Kollaard Associates
Engineers

210 Prescott Street, Unit 1
P.O. Box 189
Kemptville, Ontario K0G 1J0

Civil • Geotechnical •
Structural • Environmental •
Hydrogeology

(613) 860-0923

FAX: (613) 258-0475

REPORT ON

GEOTECHNICAL INVESTIGATION
PROPOSED COMMERCIAL DEVELOPMENT
41 EDGEWATER STREET, KANATA
CITY OF OTTAWA, ONTARIO

Project # 250848

Submitted to:

1763295 Ontario Inc.
17 Taunton Place
Ottawa, ON
K1J 7J7

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April 21, 2026

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RE: GEOTECHNICAL INVESTIGATION
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41 EDGEWATER STREET, KANATA
CITY OF OTTAWA, ONTARIO

1.0 INTRODUCTION

This report presents the results of a geotechnical investigation carried out for a proposed commercial development to be located at 41 Edgewater Street, Ottawa, Ontario (see Key Plan, Figure 1).

The purpose of the investigation was to:

- Identify the subsurface conditions at the site by means of a limited number of boreholes;
- Based on the factual information obtained, provide recommendations and guidelines on the geotechnical engineering aspects of the project design; including bearing capacity and other construction considerations, which could influence design decisions.

2.0 BACKGROUND INFORMATION AND SITE GEOLOGY

2.1 Existing Conditions and Site Geology

The subject site for this assessment consists of about a 1.4 hectare (3.5 acres) rectangular shaped property located at 41 Edgewater Street in the City of Ottawa, Ontario (see Key Plan, Figure 1).

For the purposes of this assessment, project north lies parallel to Terry Fox Drive, located west of the site.

Currently, the property is occupied by four commercial buildings. The buildings are serviced with an asphaltic surfaced laneway and accessed from Edgewater Street and Terry Fox Drive. The buildings are serviced by natural gas, hydro and by municipal sewer and water.

Surrounding land use is currently commercial development. The site is bordered on the north by Edgewater Street followed by commercial development, on the east and south by commercial development, and on the west by Terry Fox Drive followed by commercial development.

The ground surface is mostly flat lying. Drainage is directed to catch basins located on Terry Fox Drive. The regional topography is relatively flat lying at the subject site.

Based on a review of surficial geology maps for the site area, it is expected that the site is generally underlain by offshore marine deposits consisting of clay, silty clay, and silt. A review of the bedrock geology map indicates that the bedrock underlying the site consists of limestone and shale of the Simcoe Group of the Verulam Formation.

2.2 Proposed Development

Preliminary plans are being prepared to construct a single storey commercial building at the site south of the existing buildings. It is understood that the footprint of the building will be approximately 386.5 square metres (4160 square feet) in plan area.

It is understood that the building will be founded on a conventional cast-in-place concrete foundation supported by strip footings. The proposed building will be serviced by municipal sewer and water.

It is understood that the existing drainage patterns, including the existing catch basins and storm sewers, are to be retained to service the proposed development. As such, significant grade changes are not expected.

3.0 PROCEDURE

The field work for this investigation was carried out on December 11, 2025, at which time five boreholes numbered BH1 to BH5 were put down at the site using a truck mounted drill rig equipped

with a hollow stem auger owned and operated by Limitless Drilling of Renfrew, Ontario. The boreholes were put down within or immediately adjacent to the proposed building footprint.

Sampling of the overburden materials encountered at the borehole locations were carried out at regular 0.75 metre depth intervals using a 50 millimetre diameter drive open conventional split spoon sampler in conjunction with standard penetration testing (ASTM D-1586 – Penetration Test and Split Barrel Sampling of Soils). Boreholes BH1 to BH5 were advanced to depths of about 1.4 to 3.3 metres, below the existing ground surface, using 200 mm hollow stem augers.

The subsurface soil conditions encountered at the boreholes were classified based on visual and tactile examination of the samples recovered (ASTM D2488 - Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), standard penetration and laboratory test results on select samples. In-situ vane shear testing was carried out where softer cohesive materials were encountered within the boreholes. The soils were classified using the Unified Soil Classification System. Groundwater conditions at the boreholes were noted at the time of drilling. The boreholes were loosely backfilled with the auger cuttings upon completion of drilling.

Two soil samples (BH2 – SS3 – 3.0 – 3.2 m and BH3 – SS3 – 1.5 – 2.1m) were submitted for Hydrometer and moisture content (ASTM D7928) and one sample (BH3 – SS3 – 1.5 – 2.1 m) was submitted for Atterberg Limits (D4318) testing. One sample of soil (BH2 – SS2 – 1.5 – 2.1 m) was also delivered to a laboratory for chemical testing to determine any indication of the potential for soil sulphate attack and soil corrosion on buried concrete and steel. The samples were selected based on depth and tactile examination to be representative of the various soil conditions encountered at the site.

A total of 7 soil samples recovered from the boreholes were also tested for moisture content (ASTM D2216).

The field work was supervised throughout by a member of our engineering staff who located the boreholes in the field, logged the boreholes and cared for the samples obtained. A description of the subsurface conditions encountered at the boreholes is given in the attached Record of Borehole Sheets. The results of the laboratory testing of the soil samples are presented in Attachment A and

B following the text in this report. The approximate location of the boreholes is shown on the attached Site Plan, Figure 2.

4.0 SUBSURFACE CONDITIONS

4.1 General

As previously indicated, a description of the subsurface conditions encountered at the boreholes is provided in the attached Record of Borehole Sheets following the text of this report. The borehole logs indicate the subsurface conditions at the specific drill locations only. Boundaries between zones on the logs are often not distinct, but rather are transitional and have been interpreted. Subsurface conditions at locations other than borehole locations may vary from the conditions encountered at the boreholes.

The soil descriptions in this report are based on commonly accepted methods of classification and identification employed in geotechnical practice.

Classification and identification of soil involves judgement and Kollaard Associates Inc. does not guarantee descriptions as exact, but infers accuracy to the extent that is common in current geotechnical practice.

The groundwater conditions described in this report refer only to those observed at the location and on the date the observations were noted in the report and on the borehole logs. Groundwater conditions may vary seasonally, or may be affected by construction activities on or in the vicinity of the site.

The following is a brief overview of the subsurface conditions encountered at the boreholes.

4.2 Fill Materials

Fill materials consisting of topsoil (BH5) or asphalt, crushed granular stone, and yellow brown silty sand (BH3) were encountered from the surface at boreholes BH1 to BH5. The fill materials extended to a depth of about 0.3 to 0.8 metres. The fill materials were fully penetrated where encountered.

4.3 Silt

A layer of grey brown silt was encountered beneath the fill materials in borehole BH2. The silt was encountered at a depth of about 0.6 metres below the existing ground surface. The results of the standard penetration testing carried out in the silt materials measured about 6 indicating a loose state of packing. The silt materials were fully penetrated in borehole BH2, and had a thickness of about 0.9 metres.

4.4 Silty Clay

Beneath the fill materials and silt layer (BH2), a deposit of grey brown silty clay was encountered at all of the boreholes. The silty clay was encountered at depths ranging from about 0.3 to 1.5 metres below the existing ground surface. The silty clay materials were fully penetrated when encountered and had a thickness of about 0.6 to 2.4 metres.

In-situ vane shear tests carried out within the silty clay materials ranged from about 188 to greater than 280 kilopascals, indicating a very stiff consistency. Blow counts within the silty clay were between 6 to 8 per 0.3 metres of penetration and confirmed the silty clay to be very stiff.

The results of hydrometer analysis (ASTM D7928) on two samples of soil (BH2 – SS3 – 3.0 – 3.2 m and BH3 – SS3 – 1.5 – 2.1m) indicates the samples have the following:

Sample	Depth(metres)	% Gravel	% Sand	% Silt	% Clay
BH2 – SS3	3.0 – 3.2	0.0	23.0	34.0	43.0
BH3 – SS3	1.5 – 2.1	0.0	2.8	45.2	52.0

The results of Atterberg Limits tests and moisture content (ASTM D422) conducted on one soil sample (BH3 – SS3 – 1.5 – 2.1 m) of the silty clay are presented in the following table;

Table I – Atterberg Limit and Water Content Results

Sample	Depth(metres)	LL (%)	PL (%)	PI (%)	W (%)
BH3-SS3	1.5 – 2.1	69.5	23.2	46.3	47.9

LL: Liquid Limit PL: Plastic Limit PI: Plasticity Index W: water content
CH: Highly Plastic Soils

The tested silty clay sample classifies as high plasticity in accordance with the Unified Soil Classification System. The results of the laboratory testing are located in Attachment A.

4.5 Glacial Till

A layer of grey brown silty sand, some gravel, cobbles boulders, with a trace of clay (glacial till) was encountered beneath the silty clay in borehole BH2. The glacial till was encountered at a depth of about 2.7 metres below the existing ground surface. The results of the standard penetration testing carried out in the glacial till measured greater than 50 blow counts per 0.3 metres of penetration indicating a very dense state of packing. Borehole BH2 encountered practical refusal on large boulders or bedrock at a depth of about 3.3 metres below existing ground surface.

4.6 Potential Bedrock

Boreholes BH1 to BH5 were terminated with practical refusal at the base of the silty clay on bedrock or large boulders, at a depth of about 1.4 to 3.3 metres below the existing ground surface.

4.7 Moisture Contents

A total of 7 soil samples recovered from the boreholes were also tested for moisture content (ASTM D2216). The calculated moisture contents of the soil samples measured about 17 percent in the fill materials, about 37 percent in the silt, and ranged between about 18 to 48 percent in the silty clay. The results of the moisture content are located on the Record of Borehole sheets following the text of this report.

4.8 Groundwater

Some groundwater was observed at the time of drilling, December 11, 2025 in boreholes BH2 and BH3 at depths of about 2.4 meters below the existing ground surface. Boreholes BH1, BH4, and BH5 were dry at the time of drilling. Groundwater was measured in a standpipe installed within borehole BH5 at a depth of about 1.6 metres below the existing ground surface on January 13, 2026. It should be noted that the groundwater levels may be higher during wet periods of the year such as the early spring.

4.9 Corrosivity on Reinforcement and Sulphate Attack on Portland Cement

The results of the laboratory testing of a soil sample (BH2 – SS2 – 1.5 – 2.1 m) submitted for chemistry testing related to corrosivity is summarized in the following table.

Item	Threshold of Concern	Test Result	Comment
Chlorides (Cl)	Cl > 0.04 %	0.13	Above threshold
pH	pH < 5.5	7.64	Negligible concern
Resistivity	R < 20,000 ohm-cm	2,190	Highly corrosive
Sulphates (SO_4)	SO_4 > 0.1%	0.0287	Negligible concern

The results of the laboratory testing of a soil sample for sulphate gave a percent sulphate of 0.0287. The National Research Council of Canada (NRC) recognizes four categories of potential sulphate attack of buried concrete based on percent sulphate in soil as follows:

Sulphate in Soil (%)	Sulphate Rating
0 to 0.10	negligible
0.10 to 0.20	mild
0.20 to 0.50	considerable
>0.50	severe

The chloride content of the sample was also compared with the threshold level and is present at about 0.13% compared to the level of concern of greater than 0.04%, indicating concrete corrosion potential.

Based on the above, the soils are considered to have a negligible potential for sulphate attack on buried concrete materials with elevated chloride levels, supplementary cementitous materials (SCM) should be used in place of conventional Type GU General Use Hydraulic Cement or MS Portland cement in the construction of the proposed concrete elements.

The pH value for the soil sample was reported to be at 7.64, indicating a durable condition against corrosion. This value was evaluated using Table 2 of Building Research Establishment (BRE) Digest 362 (July 1991).The pH is greater than 5.5 indicating the concrete will not be exposed to attack from acids.

Corrosivity Rating for soils ranges from extremely corrosive to non-corrosive as follows:

Soil Resistivity (ohm-cm)	Corrosivity Rating
> 20,000	non- corrosive
10,000 to 20,000	mildly corrosive
5,000 to 10,000	moderately corrosive
3,000 to 5,000	corrosive
1,000 to 3,000	highly corrosive
< 1,000	extremely corrosive

The soil resistivity was found to be 2,190 ohm-cm for the sample analyzed making the soil highly corrosive for buried steel within below grade concrete walls. Due to the highly corrosive soil and elevated chloride levels increasing the specified strength and increasing concrete cover and adding air entrainment into any reinforced concrete in contact with the soil is recommended. Alternatively, a glass fiber reinforced plastic (GFRP) product could be used in place of steel reinforcing in below grade applications.

5.0 GEOTECHNICAL GUIDELINES AND RECOMMENDATIONS

5.1 General

This section of the report provides engineering guidelines on the geotechnical design aspects of the project based on our interpretation of the information from the test holes and the project requirements. It is stressed that the information in the following sections is provided for the guidance of the designers and is intended for this project only. Contractors bidding on or undertaking the works should examine the factual results of the investigation, satisfy themselves as to the adequacy of the information for construction, and make their own interpretation of the factual data as it affects their construction techniques, schedule, safety and equipment capabilities.

The professional services for this project include only the geotechnical aspects of the subsurface conditions at this site. The presence or implications of possible surface and/or subsurface contamination resulting from previous uses or activities at this site or adjacent properties, and/or resulting from the introduction onto the site of materials from offsite sources are outside the terms of reference for this report.

5.2 Foundation for Proposed Commercial Building

The subsurface conditions at the site encountered at the boreholes advanced during the investigation consisted of fill materials (topsoil or asphalt, crushed stone, and silty sand) over silt

(BH2) and/or silty clay followed by glacial till (BH2). With the exception of the fill materials the subsurface conditions encountered at the test holes advanced during the investigation are suitable for the support of the proposed building placed on a native silty clay subgrade or on engineered fill placed on the native subgrade.

The information provided indicates the development consists of a single storey commercial building. It is understood that the foundation for the proposed building is to consist of a conventional cast-in-place concrete foundation supported by conventional spread footings (frost walls, no basement). The proposed footings will bear below the depth of seasonal frost penetration.

5.3 Subsurface Conditions at the Underside of Footing Level

It is expected that the subgrade immediately below the proposed footing level will consist of grey brown very stiff silty clay. Once the excavation for the foundation is complete, the exposed subgrade should be inspected by a qualified geotechnical person. Any disturbed silty clay if encountered should also be removed.

5.4 Conventional Spread Footing Foundations

Based on the shear vane results within the silty clay deposits, the silty clay has a very stiff consistency and is suitable to support the loads from the proposed foundation footings and adjacent grade raise fill. The allowable bearing pressure for any footings depends on the depth of the footings below original ground surface, the width of the footings, the height above the original ground surface of any grade raise adjacent to the foundations and the thickness of the soils deposit beneath the footings.

Strip and pad footings, a minimum 0.5 metres in width bearing, at a founding depth of up to 1.8 metres below the existing ground, on the native undisturbed very stiff silty clay or on a suitably constructed engineering pad placed on the native silty clay may be designed using a maximum allowable bearing pressure of 120 kilopascals for serviceability limit states and 250 kilopascals for the factored ultimate bearing resistance.

The above allowable bearing pressure is subject to a maximum grade raise of 2.5 metres above the existing ground surface and to maximum strip footing width of 1.5 metres.

Provided that any loose and/or disturbed soil is removed from the bearing surfaces prior to pouring concrete, the total and differential settlement of the footings should be less than 25 millimetres and 20 millimetres, respectively.

5.5 Engineered Fill

Any fill required to raise the footings for the proposed building to founding level should consist of imported granular material (engineered fill). The engineered fill should consist of granular material meeting Ontario Provincial Standards Specifications (OPSS) requirements for Granular A or Granular B Type II and should be compacted in maximum 300 millimetre thick loose lifts to at least 95 percent of the standard Proctor maximum dry density. It is considered that the engineered fill should be compacted using dynamic compaction with a large diameter vibratory steel drum roller or diesel plate compactor. If a diesel plate compactor is used, the lift thickness may need to be restricted to less than 300 mm to achieve proper compaction. Compaction should be verified by a suitable field compaction test method.

To allow the spread of load beneath the footings, the engineered fill should extend out 0.5 metres horizontally from the edges of the footing then down and out at 1 horizontal to 1 vertical, or flatter. The excavations for the structure should be sized to accommodate this fill placement.

The first lift of engineered fill material should have a thickness of 300 millimetres in order to protect the subgrade during compaction. It is considered that the placement of a geotextile fabric between the engineered fill and the subgrade is not necessary where granular materials meeting the grading requirements for OPSS Granular B Type I or Type II are placed on a silty clay subgrade above the normal ground water level. It is recommended that trucks are not used to place the engineered fill on the subgrade. The fill should be dumped at the edge of the excavation and moved into place with a tracked bulldozer or excavator.

The native soils at this site will be sensitive to disturbance from construction operations and from rainwater or snowmelt, and frost. In order to minimize disturbance, construction traffic operating directly on the subgrade should be kept to an absolute minimum and the subgrade should be protected from below freezing temperatures.

5.6 Foundation Excavation

Any excavation for the proposed commercial building will likely be carried out through a layer of fill materials (topsoil or asphalt, crushed stone, silty sand) and silt to bear within the native silty subgrade. The sides of the excavations should be sloped in accordance with the requirements of Ontario Regulation 213/91, s. 226 under the Occupational Health and Safety Act. According to the Act, the native soils at the site can be classified as Type 3 soil, however this classification should be confirmed by qualified individuals as the site is excavated and if necessary, adjusted.

Based on the expected depths of excavation for the foundations, It is expected that the side slopes of the excavation will be stable provided the walls are sloped at 1H:1V to 1.2 metres or less from the bottom of excavation and provided no excavated materials are stockpiled within 2 metres of the top of the excavations.

5.7 Ground Water in Excavation and Construction Dewatering

Groundwater inflow from the native soils into the excavations during construction, if any should be handled by pumping from sumps within the excavation.

Some groundwater was observed at the time of drilling, December 11, 2025 in borehole BH2 and BH3 at about 2.4 metres below the existing ground surface. Boreholes BH1, BH4, and BH5 were dry at the time of drilling. Groundwater was measured in a standpipe placed within borehole BH5 at about 1.6 metres below the existing ground surface on January 13, 2026. In addition, the moisture contents of the fill materials and the silty clay samples tested indicate that the fill materials and the upper portion of the silty clay remain unsaturated above the groundwater level. Based on the groundwater levels observed, it is considered that the excavation for the proposed building at the site should not extend below the ground water level. As such, a permit to take water will not be required prior to excavation. If groundwater is encountered during excavation for the proposed building foundation, registration on the Environmental Activity Sector Registry (EASR) as per O.Reg. 63/16 is expected to be sufficient.

5.8 Frost Protection Requirements for Spread Footing Foundations

In general, all exterior foundation elements and those in any unheated parts of the proposed building should be provided with at least 1.5 metres of earth cover for frost protection purposes.

Isolated, unheated foundation elements adjacent to surfaces, which are cleared of snow cover during winter months should be provided with a minimum 1.8 metres of earth cover for frost protection purposes.

5.9 Foundation Wall Backfill and Drainage

Provided the proposed finished floor surfaces are above the exterior finished grade, the granular materials beneath the proposed floor slabs are properly compacted and provided the exterior grade is adequately sloped away from the proposed building foundation, no perimeter foundation drainage system is required.

To prevent possible foundation frost jacking due to frost adhesion, the backfill against the foundation walls should consist of free draining, non-frost susceptible material. If imported material is required, it should consist of sand or sand and gravel meeting OPSS Granular B Type I grading requirements. Alternatively, foundations could be backfilled with native material in conjunction with the use of an approved proprietary drainage layer system such as "System Platon" against the foundation wall. It is pointed out that there is potential for possible frost jacking of the upper portion of some types of these drainage layer systems if frost susceptible material is used as backfill. This could be mitigated by backfilling the upper approximately 0.6 metres with non-frost susceptible granular material.

Where the backfill material will ultimately support a pavement structure or walkway, it is suggested that the foundation wall backfill material be compacted in 250 millimetre thick lifts to 95 percent of the standard Proctor dry density value. In that case any native material proposed for foundation backfill should be inspected and approved by the geotechnical engineer.

5.10 Slab on Grade

The fill materials beneath the proposed concrete floor slab on grades should consist of a minimum of 150 millimetre thickness of crushed stone meeting OPSS Granular A immediately beneath the concrete floor slab followed by sand, or sand and gravel meeting the OPSS for Granular B Type I, or crushed stone meeting OPSS grading requirements for Granular B Type II, or other material approved by the Geotechnical Engineer. The fill materials should be compacted in maximum 300 millimetre thick lifts to at least 95 percent of the standard Proctor maximum dry density.

The slabs should be structurally independent from walls and columns, which are supported by the foundations. This is to reduce any structural distress that may occur as a result of differential soil movement. If it is intended to place any internal non-load bearing partitions directly on the slab-on-grades, such walls should also be structurally independent from other elements of the building founded on the conventional foundation system so that some relative vertical movement between the floor slabs and foundations can occur freely.

The concrete floor slabs should be saw cut at regular intervals to minimize random cracking of the slab due to shrinkage of the concrete. The saw cut depth should be about one quarter of the thickness of the slab. The crack control cuts should be placed at a grid spacing not exceeding the lesser of 25 times the slab thickness or 4.5 metres. The slabs should be cut as soon as it is possible to work on the slabs without damaging the surface of the slabs. Under slab drainage is not considered necessary provided that the floor slab levels are above the finished exterior ground surface level.

5.11 Seismic Design for the Proposed Commercial Building

5.11.1 Seismic Site Classification

For seismic design purposes, in accordance with the 2024 OBC Section 4.1.8.4, Table 4.1.8.4.A., the site classification for seismic site response is Site Class D.

5.11.2 National Building Code Seismic Hazard Calculation

The design Peak Ground Acceleration (PGA) for the site was calculated as 0.344 with a 2% probability of exceedance in 50 years based on the interpolation of the 2020 National Building Code Seismic Hazard calculation.

5.11.3 Potential for Soil Liquefaction

As indicated above, the results of the boreholes and information from geological maps indicate that the native soils below the proposed founding level consist of stiff highly plastic silty clay.
C.F.E.M. section 6.6.3.2 (6) recommends that the Bray et al. (2004) criteria be used to determine liquefaction susceptibility of fine-grained soils:

Fine-grained soils with PI ≤ 12 and W_c > 0.85LL are susceptible to liquefaction, soils with 12 ≤ PI ≤ 20 and W_c > 0.8LL are moderately susceptible to liquefaction and soils with PI > 20 and W_c < 0.8LL are not susceptible to liquefaction.

Seed et al. (2003) proposed liquefaction susceptibility criteria that are similar to those by Bray et al. (2004) except that they include slightly different Wc / LL ratios and include constraints on LL. The criteria by Seed et al. (2003) are described by three zones on the Atterberg limits chart, which are bounded by the following PI and LL values:

Zone A soils have PI ≤ 12 and LL ≤ 37 and are considered potentially susceptible to "classic cyclically induced liquefaction" if the water content is greater than 80% of the LL;

Zone B soils have PI ≤ 20 and LL ≤ 47 and are considered potentially liquefiable with detailed laboratory testing recommended if the water content is greater than 85% of the LL; and

Zone C soils with PI > 20 or LL >47 are considered generally not susceptible to classic cyclic liquefaction, although they should be checked for potential sensitivity.

C.F.E.M. section 6.6.3.2 (7) discusses residual strength for silts and clays, it recommends that the residual strength for silt and clay zones be determined as per the following guidelines given below:
a) W_c/LL ≥ 0.85 and PI ≤ 12: Sr = remolded shear strength,
b) W_c/LL ≥ 0.8 and 12 < PI < 20 Sr = 0.85 Su where Su = static undrained shear strength
c) W_c/LL < 0.80 and PI ≥ 20: Sr = Su

From the laboratory test results, the silty clay sample tested had plasticity index PI = of 46.3, moisture content of 47.9, and a liquid limit of 69.5, resulting in W_c/LL = 0.69. The clay content from the laboratory sample tested was about 52.0% for when clay is defined as grains finer than 0.002 mm. As such, the silty clay is not prone to liquefaction.

6.0 SITE SERVICES

6.1 Excavation

The excavations for the site services will be carried out through fill materials (topsoil or asphalt, crushed stone, silty sand) and silt into the native silty clay soils. For the purposes of Ontario Regulation 213/91 the soils at the site can be considered to be Type 3 soil. The sides of the excavations in overburden materials should be sloped in accordance with the requirements in Ontario Regulation 213/91 under the Ontario Occupational Health and Safety Act. That is, open cut excavations with overburden deposits could be carried out with side slopes of 1 horizontal to 1 vertical to 1.2 metres from the bottom of the trench then vertical. Where space constraints dictate, the excavation and backfilling operations should be carried out within a tightly fitting, braced steel trench box.

Boreholes BH2 and BH3 encountered groundwater at about 2.4 metres below the existing ground surface at the time of drilling on December 11, 2025. Groundwater was measured in a standpipe installed within borehole BH5 at a depth of about 1.6 metres below the existing ground surface on January 13, 2026. As such, significant groundwater flow into any excavation is unlikely. Any groundwater inflow into the service trenches should be handled by pumping from sumps from within the excavations.

6.2 Pipe Bedding and Cover Materials

It is suggested that the service pipe bedding material consist of at least 150 millimetres of granular material meeting OPSS requirements for Granular A. A provisional allowance should, however, be made for sub-excavation of any existing fill or disturbed material encountered at sub-grade level. Granular material meeting OPSS specifications for Granular A could be used as a sub-bedding material. The use of clear crushed stone as bedding or sub-bedding material should not be permitted.

Cover material, from pipe spring line to at least 300 millimetres above the top of the pipe, should consist of granular material, such as OPSS Granular A. The sub-bedding, bedding and cover materials should be compacted in maximum 200 millimetre thick lifts to at least 95 percent of the standard Proctor maximum dry density using suitable vibratory compaction equipment.

6.3 Trench Backfill

The general backfilling procedures should be carried out in a manner that is compatible with the future use of the area above the service trenches.

In areas where the service trench will be located below or in close proximity to existing or future roadway areas, acceptable native materials should be used as backfill between the roadway sub-grade level and the depth of seasonal frost penetrations (i.e. 1.8 metres below finished grade) in order to reduce the potential for differential frost heaving between the area over the trench and the adjacent section of roadway.

Where native backfill is used, it should match the native materials exposed on the trench walls. Some of the native materials from the lower part of the trench excavations may be wet for optimum compaction. Depending on the weather conditions encountered during construction, some drying of materials and/or re-compaction may be required. Any wet materials that cannot be compacted to the required density should either be wasted from the site or should be used outside of existing or future roadway areas. Any boulders larger than 300 millimetres in size should not be used as service trench backfill. Backfill below the zone of seasonal frost penetration could consist of either acceptable native material or imported granular material conforming to OPSS Granular B Type I. If the native material is not suitable for backfill, imported granular material may have to be used. If imported granular materials are used, suitable frost tapers should be used in accordance with OPSD 802.013.

To minimize future settlement of the backfill and achieve an acceptable subgrade for the roadways, sidewalks, etc., the trench should be compacted in maximum 300 millimetre thick lifts to at least 95 percent of the Standard Proctor maximum dry density. The specified density may be reduced where the trench backfill is not located in close proximity to existing or future roadways, driveways, sidewalks, or any other type of permanent structure.

7.0 CONSTRUCTION CONSIDERATIONS

It is suggested that the final design drawings for the project, including the proposed site grading plan, be reviewed by the geotechnical engineer to ensure that the guidelines provided in this report

have been interpreted as intended and to re-evaluate the guidelines provided in the report with respect to the actual project plans.

The engagement of the services of the geotechnical consultant during construction is recommended to confirm that the subsurface conditions throughout the proposed development do not materially differ from those given in the report and that the construction activities do not adversely affect the intent of the design.

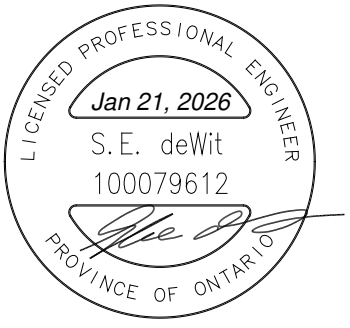
All foundation areas and any engineered fill areas for the proposed building should be inspected by Kollaard Associates Inc. to ensure that a suitable subgrade has been reached and properly prepared. The placing and compaction of any granular materials beneath the foundations and floor slab should be inspected to ensure that the materials used conform to the grading and compaction specifications.

The native silty clay soils at this site will be sensitive to disturbance from construction operations, from rainwater or snow melt, and frost. In order to minimize disturbance, construction traffic operating directly on the subgrade should be kept to an absolute minimum and the subgrade should be protected from below freezing temperatures.

We trust this report provides sufficient information for your present purposes. If you have any questions concerning this report or if we may be of further services to you, please do not hesitate to contact our office.

Regards,
Kollaard Associates Inc.

Isaac Bacon, P.Eng.



Steven deWit, P.Eng.

Kollaard Associates
Engineers

BOREHOLE BH1

PROJECT: Proposed Commercial Development
CLIENT: 1763295 Ontario Inc.
LOCATION: 41 Edgewater Street, Kanata, ON
PENETRATION TEST HAMMER: 63.5 kg, Drop, 0.76m

PROJECT NUMBER: 250848
DATE OF BORING: 2025-12-11
SHEET: 1 of 1
DATUM:

DEPTH SCALE (meters)	DESCRIPTION	DEPTH (m)	STRATA PLOT	ELEV. (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.3m	UNDIST SHEAR STRENGTH x Cu. kPa x / REM SHEAR STRENGTH o Cu. kPa o (0 50 100 150 200 250)	DYNAMIC CONE PENETRATION TEST blows/300 mm (0 20 40 60 80 100)	MOISTURE CONTENT (%)	PIEZOMETER OR STANDPIPE INSTALLATION
	Ashpalt (FILL)	0.00									
	Grey crushed granular (FILL)	0.10									
0.5											
	Grey brown SILTY CLAY	0.81			2	SS	5			26	
1.0											
	Practical refusal on large boulders or bedrock	1.42									

Borehole dry at the time of drilling, December 11, 2025

DEPTH SCALE: 1 to 20
LOGGED: KH

BORING METHOD: Power Auger
AUGER TYPE: Hollow Stem
CHECKED: SD

Kollaard Associates
Engineers

BOREHOLE BH2

PROJECT: Proposed Commercial Development
CLIENT: 1763295 Ontario Inc.
LOCATION: 41 Edgewater Street, Kanata, ON
PENETRATION TEST HAMMER: 63.5 kg, Drop, 0.76m

PROJECT NUMBER: 250848
DATE OF BORING: 2025-12-11
SHEET: 1 of 1
DATUM:

DEPTH SCALE (meters)	SOIL PROFILE: DESCRIPTION	DEPTH (m)	STRATA PLOT	ELEV. (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	UNDIST SHEAR STRENGTH x Cu. kPa x / REM SHEAR STRENGTH o Cu. kPa o (0 50 100 150 200 250)	DYNAMIC CONE PENETRATION TEST blows/300 mm (0 20 40 60 80 100)	MOISTURE CONTENT (%)	PIEZOMETER OR STANDPIPE INSTALLATION
	Asphalt (FILL)	0.00									
	Grey crushed granular (FILL)	0.10									
0.5											
	Grey brown SILT, trace clay	0.60									
1.0					1	SS	6			37	
1.5											
	Grey brown SILTY CLAY, silt layers	1.52			2	SS	6			44	
2.0											
2.5					1	VA		o ×			▽
	Grey brown silty sand, some gravel, cobbles, boulders, trace clay (GLACIAL TILL)	2.65			2	VA			×		
3.0											
					3	SS	100			36	
	Practical refusal on large boulders or bedrock	3.25									

Some groundwater observed at about 2.4 metres below existing ground surface, Dec 11, 2025

DEPTH SCALE: 1 to 20
LOGGED: KH

BORING METHOD: Power Auger
AUGER TYPE: Hollow Stem
CHECKED: SD

Kollaard Associates
Engineers

BOREHOLE BH3

PROJECT: Proposed Commercial Development
CLIENT: 1763295 Ontario Inc.
LOCATION: 41 Edgewater Street, Kanata, ON
PENETRATION TEST HAMMER: 63.5 kg, Drop, 0.76m

PROJECT NUMBER: 250848
DATE OF BORING: 2025-12-11
SHEET: 1 of 1
DATUM:

DEPTH SCALE (meters)	DESCRIPTION	DEPTH (m)	STRATA PLOT	ELEV. (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.3m	UNDIST SHEAR STRENGTH x Cu. kPa x / REM SHEAR STRENGTH o Cu. kPa o (0 50 100 150 200 250)	DYNAMIC CONE PENETRATION TEST blows/300 mm (0 20 40 60 80 100)	MOISTURE CONTENT (%)	PIEZOMETER OR STANDPIPE INSTALLATION
	Ashpalt (FILL)	0.00									
	Gey crushed granular (FILL)	0.14			1	SS	13			17	
0.5	Yellow brown silty sand (FILL)	0.50									
	Grey brown SILTY CLAY	0.61									
1.0					2	SS	6				
1.5											
					3	SS	7			48	
2.0											
					1	VA		o ×			▽
2.5					2	VA		o ×			
	Practical refusal on large boulders or bedrock	2.95									

Some groundwater observed at about 2.4 metres below existing ground surface, Dec 11, 2025

DEPTH SCALE: 1 to 20
LOGGED: KH

BORING METHOD: Power Auger
AUGER TYPE: Hollow Stem
CHECKED: SD

Kollaard Associates
Engineers

BOREHOLE BH4

PROJECT: Proposed Commercial Development
CLIENT: 1763295 Ontario Inc.
LOCATION: 41 Edgewater Street, Kanata, ON
PENETRATION TEST HAMMER: 63.5 kg, Drop, 0.76m

PROJECT NUMBER: 250848
DATE OF BORING: 2025-12-11
SHEET: 1 of 1
DATUM:

DEPTH SCALE (meters)	SOIL PROFILE: DESCRIPTION	DEPTH (m)	STRATA PLOT	ELEV. (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	UNDIST SHEAR STRENGTH x Cu. kPa x / REM SHEAR STRENGTH o Cu. kPa o (0 50 100 150 200 250)	DYNAMIC CONE PENETRATION TEST blows/300 mm (0 20 40 60 80 100)	MOISTURE CONTENT (%)	PIEZOMETER OR STANDPIPE INSTALLATION
	Asphalt (FILL)	0.00									
	Grey crushed granular (FILL)	0.10									
0.5											
	Grey brown SILTY CLAY	0.70									
1.0											
1.5					1	SS	8			18	
2.0											
	Practical refusal encountered on large boulders or bedrock	2.13									

Borehole dry at the time of drilling, December 11, 2025

DEPTH SCALE: 1 to 20
LOGGED: KH

BORING METHOD: Power Auger
AUGER TYPE: Hollow Stem
CHECKED: SD

Kollaard Associates
Engineers

BOREHOLE BH5

PROJECT: Proposed Commercial Development
CLIENT: 1763295 Ontario Inc.
LOCATION: 41 Edgewater Street, Kanata, ON
PENETRATION TEST HAMMER: 63.5 kg, Drop, 0.76m

PROJECT NUMBER: 250848
DATE OF BORING: 2025-12-11
SHEET: 1 of 1
DATUM:

DEPTH SCALE (meters)	SOIL PROFILE: DESCRIPTION	DEPTH (m)	STRATA PLOT	ELEV. (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	UNDIST SHEAR STRENGTH x Cu. kPa x / REM SHEAR STRENGTH o Cu. kPa o (0 50 100 150 200 250)	DYNAMIC CONE PENETRATION TEST blows/300 mm (0 20 40 60 80 100)	MOISTURE CONTENT (%)	PIEZOMETER OR STANDPIPE INSTALLATION
	Topsoil (FILL)	0.00									
	Grey brown SILTY CLAY	0.30									
0.5											
1.0											
1.5											
2.0											
2.5											
	Practical refusal encountered on large boulders or bedrock	2.74									

Borehole was dry at the time of drilling, Dec 11, 2025. Water measured in a standpipe at about 1.6m below existing ground surface, Jan 13, 2026

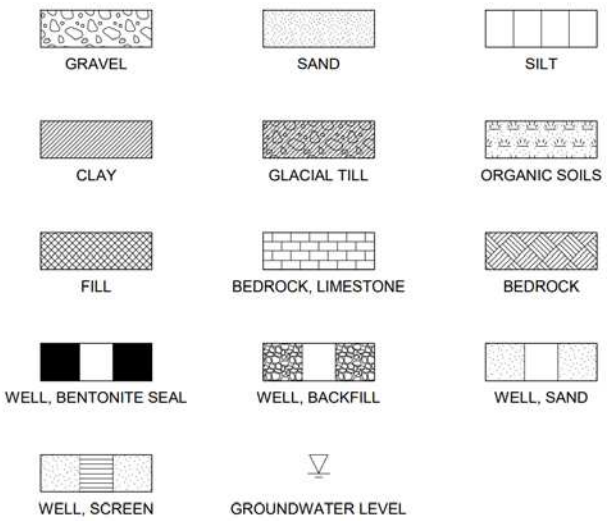
DEPTH SCALE: 1 to 20
LOGGED: KH

BORING METHOD: Power Auger
AUGER TYPE: Hollow Stem
CHECKED: SD

LIST OF ABBREVIATIONS AND TERMINOLOGY

SAMPLE TYPES	
AS	Auger Sample
CS	Chunk Sample
DO	Drive Open
MS	Manual Sample
RC	Rock Core
SS	Split Spoon Sample
TO	Thin-Walled Open Shelby Tube
WS	Wash Sample

PENETRATION RESISTANCE	
Standard Penetration Resistance (N) The number of blows by a 63.5 kg hammer dropped 760 millimeters required to drive a 50 mm drive open sampler for a distance of 300 mm.	
Dynamic Penetration Resistance The number of blows by a 63.5 kg hammer dropped 760 mm to drive a 50 mm diameter, 60° cone attached to 'A' size drill rods for a distance of 300 mm.	
WH	Sampler advanced by static weight of hammer and drill rods.
WR	Sampler advanced by static weight of drill rods.
PH	Sampler advanced by hydraulic pressure from drill rig.
PM	Sampler advanced by manual pressure.



SOIL DESCRIPTIONS

Relative Density	'N' Value
Very Loose	0 – 4
Loose	4 – 10
Compact	10 – 30
Dense	30 – 50
Very Dense	>50

Consistency	Cu, kPa
Very Soft	0 – 12
Soft	12 – 25
Firm	25 – 50
Stiff	50 – 100
Very Stiff	>100

LIST OF COMMON SYMBOLS	
Cu	Undrained Shear Strength
e	Void Ratio
Cc	Compression Index
Cv	Coefficient of Consolidation
k	Coefficient of Permeability
PI	Plasticity Index
n	Porosity
u	Pore Pressure
W	Moisture Content
LL	Liquid Limit
PL	Plastic Limit
r	Unit Weight of Soil
y	Unit Weight of Submerged Soil
cr	Normal Stress

SOIL TESTS	
C	Consolidation Test
H	Hydrometer Analysis
M	Sieve Analysis
MH	Sieve and Hydrometer Analysis
U	Unconfined Compression Test
Q	Undrained Triaxial Test
VA	Field Vane, Undisturbed and Remolded Shear Strength

KEY PLAN

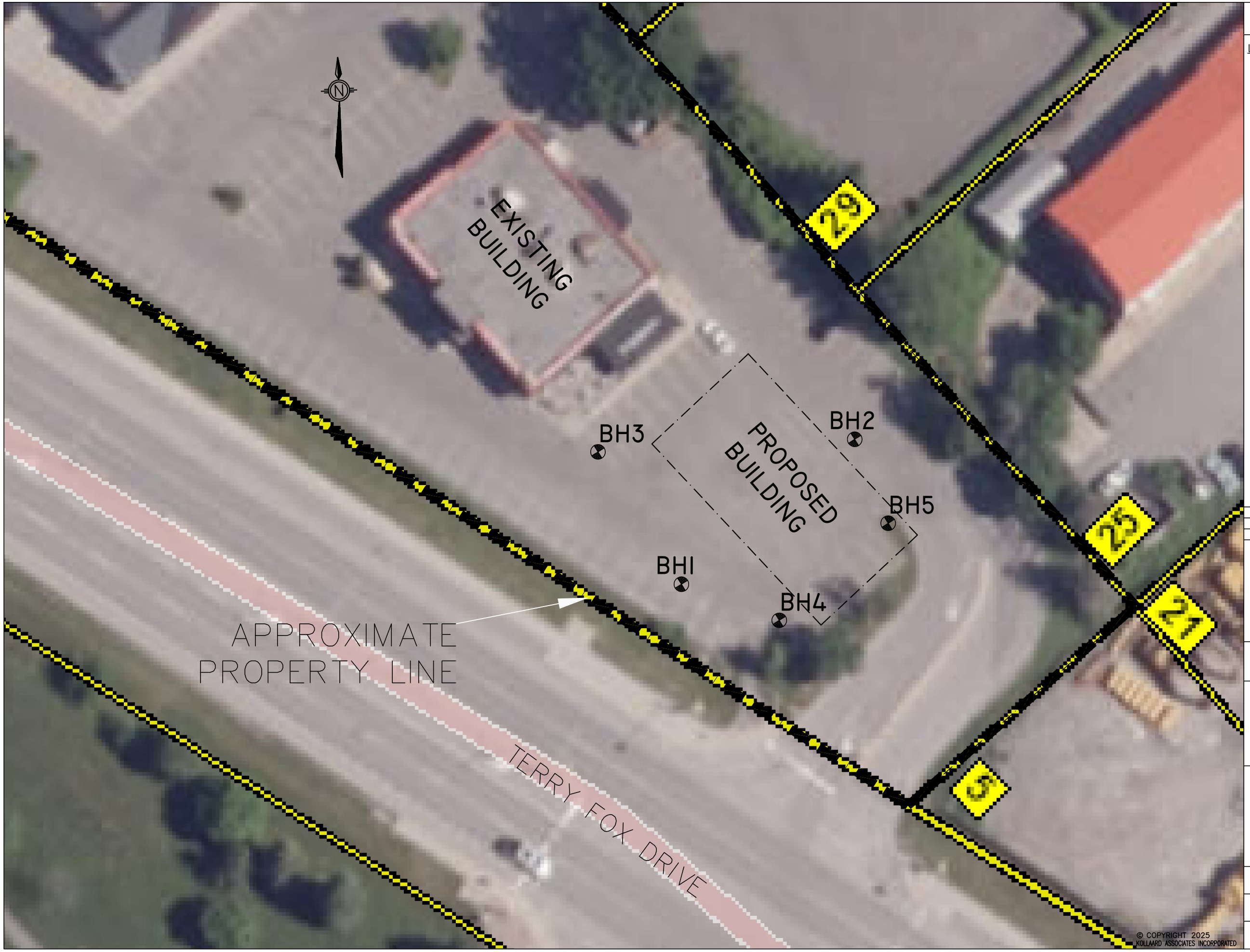
FIGURE 1

NOT TO SCALE

Kollaard Associates
Engineers

Project No. 250848

Date November 2025



DRAWING NUMBER:

SITE PLAN, FIGURE 2

LEGEND:

BH1 APPROXIMATE BOREHOLE LOCATION

REFERENCE: PLAN SUPPLIED BY CITY OF OTTAWA EMAPS

SPECIAL NOTE: THIS DRAWING TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING REPORT.

REV.	NAME	DATE	DESCRIPTION

Kollaard Associates Engineers

PO, BOX 189, 210 PRESCOTT ST
KEMPTVILLE ONTARIO
K0G 1J0 FAX (613) 258-0475
http://www.kollaard.ca

(613) 860-0923
info@kollaard.ca

CLIENT:
1763295 ONTARIO INC.

PROJECT:
GEOTECHNICAL INVESTIGATION FOR PROPOSED COMMERCIAL DEVELOPMENT

LOCATION:
41 EDGEWATER STREET
OTTAWA, ONTARIO

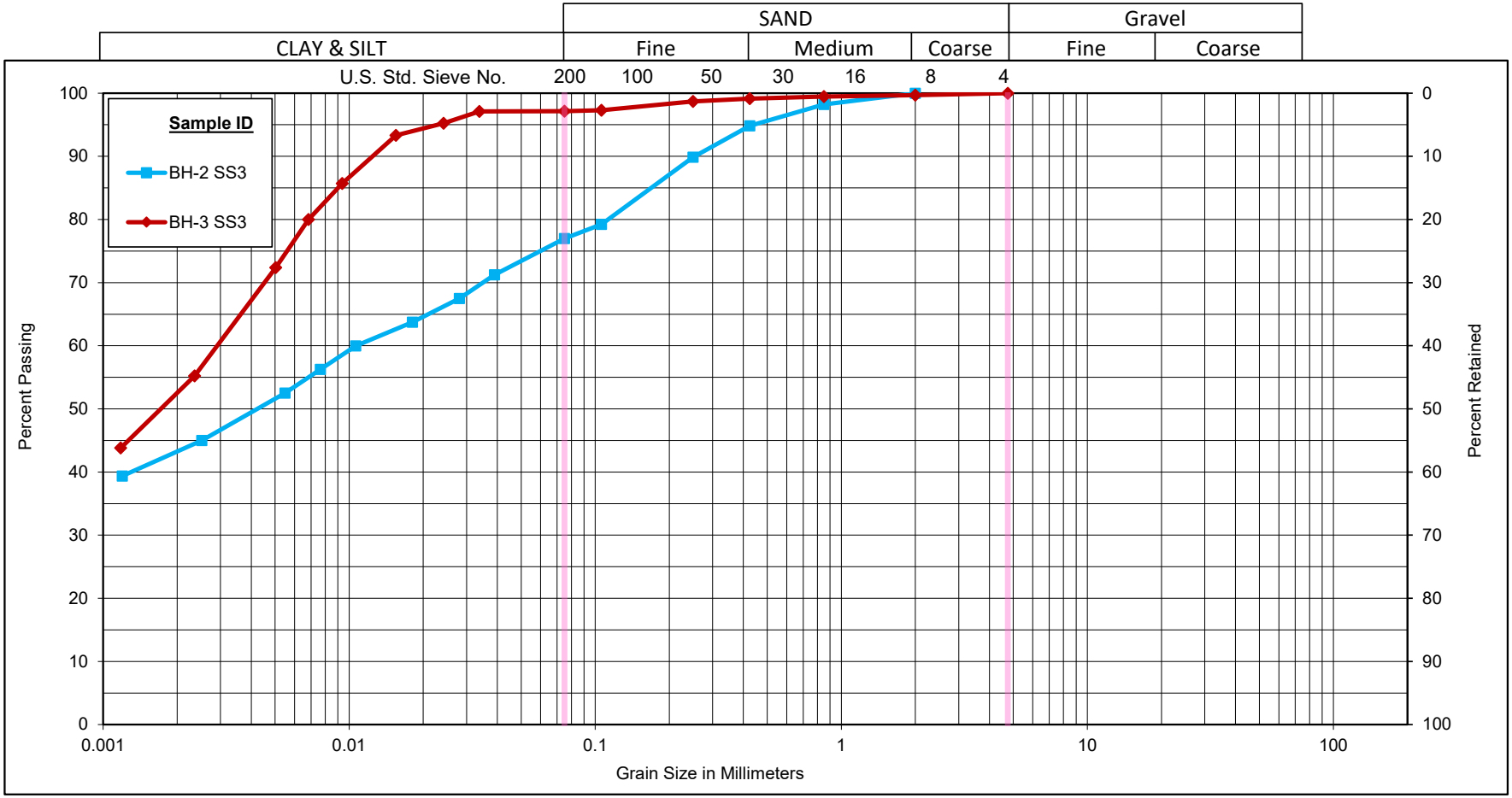
DESIGNED BY:	*DATE:*
--	NOV 25, 2025
DRAWN BY:	*SCALE:*
DT	N.T.S

KOLLAARD FILE NUMBER:
250848

ATTACHMENT A

Laboratory Test Results for Physical Properties

Unified Soil Classification System



Sample ID	Depth	% Gravel	% Sand	% Silt	% Clay
BH-2 SS3	10'-10'8"	0.0	23.0	34.0	43.0
BH-3 SS3	5'-7'	0.0	2.8	45.2	52.0

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GRAIN SIZE DISTRIBUTION

Kollaard Associates, File #250848

41 Edgewater Street, Ottawa

Figure No.

Project No. 121625581

Stantec

Particle-Size Analysis of Soils

LS702

AASHTO T88

PROJECT DETAILS			
Client:	**Kollaard Associates, File #250848**	Project No.:	**121625581**
Project:	**41 Edgewater Street, Ottawa**	Test Method:	**LS702**
Material Type:	**Soil**	Sampled By:	**Kollaard Associates**
Source:	**BH-2**	Date Sampled:	**December 11, 2025**
Sample No.:	**SS3**	Tested By:	**Brian Prevost**
Sample Depth	**10'-10'8"**	Date Tested:	**December 21, 2025**

WASH TEST DATA	
Oven Dry Mass In Hydrometer Analysis (g)	52.19
Sample Weight after Hydrometer and Wash (g)	12.23
Percent Passing No. 200 Sieve (%)	**76.6**
Percent Passing Corrected (%)	**76.56**

PERCENT LOSS IN SIEVE	
Sample Weight Before Sieve (g)	**131.30**
Sample Weight After Sieve (g)	**130.30**
Percent Loss in Sieve (%)	**0.76**

SOIL INFORMATION		
Liquid Limit (LL)		
Plasticity Index (PI)		
Soil Classification		
Specific Gravity (G_s)	2.750	
Sg. Correction Factor (α)	0.978	
Mass of Dispersing Agent/Litre	40	g

CALCULATION OF DRY SOIL MASS	
Oven Dried Mass (W_o), (g)	63.02
Air Dried Mass (W_a), (g)	63.93
Hygroscopic Corr. Factor ($F=W_o/W_a$)	0.9858
Air Dried Mass in Analysis (M_a), (g)	52.94
Oven Dried Mass in Analysis (M_o), (g)	52.19
Percent Passing 2.0 mm Sieve (P_{10}), (%)	100.00
Sample Represented (W), (g)	52.19

HYDROMETER DETAILS	
Volume of Bulb (V_B), (cm^3)	63.3
Length of Bulb (L_2), (cm)	14.2
Length from '0' Reading to Top of Bulb (L_1), (cm)	10.3
Scale Dimension (h_s), (cm/Div)	0.17
Cross-Sectional Area of Cylinder (A), (cm^2)	27.25
Meniscus Correction (H_m), (g/L)	1.0

SIEVE ANALYSIS		
Sieve Size mm	**Cum. Wt. Retained**	**Percent Passing**
75.0		100.0
63.0		100.0
53.0		100.0
37.5		100.0
26.5		100.0
19.0		100.0
13.2		100.0
9.5		100.0
4.75		100.0
2.00	0.0	100.0
Total (C + F)[1]	130.30	
0.850	0.93	98.22
0.425	2.69	94.85
0.250	5.28	89.88
0.106	10.84	79.23
0.075	12.01	76.99
PAN	12.08	

Note 1: (C + F) = Coarse + Fine

START TIME 10:37 AM **Sedimentation Cylinder No:** 3

HYDROMETER ANALYSIS

Date	Time	Elapsed Time T Mins	H_s Divisions g/L	H_c Divisions g/L	Temperature T_c °C	Corrected Reading $R = H_s - H_c$ g/L	Percent Passing P %	L cm	η Poise	K	Diameter D mm
21-Dec-25	10:38 AM	1	42.0	4.0	21.5	38.0	71.24	8.92798	9.73081	0.013047	0.03898
21-Dec-25	10:39 AM	2	40.0	4.0	21.5	36.0	67.49	9.26798	9.73081	0.013047	0.02809
21-Dec-25	10:42 AM	5	38.0	4.0	21.5	34.0	63.74	9.60798	9.73081	0.013047	0.01809
21-Dec-25	10:52 AM	15	36.0	4.0	21.5	32.0	59.99	9.94798	9.73081	0.013047	0.01063
21-Dec-25	11:07 AM	30	34.0	4.0	21.5	30.0	56.24	10.28798	9.73081	0.013047	0.00764
21-Dec-25	11:37 AM	60	32.0	4.0	21.5	28.0	52.49	10.62798	9.73081	0.013047	0.00549
21-Dec-25	3:41 PM	304	28.0	4.0	21.5	24.0	44.99	11.30798	9.73081	0.013047	0.00252
22-Dec-25	10:37 AM	1440	25.0	4.0	20.5	21.0	39.37	11.81798	9.96839	0.013205	0.00120

Remarks: Specific Gravity assumed. Moisture Content: 36.0%

Reviewed By: Brian Prevost

Date: December 23, 2025

V:\01216\active\laboratory_standing_offers\2025 Laboratory Standing Offers\121625581 Kollaard Associates Engineers\December 11, Two_Hyd_MC, Kollaard #250848\Hydrometer-Standing Offers_Traceability.xlsx

Stantec

Particle-Size Analysis of Soils

LS702

AASHTO T88

PROJECT DETAILS			
Client:	**Kollaard Associates, File #250848**	Project No.:	**121625581**
Project:	**41 Edgewater Street, Ottawa**	Test Method:	**LS702**
Material Type:	**Soil**	Sampled By:	**Kollaard Associates**
Source:	**BH-3**	Date Sampled:	**December 11, 2025**
Sample No.:	**SS3**	Tested By:	**Brian Prevost**
Sample Depth	**5'-7'**	Date Tested:	**December 21, 2025**

WASH TEST DATA	
Oven Dry Mass In Hydrometer Analysis (g)	51.22
Sample Weight after Hydrometer and Wash (g)	1.33
Percent Passing No. 200 Sieve (%)	**97.4**
Percent Passing Corrected (%)	**97.11**

PERCENT LOSS IN SIEVE	
Sample Weight Before Sieve (g)	**165.30**
Sample Weight After Sieve (g)	**164.10**
Percent Loss in Sieve (%)	**0.73**

SOIL INFORMATION		
Liquid Limit (LL)		
Plasticity Index (PI)		
Soil Classification		
Specific Gravity (G_s)	2.750	
Sg. Correction Factor (α)	0.978	
Mass of Dispersing Agent/Litre	40	g

CALCULATION OF DRY SOIL MASS	
Oven Dried Mass (W_o), (g)	110.00
Air Dried Mass (W_a), (g)	111.60
Hygroscopic Corr. Factor ($F=W_o/W_a$)	0.9857
Air Dried Mass in Analysis (M_a), (g)	51.96
Oven Dried Mass in Analysis (M_o), (g)	51.22
Percent Passing 2.0 mm Sieve (P_{10}), (%)	99.70
Sample Represented (W), (g)	51.37

SIEVE ANALYSIS		
Sieve Size mm	**Cum. Wt. Retained**	**Percent Passing**
75.0		100.0
63.0		100.0
53.0		100.0
37.5		100.0
26.5		100.0
19.0		100.0
13.2		100.0
9.5		100.0
4.75	0.0	100.0
2.00	0.5	99.7
Total (C + F)[1]	164.10	
0.850	0.12	99.46
0.425	0.29	99.13
0.250	0.52	98.69
0.106	1.23	97.30
0.075	1.30	97.17
PAN	1.31	

Note 1: (C + F) = Coarse + Fine

HYDROMETER DETAILS	
Volume of Bulb (V_B), (cm^3)	63.3
Length of Bulb (L_2), (cm)	14.2
Length from '0' Reading to Top of Bulb (L_1), (cm)	10.3
Scale Dimension (h_s), (cm/Div)	0.17
Cross-Sectional Area of Cylinder (A), (cm^2)	27.25
Meniscus Correction (H_m), (g/L)	1.0

START TIME 10:19 AM **Sedimentation Cylinder No:** 2

HYDROMETER ANALYSIS

Date	Time	Elapsed Time T Mins	H_s Divisions g/L	H_c Divisions g/L	Temperature T_c °C	Corrected Reading $R = H_s - H_c$ g/L	Percent Passing P %	L cm	η Poise	K	Diameter D mm
21-Dec-25	10:20 AM	1	55.0	4.0	21.5	51.0	97.13	6.71798	9.73081	0.013047	0.03382
21-Dec-25	10:21 AM	2	54.0	4.0	21.5	50.0	95.23	6.88798	9.73081	0.013047	0.02421
21-Dec-25	10:24 AM	5	53.0	4.0	21.5	49.0	93.32	7.05798	9.73081	0.013047	0.01550
21-Dec-25	10:34 AM	15	49.0	4.0	21.5	45.0	85.70	7.73798	9.73081	0.013047	0.00937
21-Dec-25	10:49 AM	30	46.0	4.0	21.5	42.0	79.99	8.24798	9.73081	0.013047	0.00684
21-Dec-25	11:19 AM	60	42.0	4.0	21.5	38.0	72.37	8.92798	9.73081	0.013047	0.00503
21-Dec-25	3:40 PM	321	33.0	4.0	21.5	29.0	55.23	10.45798	9.73081	0.013047	0.00235
22-Dec-25	10:19 AM	1440	27.0	4.0	20.5	23.0	43.80	11.47798	9.96839	0.013205	0.00118

Remarks: Specific Gravity assumed. Moisture Content: 47.9%

Reviewed By: Brian Prevost

Date: December 23, 2025

V:\01216\active\laboratory_standing_offers\2025 Laboratory Standing Offers\121625581 Kollaard Associates Engineers\December 11, Two_Hyd_MC, Kollaard #250848\Hydrometer-Standing Offers_Traceability.xlsx

Stantec Consulting Ltd.
2781 Lancaster Rd, Suite 100 A&B, Ottawa ON K1B 1A7

January 12, 2026
File: 121625581

Client: Kollaard Associates Engineers, File #250848

Reference: ASTM D4318 Atterberg Limit & D2216 Moisture Content

The following table summarizes Atterberg Limit & Moisture Content results for BH-3, SS3.

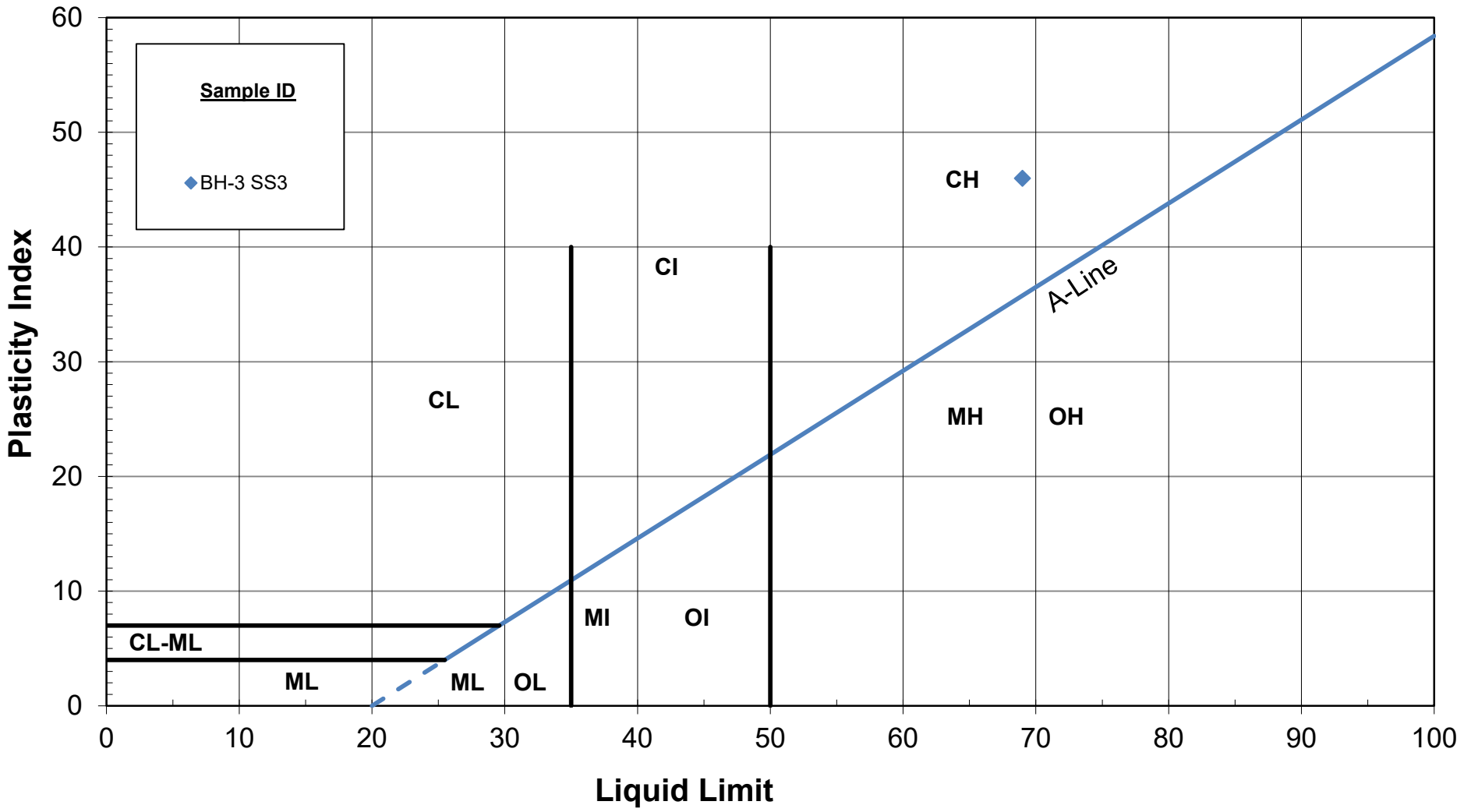
Source	Depth	Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
BH-3 SS3	5'-7'	47.9	69.5	23.2	46.3

Sincerely,

Stantec Consulting Ltd.

Brian Prevost
Laboratory Supervisor
Tel: 613-738-6075
Fax: 613-722-2799
brian.prevost@stantec.com

Attachments: Plasticity Chart



Stantec

Kollaard Associates, File #250848

41 Edgewater Street, Ottawa

PLASTICITY CHART

Figure No.

Project No. 121625581

ATTACHMENT B

Laboratory Test Results for Chemical Properties

CERTIFICATE OF ANALYSIS

Work Order	:	**WT2536963**			
Client	:	**Kollaard Associates Inc.**	Laboratory	:	ALS Environmental - Waterloo
Contact	:	Dean Tataryn	Account Manager	:	Costas Farassoglou
Address	:	210 Prescott Street Unit 1 Kemptville Ontario Canada K0G1J0	Address	:	60 Northland Road, Unit 1 Waterloo ON Canada N2V 2B8
Telephone	:	613 860 0923	E-mail	:	costas.farassoglou@alsglobal.com
Project	:	250848	Telephone	:	613 225 8279
PO	:	----	Date Samples Received	:	18-Dec-2025 12:10
C-O-C number	:	20-1044236	Date Analysis Commenced	:	23-Dec-2025
Sampler	:	----	Issue Date	:	08-Jan-2026 21:05
Site	:	----			
Quote number	:	SOA 2026			
No. of samples received	:	1			
No. of samples analysed	:	1			

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Josphin Masihi	Supervisor I	Centralized Prep, Waterloo, Ontario
Nik Perkio	Senior Analyst	Inorganics, Waterloo, Ontario

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
LOR: Limit of Reporting (detection limit).

Unit	*Description*
%	percent
mg/kg	milligrams per kilogram
mV	millivolts
ohm cm	ohm centimetres (resistivity)
pH units	pH units
µS/cm	microsiemens per centimetre

<: less than.
>: greater than.
Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	Description
FR5	As per applicable reference method(s), soil:water ratio for Fixed Ratio Leach was modified to 1:5 due to high soil organic content

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BH2 SS2 ----	----	----	----	----
					Client sampling date / time	18-Dec-2025 00:00	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		WT2536963-001	----	----	----	----
						Result	----	----	----	----
Physical Tests										
Conductivity (1:2 leachate)	----	E100-L/WT	5.00	µS/cm		2190 FR5	----	----	----	----
Moisture	----	E144/WT	0.25	%		32.1	----	----	----	----
Oxidation-reduction potential [ORP]	----	E125/WT	0.10	mV		456	----	----	----	----
pH (1:2 soil:CaCl2-aq)	----	E108A/WT	0.10	pH units		7.64	----	----	----	----
Resistivity	----	EC100R/WT	100	ohm cm		460	----	----	----	----
Inorganics										
Sulfides, acid volatile	----	E396-L/WT	0.20	mg/kg		<0.29	----	----	----	----
Leachable Anions & Nutrients										
Chloride, soluble ion content	16887-00-6	E236.Cl/WT	5.0	mg/kg		1330	----	----	----	----
Sulfate, soluble ion content	14808-79-8	E236.SO4/WT	20	mg/kg		287	----	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

ALS Canada Ltd.

right solutions.
right partner.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **WT2536963**	Page	: 1 of 7
Client	: **Kollaard Associates Inc.**	Laboratory	: ALS Environmental - Waterloo
Contact	: Dean Tataryn	Account Manager	: Costas Farassoglou
Address	: 210 Prescott Street Unit 1 Kemptville ON Canada K0G1J0	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 613 860 0923	Telephone	: 613 225 8279
Project	: 250848	Date Samples Received	: 18-Dec-2025 12:10
PO	: ----	Issue Date	: 08-Jan-2026 21:05
C-O-C number	: 20-1044236		
Sampler	: ----		
Site	: ----		
Quote number	: SOA 2026		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Inorganics : Acid Volatile Sulfide in Soil by Colourimetry (0.2 mg/kg)										
Compliant container										
BH2 SS2	E396-L	18-Dec-2025	05-Jan-2026	0 days	18 days	× UCP	05-Jan-2026	0 days	18 days	✓
Leachable Anions & Nutrients : Water Extractable Chloride by IC										
Compliant container										
BH2 SS2	E236.Cl	18-Dec-2025	08-Jan-2026	30 days	22 days	✓	08-Jan-2026	30 days	22 days	✓
Leachable Anions & Nutrients : Water Extractable Sulfate by IC										
Compliant container										
BH2 SS2	E236.SO4	18-Dec-2025	08-Jan-2026	30 days	22 days	✓	08-Jan-2026	30 days	22 days	✓
Physical Tests : Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)										
Compliant container										
BH2 SS2	E100-L	18-Dec-2025	07-Jan-2026	30 days	21 days	✓	08-Jan-2026	30 days	21 days	✓
Physical Tests : Moisture Content by Gravimetry										
Compliant container										
BH2 SS2	E144	18-Dec-2025	----	----	----		23-Dec-2025	----	----	
Physical Tests : ORP by Electrode										
Compliant container										
BH2 SS2	E125	18-Dec-2025	06-Jan-2026	180 days	19 days	✓	07-Jan-2026	180 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received										
Compliant container										
BH2 SS2	E108A	18-Dec-2025	31-Dec-2025	30 days	14 days	✓	02-Jan-2026	30 days	14 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)	E100-L	2403462	1	18	5.5	5.0	✓
pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received	E108A	2403851	1	19	5.2	5.0	✓
ORP by Electrode	E125	2406496	1	19	5.2	5.0	✓
Moisture Content by Gravimetry	E144	2397488	1	20	5.0	5.0	✓
Water Extractable Chloride by IC	E236.Cl	2403463	1	18	5.5	5.0	✓
Water Extractable Sulfate by IC	E236.SO4	2403464	1	18	5.5	5.0	✓
Acid Volatile Sulfide in Soil by Colourimetry (0.2 mg/kg)	E396-L	2405936	1	16	6.2	4.7	✓
Laboratory Control Samples (LCS)							
Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)	E100-L	2403462	2	18	11.1	10.0	✓
pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received	E108A	2403851	1	19	5.2	5.0	✓
ORP by Electrode	E125	2406496	1	19	5.2	5.0	✓
Moisture Content by Gravimetry	E144	2397488	1	20	5.0	5.0	✓
Water Extractable Chloride by IC	E236.Cl	2403463	2	18	11.1	10.0	✓
Water Extractable Sulfate by IC	E236.SO4	2403464	2	18	11.1	10.0	✓
Acid Volatile Sulfide in Soil by Colourimetry (0.2 mg/kg)	E396-L	2405936	1	16	6.2	4.7	✓
Method Blanks (MB)							
Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)	E100-L	2403462	1	18	5.5	5.0	✓
Moisture Content by Gravimetry	E144	2397488	1	20	5.0	5.0	✓
Water Extractable Chloride by IC	E236.Cl	2403463	1	18	5.5	5.0	✓
Water Extractable Sulfate by IC	E236.SO4	2403464	1	18	5.5	5.0	✓
Acid Volatile Sulfide in Soil by Colourimetry (0.2 mg/kg)	E396-L	2405936	1	16	6.2	4.7	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)	E100-L ALS Environmental - Waterloo	Soil/Solid	CSSS Ch. 15 (mod)/APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a soil sample that has been added in a defined ratio of soil to deionized water, then shaken well and allowed to settle. Conductance is measured in the fluid that is observed in the upper layer.
pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received	E108A ALS Environmental - Waterloo	Soil/Solid	MECP E3530	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C) and is carried out in accordance with procedures described in the Analytical Protocol (prescriptive method). A minimum 10g portion of the sample, as received, is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil by centrifuging, settling, or decanting and then analyzed using a pH meter and electrode. This method is equivalent to ASTM D4972 and is acceptable for topsoil analysis.
ORP by Electrode	E125 ALS Environmental - Waterloo	Soil/Solid	APHA 2580 (mod)	Oxidation Redution Potential (ORP) is reported as the oxidation-reduction potential of the platinum metal-reference electrode employed in the analysis, measured in mV.
Moisture Content by Gravimetry	E144 ALS Environmental - Waterloo	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Water Extractable Chloride by IC	E236.Cl ALS Environmental - Waterloo	Soil/Solid	EPA 300.1	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection using a soil sample that has been added in a defined ratio of soil to deionized water, then shaken well and allowed to settle. Anions are measured in the fluid that is observed in the upper layer.
Water Extractable Sulfate by IC	E236.SO4 ALS Environmental - Waterloo	Soil/Solid	EPA 300.1	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection using a soil sample that has been added in a defined ratio of soil to deionized water, then shaken well and allowed to settle. Anions are measured in the fluid that is observed in the upper layer.
Acid Volatile Sulfide in Soil by Colourimetry (0.2 mg/kg)	E396-L ALS Environmental - Waterloo	Soil/Solid	APHA 4500S2J	This analysis is carried out in accordance with the method described in APHA 4500 S2-J. After extraction the Acid Volatile Sulphide is determined colourimetrically.
Resistivity Calculation for Soil Using E100-L	EC100R ALS Environmental - Waterloo	Soil/Solid	APHA 2510 B	Soil Resistivity (calculated) is determined as the inverse of the conductivity of a 2:1 water:soil leachate (dry weight). This method is intended as a rapid approximation for Soil Resistivity. Where high accuracy results are required, direct measurement of Soil Resistivity by the Wenner Four-Electrode Method (ASTM G57) is recommended.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 ALS Environmental - Waterloo	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Leach 1:2 Soil : 0.01CaCl2 - As Received for pH	EP108A ALS Environmental - Waterloo	Soil/Solid	MOEE E3137A	A minimum 10g portion of the sample, as received, is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil by centrifuging, settling or decanting and then analyzed using a pH meter and electrode.
Preparation of ORP by Electrode	EP125 ALS Environmental - Waterloo	Soil/Solid	APHA 2580 (mod)	Field-moist sample is extracted in a 1:2 ratio with DI water and then analyzed by ORP meter.
Anions Leach 1:10 Soil:Water (Dry)	EP236 ALS Environmental - Waterloo	Soil/Solid	EPA 300.1	5 grams of dried soil is mixed with 50 grams of distilled water for a minimum of 30 minutes. The extract is filtered and analyzed by ion chromatography.
Distillation for Acid Volatile Sulfide in Soil	EP396-L ALS Environmental - Waterloo	Soil/Solid	APHA 4500S2J	Acid Volatile Sulfide is determined by colourimetric measurement on a sediment sample that has been treated with hydrochloric acid within a purge and trap system, where the evolved hydrogen sulfide gas is carried into a basic solution by argon gas for analysis.

QUALITY CONTROL REPORT

Work Order	: **WT2536963**	Page	: 1 of 5
Client	: Kollaard Associates Inc.	Laboratory	: ALS Environmental - Waterloo
Contact	: Dean Tataryn	Account Manager	: Costas Farassoglou
Address	: 210 Prescott Street Unit 1 Kemptville ON Canada K0G1J0	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 613 860 0923	Telephone	: 613 225 8279
Project	: 250848	Date Samples Received	: 18-Dec-2025 12:10
PO	: ----	Date Analysis Commenced	: 23-Dec-2025
C-O-C number	: 20-1044236	Issue Date	: 08-Jan-2026 21:05
Sampler	: ----		
Site	: ----		
Quote number	: SOA 2026		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Josphin Masihi	Supervisor I	Waterloo Centralized Prep, Waterloo, Ontario
Nik Perkio	Senior Analyst	Waterloo Inorganics, Waterloo, Ontario

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 2397488)											
TY2514717-001	Anonymous	Moisture	----	E144	0.25	%	20.6	19.8	4.05%	20%	----
Physical Tests (QC Lot: 2403462)											
WT2537256-002	Anonymous	Conductivity (1:2 leachate)	----	E100-L	5.00	µS/cm	187	197	5.16%	20%	----
Physical Tests (QC Lot: 2403851)											
EO2511531-001	Anonymous	pH (1:2 soil:CaCl2-aq)	----	E108A	0.10	pH units	7.49	7.53	0.533%	5%	----
Physical Tests (QC Lot: 2406496)											
EO2511482-001	Anonymous	Oxidation-reduction potential [ORP]	----	E125	0.10	mV	451	443	1.79%	25%	----
Inorganics (QC Lot: 2405936)											
TY2514816-001	Anonymous	Sulfides, acid volatile	----	E396-L	0.25	mg/kg	<0.25	<0.25	0.0003	Diff <2x LOR	----
Leachable Anions & Nutrients (QC Lot: 2403463)											
EO2511482-001	Anonymous	Chloride, soluble ion content	16887-00-6	E236.Cl	5.0	mg/kg	36.9	37.5	1.68%	30%	----
Leachable Anions & Nutrients (QC Lot: 2403464)											
EO2511482-001	Anonymous	Sulfate, soluble ion content	14808-79-8	E236.SO4	20	mg/kg	2220	2410	8.08%	30%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	*Result*	*Qualifier*
Physical Tests (QCLot: 2397488)						
Moisture	----	E144	0.25	%	<0.25	----
Physical Tests (QCLot: 2403462)						
Conductivity (1:2 leachate)	----	E100-L	5	µS/cm	<5.00	----
Inorganics (QCLot: 2405936)						
Sulfides, acid volatile	----	E396-L	0.2	mg/kg	<0.20	----
Leachable Anions & Nutrients (QCLot: 2403463)						
Chloride, soluble ion content	16887-00-6	E236.Cl	5	mg/kg	<5.0	----
Leachable Anions & Nutrients (QCLot: 2403464)						
Sulfate, soluble ion content	14808-79-8	E236.SO4	20	mg/kg	<20	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 2397488)									
Moisture	----	E144	0.25	%	50 %	100.0	90.0	110	----
Physical Tests (QCLot: 2403462)									
Conductivity (1:2 leachate)	----	E100-L	5	µS/cm	1410 µS/cm	100	90.0	110	----
Physical Tests (QCLot: 2403851)									
pH (1:2 soil:CaCl2-aq)	----	E108A	----	pH units	7 pH units	101	98.0	102	----
Inorganics (QCLot: 2405936)									
Sulfides, acid volatile	----	E396-L	0.2	mg/kg	100 mg/kg	74.0	70.0	130	----
Leachable Anions & Nutrients (QCLot: 2403463)									
Chloride, soluble ion content	16887-00-6	E236.Cl	5	mg/kg	1000 mg/kg	100	80.0	120	----
Leachable Anions & Nutrients (QCLot: 2403464)									
Sulfate, soluble ion content	14808-79-8	E236.SO4	20	mg/kg	1000 mg/kg	102	80.0	120	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Physical Tests (QCLot: 2403462)									
QC-2403462-003	RM	Conductivity (1:2 leachate)	----	E100-L	714 µS/cm	102	70.0	130	----
Physical Tests (QCLot: 2406496)									
QC-2406496-001	RM	Oxidation-reduction potential [ORP]	----	E125	475 mV	101	90.0	110	----
Leachable Anions & Nutrients (QCLot: 2403463)									
QC-2403463-003	RM	Chloride, soluble ion content	16887-00-6	E236.Cl	495 mg/kg	90.8	70.0	130	----
Leachable Anions & Nutrients (QCLot: 2403464)									
QC-2403464-003	RM	Sulfate, soluble ion content	14808-79-8	E236.SO4	493 mg/kg	91.8	70.0	130	----

502-283
BM

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 - 1044236

Page of

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Canada Toll Free: 1 800 668 9878

Environmental Division
Waterloo
Work Order Reference
WT2536963

Telephone : +1 519 886 6910

Report To	Contact and company name below will appear on the final report
Company:	Kolland
Contact:	
Phone:	
Company address below will appear on the final report	
Street:	
City/Province:	
Postal Code:	
Invoice To	Same as Report To ☐ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Reports / Recipients

Select Report Format: ☒ PDF ☐ EXCEL ☐ EDD (DIGITAL)
Merge QC/QCI Reports with COA ☐ YES ☐ NO ☐ N/A
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax
Email 2
Email 3

Invoice Recipients

Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax
Email 2

Turnaround Time (TAT) Requested

☒ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional charges may apply to rush requests on weekends, statutory holidays and non-routine tests.

Date and Time Required for all E&P TATs:

For all tests with rush TATs requested, please contact your AM to confirm availability.

Project Information

ALS Account # / Quote #:
Job #: 250848
PO / AFE:
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (ALS use only): WT2536963 BM

ALS Contact: Sampler:

Analysis Requested

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P)

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Corrosivity	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	BH2 SS2	DEC18		Soil	1	X			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO
Are samples for human consumption/ use? ☐ YES ☐ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☒ COOLING INITIATED
Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO
Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
12.1				11.4			

SHIPMENT RELEASE (client use)

Released by: Date: DEC18 Time:

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by: Eric Dobbins Date: 18/12/25. Time: 12:10

FINAL SHIPMENT RECEPTION (ALS use only)

Received by: Date: 19/dec/25 Time: 9:00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ATTACHMENT C

National Building Code Seismic Hazard Calculation

2020 National Building Code Seismic Hazard Calculation

Site: 45.296 N 75.899 W

Collected: Tue Dec 16 2025 12:26:07 GMT-0500 (Eastern Standard Time)

Site Designation: Class D

Probability of exceedance per annum	0.00040	0.001	0.0021
Probability of exceedance in 50 years	2%	5%	10%
Sa(0.2)	0.588	0.388	0.269
Sa(0.5)	0.496	0.331	0.226
Sa(1.0)	0.296	0.187	0.122
Sa(2.0)	0.142	0.0859	0.0542
Sa(5.0)	0.0397	0.0222	0.0131
Sa(10.0)	0.0124	0.00684	0.00401
PGA (g)	0.344	0.237	0.166
PGV(m/s)	0.346	0.213	0.136

This application provides seismic values for the design of buildings in Canada under Part 4 of the National Building Code of Canada (NBC) 2020 and 2025, as prescribed in Article 1.1.3.1. of Division B of the respective NBC editions.