing fill and deleterious materials, such as those containing organic materials, should be stripped from under the building footprints and other settlement sensitive structures, prior to placing the fill.

However, the existing fill can remain in place below the asphalt-paved or gravel-surfaced access lanes and parking areas, provided that the existing fill subgrade is proof-rolled several times under dry conditions and above freezing temperatures. Any poor performing areas noted during the proof-rolling operation should be removed and replaced with an approved fill.

Fill Placement

Fill used for grading beneath the building areas should consist, unless otherwise specified, 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 proposed building areas should be compacted to at least 98% of its standard Proctor maximum dry density (SPMDD).

Non-specified existing fill along with site-excavated soil can be used as general landscaping fill and beneath exterior parking areas where settlement of the ground surface is of minor concern. In landscaped areas, these materials should be spread in thin lifts and at least compacted by the tracks of the spreading equipment to minimize voids.

If these materials are to be used to build up the subgrade level for areas to be paved, they should be compacted in thin lifts to a minimum density of 95% of their respective SPMDD.

Non-specified existing fill and site-excavated soils are not suitable for use as backfill against foundation walls unless a composite drainage blanket connected to a perimeter drainage system is provided.

Proof Rolling

For the proposed parking areas and access lanes, proof rolling will be required in areas where the existing fill, free of deleterious materials, and approved by Paterson personnel at the time of construction is encountered at subgrade level. The purpose of the proof rolling is to induce some of the initial settlements to reduce long term total settlements. It is recommended that the subgrade surface be proof-rolled **under dry conditions** by an adequately sized roller making several passes to achieve optimum compaction levels. The compaction program should be reviewed and approved by the geotechnical consultant at the time of construction.

5.3 Foundation Design

Conventional Spread Footings

Strip footings and pad footings, up to 1 m wide, placed on undisturbed, firm brown silty clay bearing surface or on approved engineered fill placed directly over a firm brown silty clay bearing surface, can be designed using a bearing resistance value at SLS of **60 kPa** and a factored bearing resistance value at ULS of **90 kPa**, incorporating a geotechnical resistance factor of 0.5.

Strip footings and pad footings up to 1 m wide placed over 300 mm engineered fill such as OPSS crushed stone Granular A or Granular B type II, placed over an undisturbed soft to firm grey silty clay, and compacted to minimum 98.0% of its SPMDD, can be can be designed using a bearing resistance value at serviceability limit states (SLS) of **60 kPa** and a factored bearing resistance value at ultimate limit states (ULS) of **90 kPa**. A geotechnical resistance factor of 0.5 was applied to the above noted bearing resistance value at ULS.

Footings designed using the above noted bearing resistance values at SLS will be subjected to potential post construction total and differential settlements of 25 and 20 mm, respectively.

An undisturbed soil bearing surface consists of a surface from which all topsoil and deleterious materials, such as loose, frozen, or disturbed soil, whether in situ or not, have been removed, in the dry, prior to the placement of concrete footings.

Protection of Subgrade

It is recommended that a minimum of 75 mm thick lean concrete mud slab or 300 mm granular pad be placed on undisturbed, in-situ silty clay bearing medium surfaces, below the footings. The main purpose of the mud slab or granular pad is to reduce the risk of disturbance of the subgrade under the traffic or workers and equipment.

It is recommended that the final excavation of the bearing surface level and the placement of the mud slab or granular pad should be completed in smaller sections to avoid exposing large areas of the silty clay to potential disturbances due to drying as a result of evaporation of the moisture within the upper silty clay layer.

Permissible Grade Raise Recommendation

Due to the presence of the silty clay deposit, a permissible grade raise restriction of **0.3 m** is recommended for grading at the subject site.

If higher than permissible grade raises are required, preloading with or without a surcharge, lightweight fill, and/or other measures should be investigated to reduce the risks of unacceptable long-term post construction total and differential settlements.

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.

Adequate lateral support is provided to a soft to firm silty clay above the groundwater table 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 of the same or higher capacity as the bearing medium soil.

5.4 Design for Earthquakes

The site class for seismic site response can be taken as **Class E** for the foundations considered at this site.

Due to the nature and the relative density of the silty clay soils underlying the subject site are not susceptible to liquefaction. Reference should be made to the latest revision of the 2012 Ontario Building Code for a full discussion of the earthquake design requirements.

5.5 Slab on Grade Construction

With the removal of all topsoil and deleterious fill within the footprint of the proposed building, the existing fill subgrade will be considered an acceptable subgrade on which to commence backfilling for floor slab construction.

A vibratory drum roller should complete several passes over the slab-on-grade subgrade surface as a proof-rolling program. Any poor performing areas should be removed and reinstated with an engineered fill, such as OPSS Granular B Type II.

It is recommended that the upper 200 mm of sub-floor fill consist of OPSS Granular A crushed stone. All backfill materials required to raise grade within the footprint of the proposed building should be placed in maximum 300 mm thick loose layers and compacted to at least 98% of its SPMDD.

5.6 Pavement Structure

For design purposes, the pavement structures presented in the following tables could be used for the design of car only parking areas and access lanes.

Table 4 - 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 fill, in situ soil, or OPSS Granular B Type I or II material placed over in situ soil or fill	

Table 5 - Recommended Gravel Road Structure - Car Only Parking Areas	
Thickness (mm)	**Material Description**
250	**BASE** - OPSS Granular A Crushed Stone
300	**SUBBASE** - OPSS Granular B Type II
SUBGRADE - Either fill, in situ soil, or OPSS Granular B Type I or II material placed over in situ soil or fill	

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

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

Table 7 - Recommended Gravel Road Structure - Access Lanes and Heavy Truck Parking Areas

Thickness (mm)	Material Description
300	**BASE** - OPSS Granular A Crushed Stone
450	**SUBBASE** - OPSS Granular B Type II
SUBGRADE - Either fill, in situ soil, or OPSS Granular B Type I or II material placed over in situ soil or fill	

Minimum Performance Graded (PG) 58-34 asphalt cement should be used for this project.

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.

Pavement Structure Drainage

Satisfactory performance of the pavement structure is largely dependent on keeping the contact zone between the subgrade material and the base stone in a dry condition. Failure to provide adequate drainage under conditions of heavy wheel loading can result in the fine subgrade soil being pumped into the voids in the stone subbase, thereby reducing load carrying capacity.

Consideration should also be given to installing subdrains during the pavement construction as per City of Ottawa standards. These drains should extend in four orthogonal directions or longitudinally when placed along a curb. The clear crushed stone surrounding the drainage lines, or the pipe should be wrapped with suitable filter cloth. The subdrain inverts should be approximately 300 mm below subgrade level. The subgrade surface should be crowned to promote water flow to the drainage lines. Discharge of the subdrains should be directed by gravity to storm sewers or deeper drainage ditches.

6.0 Design and Construction Precautions

6.1 Foundation Drainage

The placement of a perimeter drainage system for the below-grade areas is considered optional for the proposed structure. However, it is generally considered a good practice to install. The perimeter drainage system, if considered, should consist of a 150 mm diameter, geotextile-wrapped, perforated and corrugated plastic pipe, surrounded by 150 mm of 19 mm clear crushed stone, which is placed at the footing level around the exterior perimeter of the structure. The clear crushed stone should be wrapped in a non-woven geotextile. The pipe should have a positive outlet, such as a gravity connection to the sump pump pit or storm sewer or ditch.

6.2 Foundation Backfill

Backfill against the exterior sides of the foundation walls should consist of free draining non frost susceptible granular materials, such as clean sand or OPSS Granular B Type I granular material. The greater part of the site excavated materials will be frost susceptible and, as such, are not recommended for re-use as backfill against the foundation walls.

6.3 Protection of Footings Against Frost Action

Perimeter footings of heated structures are required to be insulated against the deleterious effects of frost action. A minimum of 1.5 m of soil cover alone or a minimum of 0.6 m of soil cover, in conjunction with adequate foundation insulation should be provided.

Exterior unheated footings, such as those for isolated exterior piers, are more prone to deleterious movement associated with frost action than the exterior walls of the structure proper and require additional protection, such as soil cover of 2.1 m or a minimum of 0.6 m of soil cover, in conjunction with adequate foundation insulation should be provided.

6.4 Excavation Side Slopes

The temporary excavation side slopes anticipated should either be cut back at acceptable slopes or retained by shoring systems from the beginning of the excavation until the structure is backfilled. It is assumed 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. The subsurface soil is considered to be mainly a Type 2 and 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 maintain safe working distance from the excavation sides.

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

A trench box is recommended to protect personnel working in trenches with steep or vertical sides. Services are expected to be installed by “cut and cover” methods and excavations should not remain open for extended periods of time.

6.5 Pipe Bedding and Backfill

A minimum of 150 mm of OPSS Granular A should be placed for bedding for 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 225 mm thick lifts and compacted to 98% of the SPMDD.

It is generally possible to re-use the site materials above the cover material if the operations are carried out in dry weather conditions.

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 225 mm thick loose lifts and compacted to a minimum of 98% of the material’s SPMDD. All cobbles larger than 200 mm in their longest direction should be segregated from re-use as trench backfill.

6.6 Groundwater Control

It is anticipated that groundwater infiltration into the excavations 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. If a project qualifies for a PTTW based upon anticipated conditions, an EASR will not be allowed as a temporary dewatering measure while awaiting the MECP review of the PTTW application.

6.7 Winter Construction

Precautions must be taken if winter construction is considered for this project. The subsoil conditions at this site mostly 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 by the use of 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.

The trench excavations should be carried out in a manner to avoid the introduction of frozen materials, snow or ice into the trenches. Precautions must be taken where excavations are carried out in proximity of existing structures which may be adversely affected due to the freezing conditions. In particular, it should be recognized that where a shoring system is used, the soil behind the shoring system will be subjected to freezing conditions and could result in heaving of the structure(s) placed within or above frozen soil. Provisions should be made in the contract document to protect the walls of the excavations from freezing, if applicable.

6.8 Tree Planting Restrictions

In accordance with the City of Ottawa Tree Planting in Sensitive Marine Clay Soils (2017 Guidelines), Paterson completed a soils review of the site to determine applicable tree planting setbacks. Atterberg Limits testing was completed for recovered silty clay samples at selected locations throughout the subject site. Grain size distribution and hydrometer testing were also completed on selected soil samples. The above-noted soil samples were recovered from elevations below the anticipated design underside of footing elevation and 3.5 m depth below anticipated finished grade. The results of our testing are presented in Section 4.2 and in Appendix 1.

Based on the Atterberg Limits test results, the modified plasticity index is generally within 40%, indicating a low to medium sensitivity clay. Given that the proposed building will be a slab-on-grade structure, the underside of footing is expected at an approximate depth of 1.5 m.

The following tree planting setbacks are recommended for the low to medium sensitivity clay area. Tree planting setback limits may be reduced to **7.5 m** for small (mature tree height up to 7.5m) and medium size trees (mature tree height 7.5 m to 14 m). It should be noted that shrubs and other small planting are permitted within the **7.5 m** setback area.

However, if the underside of footing (USF) elevation is deeper than 2.1 m, in accordance with the City of Ottawa Tree Planting in Sensitive Marine Clay Soils (2017 Guidelines), for medium to low sensitive clays the tree planting setbacks can be reduced to 4.5 m, for small (mature height up to 7.5 m) and medium size trees (mature tree height 7.5 to 14 m), provided that the following conditions are met:

- ❑ The underside of footing (USF) is 2.1 m or greater below the lowest finished grade and must be satisfied for footings within 10 m from the tree, as measured from the center of the tree trunk and verified by means of the Grading Plan.
- ❑ A small tree must be provided with a minimum of 25 m^3 of available soil volume while a medium tree must be provided with a minimum of 30 m^3 of available soil volume, as determined by the Landscape Architect. The developer is to ensure that the soil is generally un-compacted when backfilling in street tree planting locations.
- ❑ The tree species must be small (mature tree height up to 7.5 m) to medium size (mature tree height 7.5 m to 14 m) as confirmed by the Landscape Architect.
- ❑ The foundation walls are to be reinforced at least nominally (minimum of two upper and two lower 15M bars in the foundation wall).

- Grading surrounding the tree must promote drainage to the tree root zone (in such a manner as not to be detrimental to the tree), as noted on the subdivision Grading Plan.

6.9 Corrosion Potential and Sulphate

The results of analytical testing show that the sulphate content is less than 0.1%. This result is indicative that Type 10 Portland cement (normal cement) would be appropriate for this site. The chloride content and the pH of the sample indicate that they are not significant factors in creating a corrosive environment for exposed ferrous metals at this site, whereas the resistivity is indicative of a moderate to aggressive corrosive environment to exposed ferrous.

7.0 Recommendations

For the foundation design data provided herein to be applicable, a material testing and observation services program is required to be completed. The following aspects should be performed by the geotechnical consultant.

- ❒ Review detailed grading plan(s) from a geotechnical perspective.
- ❒ A review of architectural and structural drawings to ensure adequate frost protection is provided to the proposed building foundations.
- ❒ Observation of all bearing surfaces prior to the placement of concrete.
- ❒ Periodic observation of the condition of unsupported excavation side slopes in excess of 3 m in height, if applicable.
- ❒ Sampling and testing of the concrete and fill materials used.
- ❒ 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 the completion of a satisfactory inspection program by the 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 made in this report are in accordance with our present understanding of the project. We request that we be permitted to review the grading plan once available and our recommendations when the drawings and specifications are complete.

A geotechnical investigation of this nature is a limited sampling of a site. The recommendations are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around the test locations. The extent of the limited area depends on the soil, bedrock and groundwater conditions, as well the history of the site reflecting natural, construction, and other activities. Should any conditions at the site be encountered which differ from those at the test locations, we request notification immediately in order to permit reassessment of our recommendations.

The recommendations provided in this report are intended for the use of design professionals associated with this project. Contractors bidding on or undertaking the work should examine the factual information contained in this report and the site conditions, satisfy themselves as to the adequacy of the information provided for construction purposes, supplement the factual information if required, and develop their own interpretation of the factual information based on both their and their subcontractor's construction methods, equipment capabilities and schedules.

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 Broder Electric or their agent(s) is not authorized without review by Paterson Group for the applicability of our recommendations to the altered use of the report.

Paterson Group Inc.

LICENSED PROFESSIONAL ENGINEER
July25, 2024
J. R. VILLENEUVE
100504344
PROVINCE OF ONTARIO

Pratheep Thirumoolan, M.Eng

Joey R Villeneuve, M.A.Sc, P.Eng.

Report Distribution:

- ❑ Broder Electric
- ❑ Paterson Group

APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

GRAIN SIZE DISTURBUTION AND HYDROMETER TESTING RESULTS

ATTERBERG LIMIT TESTING RESULTS

SHRINKAGE LIMIT TESTING RESULTS

ANALYTICAL TESTING RESULTS

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

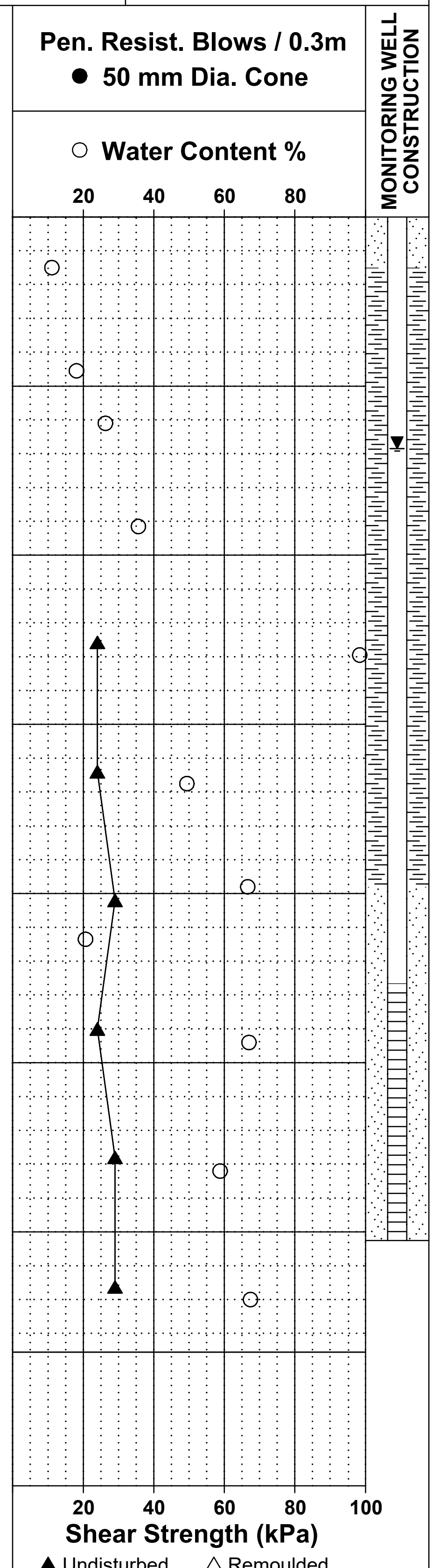
SOIL PROFILE AND TEST DATA

Geotechnical Investigation
15 Tradesman Road
Ottawa, Ontario

EASTING: 388075.405 **NORTHING:** 5022731.547 **ELEVATION:** 76.79
DATUM: Geodetic
REMARKS:
BORINGS BY: CME-55 Low Clearance Drill **DATE:** June 21, 2024

FILE NO. PG7185
HOLE NO. BH 1-24

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	76.79
Brown **SILTY SAND** with gravel and crushed stone		AU	1				
0.69							
Loose brown **SILTY SAND**							
0.91							
Soft to firm reddish brown **SILTY CLAY**		SS	2	63	6	1	75.79
- Grey by 2.2 m depth		SS	3	83	3	2	74.79
		SS	4	100	P		
		SS	5	50	P	3	73.79
4.11		SS	6	100	P	4	72.79
Grey **SILTY SAND**							
4.50							
Soft to firm reddish grey **SILTY CLAY**		SS	7	100	P	5	71.79
		SS	8	100	P		
		SS	9	100	P	6	70.79
6.71							
End of Borehole							
(GWL at 1.37 m - Jun. 28, 2024)							



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

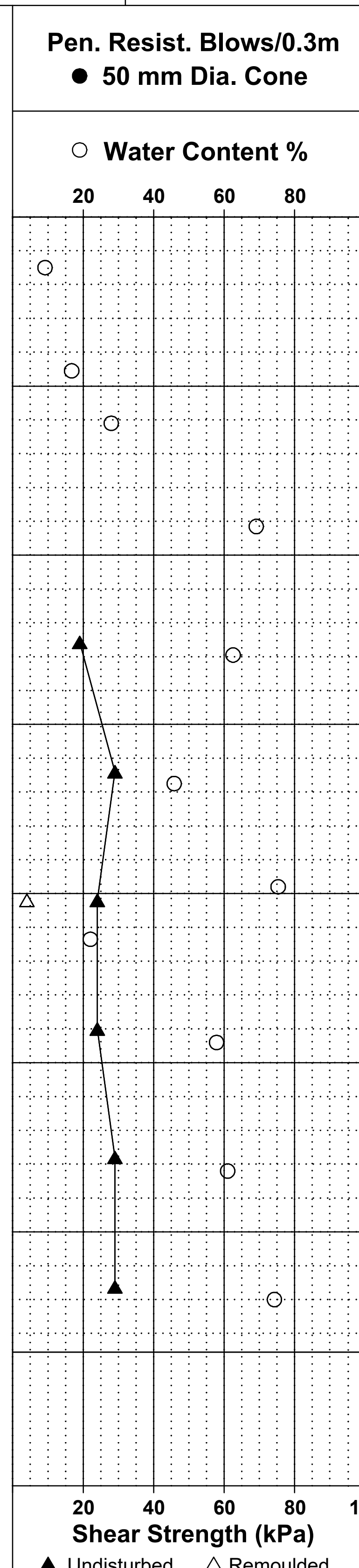
SOIL PROFILE AND TEST DATA

Geotechnical Investigation
15 Tradesman Road
Ottawa, Ontario

EASTING: 388096.494 **NORTHING:** 5022731.829 **ELEVATION:** 76.84
DATUM: Geodetic
REMARKS:
BORINGS BY: CME-55 Low Clearance Drill **DATE:** June 21, 2024

FILE NO. PG7185
HOLE NO. BH 2-24

SAMPLE DESCRIPTION	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
Ground Surface					0	76.84
FILL: Brown silty sand with gravel (to 0.69)	AU	1				
Loose brown **SILTY SAND** (0.69 to 0.91)						
Soft to firm reddish brown **SILTY CLAY** - Reddish gray by 2.1 m depth - Trace sand and gravel by 3.1 m depth (0.91 to 4.11)	SS	2	58	5	1	75.84
	SS	3	100	2	2	74.84
	SS	4	83	P		
	SS	5	25	P	3	73.84
Very loose brown **SILTY SAND** (4.11 to 4.50)	SS	6	71	P	4	72.84
Soft to firm grey **SILTY CLAY** - Trace sand and gravel by 5.3 m depth - Trace sand by 6.1 m depth (4.50 to 6.71)	SS	7	100	P	5	71.84
	SS	8	100	P		
	SS	9	100	P	6	70.84
End of Borehole (6.71) (GWL @ 0.39 m - Jun. 28, 2024)						



PIEZOMETER CONSTRUCTION

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
15 Tradesman Road
Ottawa, Ontario

EASTING: 388088.114 **NORTHING:** 5022698.386 **ELEVATION:** 76.84

DATUM: Geodetic

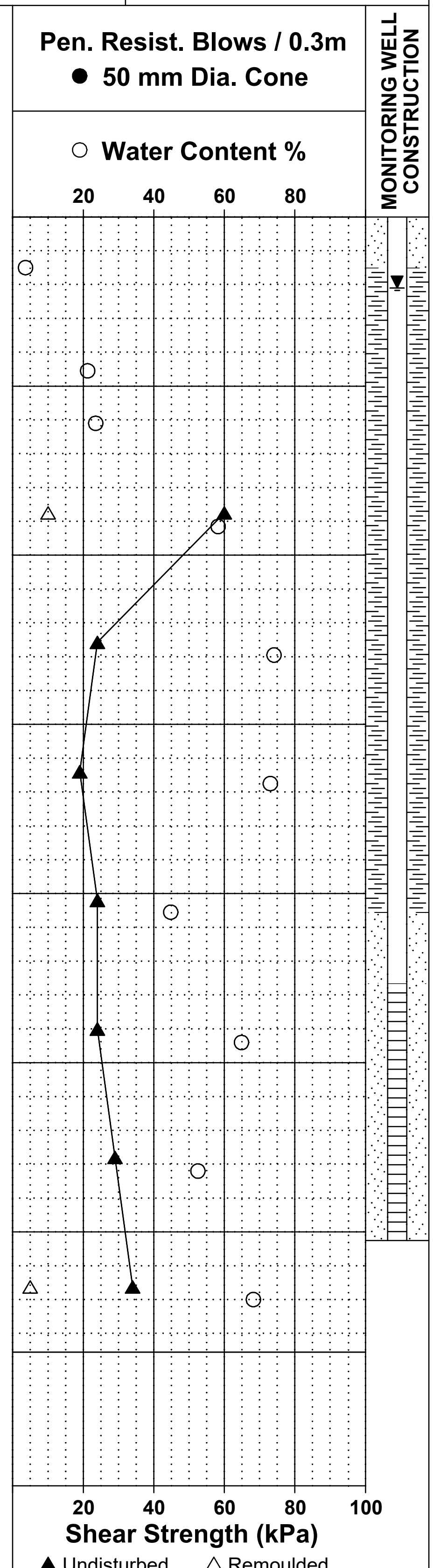
REMARKS:

BORINGS BY: CME-55 Low Clearance Drill **DATE:** June 21, 2024

FILE NO. PG7185

HOLE NO. BH 3-24

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	76.84
FILL: Brown silty sand with gravel and crushed stone		AU	1				
0.69							
Brown **SILTY SAND**							
0.91							
Brown **SILTY CLAY**, some sand		SS	2	50	7	1	75.84
1.45							
Stiff to firm reddish brown **SILTY CLAY**		SS	3	100	P		
- Reddish grey by 2.1 m depth						2	74.84
- Trace sand by 3.8 m depth		SS	4	58	P		
						3	73.84
		SS	5	100	P		
						4	72.84
		SS	6	58	P		
		SS	7	50	P		
						5	71.84
		SS	8	100	P		
						6	70.84
		SS	9	83	P		
6.71							
End of Borehole							
(GWL at 0.42 m - Jun. 28, 2024)							



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
15 Tradesman Road
Ottawa, Ontario

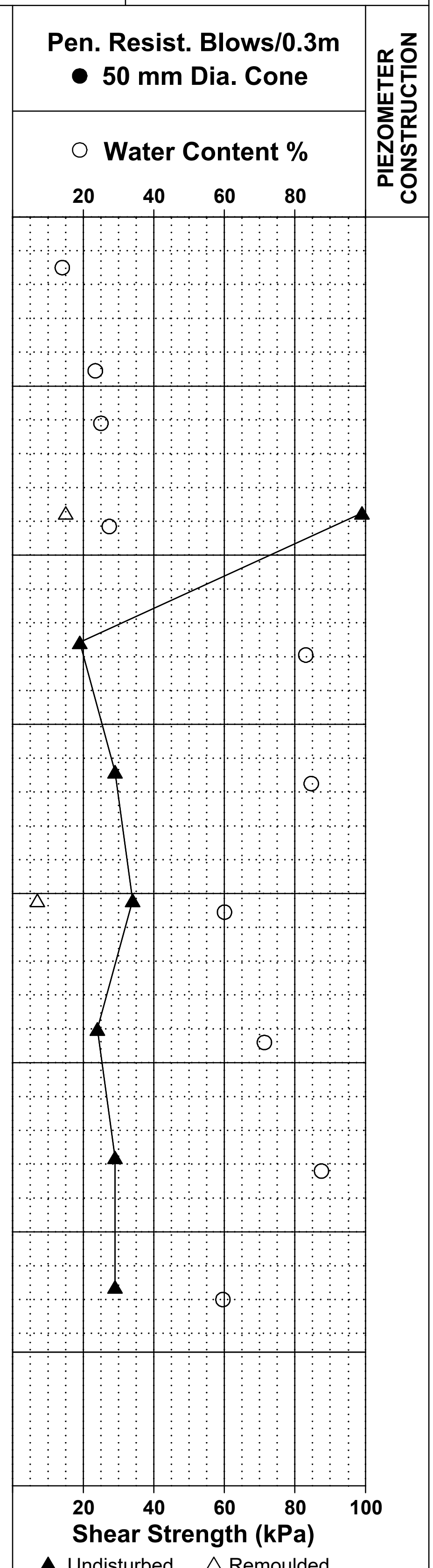
EASTING: 388133.888 **NORTHING:** 5022733.388 **ELEVATION:** 76.95
DATUM: Geodetic
REMARKS:
BORINGS BY: CME-55 Low Clearance Drill **DATE:** June 21, 2024

FILE NO. PG7185
HOLE NO. BH 4-24

SAMPLE DESCRIPTION	Depth to base (m)	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
Ground Surface						0	76.95
FILL: Brown silty sand, some gravel, trace clay	0.69	AU	1				
Loose brown **SILTY SAND**	0.91						
Soft to firm reddish brown **SILTY CLAY** - Reddish grey by 2.2 m depth		SS	2	50	7	1	75.95
		SS	3	42	P	2	74.95
		SS	4	100	P		
		SS	5	83	P	3	73.95
		SS	6	29	P	4	72.95
		SS	7	62	P	5	71.95
		SS	8	75	P		
		SS	9	75	P	6	70.95
	6.71						

End of Borehole

(GWL @ 0.35 m - Jun. 28, 2024)



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
15 Tradesman Road
Ottawa, Ontario

EASTING: 388178.046 **NORTHING:** 5022748.686 **ELEVATION:** 77.14

DATUM: Geodetic

REMARKS:

BORINGS BY: CME-55 Low Clearance Drill **DATE:** June 21, 2024

FILE NO. PG7185

HOLE NO. BH 5-24

SAMPLE DESCRIPTION

GROUND SURFACE

FILL: Brown silty sand with gravel and crushed stone — 0.69

Compact brown **SILTY SAND** — 1.45

Stiff to firm reddish brown **SILTY CLAY**

- Reddish grey by 2.2 m depth

- Trace sand and gravel by 3.1 m depth

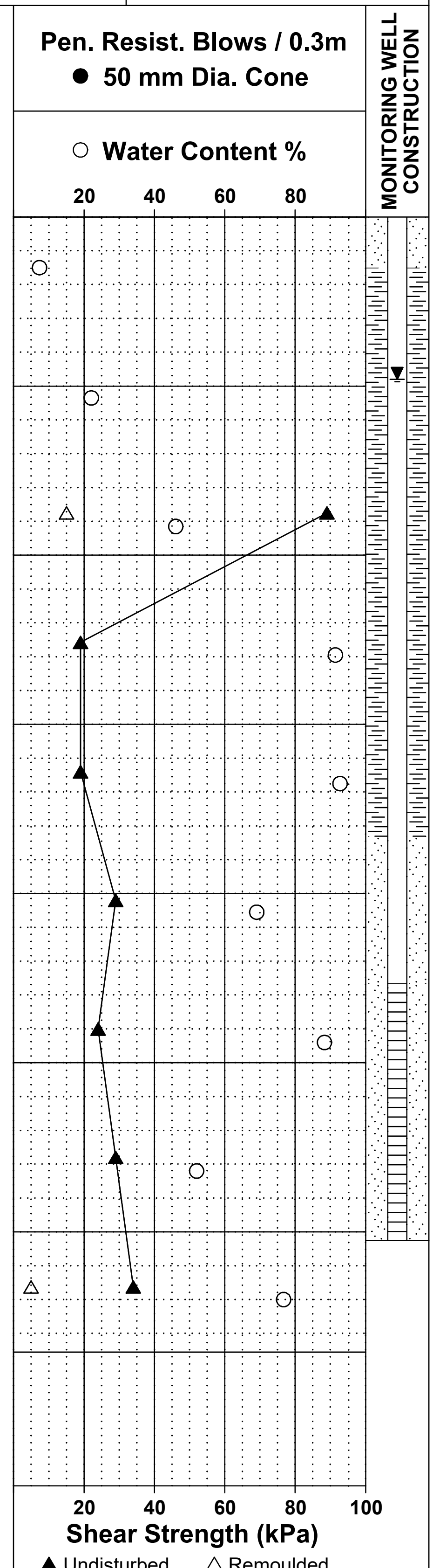
— 6.71

End of Borehole

(GWL at 0.96 m - Jun. 28, 2024)

SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD
AU	1		
SS	2	50	12
SS	3	50	P
SS	4	33	P
SS	5	33	P
SS	6	25	P
SS	7	71	P
SS	8	100	P
SS	9	42	P

DEPTH (m)	ELEV. (m)
0	77.14
1	76.14
2	75.14
3	74.14
4	73.14
5	72.14
6	71.14



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 = $(D30)^2 / (D10 \times D60)$
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

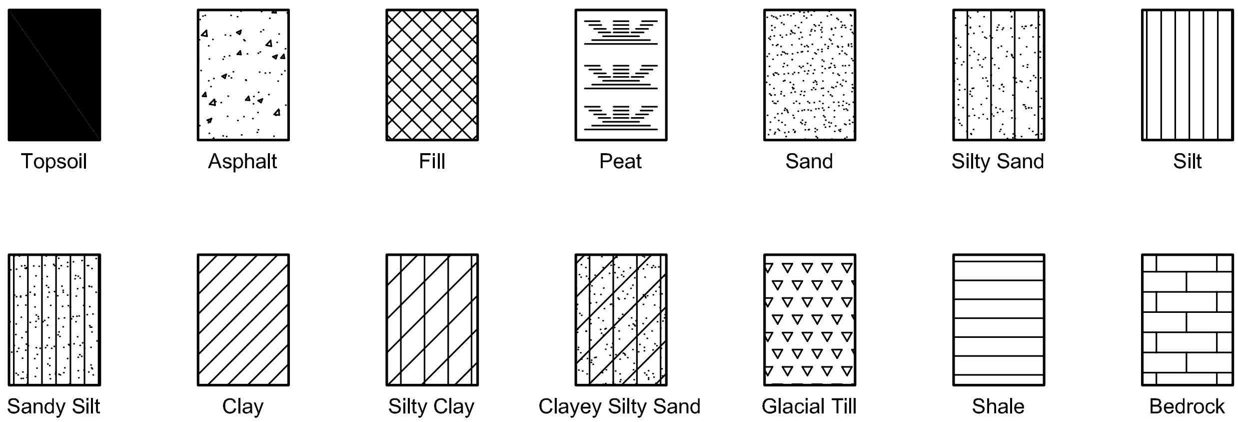
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void 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.

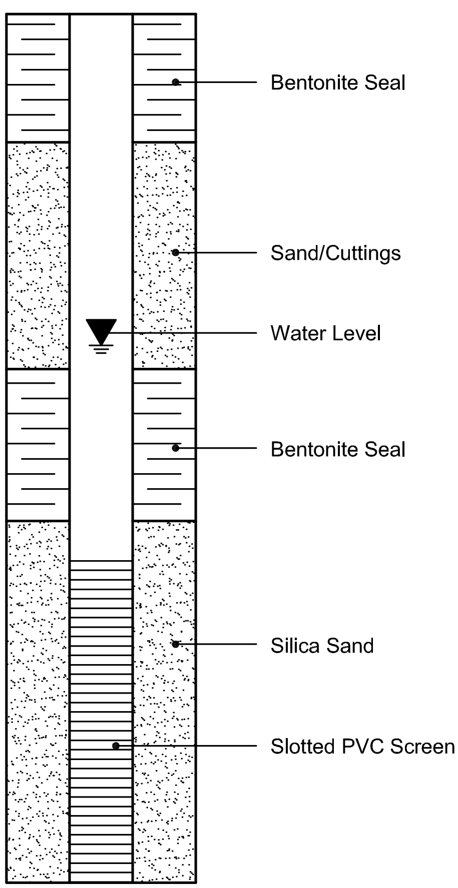
SYMBOLS AND TERMS (continued)

STRATA PLOT

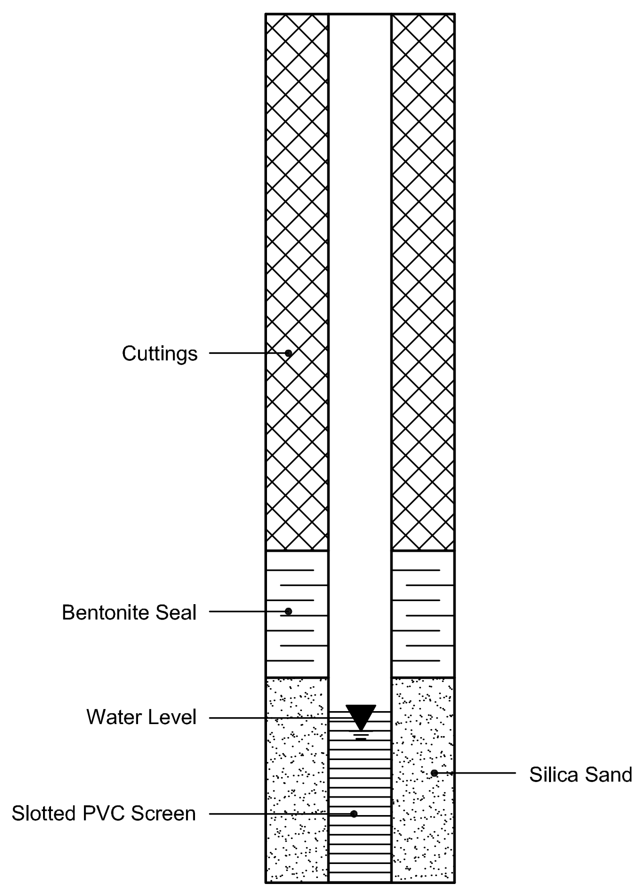


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



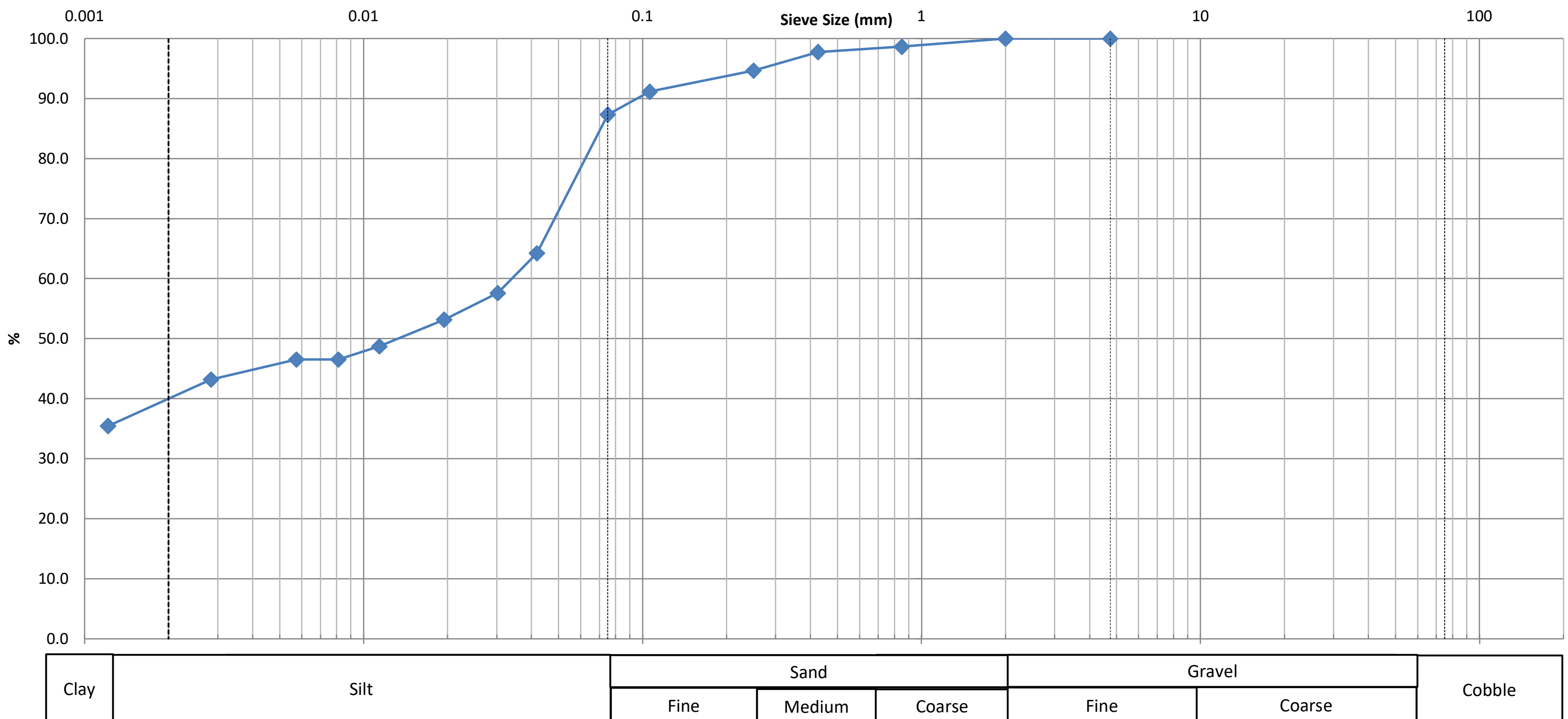
PIEZOMETER CONSTRUCTION



PATERSON GROUP

SIEVE ANALYSIS
ASTM C136

CLIENT:	Broder Electric	DEPTH:	5' - 7'	FILE NO:	PG7185
CONTRACT NO.:		BH OR TP No.:	BH2-24 SS3	LAB NO:	53536
PROJECT:	15 Tradesman Road, Ottawa, ON			DATE RECEIVED:	24-Jun-24
				DATE TESTED:	24-Jun-24
DATE SAMPLED:	21-Jun-24			DATE REPORTED:	5-Jul-24
SAMPLED BY:	A.E.			TESTED BY:	D.K



Identification	Soil Classification				MC(%)	LL	PL	PI	Cc	Cu
					31.9%					
	D100	D60	D30	D10	Gravel (%)	Sand (%)	Silt (%)	Clay (%)		
					0.0	12.7	47.3	40.0		

Comments:	Unit weight - 18.6 KN/m3

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

PATERSON GROUP

HYDROMETER
LS-702 ASTM-422

CLIENT:	Broder Electric	DEPTH:	5' - 7'	FILE NO.:	PG7185
PROJECT:	15 Tradesman Road, Ottawa, ON	BH OR TP No.:	BH2-24 SS3	DATE SAMPLED:	21-Jun-24
LAB No. :	53536	TESTED BY:	D.K	DATE RECEIVED:	24-Jun-24
SAMPLED BY:	A.E.	DATE REPT'D:	5-Jul-24	DATE TESTED:	24-Jun-24

SAMPLE INFORMATION

SAMPLE MASS	SPECIFIC GRAVITY
93.3	2.700

		HYGROSCOPIC MOISTURE		
INITIAL WEIGHT	50.00			
WEIGHT CORRECTED	44.64	TARE WEIGHT	0.00	ACTUAL WEIGHT
WT. AFTER WASH BACK SIEVE	6.64	AIR DRY	104.50	104.50
SOLUTION CONCENTRATION	40 g/L	OVEN DRY	93.30	93.30
		CORRECTED	0.893	

GRAIN SIZE ANALYSIS

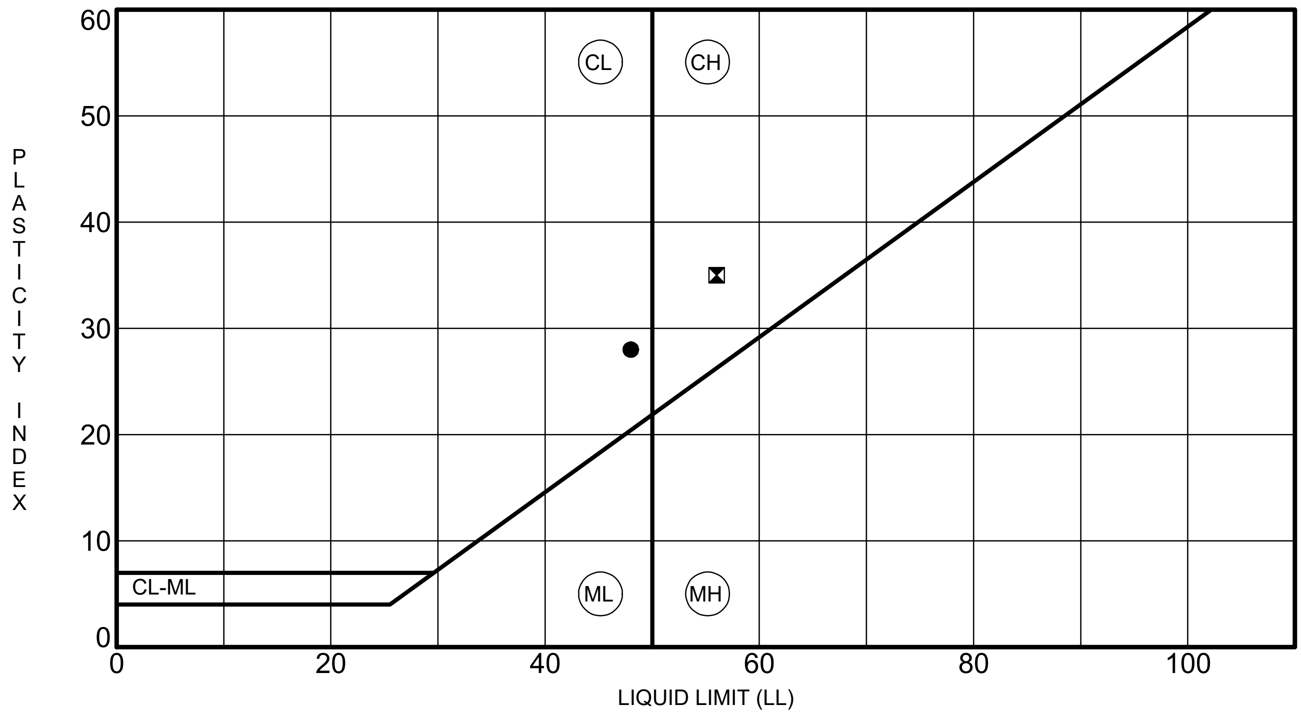
SIEVE DIAMETER (mm)	WEIGHT RETAINED (g)	PERCENT RETAINED	PERCENT PASSING
26.5			
19			
13.2			
9.5			
4.75	**0.0**	0.0	**100.0**
2.0	**0.0**	0.0	**100.0**
Pan	**93.3**		
0.850	**0.67**	1.3	**98.7**
0.425	**1.11**	2.2	**97.8**
0.250	**2.66**	5.3	**94.7**
0.106	**4.41**	8.8	**91.2**
0.075	**6.33**	12.7	**87.3**
Pan	**6.64**		
SIEVE CHECK 0.0	MAX = 0.3%		

HYDROMETER DATA

ELAPSED	TIME (24 hours)	Hs	Hc	Temp. (^{o}C)	DIAMETER	(P)	TOTAL PERCENT PASSING
1	8:35	35.0	6.0	23.0	0.0418	64.2	**64.2**
2	8:36	32.0	6.0	23.0	0.0303	57.6	**57.6**
5	8:39	30.0	6.0	23.0	0.0194	53.2	**53.2**
15	8:49	28.0	6.0	23.0	0.0114	48.7	**48.7**
30	9:04	27.0	6.0	23.0	0.0081	46.5	**46.5**
60	9:34	27.0	6.0	23.0	0.0057	46.5	**46.5**
250	12:44	25.5	6.0	23.0	0.0028	43.2	**43.2**
1440	8:34	22.0	6.0	23.0	0.0012	35.4	**35.4**

Moisture = 31.9%

REVIEWED BY:	C. Beadow	Joe Forsyth, P. Eng.
	(signature)	(signature)



	Specimen Identification		LL	PL	PI	Fines	Classification
●	**BH 1-24**	**SS3**	**48**	**20**	**28**		**CL - Inorganic clays of low plasticity**
⧗	**BH 4-24**	**SS4**	**56**	**21**	**35**		**CH - Inorganic clays of high plasticity**

CLIENT	**Broder Electric**	FILE NO.	**PG7185**
PROJECT	**Geotechnical Investigation - 15 Tradesman Road**	DATE	**21 Jun 24**

patersongroup **Consulting Engineers**
9 Auriga Drive, Ottawa, Ontario K2E 7T9

ATTERBERG LIMITS' RESULTS

PATERSON GROUP

Linear Shrinkage
ASTM D4943-02

CLIENT:	Broder Electric	DEPTH	5' - 7'	FILE NO.:	PG7185
PROJECT:	15 Tradesman Road	BH OR TP No:	BH3-24 SS3	DATE SAMPLED	21-Jun-24
LAB No:	53537	TESTED BY:	C.P	DATE RECEIVED	24-Jun-24
SAMPLED BY:	Adam E.	DATE REPORTED:	5-Jul-24	DATE TESTED	24-Jun-24

LABORATORY INFORMATION & TEST RESULTS

Moisture	No. of Blows(7)	Calibration (Two Trials)	Tin NO.(x21)	
Tare	4.99	Tin	4.77	4.78
Soil Pat Wet + Tare	63.28	Tin + Grease	5	5
Soil Pat Wet	58.29	Glass	43.22	43.22
Soil Pat Dry + Tare	38.44	Tin + Glass + Water	85.76	85.75
Soil Pat Dry	33.45	Volume	37.54	37.53
Moisture	**74.26**	**Average Volume**	**37.54**	

Soil Pat + String	33.58
Soil Pat + Wax + String in Air	40.48
Soil Pat + Wax + String in Water	14.57
Volume Of Pat (Vdx)	25.91

RESULTS:

Shrinkage Limit	**16.33**
Shrinkage Ratio	**1.842**
Volumetric Shrinkage	**106.723**
Linear Shrinkage	**21.498**

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

Certificate of Analysis

Report Date: 02-Jul-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 25-Jun-2024

Client PO: 60504

Project Description: PG7185

	Client ID:	BH2-24-SS2	-	-	-	-	-
	Sample Date:	21-Jun-24 09:00	-	-	-		
	Sample ID:	2426244-01	-	-	-		
	Matrix:	Soil	-	-	-		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	78.8	-	-	-	-	-
General Inorganics							
pH	0.05 pH Units	7.08	-	-	-	-	-
Resistivity	0.1 Ohm.m	30.4	-	-	-	-	-
Anions							
Chloride	10 ug/g	35	-	-	-	-	-
Sulphate	10 ug/g	98	-	-	-	-	-

APPENDIX 2

FIGURE 1 – KEY PLAN

DRAWING PG7185-1 – TEST HOLE LOCATION PLAN

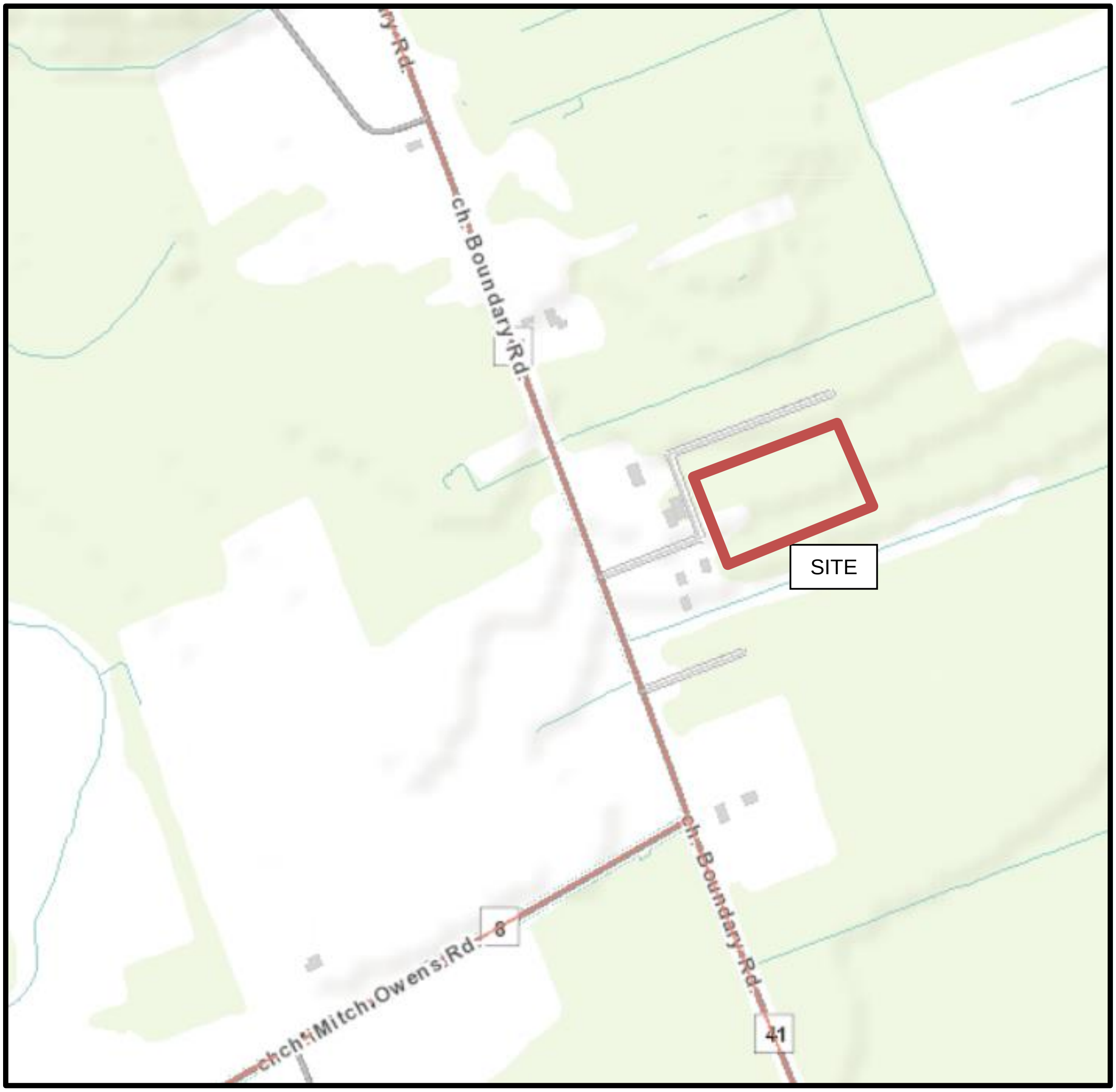
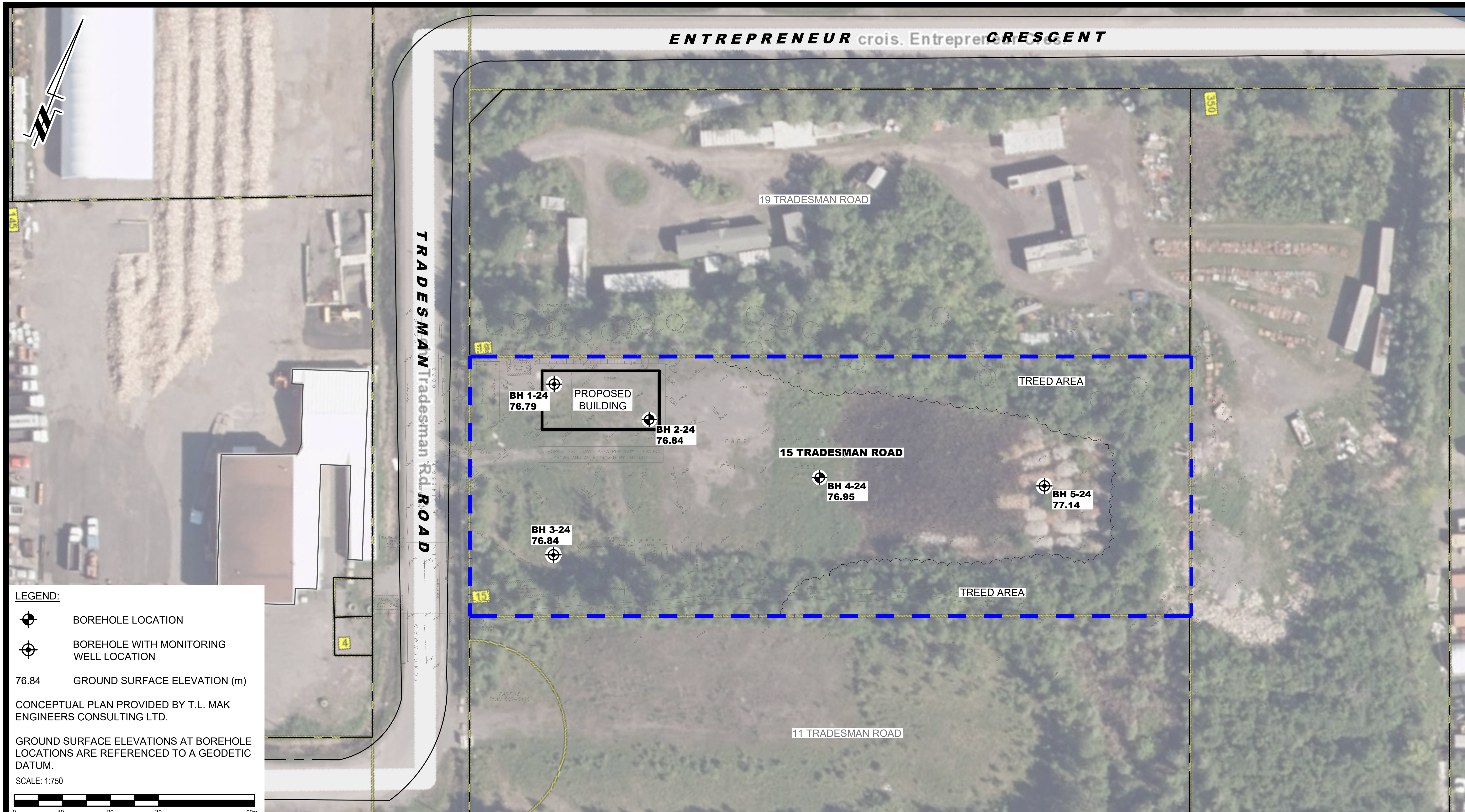


FIGURE 1

KEY PLAN

PATERSON GROUP



LEGEND:

⌖	BOREHOLE LOCATION
⌖	BOREHOLE WITH MONITORING WELL LOCATION
76.84	GROUND SURFACE ELEVATION (m)

CONCEPTUAL PLAN PROVIDED BY T.L. MAK ENGINEERS CONSULTING LTD.

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

SCALE: 1:750

0 10 20 30 50m

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

BRODER ELECTRIC
GEOTECHNICAL INVESTIGATION
PROPOSED COMMERCIAL DEVELOPMENT
15 TRADESMAN ROAD

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale:	1:750	Date:	06/2024
Drawn by:	YA	Report No.:	PG7185-1
Checked by:	NS	Dwg. No.:	PG7185-1
Approved by:	JV	Revision No.:	

p:\autocad drawings\geotechnical\pg71xx\pg7185\pg7185-1-test hole location plan.dwg

11x17