PATERSON GROUP

Geotechnical Investigation

Proposed Sorting Facility

1400 Upper Canada Street
Ottawa, Ontario

Prepared for Purolator Inc.

Report PG4783-1 Revision 4 dated November 7, 2023

Table of Contents

PAGE

Appendices

1.0 Introduction

Paterson Group (Paterson) was commissioned by Purolator Inc. to undertake a geotechnical investigation for the proposed sorting facility to be located at 1400 Upper Canada Street in the City of Ottawa, Ontario (reference should be made to Figure 1 - Key Plan in Appendix 2 of this report).

The objectives of the geotechnical investigation were to:

- ❑ Determine the subsoil and groundwater conditions at this site by means of test holes.
- ❑ Provide geotechnical recommendations for the design of the proposed development including construction considerations which may affect its design.

This 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 site was not part of the scope of work of the present investigation. Therefore, the present report does not address environmental issues.

2.0 Proposed Development

Based on the available drawings, it is understood that the proposed sorting facility will consist of a two-storey warehouse structure of slab-on-grade construction located within the central portion of the site. A one-storey garage is anticipated along the eastern portion of the building footprint. Asphalt-paved access lanes and parking areas with landscaped margins are also proposed surrounding the structure. It is expected the proposed building will be municipally serviced.

3.0 Method of Investigation

3.1 Field Investigation

Field Program

A field investigation program was completed at the subject site by Paterson on April 14 and April 17, 2023. At that time, a total of 21 test pits were advanced to a maximum depth of 5.4 m below the existing ground surface. Previous investigations were completed by Paterson on January 3 to January 4, 2019 and January 13 and 14, 2014 and consisted of a total of 13 boreholes advanced to a maximum depth of 7.7 m below ground surface throughout or within the vicinity of the subject site. Historical geotechnical investigations were also completed by others on October 29, 2018, consisting of a total of 5 boreholes advanced to a maximum depth of 6.9 m below the existing ground surface.

The test hole locations were distributed in a manner to provide general coverage of the proposed development taking into consideration existing site features and underground services. The approximate locations of the test holes are shown on Drawing PG4783-1 - Test Hole Location Plan included in Appendix 2.

The test pits were completed using a hydraulic shovel and backfilled with the excavated soil upon completion. The boreholes were advanced using a track-mounted auger drill operated by a two-person crew. All fieldwork completed by Paterson was conducted under the full-time supervision of our personnel under the direction of a senior engineer. The test pit and drilling procedures consisted of excavating or augering, respectively, to the required depths at the selected locations and sampling the overburden.

Sampling and In Situ Testing

Grab samples were collected from the test pits at selected intervals and soil samples were recovered from the auger flights or collected using a 50 mm diameter split-spoon sampler. All samples were inspected and classified on site and placed in sealed plastic bags. All samples were transported to our laboratory. The depths at which the grab, auger and split-spoon samples were recovered from the test holes are shown as G, AU and SS, respectively, on the Soil Profile and Test Data sheets in Appendix 1.

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

Undrained shear strength testing, using a vane apparatus, was carried out at regular intervals of depth in cohesive soils.

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

Groundwater infiltration levels were observed and recorded at the time of excavation in the test pits and standpipe piezometers were installed in the boreholes from the previous investigations to permit monitoring of the groundwater levels subsequent to completion of the sampling program.

Groundwater level observations are discussed in Section 4.3 and are presented in the Soil Profile and Test Data Sheets in Appendix 1.

3.2 Field Survey

The test hole locations were selected by Paterson to provide general coverage of the proposed development taking into consideration the existing site features and underground utilities. The test hole locations and ground surface elevation at each test hole location were surveyed by Paterson. The ground surface elevations were referenced to a geodetic datum. The test hole locations and ground surface elevations at each test hole location are presented on Drawing PG4783-1 - Test Hole Location Plan in Appendix 2.

3.3 Laboratory Review

Soil samples were recovered from the subject site and visually examined in our laboratory to review the results of the field logging. All samples from the current geotechnical investigation will be stored in the laboratory for one (1) month after this report is completed. They will then be discarded unless we are otherwise directed.

3.4 Analytical Testing

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

4.0 Observations

4.1 Surface Conditions

The subject site consists of a former agricultural field which is bordered by Palladium Drive to the east, Upper Canada Street to the south, a vacant property to the west, and an agricultural property to the north. The site is currently undeveloped with the existing ground surface at approximate geodetic elevation of 104 m. However, several fill piles up to geodetic elevation of 109 m were observed across the subject site.

4.2 Subsurface Profile

Overburden

Generally, the subsurface profile encountered at the test hole locations consisted of a layer of topsoil and/or fill material underlain by a silty clay to clayey silt deposit. The fill was generally observed to consist of brown silty sand and/or silty clay with trace amounts of organics and occasional cobbles. The fill was observed to extend to approximate depths ranging between 0.3 to 5.5 m below the ground surface.

The fill was observed to be underlain by a native, silty clay or clayey silt layer. The very stiff to firm, brown silty clay to clayey silt layer was observed to extend to approximate depths of 1.5 to 4.6 m below the existing ground surface.

Underlying the silty clay deposit, a layer of loose to compact, brown to grey sandy silt with occasional sand and gravel.

Practical refusal to augering was encountered within the borehole locations at approximate depths of 4.6 to 7.7 m below existing ground surface.

Reference should be made to the Soil Profile and Test Data sheets in Appendix 1 for specific details of the soil profiles encountered at each test hole location and Drawing PG4783-2–Native Soil Contour Plan for the approximate native soil contours based on the subsurface profile encountered at the test hole locations.

Bedrock

Based on available geological mapping, the bedrock in the subject area consists of interbedded limestone and dolomite of the Gull River, with an overburden drift thickness of 15 to 25 m depth.

Laboratory Testing

Grain size distribution was completed on six (6) selected soil samples on the previous field investigation. The results of the grain size analysis are summarized in Table 1 and presented on the Grain Size Distribution Results sheets in Appendix 1.

Table 1 - Summary of Grain Size Distribution Analysis

Test Hole	Sample Depth	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BH 1	1.5 m	0.4	6.7	40.8	52.1
BH 3	3.0 m	0.4	23.8	68.8	7.0
BH 4	1.5 m	0.5	2.5	90	7.0
BH 5	4.6 m	6.6	33.5	49.9	10.0
BH 6-19	0.3 m	0	6.7	43.8	49.5
BH 7-19	0.7 m	0	8.0	42.0	50.0

4.3 Groundwater

Groundwater levels were measured on January 8, 2019, within the installed standpipe piezometers. Depths of sidewall infiltration, as observed during the current test pit investigation were also recorded. The majority of test pits were dry upon completion with the exception of some minor infiltration observed at the fill-native overburden interface which collected at the bottom of the test pit at TP 14-23, TP 15-23 and TP 17-23. The measured groundwater levels and observed test pit sidewall infiltration are presented in Table 2 on the following page.

It should be noted that surface water can become trapped within a backfilled test hole, which can lead to higher than typical groundwater level observations.

The long-term groundwater level can also be estimated based on the observed colour, moisture content and consistency of the recovered samples. Based on these observations, the long-term groundwater level is expected to range between approximately **2 to 3 m** below original ground surface. It should be noted that groundwater levels are subject to seasonal fluctuations. Therefore, the groundwater level could vary at the time of construction.

Table 2 – Measured Groundwater Levels

Test Hole Number	Method	Ground Surface Elevation (m)	Measured Groundwater Level		Date
			Depth (m)	Elevation (m)	
BH 1-19	Piezometer	104.80	1.74	103.06	January 8, 2019
BH 2-19	Piezometer	107.10	1.61	105.49	January 8, 2019
BH 3-19	Piezometer	105.56	1.91	103.65	January 8, 2019
BH 4-19	Piezometer	104.49	1.08	103.41	January 8, 2019
BH 5-19	Piezometer	104.72	0.95	103.77	January 8, 2019
BH 6-19	Piezometer	104.54	1.12	103.42	January 8, 2019
BH 7-19	Piezometer	103.49	0.61	102.88	January 8, 2019
BH 8-19	Piezometer	103.64	1.00	102.64	January 8, 2019
BH 9-19	Piezometer	103.59	1.26	102.33	January 8, 2019
TP 14-23	Sidewall Infiltration	105.03	1.05	103.98	April 14, 2023
TP 15-23	Sidewall Infiltration	106.57	2.50	104.07	April 14, 2023
TP 17-23	Sidewall Infiltration	106.32	2.45	103.87	April 14, 2023

NOTE: The ground surface elevations at the test hole location of the current investigation were surveyed by Paterson using a high precision GPS unit and was referenced to a geodetic datum.

5.0 Discussion

5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site is considered suitable for the proposed development. It is anticipated that the proposed building may be supported upon conventional spread footings placed over an undisturbed, compact silty clay/clayey silt or a layer of engineered fill wrapped in bi-axial geogrid and woven-geotextile underlain by the aforementioned bearing surfaces or existing fill.

Due to the presence of a silty clay deposit, permissible grade raise restrictions are recommended for this site.

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

5.2 Site Grading and Preparation

Stripping Depth

Topsoil and fill, such as those containing organic or deleterious materials, should be stripped from under any buildings, paved areas, pipe bedding, and other settlement sensitive structures. Care should be taken not to disturb adequate bearing soils below the founding level during site preparation activities. Disturbance of the subgrade may result in having to sub-excavate the disturbed material and placement of additional suitable fill material.

It is important to note that due to the presence of a 0.3 to 5.5 m thick layer of fill overlying the native soils, sub-excavation of the existing fill will be required within the footprint of the proposed building. Where the fill is free of significant organic matter, such as peat, stumps, logs and/or other organic debris, the fill may be left in place provided proof-rolling of the fill is reviewed and approved by Paterson at the time of construction. This is discussed further in Subsection 5.3 and Subsection 5.4 of this report.

Where fill is encountered at the subgrade level for footings, it is recommended that a minimum 1.0 m deep sub-excavation of the existing fill will be completed. If undisturbed, native in-situ soi is encountered above this depth, the sub-excavation may be terminated upon the native soil surface. The footing sub-excavation should extend a minimum of 500 mm beyond the face of the overlying footing footprints. Reference should be made to Drawing PG4783-2 – Native Soil Contour Plan which depicts the areas where fill is anticipated below a geodetic elevation of 104.0 m.

Where fill is encountered at the subgrade level for the proposed slab-on-grade structure, it is recommended that a minimum 500 mm deep sub-excavation of the existing fill will be required below the slab-on-grade footprint. Further, it is recommended to sub-excavate to a minimum depth of 1 m below the subgrade depth for the Pudro slab where existing fill is encountered at the subgrade level. This sub-excavation may terminate upon the native, in-situ, undisturbed clay surface where it is encountered within the sub-excavation depth.

Fill Placement

From a geotechnical perspective, site-generated fill free of organic debris, inorganic material and/or stones/cobbles larger than 200 mm in their longest dimension is generally considered suitable for re-use as pre-grade material for throughout the subject site. The site-generated fill may be used for raising the ground surface within the building footprint, above the underside of and around footings, as foundation wall backfill, throughout the proposed paved areas and throughout landscaped areas.

It should be noted that only imported and approved crushed stone fill or lean concrete is permitted to be placed directly below footings and is discussed further in Section 5.3 of this report. In summary, sub-excavations below design underside of footing below footing footprints and within existing fill material should be reinstated using crushed stone fill wrapped in bi-axial geogrid and woven geotextile layers. Further details are provided in Section 5.3 of this report.

Prior to using site-generated soil from the existing fill piles and the remainder of the subject site, topsoil and fill which contains significant amounts of organics (peat, stumps, logs and/or other organic debris) or deleterious materials should be removed. Consideration may be given to screening topsoil from the existing fill piles to re-use the existing soil within the fill pile for use across the subject site provided it is in accordance with the above-noted requirements. The preparation and segregation of fill material should be reviewed and approved at the time of preparation and extraction from fill piles by Paterson personnel. Paterson personnel may advise on the suitability of potential re-use material at that time.

Care will also need to be taken during storage, placement and compaction of the excavated fill and native soils to maintain them in an unfrozen state and at a moisture content which is suitable for compaction. Soils intended for re-use which become frozen and/or which have excessive moisture contents will not be considered suitable for reuse at the subject site. Placement of this material during winter months increases the risk of placing frozen material which may result in future poor performing areas that will require future repair.

Based on this, site-generated fill that has been reviewed and approved by Paterson at the time of construction may be placed in maximum 300 mm thick loose lifts and compacted using a suitably sized sheepsfoot roller to a minimum of 98% of the materials SPMDD, in the dry and above-freezing conditions.
Each lift of site-generated fill should be reviewed and approved by Paterson field personnel at the time of construction.

All imported fill material should be tested and approved prior to delivery. The fill should be placed in maximum 300 mm thick loose lifts and compacted by suitable compaction equipment.

Lean Concrete Filled Trenches

As an alternative to placing geogrid and geotextile wrapped engineered fill below footings where fill is encountered at the design founding elevation, consideration may also be given to excavating near-vertical trenches extending to the undisturbed, native, stiff silty clay to clayey silt surface, and backfilling with lean concrete to the founding elevation (minimum **17 MPa** 28-day compressive strength).

Typically, the excavation side walls will be used as the form to support the concrete. The trench excavation should be at least 150 mm wider than all sides of the footing (strip and pad footings) at the base of the excavation. The additional width of the concrete poured against an undisturbed trench sidewall will suffice in providing a direct transfer of the footing load to the underlying stiff silty clay to clayey silt. Once the trench excavation is approved by the geotechnical engineer, lean concrete can be poured up to the proposed founding elevation.

5.3 Foundation Design

Bearing Resistance Values

Native Overburden Bearing Surface

Strip footings, up to 3 m wide, and pad footings, up to 5 m wide, placed on an undisturbed, stiff silty clay to clayey silt bearing surface, or on engineered fill or lean concrete placed directly over the undisturbed, stiff silty clay to clayey silt, can be designed using a bearing resistance value at serviceability limit states (SLS) of **150 kPa** and a factored bearing resistance value at ultimate limit states (ULS) of **225 kPa**.

An undisturbed soil bearing surface consists of one 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 the concrete for the footings. The bearing resistance value at SLS will be subjected to potential post-construction total and differential settlements of 25 and 20 mm, respectively.

Engineered Fill Bearing Surface

Where fill is encountered at the design founding elevation, it is recommended to sub-excavate a minimum of 1.0 m below the proposed founding depth for the overlying footing structure and be re-instated with engineered fill.

If native subgrade is encountered within the sub-excavation, the depth of the sub-excavation may be limited to the native subgrade surface. The sub-excavation is recommended to extend a minimum of 500 mm horizontally beyond the overlying footing faces. Once the sub-excavation has been completed, it is recommended to proof-roll the in-situ fill subgrade and that the proof-rolling be reviewed and approved by Paterson personnel. If the fill subgrade is deemed unsuitable for the placement of engineered fill, additional sub-excavations may be required and as determined at the time of construction.

Once approved by Paterson personnel, the sub-excavation may be in-filled up to the design founding elevation using engineered fill, such as OPSS Granular A or OPSS Granular B Type II crushed stone placed in maximum 300 mm thick loose lifts and compacted to a minimum of 98% of the materials SPMDD. Where implemented, the engineered fill layer is recommended to be wrapped by a layer of bi-axial geogrid, such as Terrafix TBX2000, and then further by a layer of woven geotextile, such as Terrafix 200W.

It is recommended that each layer overlaps beyond the footing footprint by a minimum of 500 mm beyond the edge of the overlying footing face. All abutting layers of geogrid and geotextile should be fastened/secured and overlapped as per the manufacturer's recommendations. The installation of these layers should be reviewed by Paterson personnel at the time of construction.

Footings placed on a layer of engineered fill prepared as described herein and approved by Paterson personnel can be designed using a bearing resistance value at serviceability limit states (SLS) of **150 kPa** and a factored bearing resistance value at ultimate limit states (ULS) of **225 kPa**, incorporating a geotechnical resistance factor of 0.5.

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 the in-situ bearing medium soils above the groundwater table when a plane extending down and out from the bottom edges of the footing, at a minimum of 1.5H:1V, passes only through in situ soil or engineered fill of the same or higher capacity as that of the bearing medium.

Permissible Grade Raise

Due to the presence of the silty clay to clayey silt deposit, a permissible grade raise restriction of **2.0 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.

5.4 Design for Earthquakes

Shear wave velocity testing was completed for the subject site to accurately determine the applicable seismic site classification for the proposed building in accordance with Table 4.1.8.4.A of the Ontario Building Code 2012. The shear wave velocity testing was completed by Paterson personnel. The results of the shear wave velocity test are provided in Figures 2 and 3 in Appendix 2.

Field Program

The seismic array testing location was placed within the southeast portion of the site in an approximate east-west direction as presented in Drawing PG4783-1 – Test Hole Location Plan, attached to the present report. Paterson field personnel placed 24 horizontal 4.5 Hz geophones mounted to the surface by means of two 75 mm ground spikes attached to the geophone land case. The geophones were spaced at 3 m intervals and connected by a geophone spread cable to a Geode 24 Channel seismograph.

The seismograph was also connected to a computer laptop and a hammer trigger switch attached to a 12-pound dead blow hammer. The hammer trigger switch sends a start signal to the seismograph. The hammer is used to strike an I-Beam seated into the ground surface, which creates a polarized shear wave.

The hammer shots are repeated between four (4) to eight (8) times at each shot location to improve signal to noise ratio.

The shot locations are also completed in forward and reverse directions (i.e.- striking both sides of the I-Beam seated parallel to the geophone array). The shot locations were 3, 4.5 and 30 m away from the first geophone, 3, 4.5 and 15 m away from the last geophone and at the centre of the seismic array.

Data Processing and Interpretation

Interpretation of the shear wave velocity results was completed by Paterson personnel. Shear wave velocity measurement was made using reflection/refraction methods. The interpretation is repeated at each shot location to provide an average shear wave velocity, Vs_{30}, of the upper 30 m profile immediately below the proposed building foundations. The layer intercept times, velocities from different layers and critical distances are interpreted from the shear wave records to compute the bedrock depth at each location.

The bedrock velocity was interpreted using the main refractor wave velocity, which is considered a conservative estimate of the bedrock shear wave velocity due to the increasing quality of bedrock with depth. It should be noted that as bedrock quality increases, the bedrock shear wave velocity also increases. Based on the test results, the average overburden shear wave velocity is **172 m/s**. Through interpretation, the bedrock shear wave velocity is **2,685 m/s**.

The Vs_{30} was calculated using the standard equation for average shear wave velocity provided in the OBC 2012, and as presented below.

$$V_{s30} = \frac{Depth_{OfInterest}(m)}{\left(\frac{(Depth_{Layer1}(m)}{Vs_{Layer1}(m/s)} + \frac{Depth_{Layer2}(m)}{Vs_{Layer2}(m/s)}\right)}$$

$$V_{s30} = \frac{30m}{\left(\frac{4m}{172m/s} + \frac{26m}{2{,}685m/s}\right)}$$

$$V_{s30} = 911m/s$$

Based on the results of the seismic shear wave velocity testing, the average shear wave velocity, Vs_{30}, was calculated to be **911 m/s** for an anticipated underside of footing at approximate geodetic elevation 104.0 m.

Although this average shear wave velocity is sufficient for a Site Class B, as per Note 1 of Table 4.1.8.4.A of the OBC 2012, "site Classes A and B, hard rock and rock are not to be used if there is more than 3 m of softer materials between the rock and the underside of footing or mat foundations." Therefore, for the anticipated underside of footing elevation noted above, a **Site Class C** is applicable for design of the proposed building.

However, if the underside of footing is located at or below geodetic elevation 102.0 m or is supported on lean concrete trenches which extend to geodetic elevation 102.0 m, which is within 3 m of the bedrock surface, a **Site Class B** would be applicable for design of the proposed building. The soils underlying the subject site are not susceptible to liquefaction.

5.5 Slab on Grade Construction

With the removal of all topsoil, deleterious fill/material within the footprint of the proposed warehouse footprint, the existing fill approved by Paterson field personnel at the time of construction will be considered an acceptable subgrade on which to commence backfilling for floor slab construction. It is recommended that where fill is encountered at the subgrade level below the slab-on-grade, that the existing fill be sub-excavated a minimum depth of 500 mm, or the native soil surface if encountered above this depth, below the underside of the slab-on-grade surface and as noted in Section 5.2.

Where fill is encountered at the depth of this sub-excavation, the ground surface should be proof-rolled by a suitably sized vibratory-roller and that proof-rolling be reviewed and approved by Paterson field personnel. Proof-rolling is recommended to be undertaken in the dry and in above-freezing conditions. Any soft areas should be removed and backfilled with appropriate granular material. If the existing fill layer is considered acceptable, it may be left in place for support of the slab-on-grade sub-slab fill layer.

It is recommended that the upper 200 mm of sub-slab fill consist of OPSS Granular A crushed stone compacted to a minimum of 98% of the materials SPMDD. All backfill material within the footprint of the building footprint should be placed in maximum 300 mm thick loose layers and compacted to a minimum of 98% of the SPMDD.

Modulus of Subgrade Reaction

Based on our review, the modulus of subgrade reaction for the design of the slab-on-grade founded upon a layer of engineered fill underlain by existing fill and/or very stiff, brown silty clay may be taken as **20 MPa/m**.

5.6 Pavement Design

Car only parking areas, access lanes and heavy truck parking areas, and concrete aprons are anticipated at this site. The proposed pavement structures are shown in Table 3 to Table 6 below.

Table 3 - 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 over in-situ soil or fill material placed over in situ soil or fill.	

Table 4 - 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 over fill or in-situ soil.	

Table 5 - Recommended Rigid Pavement Structure for Concrete Aprons in Loading Areas	
Thickness (mm)	**Material Description**
Specified by Others	**Exposure Class C1 – 35 MPa Concrete** (5 to 8% Air Entrainment)
300	**BASE** – OPSS Granular A Crushed Stone
100	**RIGID INSULATION** – HI-40 Extruded Polystyrene Insulation
SUBGRADE – Either fill, in-situ soil, or OPSS Granular B Type I or II material over fill or in-situ soil.	

Table 6 - Recommended Rigid Pavement Structure for Truck Traffic and Turning Lane Areas	
Thickness (mm)	**Material Description**
200	**Exposure Class C1 – 35 MPa Concrete** (5 to 8% Air Entrainment)
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 over fill or in-situ soil.	

Minimum Performance Graded (PG) 58-34 asphalt cement should be used for this project. It is recommended that exterior apron slabs consist of a Category C1 Exposure Class concrete with a minimum 28-day compressive strength of 35 MPa.

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 100% of the material's SPMDD using suitable vibratory equipment.

Rigid Pavement Structure – Frost Taper Recommendations

To improve the long-term performance of the concrete apron and lessen the effects of frost penetration and differential movement between the rigid and flexible pavement structures, it is recommended to place a minimum 100 mm thick layer of insulation a extending a minimum of 2.4 m beyond all directions of the footprint of the concrete loading dock where it meets the asphaltic laneway.

This layer should be placed on the subgrade layer throughout the area of the flexible pavement structure (i.e.- asphalt paved lanes).

Further, it is recommended to sub-excavate at least 300 mm below the subgrade level of the pavement structure along the outside edge of the rigid insulation to provide a suitable frost taper. The sub-excavated area should extend horizontally at least 600 mm beyond the exterior face of the rigid insulation layer. A minimum 5H:1V slope profile can be used to raise the sub-excavated area back to subgrade level. The frost taper area should be backfilled with a free draining, non-frost susceptible engineered fill, such as OPSS Granular A or OPSS Granular B Type II compacted to a minimum of 98% of the materials SPMDD.

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 its load carrying capacity.

Due to the impervious nature of the subgrade materials consideration should be given to installing subdrains during the pavement construction as per City of Ottawa standards. 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.

5.7 Percolation Rates

Infiltration galleries are anticipated to be located beneath the asphaltic parking areas within the subject site. Paterson has completed a detailed hydrogeological investigation of the lands south of the subject site as part of previous phases of the Kanata West Business Park in order to establish hydraulic conductivity and percolation time of in-situ materials.

Varying strata at the base of the galleries will be encountered during the installation and will affect the rate of stormwater infiltration into the underlying material. The calculations for the infiltration galleries should be reviewed to correspond with the appropriate percolation rates given the appropriate strata. The percolation rate was interpreted from the hydraulic conductivity which was estimated based on the range of grain size distribution for the proposed development area. Based on these values, the average percolation rate (T-Time) was estimated to be within the ranges in Table 6.

Table 6 – Estimated Percolation Rates		
Material	**Hydraulic Conductivity – k (m/sec)**	**Percolation (T-time) – (mins/cm)**
Silty Clay [1]	**3 x 10^{-6} to 1 x 10^{-10}**	**35 to 50+**
Silty Fine Sand / Sandy Silt [1]	**1 x 10^{-7} to 1 x 10^{-8}**	**20 to 50**
[1] - Values are based upon site specific testing carried out at a nearby phase of the development		

5.8 Infiltration Galleries

Based on preliminary review of the proposed development plans, it is understood that an infiltration gallery will be constructed within the parking area of the development. Based on our review of the site servicing plans, it is important to note that a dewatering of the observed 'perched' pre-development groundwater level will occur.

Based on our review of the existing and proposed servicing, long-term groundwater levels will be located at invert of the lowest service pipe alignment. The lowest service pipes are located along Upper Canada Street, which will provide an outlet for the 'perched' pre-development groundwater level and provide sufficient separation between the infiltration gallery invert and the long-term groundwater level.

6.0 Design and Construction Precautions

6.1 Foundation Drainage and Backfill

Foundation Drainage

Since the building will consist of a slab-on-grade perimeter foundation drainage system is considered optional throughout the landscaped portions of the proposed building footprint. In areas where hard-scaping or pavement structures will abut the building footprint, it is recommended to implement a foundation drainage system. The system should consist of a 150 mm diameter perforated corrugated plastic pipe wrapped in a geosock and surrounded on all sides by 150 mm of 10 mm clear crushed stone. The clear stone should be wrapped in a non-woven geotextile. The pipe should have a positive outlet, such as a gravity connection to the storm sewer.

The pipe should be placed at the footing level around the exterior perimeter of the structure if the backfill between the founding depth and will consist of crushed stone fill or site-generated soil backfill in conjunction with a composite foundation drainage board.

Alternatively, the perimeter drainage pipe may be placed up to 1 m below proposed finished grade and against the building footprint upon approved soil backfill to ensure adequate drainage of the granular fill layer is provided from precipitation events and/or spring meltwater. In this configuration, provided the backfill overlying the pipe consists of crushed stone fill associated with the pavement structure, a composite foundation drainage board will not be required.

Pavement drainage will be required to limit the accumulation of water below the slab. Drainage can be achieved by installing perimeter drainage along the wing wall below the slab or centrally below the slab and connected to the building's perimeter drainage.

The pipe should be located a minimum of 1 m below finished grade at the ramp and should consist of a minimum 150 mm perforated drainage pipe wrapped in geotextile and surrounded with a minimum of 150 mm of clear crushed stone. The pipe is not required to be connected to the remainder of the building's perimeter drainage pipe if it is founded lower than that pipe. However, the loading dock drainage pipe should have a gravity connection towards a nearby storm drainage feature.

Foundation Backfill

Backfill against the exterior sides of the foundation walls may consist of free-draining, non-frost susceptible imported crushed stone or clean sand fill. Alternatively, consideration may be given to placing approved soil fill as described in Section 5.2 of this report as backfill against the foundation walls.

If the building's perimeter drainage pipe is located at footing level, a composite foundation drainage board should be placed against the foundation walls to ensure satisfactory drainage of the backfill layer to the perimeter drainage pipe. If the building's perimeter drainage pipe is raised up to 1 m below finished grade and the overlying fill will consist of granular stone fill, the composite foundation drainage board may be omitted.

All fill placed as foundation backfill should be paled in maximum 300 mm thick loose lifts, compacted using suitable compaction equipment (suitably sized smooth-drum roller for crushed stone fill, sheepsfoot roller for soil fill) and tested for compaction efforts at the time of construction by Paterson personnel.

Concrete and Brick Sidewalks Adjacent to Buildings

To avoid differential settlements within the proposed concrete and brick sidewalks adjacent to the proposed building, it is recommended that the upper 600 mm of backfill placed below the concrete sidewalks adjacent to the building footprints to consist of non-frost susceptible material such as OPSS Granular A or Granular B Type II. The granular material should be placed in maximum 300 mm loose lifts and compacted to a minimum of 98% of the material's SPMDD using suitable compaction equipment.

The subgrade material should be shaped to promote positive drainage towards the building's perimeter drainage system. Consideration should be given to placing a layer of rigid insulation below the granular fill layer, however, should be detailed by Paterson once design drawings are being complete by others.

Further, consideration can be given to installing a 150 mm diameter perforated, corrugated plastic pipe surrounded on all sides by 150 mm of 19 mm clear crushed stone at the interface of the soil subgrade and the granular sidewalk base. If a drainage pipe is provided at the top of the soil subgrade layer, the granular backfill thickness below the sidewalk may be reduced to 300 mm.

6.2 Protection of Footings and Slabs Against Frost Action

Perimeter footings of heated structures are required to be insulated against the deleterious effect of frost action. A minimum of 1.5 m thick soil cover (or equivalent) should be provided in this regard. This would be considered applicable to the perimeter of the proposed building, including snow-cleared areas, since the proposed building is anticipated to be heated.

Exterior unheated footings, such as those for isolated exterior piers and loading dock wing-walls, are more prone to deleterious movement associated with frost action than the exterior perimeter foundation walls of the proposed structure and would require additional protection, such as soil cover of 2.1 m or a combination of soil cover and foundation insulation. It is recommended that Paterson review the proposed frost protection detail for the loading dock footings during the design stage of the proposed building.

6.3 Excavation Side Slopes

Unsupported Excavations

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

The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be cut back at 1H:1V or flatter. The flatter slope is required for excavation below groundwater level. Excavations below the groundwater level should be cut back at a maximum slope of 1.5H:1V. The subsoil at this site is considered to be mainly a Type 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 be kept away from the excavation sides.

Slopes in excess of 3 m in height should be periodically inspected by the geotechnical consultant in order to detect if the slopes are exhibiting signs of distress. It is recommended that a trench box be used at all times to protect personnel working in trenches with steep or vertical sides. It is expected that services will be installed by “cut and cover” methods and excavations will not be left open for extended periods of time.

6.4 Pipe Bedding and Backfill

Bedding and backfill materials should be in accordance with the most recent Material Specifications & Standard Detail Drawings from the Department of Public Works and Services, Infrastructure Services Branch of the City of Ottawa.

The pipe bedding for sewer and water pipes should consist of at least 150 mm of OPSS Granular A material. Where the bedding is located within firm grey silty clay, the thickness of the bedding material should be increased to a minimum of 300 mm and as advised by Paterson at the time of construction. The material should be placed in maximum 300 mm thick lifts and compacted to a minimum of 99% of its SPMDD. The bedding material should extend at least to the spring line of the pipe.

The cover material, which should consist of OPSS Granular A, should extend from the spring line of the pipe to at least 300 mm above the obvert of the pipe. The material should be placed in maximum 300 mm thick lifts and compacted to a minimum of 99% of its SPMDD.

It should generally be possible to re-use the moist (not wet) brown silty clay above the cover material if the excavation and filling operations are carried out in dry weather conditions. Wet silty clay materials will be difficult to re-use, as the high-water contents make compacting impractical without an extensive drying period.

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) should match the soils exposed at the trench walls to minimize differential frost heaving. The trench backfill should be placed in maximum 300 mm thick loose lifts and compacted to a minimum of 95% of the material's SPMDD.

To reduce long-term lowering of the groundwater level at this site, clay seals should be provided in the service trenches. The seals should be at least 1.5 m long (in the trench direction) and should extend from trench wall to trench wall. Generally, the seals should extend from the frost line and fully penetrate the bedding, subbedding and cover material. The barriers should consist of relatively dry and compactable brown silty clay placed in maximum 225 mm thick loose layers and compacted to a minimum of 95% of the SPMDD. The clay seals should be placed at the site boundaries and at strategic locations at no more than 60 m intervals in the service trenches.

6.5 Groundwater Control

Based on our observations, it is anticipated that groundwater infiltration into the excavations should be low to moderate and controllable using open sumps. Pumping from open sump pumps should be sufficient to control the groundwater influx through the sides of shallow excavations. 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.

6.6 Winter Construction

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

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

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

6.7 Corrosion Potential and Sulphate

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 non to slightly aggressive corrosive environment.

6.8 Tree Planting Restrictions

The silty clay which was encountered 3 to 3.5 m below design footing level was very stiff to stiff and is considered low to medium sensitivity and is not considered a sensitive marine clay. Tree planting setback limits may therefore be reduced to 4.5 m for small trees (mature tree height up to 7.5 m) and medium size trees (mature tree height 7.5 m to 14 m). It should be noted that shrubs and other small plantings are permitted within the 4.5 m setback area.

It is documented in the literature, and is our experience, that fast-growing trees located near buildings founded on cohesive soils which shrink on drying can result in long-term differential settlements of the structures. Tree varieties that have the most pronounced effect on foundations are seen to consist of poplars, willows and some maples (i.e., Manitoba Maples) and should not be considered in the landscaping design.

7.0 Recommendations

It is recommended that the following be carried out by Paterson once preliminary and future details of the proposed development have been prepared:

- Review preliminary and detailed grading, servicing and structural plan(s) from a geotechnical perspective.

It is a requirement for the foundation design data provided herein to be applicable that a material testing and observation program be performed by the geotechnical consultant. The following aspects of the program should be performed by Paterson:

- Review and inspection of the installation of the foundation drainage systems.
- Observation of all bearing surfaces prior to the placement of concrete.
- Sampling and testing of the concrete and fill materials.
- Periodic observation of the condition of unsupported excavation side slopes in excess of 3 m in height, if applicable.
- Observation of all subgrades prior to backfilling and follow-up field density tests to determine the level of compaction achieved.
- 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 soil must 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 to review 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 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 Purolator Inc. 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.

November 7, 2023

Drew Petahtegoose, P.Eng.

David J. Gilbert, P.Eng.

Report Distribution:

- ❑ Purolator Inc. (e-mail copy)
- ❑ Paterson Group (1 copy)

APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

SOIL PROFILE & TEST DATA SHEETS BY OTHERS

GRAIN SIZE DISTRIBUTION ANALYSIS RESULTS

ANALYTICAL TESTING RESULTS

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 17, 2023

FILE NO. PG4783

HOLE NO. TP 1-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
Ground Surface						0	103.67	20 40 60 80	
TOPSOIL 0.05									
FILL: Brown silty clay, trace organics 0.40		G	1						
Very stiff, brown **SILTY CLAY,** trace sand 0.60		G	2					185	
End of Test Pit									

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 17, 2023

FILE NO. PG4783

HOLE NO. TP 2-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
Ground Surface						0	103.85		
TOPSOIL 0.05									
FILL: Brown silty clay to clayey silt, trace sand and organics 0.45		G	1						
Very stiff to hard, brown **SILTY CLAY,** trace sand 0.65		G	2					228	
End of Test Pit									

20 40 60 80

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

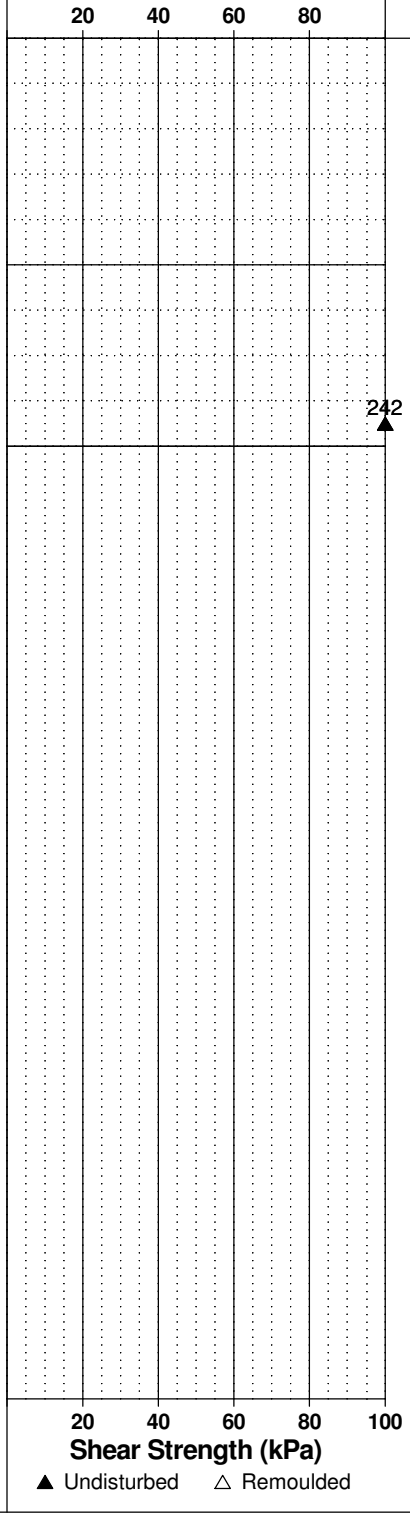
BORINGS BY Excavator **DATE** April 17, 2023

FILE NO. PG4783

HOLE NO. TP 3-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
Ground Surface						0	104.61		
TOPSOIL 0.05									
FILL: Brown silty sand to sandy silt, trace clay, organics, occasional cobbles		G	1						
		G	2			1	103.61		
1.60									
Very stiff to hard, brown **SILTY CLAY,** trace sand 1.80		G	3						
End of Test Pit									

Pen. Resist. Blows/0.3m: ● 50 mm Dia. Cone; ○ Water Content %



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 17, 2023

FILE NO. PG4783

HOLE NO. TP 4-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
Ground Surface									
TOPSOIL 0.05						0	105.98		
FILL: Topsoil with some sand, organics, trace clay, occasional cobbles		G	1			1	104.98		
		G	2			2	103.98		
		G	3						
2.90									
Very stiff to hard, brown **SILTY CLAY,** trace sand 3.10		G	4			3	102.98	245	
End of Test Pit									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 17, 2023

FILE NO. PG4783

HOLE NO. TP 5-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
Ground Surface									
TOPSOIL 0.05						0	107.54		
FILL: Topsoil with dark brown silty sand, some organics, trace clay, occasional cobbles		G	1			1	106.54		
1.25									
FILL: Dark brown silty sand, some silt and clay, trace organics, occasional cobbles		G	2			2	105.54		
		G	3						
2.80									
FILL: Light brown to grey silty clay, some organics, trace gravel, occasional cobbles		G	4			3	104.54		
4.55						4	103.54		
Very stiff, light brown **SILTY CLAY,** trace sand 4.70		G	5						
End of Test Pit									

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 17, 2023

FILE NO. PG4783

HOLE NO. TP 6-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
Ground Surface									
TOPSOIL 0.05						0	107.64		
FILL: Topsoil with silty sand, some organics, occasional cobbles		G	1			1	106.64		
1.30									
		G	2			2	105.64		
FILL: Dark brown silty sand to sandy silt, trace clay and organics		G	3			3	104.64		
		G	4			4	103.64		
4.30									
Stiff to very stiff, brown to grey **SILTY CLAY to CLAYEY SILT,** trace sand 4.50		G	5						
End of Test Pit									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 17, 2023

FILE NO. PG4783

HOLE NO. TP 7-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
Ground Surface									
TOPSOIL 0.05						0	106.88		
FILL: Brown silty sand to sandy silt, trace organics, occasional cobbles		G	1						
		G	2			1	105.88		
		G	3						
2.00		G	4			2	104.88		
FILL: Light brown silty sand with topsoil, trace organics, occasional cobbles		G	5						
3.30						3	103.88		
Hard, brown **SILTY CLAY,** trace sand 3.50		G	6					260	
End of Test Pit									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 17, 2023

FILE NO. PG4783

HOLE NO. TP 8-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
Ground Surface									
TOPSOIL 0.05						0	105.43		
FILL: Brown silty sand to sandy silt, trace organics, occasional cobbles		G	1						
		G	2			1	104.43		
		G	3						
2.00									
Very stiff to hard, brown **SILTY CLAY** 2.20		G	4			2	103.43	254	
End of Test Pit									

Pen. Resist. Blows/0.3m: ● 50 mm Dia. Cone; ○ Water Content %
20 40 60 80

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

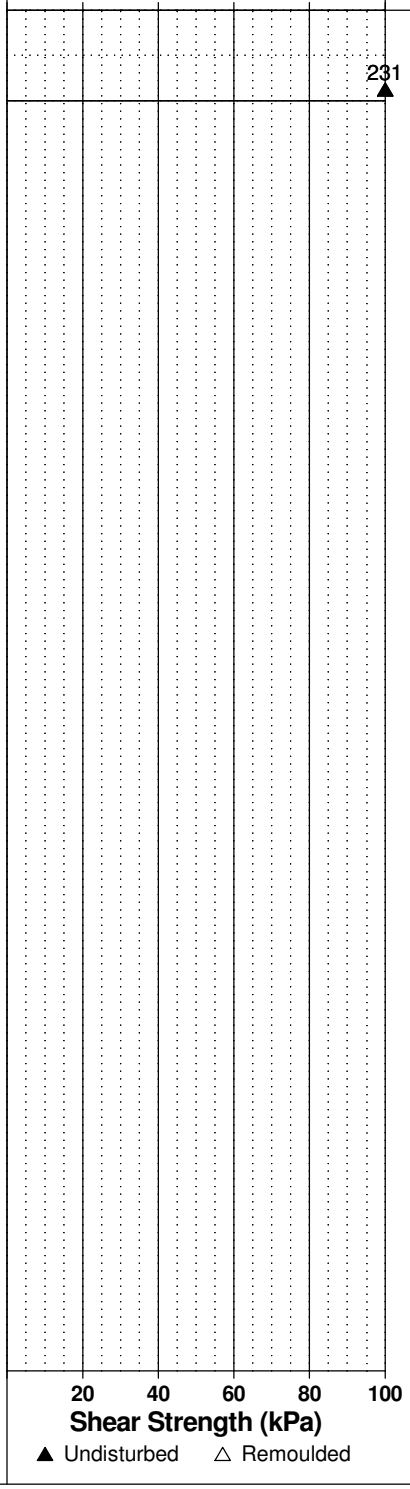
REMARKS

BORINGS BY Excavator **DATE** April 17, 2023

FILE NO. PG4783

HOLE NO. TP 9-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
Ground Surface									
TOPSOIL 0.05						0	103.98		
FILL: Brown silty clay to clayey silt, trace organics and sand 0.30		G	1						
0.40		G	2						
Very stiff to hard, brown **SILTY CLAY**									
End of Test Pit									



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 14, 2023

FILE NO. PG4783

HOLE NO. TP10-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
Ground Surface									
TOPSOIL 0.05						0	105.22		
FILL: Brown silty sand with topsoil and gravel, trace organics, asphalt and clay		G	1						
		G	2			1	104.22		
1.15									
Very stiff to hard, brown **SILTY CLAY,** trace sand 1.40		G	3					219	
End of Test Pit									

Pen. Resist. Blows/0.3m: ● 50 mm Dia. Cone; ○ Water Content %
20 40 60 80

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

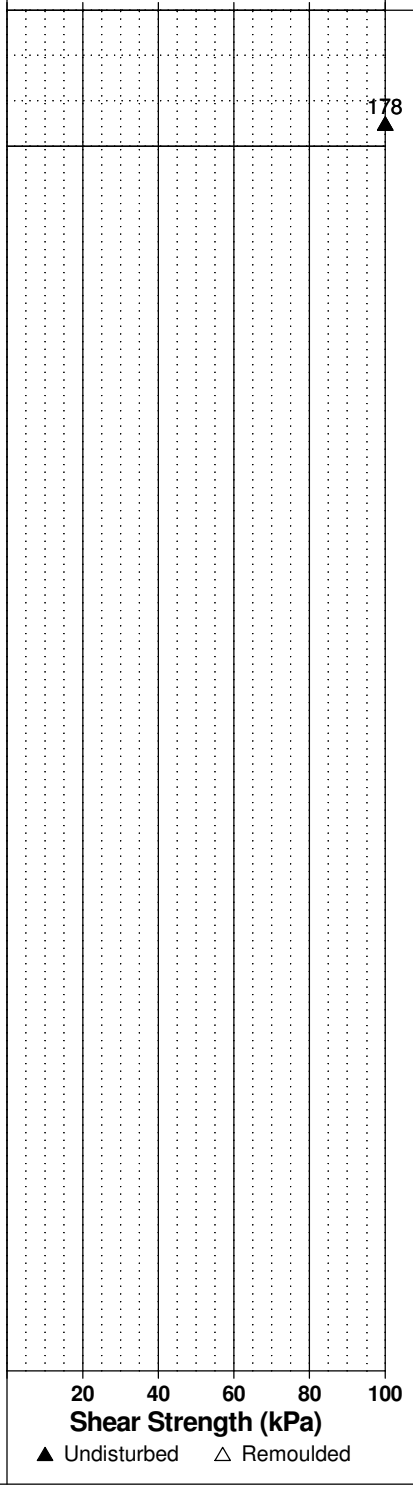
REMARKS

BORINGS BY Excavator **DATE** April 14, 2023

FILE NO. PG4783

HOLE NO. TP11-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
Ground Surface						0	104.18		
TOPSOIL 0.05									
FILL: Topsoil, some silty sand and organics 0.40		G	1						
Very stiff, brown **SILTY CLAY,** trace sand 0.60		G	2						
End of Test Pit									



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 14, 2023

FILE NO. PG4783

HOLE NO. TP12-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
Ground Surface									
TOPSOIL 0.05						0	109.41		
FILL: Brown silty sand to sandy silt, trace organics, clay and gravel, occasional cobbles		G	1			1	108.41		
		G	2			2	107.41		
		G	3			3	106.41		
		G	4			4	105.41		
5.15		G	5			5	104.41		
Stiff to very stiff, brown **SILTY CLAY** 5.40		G	6						
End of Test Pit									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 14, 2023

FILE NO. PG4783

HOLE NO. TP13-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
Ground Surface						0	105.94		
TOPSOIL 0.05									
FILL: Brown silty sand to sandy silt, some organics, trace clay and gravel		G	1						
		G	2			1	104.94		
1.50									
FILL: Brown silty sand with gravel, crushed stone, trace clay 1.70		G	3						
Hard, brown **SILTY CLAY,** trace sand 2.00		G	4			2	103.94		
End of Test Pit									

Pen. Resist. Blows/0.3m: ● 50 mm Dia. Cone; ○ Water Content %
20 40 60 80
260
20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 14, 2023

FILE NO. PG4783

HOLE NO. TP14-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
Ground Surface						0	105.03		
TOPSOIL 0.05									
FILL: Topsoil, some gravel and organics		G	1						
0.90		G	2						
FILL: Light brown silty clay to clayey silt with gravel, crushed stone, trace topsoil and asphalt 1.20		G	3			1	104.03		
Hard, brown **SILTY CLAY,** trace sand 1.50		G	4					260	
End of Test Pit									
Sidewall infiltration encountered at base of test pit below fill layer.									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 14, 2023

FILE NO. PG4783

HOLE NO. TP15-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
Ground Surface									
TOPSOIL 0.05						0	106.57		
FILL: Brown silty sand to sandy silt with topsoil, clay, some gravel, occasional cobbles		G	1			1	105.57		
		G	2			2	104.57		
2.50		G	3						
Very stiff, brown **SILTY CLAY,** trace sand and gravel 2.70		G	4						
End of Test Pit									
Sidewall infiltration encountered at base of test pit below fill layer.									

Pen. Resist. Blows/0.3m: ● 50 mm Dia. Cone; ○ Water Content %
20 40 60 80
159 ▽
20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

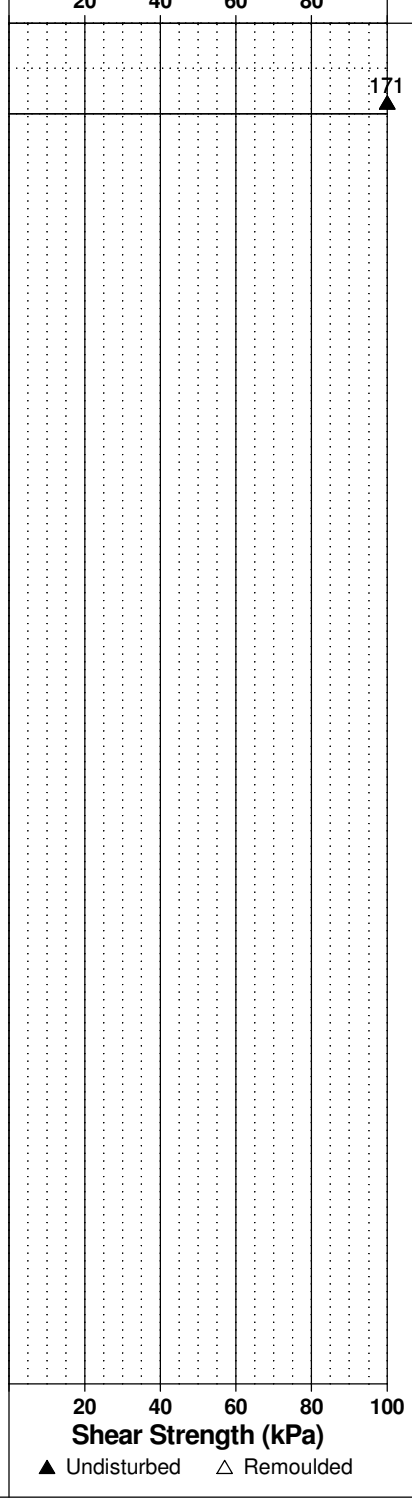
REMARKS

BORINGS BY Excavator **DATE** April 14, 2023

FILE NO. PG4783

HOLE NO. TP16-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
Ground Surface						0	104.88		
TOPSOIL 0.05									
Very stiff, brown **SILTY CLAY to CLAYEY SILT,** some gravel, trace organics 0.40		G	1						
End of Test Pit									



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 14, 2023

FILE NO. PG4783

HOLE NO. TP17-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
Ground Surface						0	106.32		
TOPSOIL 0.05									
FILL: Brown silty clay, some organics, trace gravel and brick		G	1			1	105.32		
		G	2			2	104.32		
2.40		G	3					159	
Very stiff, brown **SILTY CLAY,** trace sand 2.70									
End of Test Pit									
Sidewall infiltration encountered at base of test pit below fill layer.									

20 40 60 80

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 14, 2023

FILE NO. PG4783

HOLE NO. TP18-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
Ground Surface									
TOPSOIL 0.05						0	104.97		
FILL: Topsoil with silty clay, trace organics and gravel		G	1						
		G	2			1	103.97		
1.40									
Very stiff to hard, brown **SILTY CLAY,** trace sand and gravel 1.60		G	3						
End of Test Pit									

Pen. Resist. Blows/0.3m: ● 50 mm Dia. Cone; ○ Water Content %
20 40 60 80
200
20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 14, 2023

FILE NO. PG4783

HOLE NO. TP19-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
Ground Surface									
TOPSOIL 0.05						0	104.48		
FILL: Topsoil, trace silty clay, organics, crushed stone, sand and cobbles		G	1						
		G	2			1	103.48		
1.40									
Stiff to very stiff, brown **SILTY CLAY**, trace sand 1.50		G	3					151	
End of Test Pit									

20 40 60 80

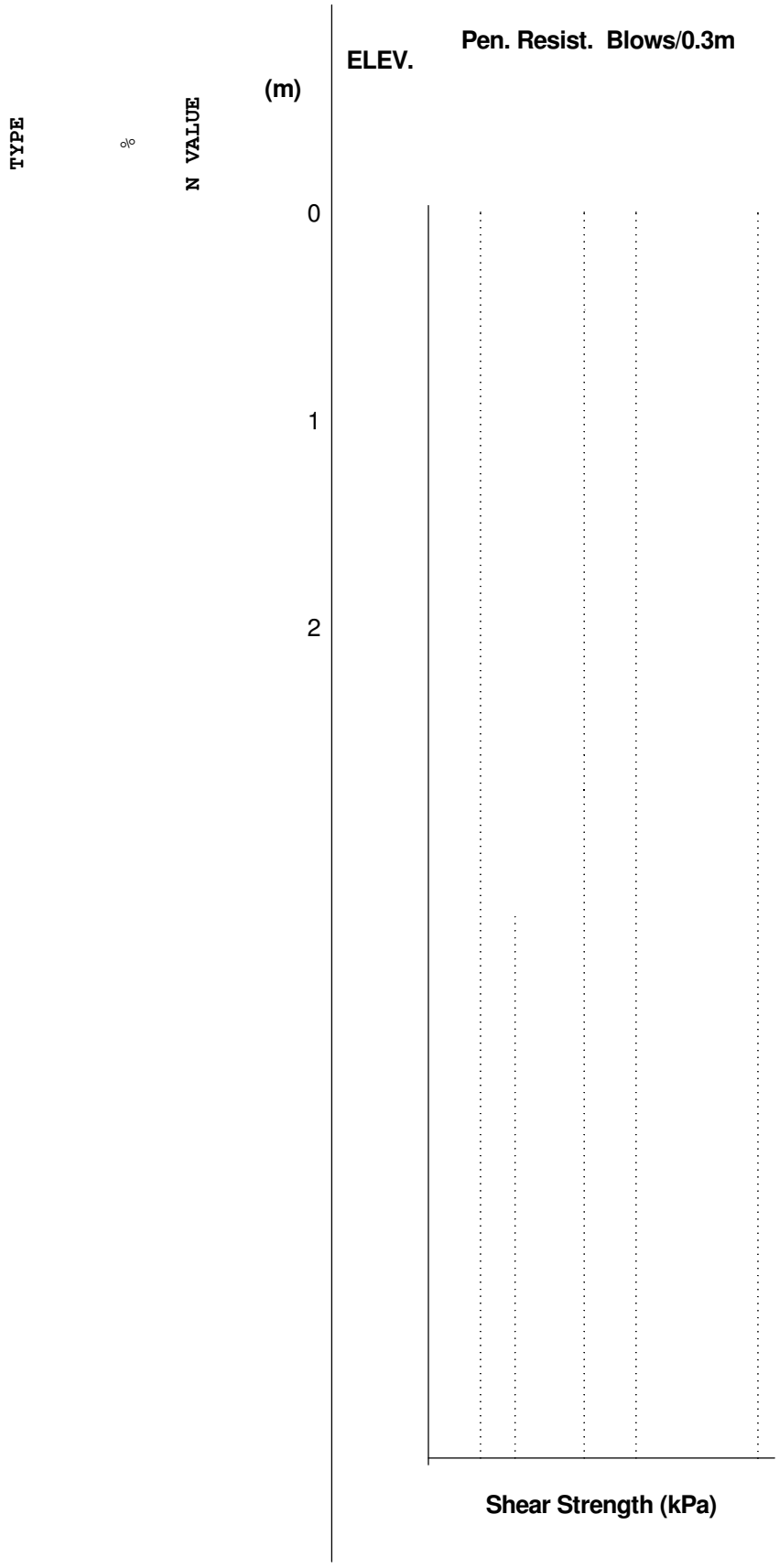
20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

patersongroup

SOIL PROFILE AND TEST DATA



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 17, 2023

FILE NO. PG4783

HOLE NO. TP21-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
Ground Surface						0	106.88		
TOPSOIL 0.05		G	1			1	105.88		
FILL: Brown silty sand to sandy silt, trace organics, occasional cobbles		G	2			2	104.88		
		G	3			3	103.88		
3.30									
Very stiff, light brown to grey **CLAYEY SILT to SILTY CLAY,** trace sand 3.50		G	4						
End of Test Pit									

Pen. Resist. Blows/0.3m: ● 50 mm Dia. Cone; ○ Water Content %
20 40 60 80

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sort Facility - Upper Canada St. & Palladium Dr.
Ottawa, Ontario

DATUM Geodetic

FILE NO. PG4783

REMARKS

HOLE NO. TP 1

BORINGS BY Excavator **DATE** 2020 December 17

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	109.08		
FILL: Brown silty sand, some clay, trace organics, gravel, and cobbles		G	1						
		G	2			1	108.08		
1.35									
FILL: Brown to grey silty clay some organics, trace gravel, cobbles, and sand						2	107.08		
						3	106.08		
						4	105.08		
		G	3			5	104.08		
5.55									
Brown **CLAYEY SILT** to **SILTY CLAY**		G	4			6	103.08		
6.22									
End of Test Pit									
(GWL @ 5.55 m depth - Dec 17, 2020)									

20 40 60 80

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sort Facility - Upper Canada St. & Palladium Dr.
Ottawa, Ontario

DATUM Geodetic

FILE NO. PG4783

REMARKS

HOLE NO. TP 2

BORINGS BY Excavator **DATE** 2020 December 17

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	108.15		
FILL: Brown sandy silt, some clay, trace organics, gravel, and cobbles		G	1			1	107.15		
1.43		G	2			2	106.15		
FILL: Brown silty clay to clayey silt, trace organics, sand, gravel, and cobbles		G	3			3	105.15		
4.74						4	104.15		
Brown **CLAYEY SILT**		G	4			5	103.15		
5.67									
End of Test Pit									
(TP dry upon completion)									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sort Facility - Upper Canada St. & Palladium Dr.
Ottawa, Ontario

DATUM Geodetic

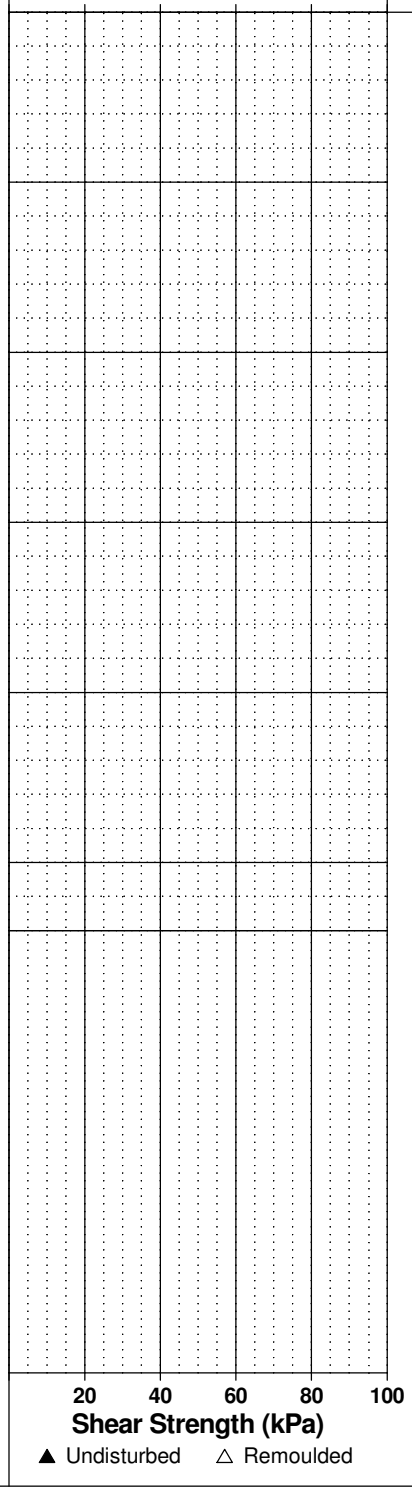
FILE NO. PG4783

REMARKS

HOLE NO. TP 3

BORINGS BY Excavator **DATE** 2020 December 17

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	106.87		
FILL: Brown silty sand with some organics, trace gravel and cobbles		G	1						
1.19						1	105.87		
FILL: Brown silty sand, some clay and organics, trace gravel and cobbles		G	2						
1.78									
FILL: Dark brown silty clay, some sand, organics trace gravel and cobbles		G	3			2	104.87		
		G	4			3	103.87		
3.38									
Brown **CLAYEY SILT**		G	5			4	102.87		
						5	101.87		
5.40									
End of Test Pit									
(GWL @ 4.32 m depth - Dec 17, 2020)									



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sort Facility - Upper Canada St. & Palladium Dr.
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** 2020 December 17

FILE NO. PG4783

HOLE NO. TP 4

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE									
TOPSOIL 0.27		G	1			0	107.31		
FILL: Brown sandy silt, trace organics, gravel, and cobbles						1	106.31		
1.65		G	2			2	105.31		
FILL: Dark brown clayey silt, some organics, trace sand gravel and cobbles						3	104.31		
3.75						4	103.31		
TOPSOIL 3.85		G	3			5	102.31		
Brown **CLAYEY SILT**									
5.42									
End of Test Pit									
(GWL @ 5.0 m depth - Dec 17, 2020)									

Pen. Resist. Blows/0.3m: ● 50 mm Dia. Cone; ○ Water Content %
20 40 60 80

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sort Facility - Upper Canada St. & Palladium Dr.
Ottawa, Ontario

DATUM Geodetic

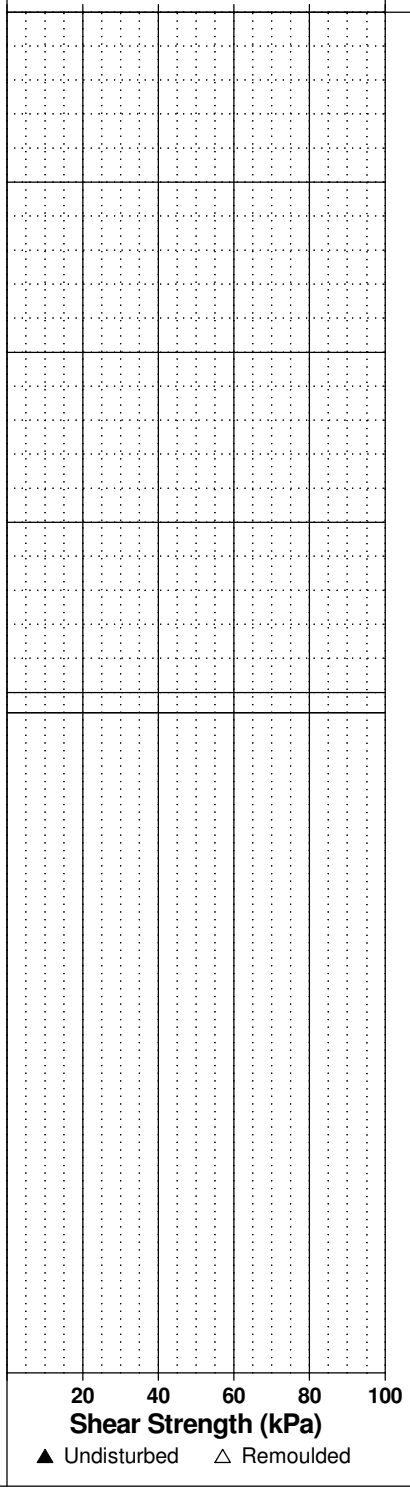
FILE NO. PG4783

REMARKS

HOLE NO. TP 5

BORINGS BY Excavator **DATE** 2020 December 17

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE									
TOPSOIL 0.41		G	1			0	105.68		
FILL: Brown clayey silt, some sand, trace organics, gravel, and cobbles 1.19		G	2			1	104.68		
FILL: Dark brown sandy silt, some organics, trace gravel, and cobbles 1.85		G	3			2	103.68		
Brown **CLAYEY SILT**		G	4			3	102.68		
4.12						4	101.68		
End of Test Pit									
(GWL 3.77 m depth - Dec 17, 2020)									



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sort Facility - Upper Canada St. & Palladium Dr.
Ottawa, Ontario

DATUM Geodetic

FILE NO. PG4783

REMARKS

HOLE NO. TP 6

BORINGS BY Excavator **DATE** 2020 December 17

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	106.50		
FILL: Brown sandy silt to silty sand, some organics, trace clay, cobbles, PVC pipe and plastic wrappers		G	1						
		G	2			1	105.50		
1.91									
Brown **CLAYEY SILT** to **SILTY CLAY**						2	104.50		
2.70		G	3						
End of Test Pit									
(TP dry upon completion)									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sort Facility - Upper Canada St. & Palladium Dr.
Ottawa, Ontario

DATUM Geodetic

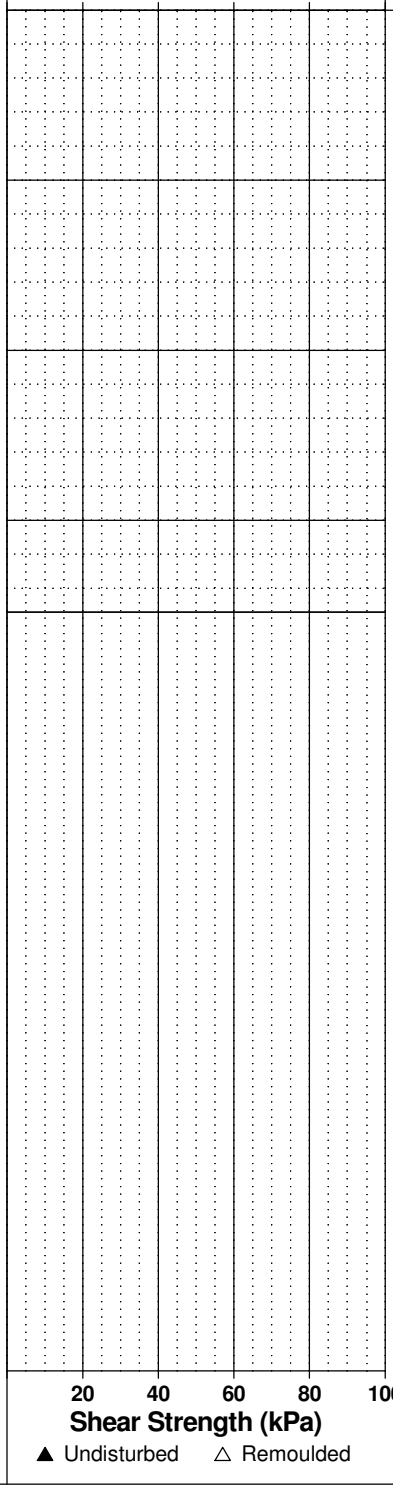
FILE NO. PG4783

REMARKS

HOLE NO. TP 7

BORINGS BY Excavator **DATE** 2020 December 17

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	107.22		
FILL: Brown clayey silt, some clay, trace gravel, and cobbles		G	1			1	106.22		
1.93						2	105.22		
FILL: Brown sandy silt, some clay, trace organics, gravel, and cobbles		G	2						
3.21		G	3			3	104.22		
Brown **CLAYEY SILT** to **SILTY CLAY**									
3.54		G	4						
End of Test Pit									
(TP dry upon completion)									



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Sort Facility - Upper Canada St. & Palladium Dr.
Ottawa, Ontario

DATUM Geodetic

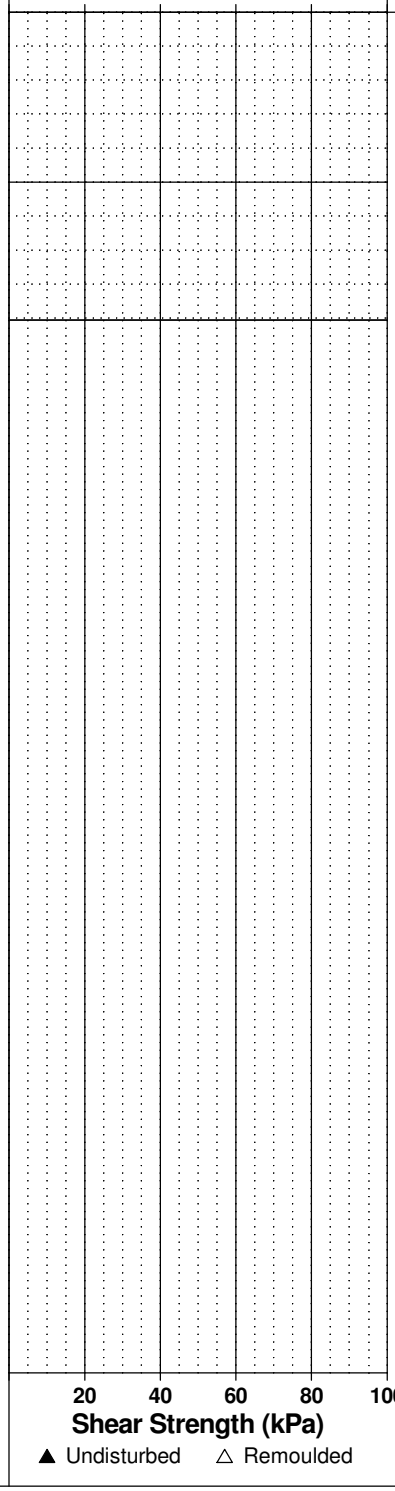
FILE NO. PG4783

REMARKS

HOLE NO. TP 8

BORINGS BY Excavator **DATE** 2020 December 17

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	105.50		
FILL: Brown clayey silt to silty clay trace organics, gravel, and cobbles		G	1			1	104.50		
1.42									
Brown **CLAYEY SILT** to **SILTY CLAY**		G	2						
1.81									
End of Test Pit									
(TP dry upon completion)									



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Sort Facility - Upper Canada St. @ Palladium Dr.
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located at the north end of Palladium Drive, with a geodetic elev. of 105.51 based on topographic interpolation of available plans.

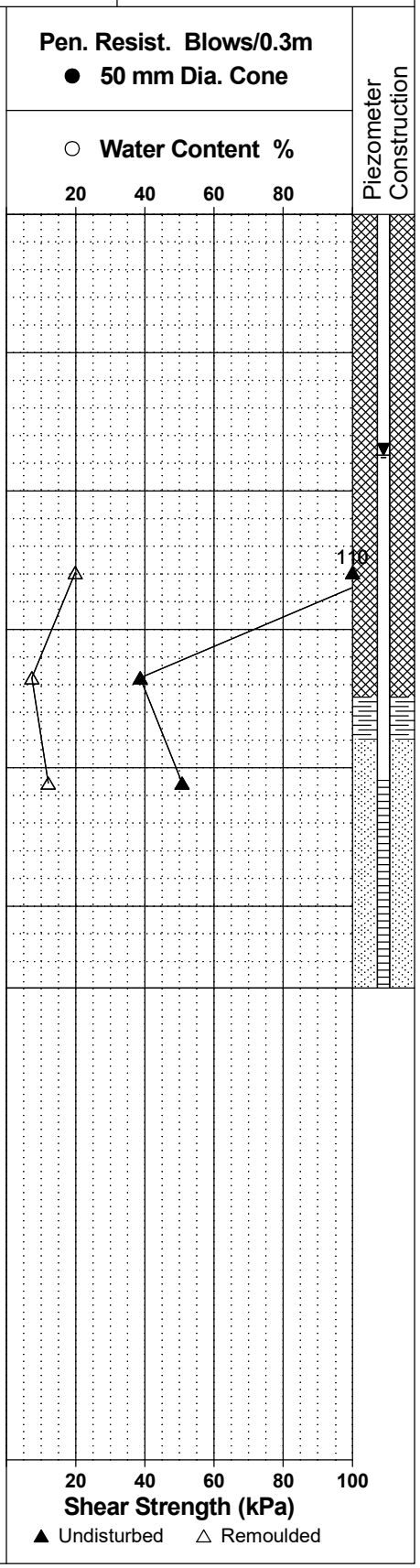
REMARKS

FILE NO. PG4783

HOLE NO. BH 1-19

BORINGS BY CME-55 Low Clearance Drill **DATE** 2019 January 3

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	104.80
FILL: Topsoil, trace clay		AU	1				
0.60							
		SS	2	67	5	1	103.80
Very stiff, brown **SILTY CLAY**		SS	3	96	5	2	102.80
3.05						3	101.80
Brown **SILT,** trace clay and sand							
- grey by 3.8m depth						4	100.80
4.57							
Very loose, grey **SANDY SILT,** trace gravel		SS	4	96	3	5	99.80
		SS	5	100	50+		
5.59							
End of Borehole							
Practical refusal to augering at 5.59m depth							
(GWL @ 1.74m - Jan. 8, 2019)							



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Sort Facility - Upper Canada St. @ Palladium Dr.
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located at the north end of Palladium Drive, with a geodetic elev. of 105.51 based on topographic interpolation of available plans.

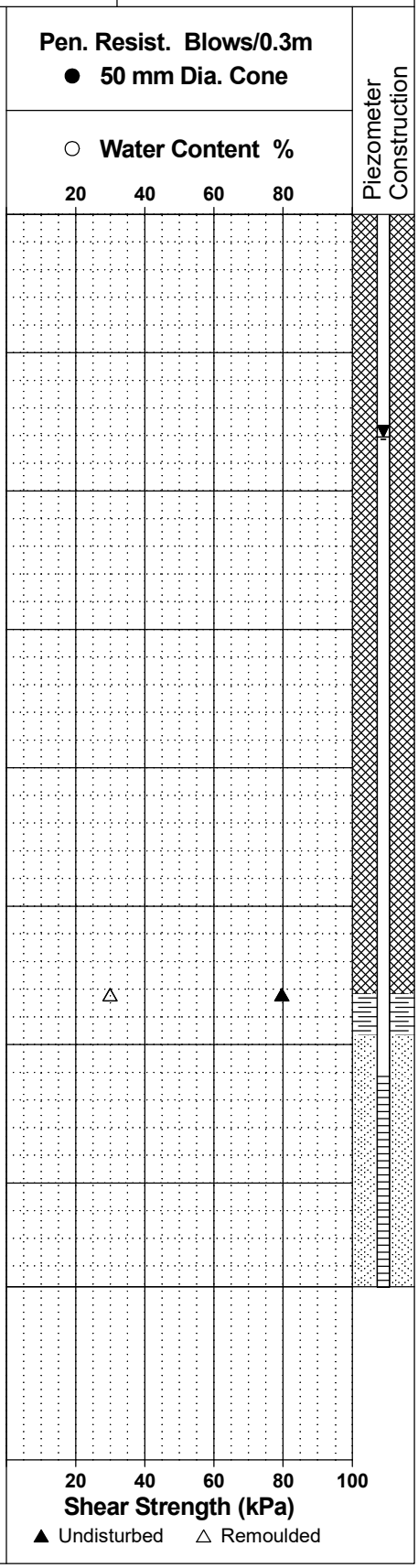
REMARKS

FILE NO. PG4783

HOLE NO. BH 2-19

BORINGS BY CME-55 Low Clearance Drill **DATE** 2019 January 4

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
FILL PILE SURFACE						0	107.10
		AU	1				
FILL: Brown silt, some sand and roots		SS	2	54	3	2	105.10
3.05						3	104.10
FILL: Grey sandy silt, trace gravel and roots		SS	3	4	11		
		SS	4	4	8	4	103.10
4.42							
		SS	5	4	5	5	102.10
Loose, grey **SANDY SILT,** trace clay						6	101.10
		SS	6	75	9		
		SS	7	71	6	7	100.10
7.75		SS	8	100	50+		
End of Borehole							
Practical refusal to augering at 7.75m depth							
(GWL @ 1.61m - Jan. 8, 2019)							



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Sort Facility - Upper Canada St. @ Palladium Dr.
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located at the north end of Palladium Drive, with a geodetic elev. of 105.51 based on topographic interpolation of available plans.

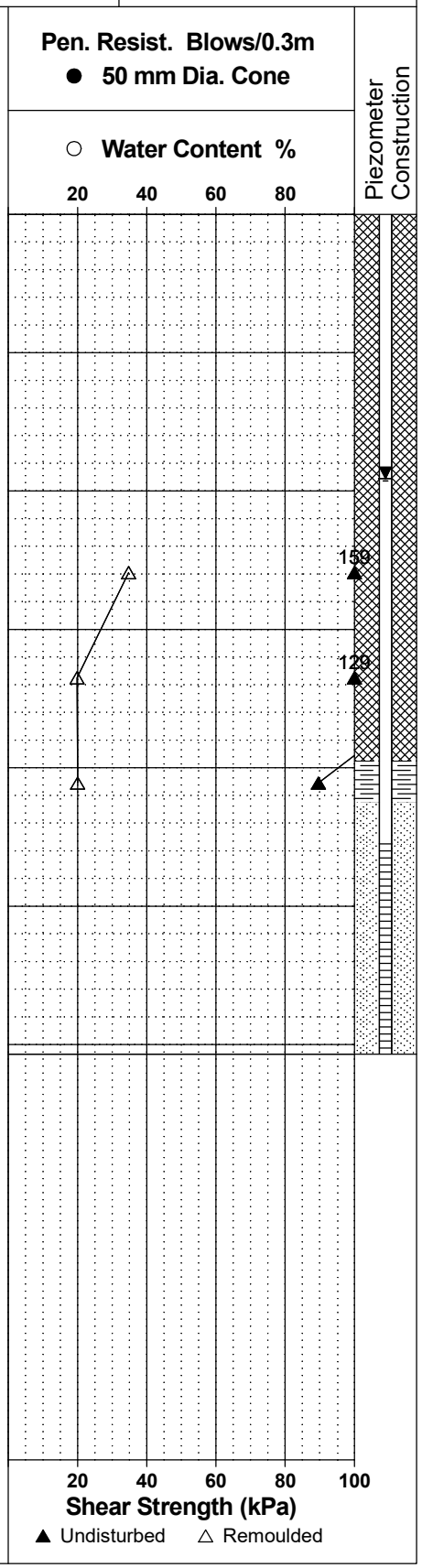
REMARKS

FILE NO. PG4783

HOLE NO. BH 3-19

BORINGS BY CME-55 Low Clearance Drill **DATE** 2019 January 4

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
FILL PILE SURFACE						0	105.56
		AU	1				
FILL: Brown silt, trace to some clay, trace sand and roots.						1	104.56
1.83		SS	2	29	4	2	103.56
Very stiff to stiff, brown **CLAYEY SILT**						3	102.56
4.57		SS	3	79	15	4	101.56
Compact to loose, brown **SANDY SILT**		SS	4	50	5	5	100.56
6.07						6	99.56
End of Borehole							
Practical refusal to augering at 6.07m depth							
(GWL @ 1.91m - Jan. 8, 2019)							



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Sort Facility - Upper Canada St. @ Palladium Dr.
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located at the north end of Palladium Drive, with a geodetic elev. of 105.51 based on topographic interpolation of available plans.

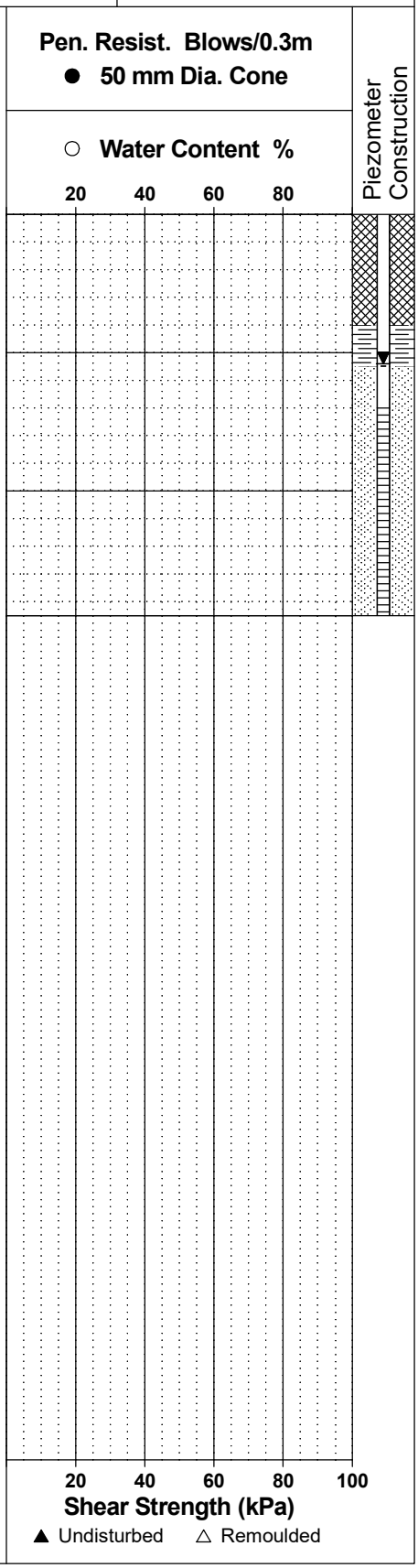
REMARKS

FILE NO. PG4783

HOLE NO. BH 4-19

BORINGS BY CME-55 Low Clearance Drill **DATE** 2019 January 3

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	104.49
TOPSOIL 0.36		AU	1				
		SS	2	12	12	1	103.49
Very stiff to stiff, brown **CLAYEY SILT**		SS	3	71	12	2	102.49
		SS	4	71	8		
2.90							
End of Borehole							
(GWL @ 1.08m - Jan. 8, 2019)							



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Sort Facility - Upper Canada St. @ Palladium Dr.
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located at the north end of Palladium Drive, with a geodetic elev. of 105.51 based on topographic interpolation of available plans.

REMARKS

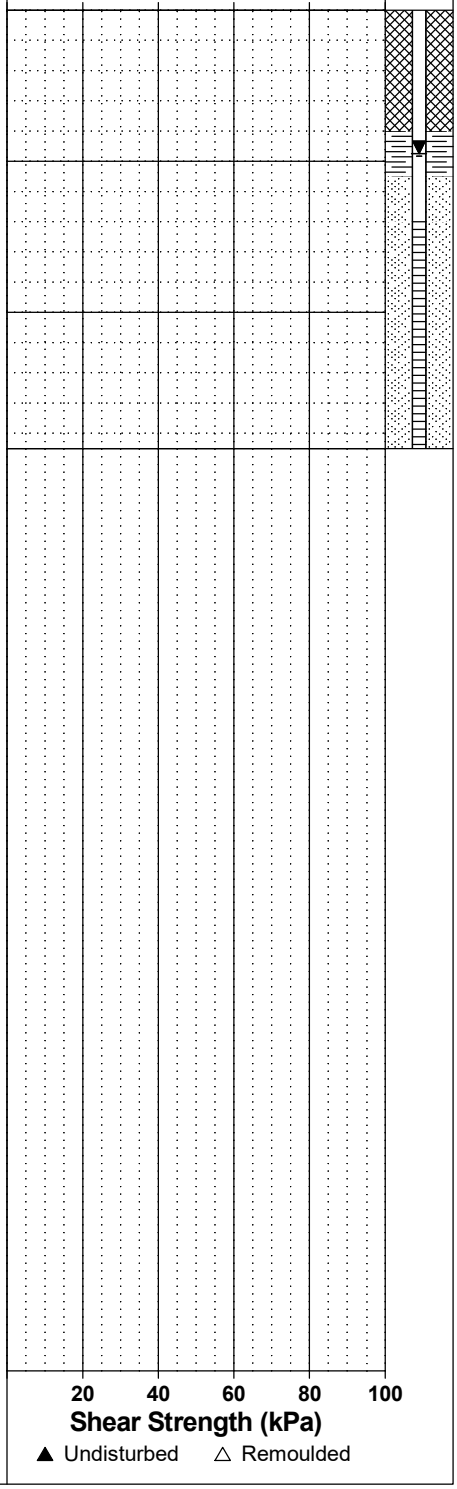
FILE NO. PG4783

HOLE NO. BH 5-19

BORINGS BY CME-55 Low Clearance Drill **DATE** 2019 January 3

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	104.72
TOPSOIL 0.41		AU	1				
Stiff, brown **CLAYEY SILT**		SS	2	75	8	1	103.72
1.50							
Loose to dense, brown **SANDY SILT,** some clay		SS	3	71	11	2	102.72
		SS	4	88	35		
2.90							
End of Borehole							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %



Piezometer Construction

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Sort Facility - Upper Canada St. @ Palladium Dr.
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located at the north end of Palladium Drive, with a geodetic elev. of 105.51 based on topographic interpolation of available plans.

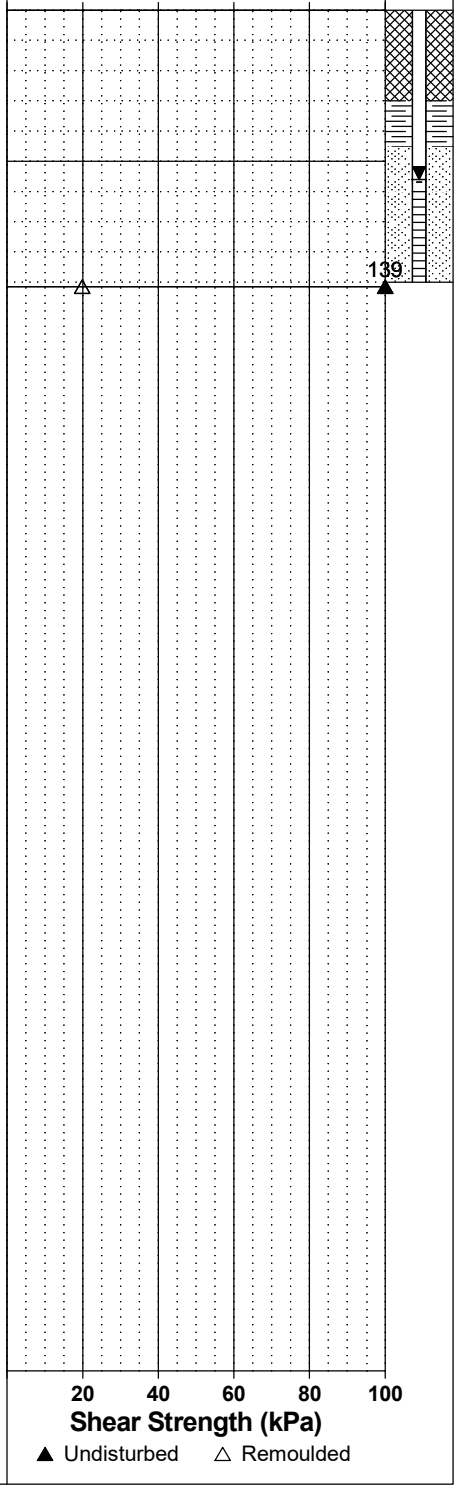
REMARKS

FILE NO. PG4783

HOLE NO. BH 6-19

BORINGS BY CME-55 Low Clearance Drill **DATE** 2019 January 3

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE									
TOPSOIL		AU	1			0	104.54		
0.46									
Very stiff, brown **SILTY CLAY**		SS	2	92	6	1	103.54		
1.83									
End of Borehole									
(GWL @ 1.12m - Jan. 8, 2019)									



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Sort Facility - Upper Canada St. @ Palladium Dr.
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located at the north end of Palladium Drive, with a geodetic elev. of 105.51 based on topographic interpolation of available plans.

REMARKS

FILE NO. PG4783

HOLE NO. BH 7-19

BORINGS BY CME-55 Low Clearance Drill **DATE** 2019 January 3

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	103.49		
Very stiff, brown **SILTY CLAY**		AU	1						
		SS	2	92	6	1	102.49		
						1.83			
End of Borehole									
(GWL @ 0.61m - Jan. 8, 2019)									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

129

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Sort Facility - Upper Canada St. @ Palladium Dr.
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located at the north end of Palladium Drive, with a geodetic elev. of 105.51 based on topographic interpolation of available plans.

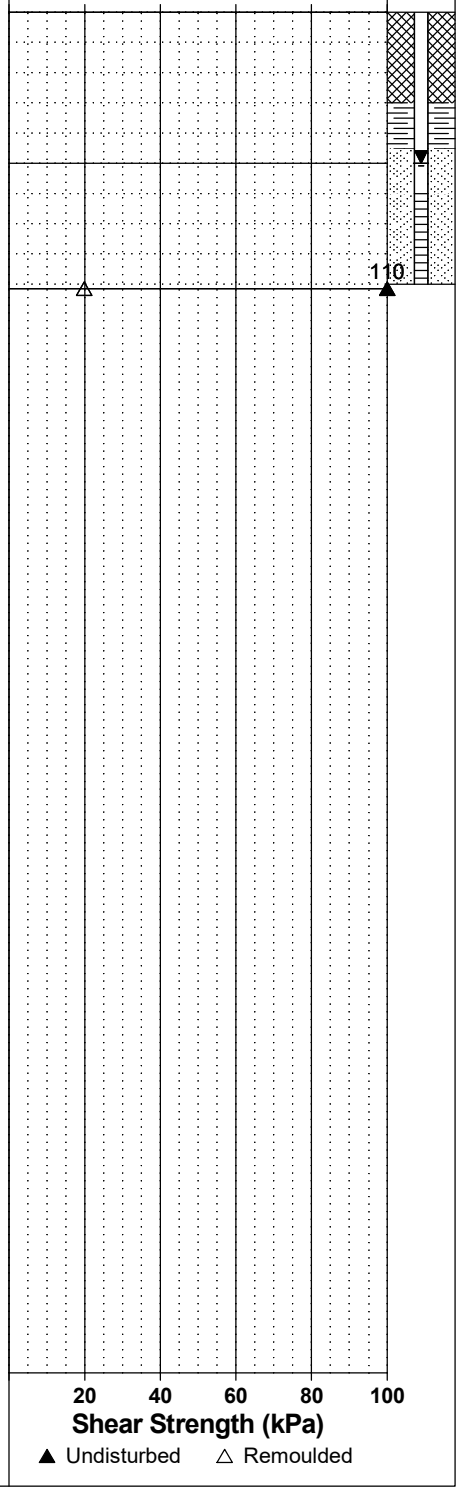
REMARKS

FILE NO. PG4783

HOLE NO. BH 8-19

BORINGS BY CME-55 Low Clearance Drill **DATE** 2019 January 3

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE									
TOPSOIL 0.30		AU	1			0	103.64		
Very stiff, brown **SILTY CLAY**		SS	2	96	4	1	102.64		
1.83									
End of Borehole									
(GWL @ 1.00m - Jan. 8, 2019)									



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Sort Facility - Upper Canada St. @ Palladium Dr.
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located at the north end of Palladium Drive, with a geodetic elev. of 105.51 based on topographic interpolation of available plans.

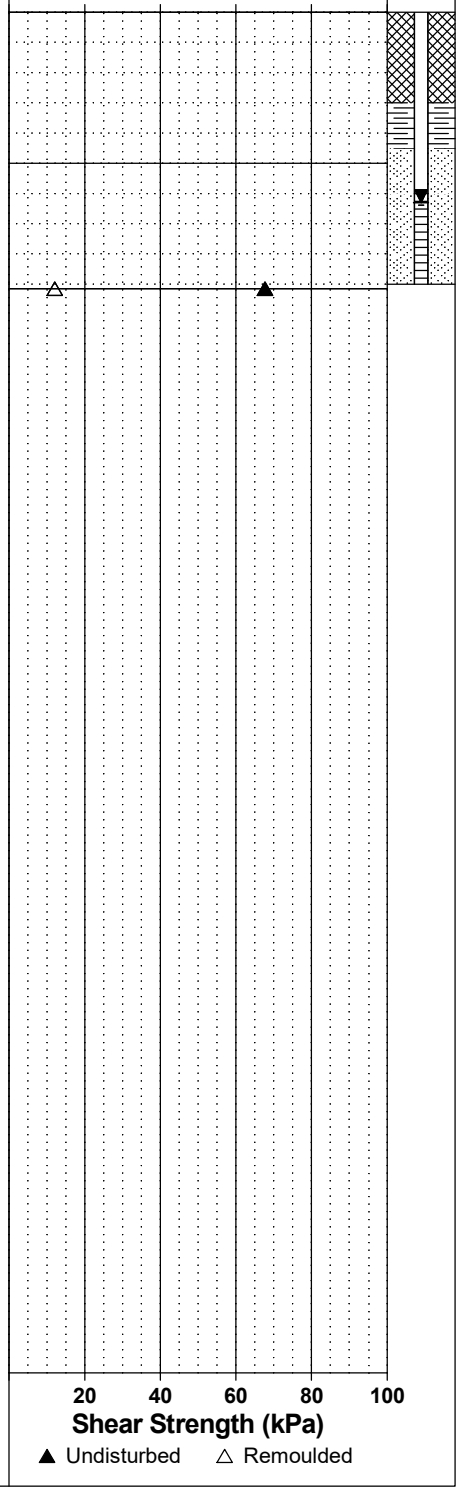
REMARKS

FILE NO. PG4783

HOLE NO. BH 9-19

BORINGS BY CME-55 Low Clearance Drill **DATE** 2019 January 3

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE									
TOPSOIL		AU	1			0	103.59		
0.38									
Stiff, brown **SILTY CLAY**		SS	2	100	5	1	102.59		
1.83									
End of Borehole									
(GWL @ 1.26m - Jan. 8, 2019)									



patersongroup

Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Commercial Development - Huntmar Road
Ottawa, Ontario

DATUM Ground surface elevations provided by Stantec Geomatics Ltd.

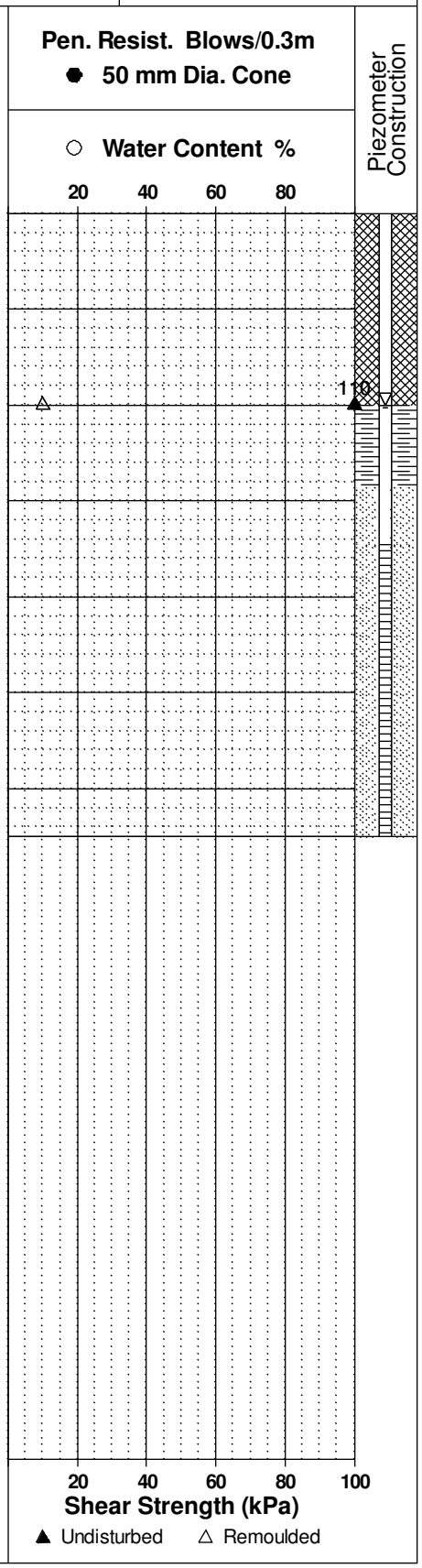
FILE NO. PG3115

REMARKS

HOLE NO. BH 4

BORINGS BY CME 55 Power Auger **DATE** January 14, 2014

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	104.12
TOPSOIL 0.30		AU	1				
		AU	2				
Very stiff, brown **SILTY CLAY**		SS	3	100	4	1	103.12
2.13						2	102.12
		SS	4	71	13		
		SS	5	54	9	3	101.12
Grey **CLAYEY SILT**							
		SS	6	50	5	4	100.12
- trace gravel below 4.6m depth							
		SS	7	71	7	5	99.12
		SS	8	100	19		
		SS	9	86	50+	6	98.12
6.50							
End of Borehole							
Practical refusal to augering at 6.50m depth							
(GWL @ 2.0m depth based on field observations)							



patersongroup

Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Commercial Development - Huntmar Road
Ottawa, Ontario

DATUM Ground surface elevations provided by Stantec Geomatics Ltd.

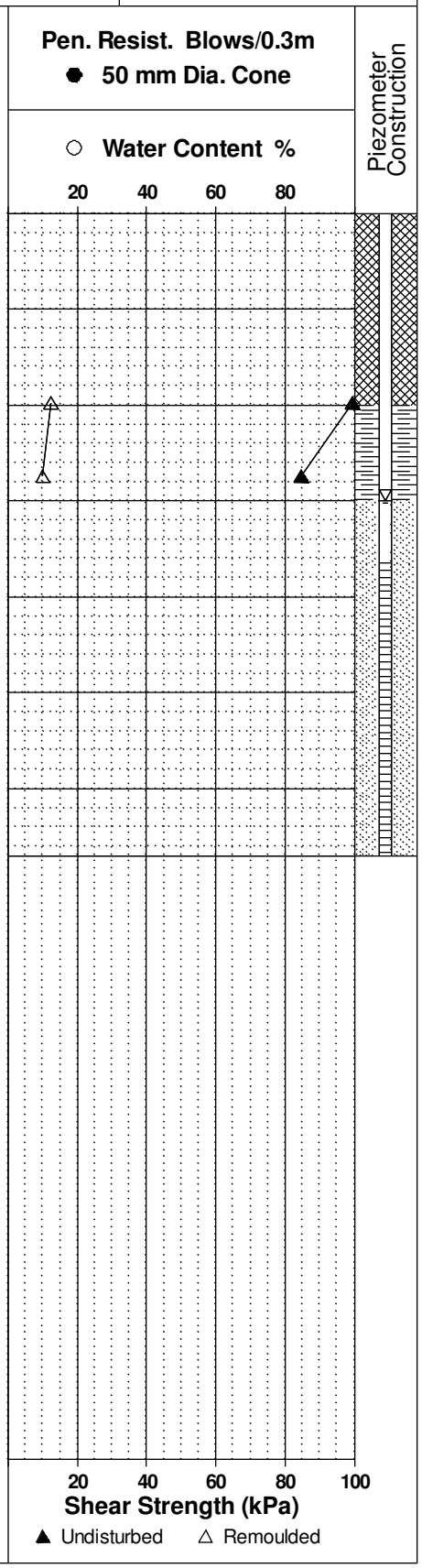
FILE NO. PG3115

REMARKS

HOLE NO. BH 5

BORINGS BY CME 55 Power Auger **DATE** January 14, 2014

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	103.56
TOPSOIL 0.28		AU	1				
		SS	2	100	2	1	102.56
Stiff, brown **SILTY CLAY**						2	101.56
- grey-brown by 2.9m depth		SS	3	100	8	3	100.56
		SS	4	83	5	4	99.56
4.50							
GLACIAL TILL: Grey-brown clayey silt with gravel		SS	5	58	3	5	98.56
5.25							
GLACIAL TILL: Brown silty sand with gravel, cobbles and boulders		SS	6	50	11	6	97.56
		SS	7	100	17		
6.70							
End of Borehole							
(GWL @ 3.0m depth based on field observations)							



patersongroup

Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Commercial Development - Huntmar Road
Ottawa, Ontario

DATUM Ground surface elevations provided by Stantec Geomatics Ltd.

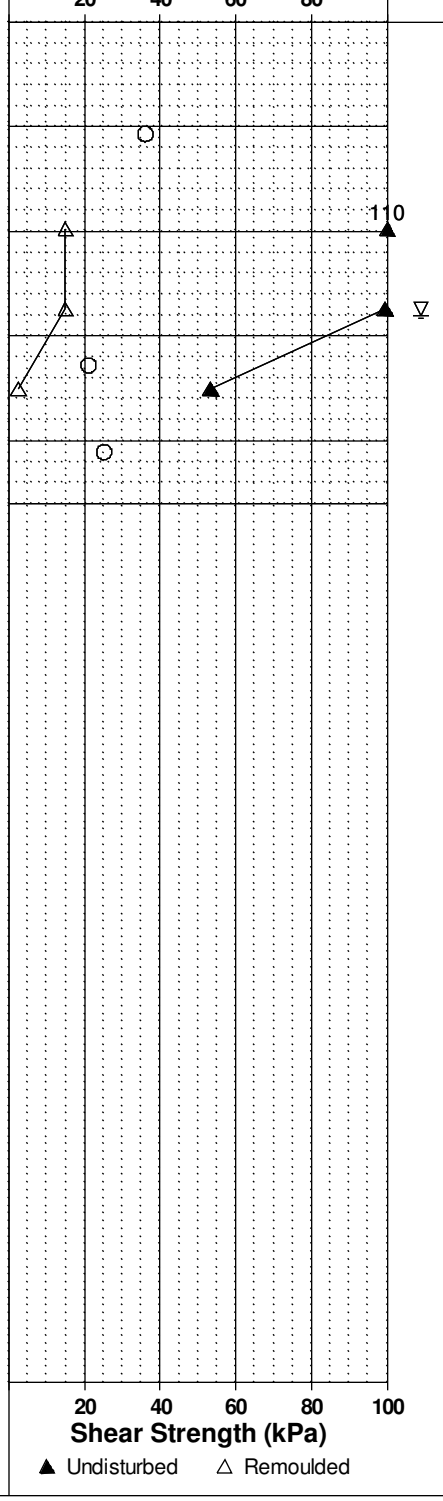
FILE NO. PG3115

REMARKS

HOLE NO. BH14

BORINGS BY CME 55 Power Auger **DATE** January 13, 2014

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	103.55
TOPSOIL 0.28							
Very stiff to stiff, brown **SILTY CLAY**		SS	1	100	3	1	102.55
3.66						2	101.55
Grey-brown **SILTY FINE SAND**		SS	2	71	6	3	100.55
4.60		SS	3	0	50+	4	99.55
End of Borehole							
Practical refusal to augering at 4.60m depth							
(GWL @ 2.8m depth based on field observations)							



Piezometer Construction

patersongroup

Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Commercial Development - Huntmar Road
Ottawa, Ontario

DATUM Ground surface elevations provided by Stantec Geomatics Ltd.

FILE NO. PG3115

REMARKS

HOLE NO. BH15

BORINGS BY CME 55 Power Auger **DATE** January 14, 2014

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone / ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	104.43		
TOPSOIL 0.20		AU	1						
Stiff, brown **SILTY CLAY**		SS	2	83	4	1	103.43		
		SS	3	100	4	2	102.43		
2.90									
		SS	4	67	14	3	101.43		
Grey-brown **SILTY FINE SAND**		SS	5	42	3	4	100.43		
		SS	6	83	5	5	99.43		
5.49		SS	7	0	50+				
End of Borehole									
Practical refusal to augering at 5.49m depth									
(GWL @ 3.0m depth based on field observations)									

Pen. Resist. Blows/0.3m: ● 50 mm Dia. Cone; ○ Water Content %

Water Content % scale: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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 strength of cohesionless soils is the relative density, 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.

Relative Density	'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 vane tests, penetrometer tests, unconfined compression tests, or occasionally by Standard Penetration Tests.

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 is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil.

Terminology used for describing soil strata based upon texture, or the proportion of individual particle sizes present is provided on the Textural Soil Classification Chart at the end of this information package.

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 NXL size core. However, it can be used on smaller core sizes, such as BX, 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
PS	-	Piston sample
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size AXT, BXL, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

SYMBOLS AND TERMS (continued)

GRAIN SIZE DISTRIBUTION

MC%	-	Natural moisture 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 which xx% of the soil, by weight, is of finer grain sizes These grain size descriptions are not used below 0.075 mm grain size
D10	-	Grain size at which 10% of the soil is finer (effective grain size)
D60	-	Grain size at which 60% of the soil is finer
Cc	-	Concavity coefficient = $(D30)^2$ / (D10 x D60)
Cu	-	Uniformity coefficient = D60 / D10

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

CONSOLIDATION TEST

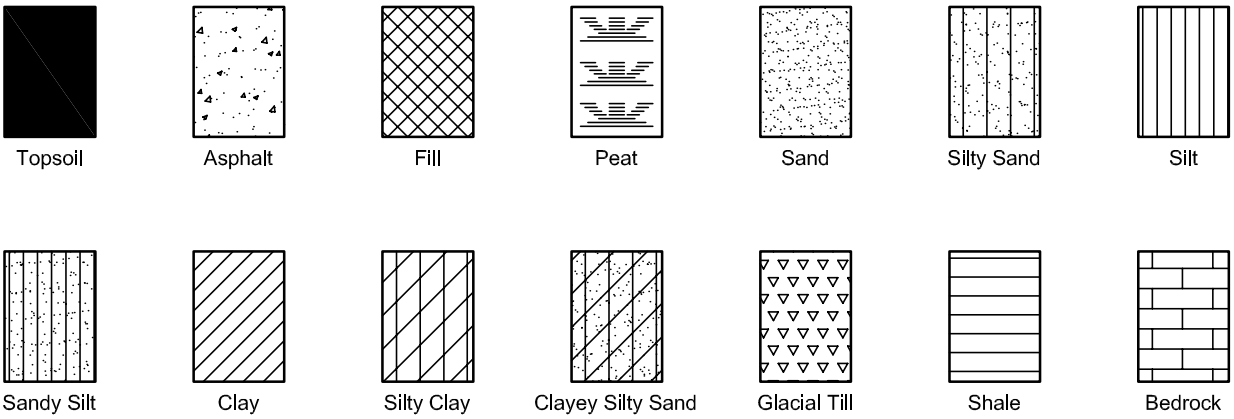
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void Ratio		Initial sample void ratio = volume of voids / volume of solids
Wo	-	Initial water content (at start of consolidation test)

PERMEABILITY TEST

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

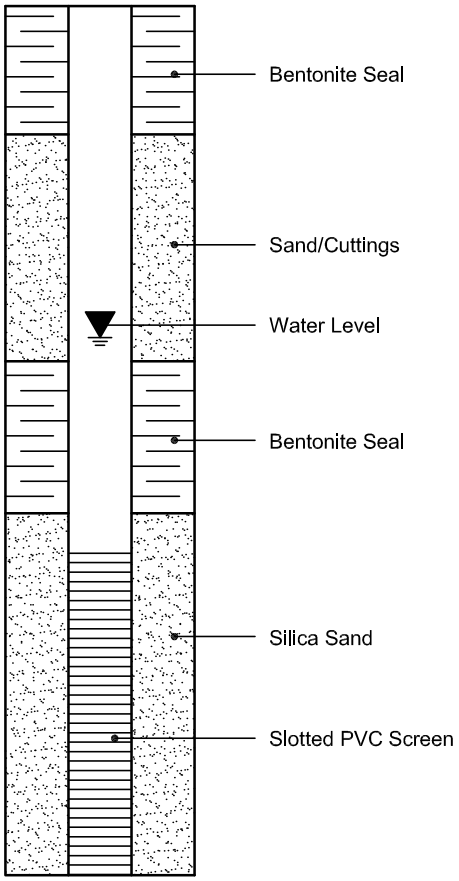
SYMBOLS AND TERMS (continued)

STRATA PLOT

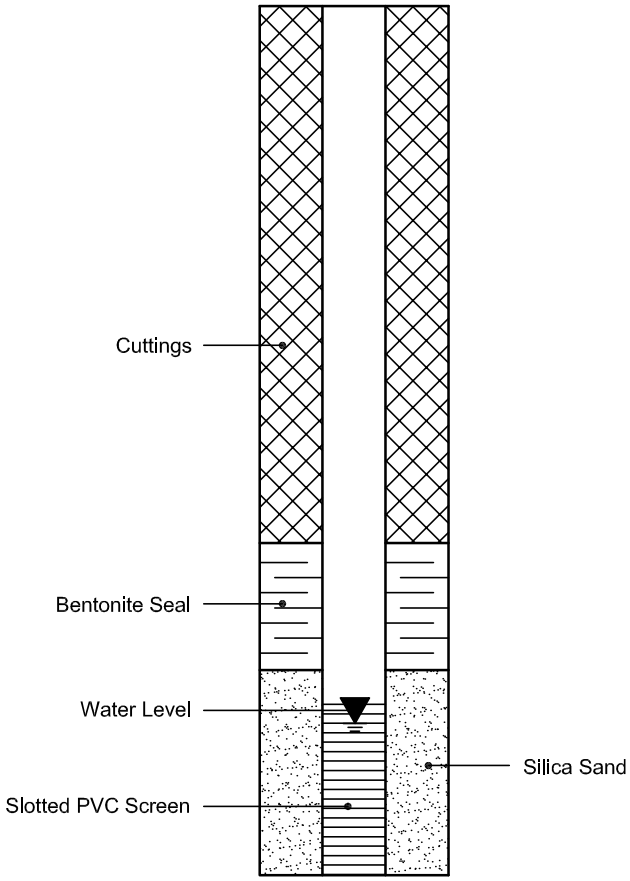


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



Log of Borehole: BH1

Project #: 231270.001 **Logged By:** WT

Project: Geotechnical Investigation

Client: Purolator Inc.

Location: Part of Lots 3 & 4, Concession 1, Blocks 26 to 33, Ottawa, ON

Drill Date: October 29, 2018 **Project Manager:** WT

SUBSURFACE PROFILE					SAMPLE									
Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-Value	Standard Penetration N-Value 20 40 60	Shear Strength kPa 100 200	Water Content (%)	Sample ID	Soil Vapour Concentration (ppm)	Laboratory Analysis
0		Ground Surface	0.00											
		Clay and silt, trace gravel, trace sand, DTPL to ATPL, grey, soft to stiff			SS	SS1	40	12						
1					SS	SS2	80	8						
2			-2.29		SS	SS3	100	3			32.7			Hydrometer
		Silt, trace to some sand, trace gravel, trace clay, wet, grey, very loose			SS	SS4	80	3						
3					SS	SS5	100	4						
			-3.81											
4		Till - Sandy silt, trace to some clay, trace gravel, wet, grey, very loose to loose			SS	SS6	100	9						
5					SS	SS7	80	3						
			-5.49		SS	SS8	100	2						
6		End of Borehole Due to SPT refusal on probable bedrock												
7														

Contractor: Strata Drilling Group **Grade Elevation:** N/A

Drilling Method: Direct Push/Split Spoon **Top of Casing Elevation:** N/A

Well Casing Size: N/A **Sheet:** 1 of 1

Log of Borehole: BH2

Project #: 231270.001 ***Logged By:*** WT

Project: Geotechnical Investigation

Client: Purolator Inc.

Location: Part of Lots 3 & 4, Concession 1, Blocks 26 to 33, Ottawa, ON

Drill Date: October 29, 2018 ***Project Manager:*** WT

SUBSURFACE PROFILE					SAMPLE									
Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-Value	Standard Penetration N-Value 20 40 60	Shear Strength kPa 100 200	Water Content (%)	Sample ID	Soil Vapour Concentration (ppm)	Laboratory Analysis
0		Ground Surface	0.00											
		Fill - Sand and gravel, some silt, some clay, damp, brown, compact	-0.76		SS	SS1	40	14						
1		Clay and silt, trace gravel, trace sand, DTPL to WTPL, grey, very soft			SS	SS2	80	1						
2			-2.29		SS	SS3	100	0						
		Till - Sandy silt, trace to some clay, trace gravel, wet, grey, compact			SS	SS4	80	15						
3					SS	SS5	100	12						
4														
5					SS	SS6	100	12						
			-5.79											
6		End of Borehole Due to casing refusal on probable bedrock												
7														

Contractor: Strata Drilling Group

Grade Elevation: N/A

Drilling Method: Direct Push/Split Spoon

Top of Casing Elevation: N/A

Well Casing Size: N/A

Sheet: 1 of 1

Log of Borehole: BH3

Project #: 231270.001 **Logged By:** WT

Project: Geotechnical Investigation

Client: Purolator Inc.

Location: Part of Lots 3 & 4, Concession 1, Blocks 26 to 33, Ottawa, ON

Drill Date: October 29, 2018 **Project Manager:** WT

SUBSURFACE PROFILE					SAMPLE									
Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-Value	Standard Penetration N-Value 20 40 60	Shear Strength kPa 100 200	Water Content (%)	Sample ID	Soil Vapour Concentration (ppm)	Laboratory Analysis
0		Ground Surface	0.00											
		Silt, trace gravel, trace sand, trace clay, damp to moist, grey, very loose to compact			SS	SS1	80	12						
1					SS	SS2	60	2						
2					SS	SS3	50	3						
					SS	SS4	100	4						
3			-3.05	▼										
		Till - Sandy silt, trace to some clay, trace gravel, wet, grey, loose to compact			SS	SS5	100	19			16.7			Hydrometer
4														
5					SS	SS6	80	6						
6														
					SS	SS7	100	8						
			-6.86											
7		End of Borehole Due to casing refusal on probable bedrock												

Contractor: Strata Drilling Group **Grade Elevation:** N/A

Drilling Method: Direct Push/Split Spoon **Top of Casing Elevation:** N/A

Well Casing Size: N/A **Sheet:** 1 of 1

Log of Borehole: BH4

Project #: 231270.001 **Logged By:** WT

Project: Geotechnical Investigation

Client: Purolator Inc.

Location: Part of Lots 3 & 4, Concession 1, Blocks 26 to 33, Ottawa, ON

Drill Date: October 29, 2018 **Project Manager:** WT

SUBSURFACE PROFILE					SAMPLE									
Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-Value	Standard Penetration N-Value 20 40 60	Shear Strength kPa 100 200	Water Content (%)	Sample ID	Soil Vapour Concentration (ppm)	Laboratory Analysis
0		Ground Surface	0.00											
		Clay and silt, trace gravel, trace sand, DTPL to ATPL, grey, soft to firm			SS	SS1	60	5						
1					SS	SS2	100	4						
			-1.52											
		Silt, trace to some sand, trace gravel, trace clay, wet, grey, loose to compact		▼	SS	SS3	100	13			17.4			Hydrometer
2					SS	SS4	100	15						
3					SS	SS5	100	7						
4			-4.57											
		Till - Sandy silt, trace to some clay, trace gravel, wet, grey, compact			SS	SS6	100	28						
5			-5.33											
		End of Borehole Due to casing refusal on probable bedrock												
6														
7														

Contractor: Strata Drilling Group **Grade Elevation:** N/A

Drilling Method: Direct Push/Split Spoon **Top of Casing Elevation:** N/A

Well Casing Size: N/A **Sheet:** 1 of 1

Log of Borehole: BH5

Project #: 231270.001 **Logged By:** WT

Project: Geotechnical Investigation

Client: Purolator Inc.

Location: Part of Lots 3 & 4, Concession 1, Blocks 26 to 33, Ottawa, ON

Drill Date: October 29, 2018 **Project Manager:** WT

Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-Value	Standard Penetration N-Value 20 40 60	Shear Strength kPa 100 200	Water Content (%)	Sample ID	Soil Vapour Concentration (ppm)	Laboratory Analysis
		SUBSURFACE PROFILE			**SAMPLE**									
0		Ground Surface	0.00											
		Organics ~ 150 mm Clay and silt, trace gravel, trace sand, DTPL to ATPL, grey, soft to stiff			SS	SS1	80	9						
1					SS	SS2	100	4						
			-1.52											
		Silt, trace to some sand, trace gravel, trace clay, moist to wet, grey, very loose			SS	SS3	100	1						
2					SS	SS4	100	0						
3					SS	SS5	100	3						
4			-4.57											
		Till - Sandy silt, trace to some clay, trace gravel, wet, grey, compact to dense			SS	SS6	100	18			15.3			Hydrometer
5														
6			-6.40		SS	SS7	100	56						
		End of Borehole Due to SPT refusal on probable bedrock												
7														

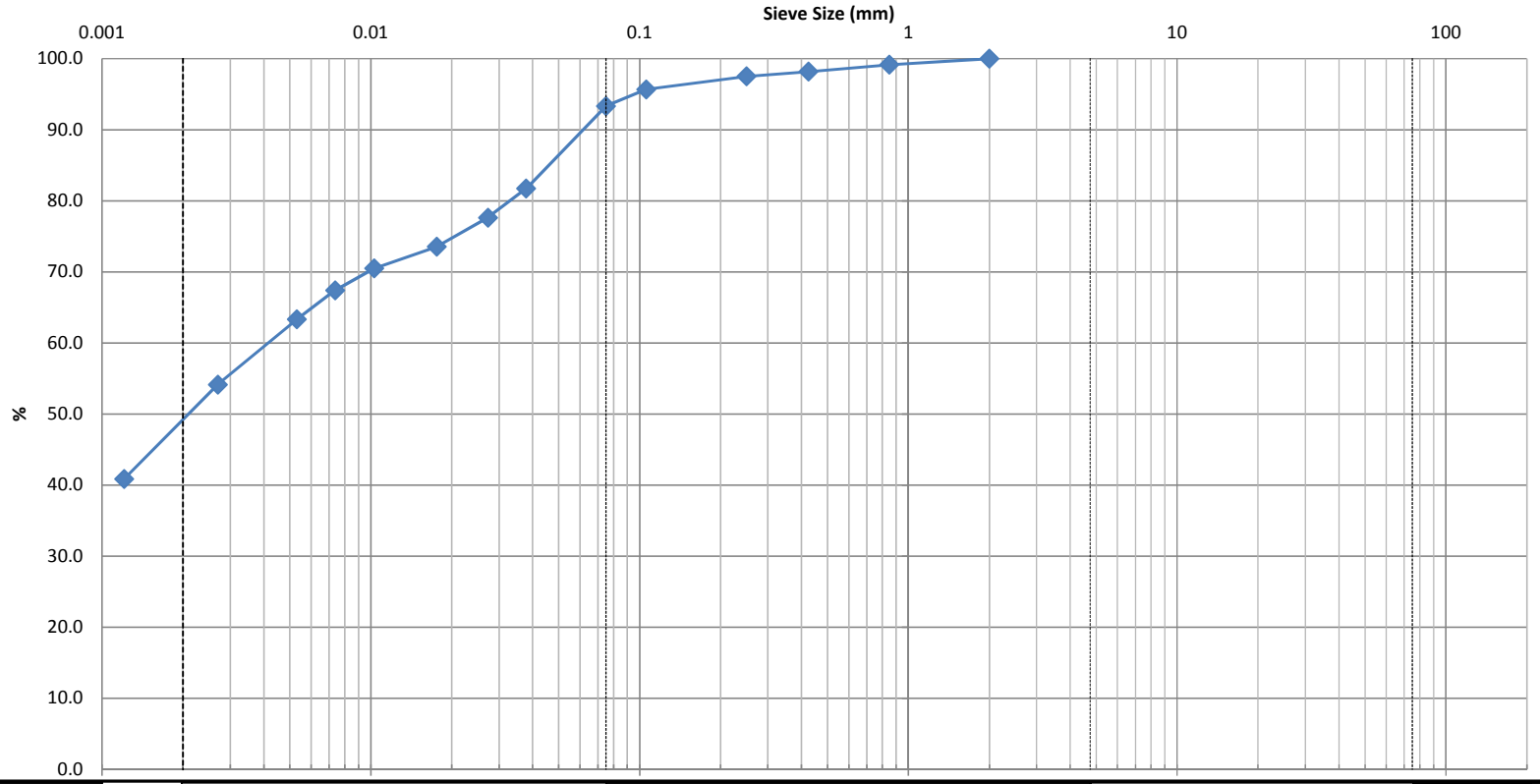
Contractor: Strata Drilling Group **Grade Elevation:** N/A

Drilling Method: Direct Push/Split Spoon **Top of Casing Elevation:** N/A

Well Casing Size: N/A **Sheet:** 1 of 1

patersongroup
consulting engineers

CLIENT:	Purolator Inc.	DEPTH:	2' 6" - 8' 6"	FILE NO:	PG4783
CONTRACT NO.:		BH OR TP No.:	BH6 - SS2	LAB NO:	06706
PROJECT:	Purolator Sort Facility			DATE RECEIVED:	4-Jan-19
				DATE TESTED:	9-Jan-19
DATE SAMPLED:	4-Jan-19			DATE REPORTED:	11-Jan-19
SAMPLED BY:	D. Lattin			TESTED BY:	D. Bertrand



	Clay	Silt	Sand			Gravel		Cobble
			Fine	Medium	Coarse	Fine	Coarse	

Identification	Soil Classification					MC(%)	LL	PL	PI	Cc	Cu
						28.6					
	D100	D60	D30	D10	Gravel (%)	Sand (%)		Silt (%)		Clay (%)	
					0.0	6.7		43.8		49.5	

Comments	

patersongroup
consulting engineers

HYDROMETER
LS-702 ASTM-422

CLIENT:	Purolator Inc.	DEPTH:	2' 6" - 8' 6"	FILE NO.:	PG4783
PROJECT:	Purolator Sort Facility	BH OR TP No.:	BH6 - SS2	DATE SAMPLED:	04-Jan-19
LAB No. :	06706	TESTED BY:	D. Bertrand	DATE RECEIVED:	04-Jan-19
SAMPLED BY:	D. Lattin	DATE REPT'D:	11-Jan-19	DATE TESTED:	09-Jan-19

SAMPLE INFORMATION

SAMPLE MASS	109.8	50.00	
SPECIFIC GRAVITY (Gs)	2.700	REMARKS	
HYGROSCOPIC MOISTURE	Tare No.		
TARE Wt.	50.00	ACTUAL Wt.	
AIR DRY (Wa)	150.00	100.00	
OVEN DRY (Wo)	146.80	96.80	
F=(Wo/Wa)	0.968		
INITIAL Wt. (Ma)	50.00		
Wt. CORRECTED	48.40		
Wt. AFTER WASH BACK SIEVE	3.45		
SOLUTION CONCENTRATION	40 g / L		

GRAIN SIZE ANALYSIS

SIEVE DIAMETER (mm)	WEIGHT RETAINED (g)	PERCENT RETAINED	PERCENT PASSING
63.0			
53.0			
37.5			
26.5			
19.0			
16.0			
13.2			
9.5			
4.75			
2.0	**0.0**	0.0	100.0
Pan	**109.8**		
0.850	**0.42**	0.8	99.2
0.425	**0.91**	1.8	98.2
0.250	**1.24**	2.5	97.5
0.106	**2.16**	4.3	95.7
0.075	**3.33**	6.7	93.3
Pan	**3.45**		
SIEVE CHECK 0.0	MAX = 0.3%		

HYDROMETER DATA

ELAPSED	TIME (24 hours)	Hs	Hc	Temp. (°C)	DIAMETER	(P)	TOTAL PERCENT PASSING
1	8:41	46.0	6.0	23.0	0.0378	81.7	81.7
2	8:42	44.0	6.0	23.0	0.0273	77.6	77.6
5	8:45	42.0	6.0	23.0	0.0176	73.5	73.5
15	8:55	40.5	6.0	23.0	0.0103	70.5	70.5
30	9:10	39.0	6.0	23.0	0.0074	67.4	67.4
60	9:40	37.0	6.0	23.0	0.0053	63.3	63.3
250	12:50	32.5	6.0	23.0	0.0027	54.1	54.1
1440	8:40	26.0	6.0	21.0	0.0012	40.9	40.9

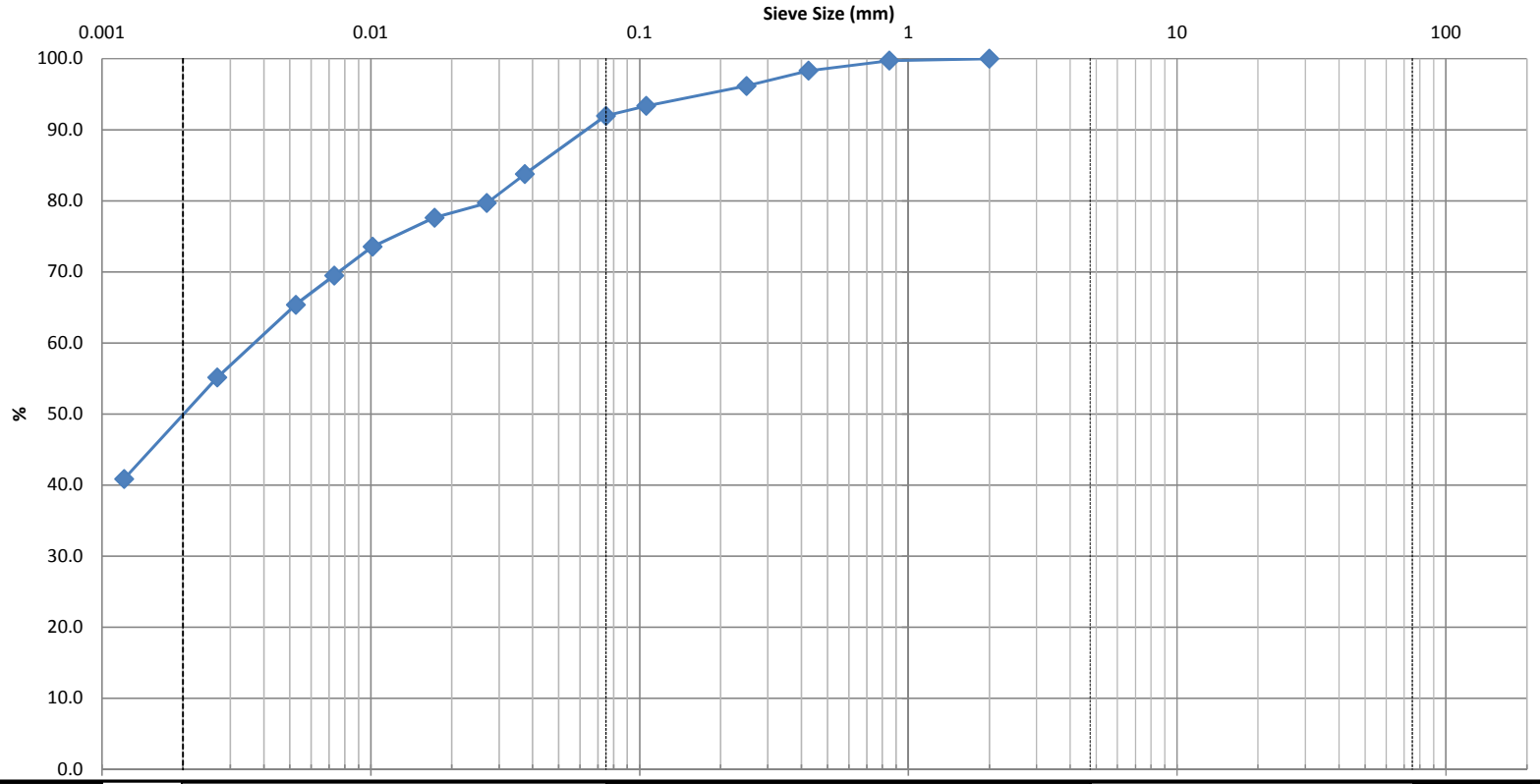
COMMENTS

Moisture Content = 28.6%

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

patersongroup
consulting engineers

CLIENT:	Purolator Inc.	DEPTH:	0' - 2'	FILE NO:	PG4783
CONTRACT NO.:		BH OR TP No.:	BH7 - AU1	LAB NO:	06707
PROJECT:	Purolator Sort Facility			DATE RECEIVED:	4-Jan-19
				DATE TESTED:	9-Jan-19
DATE SAMPLED:	4-Jan-19			DATE REPORTED:	11-Jan-19
SAMPLED BY:	D. Lattin			TESTED BY:	D. Bertrand



	Clay	Silt	Sand			Gravel		Cobble
			Fine	Medium	Coarse	Fine	Coarse	

Identification	Soil Classification					MC(%)	LL	PL	PI	Cc	Cu
						28.2					
	D100	D60	D30	D10	Gravel (%)	Sand (%)		Silt (%)		Clay (%)	
					0.0	8.0		42.0		50.0	

Comments	

patersongroup
consulting engineers

HYDROMETER
LS-702 ASTM-422

CLIENT:	Purolator Inc.	DEPTH:	0' - 2'	FILE NO.:	PG4783
PROJECT:	Purolator Sort Facility	BH OR TP No.:	BH7 - AU1	DATE SAMPLED:	04-Jan-19
LAB No. :	06707	TESTED BY:	D. Bertrand	DATE RECEIVED:	04-Jan-19
SAMPLED BY:	D. Lattin	DATE REPT'D:	11-Jan-19	DATE TESTED:	09-Jan-19

SAMPLE INFORMATION

SAMPLE MASS	109.8	50.00	
SPECIFIC GRAVITY (Gs)	2.700	REMARKS	
HYGROSCOPIC MOISTURE	Tare No.		
TARE Wt.	50.00	ACTUAL Wt.	
AIR DRY (Wa)	150.00	100.00	
OVEN DRY (Wo)	146.80	96.80	
F=(Wo/Wa)	0.968		
INITIAL Wt. (Ma)	50.00		
Wt. CORRECTED	48.40		
Wt. AFTER WASH BACK SIEVE	3.45		
SOLUTION CONCENTRATION	40 g / L		

GRAIN SIZE ANALYSIS

SIEVE DIAMETER (mm)	WEIGHT RETAINED (g)	PERCENT RETAINED	PERCENT PASSING
63.0			
53.0			
37.5			
26.5			
19.0			
16.0			
13.2			
9.5			
4.75			
2.0	**0.0**	0.0	100.0
Pan	**111.3**		
0.850	**0.14**	0.3	99.7
0.425	**0.85**	1.7	98.3
0.250	**1.92**	3.8	96.2
0.106	**3.32**	6.6	93.4
0.075	**4.02**	8.0	92.0
Pan	**4.12**		
SIEVE CHECK -19.4	MAX = 0.3%		

HYDROMETER DATA

ELAPSED	TIME (24 hours)	Hs	Hc	Temp. (°C)	DIAMETER	(P)	TOTAL PERCENT PASSING
1	8:59	47.0	6.0	23.0	0.0374	83.8	83.8
2	9:00	45.0	6.0	23.0	0.0270	79.7	79.7
5	9:03	44.0	6.0	23.0	0.0173	77.6	77.6
15	9:13	42.0	6.0	23.0	0.0102	73.5	73.5
30	9:28	40.0	6.0	23.0	0.0073	69.5	69.5
60	9:58	38.0	6.0	23.0	0.0053	65.4	65.4
250	13:08	33.0	6.0	23.0	0.0027	55.2	55.2
1440	8:58	26.0	6.0	21.0	0.0012	40.9	40.9

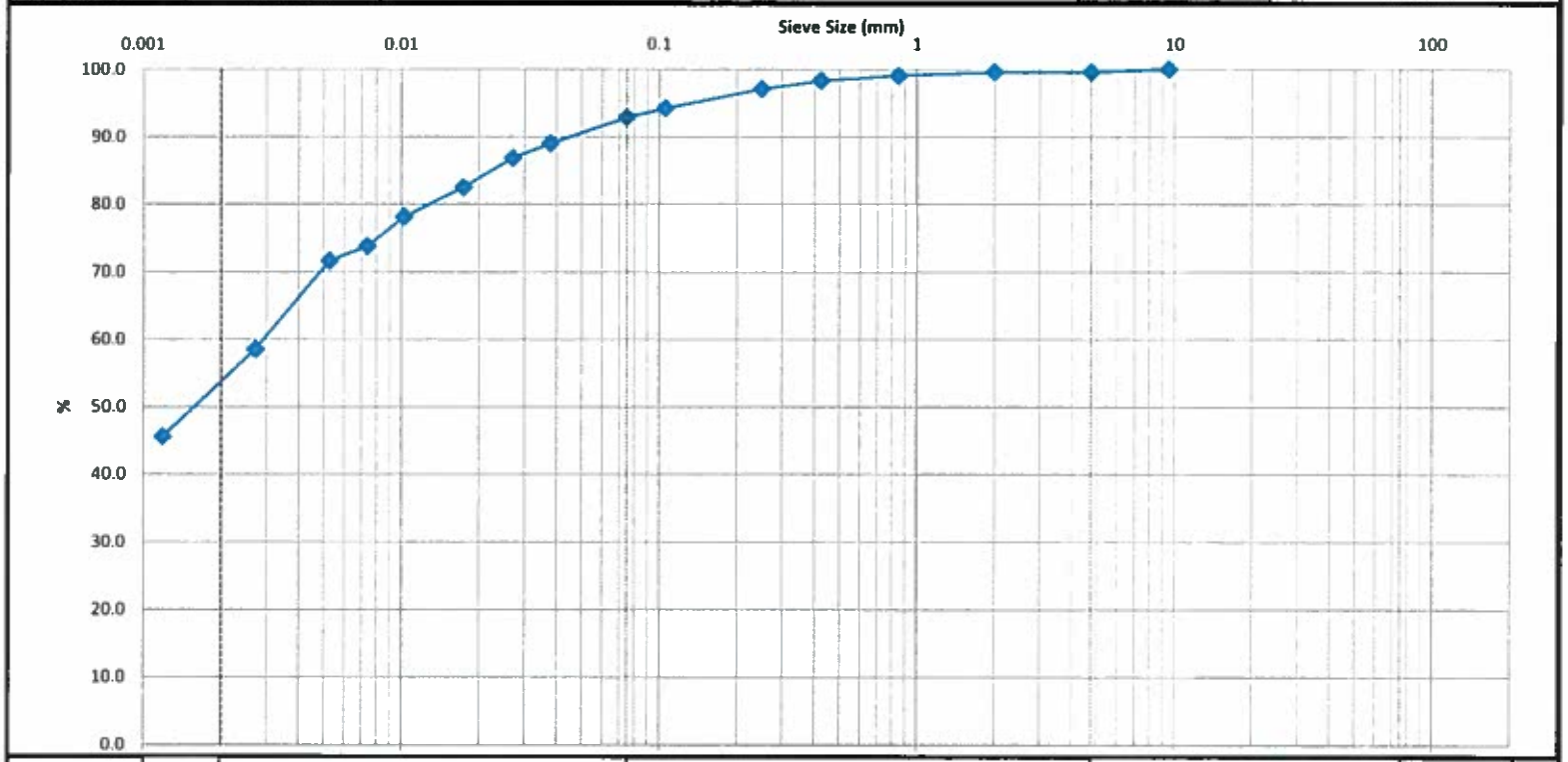
COMMENTS

Moisture Content = 28.2%

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

patersongroup
consulting engineers

CLIENT:	Pinchin Limited	DEPTH:	5' - 7'	FILE NO:	PM4184
CONTRACT NO.:		BH OR TP No.:	BH1	LAB NO:	06027
PROJECT:	231270.001			DATE RECEIVED:	6-Nov-18
				DATE TESTED:	9-Nov-18
DATE SAMPLED:	29-Oct-18			DATE REPORTED:	13-Nov-18
SAMPLED BY:	W. Tabaczuk			TESTED BY:	D. Bertrand



	Clay	Silt	Sand			Gravel		Cobble
			Fine	Medium	Coarse	Fine	Coarse	

Identification	Soil Classification					MC(%)	LL	PL	PI	Cc	Cu
						32.7					
	D100	D60	D30	D10	Gravel (%)	Sand (%)		Silt (%)		Clay (%)	
					0.4	6.7		40.8		52.1	

Comments	

patersongroup
consulting engineers

HYDROMETER
LS-702 ASTM-422

CLIENT:	Pinchin Limited	DEPTH:	5' - 7'	FILE NO.:	PM4184
PROJECT:	231270.001	BH OR TP No.:	BH1	DATE SAMPLED:	29-Oct-18
LAB No. :	06027	TESTED BY:	D. Bertrand	DATE RECEIVED:	06-Nov-18
SAMPLED BY:	W. Tabaczuk	DATE REPT'D:	13-Nov-18	DATE TESTED:	09-Nov-18

SAMPLE INFORMATION

SAMPLE MASS	112.3	50.30	
SPECIFIC GRAVITY (Gs)	2.700	REMARKS	
HYGROSCOPIC MOISTURE	Tare No.		
TARE Wt.	50.00	ACTUAL Wt.	
AIR DRY (Wa)	150.00	100.00	
OVEN DRY (Wo)	140.15	90.15	
F=(Wo/Wa)	0.902		
INITIAL Wt. (Ma)	50.30		
Wt. CORRECTED	45.35		
Wt. AFTER WASH BACK SIEVE	3.51		
SOLUTION CONCENTRATION	40 g / L		

GRAIN SIZE ANALYSIS

SIEVE DIAMETER (mm)	WEIGHT RETAINED (g)	PERCENT RETAINED	PERCENT PASSING
63.0			
53.0			
37.5			
26.5			
19.0			
16.0			
13.2			
9.5	0.0	0.0	100.0
4.75	0.5	0.4	99.6
2.0	0.5	0.4	99.6
Pan	111.8		
0.850	0.26	1.0	99.0
0.425	0.65	1.7	98.3
0.250	1.25	2.9	97.1
0.106	2.68	5.7	94.3
0.075	3.38	7.1	92.9
Pan	3.51		
SIEVE CHECK 0.0	MAX = 0.3%		

HYDROMETER DATA

ELAPSED	TIME (24 hours)	Hs	Hc	Temp. (°C)	DIAMETER	(P)	TOTAL PERCENT PASSING
1	9:43	47.0	6.0	22.0	0.0379	89.4	89.0
2	9:44	46.0	6.0	22.0	0.0271	87.2	86.8
5	9:47	44.0	6.0	22.0	0.0175	82.9	82.5
15	9:57	42.0	6.0	22.0	0.0103	78.5	78.2
30	10:12	40.0	6.0	22.0	0.0074	74.1	73.8
60	10:42	39.0	6.0	22.0	0.0053	72.0	71.6
250	13:52	33.0	6.0	22.0	0.0027	58.9	58.6
1440	9:42	27.0	6.0	22.0	0.0012	45.8	45.6

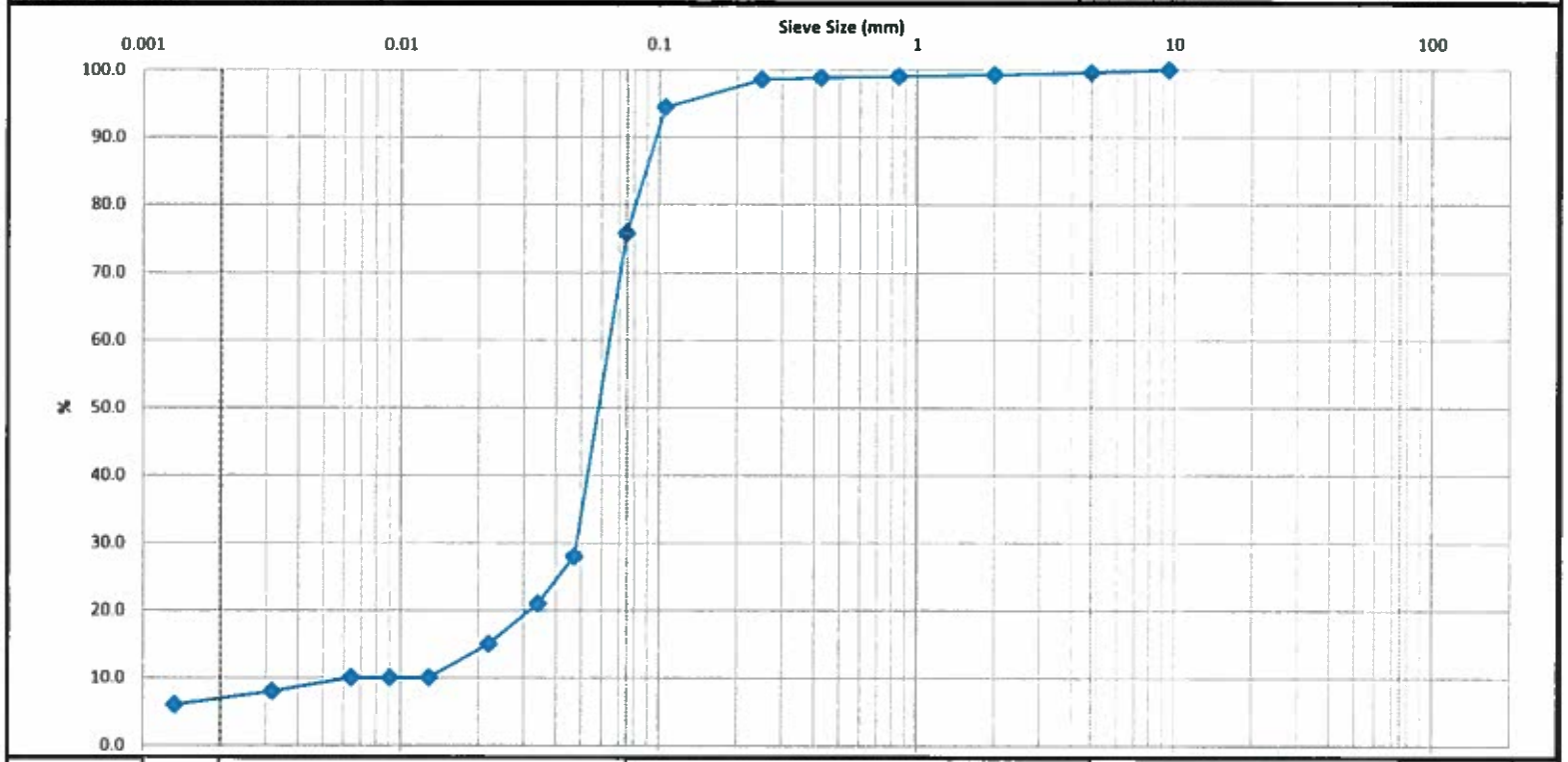
COMMENTS

Moisture Content = 32.7%

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

patersongroup
consulting engineers

CLIENT:	Pinchin Limited	DEPTH:	10' - 12'	FILE NO:	PM4184
CONTRACT NO.:		BH OR TP No.:	BH3	LAB NO:	06028
PROJECT:	231270.001			DATE RECEIVED:	6-Nov-18
				DATE TESTED:	9-Nov-18
DATE SAMPLED:	29-Oct-18			DATE REPORTED:	13-Nov-18
SAMPLED BY:	W. Tabaczuk			TESTED BY:	D. Bertrand



Clay	Silt	Sand			Gravel		Cobble
		Fine	Medium	Coarse	Fine	Coarse	

Identification	Soil Classification	MC(%)	LL	PL	PI	Cc	Cu
		16.7					

D100	D60	D30	D10	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
				0.4	23.8	68.8	7.0

Comments	

patersongroup
consulting engineers

HYDROMETER
LS-702 ASTM-422

CLIENT:	Pinchin Limited	DEPTH:	10' - 12'	FILE NO.:	PM4184
PROJECT:	231270.001	BH OR TP No.:	BH9	DATE SAMPLED:	29-Oct-18
LAB No. :	06028	TESTED BY:	D. Bertrand	DATE RECEIVED:	06-Nov-18
SAMPLED BY:	W. Tabaczuk	DATE REPT'D:	13-Nov-18	DATE TESTED:	09-Nov-18

SAMPLE INFORMATION

SAMPLE MASS	151.1	50.30	
SPECIFIC GRAVITY (Gs)	2.700	REMARKS	
HYGROSCOPIC MOISTURE	Tare No.		
TARE Wt.	50.00	ACTUAL Wt.	
AIR DRY (Wa)	150.00	100.00	
OVEN DRY (Wo)	147.55	97.55	
F=(Wo/Wa)	0.976		
INITIAL Wt. (Ma)	50.30		
Wt. CORRECTED	49.07		
Wt. AFTER WASH BACK SIEVE	17.65		
SOLUTION CONCENTRATION	40 g / L		

GRAIN SIZE ANALYSIS

SIEVE DIAMETER (mm)	WEIGHT RETAINED (g)	PERCENT RETAINED	PERCENT PASSING
63.0			
53.0			
37.5			
26.5			
19.0			
16.0			
13.2			
9.5	**0.0**	0.0	100.0
4.75	**0.6**	0.4	99.6
2.0	**1.1**	0.7	99.3
Pan	**150**		
0.850	**0.12**	1.0	99.0
0.425	**0.22**	1.2	98.8
0.250	**0.35**	1.4	98.6
0.106	**2.44**	5.5	94.5
0.075	**11.87**	24.2	75.8
Pan	**17.65**		
SIEVE CHECK 0.0	MAX = 0.3%		

HYDROMETER DATA

ELAPSED	TIME (24 hours)	Hs	Hc	Temp. (°C)	DIAMETER	(P)	TOTAL PERCENT PASSING
1	9:57	20.0	6.0	22.0	0.0472	28.2	28.0
2	9:58	16.5	6.0	22.0	0.0342	21.2	21.0
5	10:01	13.5	6.0	22.0	0.0220	15.1	15.0
15	10:11	11.0	6.0	22.0	0.0129	10.1	10.0
30	10:26	11.0	6.0	22.0	0.0091	10.1	10.0
60	10:56	11.0	6.0	22.0	0.0064	10.1	10.0
250	14:06	10.0	6.0	22.0	0.0032	8.1	8.0
1440	9:56	9.0	6.0	22.0	0.0013	6.0	6.0

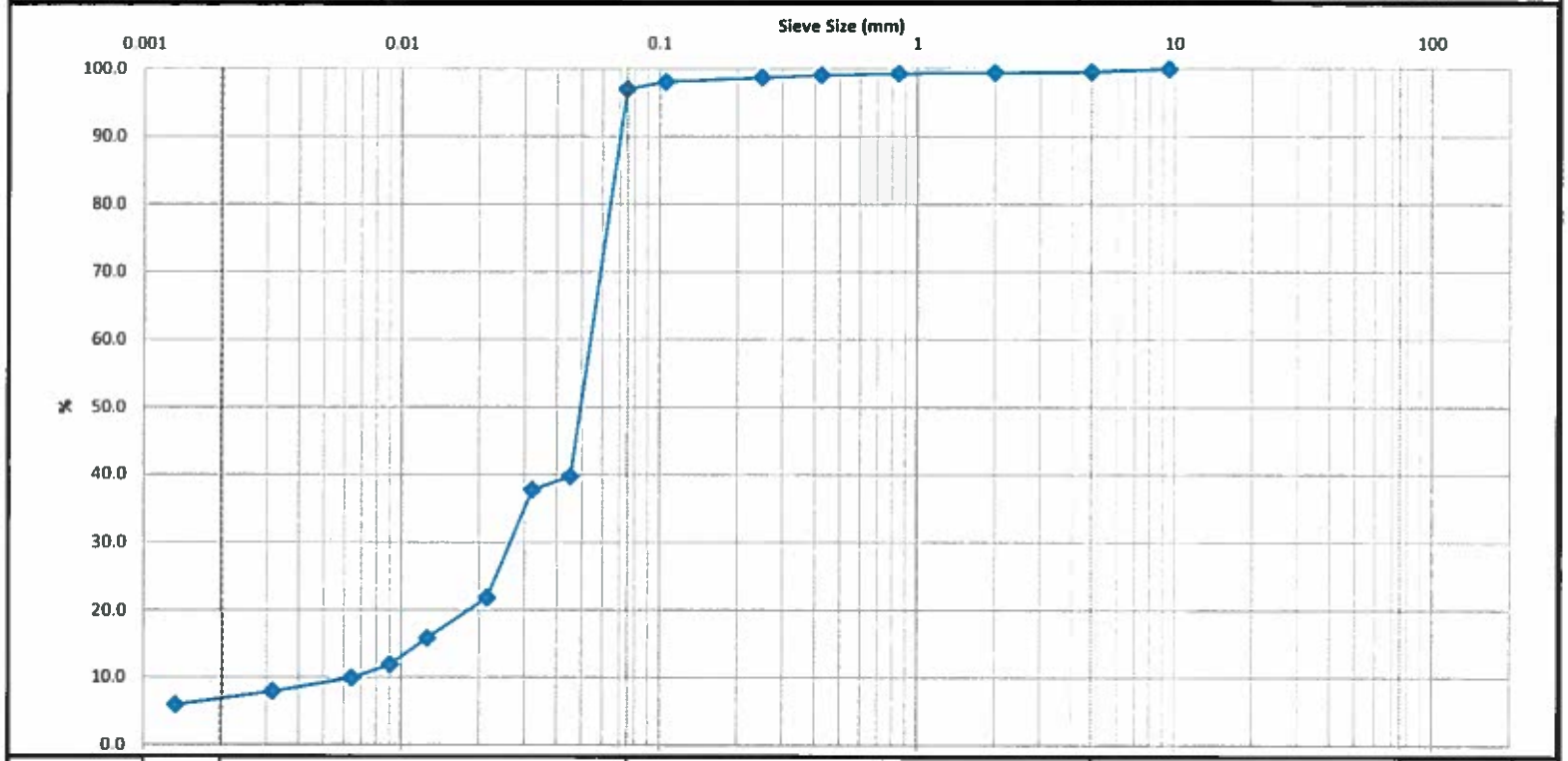
COMMENTS

Moisture Content = 16.7%

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

patersongroup
consulting engineers

CLIENT:	Pinchin Limited	DEPTH:	5' - 7'	FILE NO.:	PM4184
CONTRACT NO.:		BH OR TP No.:	BH4	LAB NO.:	06029
PROJECT:	231270.001			DATE RECEIVED:	6-Nov-18
				DATE TESTED:	9-Nov-18
DATE SAMPLED:	29-Oct-18			DATE REPORTED:	13-Nov-18
SAMPLED BY:	W. Tabaczuk			TESTED BY:	D. Bertrand



	Clay	Silt	Sand			Gravel		Cobble
			Fine	Medium	Coarse	Fine	Coarse	

Identification	Soil Classification				MC(%)	LL	PL	PI	Cc	Cu
					17.4					
	D100	D60	D30	D10	Gravel (%)	Sand (%)	Silt (%)		Clay (%)	
					0.5	2.5	90.0		7.0	

Comments	

patersongroup
consulting engineers

HYDROMETER
LS-702 ASTM-422

CLIENT:	Pinchin Limited	DEPTH:	5' - 7'	FILE NO.:	PM4184
PROJECT:	231270.001	BH OR TP No.:	BH4	DATE SAMPLED:	29-Oct-18
LAB No. :	06029	TESTED BY:	D. Bertrand	DATE RECEIVED:	06-Nov-18
SAMPLED BY:	W. Tabaczuk	DATE REPT'D:	13-Nov-18	DATE TESTED:	09-Nov-18

SAMPLE INFORMATION

SAMPLE MASS	131.4	50.30	
SPECIFIC GRAVITY (Gs)	2.700		
HYGROSCOPIC MOISTURE	Tare No.		
TARE Wt.	50.00	ACTUAL Wt.	
AIR DRY (Wa)	150.00	100.00	
OVEN DRY (Wo)	148.50	98.50	
F=(Wo/Wa)	0.985		
INITIAL Wt. (Ma)	50.30		
Wt. CORRECTED	49.55		
Wt. AFTER WASH BACK SIEVE	1.54		
SOLUTION CONCENTRATION	40 g / L		

REMARKS

GRAIN SIZE ANALYSIS

SIEVE DIAMETER (mm)	WEIGHT RETAINED (g)	PERCENT RETAINED	PERCENT PASSING
63.0			
53.0			
37.5			
26.5			
19.0			
16.0			
13.2			
9.5	0.0	0.0	100.0
4.75	0.5	0.5	99.5
2.0	0.7	0.5	99.5
Pan	132.1		
0.850	0.07	0.7	99.3
0.425	0.21	0.9	99.1
0.250	0.38	1.3	98.7
0.106	0.71	1.9	98.1
0.075	1.26	3.0	97.0
Pan	1.54		
SIEVE CHECK 0.0	MAX = 0.3%		

HYDROMETER DATA

ELAPSED	TIME (24 hours)	Hs	Hc	Temp. (°C)	DIAMETER	(P)	TOTAL PERCENT PASSING
1	10:14	26.0	6.0	22.0	0.0453	39.9	39.7
2	10:15	25.0	6.0	22.0	0.0323	37.9	37.7
5	10:18	17.0	6.0	22.0	0.0215	22.0	21.8
15	10:28	14.0	6.0	22.0	0.0127	16.0	15.9
30	10:43	12.0	6.0	22.0	0.0091	12.0	11.9
60	11:13	11.0	6.0	22.0	0.0064	10.0	9.9
250	14:23	10.0	6.0	22.0	0.0032	8.0	7.9
1440	10:13	9.0	6.0	22.0	0.0013	6.0	6.0

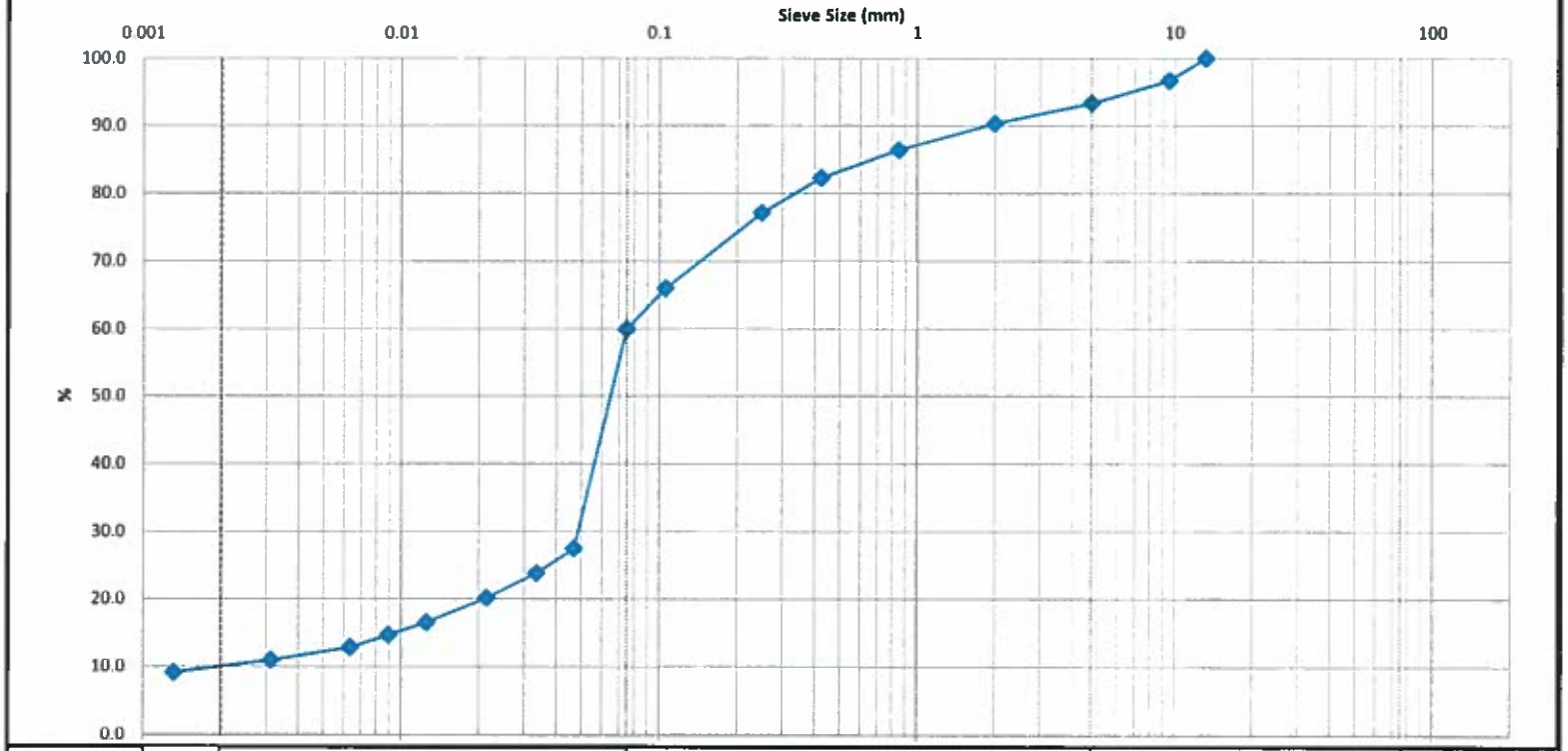
COMMENTS

Moisture Content = 17.4%

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

patersongroup
consulting engineers

CLIENT:	Pinchin Limited	DEPTH:	15' - 17'	FILE NO:	PM4184
CONTRACT NO.:		BH OR TP No.:	BH5	LAB NO:	06030
PROJECT:	231270.001			DATE RECEIVED:	6-Nov-18
				DATE TESTED:	9-Nov-18
DATE SAMPLED:	29-Oct-18			DATE REPORTED:	13-Nov-18
SAMPLED BY:	W. Tabaczuk			TESTED BY:	D. Bertrand



	Clay	Silt	Sand			Gravel		Cobble
			Fine	Medium	Coarse	Fine	Coarse	

Identification	Soil Classification					MC(%)	LL	PL	PI	Cc	Cu
						17.4					
	D100	D60	D30	D10	Gravel (%)	Sand (%)		Silt (%)		Clay (%)	
					6.6	33.5		49.9		10.0	

Comments	

patersongroup
consulting engineers

HYDROMETER
LS-702 ASTM-422

CLIENT:	Pinchin Limited	DEPTH:	15' - 17'	FILE NO.:	PM4184
PROJECT:	231270.001	BH OR TP No.:	BH5	DATE SAMPLED:	29-Oct-18
LAB No. :	06030	TESTED BY:	D. Bertrand	DATE RECEIVED:	06-Nov-18
SAMPLED BY:	W. Tabaczuk	DATE REPT'D:	13-Nov-18	DATE TESTED:	09-Nov-18

SAMPLE INFORMATION

SAMPLE MASS	147.8	50.30	
SPECIFIC GRAVITY (Gs)	2.700	REMARKS	
HYGROSCOPIC MOISTURE	Tare No.		
TARE Wt.	50.00	ACTUAL Wt.	
AIR DRY (Wa)	150.00	100.00	
OVEN DRY (Wo)	146.75	96.75	
F=(Wo/Wa)	0.968		
INITIAL Wt. (Ma)	50.30		
Wt. CORRECTED	48.67		
Wt. AFTER WASH BACK SIEVE	17.73		
SOLUTION CONCENTRATION	40 g / L		

GRAIN SIZE ANALYSIS

SIEVE DIAMETER (mm)	WEIGHT RETAINED (g)	PERCENT RETAINED	PERCENT PASSING
63.0			
53.0			
37.5			
26.5			
19.0			
16.0			
13.2	0.0	0.0	100.0
9.5	4.9	3.3	96.7
4.75	9.8	6.6	93.4
2.0	14.3	9.7	90.3
Pan	133.3		
0.850	2.19	13.6	86.4
0.425	4.49	17.7	82.3
0.250	7.37	22.9	77.1
0.106	13.55	34.0	66.0
0.075	16.92	40.1	59.9
Pan	17.73		
SIEVE CHECK 0.0	MAX = 0.3%		

HYDROMETER DATA

ELAPSED	TIME (24 hours)	Hs	Hc	Temp. (°C)	DIAMETER	(P)	TOTAL PERCENT PASSING
1	10:32	21.0	6.0	22.0	0.0469	30.5	27.5
2	10:33	19.0	6.0	22.0	0.0336	26.4	23.9
5	10:36	17.0	6.0	22.0	0.0215	22.4	20.2
15	10:46	15.0	6.0	22.0	0.0126	18.3	16.5
30	11:01	14.0	6.0	22.0	0.0090	16.3	14.7
60	11:31	13.0	6.0	22.0	0.0064	14.2	12.8
250	14:41	12.0	6.0	22.0	0.0031	12.2	11.0
1440	10:31	11.0	6.0	22.0	0.0013	10.2	9.2

COMMENTS

Moisture Content = 15.3%

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

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 25691

Report Date: 17-Dec-2018
Order Date: 13-Dec-2018
Project Description: PG4778

	Client ID:	BH2 SS3 5' - 7'	-	-	-
	Sample Date:	12/12/2018 11:00	-	-	-
	Sample ID:	1850490-01	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	69.7	-	-	-
General Inorganics					
pH	0.05 pH Units	7.47	-	-	-
Resistivity	0.10 Ohm.m	43.1	-	-	-
Anions					
Chloride	5 ug/g dry	41	-	-	-
Sulphate	5 ug/g dry	102	-	-	-

APPENDIX 2

FIGURE 1 – KEY PLAN

FIGURES 2 & 3 – SEISMIC SHEAR WAVE VELOCITY PROFILES

DRAWING PG4783-1 – TEST HOLE LOCATION PLAN

DRAWING PG4783-2 – NATIVE SOIL CONTOUR PLAN

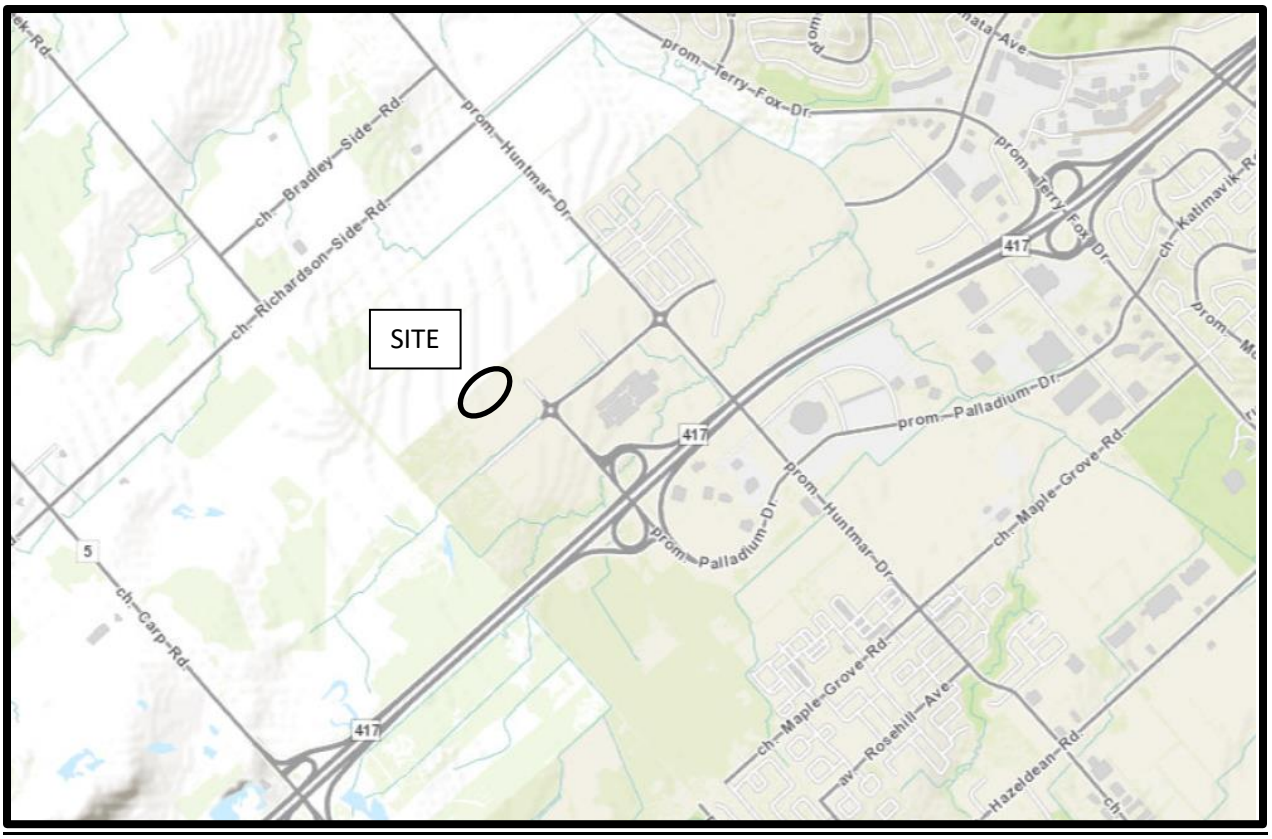


FIGURE 1

KEY PLAN

PATERSON GROUP

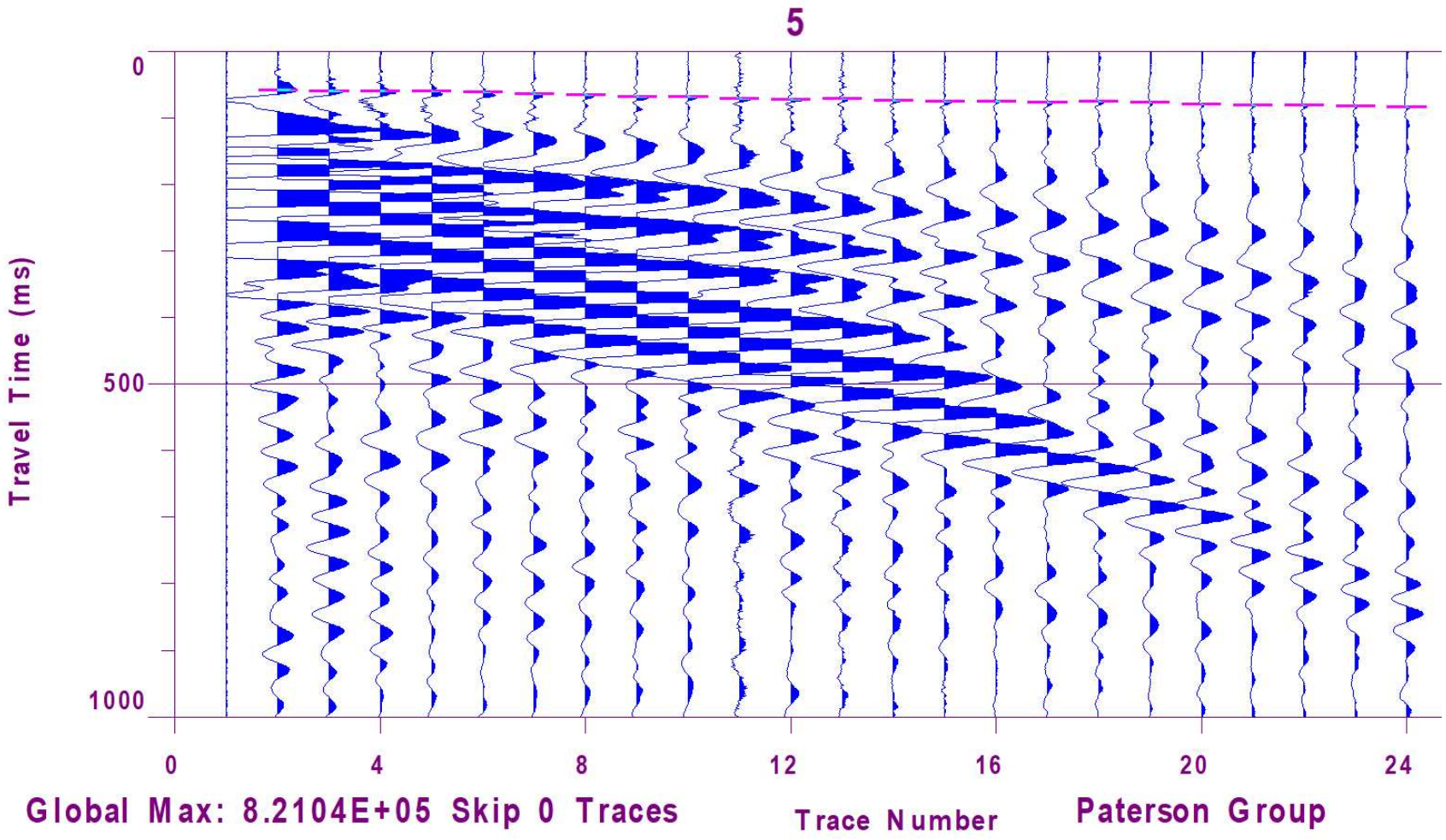


FIGURE 2 –Shear Wave Velocity Profile at Shot Location -15 m

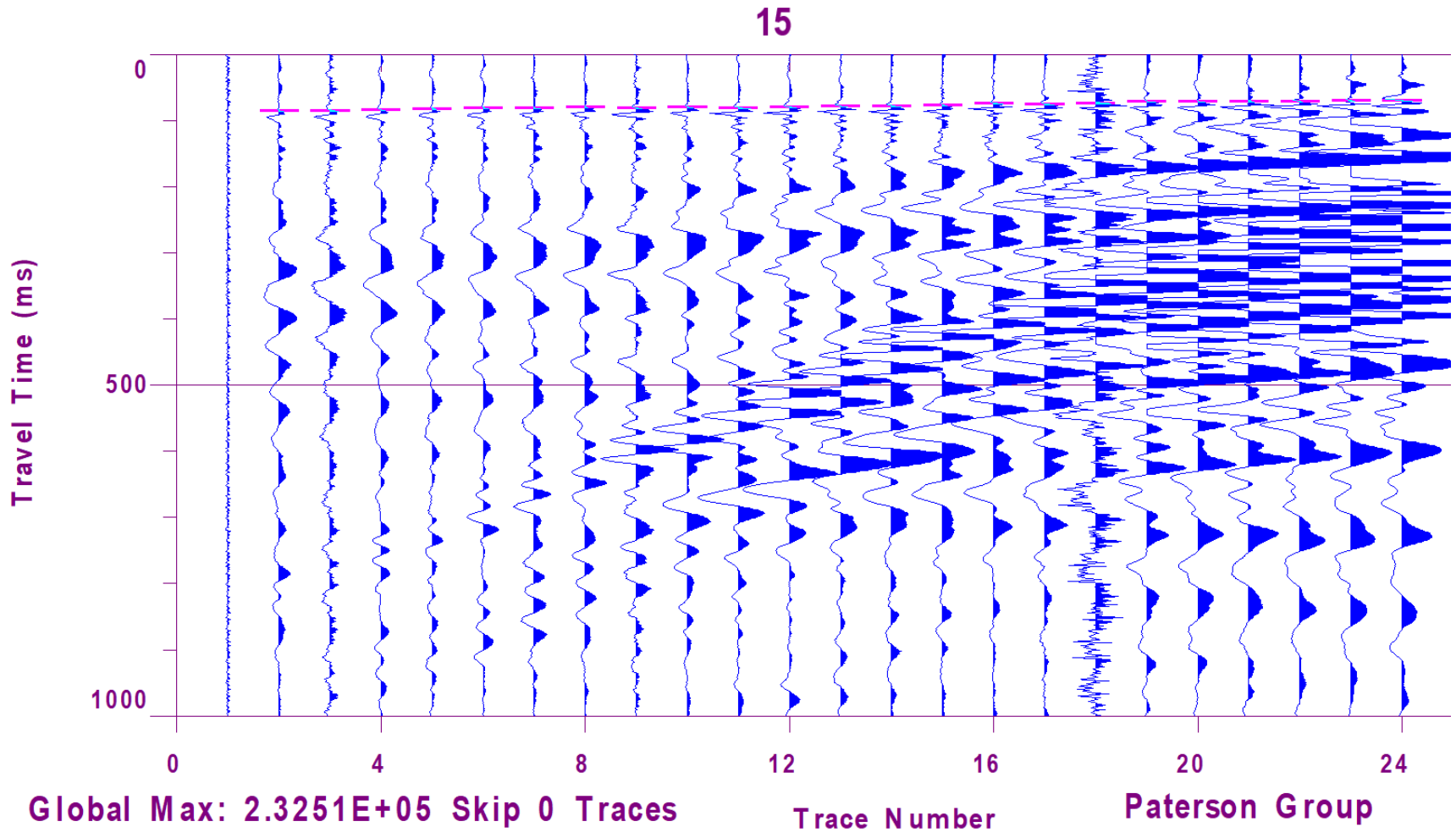
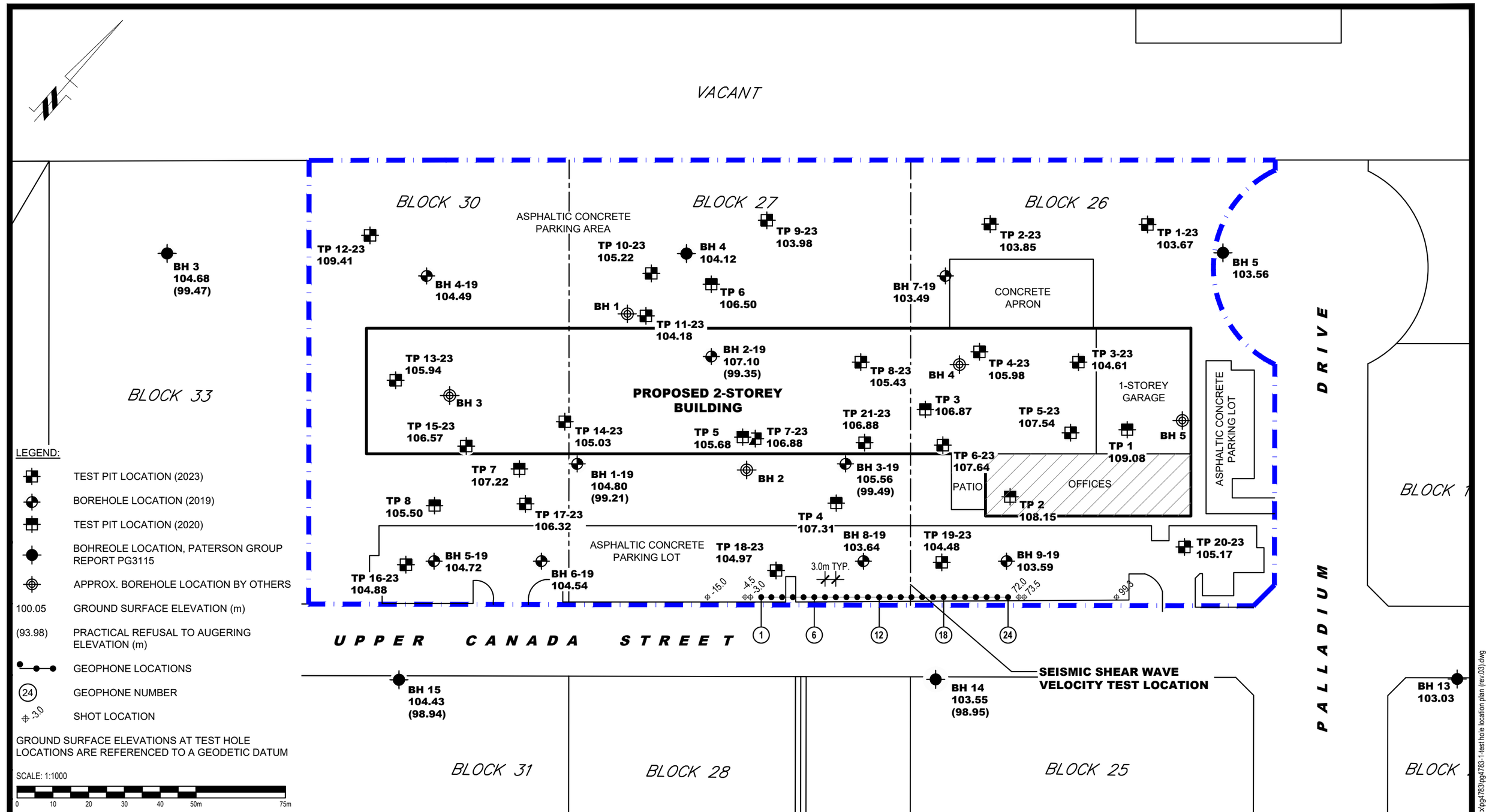


FIGURE 3 – Shear Wave Velocity Profile at Shot Location +72 m



LEGEND:

- TEST PIT LOCATION (2023)
- BOREHOLE LOCATION (2019)
- TEST PIT LOCATION (2020)
- BOHREOLE LOCATION, PATERSON GROUP REPORT PG3115
- APPROX. BOREHOLE LOCATION BY OTHERS
- 100.05 GROUND SURFACE ELEVATION (m)
- (93.98) PRACTICAL REFUSAL TO AUGERING ELEVATION (m)
- GEOPHONE LOCATIONS
- (24) GEOPHONE NUMBER
- -3.0 SHOT LOCATION

GROUND SURFACE ELEVATIONS AT TEST HOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM

SCALE: 1:1000

0 10 20 30 40 50m 75m

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

NO.	REVISIONS	DATE	INITIAL
3	2023 TEST PITS ADDED UPDATED TO NEW CONCEPTUAL PLAN	08/05/2023	FC
2	2020 TEST PITS ADDED UPDATED TO NEW CONCEPTUAL PLAN	04/01/2021	SD
1	SEISMIC SHEAR WAVE VELOCTY TEST ADDED	30/01/2020	SD

PUROLATOR INC.

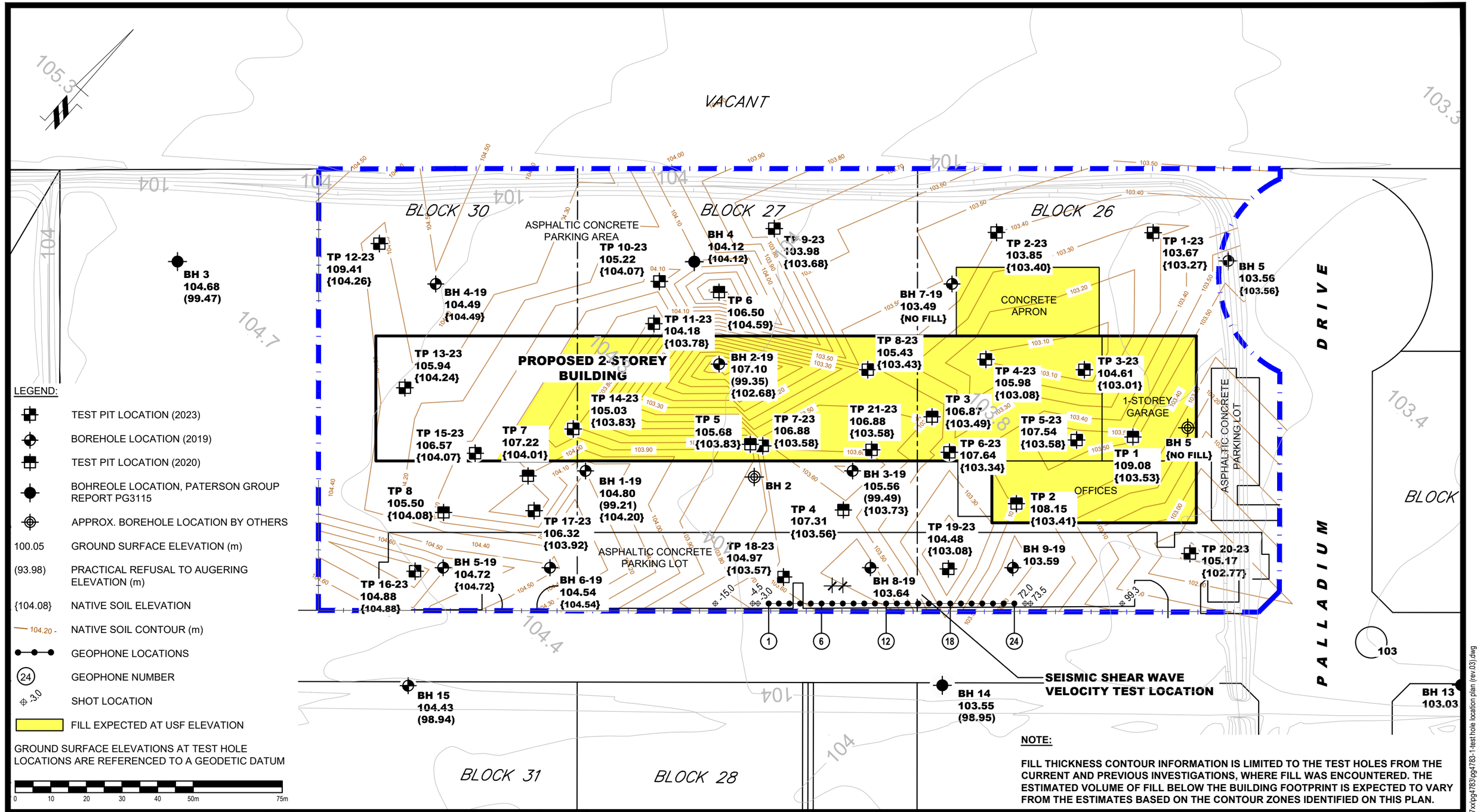
GEOTECHNICAL INVESTIGATION
PROPOSED SORTING FACILITY
1400 UPPER CANADA STREET
OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:1000	Date: 01/2019
Drawn by: MPG	Report No.: PG4783-1
Checked by: SD	Dwg. No.: PG4783-1
Approved by: SD	Revision No.: 3

p:\autocad drawings\geotechnical\pg47xx\pg4783\pg4783-1-test hole location plan (rev.03).dwg



LEGEND:

- TEST PIT LOCATION (2023)
- BOREHOLE LOCATION (2019)
- TEST PIT LOCATION (2020)
- BOHREOLE LOCATION, PATERSON GROUP REPORT PG3115
- APPROX. BOREHOLE LOCATION BY OTHERS
- 100.05 GROUND SURFACE ELEVATION (m)
- (93.98) PRACTICAL REFUSAL TO AUGERING ELEVATION (m)
- {104.08} NATIVE SOIL ELEVATION
- 104.20 NATIVE SOIL CONTOUR (m)
- GEOPHONE LOCATIONS
- (24) GEOPHONE NUMBER
- -3.0 SHOT LOCATION
- FILL EXPECTED AT USF ELEVATION

GROUND SURFACE ELEVATIONS AT TEST HOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM

0 10 20 30 40 50m 75m

NOTE:

FILL THICKNESS CONTOUR INFORMATION IS LIMITED TO THE TEST HOLES FROM THE CURRENT AND PREVIOUS INVESTIGATIONS, WHERE FILL WAS ENCOUNTERED. THE ESTIMATED VOLUME OF FILL BELOW THE BUILDING FOOTPRINT IS EXPECTED TO VARY FROM THE ESTIMATES BASED ON THE CONTOUR ZONES IDENTIFIED ON THIS PLAN.

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

NO.	REVISIONS	DATE	INITIAL

PUROLATOR INC.

GEOTECHNICAL INVESTIGATION
PROPOSED SORTING FACILITY
1400 UPPER CANADA STREET
OTTAWA, ONTARIO

Title:

NATIVE SOIL CONTOUR PLAN

Scale: 1:1000	Date: 05/2023
Drawn by: RCG	Report No.: PG4783-1
Checked by: FC	Dwg. No.: PG4783-2
Approved by: DG	Revision No.: 0

p:\autocad drawings\geotechnical\pg4747xx\pg4783\pg4783-1-test hole location plan (rev.03).dwg

APPENDIX 3

PE6052-LET.01 – EXCESS SOIL QUALITY ASSESSMENT

May 8, 2023
File: PE6052-LET.01

Purolator c/o Taggart Realty Management
222 Metcalfe Street
Ottawa, Ontario
K2P 1P9

Attention: **Mr. Braden Walker**

Subject: **Proposed Commercial Development**
Excess Soil Quality Assessment
1400 Upper Canada Street
Ottawa, Ontario

PATERSON GROUP
Consulting Engineers
9 Auriga Drive
Ottawa, Ontario
K2E 7T9
Tel: (613) 226-7381

Geotechnical Engineering
Environmental Engineering
Hydrogeology
Materials Testing
Building Science
Rural Development Design
Retaining Wall Design
Noise and Vibration Studies

patersongroup.ca

Dear Sir,

Further to your request and authorization, Paterson Group (Paterson) conducted an excess soil quality assessment at the above-noted site (Project Area). Based on preliminary estimates, approximately 20,000 m^3 of excess soil will be generated.

1.0 Background

Based on brief historical research, no known areas of potential environmental concern (APECs) have been identified, other than fill material of unknown quality. Based on the observations made during the site visit and field program it was recommended that the analytical testing parameters include PAHs and EC/SAR beyond the minimum required sampling under O.Reg 406/19 (PHCs, BTEX, and Metals).

The excess soils testing is being completed for due diligence purposes prior to the redevelopment of the property.

2.0 Observations

Paterson conducted a test pit program within the project area on April 17, 2023. A total of 21 test pits were excavated within the project area as shown on drawing PE6052-1-Test Hole Location Plan, appended to this letter.

The soils encountered across the site generally consisted of brown silty clay to clayey silt fill underlain by native brown silty clay or clayey silt encountered in TP6-12 and TP21-23. Asphalt fragments were identified within the fill material in TP10-23 and TP14-23. Additionally, brick fragments were encountered within the fill material in TP17-23. The test pits were excavated to depths ranging from 0.4 to 5.4 m below grade, terminated in native brown silty clay or clayey silt. No other apparent deleterious materials or any visual or olfactory signs of potential contamination were observed in the samples collected during the field program.

All soil samples collected were subject to a preliminary screening procedure, which included visual screening for colour and evidence of deleterious materials, as well as soil vapour screening with a photo ionization detector (PID). The vapour readings were not considered to be representative of volatile organic compound impacts.

3.0 Analytical Test Results

A total of 30 representative soil samples and three duplicate samples (of TP1-23-G1, TP15-23-G1 and TP19-23-G2) were submitted to Paracel Laboratories (Paracel) in Ottawa for bulk analysis of benzene, ethylbenzene, toluene, and xylenes (BTEX), petroleum hydrocarbons (PHCs, Fractions F_1 to F_4), metals, polycyclic aromatic hydrocarbons (PAHs) and EC/SAR. Five representative soil samples were also submitted for pH analysis.

Although a reuse site has not been formally selected, the Ministry of the Environment, Conservation and Parks (MECP) Table 1 Residential standards and Table 2.1 Residential, Parkland and Institutional (RPI), were identified as generic reuse site standards.

The test results obtained during the current investigation are appended to this letter along with the laboratory certificates of analysis.

3.1 Metals

All samples complied with the MECP Table 2.1 RPI reuse standards. Multiple soil samples exceed the MECP Table 1 Residential reuse standards for Barium. The identified Barium concentrations are considered to be naturally occurring.

3.2 PAHs

All samples complied with the MECP Table 1 Residential and MECP Table 2.1 RPI reuse standards.

3.3 BTEX

All samples complied with the MECP Table 1 Residential and MECP Table 2.1 RPI reuse standards.

3.4 PHCs (F_1-F_4)

All samples complied with MECP Table 2.1 RPI reuse standards. All samples complied with the MECP Table 1 Residential reuse standards with the exception of sample TP10-23-G2, which exceeds the selected MECP Table 1 standard for PHC fraction F_4.

3.5 EC/SAR

All samples complied with the MECP Table 1 Residential and MECP Table 2.1 RPI reuse standards.

3.6 pH

Five soil samples, TP1-23-G1, TP5-23-G4, TP6-23-G4, TP12-23-G3, TP13-23-G4, TP14-23-G4, TP19-23-G2 and TP21-23-G1 were submitted for analysis of pH.

The analytical test results were found to be within the pH range of 5.0 and 9.0 and are therefore within the acceptable range for both surface and subsurface soils.

Conclusion

A total of 21 test pits were excavated at the project area to assess the conditions of the soil on site.

Thirty soil samples and three duplicate samples, representative of the excess soil that will be generated from the project area, were submitted for analysis of benzene, toluene, ethylbenzene and xylenes (BTEX), petroleum hydrocarbons (PHCs, Fractions F_1 to F_4), metals, polycyclic aromatic hydrocarbons (PAHs) and EC/SAR. An additional five samples were submitted for pH analysis.

Although a reuse site has not been selected, analytical results were compared to Table 1 Residential and Table 2.1 RPI for general soil management purposes.

All soil samples collected from the test pits advanced on the Project Area were found to comply with MECP Table 2.1 RPI standards. The excess soil generated from the Project Area can beneficially be reused at this type of property and properties with less stringent reuse standards (provided the placement is in accordance with the regulation).

Several soil samples exceed the MECP Table 1 Residential standards for the metal parameter Barium. These exceedances are considered to be naturally occurring and are representative of the native soil conditions throughout the Ottawa Area. A review of the proposed reuse site should be conducted to determine its suitability to accept the naturally elevated Barium concentrations.

Sample TP10-23-G2 exceeded the selected MECP Table 1 standard for PHC fraction F_4. If the reuse site accepts only Table 1 soil, further delineation of the soil in the area of TP10 is recommended to confirm the boundaries of the PHCs in the soil.

As mentioned in Section 2.1 and identified in the attached test hole logs, discrete areas were identified where asphalt, brick, and other debris are present within the fill material. This soil should be retained onsite wherever possible and/or the deleterious material be removed and appropriately disposed.

Statement of Limitations

A soils investigation of this nature is considered to be a limited sampling program. Should any conditions at the site be encountered which differ from those at the test locations, we request that we be notified immediately in order to permit reassessment of our recommendations/conclusions.

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 Purolator c/o Taggart or their agents, without review by this firm for the applicability of our recommendations to the altered use of the report, is prohibited.

Regards,

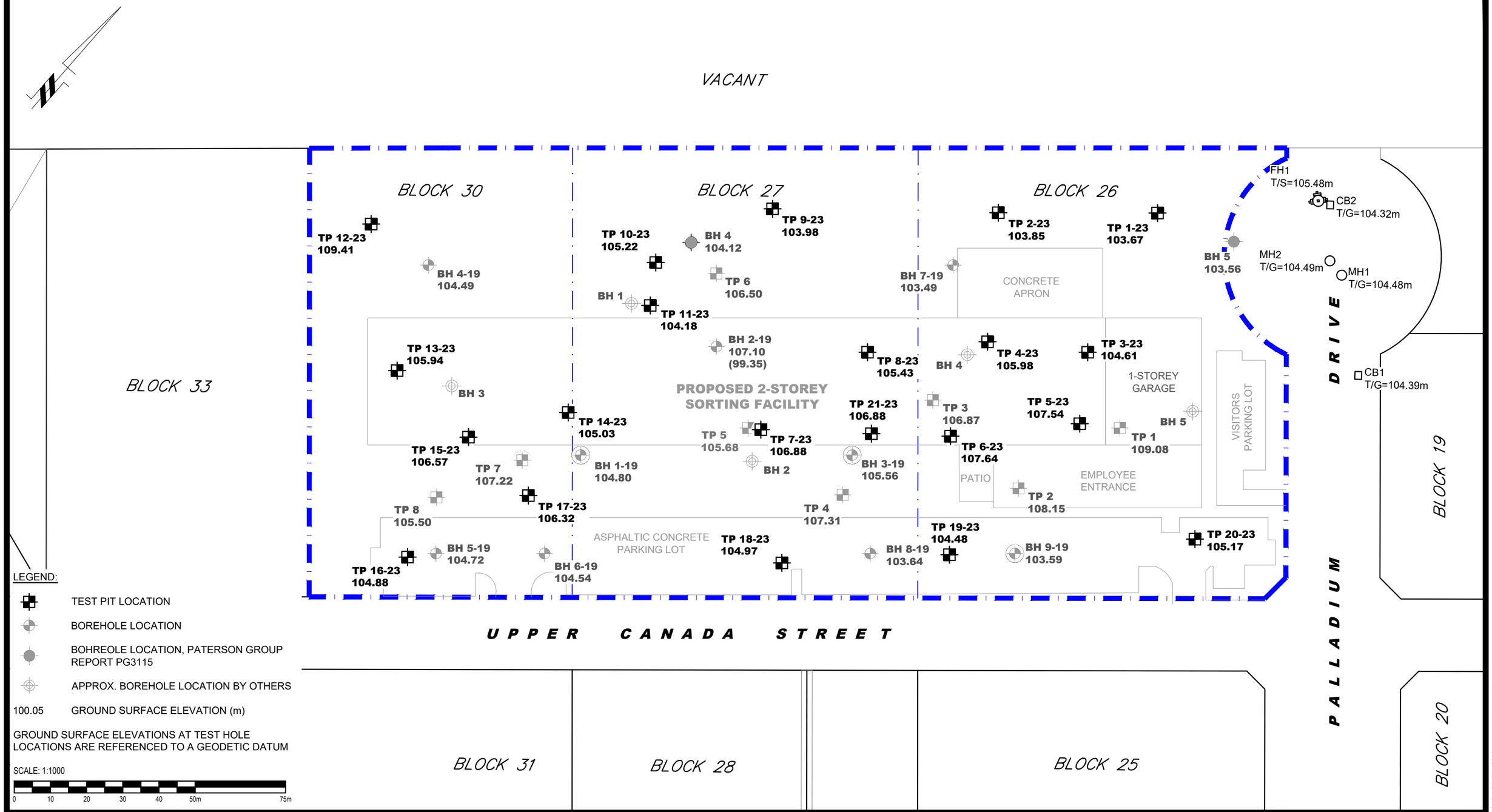
Paterson Group Inc.

Samuel Berube, EIT.

Michael Beaudoin, P.Eng. QP_{esa}

Attachments

- ❑ PE6052-1-Test Hole Location Plan
- ❑ Soil Profile and Test Data Sheets
- ❑ Laboratory Results Compared to MECP Table 1 Residential
- ❑ Laboratory Results Compared to MECP Table 2.1 RPI
- ❑ Certificates of Analysis



LEGEND:

- TEST PIT LOCATION
- BOREHOLE LOCATION
- BOHREOLE LOCATION, PATERSON GROUP REPORT PG3115
- APPROX. BOREHOLE LOCATION BY OTHERS
- 100.05 GROUND SURFACE ELEVATION (m)

GROUND SURFACE ELEVATIONS AT TEST HOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM

SCALE: 1:1000

0 10 20 30 40 50m 75m

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

NO.	REVISIONS	DATE	INITIAL

PUROLATOR INC.

PHASE I-II - ENVIRONMENTAL SITE ASSESSMENT
1400 UPPER CANADA STREET

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:1000	Date: 04/2023
Drawn by: YA	Report No.: PE6052-1
Checked by: SB	Dwg. No.: PE6052-1
Approved by: MB	Revision No.:

p:\autocad drawings\environmental\pe60xx\pe6052\pe6052-1-test hole location plan.dwg

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 17, 2023

FILE NO. PE6052

HOLE NO. TP 1-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: ● Volatile Organic Rdg. (ppm) / ○ Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	103.67		
TOPSOIL 0.05									
FILL: Brown silty clay, trace organics 0.40		G	1						
Very stiff, brown **SILTY CLAY,** trace sand 0.60		G	2						
End of Test Pit									

Photo Ionization Detector: ○ Lower Explosive Limit % — 20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 17, 2023

FILE NO. PE6052

HOLE NO. TP 2-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: ● Volatile Organic Rdg. (ppm) / ○ Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	103.85		
TOPSOIL 0.05									
FILL: Brown silty clay to clayey silt, trace sand and organics 0.45		G	1						
Very stiff to hard, brown **SILTY CLAY,** trace sand 0.65		G	2						
End of Test Pit									

Photo Ionization Detector: ● Volatile Organic Rdg. (ppm); ○ Lower Explosive Limit %

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 17, 2023

FILE NO. PE6052

HOLE NO. TP 3-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
TOPSOIL 0.05						0	104.61
FILL: Brown silty sand to sandy silt, trace clay, organics, occasional cobbles		G	1				
		G	2			1	103.61
1.60							
Very stiff to hard, brown **SILTY CLAY,** trace sand 1.80		G	3				
End of Test Pit							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 17, 2023

FILE NO. PE6052

HOLE NO. TP 4-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE									
TOPSOIL 0.05						0	105.98		
FILL: Topsoil with some sand, organics, trace clay, occasional cobbles		G	1			1	104.98		
		G	2			2	103.98		
		G	3						
2.90						3	102.98		
Very stiff to hard, brown **SILTY CLAY,** trace sand 3.10		G	4						
End of Test Pit									

Photo Ionization Detector: ● Volatile Organic Rdg. (ppm); ○ Lower Explosive Limit %

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 17, 2023

FILE NO. PE6052

HOLE NO. TP 5-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	107.54
TOPSOIL 0.05							
FILL: Topsoil with dark brown silty sand, some organics, trace clay, occasional cobbles		G	1			1	106.54
1.25							
FILL: Dark brown silty sand, some silt and clay, trace organics, occasional cobbles		G	2			2	105.54
		G	3				
2.80						3	104.54
FILL: Light brown to grey silty clay, some organics, trace gravel, occasional cobbles		G	4			4	103.54
4.55							
Very stiff, light brown **SILTY CLAY**, trace sand 4.70		G	5				
End of Test Pit							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 17, 2023

FILE NO. PE6052

HOLE NO. TP 6-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	107.64
TOPSOIL 0.05							
FILL: Topsoil with silty sand, some organics, occasional cobbles		G	1			1	106.64
1.30							
		G	2			2	105.64
FILL: Dark brown silty sand to sandy silt, trace clay and organics		G	3			3	104.64
		G	4			4	103.64
4.30							
Stiff to very stiff, brown to grey **SILTY CLAY to CLAYEY SILT,** trace sand 4.50		G	5				
End of Test Pit							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 17, 2023

FILE NO. PE6052

HOLE NO. TP 7-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	106.88
TOPSOIL 0.05							
FILL: Brown silty sand to sandy silt, trace organics, occasional cobbles		G	1				
		G	2			1	105.88
		G	3				
2.00		G	4			2	104.88
FILL: Light brown silty sand with topsoil, trace organics, occasional cobbles		G	5				
3.30						3	103.88
Hard, brown **SILTY CLAY,** trace sand 3.50		G	6				
End of Test Pit							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)
○ **Lower Explosive Limit %**
20 40 60 80
100 200 300 400 500
RKI Eagle Rdg. (ppm)
▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 17, 2023

FILE NO. PE6052

HOLE NO. TP 8-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
TOPSOIL 0.05							
FILL: Brown silty sand to sandy silt, trace organics, occasional cobbles		G	1			0	105.43
		G	2			1	104.43
		G	3				
2.00						2	103.43
Very stiff to hard, brown **SILTY CLAY** 2.20		G	4				
End of Test Pit							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 17, 2023

FILE NO. PE6052

HOLE NO. TP 9-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	103.98
TOPSOIL 0.05							
FILL: Brown silty clay to clayey silt, trace organics and sand 0.30		G	1				
0.40		G	2				
Very stiff to hard, brown **SILTY CLAY**							
End of Test Pit							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)
○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)
▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

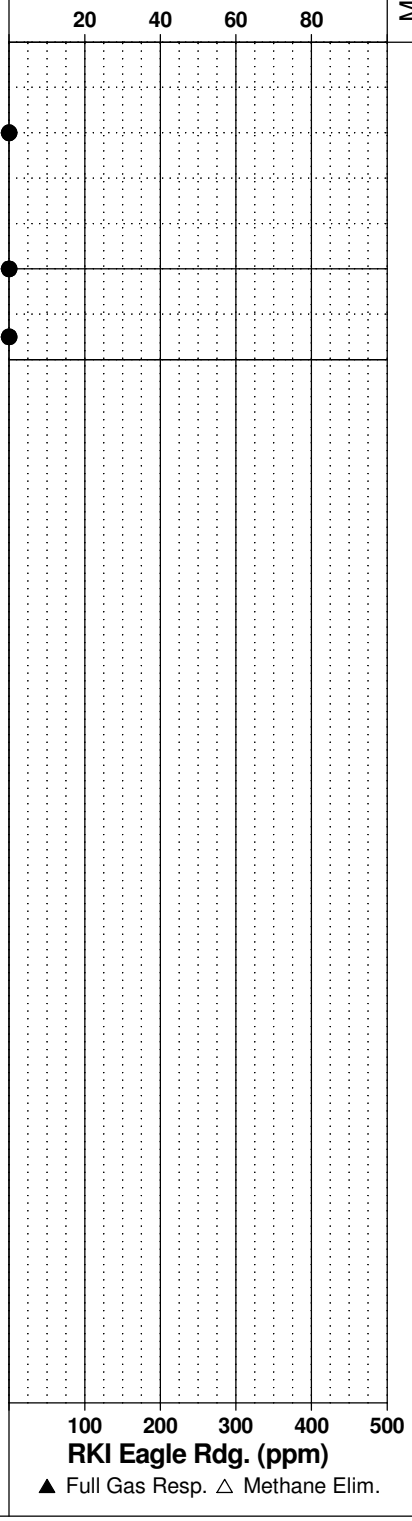
BORINGS BY Excavator **DATE** April 14, 2023

FILE NO. PE6052

HOLE NO. TP10-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
TOPSOIL 0.05						0	105.22
FILL: Brown silty sand with topsoil and gravel, trace organics, asphalt and clay		G	1				
		G	2			1	104.22
1.15							
Very stiff to hard, brown **SILTY CLAY,** trace sand 1.40		G	3				
End of Test Pit							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)
○ **Lower Explosive Limit %**



▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

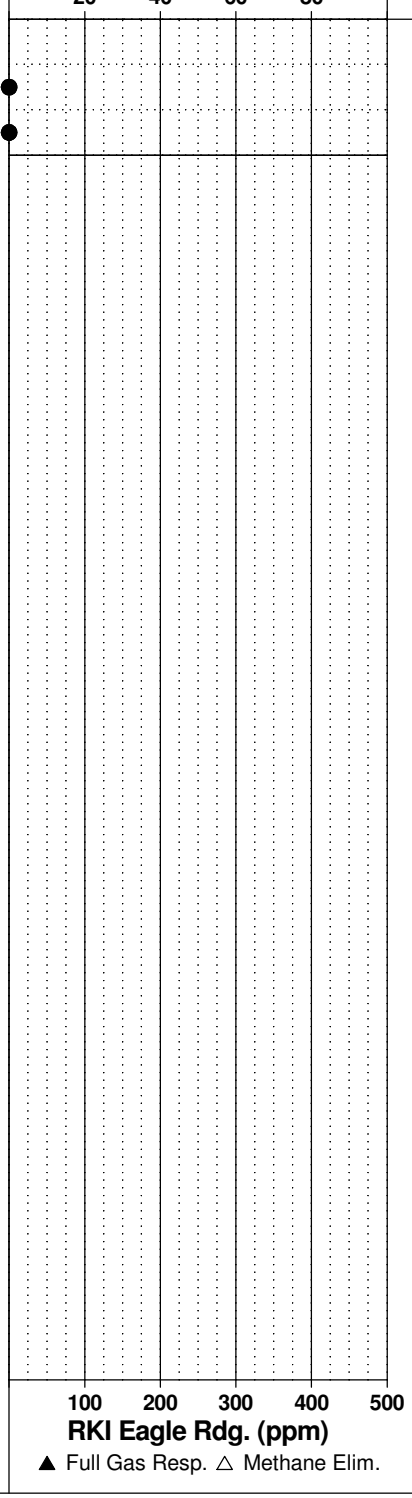
BORINGS BY Excavator **DATE** April 14, 2023

FILE NO. PE6052

HOLE NO. TP11-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	104.18
TOPSOIL 0.05							
FILL: Topsoil, some silty sand and organics 0.40		G	1				
Very stiff, brown **SILTY CLAY,** trace sand 0.60		G	2				
End of Test Pit							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)
○ **Lower Explosive Limit %**



Monitoring Well Construction

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 14, 2023

FILE NO. PE6052

HOLE NO. TP12-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE									
TOPSOIL 0.05						0	109.41		
		G	1			1	108.41		
		G	2			2	107.41		
FILL: Brown silty sand to sandy silt, trace organics, clay and gravel, occasional cobbles									
		G	3			3	106.41		
		G	4			4	105.41		
		G	5			5	104.41		
5.15									
Stiff to very stiff, brown **SILTY CLAY**		G	6						
5.40									
End of Test Pit									

Photo Ionization Detector: ● Volatile Organic Rdg. (ppm); ○ Lower Explosive Limit %

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

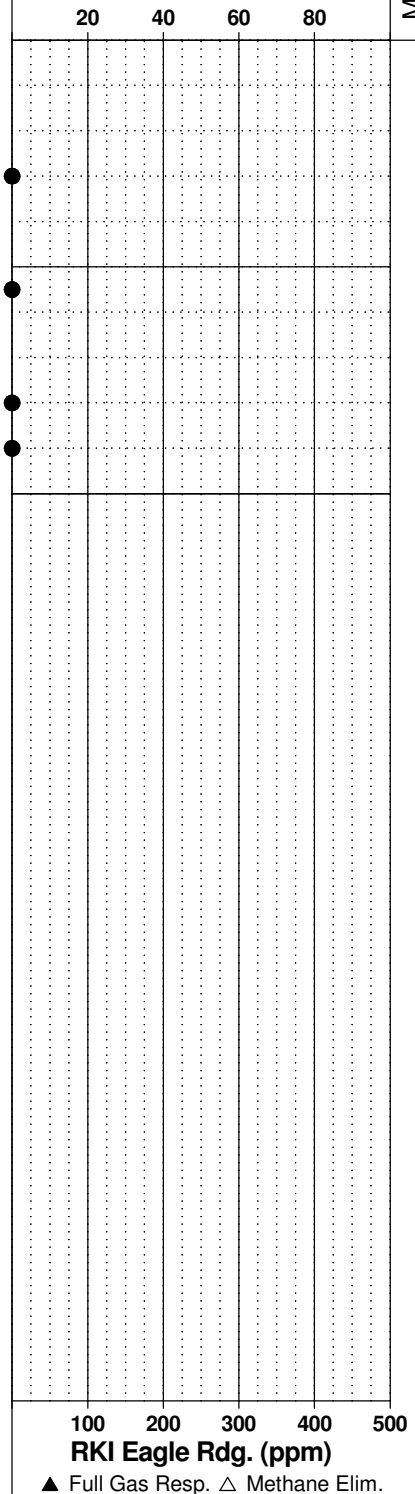
BORINGS BY Excavator **DATE** April 14, 2023

FILE NO. PE6052

HOLE NO. TP13-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
TOPSOIL 0.05						0	105.94
FILL: Brown silty sand to sandy silt, some organics, trace clay and gravel		G	1				
		G	2			1	104.94
1.50							
FILL: Brown silty sand with gravel, crushed stone, trace clay 1.70		G	3				
Hard, brown **SILTY CLAY,** trace sand 2.00		G	4			2	103.94
End of Test Pit							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)
○ **Lower Explosive Limit %**



▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

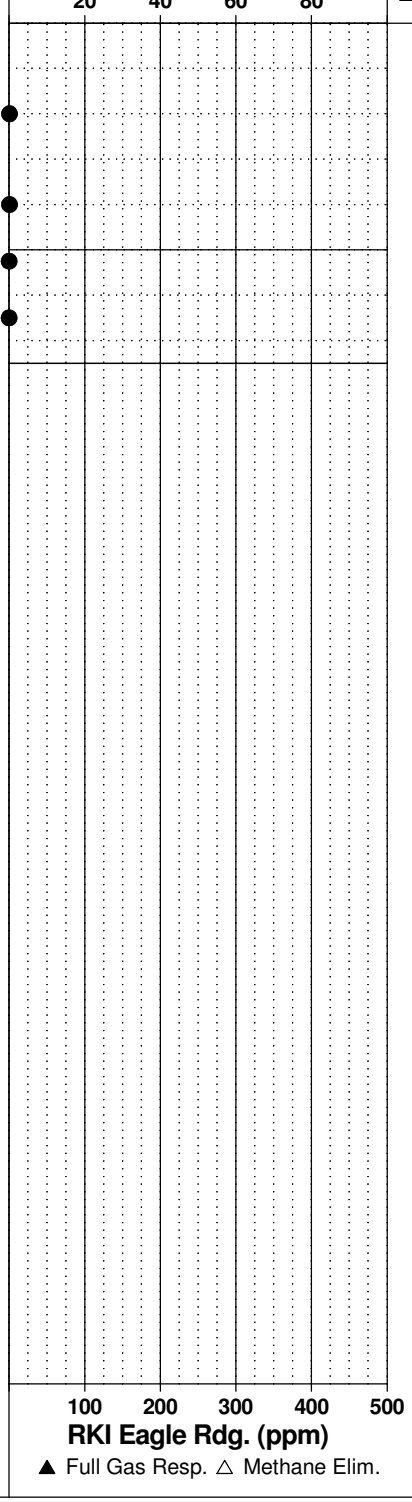
REMARKS

BORINGS BY Excavator **DATE** April 14, 2023

FILE NO. PE6052

HOLE NO. TP14-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE									
TOPSOIL 0.05									
FILL: Topsoil, some gravel and organics		G	1			0	105.03		
0.90		G	2						
FILL: Light brown silty clay to clayey silt with gravel, crushed stone, trace topsoil and asphalt 1.20		G	3			1	104.03		
Hard, brown **SILTY CLAY,** trace sand 1.50		G	4						
End of Test Pit									
(Groundwater infiltration at base of test pit)									



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 14, 2023

FILE NO. PE6052

HOLE NO. TP15-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: ● Volatile Organic Rdg. (ppm) / ○ Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE									
TOPSOIL 0.05									
FILL: Brown silty sand to sandy silt with topsoil, clay, some gravel, occasional cobbles		G	1			1	105.57		
		G	2			2	104.57		
2.50		G	3						
Very stiff, brown **SILTY CLAY,** trace sand and gravel 2.70		G	4						
End of Test Pit									

Photo Ionization Detector: ○ Lower Explosive Limit % — 20 40 60 80; 0 — 106.57

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 14, 2023

FILE NO. PE6052

HOLE NO. TP16-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: ● Volatile Organic Rdg. (ppm) / ○ Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	104.88		
TOPSOIL 0.05									
Very stiff, brown **SILTY CLAY to CLAYEY SILT,** some gravel, trace organics 0.40		G	1						
End of Test Pit									

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)
○ Lower Explosive Limit %
20 40 60 80
100 200 300 400 500
RKI Eagle Rdg. (ppm)
▲ Full Gas Resp. △ Methane Elim.

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 14, 2023

FILE NO. PE6052

HOLE NO. TP17-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE									
TOPSOIL 0.05						0	106.32		
FILL: Brown silty clay, some orgnaics, trace gravel and brick		G	1			1	105.32		
		G	2			2	104.32		
2.40		G	3						
Very stiff, brown **SILTY CLAY,** trace sand 2.70									
End of Test Pit									

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)
○ Lower Explosive Limit %
20 40 60 80
100 200 300 400 500
RKI Eagle Rdg. (ppm)
▲ Full Gas Resp. △ Methane Elim.

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 14, 2023

FILE NO. PE6052

HOLE NO. TP18-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE									
TOPSOIL 0.05						0	104.97		
FILL: Topsoil with silty clay, trace organics and gravel		G	1						
		G	2			1	103.97		
1.40									
Very stiff to hard, brown **SILTY CLAY,** trace sand and gravel 1.60		G	3						
End of Test Pit									

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)
○ Lower Explosive Limit %
20 40 60 80
100 200 300 400 500
RKI Eagle Rdg. (ppm)
▲ Full Gas Resp. △ Methane Elim.

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 14, 2023

FILE NO. PE6052

HOLE NO. TP19-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
TOPSOIL 0.05							
FILL: Topsoil, trace silty clay, organics, crushed stone, sand and cobbles		G	1			0	104.48
		G	2			1	103.48
1.40							
Stiff to very stiff, brown **SILTY CLAY,** trace sand 1.50		G	3				
End of Test Pit							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)
○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)
▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator **DATE** April 17, 2023

FILE NO. PE6052

HOLE NO. TP20-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
TOPSOIL 0.05						0	105.17
FILL: Topsoil, some organics, trace clay, occasional cobbles		G	1			1	104.17
		G	2			2	103.17
2.40							
Very stiff, brown **SILTY CLAY,** trace sand 2.60		G	3				
End of Test Pit							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)
○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)
▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Sorting Facility - 1400 Upper Canada Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

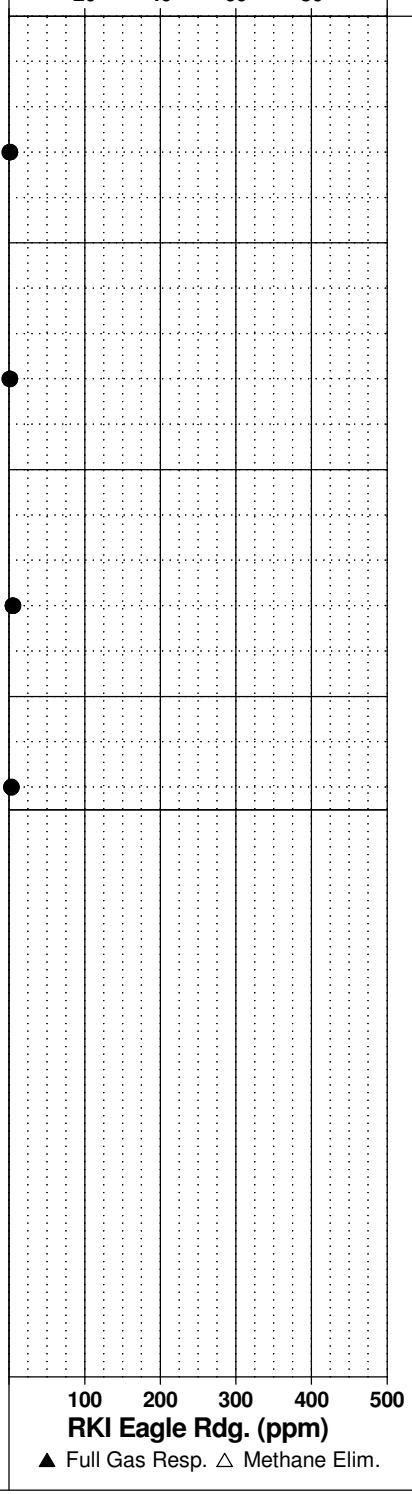
BORINGS BY Excavator **DATE** April 17, 2023

FILE NO. PE6052

HOLE NO. TP21-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	106.88
TOPSOIL 0.05		G	1			1	105.88
FILL: Brown silty sand to sandy silt, trace organics, occasional cobbles		G	2			2	104.88
		G	3			3	103.88
3.30							
Very stiff, light brown to grey **CLAYEY SILT to SILTY CLAY,** trace sand 3.50		G	4				
End of Test Pit							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)
○ **Lower Explosive Limit %**



Monitoring Well Construction

TABLE 1		CLIENT: Paterson Group Consulting Engineers								
PARACEL LABORATORIES LTD.		ATTENTION: Mike Beaudoin								
WORKORDER: 2316216		PROJECT: PE6052								
REPORT DATE: 04/24/2023		REFERENCE: Standing Offer								

Parameter	Units	MDL	Regulation	TP1-23-G1 2316216-01	TP1-23-G2 2316216-02	TP2-23-G1 2316216-03	TP3-23-G1 2316216-04	TP3-23-G2 2316216-05	TP4-23-G2 2316216-06	TP5-23-G2 2316216-07	TP5-23-G4 2316216-08
Sample Date (m/d/y)			Reg 153/04 (2011)-Table 1 Residential	04/17/2023 09:00 AM	04/17/2023 09:00 AM	04/17/2023 09:00 AM	04/17/2023 09:00 AM	04/17/2023 09:00 AM	04/17/2023 09:00 AM	04/17/2023 09:00 AM	04/17/2023 09:00 AM
Physical Characteristics											
% Solids	% by Wt.	0.1		76.0	74.8	76.6	81.2	81.5	83.5	78.8	76.7
General Inorganics											
SAR	N/A	0.01	2.4 N/A	0.15	0.15	0.07	0.10	0.16	0.18	0.18	0.15
Conductivity	uS/cm	5	0.57 mS/cm (570 uS/cm)	111	98	127	206	212	434	227	231
pH	pH Units	0.05		7.15	N/A	N/A	N/A	N/A	N/A	N/A	7.12
Metals											
Antimony	ug/g dry	1.0	1.3 ug/g dry	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Arsenic	ug/g dry	1.0	18 ug/g dry	3.0	4.9	2.4	2.0	1.7	2.1	1.8	2.5
Barium	ug/g dry	1.0	220 ug/g dry	353	383	261	101	142	179	100	254
Beryllium	ug/g dry	0.5	2.5 ug/g dry	1.0	1.0	0.8	0.5	0.5	0.6	0.5	0.7
Boron	ug/g dry	5.0	36 ug/g dry	7.2	7.6	5.9	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	6.3
Cadmium	ug/g dry	0.5	1.2 ug/g dry	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Chromium	ug/g dry	5.0	70 ug/g dry	63.5	69.4	42.6	18.8	22.0	26.5	21.1	42.4
Cobalt	ug/g dry	1.0	21 ug/g dry	16.3	20.9	11.0	5.8	6.6	7.5	6.1	11.0
Copper	ug/g dry	5.0	92 ug/g dry	24.4	29.6	21.1	19.0	13.0	13.0	11.2	25.2
Lead	ug/g dry	1.0	120 ug/g dry	6.3	6.5	6.1	5.2	4.4	5.5	4.7	6.2
Molybdenum	ug/g dry	1.0	2 ug/g dry	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Nickel	ug/g dry	5.0	82 ug/g dry	33.1	34.9	22.2	9.6	11.4	13.5	11.4	21.6
Selenium	ug/g dry	1.0	1.5 ug/g dry	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Silver	ug/g dry	0.3	0.5 ug/g dry	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)
Thallium	ug/g dry	1.0	1 ug/g dry	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Uranium	ug/g dry	1.0	2.5 ug/g dry	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Vanadium	ug/g dry	10.0	86 ug/g dry	74.1	82.6	49.8	30.0	32.4	37.5	32.1	53.8
Zinc	ug/g dry	20.0	290 ug/g dry	89.5	98.0	71.7	39.2	38.0	47.7	37.4	75.9
Volatiles											
Benzene	ug/g dry	0.02	0.02 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Ethylbenzene	ug/g dry	0.05	0.05 ug/g dry	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Toluene	ug/g dry	0.05	0.2 ug/g dry	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
m/p-Xylene	ug/g dry	0.05		ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
o-Xylene	ug/g dry	0.05		ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Xylenes, total	ug/g dry	0.05	0.05 ug/g dry	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Hydrocarbons											
F1 PHCs (C6-C10)	ug/g dry	7	25 ug/g dry	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)
F2 PHCs (C10-C16)	ug/g dry	4	10 ug/g dry	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)
F3 PHCs (C16-C34)	ug/g dry	8	240 ug/g dry	ND (8)	ND (8)	23	31	30	34	35	19
F4 PHCs (C34-C50)	ug/g dry	6	120 ug/g dry	ND (6)	ND (6)	11	32	30	41	27	23
F4G PHCs (gravimetric)	ug/g dry	50	120 ug/g dry	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Semi-Volatiles											
Acenaphthene	ug/g dry	0.02	0.072 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Acenaphthylene	ug/g dry	0.02	0.093 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Anthracene	ug/g dry	0.02	0.16 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Benzo[a]anthracene	ug/g dry	0.02	0.36 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Benzo[a]pyrene	ug/g dry	0.02	0.3 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Benzo[b]fluoranthene	ug/g dry	0.02	0.47 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Benzo[g,h,i]perylene	ug/g dry	0.02	0.68 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Benzo[k]fluoranthene	ug/g dry	0.02	0.48 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Chrysene	ug/g dry	0.02	2.8 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Dibenzo[a,h]anthracene	ug/g dry	0.02	0.1 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Fluoranthene	ug/g dry	0.02	0.56 ug/g dry	0.03	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Fluorene	ug/g dry	0.02	0.12 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Indeno [1,2,3-cd] pyrene	ug/g dry	0.02	0.23 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
1-Methylnaphthalene	ug/g dry	0.02	0.59 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
2-Methylnaphthalene	ug/g dry	0.02	0.59 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Methylnaphthalene (1&2)	ug/g dry	0.04	0.59 ug/g dry	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)
Naphthalene	ug/g dry	0.01	0.09 ug/g dry	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Phenanthrene	ug/g dry	0.02	0.69 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Pyrene	ug/g dry	0.02	1 ug/g dry	0.02	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)

								Sample				
TP6-23-G4	**TP7-23-G4**	**TP8-23-G2**	**TP8-23-G4**	**TP9-23-G1**	**TP10-23-G2**	**TP11-23-G1**	**TP12-23-G3**	**TP13-23-G1**	**TP13-23-G4**	**TP14-23-G3**	**TP14-23-G4**	**TP15-23-G2**
2316216-09	**2316216-10**	**2316216-11**	**2316216-12**	**2316216-13**	**2316216-14**	**2316216-15**	**2316216-16**	**2316216-17**	**2316216-18**	**2316216-19**	**2316216-20**	**2316216-21**
04/17/2023 09:00 AM	**04/17/2023 09:00 AM**	**04/17/2023 09:00 AM**	**04/17/2023 09:00 AM**	**04/17/2023 09:00 AM**	**04/14/2023 09:00 AM**	**04/14/2023 09:00 AM**	**04/14/2023 09:00 AM**	**04/14/2023 09:00 AM**	**04/14/2023 09:00 AM**	**04/14/2023 09:00 AM**	**04/14/2023 09:00 AM**	**04/14/2023 09:00 AM**
73.9	80.0	85.2	81.4	78.1	79.8	82.7	84.4	83.5	82.1	79.8	81.2	84.2
0.30	0.08	0.20	0.16	0.07	0.08	0.09	0.32	0.28	0.31	0.31	0.33	0.71
198	175	244	168	109	207	119	375	299	290	236	159	338
6.61	N/A	N/A	N/A	N/A	N/A	N/A	7.23	7.27	N/A	N/A	7.25	N/A
ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1.5	1.9	1.7	2.3	2.2	1.8	2.2	1.6	2.0	2.3	2.1	2.0	2.3
62.2	90.9	81.7	361	329	117	326	136	169	378	204	266	124
ND (0.5)	ND (0.5)	ND (0.5)	0.9	0.9	ND (0.5)	0.8	ND (0.5)	ND (0.5)	0.8	0.6	0.6	ND (0.5)
ND (5.0)	ND (5.0)	ND (5.0)	6.7	7.1	5.1	6.7	ND (5.0)	5.4	6.3	5.9	ND (5.0)	ND (5.0)
ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
13.1	17.0	15.5	56.2	48.2	23.7	46.4	22.6	26.3	47.7	36.5	41.8	26.8
4.0	4.9	4.8	14.6	12.6	6.5	12.5	6.2	7.2	13.3	9.1	11.3	6.6
12.8	21.8	10.4	21.0	27.3	16.2	18.9	19.7	17.1	18.0	16.0	12.8	13.1
5.1	4.9	3.8	6.6	6.5	7.3	7.2	4.6	5.4	6.0	6.9	4.7	11.5
ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
6.2	8.4	7.6	28.9	25.3	13.0	24.0	12.0	14.3	24.9	18.3	22.6	14.1
ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)
ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
21.8	28.2	27.8	63.2	54.1	30.6	53.4	30.4	36.9	57.3	45.7	49.3	33.8
28.5	34.4	28.0	87.1	89.5	43.3	82.0	43.8	45.3	74.6	61.7	61.0	48.4
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)
ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)
43	44	28	12	22	52	28	33	34	ND (8)	19	ND (8)	25
52	42	20	19	26	168	90	78	88	ND (6)	28	ND (6)	37
N/A	N/A	N/A	N/A	N/A	326	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.04
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.03
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.04
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.02
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.03
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.04
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.03	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.09
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.03
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.02
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.03
ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	0.05
ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	0.08
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.10
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.03	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.07

TP16-23-G1 2316216-22	TP17-23-G2 2316216-23	TP18-23-G1 2316216-24	TP19-23-G2 2316216-25	TP19-23-G3 2316216-26	TP20-23-G1 2316216-27	TP20-23-G2 2316216-28	TP21-23-G1 2316216-29	TP21-23-G4 2316216-30	DUP1 2316216-31	DUP2 2316216-32	DUP3 2316216-33
04/14/2023 09:00 AM	04/14/2023 09:00 AM	04/14/2023 09:00 AM	04/14/2023 09:00 AM	04/14/2023 09:00 AM	04/17/2023 09:00 AM	04/17/2023 09:00 AM	04/17/2023 09:00 AM	04/17/2023 09:00 AM	04/14/2023 09:00 AM	04/14/2023 09:00 AM	04/17/2023 09:00 AM
84.3	82.8	80.8	82.8	73.4	79.9	81.6	77.8	75.4	82.1	82.1	75.6
0.20	0.75	0.13	0.16	0.18	0.09	0.21	0.08	0.24	0.35	0.16	0.17
166	224	133	346	132	192	376	204	133	160	358	107
N/A	N/A	N/A	7.20	N/A	N/A	N/A	7.23	N/A	N/A	N/A	N/A
ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1.7	1.9	1.7	1.7	2.3	1.8	1.8	1.3	2.1	2.2	1.5	2.9
132	184	171	119	299	126	211	42.7	320	291	106	325
ND (0.5)	0.5	0.5	ND (0.5)	0.8	ND (0.5)	ND (0.5)	ND (0.5)	0.8	0.7	ND (0.5)	0.8
ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	7.7	ND (5.0)	ND (5.0)	ND (5.0)	5.7	5.1	ND (5.0)	6.2
ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
23.5	27.7	28.4	18.5	59.8	24.9	30.4	9.9	50.6	45.6	16.4	58.0
6.6	8.3	7.7	5.4	14.2	6.7	8.6	3.1	13.4	12.0	4.8	15.0
13.8	12.5	15.4	11.0	26.2	11.4	14.4	ND (5.0)	24.2	14.7	10.1	23.2
3.2	5.2	5.9	4.7	5.6	4.7	4.9	4.1	5.1	4.9	4.3	6.2
ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
13.0	14.3	13.8	9.6	32.2	12.9	16.2	ND (5.0)	27.0	24.6	8.8	30.8
ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)
ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
35.0	38.3	37.9	27.9	67.2	33.5	39.8	18.1	56.9	52.2	25.6	68.6
35.5	49.4	50.6	39.2	85.0	41.4	52.8	ND (20.0)	77.7	67.8	34.2	83.0
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)
ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)
ND (8)	18	16	38	ND (8)	25	29	12	ND (8)	ND (8)	30	13
ND (6)	29	19	83	ND (6)	40	52	24	ND (6)	ND (6)	50	17
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)
ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)

TABLE 1		CLIENT: Paterson Group Consulting Engineers								
PARACEL LABORATORIES LTD.		ATTENTION: Mike Beaudoin								
WORKORDER: 2316216		PROJECT: PE6052								
REPORT DATE: 04/24/2023		REFERENCE: Standing Offer								

Parameter	Units	MDL	Regulation	TP1-23-G1 2316216-01	TP1-23-G2 2316216-02	TP2-23-G1 2316216-03	TP3-23-G1 2316216-04	TP3-23-G2 2316216-05	TP4-23-G2 2316216-06	TP5-23-G2 2316216-07	TP5-23-G4 2316216-08
Sample Date (m/d/y)			Reg 406/19-Table 2.1 Residential/Parkland/Institutional	04/17/2023 09:00 AM	04/17/2023 09:00 AM	04/17/2023 09:00 AM	04/17/2023 09:00 AM	04/17/2023 09:00 AM	04/17/2023 09:00 AM	04/17/2023 09:00 AM	04/17/2023 09:00 AM
Physical Characteristics											
% Solids	% by Wt.	0.1		76.0	74.8	76.6	81.2	81.5	83.5	78.8	76.7
General Inorganics											
SAR	N/A	0.01	5 N/A	0.15	0.15	0.07	0.10	0.16	0.18	0.18	0.15
Conductivity	uS/cm	5	0.7 mS/cm (700 uS/cm)	111	98	127	206	212	434	227	231
pH	pH Units	0.05	5 pH units (5 pH Units)	7.15	N/A	N/A	N/A	N/A	N/A	N/A	7.12
Metals											
Antimony	ug/g dry	1.0	7.5 ug/g dry	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Arsenic	ug/g dry	1.0	18 ug/g dry	3.0	4.9	2.4	2.0	1.7	2.1	1.8	2.5
Barium	ug/g dry	1.0	390 ug/g dry	353	383	261	101	142	179	100	254
Beryllium	ug/g dry	0.5	4 ug/g dry	1.0	1.0	0.8	0.5	0.5	0.6	0.5	0.7
Boron	ug/g dry	5.0	120 ug/g dry	7.2	7.6	5.9	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	6.3
Cadmium	ug/g dry	0.5	1.2 ug/g dry	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Chromium	ug/g dry	5.0	160 ug/g dry	63.5	69.4	42.6	18.8	22.0	26.5	21.1	42.4
Cobalt	ug/g dry	1.0	22 ug/g dry	16.3	20.9	11.0	5.8	6.6	7.5	6.1	11.0
Copper	ug/g dry	5.0	140 ug/g dry	24.4	29.6	21.1	19.0	13.0	13.0	11.2	25.2
Lead	ug/g dry	1.0	120 ug/g dry	6.3	6.5	6.1	5.2	4.4	5.5	4.7	6.2
Molybdenum	ug/g dry	1.0	6.9 ug/g dry	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Nickel	ug/g dry	5.0	100 ug/g dry	33.1	34.9	22.2	9.6	11.4	13.5	11.4	21.6
Selenium	ug/g dry	1.0	2.4 ug/g dry	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Silver	ug/g dry	0.3	20 ug/g dry	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)
Thallium	ug/g dry	1.0	1 ug/g dry	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Uranium	ug/g dry	1.0	23 ug/g dry	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Vanadium	ug/g dry	10.0	86 ug/g dry	74.1	82.6	49.8	30.0	32.4	37.5	32.1	53.8
Zinc	ug/g dry	20.0	340 ug/g dry	89.5	98.0	71.7	39.2	38.0	47.7	37.4	75.9
Volatiles											
Benzene	ug/g dry	0.02	0.02 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Ethylbenzene	ug/g dry	0.05	0.05 ug/g dry	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Toluene	ug/g dry	0.05	0.2 ug/g dry	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
m/p-Xylene	ug/g dry	0.05		ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
o-Xylene	ug/g dry	0.05		ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Xylenes, total	ug/g dry	0.05	0.091 ug/g dry	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Hydrocarbons											
F1 PHCs (C6-C10)	ug/g dry	7	25 ug/g dry	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)
F2 PHCs (C10-C16)	ug/g dry	4	10 ug/g dry	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)
F3 PHCs (C16-C34)	ug/g dry	8	240 ug/g dry	ND (8)	ND (8)	23	31	30	34	35	19
F4 PHCs (C34-C50)	ug/g dry	6	2800 ug/g dry	ND (6)	ND (6)	11	32	30	41	27	23
F4G PHCs (gravimetric)	ug/g dry	50	2800 ug/g dry	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Semi-Volatiles											
Acenaphthene	ug/g dry	0.02	2.5 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Acenaphthylene	ug/g dry	0.02	0.093 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Anthracene	ug/g dry	0.02	0.16 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Benzo[a]anthracene	ug/g dry	0.02	0.5 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Benzo[a]pyrene	ug/g dry	0.02	0.31 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Benzo[b]fluoranthene	ug/g dry	0.02	3.2 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Benzo[g,h,i]perylene	ug/g dry	0.02	6.6 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Benzo[k]fluoranthene	ug/g dry	0.02	3.1 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Chrysene	ug/g dry	0.02	7 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Dibenzo[a,h]anthracene	ug/g dry	0.02	0.57 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Fluoranthene	ug/g dry	0.02	0.69 ug/g dry	0.03	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Fluorene	ug/g dry	0.02	6.8 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Indeno [1,2,3-cd] pyrene	ug/g dry	0.02	0.38 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
1-Methylnaphthalene	ug/g dry	0.02	0.59 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
2-Methylnaphthalene	ug/g dry	0.02	0.59 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Methylnaphthalene (1&2)	ug/g dry	0.04	0.59 ug/g dry	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)
Naphthalene	ug/g dry	0.01	0.2 ug/g dry	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Phenanthrene	ug/g dry	0.02	6.2 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Pyrene	ug/g dry	0.02	28 ug/g dry	0.02	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)

								Sample				
TP6-23-G4 **2316216-09**	**TP7-23-G4** **2316216-10**	**TP8-23-G2** **2316216-11**	**TP8-23-G4** **2316216-12**	**TP9-23-G1** **2316216-13**	**TP10-23-G2** **2316216-14**	**TP11-23-G1** **2316216-15**	**TP12-23-G3** **2316216-16**	**TP13-23-G1** **2316216-17**	**TP13-23-G4** **2316216-18**	**TP14-23-G3** **2316216-19**	**TP14-23-G4** **2316216-20**	**TP15-23-G2** **2316216-21**
04/17/2023 09:00 AM	**04/17/2023 09:00 AM**	**04/17/2023 09:00 AM**	**04/17/2023 09:00 AM**	**04/17/2023 09:00 AM**	**04/14/2023 09:00 AM**	**04/14/2023 09:00 AM**	**04/14/2023 09:00 AM**	**04/14/2023 09:00 AM**	**04/14/2023 09:00 AM**	**04/14/2023 09:00 AM**	**04/14/2023 09:00 AM**	**04/14/2023 09:00 AM**
73.9	80.0	85.2	81.4	78.1	79.8	82.7	84.4	83.5	82.1	79.8	81.2	84.2
0.30	0.08	0.20	0.16	0.07	0.08	0.09	0.32	0.28	0.31	0.31	0.33	0.71
198	175	244	168	109	207	119	375	299	290	236	159	338
6.61	N/A	N/A	N/A	N/A	N/A	N/A	7.23	7.27	N/A	N/A	7.25	N/A
ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1.5	1.9	1.7	2.3	2.2	1.8	2.2	1.6	2.0	2.3	2.1	2.0	2.3
62.2	90.9	81.7	361	329	117	326	136	169	378	204	266	124
ND (0.5)	ND (0.5)	ND (0.5)	0.9	0.9	ND (0.5)	0.8	ND (0.5)	ND (0.5)	0.8	0.6	0.6	ND (0.5)
ND (5.0)	ND (5.0)	ND (5.0)	6.7	7.1	5.1	6.7	ND (5.0)	5.4	6.3	5.9	ND (5.0)	ND (5.0)
ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
13.1	17.0	15.5	56.2	48.2	23.7	46.4	22.6	26.3	47.7	36.5	41.8	26.8
4.0	4.9	4.8	14.6	12.6	6.5	12.5	6.2	7.2	13.3	9.1	11.3	6.6
12.8	21.8	10.4	21.0	27.3	16.2	18.9	19.7	17.1	18.0	16.0	12.8	13.1
5.1	4.9	3.8	6.6	6.5	7.3	7.2	4.6	5.4	6.0	6.9	4.7	11.5
ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
6.2	8.4	7.6	28.9	25.3	13.0	24.0	12.0	14.3	24.9	18.3	22.6	14.1
ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)
ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
21.8	28.2	27.8	63.2	54.1	30.6	53.4	30.4	36.9	57.3	45.7	49.3	33.8
28.5	34.4	28.0	87.1	89.5	43.3	82.0	43.8	45.3	74.6	61.7	61.0	48.4
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)
ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)
43	44	28	12	22	52	28	33	34	ND (8)	19	ND (8)	25
52	42	20	19	26	168	90	78	88	ND (6)	28	ND (6)	37
N/A	N/A	N/A	N/A	N/A	326	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.04
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.03
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.04
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.02
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.03
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.04
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.03	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.09
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.03
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.02
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.03
ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	0.05
ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	0.08
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.10
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.03	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.07

TP16-23-G1 2316216-22	**TP17-23-G2 2316216-23**	**TP18-23-G1 2316216-24**	**TP19-23-G2 2316216-25**	**TP19-23-G3 2316216-26**	**TP20-23-G1 2316216-27**	**TP20-23-G2 2316216-28**	**TP21-23-G1 2316216-29**	**TP21-23-G4 2316216-30**	**DUP1 2316216-31**	**DUP2 2316216-32**	**DUP3 2316216-33**
04/14/2023 09:00 AM	**04/14/2023 09:00 AM**	**04/14/2023 09:00 AM**	**04/14/2023 09:00 AM**	**04/14/2023 09:00 AM**	**04/17/2023 09:00 AM**	**04/17/2023 09:00 AM**	**04/17/2023 09:00 AM**	**04/17/2023 09:00 AM**	**04/14/2023 09:00 AM**	**04/14/2023 09:00 AM**	**04/17/2023 09:00 AM**
84.3	82.8	80.8	82.8	73.4	79.9	81.6	77.8	75.4	82.1	82.1	75.6
0.20	0.75	0.13	0.16	0.18	0.09	0.21	0.08	0.24	0.35	0.16	0.17
166	224	133	346	132	192	376	204	133	160	358	107
N/A	N/A	N/A	7.20	N/A	N/A	N/A	7.23	N/A	N/A	N/A	N/A
ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1.7	1.9	1.7	1.7	2.3	1.8	1.8	1.3	2.1	2.2	1.5	2.9
132	184	171	119	299	126	211	42.7	320	291	106	325
ND (0.5)	0.5	0.5	ND (0.5)	0.8	ND (0.5)	ND (0.5)	ND (0.5)	0.8	0.7	ND (0.5)	0.8
ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	7.7	ND (5.0)	ND (5.0)	ND (5.0)	5.7	5.1	ND (5.0)	6.2
ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
23.5	27.7	28.4	18.5	59.8	24.9	30.4	9.9	50.6	45.6	16.4	58.0
6.6	8.3	7.7	5.4	14.2	6.7	8.6	3.1	13.4	12.0	4.8	15.0
13.8	12.5	15.4	11.0	26.2	11.4	14.4	ND (5.0)	24.2	14.7	10.1	23.2
3.2	5.2	5.9	4.7	5.6	4.7	4.9	4.1	5.1	4.9	4.3	6.2
ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
13.0	14.3	13.8	9.6	32.2	12.9	16.2	ND (5.0)	27.0	24.6	8.8	30.8
ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)
ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
35.0	38.3	37.9	27.9	67.2	33.5	39.8	18.1	56.9	52.2	25.6	68.6
35.5	49.4	50.6	39.2	85.0	41.4	52.8	ND (20.0)	77.7	67.8	34.2	83.0
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)
ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)
ND (8)	18	16	38	ND (8)	25	29	12	ND (8)	ND (8)	30	13
ND (6)	29	19	83	ND (6)	40	52	24	ND (6)	ND (6)	50	17
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)
ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)

PARACEL LABORATORIES LTD.
TRUSTED. RESPONSIVE. RELIABLE.

300 - 2319 St. Laurent Blvd
Ottawa, ON, K1G 4J8
1-800-749-1947
www.paracellabs.com

Certificate of Analysis

Paterson Group Consulting Engineers

9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Mike Beaudoin

Client PO: 57275
Project: PE6052
Custody:

Report Date: 24-Apr-2023
Order Date: 18-Apr-2023

Order #: 2316216

This Certificate of Analysis contains analytical data applicable to the following samples as submitted :

Paracel ID	Client ID
2316216-01	TP1-23-G1
2316216-02	TP1-23-G2
2316216-03	TP2-23-G1
2316216-04	TP3-23-G1
2316216-05	TP3-23-G2
2316216-06	TP4-23-G2
2316216-07	TP5-23-G2
2316216-08	TP5-23-G4
2316216-09	TP6-23-G4
2316216-10	TP7-23-G4
2316216-11	TP8-23-G2
2316216-12	TP8-23-G4
2316216-13	TP9-23-G1
2316216-14	TP10-23-G2
2316216-15	TP11-23-G1
2316216-16	TP12-23-G3
2316216-17	TP13-23-G1
2316216-18	TP13-23-G4
2316216-19	TP14-23-G3
2316216-20	TP14-23-G4
2316216-21	TP15-23-G2
2316216-22	TP16-23-G1
2316216-23	TP17-23-G2
2316216-24	TP18-23-G1
2316216-25	TP19-23-G2
2316216-26	TP19-23-G3
2316216-27	TP20-23-G1
2316216-28	TP20-23-G2
2316216-29	TP21-23-G1
2316216-30	TP21-23-G4

Approved By:

Dale Robertson, BSc
Laboratory Director

2316216-31	DUP1
2316216-32	DUP2
2316216-33	DUP3

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Client PO: **57275**

Report Date: 24-Apr-2023

Order Date: 18-Apr-2023

Project Description: PE6052

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	20-Apr-23	20-Apr-23
Conductivity	MOE E3138 - probe @25 °C, water ext	20-Apr-23	21-Apr-23
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	18-Apr-23	20-Apr-23
PHC F1	CWS Tier 1 - P&T GC-FID	20-Apr-23	20-Apr-23
PHC F4G (gravimetric)	CWS Tier 1 - Extraction Gravimetric	24-Apr-23	24-Apr-23
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	19-Apr-23	21-Apr-23
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	20-Apr-23	21-Apr-23
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	19-Apr-23	21-Apr-23
SAR	Calculated	21-Apr-23	21-Apr-23
Solids, %	CWS Tier 1 - Gravimetric	19-Apr-23	20-Apr-23

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Client PO: **57275**

Report Date: 24-Apr-2023

Order Date: 18-Apr-2023

Project Description: PE6052

	Client ID:	TP1-23-G1	TP1-23-G2	TP2-23-G1	TP3-23-G1
	Sample Date:	17-Apr-23 09:00	17-Apr-23 09:00	17-Apr-23 09:00	17-Apr-23 09:00
	Sample ID:	2316216-01	2316216-02	2316216-03	2316216-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	76.0	74.8	76.6	81.2
General Inorganics					
SAR	0.01 N/A	0.15	0.15	0.07	0.10
Conductivity	5 uS/cm	111	98	127	206
pH	0.05 pH Units	7.15	-	-	-
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Arsenic	1.0 ug/g dry	3.0	4.9	2.4	2.0
Barium	1.0 ug/g dry	353	383	261	101
Beryllium	0.5 ug/g dry	1.0	1.0	0.8	0.5
Boron	5.0 ug/g dry	7.2	7.6	5.9	<5.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5.0 ug/g dry	63.5	69.4	42.6	18.8
Cobalt	1.0 ug/g dry	16.3	20.9	11.0	5.8
Copper	5.0 ug/g dry	24.4	29.6	21.1	19.0
Lead	1.0 ug/g dry	6.3	6.5	6.1	5.2
Molybdenum	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Nickel	5.0 ug/g dry	33.1	34.9	22.2	9.6
Selenium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	<0.3
Thallium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Uranium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Vanadium	10.0 ug/g dry	74.1	82.6	49.8	30.0
Zinc	20.0 ug/g dry	89.5	98.0	71.7	39.2
Volatiles					
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
o-Xylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene-d8	Surrogate	116%	117%	118%	115%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Client PO: **57275**

Report Date: 24-Apr-2023

Order Date: 18-Apr-2023

Project Description: PE6052

	Client ID:	TP1-23-G1	TP1-23-G2	TP2-23-G1	TP3-23-G1
	Sample Date:	17-Apr-23 09:00	17-Apr-23 09:00	17-Apr-23 09:00	17-Apr-23 09:00
	Sample ID:	2316216-01	2316216-02	2316216-03	2316216-04
	MDL/Units	Soil	Soil	Soil	Soil
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	23 [2]	31 [2]
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	11 [2]	32 [2]
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Acenaphthylene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [a] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [a] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Chrysene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Fluoranthene	0.02 ug/g dry	0.03	<0.02	<0.02	<0.02
Fluorene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
2-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	<0.04	<0.04	<0.04
Naphthalene	0.01 ug/g dry	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Pyrene	0.02 ug/g dry	0.02	<0.02	<0.02	<0.02
2-Fluorobiphenyl	Surrogate	98.4%	87.7%	99.1%	75.3%
Terphenyl-d14	Surrogate	111%	91.3%	106%	61.3%

PARACEL LABORATORIES LTD.

Order #: 2316216

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 57275

Report Date: 24-Apr-2023

Order Date: 18-Apr-2023

Project Description: PE6052

	Client ID:	TP3-23-G2	TP4-23-G2	TP5-23-G2	TP5-23-G4
	Sample Date:	17-Apr-23 09:00	17-Apr-23 09:00	17-Apr-23 09:00	17-Apr-23 09:00
	Sample ID:	2316216-05	2316216-06	2316216-07	2316216-08
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	81.5	83.5	78.8	76.7
General Inorganics					
SAR	0.01 N/A	0.16	0.18	0.18	0.15
Conductivity	5 uS/cm	212	434	227	231
pH	0.05 pH Units	-	-	-	7.12
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Arsenic	1.0 ug/g dry	1.7	2.1	1.8	2.5
Barium	1.0 ug/g dry	142	179	100	254
Beryllium	0.5 ug/g dry	0.5	0.6	0.5	0.7
Boron	5.0 ug/g dry	<5.0	<5.0	<5.0	6.3
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5.0 ug/g dry	22.0	26.5	21.1	42.4
Cobalt	1.0 ug/g dry	6.6	7.5	6.1	11.0
Copper	5.0 ug/g dry	13.0	13.0	11.2	25.2
Lead	1.0 ug/g dry	4.4	5.5	4.7	6.2
Molybdenum	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Nickel	5.0 ug/g dry	11.4	13.5	11.4	21.6
Selenium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	<0.3
Thallium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Uranium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Vanadium	10.0 ug/g dry	32.4	37.5	32.1	53.8
Zinc	20.0 ug/g dry	38.0	47.7	37.4	75.9
Volatiles					
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
o-Xylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene-d8	Surrogate	116%	114%	120%	121%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Client PO: **57275**

Report Date: 24-Apr-2023

Order Date: 18-Apr-2023

Project Description: PE6052

	Client ID:	TP3-23-G2	TP4-23-G2	TP5-23-G2	TP5-23-G4
	Sample Date:	17-Apr-23 09:00	17-Apr-23 09:00	17-Apr-23 09:00	17-Apr-23 09:00
	Sample ID:	2316216-05	2316216-06	2316216-07	2316216-08
	MDL/Units	Soil	Soil	Soil	Soil
F3 PHCs (C16-C34)	8 ug/g dry	30 [2]	34 [2]	35 [2]	19 [2]
F4 PHCs (C34-C50)	6 ug/g dry	30 [2]	41 [2]	27 [2]	23 [2]
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Acenaphthylene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [a] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [a] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Chrysene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Fluorene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
2-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	<0.04	<0.04	<0.04
Naphthalene	0.01 ug/g dry	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
2-Fluorobiphenyl	Surrogate	67.3%	82.9%	74.7%	70.7%
Terphenyl-d14	Surrogate	60.3%	67.7%	112%	53.3%

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Client PO: **57275**

Report Date: 24-Apr-2023

Order Date: 18-Apr-2023

Project Description: PE6052

	Client ID:	TP6-23-G4	TP7-23-G4	TP8-23-G2	TP8-23-G4
	Sample Date:	17-Apr-23 09:00	17-Apr-23 09:00	17-Apr-23 09:00	17-Apr-23 09:00
	Sample ID:	2316216-09	2316216-10	2316216-11	2316216-12
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	73.9	80.0	85.2	81.4
General Inorganics					
SAR	0.01 N/A	0.30	0.08	0.20	0.16
Conductivity	5 uS/cm	198	175	244	168
pH	0.05 pH Units	6.61	-	-	-
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Arsenic	1.0 ug/g dry	1.5	1.9	1.7	2.3
Barium	1.0 ug/g dry	62.2	90.9	81.7	361
Beryllium	0.5 ug/g dry	<0.5	<0.5	<0.5	0.9
Boron	5.0 ug/g dry	<5.0	<5.0	<5.0	6.7
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5.0 ug/g dry	13.1	17.0	15.5	56.2
Cobalt	1.0 ug/g dry	4.0	4.9	4.8	14.6
Copper	5.0 ug/g dry	12.8	21.8	10.4	21.0
Lead	1.0 ug/g dry	5.1	4.9	3.8	6.6
Molybdenum	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Nickel	5.0 ug/g dry	6.2	8.4	7.6	28.9
Selenium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	<0.3
Thallium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Uranium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Vanadium	10.0 ug/g dry	21.8	28.2	27.8	63.2
Zinc	20.0 ug/g dry	28.5	34.4	28.0	87.1
Volatiles					
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
o-Xylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene-d8	Surrogate	122%	118%	114%	116%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Client PO: **57275**

Report Date: 24-Apr-2023

Order Date: 18-Apr-2023

Project Description: PE6052

	Client ID:	TP6-23-G4	TP7-23-G4	TP8-23-G2	TP8-23-G4
	Sample Date:	17-Apr-23 09:00	17-Apr-23 09:00	17-Apr-23 09:00	17-Apr-23 09:00
	Sample ID:	2316216-09	2316216-10	2316216-11	2316216-12
	MDL/Units	Soil	Soil	Soil	Soil
F3 PHCs (C16-C34)	8 ug/g dry	43 [2]	44 [2]	28 [2]	12 [2]
F4 PHCs (C34-C50)	6 ug/g dry	52 [2]	42 [2]	20 [2]	19 [2]
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Acenaphthylene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [a] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [a] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Chrysene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Fluorene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
2-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	<0.04	<0.04	<0.04
Naphthalene	0.01 ug/g dry	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
2-Fluorobiphenyl	Surrogate	66.1%	74.0%	74.7%	97.3%
Terphenyl-d14	Surrogate	55.5%	93.2%	104%	85.3%

Certificate of Analysis

Report Date: 24-Apr-2023

Client: Paterson Group Consulting Engineers

Order Date: 18-Apr-2023

Client PO: 57275

Project Description: PE6052

	Client ID:	TP9-23-G1	TP10-23-G2	TP11-23-G1	TP12-23-G3
	Sample Date:	17-Apr-23 09:00	14-Apr-23 09:00	14-Apr-23 09:00	14-Apr-23 09:00
	Sample ID:	2316216-13	2316216-14	2316216-15	2316216-16
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	78.1	79.8	82.7	84.4
General Inorganics					
SAR	0.01 N/A	0.07	0.08	0.09	0.32
Conductivity	5 uS/cm	109	207	119	375
pH	0.05 pH Units	-	-	-	7.23
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Arsenic	1.0 ug/g dry	2.2	1.8	2.2	1.6
Barium	1.0 ug/g dry	329	117	326	136
Beryllium	0.5 ug/g dry	0.9	<0.5	0.8	<0.5
Boron	5.0 ug/g dry	7.1	5.1	6.7	<5.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5.0 ug/g dry	48.2	23.7	46.4	22.6
Cobalt	1.0 ug/g dry	12.6	6.5	12.5	6.2
Copper	5.0 ug/g dry	27.3	16.2	18.9	19.7
Lead	1.0 ug/g dry	6.5	7.3	7.2	4.6
Molybdenum	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Nickel	5.0 ug/g dry	25.3	13.0	24.0	12.0
Selenium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	<0.3
Thallium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Uranium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Vanadium	10.0 ug/g dry	54.1	30.6	53.4	30.4
Zinc	20.0 ug/g dry	89.5	43.3	82.0	43.8
Volatiles					
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
o-Xylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene-d8	Surrogate	120%	118%	114%	114%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Client PO: **57275**

Report Date: 24-Apr-2023

Order Date: 18-Apr-2023

Project Description: PE6052

	Client ID:	TP9-23-G1	TP10-23-G2	TP11-23-G1	TP12-23-G3
	Sample Date:	17-Apr-23 09:00	14-Apr-23 09:00	14-Apr-23 09:00	14-Apr-23 09:00
	Sample ID:	2316216-13	2316216-14	2316216-15	2316216-16
	MDL/Units	Soil	Soil	Soil	Soil
F3 PHCs (C16-C34)	8 ug/g dry	22 [2]	52 [2]	28 [2]	33 [2]
F4 PHCs (C34-C50)	6 ug/g dry	26 [2]	168 [1] [2]	90 [2]	78 [2]
F4G PHCs (gravimetric)	50 ug/g dry	-	326	-	-
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Acenaphthylene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [a] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [a] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Chrysene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Fluoranthene	0.02 ug/g dry	<0.02	0.03	<0.02	<0.02
Fluorene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
2-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	<0.04	<0.04	<0.04
Naphthalene	0.01 ug/g dry	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Pyrene	0.02 ug/g dry	<0.02	0.03	<0.02	<0.02
2-Fluorobiphenyl	Surrogate	83.0%	102%	87.8%	93.0%
Terphenyl-d14	Surrogate	109%	108%	86.8%	106%

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Client PO: **57275**

Report Date: 24-Apr-2023

Order Date: 18-Apr-2023

Project Description: PE6052

	Client ID:	TP13-23-G1	TP13-23-G4	TP14-23-G3	TP14-23-G4
	Sample Date:	14-Apr-23 09:00	14-Apr-23 09:00	14-Apr-23 09:00	14-Apr-23 09:00
	Sample ID:	2316216-17	2316216-18	2316216-19	2316216-20
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	83.5	82.1	79.8	81.2
General Inorganics					
SAR	0.01 N/A	0.28	0.31	0.31	0.33
Conductivity	5 uS/cm	299	290	236	159
pH	0.05 pH Units	7.27	-	-	7.25
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Arsenic	1.0 ug/g dry	2.0	2.3	2.1	2.0
Barium	1.0 ug/g dry	169	378	204	266
Beryllium	0.5 ug/g dry	<0.5	0.8	0.6	0.6
Boron	5.0 ug/g dry	5.4	6.3	5.9	<5.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5.0 ug/g dry	26.3	47.7	36.5	41.8
Cobalt	1.0 ug/g dry	7.2	13.3	9.1	11.3
Copper	5.0 ug/g dry	17.1	18.0	16.0	12.8
Lead	1.0 ug/g dry	5.4	6.0	6.9	4.7
Molybdenum	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Nickel	5.0 ug/g dry	14.3	24.9	18.3	22.6
Selenium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	<0.3
Thallium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Uranium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Vanadium	10.0 ug/g dry	36.9	57.3	45.7	49.3
Zinc	20.0 ug/g dry	45.3	74.6	61.7	61.0
Volatiles					
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
o-Xylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene-d8	Surrogate	116%	116%	119%	116%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Client PO: **57275**

Report Date: 24-Apr-2023

Order Date: 18-Apr-2023

Project Description: PE6052

	Client ID:	TP13-23-G1	TP13-23-G4	TP14-23-G3	TP14-23-G4
	Sample Date:	14-Apr-23 09:00	14-Apr-23 09:00	14-Apr-23 09:00	14-Apr-23 09:00
	Sample ID:	2316216-17	2316216-18	2316216-19	2316216-20
	MDL/Units	Soil	Soil	Soil	Soil
F3 PHCs (C16-C34)	8 ug/g dry	34 [2]	<8	19 [2]	<8
F4 PHCs (C34-C50)	6 ug/g dry	88 [2]	<6	28 [2]	<6
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Acenaphthylene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [a] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [a] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Chrysene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Fluorene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
2-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	<0.04	<0.04	<0.04
Naphthalene	0.01 ug/g dry	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
2-Fluorobiphenyl	Surrogate	88.7%	90.4%	86.0%	69.1%
Terphenyl-d14	Surrogate	97.9%	80.9%	105%	98.5%

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Client PO: **57275**

Report Date: 24-Apr-2023

Order Date: 18-Apr-2023

Project Description: PE6052

	Client ID:	TP15-23-G2	TP16-23-G1	TP17-23-G2	TP18-23-G1
	Sample Date:	14-Apr-23 09:00	14-Apr-23 09:00	14-Apr-23 09:00	14-Apr-23 09:00
	Sample ID:	2316216-21	2316216-22	2316216-23	2316216-24
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	84.2	84.3	82.8	80.8
General Inorganics					
SAR	0.01 N/A	0.71	0.20	0.75	0.13
Conductivity	5 uS/cm	338	166	224	133
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Arsenic	1.0 ug/g dry	2.3	1.7	1.9	1.7
Barium	1.0 ug/g dry	124	132	184	171
Beryllium	0.5 ug/g dry	<0.5	<0.5	0.5	0.5
Boron	5.0 ug/g dry	<5.0	<5.0	<5.0	<5.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5.0 ug/g dry	26.8	23.5	27.7	28.4
Cobalt	1.0 ug/g dry	6.6	6.6	8.3	7.7
Copper	5.0 ug/g dry	13.1	13.8	12.5	15.4
Lead	1.0 ug/g dry	11.5	3.2	5.2	5.9
Molybdenum	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Nickel	5.0 ug/g dry	14.1	13.0	14.3	13.8
Selenium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	<0.3
Thallium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Uranium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Vanadium	10.0 ug/g dry	33.8	35.0	38.3	37.9
Zinc	20.0 ug/g dry	48.4	35.5	49.4	50.6
Volatiles					
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
o-Xylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene-d8	Surrogate	116%	116%	117%	116%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	25 [2]	<8	18 [2]	16 [2]

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Client PO: **57275**

Report Date: 24-Apr-2023

Order Date: 18-Apr-2023

Project Description: PE6052

	Client ID:	TP15-23-G2	TP16-23-G1	TP17-23-G2	TP18-23-G1
	Sample Date:	14-Apr-23 09:00	14-Apr-23 09:00	14-Apr-23 09:00	14-Apr-23 09:00
	Sample ID:	2316216-21	2316216-22	2316216-23	2316216-24
	MDL/Units	Soil	Soil	Soil	Soil
F4 PHCs (C34-C50)	6 ug/g dry	37 [2]	<6	29 [2]	19 [2]
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Acenaphthylene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [a] anthracene	0.02 ug/g dry	0.04	<0.02	<0.02	<0.02
Benzo [a] pyrene	0.02 ug/g dry	0.03	<0.02	<0.02	<0.02
Benzo [b] fluoranthene	0.02 ug/g dry	0.04	<0.02	<0.02	<0.02
Benzo [g,h,i] perylene	0.02 ug/g dry	0.02	<0.02	<0.02	<0.02
Benzo [k] fluoranthene	0.02 ug/g dry	0.03	<0.02	<0.02	<0.02
Chrysene	0.02 ug/g dry	0.04	<0.02	<0.02	<0.02
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Fluoranthene	0.02 ug/g dry	0.09	<0.02	<0.02	<0.02
Fluorene	0.02 ug/g dry	0.03	<0.02	<0.02	<0.02
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	0.02	<0.02	<0.02	<0.02
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
2-Methylnaphthalene	0.02 ug/g dry	0.03	<0.02	<0.02	<0.02
Methylnaphthalene (1&2)	0.04 ug/g dry	0.05	<0.04	<0.04	<0.04
Naphthalene	0.01 ug/g dry	0.08	<0.01	<0.01	<0.01
Phenanthrene	0.02 ug/g dry	0.10	<0.02	<0.02	<0.02
Pyrene	0.02 ug/g dry	0.07	<0.02	<0.02	<0.02
2-Fluorobiphenyl	Surrogate	93.7%	75.8%	81.2%	60.3%
Terphenyl-d14	Surrogate	111%	93.9%	92.9%	73.8%

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Client PO: **57275**

Report Date: 24-Apr-2023

Order Date: 18-Apr-2023

Project Description: PE6052

	Client ID:	TP19-23-G2	TP19-23-G3	TP20-23-G1	TP20-23-G2
	Sample Date:	14-Apr-23 09:00	14-Apr-23 09:00	17-Apr-23 09:00	17-Apr-23 09:00
	Sample ID:	2316216-25	2316216-26	2316216-27	2316216-28
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	82.8	73.4	79.9	81.6
General Inorganics					
SAR	0.01 N/A	0.16	0.18	0.09	0.21
Conductivity	5 uS/cm	346	132	192	376
pH	0.05 pH Units	7.20	-	-	-
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Arsenic	1.0 ug/g dry	1.7	2.3	1.8	1.8
Barium	1.0 ug/g dry	119	299	126	211
Beryllium	0.5 ug/g dry	<0.5	0.8	<0.5	<0.5
Boron	5.0 ug/g dry	<5.0	7.7	<5.0	<5.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5.0 ug/g dry	18.5	59.8	24.9	30.4
Cobalt	1.0 ug/g dry	5.4	14.2	6.7	8.6
Copper	5.0 ug/g dry	11.0	26.2	11.4	14.4
Lead	1.0 ug/g dry	4.7	5.6	4.7	4.9
Molybdenum	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Nickel	5.0 ug/g dry	9.6	32.2	12.9	16.2
Selenium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	<0.3
Thallium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Uranium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Vanadium	10.0 ug/g dry	27.9	67.2	33.5	39.8
Zinc	20.0 ug/g dry	39.2	85.0	41.4	52.8
Volatiles					
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
o-Xylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene-d8	Surrogate	116%	119%	118%	116%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	38 [2]	<8	25 [2]	29 [2]

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Client PO: **57275**

Report Date: 24-Apr-2023

Order Date: 18-Apr-2023

Project Description: PE6052

	Client ID:	TP19-23-G2	TP19-23-G3	TP20-23-G1	TP20-23-G2
	Sample Date:	14-Apr-23 09:00	14-Apr-23 09:00	17-Apr-23 09:00	17-Apr-23 09:00
	Sample ID:	2316216-25	2316216-26	2316216-27	2316216-28
	MDL/Units	Soil	Soil	Soil	Soil
F4 PHCs (C34-C50)	6 ug/g dry	83 [2]	<6	40 [2]	52 [2]
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Acenaphthylene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [a] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [a] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Chrysene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Fluorene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
2-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	<0.04	<0.04	<0.04
Naphthalene	0.01 ug/g dry	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
2-Fluorobiphenyl	Surrogate	84.3%	108%	117%	119%
Terphenyl-d14	Surrogate	97.1%	130%	123%	134%

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Client PO: **57275**

Report Date: 24-Apr-2023

Order Date: 18-Apr-2023

Project Description: PE6052

	Client ID:	TP21-23-G1	TP21-23-G4	DUP1	DUP2
	Sample Date:	17-Apr-23 09:00	17-Apr-23 09:00	14-Apr-23 09:00	14-Apr-23 09:00
	Sample ID:	2316216-29	2316216-30	2316216-31	2316216-32
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	77.8	75.4	82.1	82.1
General Inorganics					
SAR	0.01 N/A	0.08	0.24	0.35	0.16
Conductivity	5 uS/cm	204	133	160	358
pH	0.05 pH Units	7.23	-	-	-
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Arsenic	1.0 ug/g dry	1.3	2.1	2.2	1.5
Barium	1.0 ug/g dry	42.7	320	291	106
Beryllium	0.5 ug/g dry	<0.5	0.8	0.7	<0.5
Boron	5.0 ug/g dry	<5.0	5.7	5.1	<5.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5.0 ug/g dry	9.9	50.6	45.6	16.4
Cobalt	1.0 ug/g dry	3.1	13.4	12.0	4.8
Copper	5.0 ug/g dry	<5.0	24.2	14.7	10.1
Lead	1.0 ug/g dry	4.1	5.1	4.9	4.3
Molybdenum	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Nickel	5.0 ug/g dry	<5.0	27.0	24.6	8.8
Selenium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	<0.3
Thallium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Uranium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Vanadium	10.0 ug/g dry	18.1	56.9	52.2	25.6
Zinc	20.0 ug/g dry	<20.0	77.7	67.8	34.2
Volatiles					
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
o-Xylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene-d8	Surrogate	119%	121%	118%	115%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Client PO: **57275**

Report Date: 24-Apr-2023

Order Date: 18-Apr-2023

Project Description: PE6052

	Client ID:	TP21-23-G1	TP21-23-G4	DUP1	DUP2
	Sample Date:	17-Apr-23 09:00	17-Apr-23 09:00	14-Apr-23 09:00	14-Apr-23 09:00
	Sample ID:	2316216-29	2316216-30	2316216-31	2316216-32
	MDL/Units	Soil	Soil	Soil	Soil
F3 PHCs (C16-C34)	8 ug/g dry	12 [2]	<8	<8	30 [2]
F4 PHCs (C34-C50)	6 ug/g dry	24 [2]	<6	<6	50 [2]
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Acenaphthylene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [a] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [a] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Chrysene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Fluorene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
2-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	<0.04	<0.04	<0.04
Naphthalene	0.01 ug/g dry	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
2-Fluorobiphenyl	Surrogate	110%	86.6%	82.6%	80.6%
Terphenyl-d14	Surrogate	126%	111%	102%	93.8%

Certificate of Analysis

Report Date: 24-Apr-2023

Client: Paterson Group Consulting Engineers

Order Date: 18-Apr-2023

Client PO: 57275

Project Description: PE6052

	Client ID:	DUP3	-	-	-
	Sample Date:	17-Apr-23 09:00	-	-	-
	Sample ID:	2316216-33	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	75.6	-	-	-
General Inorganics					
SAR	0.01 N/A	0.17	-	-	-
Conductivity	5 uS/cm	107	-	-	-
Metals					
Antimony	1.0 ug/g dry	<1.0	-	-	-
Arsenic	1.0 ug/g dry	2.9	-	-	-
Barium	1.0 ug/g dry	325	-	-	-
Beryllium	0.5 ug/g dry	0.8	-	-	-
Boron	5.0 ug/g dry	6.2	-	-	-
Cadmium	0.5 ug/g dry	<0.5	-	-	-
Chromium	5.0 ug/g dry	58.0	-	-	-
Cobalt	1.0 ug/g dry	15.0	-	-	-
Copper	5.0 ug/g dry	23.2	-	-	-
Lead	1.0 ug/g dry	6.2	-	-	-
Molybdenum	1.0 ug/g dry	<1.0	-	-	-
Nickel	5.0 ug/g dry	30.8	-	-	-
Selenium	1.0 ug/g dry	<1.0	-	-	-
Silver	0.3 ug/g dry	<0.3	-	-	-
Thallium	1.0 ug/g dry	<1.0	-	-	-
Uranium	1.0 ug/g dry	<1.0	-	-	-
Vanadium	10.0 ug/g dry	68.6	-	-	-
Zinc	20.0 ug/g dry	83.0	-	-	-
Volatiles					
Benzene	0.02 ug/g dry	<0.02	-	-	-
Ethylbenzene	0.05 ug/g dry	<0.05	-	-	-
Toluene	0.05 ug/g dry	<0.05	-	-	-
m,p-Xylenes	0.05 ug/g dry	<0.05	-	-	-
o-Xylene	0.05 ug/g dry	<0.05	-	-	-
Xylenes, total	0.05 ug/g dry	<0.05	-	-	-
Toluene-d8	Surrogate	121%	-	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	-	-	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	-	-	-
F3 PHCs (C16-C34)	8 ug/g dry	13 [2]	-	-	-
F4 PHCs (C34-C50)	6 ug/g dry	17 [2]	-	-	-

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Client PO: **57275**

Report Date: 24-Apr-2023

Order Date: 18-Apr-2023

Project Description: PE6052

	Client ID:	DUP3	-	-	-
	Sample Date:	17-Apr-23 09:00	-	-	-
	Sample ID:	2316216-33	-	-	-
	MDL/Units	Soil	-	-	-
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	-	-	-
Acenaphthylene	0.02 ug/g dry	<0.02	-	-	-
Anthracene	0.02 ug/g dry	<0.02	-	-	-
Benzo [a] anthracene	0.02 ug/g dry	<0.02	-	-	-
Benzo [a] pyrene	0.02 ug/g dry	<0.02	-	-	-
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	-	-	-
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	-	-	-
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	-	-	-
Chrysene	0.02 ug/g dry	<0.02	-	-	-
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	-	-	-
Fluoranthene	0.02 ug/g dry	<0.02	-	-	-
Fluorene	0.02 ug/g dry	<0.02	-	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	-	-	-
1-Methylnaphthalene	0.02 ug/g dry	<0.02	-	-	-
2-Methylnaphthalene	0.02 ug/g dry	<0.02	-	-	-
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	-	-	-
Naphthalene	0.01 ug/g dry	<0.01	-	-	-
Phenanthrene	0.02 ug/g dry	<0.02	-	-	-
Pyrene	0.02 ug/g dry	<0.02	-	-	-
2-Fluorobiphenyl	Surrogate	99.5%	-	-	-
Terphenyl-d14	Surrogate	115%	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Conductivity	ND	5	uS/cm						
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
F4G PHCs (gravimetric)	ND	50	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g						
Acenaphthylene	ND	0.02	ug/g						
Anthracene	ND	0.02	ug/g						
Benzo [a] anthracene	ND	0.02	ug/g						
Benzo [a] pyrene	ND	0.02	ug/g						
Benzo [b] fluoranthene	ND	0.02	ug/g						
Benzo [g,h,i] perylene	ND	0.02	ug/g						
Benzo [k] fluoranthene	ND	0.02	ug/g						
Chrysene	ND	0.02	ug/g						
Dibenzo [a,h] anthracene	ND	0.02	ug/g						
Fluoranthene	ND	0.02	ug/g						
Fluorene	ND	0.02	ug/g						
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g						
1-Methylnaphthalene	ND	0.02	ug/g						
2-Methylnaphthalene	ND	0.02	ug/g						
Methylnaphthalene (1&2)	ND	0.04	ug/g						
Naphthalene	ND	0.01	ug/g						
Phenanthrene	ND	0.02	ug/g						
Pyrene	ND	0.02	ug/g						
Surrogate: 2-Fluorobiphenyl	*1.11*		*ug/g*		*82.9*	*50-140*			
Surrogate: Terphenyl-d14	*1.10*		*ug/g*		*82.7*	*50-140*			
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*8.19*		*ug/g*		*102*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	0.15	0.01	N/A	0.15			0.0	30	
Conductivity	113	5	uS/cm	111			1.8	5	
pH	7.16	0.05	pH Units	7.20			0.6	2.3	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g	ND			NC	40	
F2 PHCs (C10-C16)	ND	4	ug/g	ND			NC	30	
F3 PHCs (C16-C34)	28	8	ug/g	34			18.6	30	
F4 PHCs (C34-C50)	13	6	ug/g	59			NC	30	
F4G PHCs (gravimetric)	1270	50	ug/g	1090			15.0	30	
Metals									
Antimony	ND	1.0	ug/g	ND			NC	30	
Arsenic	4.5	1.0	ug/g	4.7			4.2	30	
Barium	59.5	1.0	ug/g	66.0			10.4	30	
Beryllium	0.7	0.5	ug/g	ND			NC	30	
Boron	5.3	5.0	ug/g	ND			NC	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium	22.0	5.0	ug/g	23.4			6.5	30	
Cobalt	7.3	1.0	ug/g	8.0			9.3	30	
Copper	13.3	5.0	ug/g	14.4			8.0	30	
Lead	18.2	1.0	ug/g	19.5			7.1	30	
Molybdenum	1.7	1.0	ug/g	1.8			4.2	30	
Nickel	15.1	5.0	ug/g	16.4			8.5	30	
Selenium	ND	1.0	ug/g	ND			NC	30	
Silver	ND	0.3	ug/g	ND			NC	30	
Thallium	ND	1.0	ug/g	ND			NC	30	
Uranium	ND	1.0	ug/g	ND			NC	30	
Vanadium	23.8	10.0	ug/g	25.7			7.9	30	
Zinc	49.5	20.0	ug/g	54.0			8.8	30	
Physical Characteristics									
% Solids	75.9	0.1	% by Wt.	76.0			0.2	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g	ND			NC	40	
Acenaphthylene	0.141	0.02	ug/g	0.209			38.4	40	
Anthracene	0.088	0.02	ug/g	0.116			27.8	40	
Benzo [a] anthracene	0.262	0.02	ug/g	0.334			24.4	40	
Benzo [a] pyrene	0.302	0.02	ug/g	0.490			47.3	40	QR-04
Benzo [b] fluoranthene	0.303	0.02	ug/g	0.561			59.7	40	QR-04
Benzo [g,h,i] perylene	0.202	0.02	ug/g	0.267			27.5	40	
Benzo [k] fluoranthene	0.170	0.02	ug/g	0.318			60.7	40	QR-04
Chrysene	0.309	0.02	ug/g	0.312			1.0	40	
Dibenzo [a,h] anthracene	0.062	0.02	ug/g	0.095			41.4	40	QR-04
Fluoranthene	0.370	0.02	ug/g	0.283			26.4	40	
Fluorene	ND	0.02	ug/g	ND			NC	40	
Indeno [1,2,3-cd] pyrene	0.187	0.02	ug/g	0.272			36.9	40	
1-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
2-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
Naphthalene	ND	0.01	ug/g	ND			NC	40	
Phenanthrene	0.066	0.02	ug/g	0.043			41.6	40	QR-04
Pyrene	0.359	0.02	ug/g	0.430			18.0	40	
Surrogate: 2-Fluorobiphenyl	*1.45*		*ug/g*		*95.2*	*50-140*			
Surrogate: Terphenyl-d14	*1.51*		*ug/g*		*99.2*	*50-140*			
Volatiles									
Benzene	ND	0.02	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Client PO: **57275**

Report Date: 24-Apr-2023

Order Date: 18-Apr-2023

Project Description: PE6052

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
m,p-Xylenes	ND	0.05	ug/g	ND			NC	50	
o-Xylene	ND	0.05	ug/g	ND			NC	50	
Surrogate: Toluene-d8	*11.2*		*ug/g*		*114*	*50-140*			

Certificate of Analysis
Client: **Paterson Group Consulting Engineers**
Client PO: **57275**

Report Date: 24-Apr-2023
Order Date: 18-Apr-2023
Project Description: PE6052

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	166	7	ug/g	ND	82.9	80-120			
F2 PHCs (C10-C16)	121	4	ug/g	ND	132	60-140			
F3 PHCs (C16-C34)	345	8	ug/g	34	139	60-140			
F4 PHCs (C34-C50)	235	6	ug/g	59	125	60-140			
F4G PHCs (gravimetric)	1050	50	ug/g	ND	105	80-120			
Metals									
Arsenic	47.1	1.0	ug/g	1.9	90.5	70-130			
Barium	70.8	1.0	ug/g	26.4	88.7	70-130			
Beryllium	49.0	0.5	ug/g	ND	97.5	70-130			
Boron	48.3	5.0	ug/g	ND	92.8	70-130			
Cadmium	45.8	0.5	ug/g	ND	91.4	70-130			
Chromium	56.3	5.0	ug/g	9.4	93.9	70-130			
Cobalt	49.2	1.0	ug/g	3.2	91.9	70-130			
Copper	50.0	5.0	ug/g	5.8	88.5	70-130			
Lead	50.7	1.0	ug/g	7.8	85.8	70-130			
Molybdenum	45.9	1.0	ug/g	ND	90.4	70-130			
Nickel	51.7	5.0	ug/g	6.6	90.2	70-130			
Selenium	46.1	1.0	ug/g	ND	91.8	70-130			
Silver	42.1	0.3	ug/g	ND	84.2	70-130			
Thallium	47.2	1.0	ug/g	ND	94.2	70-130			
Uranium	45.2	1.0	ug/g	ND	89.9	70-130			
Vanadium	56.7	10.0	ug/g	10.3	92.8	70-130			
Zinc	62.6	20.0	ug/g	21.6	81.9	70-130			
Semi-Volatiles									
Acenaphthene	0.192	0.02	ug/g	ND	101	50-140			
Acenaphthylene	0.190	0.02	ug/g	ND	93.8	50-140			
Anthracene	0.197	0.02	ug/g	ND	97.3	50-140			
Benzo [a] anthracene	0.184	0.02	ug/g	ND	90.6	50-140			
Benzo [a] pyrene	0.187	0.02	ug/g	ND	92.4	50-140			
Benzo [b] fluoranthene	0.279	0.02	ug/g	ND	137	50-140			
Benzo [g,h,i] perylene	0.186	0.02	ug/g	ND	91.4	50-140			
Benzo [k] fluoranthene	0.268	0.02	ug/g	ND	132	50-140			
Chrysene	0.207	0.02	ug/g	ND	102	50-140			
Dibenzo [a,h] anthracene	0.209	0.02	ug/g	ND	103	50-140			
Fluoranthene	0.174	0.02	ug/g	ND	85.9	50-140			
Fluorene	0.196	0.02	ug/g	ND	96.5	50-140			
Indeno [1,2,3-cd] pyrene	0.193	0.02	ug/g	ND	95.3	50-140			
1-Methylnaphthalene	0.206	0.02	ug/g	ND	101	50-140			
2-Methylnaphthalene	0.220	0.02	ug/g	ND	108	50-140			
Naphthalene	0.239	0.01	ug/g	ND	118	50-140			
Phenanthrene	0.180	0.02	ug/g	ND	88.8	50-140			
Pyrene	0.173	0.02	ug/g	ND	85.3	50-140			
Surrogate: 2-Fluorobiphenyl	*1.81*		*ug/g*		*111*	*50-140*			
Surrogate: Terphenyl-d14	*1.88*		*ug/g*		*116*	*50-140*			
Volatiles									
Benzene	3.99	0.02	ug/g	ND	99.7	60-130			
Ethylbenzene	4.00	0.05	ug/g	ND	100	60-130			
Toluene	4.10	0.05	ug/g	ND	102	60-130			

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Client PO: **57275**

Report Date: 24-Apr-2023

Order Date: 18-Apr-2023

Project Description: PE6052

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
m,p-Xylenes	7.77	0.05	ug/g	ND	97.1	60-130			
o-Xylene	3.95	0.05	ug/g	ND	98.7	60-130			
Surrogate: Toluene-d8	*8.00*		*ug/g*		*100*	*50-140*			

Qualifier Notes:

Sample Qualifiers :

1 : GC-FID signal did not return to baseline by C50

2 : Some peak(s) in the GC-FID Chromatogram are not typical of petroleum hydrocarbon distillates. May be the result of high concentrations of non-mineral based compounds not completely removed by the method cleanup. Results may be biased high.

QC Qualifiers :

QR-04 Duplicate results exceeds RPD limits due to non-homogeneous matrix.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.
NC: Not Calculated

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC crite
- When reported, data for F4G has been processed using a silica gel cleanup.

PARACEL LABORATORIES LTD. | T R R

Paracel ID: 2316216

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)

Client Name: Paterson Group
Contact Name: Mike Beaudoin
Address: 9 Auriga Drive
Telephone: 613-226-7381

Project Ref: PE6052
Quote #:
PO #: 57275
E-mail: MBeaudoin@patersongroup.ca

Page 1 of 4

Turnaround Time
☐ 1 day ☐ 3 day
☐ 2 day ☒ Regular
Date Required:

☒ REG 153/04 ☐ REG 406/19

Other Regulation: ☐ REG 558 ☐ PWQO ☐ CCME ☐ MISA ☐ SU - Sani ☐ SU - Storm ☐ Mun: ☐ Other:

☐ Table 1 ☐ Res/Park ☐ Med/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☐ Table 3 ☐ Agri/Other
☐ Table
For RSC: ☐ Yes ☐ No

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	EC/SAR	pH				
1	TP1-23-G1	S		2	April 17/23		X		X	X				X	X				
2	TP1-23-G2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓					
3	TP2-23-G1																		
4	TP3-23-G1																		
5	TP3-23-G2																		
6	TP4-23-G2																		
7	TP5-23-G2																		
8	TP5-23-G4																		
9	TP6-23-G4			↓											X				
10	TP7-23-G4	↓		3	↓		↓		↓	↓				↓	X				

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Joshua Dorgay	Date/Time: 18/04/23 1512	Date/Time: 18/04/23 1557	Date/Time: 18/04/23 412
Date/Time: April 18/2023	Temperature: °C	Temperature: 8.1	pH Verified: ☐ By:

PARACEL LABORATORIES LTD. | T R R

Paracel ID: 2316216

Paracel Order Number (Lab Use Only)	**Chain Of Custody** (Lab Use Only)

Client Name: Paterson Group
Contact Name: Mike Beaudoin
Address: 9 Auriga Drive
Telephone: 613-226-7381

Project Ref: PE6052
Quote #:
PO #: 57275
E-mail: mbeaudoin@patersongroup.ca

Page 2 of 4

Turnaround Time
☐ 1 day ☐ 3 day
☐ 2 day ☒ Regular
Date Required:

☒ REG 153/04 ☐ REG 406/19

☐ Table 1 ☐ Res/Park ☐ Med/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☐ Table 3 ☐ Agri/Other
☐ Table
For RSC: ☐ Yes ☐ No

Other Regulation
☐ REG 558 ☐ PWQO
☐ CCME ☐ MISA
☐ SU - Sani ☐ SU - Storm
Mun:
☐ Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	EC/SAR	pH				
1	TP8-23-G2	S		3	April 17/23		X		X	X				X					
2	TP8-23-G4	↓		↓	↓		↓		↓	↓				↓					
3	TP9-23-G1			↓	↓														
4	TP10-23-G2			2	April 14/23														
5	TP11-23-G1																		
6	TP12-23-G3																		
7	TP13-23-G1														X				
8	TP13-23-G4														X				
9	TP14-23-G3																		
10	TP14-23-G4	↓		↓	↓		↓		↓	↓				↓	X				

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign):	Received By Driver/Depot: A. TEQUE	Received at Lab:	Verified By:
Relinquished By (Print): Joshua Dayney	Date/Time: 18/04/23 1512	Date/Time: 18/04/23 1557	Date/Time: 18/04/23 4:12
Date/Time: April 18/2023	Temperature: °C	Temperature: 8.1	pH Verified: ☐ By:

PARACEL LABORATORIES LTD.

Paracel ID: 2316216

Paracel Order Number (Lab Use Only)	**Chain Of Custody** (Lab Use Only)

Client Name: Paterson Group
Contact Name: Mike Beaudoin
Address: 9 Auriga Drive
Telephone: 613-226-7381

Project Ref: PE6052
Quote #:
PO #: 57275
E-mail: mbeaudoin@patersongroup.ca

Turnaround Time
☐ 1 day ☐ 3 day
☐ 2 day ☒ Regular
Date Required:

☒ REG 153/04 ☐ REG 406/19

☐ Table 1 ☐ Res/Park ☐ Med/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☐ Table 3 ☐ Agri/Other
☐ Table
For RSC: ☐ Yes ☐ No

Other Regulation
☐ REG 558 ☐ PWQO
☐ CCME ☐ MISA
☐ SU - Sani ☐ SU - Storm
Mun:
☐ Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	EC/SAR					
		Required Analysis																	
1	TP15-23-G2	S			April 14/23		X		X	X				X					
2	TP16-23-G1	↓			↓		↓		↓	↓				↓					
3	TP17-23-G2																		
4	TP18-23-G1																		
5	TP19-23-G2														X				
6	TP19-23-G3				↓														
7	TP20-23-G1				April 17/23														
8	TP20-23-G2				↓														
9	TP21-23-G1														X				
10	TP21-23-G4	↓			↓		↓		↓	↓				↓					

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign):	Received By Driver/Depot: M. Trouse	Received at Lab:	Verified By:
Relinquished By (Print): Joshua Dempsey	Date/Time: 18/04/23 1512	Date/Time: 18/04/23 1557	Date/Time: 18/04/23 412
Date/Time: April 18/2023	Temperature: °C	Temperature: 8.1	pH Verified: ☐ By:

PARACEL LABORATORIES LTD.

Paracel ID: 2316216

Paracel Order Number (Lab Use Only)	**Chain Of Custody** (Lab Use Only)

Client Name: Paterson Group
Contact Name: Mike Beaudoin
Address: 9 Auriga Drive
Telephone: 613-226-7381

Project Ref: PE6052
Quote #:
PO #: 57275
E-mail: mbeaudoin@patersongroup.ca

Page 1 of 1

Turnaround Time
☐ 1 day ☐ 3 day
☐ 2 day ☒ Regular
Date Required:

☒ REG 153/04 ☐ REG 406/19

Other Regulation: ☐ Table 1 ☐ Res/Park ☐ Med/Fine ☐ Table 2 ☐ Ind/Comm ☐ Coarse ☐ Table 3 ☐ Agri/Other ☐ Table — For RSC: ☐ Yes ☐ No
☐ REG 558 ☐ PWQO ☐ CCME ☐ MISA ☐ SU - Sani ☐ SU - Storm Mun: ☐ Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	EC/SAR				
1	DUP1	S		2	April 14/23		X		X	X				X				
2	DUP2	↓		↓	↓		↓		↓	↓				↓				
3	DUP3	↓		2	April 17/23		↓		↓	↓				↓				
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Joshua Dempsey	Date/Time: 18/04/23 1512	Date/Time: 18/04/23 1557	Date/Time: 18/04/23 417
Date/Time: April 18/2023	Temperature: °C	Temperature: 8.1	pH Verified: ☐ By: