

Geotechnical Design Report for Building Permit Application CHEO 1Door4care Parking Garage

Client Name: EllisDon Date: August 21, 2023 File: 36182

Suite 103, 2010 Winston Park Drive, Oakville, Ontario L6H 5R7 | Phone: (905) 829-8666



TABLE OF CONTENTS

1.	INTRC	DUCTION1			
2.	BACKGROUND1				
3.	UNDE	UNDERSTANDING OF SUBSURFACE CONDITIONS			
4.	FOUN	DATION DESIGN RECOMMENDATIONS5			
	4.1	Foundation Excavation and Temporary Dewatering5			
	4.2	Site Preparation			
	4.3	Protection of Expansive Shale7			
	4.4	Engineered Fill Pad7			
	4.5	Foundation Design			
	4.6	Frost Depth 9			
	4.7	Slab-On-Grade and Raft Foundations9			
	4.8	Backfill to Structures and Lateral Earth Pressure10			
	4.9	Site Seismic Classification11			
	4.10	Cement Type11			
	4.11	Site Servicing12			
5.	CLOS	URE13			

STATEMENT OF LIMITATIONS AND CONDITIONS

IN-TEXT TABLES

Table 3.1: Approximate Depth and Elevation of Bedrock	2
Table 3.2: Groundwater Level Readings at the Site	3
Table 4.1: Foundation Design Options	8
Table 4.2: Recommended Geotechnical Resistances at ULS and SLS	8
Table 4.3: Lateral Earth Pressure Coefficients	11

APPENDICES

APPENDIX A

Borehole Location Plan (from GHD's) Report Record of Boreholes and Laboratory Test Results



1. INTRODUCTION

Thurber Engineering Ltd. (Thurber) has been retained by EllisDon to provide geotechnical input to the design of foundations for the proposed parking structure at the Children's Hospital for Eastern Ontario (CHEO) Campus.

It is a condition of this report that Thurber's performance of its professional services is subject to the attached Statement of Limitations and Conditions included in Appendix A.

Geo-environmental (chemical) aspects of the project including disposal excess soil/groundwater off site, consequences of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources, are outside our terms of reference for this project and are not addressed herein.

This report has been issued based on a review of the geotechnical investigations conducted by Infrastructure Ontario's engineer (GHD). The soil conditions may vary between and beyond the borehole locations, and accordingly geotechnical inspection during construction is important to assess any variation of subsurface conditions and to provide additional recommendations if necessitated by such variations.

The use of this report is contingent to ED obtaining a reliance letter from the owner (Infrastructure Ontario) for all the subsurface investigation report(s) provided by the owner and that the reliance letter will include Thurber in conjunction with ED.

It should be noted that Thurber accepts no responsibility for the accuracy and quality of the factual information presented by others.

2. BACKGROUND

Preliminary geotechnical investigations were conducted at the Site by GHD (Infrastructure Ontario's Consultant), the results of which were presented in a report titled "1Door4Care: CHEO Integrated Treatment Centre – Geotechnical Investigation Report (Parking Garage)" dated October 25, 2022.

The geotechnical investigations took place in two stages between January 12, 2021 and July 19, 2022. The scope of geotechnical investigation included advancing a total of 23 boreholes and 6 monitoring wells and geophysical survey using Ground Penetration Radar (GPR).



3. UNDERSTANDING OF SUBSURFACE CONDITIONS

A plan showing the location of the proposed structure at the site as well as the location of the boreholes and monitoring wells advanced at the site has been included in Appendix B. The record of borehole sheets along with the laboratory test results have been included in Appendix B.

The inferred subsurface conditions outlined in this report, have been inferred based on the record of boreholes presented in the above GHD's report.

In general, the subsurface conditions at the site consisted of asphalt over non-cohesive fill (predominantly gravelly sand/gravel/sandy gravel/silty sand to sand and gravel) which is in turn underlain by non-cohesive native soil (predominantly compact to dense gravelly sand/sand/silty sand/sand and gravel/sand and silt) over shale bedrock. The thickness of the fill at the site varied between 0.3 m and 0.8 m. The silty native soil extended to depths ranging from 0.6 m to 1.2 m below existing ground surface, and shale bedrock was encountered or inferred at depths ranging from 0.4 m to 1.2 m below existing ground surface.

Due to the method of investigation and the presence of highly weathered shale below native soil, the top of the bedrock profile cannot be accurately determined. However, the estimated depths to the highly weathered shale bedrock surface as well as estimated elevation of the competent shale bedrock from augering and coring or auger refusal at the location of each borehole at the site have been presented in the following table:

Borehole Identification Number	Estimated Depth/Elevation of Bedrock Surface (mbgs/m)	Estimated Elevation of Competent Bedrock Surface (m)
BH1-21	0.9 / 80.5	3.2 / 78.2*
BH2-21	1.1 / 80.2	2.8 / 78.6*
MW3-21	0.6 / 80.8	4.6 / 76.8
BH4-21	0.8 / 81.5	2.8 / 79.5*
MW5-21	0.4 / 81.4	-
MW6-21	1.2 / 80.9	3.5 / 78.7
BH7-21	0.8 / 81.5	2.5 / 79.7*
MW8-21	0.9 / 81.3	2.2 / 80.0*
B1-21	1.0 / 81.0	1.0 / 81.3*

Table 3.1: Approximate Depth and Elevation of Bedrock



Borehole Identification Number	Estimated Depth/Elevation of Bedrock Surface (mbgs/m)	Estimated Elevation of Competent Bedrock Surface (m)
B2-21	0.9 / 80.5	-
B3-21	1.2 / 80.9	-
MW9-22	0.8 / 81.2	2.6 / 79.4
BH10-22	0.7 / 81.5	1.2 / 80.9*
BH11-22	0.9 / 81.3	2.5 / 79.6
BH12-22	1.1 / 81.0	1.8 / 80.2*
BH13-22	1.0 / 81.2	1.9 / 80.2
BH14-22	0.7 / 81.5	1.2 / 81.0*
BH15-22	0.6 / 81.5	1.1 / 81.1*
BH16-22	0.9 / 81.2	1.2 / 80.9*
BH17-22	1.0 / 81.1	1.1 / 81.0*
BH18-22	0.8 / 81.3	1.4 / 80.7
BH19-22	0.9 / 80.2	-
MW20-22	1.0 / 80.2	1.6 / 79.6*

* Estimated Elevation due to Auger Refusal

The groundwater level measurements in the wells are summarized below:

Developeda	Ground Surface	Depth to	Groundwater	Main Screened
Borehole	Elev. (m)	Water (m)	Elev. (m)	Deposit
		2.7	78.7	
MW3-21	81.37	2.5	78.9	Weathered Shale
		2.6	78.8	
MW5-21	81.83	Dry	Dry	Gravelly Sand FILL/Weathered Shale
		3.0	79.2	
MW6-21	82.17	3.0	79.2	Shale
	02.17	3.1	79.1	Shale
		3.0	79.2	
		2.0	80.2	Shale

Table 3.2: Groundwater Level Readings at the Site



Borehole	Ground Surface Elev. (m)	Depth to Water (m)	Groundwater Elev. (m)	Main Screened Deposit
MW8-21	82.2	2.1	80.1	
		1.7	80.5	
		1.7	80.5	

The groundwater level will be subject to seasonal fluctuations and precipitation events and should be expected to be higher during wet seasons. Perched water may be present at higher levels within the existing fills and/or directly above the bedrock surface.



4. FOUNDATION DESIGN RECOMMENDATIONS

The discussions and preliminary design recommendations presented in this report are based on the information provided to us and on the factual data obtained as part of the investigations completed by GHD. These preliminary recommendations are subject to changes and modifications subject to completion of a supplemental geotechnical investigation (to be carried out during execution).

It is understood that the proposed structure includes an 8-storey building with no below-grade levels. The average top of ground elevation within the proposed building footprint is about Elev. 82.1 m, based on boreholes MH6-21, B2-21, MW9-22, and BH11-22 to BH18-22. The final grades of the lowest level of the proposed structure will be at about Elev. 82.8 m, and the structure will be supported on spread/square footings founded at about Elev. 81.0 m (where bedrock was found at the site).

The reference geotechnical report indicated that bedrock at the site is Shale of Georgian Bay formation which is the dominant bedrock formation in the Greater Toronto Area (GTA). However, a review of bedrock geology maps for Ottawa (MAP 1508A published by Geological Survey of Canada) indicates that the site is located at the border of Carlsbad and Billings Shale formations.

Although the Georgian Bay Shale formation presents some long-term swelling potential associated with changes in salinity, changes in groundwater regime, changes in in-situ stresses, etc., the Carlsbad and Billings Shale formations of Ottawa have not shown such behavior. However, the shale from the Billings Formation (which is likely to be encountered at the site, and to be confirmed as part of the supplemental investigation during the execution) is susceptible to heaving if allowed to weather in the presence of oxygen and moisture. The general mechanism is that oxidation of pyrite within the shale produces sulfuric acid, which in turn reacts with calcite in the shale to form gypsum crystals, which occupy a larger volume than the original materials. A by-product of this chain of reactions also tends to increase sulphate levels which can attack buried concrete structures.

4.1 Foundation Excavation and Temporary Dewatering

It is anticipated that the finished floor of the building will be at about Elev. 82.7 m and that the excavations will be extended to about Elev. 81.0 m. In general, the open-cut excavations will extend through non-cohesive fill (predominantly gravelly sand/gravel/sandy gravel/silty sand to sand and gravel), non-cohesive native soil (predominantly compact to dense gravelly



sand/sand/silty sand/sand and gravel/sand and silt) and shale bedrock. Groundwater is expected to be at or below the base of excavation.

Use of a hydraulic excavator should be suitable for trench excavation within the overburden soils. Provision should be made for handling and removal of asphalt and possible obstructions (i.e., cobbles and boulders) within the fill/soils.

All temporary excavations must be carried out in accordance with the current Occupational Health and Safety Act (OHSA) of Ontario and local regulations. Provided that the excavations are adequately dewatered, the overburden soils are classified as Type 3 above the groundwater level in accordance with the OHSA. Accordingly, excavations in the overburden above the groundwater level can be inclined at 1H:1V, or flatter.

Soil must not be stockpiled beside the excavation within a horizontal distance from the excavation wall equal to the depth of excavation.

Depending on the final elevation of the footings, bedrock removal may be necessary. It will be possible to remove the upper highly weathered portion of shale, to about 0.5 to 1.0 m depth using large hydraulic excavating equipment. Further shale bedrock removal could be accomplished using mechanical methods (such as hoe ramming); however, it is unlikely that removal of competent shale would be necessary for excavations with their base at or above Elev. 81 m.

Provided that the base of excavation is kept at or above Elev. 81 m, groundwater seepage into the excavation is expected to be handled by filtered sumps and drains.

4.2 Site Preparation

The existing fill and loose native soils founded at the site are not suitable for the support of foundations and floor slabs. These deposits, along with all existing foundations, floor slabs and utilities associated with the current site development, will need to be removed from beneath proposed foundations and slabs and from within the influence zone of the foundations and slabs. The influence zone includes the area beneath an imaginary line extending downward and outward from the edges of the proposed foundations/slabs at a 45 degrees angle down to undisturbed native soil or bedrock. Grades can be raised using Engineered Fill.



4.3 **Protection of Expansive Shale**

The shale bedrock at this site has the potential to swell following exposure to oxygen. The general mechanism is considered to be that pyrite (FeS2) which is present at low concentrations in the shale, is weathered in the combined presence of oxygen and water to form sulphuric acid.

That sulphuric acid then reacts with calcite, which is also present within the shale either as an integral part of the rock or as filling within fractures, to form gypsum. The gypsum crystals tend to form within existing fractures and to be volumetrically larger than the materials that formed them, thus resulting in heaving.

For the above reactions to occur there must be both water and oxygen available. An increase in the ground temperature, such as due to the heat from the parking vehicle, heated areas, etc., is also considered to promote the above reactions.

It is also possible for the products of the above reactions to attack the concrete (i.e., sulphate attack).

To help prevent expansion of the shale and/or reaction with the concrete, the shale must be protected from exposure to oxygen both in the long term as well as temporarily during construction adjacent to the existing building.

The shale bedrock subgrade, when exposed during construction, should be covered as soon as practical (within 12 hours) following the first exposure with a lean concrete layer at least 100 millimetres thick.

Construction planning should ensure the shale is not left exposed and uncovered overnight. Where shale is exposed on the sides of the excavation, the mud slab (with sulphate resistant cement) or shotcrete should be placed such that the concrete covers the shale to at least 100 millimetres above the top of rock level.

Previous excavations or trenches within the proposed construction area should be re-excavated down to shale bedrock and approximately 150 millimetres of the previously exposed shale removed prior to the placement of the concrete skim coat.

4.4 Engineered Fill Pad

The engineered fill, where and if required, should consist of Ontario Provincial Standard Specification (OPSS) Granular A or Granular B Type II placed in a maximum 300 mm thick loose



lifts and compacted to 100 percent of the material's standard Proctor maximum dry density (SPMDD). The top of the engineered fill should be at least 1.0 m wider than foundations at the underside of the footing. Where engineered fill is placed to support the structure footings, its thickness should not be less than 1.0 m unless the engineered fill is placed on bedrock, in which case a lower thickness would be acceptable for the engineered fill.

4.5 Foundation Design

The following options are considered feasible for support of the building structure:

Foundation Options	Advantages	Disadvantages
Spread/Square Footings on Competent Bedrock	Allows for relatively high geotechnical bearing capacities at ULS and SLS	May require deeper excavations and lower founding elevations
Spread/Square Footings on at least 0.2 m thick engineered fill on Weathered Bedrock	Allows shallower excavations	Will provide moderate geotechnical resistances at ULS and SLS

Table 4.1: Foundation Design Options

The following Table may be used for the design of shallow foundations bearing on a maximum 1 m thick engineered fill pad over weathered shale or directly supported on competent bedrock:

Table 4.2: Recommended Geotechnical Resistances at ULS and SLS

Founding Stratum	Footing Size (m)/Type	Factored Geotechnical Resistance at ULS (kPa)	Geotechnical Resistance at SLS (kPa) for 20 mm of Settlement
	2 m wide strip	600	500
	3 m wide strip	650	480
Engineered Fill Pad	4 m wide strip	700	400
over Weathered Shale	2 m Square	850	800
	3 m Square	880	550
	4 m Square	900	400
	2 m wide strip	1,100	1,100
	3 m wide strip	1,200	1,100
Competent Shale	4 m wide strip	1,300	1,200
	2 m Square	1,600	1,500
	3 m Square		1,200



Founding Stratum	Footing Size (m)/Type	Factored Geotechnical Resistance at ULS (kPa)	Geotechnical Resistance at SLS (kPa) for 20 mm of Settlement
	4 m Square		1,000

The resistance values provided above are for vertical, concentric loads. Where eccentric or inclined loads are applied, the resistance values used in the design must be reduced accordingly.

The sliding resistance of a cast-in-place footing on bedrock or engineered fill may be computed using the unfactored friction coefficient of 0.7 or 0.55, respectively.

Due to potential swelling of Billings Shale, the final prepared bedrock surface shall be covered by shotcrete or lean concrete within 12 hours of exposure.

Where previous excavations or trenches are present within about 1 m from the closest edge of each proposed foundation or within the footprint of the slab-on-grade, those utilities (including their bedding and backfill) should be fully removed (abandoned) and backfilled with lean concrete (to the top of the adjacent shale bedrock) after removal of about 150 millimetres of the previously exposed shale (the shale which was exposed during construction of the existing trenches).

4.6 Frost Depth

The design frost depth in Ottawa is 1.8 m below the ground surface. The base of all footings should be founded at a minimum depth of 1.8 m, both vertically and horizontally or be provided with an equivalent thickness of insulation such as expanded polystyrene (EPS) for frost protection. Typically, 25 mm of EPS can be considered equivalent to 300 mm of earth cover for frost protection.

Perimeter footings and interior footings within 1.5 m of perimeter walls of heated structures should be protected by a minimum soil cover of 1.5 m or equivalent insulations. For interior foundations with a horizontal distance greater than 1.5 m from the perimeter of a heated building, frost protection is not required.

4.7 Slab-On-Grade and Raft Foundations

A conventional slab-on-grade is suitable for this project after completion of the site preparation and protection of the swelling shale as described in previous sections. The design of slabs-ongrade may be based on a modulus of subgrade reaction of 25 MPa/m, based on a loaded area of



0.3 m by 0.3 m. A layer of free draining granular material such as OPSS Granular A at least 200 mm thick compacted to 100% of SPMDD should be placed below the floor slab to create a level construction pad and to provide drainage and support. Any bulk fill required to raise the grade to the underside of the Granular A should consist of OPSS Granular B Type II.

Perimeter drains and under slab drains are not required in areas where the Finished Floor Elevation is at least 200 mm above the exterior grades and surface water is directed away from the building.

In building areas that include below grade structures (e.g., elevator pits), the walls and floors should be designed as water-tight and to resist hydrostatic pressures unless perimeter and under slab drainage is provided. The decision on whether to provide drainage for the below grade structures should consider factors such as the quality and quantity of water that will be removed from the site and the need to prevent the underlying shale bedrock from drying out which could lead to heave.

4.8 Backfill to Structures and Lateral Earth Pressure

Backfilling the structures should be conducted with free draining non frost susceptible granular material such as OPSS Granular A or Granular B Type I, II or III conforming to the requirements of OPSS.MUNI 1010. Small vibratory compaction equipment should be used within about 0.5 m of the wall to minimize compaction induced stresses. Compaction of the backfill materials should be conducted as per OPSS.MUNI 501.

Lateral earth pressures acting on the structure may be assumed to be triangular and to be governed by the characteristics of the backfill. For a fully drained condition, the pressures should be computed in accordance with the CHBDC but generally are given by the expression:

$$P_{h}(d) = K^{*}(\gamma d + q)$$

where: $P_h(d) =$ lateral earth pressure at depth d (kPa);

K = static earth pressure coefficient (see table);

 γ = unit weight of retained soil (kN/m³), adjusted for groundwater level;

d = depth below top of fill where pressure is computed (m); and

q = value of any surcharge (kPa).



A compaction surcharge should be applied in the design. The magnitude of the lateral pressure representing the compaction surcharge should be 12 kPa at the top of fill which linearly decreases to zero at a depth of 1.7 m (for OPSS Granular B Type I) or at a depth of 2.0 m (for OPSS Granular A or Granular B Type II).

Earth pressure coefficients for backfill to the structure walls are dependent on properties of the granular fill used as the backfill. Typical earth pressure coefficients are shown in the table below, assuming the ground surface behind the wall is flat.

Loading Condition	OPSS Granular A or Granular B Type II Φ = 35°, γ = 22.0 kN/m ³	OPSS Granular B Type I or Type III Φ = 32°, γ = 21.0 kN/m ³
Active, Ka	0.27	0.31
At-Rest, K₀	0.43	0.47
Passive, K _p	3.7	3.3

 Table 4.3: Lateral Earth Pressure Coefficients

4.9 Site Seismic Classification

Based on the results of the MASW survey conducted in the vicinity of the proposed structure, described in a report by GHD titled "1Door4Care: CHEO Integrated Treatment Centre – Geotechnical Investigation Report (1Door4Care)" dated October 25, 2022, the average shear wave velocity at the site is greater than 760 m/s, and less than 1500 m/s, therefore, a Site Class B designation should be used in the design of the proposed structure provided that the thickness of soil between underside of the foundations and the top of bedrock does not exceed 3 m.

Based on correspondence with structural engineers it is understood that a Request For Information (RFI) will be sent to IO to identify the governing code (NBC 2015, NBC 2020, OBC 2012, etc.) in design of the structure. Further recommendations along with the anticipated seismic hazard values will be provided once clarifications have been received.

4.10 Cement Type

A moderate potential for sulphate attack was identified for the weathered shale. Therefore, design of the foundations and below grade walls of the proposed structure should consider CSA Type MS or MH cements.



4.11 Site Servicing

Bedding requirements for the sewers and watermains are summarized as follows:

- Where the subgrade consists of native soil, a bedding thickness of 150 mm can be used in accordance with City of Ottawa Standard Detail Drawing, S6, S7 and W17; or
- Where the subgrade consists of bedrock, the bedding thickness should be increased to 300 mm in accordance with City of Ottawa Standard Detail Drawing S6, S7, and W17 to reduce the potential for point loads from a potentially irregular bedrock surface.

In all cases the bedding material and pipe cover (to at least 300 mm above the top of pipe) should consist of Granular A (S.P. F-3147) that is compacted using suitable vibratory compaction equipment in accordance with S.P. D-029.

The lateral clearance from the outside edge of the pipe to the trench wall should be a minimum of 450 mm for a pipe diameter less than or equal to 900 mm. For pipes with a diameter larger than 900 mm, the minimum lateral clearance should be increased to 500 mm.

The use of clear crushed stone as a bedding layer should not be permitted since fine particles of the overlying backfill soils could potentially migrate into the voids in the clear crushed stone and cause settlement of the pipe and/or the road surface.

Trench backfill above the pipe cover/embedment material should conform to City of Ottawa specification S.P. F-2120 and/or OPSD 802.030 to 803.034 whichever is governing. Backfill should consist of approved excavated material, such as heterogeneous fill (provided that it is fee of organic matter and other deleterious materials), or native inorganic overburden that has a suitable moisture content for compaction.

As noted previously, the shale bedrock at this site is potentially expansive following exposure to oxygen. Due to the risk for expansion, the excavated shale bedrock is not recommended for reuse as trench backfill. The excavated shale, as well as any fill that contains organic and/or deleterious materials, should be transferred off-site in accordance with the Soil Characterization Report prepared for this project, which is provided under separate cover.

If imported fill is required to make up the balance of trench backfill, it should consist of compactable and inorganic earth borrow (OPSS.MUNI 206/212) or Select Subgrade Material (OSSS.MUNI 1010).



All trench backfill, including re-used soils and imported fill, should be compacted in accordance with City S.P. D-029. If the trench backfill material is too wet to achieve the required compaction requirements, it should be stockpiled and allowed to dry, or wasted and replaced with more suitable fill.

The trench backfill above the bedrock surface and within the frost zone (i.e., between the pavement subgrade level and 1.8 m depth, or the bedrock surface, whichever is shallower) should match the soil exposed on the trench walls for frost heave compatibility. This will require some separation of materials upon excavation. Qualified geotechnical personnel should approve the backfill materials for frost compatibility and review the requirements for frost tapers at the time of construction based on the soils exposed in the trench walls. Watermains with less than 2.4 m of cover should be insulated in accordance with City of Ottawa Standard Detail Drawing W22.

Backfilling operations during cold weather must avoid frozen lumps of material, snow, and ice; otherwise, settlement should be expected.

Seepage barriers should be constructed at periodic intervals along the trench to reduce the potential for groundwater level lowering in the surrounding area due to the "French drain" effect on the granular bedding and surround. Otherwise, long-term groundwater level lowering could result in heaving of the shale beneath the new service pipes or adjacent structures. Seepage barriers also act as cut-offs to prevent migration of contaminants along the relatively permeable backfill in the trenches, as well as a mitigation method during construction to limit groundwater inflow along the trench.

It is important that the seepage barriers extend from trench wall to trench wall and that they fully penetrate the granular surround materials to the trench bottom. The seepage barriers should be at least 1.5 m long. Construction of the seepage barriers should be in accordance with the City of Ottawa's Standard Detail Drawing No. S8. Seepage barriers should be placed at a maximum spacing of 75 m along the trench and on either side of crossing roadways to limit hydraulic connections with intersecting services.

5. CLOSURE

This report was issued for the purpose of building permit application only, before any final design or construction details had been prepared or issued. Therefore, differences may exist between the report recommendations and the final design, the project specifications, or conditions during construction. In such instances, Thurber Engineering Ltd. should be contacted immediately to address these differences. Designers and contractors undertaking or bidding the work should examine the factual results of the investigation, satisfy



themselves as to the adequacy of the information for design and construction, and make their own interpretation of the data as it may affect their proposed scope of work, cost, schedules, safety, and equipment capabilities.

We trust this information meets your present needs. If you have any questions, please contact the undersigned at your convenience.

Nina Warrier, P. Eng. Geotechnical Engineer



Mehdi Mostakhdemi, M.Sc., P. Eng. Review Engineer

Date: *August 21, 2023* File: *36182*



STATEMENT OF LIMITATIONS AND CONDITIONS

1. STANDARD OF CARE

This Report has been prepared in accordance with generally accepted engineering or environmental consulting practices in the applicable jurisdiction. No other warranty, expressed or implied, is intended or made.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report, which is of a summary nature and is not intended to stand alone without reference to the instructions given to Thurber by the Client, communications between Thurber and the Client, and any other reports, proposals or documents prepared by Thurber for the Client relative to the specific site described herein, all of which together constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. THURBER IS NOT RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives and purposes that were described to Thurber by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the Report, subject to the limitations provided herein, are only valid to the extent that the Report expressly addresses proposed development, design objectives and purposes, and then only to the extent that there has been no material alteration to or variation from any of the said descriptions provided to Thurber, unless Thurber is specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT THURBER'S WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS THURBER MAY EXPRESSLY APPROVE. Ownership in and copyright for the contents of the Report belong to Thurber. Any use which a third party makes of the Report, is the sole responsibility of such third party. Thurber accepts no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without Thurber's express written permission.

5. INTERPRETATION OF THE REPORT

- a) Nature and Exactness of Soil and Contaminant Description: Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other persons making use of such documents or records with our express written consent should be aware of this risk and the Report is delivered subject to the express condition that such risk is accepted by the Client and such other persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.
- b) Reliance on Provided Information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to Thurber. Thurber has relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, Thurber does not accept responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons providing information relied on by Thurber. Thurber is entitled to rely on such representations, information and instructions and is not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.
- c) Design Services: The Report may form part of design and construction documents for information purposes even though it may have been issued prior to final design being completed. Thurber should be retained to review final design, project plans and related documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the Report's recommendations and the final design detailed in the contract documents should be reported to Thurber immediately so that Thurber can address potential conflicts.
- d) Construction Services: During construction Thurber should be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions in order to confirm and document that the site conditions do not materially differ from those interpreted conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

6. RELEASE OF POLLUTANTS OR HAZARDOUS SUBSTANCES

Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause the escape, release or dispersal of those substances. Thurber shall have no liability to the Client under any circumstances, for the escape, release or dispersal of pollutants or hazardous substances, unless such pollutants or hazardous substances have been specifically and accurately identified to Thurber by the Client prior to the commencement of Thurber's professional services.

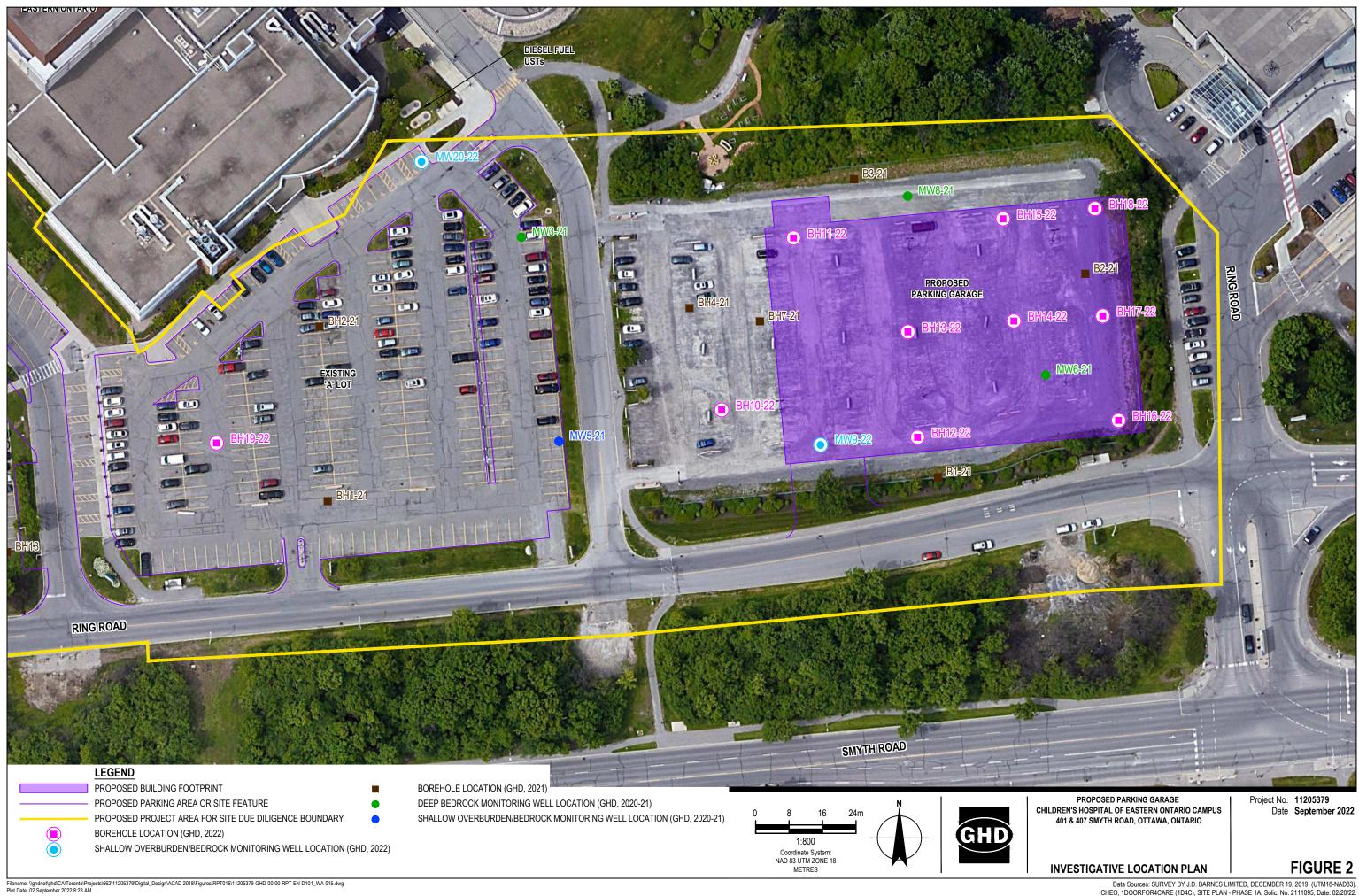
7. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on Thurber's interpretation of conditions revealed through limited investigation conducted within a defined scope of services. Thurber does not accept responsibility for independent conclusions, interpretations, interpretations and/or decisions of the Client, or others who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.



APPENDIX A

Borehole Location Plan (from GHD's) Report Record of Boreholes and Laboratory Test Results



Data Sources: SURVEY BY J.D. BARNES LIMITED, DECEMBER 19, 2019. (UTM18-NAD83). CHEO, 1DOORFOR4CARE (1D4C), SITE PLAN - PHASE 1A, Solic. No: 2111095, Date: 02/20/22. Image ©2022 Google (Imagery Date 6/8/2018).



Notes on Borehole and Test Pit Reports

Soil description :

GHD PS-020.01 - Notes on Borehole and Test Pit Reports - Rev.0 - 07/01/2015

Each subsurface stratum is described using the following terminology. The relative density of granular soils is determined by the Standard Penetration Index ("N" value), while the consistency of clayey sols is measured by the value of undrained shear strength (Cu).

Clay	Classification < 0.002 mm	(Unified system)		Terminolo	ogy		
Silt	0.002 to 0.075 mm						
		fine 0.075 to 4.05 mm		"trace" "some"		1-10% 10-20%	
Sand	0.075 to 4.75 mm	fine 0.075 to 4.25 mm medium 0.425 to 2.0 mm		ie ctive (silty, sandy)			
		medium 0.425 to 2.0 mm coarse 2.0 to 4.75 mm	aujec "and) 20-35% 35-50%		
Gravel	4.75 to 75 mm	fine 4.75 to 19 mm	anu		35-50%		
		coarse 19 to 75 mm					
Cobbles Boulders	75 to 300 mm >300 mm						
	ve density of nular soils	Standard penetration index "N" value		stency of ive soils	Undraine strengt		
		(BLOWS/ft - 300 mm)			(P.S.F)	(kPa)	
			Ver	ry soft	<250	<12	
V	ery loose	0-4	S	Soft	250-500	12-25	
	Loose	4-10	F	irm	500-1000	25-50	
(Compact	10-30		Stiff	1000-2000	50-100	
	Dense	30-50	Ver	ry stiff	2000-4000	100-200	
Ve	ery dense	>50	H	Hard		>200	
	Rock quality	designation]	STRATIGRAPH	IC LEGEND		
"RQI	D" (%) Value	Quality	processory.		•		
	<25	Very poor		00	20		
	25-50	Poor	Const.	Gravel C	Cobbles& boulders		
	50-75	Fair	Sand			Bedrock	
	75-90	Good		77777	$\nabla \nabla$	×××××	
					~ ~		
	>90	Excellent					
	>90	Excellent	Silt	Clay	Organic soil	Fill	
S: Split spoon SE, GSE, AGE	ber nple recovered is shown o E: Environmental samplir	on the log by the abbreviation listed he ST: S Ig PS: P	reafter. The numbering of samples is s helby tube iston sample (Osterberg)	sequential for each t AG RC GS	type of sample. :: Auger :: Rock core :: Grab sample	Fill	
pe and Num he type of sam S: Split spoon SE, GSE, AGE ecovery he recovery, s	ber nple recovered is shown o E: Environmental samplir	on the log by the abbreviation listed he ST: S Ig PS: P	reafter. The numbering of samples is shelby tube	sequential for each t AG RC GS	type of sample. :: Auger :: Rock core :: Grab sample	Fill	
rpe and Num be type of sam S: Split spoon SE, GSE, AGE ecovery be recovery, si QD	ber nple recovered is shown of E: Environmental samplin hown as a percentage, is	on the log by the abbreviation listed he ST: S Ig PS: P s the ratio of length of the sample obtain	reafter. The numbering of samples is s helby tube iston sample (Osterberg)	sequential for each t AG RC GS iven/pushed into the	type of sample. :: Auger :: Rock core :: Grab sample e soil		
rpe and Num le type of sam S: Split spoon SE, GSE, AGE ecovery le recovery, s QD le "Rock Qual	ber nple recovered is shown of E: Environmental samplin hown as a percentage, is lity Designation" or "RQD	on the log by the abbreviation listed he ST: S Ig PS: P s the ratio of length of the sample obtain	reafter. The numbering of samples is s helby tube iston sample (Osterberg) ned to the distance the sampler was dr	sequential for each t AG RC GS iven/pushed into the	type of sample. :: Auger :: Rock core :: Grab sample e soil		
rpe and Num le type of sam S: Split spoon SE, GSE, AGE ecovery le recovery, s QD le "Rock Qual e run. I-SITU TES	ber nple recovered is shown of E: Environmental samplin hown as a percentage, is lity Designation" or "RQD	on the log by the abbreviation listed he ST: S Ig PS: P s the ratio of length of the sample obtain	reafter. The numbering of samples is s helby tube iston sample (Osterberg) ned to the distance the sampler was dr	sequential for each f AG RC GS iven/pushed into the	type of sample. :: Auger :: Rock core :: Grab sample e soil	ne total lengt	
rpe and Num le type of sam S: Split spoon SE, GSE, AGE ecovery le recovery, s QD le "Rock Qual e run. I-SITU TES	ber nple recovered is shown of E: Environmental samplin hown as a percentage, is lity Designation" or "RQD TS: netration index	on the log by the abbreviation listed he ST: S Ig PS: P s the ratio of length of the sample obtain	reafter. The numbering of samples is s helby tube iston sample (Osterberg) ned to the distance the sampler was dr he ratio of the total length of all core fra	sequential for each f AG RC GS iven/pushed into the	type of sample. :: Auger :: Rock core :: Grab sample e soil (10 cm) or more to th	ne total leng	
rpe and Num le type of sam S: Split spoon SE, GSE, AGE acovery le recovery, s QD le "Rock Qual e run. I-SITU TES" Standard per	ber pple recovered is shown of E: Environmental samplin hown as a percentage, is lity Designation" or "RQD TS: netration index enetration	on the log by the abbreviation listed he ST: S Ig PS: P s the ratio of length of the sample obtain	reafter. The numbering of samples is a helby tube iston sample (Osterberg) ned to the distance the sampler was dr he ratio of the total length of all core fra N _c : Dynamic cone penetration inde Cu: Undrained shear strength	sequential for each f AG RC GS iven/pushed into the	type of sample. :: Auger :: Rock core :: Grab sample e soil (10 cm) or more to th k: Permeab ABS: Absorption (F	ne total lengi ility Packer test)	
rpe and Num le type of sam S: Split spoon SE, GSE, AGE ecovery le recovery, s QD le "Rock Qual e run. Standard per Refusal to pe ABORATOF	ber aple recovered is shown of E: Environmental samplin hown as a percentage, is lity Designation" or "RQD TS: netration index enetration RY TESTS:	on the log by the abbreviation listed he ST: S ig PS: P the ratio of length of the sample obtain value, expressed as percentage, is t	reafter. The numbering of samples is a helby tube iston sample (Osterberg) ned to the distance the sampler was dr he ratio of the total length of all core fra N _c : Dynamic cone penetration indo Cu: Undrained shear strength Pr: Pressure meter	sequential for each f AG RC GS iven/pushed into the	type of sample. : Auger : Rock core : Grab sample e soil (10 cm) or more to th k: Permeab ABS: Absorption (F	ne total lengt ility Packer test) O.V.: Organ	
rpe and Num be type of sam S: Split spoon SE, GSE, AGE ecovery be recovery, s QD be "Rock Qual e run. I-SITU TES" Standard per Refusal to pe	ber aple recovered is shown of E: Environmental samplin hown as a percentage, is lity Designation" or "RQD TS: netration index enetration RY TESTS:	on the log by the abbreviation listed he ST: S Ig PS: P s the ratio of length of the sample obtain	reafter. The numbering of samples is a helby tube iston sample (Osterberg) ned to the distance the sampler was dr he ratio of the total length of all core fra N _c : Dynamic cone penetration inde Cu: Undrained shear strength	sequential for each f AG RC GS iven/pushed into the igments of 4 inches ex	type of sample. : Auger : Rock core : Grab sample e soil (10 cm) or more to th k: Permeab ABS: Absorption (F	ne total lengt ility Packer test)	



Explanation of Terms Used in the Bedrock Core Log

Strength (ISRM)

Terms	Grade	Description	Unconfii Compressive St (MPa)	
Extremely Weak Rock	RQ	Indented by thumbnail	0.25-1.0	36-145
Very Weak	R1	Crumbles under firm blows with point of geological hammer, can be peeled by a pocket knife.	1.0-5.0	145-725
Weak Rock	R2	Can be peeled by a pocket knife with difficulty, shallow indentations made by firm blow with point of geological hammer.	5.0-25	725-3625
Medium Strong	R3	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with single firm blow of geological hammer.	25-50	3625-7250
Strong Rock	R4	Specimen requires more than one blow of geological hammer to fracture it.	50-100	7250-14500
Very strong Rock	R5	Specimen requires many blows of geological hammer to fracture it.	100-250	14500-36250
Extremely Strong Rock	R6	Specimen can only be chipped with geological hammer.	>250	>36250

Bedding (Geological Society Eng. Group Working Party, 1970, Q.J. of Eng. Geol. Vol 3)

Term	Bed Thickness	
Very thickly bedded	>2 m	>6.5 ft.
Thickly bedded	600 mm-2 m	2.00-6.50 ft.
Medium bedded	200 mm-600 mm	0.65-2.00 ft.
Thinly bedded	60 mm-200 mm	0.20-0.65 ft.
Very thinly bedded	20 mm-60 mm	0.06-0.20 ft.
Laminated	6 mm-20 mm	0.02-0.06 ft.
Thinly laminated	<6 mm	<0.02 ft.

TCR (Total Core Recovery)

Sum of lengths of rock core recovered from a core run, divided by the length of the core rum and expressed as a percentage

SCR (Solid Core Recover)

Sum length of solid full diameter drill core recovered expressed as a percentage of the total length of the core run.



Explanation of Terms Used in the Bedrock Core Log

Weathering (ISRM)

Terms	Grade	Description
Fresh	W1	No visible sign of rock material weathering.
Slightly	W2	Discolouration indicates weathering of rock weathered material and discontinuity surfaces. All the rock material may be discoloured by weathering and may be somewhat weaker than in its fresh condition.
Moderately	W3	Less than half of the rock material is weathered decomposed and/or disintegrated a soil. Fresh or discoloured rock is present either as a corestone.
Highly Weathered	W4	More than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discoloured rock is present either as a continuous framework or as corestones.
Completely Weathered	W5	All rock material is decomposed and/or disintegrated to a soil. The original mass structure is still largely intact.
Residual Soil	W6	All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soil has been significantly transported.

ROD (Rock Quality Designation, after Deere, 1968)

Sum of lengths of pieces of rock core measured along centerline of core equal to or greater than 100 mm from a core run, divided by the length of the core run, divided by the length of the core run and expressed as a percentage. Core fractured by drilling is considered intact. RQD normally quoted for N-Size core.

RQD (%)	Rock Quality
90-100	Excellent
75-90	Good
50-75	Fair
25-50	Poor
0-25	Very Poor

(FI) Fracture Index

Expressed as the number of discontinuities per 300 mm (1 ft.) Excluded drill-induced fractures and fragmented zones. Reported as ">>25" if frequency exceeds 25 fractures/0.3 m.

Broken Zone

Zone where core diameter core of very low RQD which may include some drill-induced fractures.

Fragmented Zone

Zone where core is less than full diameter and RQD = 0.

Discontinuity Spacing (ISRM)

Term	Average Spacir	ng
Extremely widely spaced	>6 m	>20.00 ft.
Very widely spaced	2 m-6 m	6.50-20.00 ft.
Widely spaced	600 mm-2 m	2.00-6.50 ft.
Moderately spaced	200 mm-600 mm	0.65-2.00 ft.
Closely spaced	60 mm-200 mm	0.20-0.65 ft.
Very closely spaced	20 mm-60 mm	0.06-0.20 ft.
Extremely closely spaced	<20 mm	>0.06 ft.
Note: Excludes drill-induced fractu	res and fragmented rock.	

Discontinuity Orientation

Discontinuity, fracture, and bedding plane orientations are cited as the acute angle measured with respect to the core axis. Fractures perpendicular to the core axis are at 90 degrees and those parallel to the core axis are at 0 degrees.

REFERENCE No.: <u>11205379-90</u>												ENCI	LOSU	RE N	lo.: _			
					BOREHOLE No.:			BH1-	21		B	ΩR	EH		FF	5 F F	SOI	RT
		G	iHD		ELEVATION:		81.	39 m			U		Page:					
	CLIENT:		Infra	astructure Ontario (I.0	O.)						LEC	GEN	5					
	PROJECT		Chil	iminary Geotechnica dren's Hospital of Ea	I Investigation - Propose Istern Ontario Campus -	ed 40	Parking)1 Smyt	<u>Struc</u> h Roa	<u>ture</u> d,		\bowtie		- SF		SPO(Y TU			
21				awa, Ontario Schaller	CHECKED BY:		S Sha	handi	an		$\overline{\mathbf{I}}$	RC	- R0	ОСК	COR	E		
: 2/26				uary 15, 2021							Ţ		- vv.	AIE	R LEV	/EL		
LL Date	NORTHIN			7575.049	EASTING:		449073											
G WITH GRAPH+WE	Depth	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15 cm/ RQD(%)	'N' Value/ SCR(%)	Sen:	ar test sitivity Water Atterb "N" Val ws / 12	(S) conte erg lin ue	ent (% nits (%	, 🗆	Field Lab					
	Feet Metres	81.39			D SURFACE			%			Ν	10 :	20 30	40 50	0 60 7	0 80	90	
u: so		81.26	$\times\!\!\times$	- ASPHALT : 125 mi FILL :	m	×	GS1		4			0				\square	\square	
GLB Repo	$2 - \frac{1}{2}$ $3 - \frac{1}{2} 0.91$	80.48		SAND and GRAVE moist, loose to very	EL, trace clay, brown, y dense d : 41%, Clay : 3%, Silt _	X	SS1	25	5	10-5-4-6	9							
ECH_V02.	3 <u>-</u> 1.0 4 <u>-</u>	00.40		: 8%	d : 39%, Clay : 7%, Silt	X	SS2	88	10	12-30-50/ 100mm	50+	0			,			
GHD_GEOT				BEDROCK (inferre greyish brown, ver	ed), shale fragments, y dense	X	SS3	100	4	50/ 100mm	50+			•	·		-	
y File: GF	7					Х	SS4	100	4	50/ 75mm	50+	0		•				
J LIDRAL	9 – 10 – 3.0					X	SS5	100	4	50/ 75mm	50+	0		•				
- 90.GP	10 <u>-</u> 3.20 11 <u>-</u>	78.19		auger refusal														
205379	12 -			END OF BOREHOL	<u>.E :</u>													
5379/11	13 — 4.0 14 —			- End of Borehole a - Borehole was bac	ckfilled with bentonite													
53\1120	15			holeplug and seale - bgs donates 'belo														
\11205	16 <u>-</u> 5.0																	
\1120-	17 — 18 —													+		\vdash		
NK/11	- <u>-</u> 19															\square	-	
E\8-CH/	20 - 6.0															\square	_	
TABAS	21 <u></u> 22 <u></u>															\square	_	
-OG DA	23 - 7.0															\square	_	
GACYI	24 —															\square	_	
NEL/LE	25 26 8.0															\square	_	
11 BRL	27																	
UGA - 1	28															\square		
SSISSA	29 — — 9.0 30 —																	
:\CA\MI	31 -																	
File: N	32 —																+	

REFERENCE No.:11205379-90												ENCLOS	JRE No	o.:	2	
			\frown		BOREHOLE No.:	_		BH2-	21		B	OREH	IOI F	= RF	PO	RT
		9	iHD		ELEVATION:		81.	36 m			-					
	CLIENT:		Infra	astructure Ontario (I.	O.)						LEC	<u>GEND</u>				
	PROJECT		Chil	iminary Geotechnica dren's Hospital of Ea wa, Ontario	l Investigation - Propos stern Ontario Campus	ed - 40	Parking 1 Smyt	<u>Struc</u> h Roa	ture d,		\square	ST - S	PLIT S HELBY OCK C	' TUBE		
12/97	DESCRIBE	ED BY:	<u>K.</u> S	schaller	CHECKED BY:		S. Sha	hangia	an		⊥⊔ Ţ		ATER		-	
ate: 2/	DATE (ST/	ART):	Jan	uary 18, 2021	DATE (FINISH)	:	Januar	y 18, :	2021							
	NORTHIN	G:	502	7616.781	EASTING:		44907	1.365								
	Depth	Elevation (m) BGS	Stratigraphy		IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15 cm/ RQD(%)	'N' Value/ SCR(%)	Shear tes Sensitivity O Wate W _p W ₁ Atter • "N" V (blows / 1	/ (S) ´ er conten berg limi alue	ıt (%) ts (%)	∆ Field □ Lab	
	eet Metres	81.36		GROUN	D SURFACE			%			N	10 20 30	40 50	60 70 8	80 90	
	0.10	81.26	\bigotimes	∽_ASPHALT : 100 m FILL :	m/	×	GS1		4			0				
odex 2 2 3	- <u>-</u> 0.61			SAND and GRAVE T moist, compact \Gravel : 42%, Sand	L, trace silt, brown, d : 50%, Clay : 2%, Silt	\mathbb{N}	SS1	71	19	9-7-3-4	10					İ
	1.0 1.14 	80.22		SAND, some silt, ti dark brown, moist,	race clay and gravel, very dense	-	SS2	87	7	10-22-42/ 100mm	50+					í
			իկկկկ	: 18% BEDROCK (inferre	d : 61%, Clay : 6%, Silt ed), shale fragments,	×	SS3	83	4	50/ 125mm	50+	0	•			
8 7				grey, moist, very de	ense	×	SS4	100	4	50/ 75mm	50+	0	+			, [
-1	2.77 <u>-</u> 2.77	78.59		\auger refusal	/	-	SS5	100	9	50/ 25mm	50+	0	•			ł
5) 0.0 1			END OF BOREHOL	<u>.E :</u>											1
n N	2			NOTE : - End of Borehole a	at 2 77 m bos											
20	3 - 4.0			- Borehole was bac holeplug and seale	ckfilled with bentonite											
N	4			- bgs donates 'belo	w ground surface'											
11/290711/-	s <u>+</u>															
	7 <u>-</u> 5.0															
	-1															
19 20																
IABASE (8-0																
	-C															I
																í
24 24 24 24																í
																ł
27	F 1															ł
- 28																l
2 4	- 9.0															
A MISSISC	+												+	+		
	2 - 1															

REFERENCE No.:11205379-90								ENCLOSU	RE No	.:	3	\$
	BOREHOLE No.:		I	MW3	-21		B	OREH		R	FP()RT
GHD	ELEVATION:		81.	37 m			-		_1_			
CLIENT: Infrastructure Ontario (I.	O.)						LEC	GEND				
PROJECT: Preliminary Geotechnica Children's Hospital of Ea							\boxtimes		PLIT SF	200	1	
Children's Hospital of Ea LOCATION: <u>Ottawa, Ontario</u>	stern Ontario Campus -	40	1 Smytł	n Roa	d,			ST - SI	HELBY		E	
DESCRIBED BY: <u>K. Schaller</u>	CHECKED BY:		S. Sha	hangia	an		⊥⊔ Ţ		ATER		Ľ	
DATE (START):January 14, 2021	DATE (FINISH):		Januar	y 15, 2	2021							
NORTHING: 5027638.113	EASTING:		449119	.449								
Handright Constraints of the state of the st		υ	and	ery/ (%)	art e	Blows per	ue/ (%)	Shear test Sensitivity	(Cu) (S)	(0/.)	∆ Fie □ Lat	
Multication Depth Multication Depth	IPTION OF D BEDROCK	State	Type and Number	ecove TCR(loistu Conte	Blows per 15 cm/ RQD(%)	l' Val SCR(erg limit	s (%)		
			μz		20			(010005712	in30 c	,		
ASPHALT 175 m	D SURFACE			%			N	10 20 30	40 50 6	50 70	80 90	
1 - 0.10 81.07 GRAVEL : 125 mn		М	SS1	100	8	17-22-50/ 150mm	72			0.3	1 m_	
	D, some gravel, trace		SS2	100	9	42-50/	50+	0				
damp/moist, very d	lense					75mm						
I _ T _ I _ arev wet verv der	30		SS3 SS4	100 100	4	50/ 125mm	50+ 50+			Bento	onite	
	d : 50%, Clay : 14%,		SS5	100	4	50/ 100mm	50+		\square		+-	
		×	SS6	100	4	50/ 100mm	50+	0	•		++	
						50/ 75mm					0/202 [.]	_ 1
		×	SS7	83	4	50/ 150mm	50+	0	++	_2.74 #2 S	4 m_ Sand	
		×	SS8		17							
		Д	SS8A	100	11	50/ 50mm	50+	0 I	•		+	
		×	SS9	100	5	50/	50+	0	++	-Sci	reen	
						50mm					++	
15 – 4.57 76.80 auger refusal	ر ۲. laminated, interbeds	¥	SS10 RC1	100 100	4	50/ 50mm	50+	0	•	18	7 m= Sand	
of limestone/siltsto 17	ne (hard layers),					100				4.8	8 m-	
18 - moderately strong,											+	
			RC2	100		78						
											++	
$ \begin{bmatrix} 22 \\ - \\ 23 \\ - \\ 7 \\ 23 \\ - \\ 7 \\ 0 \end{bmatrix} = 7.0 $												
			RC3	98		85					+	
									Bento	onite :	Seal	
											++	
											\ddagger	
			RC4	100		93					\pm	
			NC4	100		30						
									+	+	++	
			RC5	83		61			+	\square	++	
						i						

	REFEREN	ICE No.		11205379-90								EN	CLOS	SUR	E No).: _		3	
		6			BOREHOLE No.	:		MW3	-21		B	OF	RE	НС)LE	ER	EP	OF	RT
					ELEVATION:		81.	<u>37 m</u>									_2		
	CLIENT:		Infra	astructure Ontario (I.	0.)						LEC	GEN	ID.						
	PROJECT		Chil	iminary Geotechnica dren's Hospital of Ea wa, Ontario	al Investigation - Propos astern Ontario Campus	ed - 40	Parking)1 Smyt	<u>Struc</u> h Roa	ture d,			ST	-	SHE	LIT S	' TUI	ЗE		
26/21	DESCRIBE	ED BY:	<u>K.</u> S	Schaller	CHECKED BY:		S. Sha	hangi	an		∏ ₹	RC			CK C				
ate: 2//	DATE (ST	ART):	Jan	uary 14, 2021	DATE (FINISH)	: _	Januar	y 15,	2021										
ELL	NORTHIN	G:	502	7638.113	EASTING:		449119	9.449											
OG WITH GRAPH+W	Depth	Elevation (m) BGS	Stratigraphy		IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15 cm/ RQD(%)	'N' Value/ SCR(%)	Se O W _p V	ear te nsitiv Wa Na Na Na Na Na Na	ity (S ter c erber Value	Cu) S) onter rg limi e n30	it (%) ts (% cm)		ield .ab	
	Feet Metres			GROUN	D SURFACE			%			Ν	10	20 3	30 4	0 50		0 80 9		
ภี มี	33 - 10.06	71.31	×////		E.											10.	06 m		
Repo	34			END OF BOREHO															
CGLB.	35			NOTE : - End of Borehole									_			+	_		
H_V02	36 <u>11.0</u> 37 <u>37</u>			 Borehole was dry Rock coring from 	4.57 m bgs														
OIEC	38 -			- 50 mm diameter installed at 7.47 m	bas														
D_GE	30			- Groundwater fou January 28, 2021	nd at 2.69 m bgs on								_			+			
E G H	40			- Groundwater four February 10, 2021	nd at 2.49 m bgs on														
ry File	41 —			- bgs donates 'belo	ow ground surface'														
Libra	42 —																		
GPJ	43 - 13.0																		
9 - 90.	44 —																		
20537	45 —																		
379\11	46																_		
1205	47 –																		
053\11	48 —																		
\112	4915.0																		
1120-	50 —																		
1	51 —												_			+	_		
HAR/1	52 <u>-</u> 																		
E\8-C	53																		
ABAS	54 —																		
G DAT	55 – 56 ––17.0																		
:Y/LOC													_						
EGAC	57																		
NEL	58											\vdash	+	$\left \right $		+	_	\vdash	
1 BRU	59 — 18.0 60 —											\square				\square			
A - 11	61																		
SAUG	62 1											$\left - \right $	+	$\left \right $		+		\square	
SSIS	62 <u>-</u> 19.0 63 -																		
\CA\M	64 —											\vdash	_	$\left \right $	+	+	_	\square	
: : :	65											\square							
Ξļ																			

	REFEREN	:	11205379-90								EN	CLOS	SURI	E No).: _		4		
		6			BOREHOLE No.:			BH4-	21		В	OF	REF	10)LE	ER	REP	OF	۲۲
		9			ELEVATION:		82.	<u>23 m</u>				-					1		
ľ	CLIENT:		Infra	astructure Ontario (I.0	D.)						LEC	GEN	ND						
	PROJECT	:	Prel	liminary Geotechnica	I Investigation - Propos stern Ontario Campus ·	ed	Parking	Struc	ture		\boxtimes	ss		SPL	IT S	POC	N		
	LOCATION	N:	Otta	awa, Ontario	stern Ontario Campus -	- 40	n Smyl	n Roa	α,						ELBY CK C				
12/92/	DESCRIBE	ED BY:	<u>K.</u> S	Schaller	CHECKED BY:		S. Sha	hangia	an		Ţ				TER				
Jate: 2	DATE (ST/	ART):	Jan	uary 18, 2021	DATE (FINISH)	-	Januar	y 18, :	2021										
	NORTHIN	G:	502	7621.207	EASTING:		449159	9.803											
	Depth	Elevation (m) BGS	Stratigraphy		IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15 cm/ RQD(%)	'N' Value/ SCR(%)	Se O W _p V	near te ensitivi Wa Ma Atte Ma N" N"	ty (S ter co rberç Value) onten g limi			⁻ ield ₋ab	
	Feet Metres	82.23			D SURFACE			%			N	10	20 3	60 40) 50	60 7	0 80 9	0	
Keport: V	2			brown, moist to we	L, trace clay and silt, t, dense d : 41%, Clay : 3%, Silt		SS1	75		15-27-21-10	48				•				
	3 <u>-</u> 0.76 3 <u>-</u> 1.0 4 <u>-</u>	81.47		∖: 10%	d), shale fragments,		SS2	91	7	6-19-34-50/ 50mm	53	0							
EULECT	5 -					Д	SS3	90	8	21-50/ 100mm	50+	0			+				
GHD_G	6					X	SS4	100	4	50/ 75mm	50+	0			•				
brary File:	8					X	SS5	100	5	50/ 75mm	50+	0			•				
L L	9 <u>2.77</u> 10 <u>3.0</u>	79.46		\auger refusal	/												_		
9 - <u>9</u> 0.G	11 -			END OF BOREHOL	<u>.E :</u>														
205379	12 -			NOTE : - End of Borehole a	at 2.77 m bgs														
3/9/11	13 - 4.0			- Borehole was bac holeplug and seale	ckfilled with bentonite												_		
GUZTT/	14			- bgs donates 'belo	w ground surface'														
12053	15 — 16 —																		
L/07	10 <u>-</u> 5.0 17 -																		
LL/	18 -																		
-11/JA	$19 - \frac{1}{10} - \frac{1}{10} = 6.0$																		
H)-8/-	20																		
ABASE	21 <u>-</u> 22 <u>-</u>																		
I A I P	23 - 7.0																		
ACY/LC	24 —																		
L/LE G	25																		
SKUNE	26 8.0														+	+	+	\square	
- 111 E	27											H			+		+	\square	
AUGA	28 — — — — 29 — —											Ħ					+		
22122	30 - 9.0											⊢					\pm		
CANN	31 —											⊢							
FIIE: N:	32 —																		

	REFERENCI	:	11205379-90								ENC	LOSI	JRE	No.:			5		
					BOREHOLE No.:	_		MW5	-21		B	OR	FΗ		F	RI	EP	OR	т
		0	iHD		ELEVATION:												_1		
	CLIENT:		Infra	astructure Ontario (I.	0.)						LEC	GEN	<u>D</u>						
	PROJECT: LOCATION:		Preli Chile	iminary Geotechnica dren's Hospital of Ea wa, Ontario	al Investigation - Propos astern Ontario Campus	ed - 4(<u>Parking</u>)1 Smyt	<u>Struc</u> h Roa	ture d,		\boxtimes	SS ST		PLIT					
121				ichaller	CHECKED BY:		S Sha	hangi	an		∏ ¥	RC		ROCK VATE			:1		
e: 2/26				uary 15, 2021							Ŧ		·	.,					
LL Dat	NORTHING:	:	5027	7589.381	EASTING:		449128	3.777											
יט אווא פאסארא+WE	Depth	Elevation (m) BGS	Stratigraphy		IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15 cm/ RQD(%)	'N' Value/ SCR(%)	Sen	ar tes sitivity Wate Atter "N" V ws / 1	y (S) er con berg l alue	tent (imits		∆ Fi □ La		
	Feet Metres 8	31.83			D SURFACE			%			Ν	10	20 30) 40 5	50 60) 70	80 90)	
S ::	1 - 0.30 8	81.73 81.53		¬ASPHALT : 100 m ¬ SAND and GRAVE	/	×	GS1		7			-0-				0.3	1 m-	_	
GLB Repo	2 - 0.40 8	81.43		clay, brown, moist, Gravel : 43%, San	dense d : 41%, Clay : 3%, Silt	1	SS1	100	8	8-18-20-35	38	9					pņite	_	
H_V02.G	³ <u>-</u> 1.0 4 <u>-</u>			: 13% FILL : GRAVELLY SAND	, some silt, trace clay,	×	SS2	100	3	50/ 125mm	50+					 - 1.0 4_ 2	5 m ⁻	_	
0_GEOTEC	5	80.00		: 20%	d : 49%, Clay : 8%, Silt	×	SS3	100	5	50/ 100mm	50+	0		-		- I	reen 3 m ⁻	_	
FIIE: GHD	7			BEDROCK (inferre grey, damp, very d	ed), shale fragments, ense														
LIDIALY	8 — <u> </u>			END OF BOREHO	<u>LE :</u>														
90.GPJ				NOTE : - End of Borehole : - Borehole was dry	upon completion														
1205379 -	12 — 			- Borehole was dry	stalled at 1.837 m bgs on January 28, 2021 on February 10, 2021														
205379/1	13 <u>4</u> .0 14 <u>4</u> .0			- bgs donates beit	ow ground surface														
-\112053\11																			
	16 — — 5.0 17 —															_			
11120	18 															-			
	19 <u>-</u> 20 <u>-</u> 6.0													_		-		\exists	
3ASE/8-	21																		
LOG DATABASE/8	22																	\neg	
:Y/LOG	23 <u>-</u> 7.0 24 <u>-</u>													_		_		\neg	
\LEGAC	25 -															+		-	
BRUNELILE	26 8.0													-				\exists	
- 111 B	27 — - 28 —													-		+		4	
SAUGA	29 —															+		\exists	
N:\CA\MISSISS	30 - 9.0															+		\exists	
	31															+		\dashv	
FIIe:	32 —																		

	REFEREN	ICE No	:	11205379-90								ENCLOSURE No.:	6
					BOREHOLE No.:			MW6	-21		В	OREHOLE REPO	ORT
		9	äHD		ELEVATION:		82.	17 m			2	Page: <u>1</u> of <u>2</u>	
Ī	CLIENT:		Infra	astructure Ontario (I.0	D.)						LE	GEND	
	PROJECT LOCATION		Chil	liminary Geotechnica dren's Hospital of Ea awa, Ontario	l Investigation - Propos stern Ontario Campus	ed - 40	Parking)1 Smyt	<u>Struc</u> h Roa	ture d,		\square	SS - SPLIT SPOON ST - SHELBY TUBE	
12/97	DESCRIB	ED BY:	<u>K.</u> S	Schaller	CHECKED BY:		S. Sha	hangi	an		LL ▼	RC - ROCK CORE - WATER LEVEL	
ate: 2/2	DATE (ST	ART):	Jan	uary 12, 2021	DATE (FINISH)	: _	Januar	y 13,	2021				
	NORTHIN	G:	502	7605.404	EASTING:		449244	1.983					
WHH GKAPH+W	Depth	Elevation (m) BGS	Stratigraphy		IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15 cm/ RQD(%)	'N' Value/ SCR(%)	Shear test (Cu) △ Fir Sensitivity (S) □ La ○ Water content (%) Image: Atterberg limits (%) ● "N" Value (blows / 12 in30 cm)	
	Feet Metres	82.17			D SURFACE			%			N	10 20 30 40 50 60 70 80 90	K
Keport: S	1 - 0.35 2 - 0.61			GRAVEL : 350 mm FILL : SILTY SAND, trace		\mathbb{N}	SS1	87	14	10-30-18-8	48	○ ● 0.31 m-	
	3 - 1.0 4 - 1.22			\organics, grey/brov NATIVE : ML-GRAVELLY SA	vn, moist, dense	X	SS2	100	10	4-11-27-45	38		
GEOLECH	5	00.33		brown, moist, dens		X	SS3	100	9	35-20-50/ 75mm	100		
e: GHD	6 <u>-</u> 7 <u>-</u> 2.0			BEDROCK (inferre grey, moist, very de	d), shale fragments, ense	×	SS4	100	4	50/ 75mm	50+	Bentonite	
LIDRARY FI	8 - <u> </u> 9 - <u> </u>					×	SS5	100	3	50/ 100mm	50+		
- 90.GPJ	$10 \xrightarrow{+}{-} 3.0$					X	SS6 SS7	100 100	4	50/ 100mm	50+ 50+		⊻
12053/9-	12 <u>-</u> 3.51	78.66		of limestone/siltsto	K, laminated, interbeds ne (hard layers),		RC1	58		50/ 50mm 50		3.66 m ⁻	
112053/9/	13 - 4.0 14 - 4.0			highly weathered to moderately strong,			RC2	93		24		#2 Sand	
V-12053V	15 – 16 – – 5.0												
	17 <u>-</u> 18 <u>-</u>						5.00						
HAR/11	$19 - \frac{1}{10} - \frac{1}{10} - \frac{1}{10} - 6.0$						RC3	95		54		Screen_	
ABASE (8-C	21												
	$22 - \frac{1}{2}$ 23 - 7.0						RC4	97		55			
GACYL	24 —						1104	51				7.47 m	
	25 <u></u> 26 <u></u> 8.0					H						+Sand 	
- 111 Bh	27 – 28 –												
SAUGA	29 —						RC5	100		52		Bentonite Seal	
	30 <u>+</u> 9.0												
FIIE: N:/C/	31 — <u> </u>						RC6	100		71			

	REFERENCE No.	.:11205379-90								ENC	LOS	URE	No.:		6	
			BOREHOLE No.:	_		MW6	21		B	OR	REF	10	LE	RE	PO	RT
		AHD	ELEVATION:		82.	17 m			-				2			
	CLIENT:	Infrastructure Ontario (I	.0.)						LEC	GEN	D					
		Preliminary Geotechnic Children's Hospital of E Ottawa, Ontario	al Investigation - Propos astern Ontario Campus -	ed • 40	Parking 1 Smyt	Struc n Roa	ture d,		\boxtimes	ST	- 5	SHEI	T SP(_BY T	UBE		
6/21		K. Schaller	CHECKED BY:	_	S. Sha	hangia	an		∏ ¥	RC			K CO ER LI		_	
tte: 2/2	DATE (START):	January 12, 2021	DATE (FINISH):	_	Januar	y 13, 2	2021		-							
ELL Da	NORTHING:	5027605.404	EASTING:		449244	1.983										
JG WITH GRAPH+W	Depth Elevation (m) BGS		RIPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15 cm/ RQD(%)	'N' Value/ SCR(%)	Ser	"N" \	ty (S) er co rberg /alue	ı) ntent (limits -30 cm	%) (%)	∆ Field □ Lab	1
	Feet Metres 82.17	GROUN	ID SURFACE			%			Ν	10	20 3	0 40	50 60			
KUNEL/LEGACY/LOG DATABASE/8-CHAR/11/1120/112053/9/112053/9/112053/9/112053/9/12053/9	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	END OF BOREHO NOTE : - End of Borehole - Borehole was dr - Rock coring fron - Monitoring well i - Groundwater fou January 28, 2021 - Groundwater fou February 10, 2027	PLE : at 10.06 m bgs y upon completion n 3.51 m bgs nstalled at 7.47 m bgs ind at 2.97 m bgs on ind at 3.09 m bgs on													
ICAMISSISSAUGA - 1111	$\begin{array}{c} 60 \\ -1 \\ 61 \\ -1 \\ 62 \\ -1 \\ -19.0 \\ 63 \\ -1 \\ 64 \\ -1 \\ 65 \\ -1 \end{array}$															-
Ľ					l											

,	REFEREN	ICE No.	:	11205379-90		ENCLOSURE No.:7																
					BOREHOLE No.	:		BH7-	21		B	OF	2FF	IO	F	RF	=PC	RT				
		6	iHD		ELEVATION:		82	.22 m			BOREHOLE REPORT Page: 1 of 1											
	CLIENT:		Infra	astructure Ontario (I.	I.O.)								LEGEND									
	PROJECT		Chil	liminary Geotechnica dren's Hospital of Ea awa, Ontario	I Investigation - Propos stern Ontario Campus	ed - 40	Parking)1 Smyt	<u>Struc</u> h Roa	ture d,		SS - SPLIT SPOON											
1.7/07	DESCRIBE	ED BY:	<u>K.</u> S	Schaller	CHECKED BY:		III RC - ROCK CORE ▼ - WATER LEVEL															
ate: 2/	DATE (ST	ART):	Janu	uary 19, 2021	DATE (FINISH)): _	Januar	y 19, :	2021													
	NORTHIN	G:	502	7618.043	EASTING:		449176	6.612														
JG WITH GRAPH+WELL	Depth	Elevation (m) BGS	Stratigraphy		IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15 cm/ RQD(%)	'N' Value/ SCR(%)	Shear test (Cu) \triangle Field Sensitivity (S) \square Lab \bigcirc Water content (%) \bigcirc "N" Value (blows / 12 in30 cm)										
	Feet Metres	82.22			D SURFACE			%			N	10	20 30	0 40	50 60	70 8	30 90	-				
GLB Report: S(FILL : SILTY SAND and (moist, very dense	GRAVEL, brown,	X	SS1	54	6	28-35-17-10	52	0			•			-				
	² - 0.76 3 - 1.0	81.46		BEDROCK (inferre grey, moist, very d	ed), shale fragments, ense	- X	SS2	100	7	15-40-50/ 125mm	50+	0						-				
	4 — - 5 — - -					X	SS3	100	4	45-50/ 75mm	50+				•			-				
FIIE: GHU	6 2.0 7					×	SS4	100	4	50/ 125mm	50+	0			•			-				
LIDIALY FI	8 2.52 9	79.70		\auger refusal	/		SS5	100	3	50/ 75mm	50+	0			•			-				
GLJ CLJ	10 3.0			END OF BOREHO	<u>LE :</u>													-				
00/8-80.	11 — 12 —			NOTE : - End of Borehole :	at 2.52 m bgs ckfilled with bentonite											+		-				
12021 1/8/2GD	13 - 4.0			- boleniole was bac holeplug and seale - bgs donates 'belo	ed with cold patch													-				
N	14 											$\left \right $		_	+	+	++	-				
	16 -															_		-				
	10 5.0 17																	1				
															\square	-	\square	1				
	19 <u>-</u> 20 <u>-</u> 6.0																\square	-				
ASE /8-(21 -																+	-				
UA I ABASE	22															-	+	-				
Y LUG	23 <u>-</u> 7.0 24 <u>-</u>																++	-				
LEGAC	24 <u>+</u> 25 <u>-</u>																	-				
111 BRUNEL/LEGAC	26 8.0											Ħ				+	$\downarrow \downarrow$	4				
9	27 —											Ħ				+	\ddagger	4				
- AUGA -	28 — - 29 — -															+	\ddagger	4				
20	30 - 9.0																\ddagger	-				
N:\CA\MISS	31 															\pm	++	-				
LIG:	32 —																	+				

REFERENCE No.:	11205379-90							ENCLOSURE No.: 8							
	BOREHOLE No.	: _		MW8	-21		В	OREHOLE REPORT							
GHD	ELEVATION:		82	.20 m			-	Page: <u>1</u> of <u>1</u>							
CLIENT: Infra	structure Ontario (I.O.)					LEGEND									
PROJECT: Preli Child LOCATION: Ottav	iminary Geotechnical Investigation - Propos dren's Hospital of Eastern Ontario Campus wa, Ontario	sed - 4(<u>Parking</u>)1 Smyt	<u>Struc</u> h Roa	───── SS - SPLIT SPOON ST - SHELBY TUBE										
_	challer CHECKED BY:		S. Sha	hangi	an		II RC - ROCK CORE ▼ - WATER LEVEL								
	uary 18, 2021 DATE (FINISH)						÷								
northing: 5027	7647.908 EASTING:		44921	1.832											
Depth Depth (m) BGS Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15 cm/ RQD(%)	'N' Value/ SCR(%)	Shear test (Cu) △ Field Sensitivity (S) □ Lab ○ Water content (%) ↓ ↓ Atterberg limits (%) ● "N" Value (blows / 12 in30 cm)							
Feet Metres 82.20	GROUND SURFACE			%			Ν	10 20 30 40 50 60 70 80 90							
22 U _ 0.05 82.15	\ASPHALT : 50 mm		GS1		5			0.31 m-							
	SANDY GRAVEL, brown, moist, loose Gravel : 61%, Sand : 33%, Clay : 2%, Silt ~: 6%	\square	SS1	100	7	3-4-2-3	6	Bentonite							
	BEDROCK (inferred), shale fragments, reddish brown/grey, wet, very dense	Í	SS2	100	18	23-50/ 150mm	50+	1.22 m #2 Sand							
		×	SS3	100	8	50/ 100mm	50+	- G → ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓							
	∖auger refusal		SS4	100	4	50/ 75mm	50+	0 2.14 m21 2.22 m							
	END OF BOREHOLE :														
	NOTE : - End of Borehole at 2.22 m bgs - Borehole was dry upon completion														
12 – 12 – 13 – 4.0	- Monitoring well installed at 2.14 m bgs - Groundwater found at 2.03 m bgs on January 28, 2021														
14 –	- Groundwater found at 2.09 m bgs on February 10, 2021 - bgs donates 'below ground surface'														
24 <u>-</u> - - - - - - - - - - - - - - - - - -															
28 – – – – – – – – – – – – – – – – – – –															
30 <u>-</u> 9.0															

REFERENCE No.: 1120537	79-90								ENCLOSURE No.: 9								
01112	BOREHOLE No.:			B1-2	21		B	OREH		RFF	PORT						
GHD	ELEVATION:		82.	29 m			Page: <u>1</u> of <u>1</u>										
CLIENT: Infrastructure Or	ntario (I.O.)						<u>LE</u>	GEND									
PROJECT: Preliminary Geo Children's Hospi LOCATION: Ottawa, Ontario	technical Investigation - Proposi ital of Eastern Ontario Campus -	al Investigation - Proposed Parking Structure astern Ontario Campus - 401 Smyth Road,								SS - SPLIT SPOON ST - SHELBY TUBE C - ROCK CORE							
DESCRIBED BY: K. Schaller	CHECKED BY:	CHECKED BY: <u>S. Shahangian</u>															
DATE (START): <u>January 18, 202</u>	1 DATE (FINISH):	:	Januar	y 18, 2													
NORTHING: 5027580.742	EASTING:		449219	9.213													
	DESCRIPTION OF DIL AND BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15 cm/ RQD(%)	'N' Value/ SCR(%)	Shear test Sensitivity (Water Atterbe w _p w ₁ M'' Vali (blows / 12	S) ´ content org limits	(%) ≋ (%)	Field Lab						
	GROUND SURFACE			%			Ν	10 20 30	40 50 6	0 70 80	90						
FILL : FILL : SILTY SAI	ND and GRAVEL, greyish ist, loose	-	SS1	62	2	7-3-2-3	5										
3 - 0.91 - 1.04 81.38 81.25 Clay, brow Gravel : 38	l GRAVEL, some silt, trace n, moist, very dense 9%, Sand : 39%, Clay : 7%, Silt	-X	SS2	89	10	9-24-50/ 125mm	50+										
[™] 6 red/grey, r	K, shale fragments, brownish noist, very dense																
	OREHOLE :																
	orehole at 1.04 m bgs was dry upon completion																
5 10 - 5 11 - 2 - bgs dona	ates 'below ground surface'																
$\frac{22}{12}$ $\frac{12}{12}$ $\frac{1}{12}$ $\frac{1}{12$																	
14 - 1 15 - 1 15 - 1 16 - 5.0																	
											\square						
$21 - \frac{1}{1}$ $22 - \frac{1}{1}$ $23 - \frac{1}{1}$ 7.0																	
25											+						
											+						
											+						
22 23 30 31 											+						
											+						
											+-1						

	REFEREN	ICE No.	·	11205379-90		ENCLOSURE No.:10														
					BOREHOLE No.:	_		B2-2	21		В	OR	FH		ΕI	REP	^o OF	۶T		
		6	ind		ELEVATION:		82.	18 m			Page: <u>1</u> of <u>1</u>									
	CLIENT:		Infra	astructure Ontario (I.0	O.)						LEGEND									
	PROJECT		Chile	iminary Geotechnica dren's Hospital of Ea wa, Ontario	al Investigation - Propos astern Ontario Campus -	ed - 40	Parking)1 Smyt	Struc h Roa	ture d,		SS - SPLIT SPOON									
26/21	DESCRIBI	ED BY:	<u>K.</u> S	challer	CHECKED BY:		I RC - ROCK CORE ▼ - WATER LEVEL													
Date: 2	DATE (ST	ART):	Janu	uary 18, 2021	DATE (FINISH):															
VELL	NORTHIN	G:	5027	7629.392	EASTING:		449254	1.399	1	1	1	1								
JG WITH GRAPH+V	Depth	Elevation (m) BGS	Stratigraphy		IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15 cm/ RQD(%)	'N' Value/ SCR(%)	Ser ○ ₩ _p ₩	ear tes nsitivity Wate Attern "N" Va ws / 1	/ (S) er cont berg li alue	ent (% mits (%) %)	Field Lab			
JIL LC	Feet Metres	82.18			D SURFACE			%			N	10	20 30	40 5	0 60	70 80 9	90			
Report: S(FILL : SILTY SAND and (moist, dense	GRAVEL, brown,		SS1	71	4	13-17-24-9	41	0		•						
_V02.GLB	$\begin{array}{c} - & - \\ 3 & - & - & 0.91 \\ - & - & 1.0 \\ 4 & - & - \end{array}$	81.27		BEDROCK, shale t dense	fragments, grey, very	\mathbb{N}	SS2	100	10	4-10-28-34	38	0								
SEOTECH	4 5 — 1.52	80.66				X	SS3		9	22-50/ 150mm	50+									
S GHD G	6 2.0 7			END OF BOREHOL																
ibrary File:	8 - <u>-</u> 9 - <u>-</u>			 End of Borehole a Borehole was dry bgs donates 'below 	upon completion															
0.GPJ L	10 3.0																			
05379 - 9	11 — <u>[</u> 													_						
05379\112	13 – 4.0 14 –																			
053\1120	15 — 																			
20\112	16																			
11\11	18 19 																			
\8-CHAR\	20 6.0																			
ATABASE	21 <u>+</u> 22 <u>-</u>																			
VLOG D/	23 - 7.0													_						
-\LEGAC'	24 — 25 —													-						
BRUNEL	26 – 8.0 27 –																			
GA - 111	28																			
SSISSAU	29 — — 30 — 9.0																			
N:\CA\MI\$	31 —																			
File: D	32 —																			

	REFEREN	ICE No.	:	11205379-90			ENCLOSURE No.:												
		6			BOREHOLE No.:	_		B3-2	21		BOREHOLE REPORT								
		9	iHD		ELEVATION:		82.	27 m									_1_		
	CLIENT:		Infra	astructure Ontario (I.	0.)						LEC	GEN	D						
	PROJECT LOCATION		Prel Chil Otta	iminary Geotechnica dren's Hospital of Ea wa, Ontario	al Investigation - Propos astern Ontario Campus -	ed - 40	Parking)1 Smyt	<u>Struc</u> h Roa	<u>ture</u> d,		SS - SPLIT SPOON								
26/21	DESCRIB	ED BY:	<u>K.</u> S	challer	CHECKED BY:		II RC - ROCK CORE ▼ - WATER LEVEL												
ate: 2/	DATE (ST	ART):			DATE (FINISH):														
	NORTHIN	G:	502	7652.016	EASTING:		449199	9.133											
G WITH GRAPH+W	Depth	Elevation (m) BGS	Stratigraphy		IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15 cm/ RQD(%)	'N' Value/ SCR(%)	Se O Wp V	"N" '	ity (S ter co erberg Value) ontent g limit		∆ Fie □ La		
	Feet Metres	82.27		GROUN	D SURFACE			%			N					,	80 90		
Report: SC	0 1 2 0.61	91.66		moist, loose	gravel, greyish brown,	\mathbb{N}	SS1	62	15	6-6-2-2	8	•	о С						
/02.GLB	3 1.0	81.00		\u03c8 trace to some clay Sand, some grave grey, moist, stiff	/ l, silt and clay, reddish	X	SS2	100	13	4-5-9-25	14								
OIECH_	4 1.22 1.37 5	81.05 80.90		BEDROCK (inferre	ed), shale fragments, y dense	×	SS3	100	7	50/ 150mm	50+	0			•			_	
GHD_GE	6			END OF BOREHO	L <u>E :</u>													_	
orary File:	8			NOTE : - End of Borehole : - Borehole was dry	upon completion													_	
GPJ LIK	9 <u>-</u> 10 <u>-</u> 3.0			- bgs donates 'belo	ow ground surface'														
5379 - 90	11 — 12 —														-			_	
5379/1120	13 - 4.0																	_	
53\1120	14 —[15 —														_			_	
01120	16																	_	
1112	18 -																	_	
FCHAR/1	$19 - \frac{1}{20} - \frac{1}{20} - 6.0$																	-	
ABASE\8	21 <u>-</u> 22 -																	_	
OG DAI	23 - 7.0														_			_	
GACYL	24														-			-	
NEL/LE	$25 - \frac{1}{26}$																	-	
11 BRU	²⁶ – 8.0 27 –																	_	
UGA - 1	28																		
SSISSA	29 <u>-</u> <u>+</u> 9.0 30 <u>-</u>																		
:\CA\MI	31 -																		
File: N:	32 —																		

,	REFEREN	CE No.	:	11205379						ENCLOSURE No.: 9									
					BOREHOLE No.:	_		MW9	-22		BOREHOLE REPORT								
					ELEVATION:		82	.0 m			Page: <u>1</u> of <u>1</u>								
	CLIENT:	Infrast	ructur	e Ontario (I.O.)	PROJECT: P	reli	minary	Geote	chnica	al Investigat	ion	LEGE	<u>ID</u>						
2	LOCATION	N:	401	Smyth Road, Ottaw	a, Ontario							🖂 ss	- S	PLIT SPOO	N				
: 1/9/:	DRILLING	RIG:	Trac	k Drill Rig	DRILLING MET	НО	D: <u>203</u>	mm C	D Ho	llow Stem A	ugers	⊠ ST ∎ RC		HELBY TUE					
L Date	DESCRIBE	ED BY:	<u>D.</u> A	sh	CHECKED BY:		A. Kha	ndeka	r			Ţ.		ATER LEV					
H+WEL	DATE (ST	ART):	19 J	uly 2022	DATE (FINISH):	_	19 July	2022											
GRAPI	NORTHIN	G:	5027	7588.5 m	EASTING:		44919 [,]	l.1 m		[1								
Library File: 11205379 GHD_GEOTECH_V05.GLB Report: 11205379 SOIL LOG WITH GRAPH+WELL Date: 1/9/22	Depth	Elevation (m)	Stratigraphy	DESCF SOIL AN	RIPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15cm/ RQD(%)	'N' Value/ SCR(%)	Shear tes Sensitivit O Wate W _p W ₁ Atter • "N" V (blows / 1	/ (S) ´ er conte berg lim alue	nits (%)					
120537	Feet Metres	82.0			D SURFACE				%			10 20 30	40 50	60 70 80 90					
port: 1		81.8		FILL : GM-SAND and GF moist, compact	RAVEL, grey/brown,	\mathbb{X}	SS1	62	6	9-8-10-4	18	0		0.2 m=					
SLB Re	2 0.8	81.2		NATIVE : ∖SM-SILTY SAND ;	,	$\overline{\mathbb{N}}$													
V05.0	$\begin{array}{c} 3 \\ 4 \end{array} + 1.0 \\ 4 \end{array}$			grey/brown, moist	compact to dense	Ň	SS2	83	3	2-11-27-50	38	0		bentonite					
OTECH	5 -			brown	, would of ou, light														
HD_GE	6 + 20																		
379 GF	7 - 2.0													2.1 m_	-				
11205	8 2.6	79.4		SHALE-BEDROC	K, highly to moderately														
y File:	9 <u>-</u> 10 <u>-</u> 3.0				ately bedded, weak to		RC1	90		13									
Librar					, g j														
I.GPJ	12 -																		
ADDITION.GPJ	13 - 4.0						RC2	100		40									
	14													screen					
GARA	15 — 16 —																		
RING	10 <u>-</u> 5.0 17 -																		
9 - PAI	18 —																		
120537	19 -						RC3	97		65				5.8 m-	- ■				
3ASE/1	20 6.0													sand	\exists				
DATAE	21					T								6.4 m-					
H/LOG	22 <u>-</u> 23 <u>-</u> 7.0																		
9\TECH	24						RC4	93		67			ber	ntonite seal					
120537	25 —																		
\662\11	26 _ 7.9	74.2		END OF BOREHO										7.9 m					
JECTS	27			NOTE :	<u></u>														
O/PRO	28			- End of Borehole - Rock coring from															
RONT(29 <u>-</u> <u>-</u> 9.0				nstalled at 5.79 m bgs														
CANTO	31 -			590 donatos Del	Si giodina bariabo														
File: N:\CA\TORONTO\PROJECTS\662\11205379\TECH\LOG DATABASE\11205379 - PARKING GARAGE	32 —												+						
шļ						1				1									

	REFEREN	CE No.	:	11205379								ENC	LOS	URE	No.:		10	
					BOREHOLE No.	: _		BH10	-22		B	OF	?FF	IOI	FF	REI	POF	RT
					ELEVATION:		82	.1 m			5				C			
	CLIENT:	Infrast	tructur	e Ontario (I.O.)	PROJECT: F	Preli	minary	Geote	chnica	al Investigat	ion	LI	EGEI	ND				
~	LOCATION	N:	401	Smyth Road, Ottaw	a, Ontario							\boxtimes] ss	-	SPLI	r spo	NOC	
1/9/2	DRILLING	RIG:	Trac	k Drill Rig	DRILLING MET	ГНС	D: <u>203</u>	mm C	D Ho	llow Stem A	ugers		ST		SHEL ROCI			
Date:	DESCRIBE	ED BY:	<u>D.</u> A	sh	CHECKED BY:		A. Kha	ndeka	ar			LL L] RC				EVEL	
+WELL	DATE (STA	ART):	12 J	uly 2022	DATE (FINISH)): _	12 July	/ 2022	2									
GRAPH	NORTHING	G:	502	7596.9 m	EASTING:		44916	7.5 m		1								
ADDITION.GPJ LIbrary File: 11205379 GHD_GEOTECH_V05.GLB Report: 11205379 SOIL LOG WITH GRAPH+WELL Date: 1/9/22	Depth	Elevation (m)	Stratigraphy		IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15cm/ RQD(%)	'N' Value/ SCR(%)	Ser	Nsitivit Wate Atter	er cont berg li alue	ent (% mits (%) %)	. Field] Lab	
20537	Feet Metres	82.1			D SURFACE				%			10	20 30	0 40 5	0 60	70 80	90	
Ë 1			\bigotimes	FILL : GM-SAND and GF		$\left \right $												
SLB Repo	1 -			trace clay, brown, Gravel : 43%, San Clay : 3%	moist, compact d : 43%, Silt : 11%,	X	SS1	83	3	16-13-12-4	25	0	•					
CH_V05.0	- 0.5 2 - 0.6	81.5		NATIVE														
GEOTEC	- 0.7	81.4		SM-SILTY SAND a clay, very dense	and GRAVEL, trace	/\/	SS2	87	6	7-38-50/ 75mm	88/ 75mm	0						
9 GHD	3 1.0			SHALE-BEDROCH	K, weathered, light												+	
120537	4 - 1.2	80.9		Borehole terminate	ed due to spoon and	_												
y File: 、	- 5 1.5			auger refusal END OF BOREHO														
Librar				NOTE :													+	
N.GPJ	6 —			- End of Borehole - Borehole was dry	upon completion													
ADDITIC	2.0 7			- bgs donates 'belo	ow ground surface													
ARAGE	-																	
KING G	8 2.5																	
79 - PAF	9 —																	
\112053																		
TABASE																		
OG DA	11 —																	
TECH	- 3.5 12 -																	
205379\	-																	
S\662\11	13 - 4.0												+	_			+	
ROJECT	 14												+	_		$\left \right $	+	
NTO/PF	45															$\left \right $	+	
ALTORC													+			$\left \right $	+	
File: N:\CA\TORONTO\PROJECTS\662\11205379\TECH\LOG DATABASE\11205379 - PARKING GARAGE	16 —																+	
- 1	1 1					1	1	1	1	1	1				i I	1 1	- I - I	

_	REFEREN	CE No	.:	11205379								ENCLOSURE No.: 11
					BOREHOLE No.:	_	E	3H11	-22		B	OREHOLE REPORT
		ì			ELEVATION:		82	.1 m				Page: <u>1</u> of <u>1</u>
	CLIENT:	Infras	tructur	re Ontario (I.O.)	PROJECT: _P	reli	minary (Geote	chnica	al Investigat	ion	LEGEND
3	LOCATION	N:	401	Smyth Road, Ottaw	a, Ontario							SS - SPLIT SPOON
19/1	DRILLING	RIG:	Trac	ck Drill Rig	DRILLING MET	но	D: <u>203</u>	mm C	D Ho	llow Stem A	ugers	ST - SHELBY TUBE
	DESCRIBE	ED BY:	<u>D.</u> A	Ash	CHECKED BY:		A. Kha	ndeka	ır			▼ - WATER LEVEL
	DATE (STA	ART):	18 J	July 2022	DATE (FINISH)	-	18 July	2022				
L L L L L L L L L L L L L L L L L L L	NORTHING	G:	502	7638.0 m	EASTING:	_	449184	l.6 m		I		
	Depth	Elevation (m)	Stratigraphy		IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15cm/ RQD(%)	'N' Value/ SCR(%)	Shear test (Cu) △ Field Sensitivity (S) □ Lab ○ Water content (%) ↓ Atterberg limits (%) ● "N" Value (blows / 12 in30 cm)
	Feet Metres	82.1			D SURFACE				%			10 20 30 40 50 60 70 80 90
	$\begin{array}{c} 1 \\ 1 \\ 2 \\ - \\ 2 \end{array} \begin{array}{c} - \\ 0.6 \end{array}$	81.5		trace clay, brown,	GRAVEL, trace silt, moist, compact d : 37%, Silt : 8%, Clay <i> </i>	X	SS1	67	2	19-17-11-3	28	
GLD .GLD	3 _ 0.9	81.3		<u>: 3%</u> NATIVE :		łX	SS2	62	9	3-6-11-14	17	
	4			SM-ML-SAND and grey/brown, moist,			SS3	100		50/ 75mm	50+	
ח פבט ב	6 <u>-</u> 7 <u>-</u> 2.0			SHALE-BEDROCI brown		M	SS4	100		50/ 50mm	50+	• • • • • • • • • • • • • • • • • • •
	8 <u>-</u> 2.5 9 <u>-</u> 10 <u>-</u> 3.0 11 <u>-</u>	79.6			K, moderately bedded, ered, medium strong,		RC1	78		36		
	12 – 13 – 4.0 13 – 4.0 14 – 15 – 15 – 1						RC2	100		60		
	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$						RC3	100		50		
	$\begin{array}{c} 22 & -1 \\ 23 & -1 \\ 24 & -1 \\ 25 & -1 \\ 26 & -1 \\ 26 & -1 \\ 8 \\ 0 \end{array}$	74.2					RC4	100		55		
N./OA/I UNO/NI O/F NOULO I O/00/11 1-0000	27			END OF BOREHO NOTE : - End of Borehole - Borehole was dry - bgs donates 'belo	at 7.98 m bgs vupon completion							

	REFEREN	ICE No.	:	11205379								ENCI	_050	IRE N	0.: _		12
					BOREHOLE No.	:	E	3H12	-22		В	OR	EΗ	OL	ER	REP	ORT
					ELEVATION:		82	.1 m			_						
	CLIENT:	Infrast	ructur	e Ontario (I.O.)	PROJECT: F	reli	minary (Geote	chnica	al Investigati	ion	LE	GEN	D			
	LOCATION	N:	401	Smyth Road, Ottaw	a, Ontario							\boxtimes	SS	- S	PLIT	SPOO	ON
1/9/2:	DRILLING	RIG:	Trac	k Drill Rig	DRILLING MET	ΉО	D: <u>203</u>	mm C	D Ho	llow Stem A	ugers		ST			BY TU	
Date:	DESCRIBE	ED BY:	D. A	sh	CHECKED BY:		A. Kha	ndeka	ır			⊔⊔ ▼	RC			CORI	
-WELL	DATE (ST	ART):	12 J	uly 2022	DATE (FINISH)	: _	12 July	2022									
RAPH	NORTHIN	G:	502	7590.3 m	EASTING:		449214	.3 m									
ADDITION.GPJ LIDEARY FILE: 11205379 GHD_GEOTECH_V05.GLB Report: 11205379 SOIL LOG WITH GRAPH+WELL Date: 1/9/22	Depth	Elevation (m)	Stratigraphy		IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15cm/ RQD(%)	'N' Value/ SCR(%)	Sen	Atterb "N" Va	(S) r conte perg lim	nits`(%	△ F □ L)	
20537	Feet Metres	82.1			D SURFACE				%			10	20 30	40 50	60 7	0 80 9	0
ort: 1					ne sand and silt, trace	\mathbb{N}											
B Rep	1 —				d : 14%, Clay & Silt :	X	SS1	46	3	13-25-5-5	30	0					
'05.GL	- 0.5			20%		$ \rangle$								N			
ECH_	2 0.7	81.4	XX	NATIVE :											\mathbf{X}		
GEOTI				SM-ML-SAND and brown, moist, very		IV	SS2	100	5	15-39-40-50/	79	0		++	+		
GHD	3			,,,						75mm							
05379	- 1.1 4	81.0		SHALE-BEDROCH	K, weathered, light		SS3	100		50/	50/						
e: 112	·			brown						0mm	0mm						
ary Fil	5 1.5																
Lib	-																
N.GPJ	6 - 1.8	80.2			ed due to spoon and	-											
DITIO	2.0			auger refusal													
	7 —			END OF BOREHO	<u>LE :</u>												
GARA	8			NOTE : - End of Borehole													_
KING	- 2.5			 Borehole was dry bgs donates 'below 	/ upon completion ow ground surface'												
9 - PAI	9 —																
20537	-																
ASE/1	10 - 3.0																
DATAB	+																
LOG	11																
TECH	- 3.5 12 -																
05379\	-																
62\112	13 - 4.0																
CTS/6	- 4.0																
PROJE	14 —																
NTO/F	- 4.5											\vdash		++			_
ITORC	15 —													++			_
File: N:\CA\TORONTO\PROJECTS\662\11205379\TECH\LOG DATABASE\11205379 - PARKING GARAGE	16													++			_
File	16 —																

_	REFEREN	ICE No.	:	11205379								EN	CLOS	SUR		D.: _		13	
					BOREHOLE No.:	_	E	3H13	-22		B	OF	RE	HC)LE	ER	EP	ORT	
			<u>a</u> HL		ELEVATION:		82	.2 m				•.					_1_		
	CLIENT:	Infrast	ructur	e Ontario (I.O.)	PROJECT: P	reli	minary (Geote	chnica	al Investigat	ion	L	EGE	END					
2	LOCATION	N:	401	Smyth Road, Ottaw	a, Ontario								s 🛛		- SI	PLIT	SPOC	ON	
: 1/9/2	DRILLING	RIG:	Trac	k Drill Rig	DRILLING METI	ю	D: <u>203</u>	mm C	D Ho	llow Stem A	ugers	E] s ⁻ R				Y TU CORI		
Date	DESCRIB	ED BY:	L. M	cCann/S. Wallis	CHECKED BY:		A. Kha	ndeka	ır				Ţ	-			R LEV		
+WEL	DATE (ST	ART):	4 Ju	ly 2022	DATE (FINISH):	_	4 July 2	2022											
GRAPH	NORTHIN	G:	5027	7615.5 m	EASTING:		449212	2.0 m											
Library File: 11205379 GHD_GEOTECH_V05.GLB_Report: 11205379 SOIL LOG WITH GRAPH+WELL Date: 1/9/22	Depth	Elevation (m)	Stratigraphy		IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15cm/ RQD(%)	'N' Value/ SCR(%)		ear te nsitiv Wa Atte "N" ows /	rity (S ater c erber Value	s) onter g limi	nt (%) its (%) cm)	∆ F □ L		
F 1	eet Metres	82.2			D SURFACE				%			10	20	30 40	0 50	60 70	80 90	0	
11 11	0 0.1 1	82.1	\bigotimes	∼ASPHALT : 75 mn FILL :	ו	M	SS1	100		10-13-10-5	23		•	$\left \right $	_				
Repo	· 2 /			GW-GM-SANDY (brown/grey, dry, co		Δ	001	100			20								
5.GLB	3 <u>-</u> 0.9 3 <u>-</u> 1.0 7 1.0	81.3 81.2		_ NATIVE :		$\overline{\mathbb{N}}$	SS2	71		2-2-11-15	13								
9 HO	4 _ 1:0	0.112		SP-GP-SAND and brown, moist, com	GRAVEL, trace clay, pact	\square									-				
EOTE	5				K, weathered, grey		RC1	82		0									
	6 <u>-</u> - 2:8	80.2		SHALE-BEDROC	K, moderately to highly	╢													
5379 0				weathered, thinly i moderately fractur	bedded, highly to														
: 1120	8 - <u>-</u> + 9 - <u>-</u>				ou, g. c,,cu.		RC2	95		10									
Z File	0 3.0																	_	
Libra	1																		
	2 —			occasional clay an	d shale layers														
ADDITION.GPJ	3 - 4.0																		
	4						RC3	100		37									
BARAG	5																		
	6 — 5.0			occasional clay an	d shale lavers								_	$\left \right $	+	+		_	
I PAR	7			,,,															
. 05379	9						RC4	100		43									
SE/112	20 _ 6.0						rto r	100											
2 TABA	21 -																		
40 00	22 - 6.6	75.5				┦╹													
2 ECHI	23 - 7.0			END OF BOREHO	<u>LE .</u>														
2 2379/1	24			NOTE : - End of Borehole															
Z/1120	25 <u>+</u> 26 <u>-</u> 80			 Borehole was dry Rock coring from 	1.32 m bgs									\square		\square			
2 12/66:	²⁶ 8.0			- bgs donates 'bel	ow ground sufface										+				
	28 —																		
	29											+		+		+	+	_	
ORON 3	80 - 9.0												+	\square	+	\downarrow			
File: N./CATORONTOPROJECTS/662/11205379/TECHLOG DATABASE/11205379 - PARKING GARAGE	31 <u>-</u>												+	\square	+	\ddagger			
File: 1 3	32 — +																		

Image: Section of the secting of the secting of th	_	REFEREN	CE No.	:	11205379								ENCLOS	URE N	0.:	1	4
ELEVATION:						BOREHOLE No.	:		3H14	-22		В	ORE	IOL	ER	EPC)RT
Interviewer 401 Smyth Road, Ottawa, Ontario Image: SS - SPLIT SP DRILLING RIG: Track Drill Rig DRILLING METHOD: 203mm OD Hollow Stem Augers SS - SPLIT SP DESCRIBED BY: D. Ash CHECKED BY: A. Khandekar - SPLIT SP DATE (START): 12 July 2022 DATE (FINISH): 12 July 2022 - WATER L NORTHING: 5027618.1 m EASTING: 449237.3 m - WATER L MORTHING: 5027618.1 m EASTING: 449237.3 m - WATER L MORTHING: 5027618.1 m EASTING: 449237.3 m - WATER L MORTHING: 5027618.1 m EASTING: 449237.3 m - WATER L MORTHING: 5027618.1 m EASTING: 449237.3 m - WATER L MORTHING: 5027618.1 m EASTING: 449237.3 m - WATER L MORTHING: SOIL AND BEDROCK Image: Biology of Bar Bio						ELEVATION:		82	.2 m			-					
Description		CLIENT:	Infrast	tructur	e Ontario (I.O.)	PROJECT: _F	reli	minary	Geote	chnica	al Investigat	ion	LEGE	ND			
Bit International Control DRILLING RIG: Track Drill Rig DRILLING METHOD: 203mm OD Hollow Stem Auges St St - SHELBY C - NOCK CC DESCRIBED BY: D.Ash CHECKED BY: A Khandekar - WATER L DATE (START): 12 July 2022 DATE (FINISH): 12 July 2022 - WATER L MORTHING: 5027618.1 m EASTING: 449237.3 m - WATER L Solid AND BEDROCK Solid AND BEDROCK Box St	5	LOCATION	l:	401	Smyth Road, Ottaw	a, Ontario							🖂 ss	- S	PLIT	SPOOI	N
Described BY: D. Ash CHECKED BY: A. Khandekar WATER L DATE (START): 12 July 2022 DATE (FINISH): 12 July 2022 WATER L NORTHING: 5027618.1 m EASTING: 449237.3 m See 30 (2000) See 30	: 1/9/2	DRILLING	RIG:	Trac	k Drill Rig	DRILLING MET	НО	D: <u>203</u>	mm C	D Ho	llow Stem A	ugers					E
DATE (START): 12 July 2022 DATE (FINISH): 12 July 2022 NORTHING: 5027618.1 m EASTING: 449237.3 m Image: Strength of the s	Date	DESCRIBE	D BY:	D. A	sh	CHECKED BY:		A. Kha	ndeka	ır							EL
NORTHING: 5027618.1 m EASTING: 449237.3 m Image: Source of the standard stress of the standard s	I+WELI	DATE (STA	ART):	12 J	uly 2022	DATE (FINISH)	: _	12 July	2022								
Image: Section of the sectio	GRAPH	NORTHING	G:	5027	7618.1 m	EASTING:		449237	7.3 m	1	I	I					
Fill GROUND SURFACE % 10 20 30 40 50 60 70 8C 1 -	9 SOIL LOG WITH	Depth	Elevation (m)	Stratigraphy			State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15cm/ RQD(%)	'N' Value/ SCR(%)	Sensitivit	y (S) er conte berg lin alue	nt (%) hits (%) cm)	∆ Fie □ Lat	
FILE: FILE: FILE: FILE: GW-GM-SANDY GRAVEL, trace silt, trace clay, brown, moist, dense Gravel: 66%, Sand : 22%, Clay & Silt: SS1 58 2 11-25-16-6 41 <td>20537</td> <td>Feet Metres</td> <td>82.2</td> <td></td> <td></td> <td>D SURFACE</td> <td></td> <td></td> <td></td> <td>%</td> <td></td> <td></td> <td>10 20 3</td> <td>0 40 50</td> <td>60 70</td> <td>80 90</td> <td>_</td>	20537	Feet Metres	82.2			D SURFACE				%			10 20 3	0 40 50	60 70	80 90	_
	4:\CA\TORONTO\PROJECTS\662\11205379\TECH\LOG DATABASE\11205379 - PARKING GARAGE	$\begin{array}{c} 0 \\ - \\ 1 \\ - \\ - \\ 0.5 \\ 2 \\ - \\ 0.5 \\ 2 \\ - \\ 0.5 \\ 2 \\ - \\ 0.5 \\ -$	81.6 81.5		FILL : GW-GM-SANDY (trace clay, brown, Gravel : 66%, San 12% NATIVE : SP-GP-SAND and trace clay, brown, SHALE-BEDROCI brown Borehole terminate auger refusal END OF BOREHO NOTE : - End of Borehole - Borehole was dry	GRAVEL, trace silt, moist, dense d : 22%, Clay & Silt : I GRAVEL, trace silt, moist, very dense K, weathered, light ed due to spoon and <u>LE :</u> at 1.22 m bgs y upon completion				2			0				

	REFEREN	CE No.:		11205379								ENC	LOSU	RE N	0.: _		15
					BOREHOLE No.:	_	E	3H15	-22		В	OR	EH	OL	ER	EPO	ORT
		9	ifil		Elevation:		82	.1 m							of		
	CLIENT:	Infrast	ructur	e Ontario (I.O.)	PROJECT: P	reli	minary (Geote	chnica	al Investigat	ion	LE	GEN	D			
2	LOCATION	I:	401	Smyth Road, Ottaw	a, Ontario								SS	- 5	PLIT	SPOO	N
: 1/9/2	DRILLING	RIG: _	Trac	k Drill Rig	DRILLING MET	но	D: <u>203</u>	mm C	D Ho	llow Stem A	ugers		ST RC		HELB		
Date	DESCRIBE	D BY:	D. A	sh	CHECKED BY:		A. Kha	ndeka	ır			Ţ			VATE		
1+WEL	DATE (STA	ART):	12 J	uly 2022	DATE (FINISH)	-	12 July	2022									
GRAPH	NORTHING	G:	5027	7642.6 m	EASTING:		449234	1.7 m									
9 SOIL LOG WITH	Depth	Elevation (m)	Stratigraphy	DESCR SOIL AN	RIPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15cm/ RQD(%)	'N' Value/ SCR(%)	Sen	ar test sitivity Water Atterb "N" Va ws / 12	(S) conte erg lin lue	nt (%) nits (%)	∆ Fi □ La	
20537	Feet Metres	82.1			D SURFACE				%			10	20 30	40 50	60 70	80 90	,
ADDITION.GPJ LIBRAY FIIe: 11205379 GHD_GEOTECH_V05.GLB Report: 11205379 SOIL LOG WITH GRAPH+WELL Date: 1/9/22	1	81.5		clay, brown, moist Gravel : 40%, San Clay : 3%	d : 47%, Silt : 10%,	$\left \right\rangle$	SS1	62	3	16-18-13-5	31	0	•				_
5379 GHD_GEOTECH	3 3 - 1.0 1.1	81.1		brown	K, weathered, light ed due to spoon and		SS2	100	6	20-25-50/ 125mm	75/ 125mn	O n					_
-ibrary File: 1120	4 — 5 — 1.5			END OF BOREHO NOTE : - End of Borehole													_
ADDITION.GPJ	6			- Borehole was dry - bgs donates 'belo	/ upon completion ow ground surface'												_
File: N:/CA\TORONTO\PROJECTS\662\11205379\TECH\LOG DATABASE\11205379 - PARKING GARAGE /	8 — - 2.5																_
E\11205379 - PA	9																_
LOG DATABAS	11 -																_
1205379\TECH\	+ 3.5 12 - 12 - 12																_
JECTS/662/1	¹³ – 4.0																_
DRONTO/PRC	14 — _ _ — 15 —																
File: N:\CA\TC	 16																_

	REFEREN	CE No.	:	11205379								ENCLOSURE No.: 16
					BOREHOLE No.:	_	E	3H16	-22		B	OREHOLE REPORT
					ELEVATION:		82	.1 m				Page: <u>1</u> of <u>1</u>
ľ	CLIENT:	Infrast	ructur	e Ontario (I.O.)	PROJECT: P	reli	minary (Geote	chnica	al Investigat	ion	LEGEND
N	LOCATION	N:	401	Smyth Road, Ottaw	a, Ontario							🔀 SS - SPLIT SPOON
7/8/1	DRILLING	RIG:	Trac	ck Drill Rig	DRILLING MET	но	D: <u>203</u>	mm C	D Ho	llow Stem A	ugers	s 🖾 ST - SHELBY TUBE
Date:	DESCRIBE	ED BY:	D. A	Ash	CHECKED BY:		A. Kha	ndeka	ır			I RC - ROCK CORE ▼ - WATER LEVEL
	DATE (ST	ART):	12 J	July 2022	DATE (FINISH):	: _	17 Dec	embe	r 202	2		
	NORTHIN	G:	502	7594.4 m	EASTING:		449262	2.3 m				
	Depth	Elevation (m)	Stratigraphy		IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15cm/ RQD(%)	'N' Value/ SCR(%)	Shear test (Cu) \triangle Field Sensitivity (S) \Box Lab Water content (%) \square_{μ_p} Atterberg limits (%) \square_{μ_p} N" Value (blows / 12 in30 cm)
10007	Feet Metres	82.1			D SURFACE				%			10 20 30 40 50 60 70 80 90
חובטים אינט אינייי	1	81.4		trace clay, brown, Gravel : 44%, San : 2% NATIVE :	d GRAVEL, trace silt, moist, compact d : 45%, Silt : 9%, Clay GRAVEL, trace silt,		SS1	54	3	2-6-8-6	14	
<u></u>	3 0.9	81.2		trace clay, brown, SHALE-BEDROCI	moist, compact/		SS2	87	7	2-4-11-14	15	
	4 - 1.2	80.9		Borehole terminate auger refusal	ed due to spoon and		SS3	100		50/ 0mm	50/ 0mm	
ary riit	5 1.5			END OF BOREHO	<u>LE :</u>							
	6 7 7 6 7 7			NOTE : - End of Borehole - Borehole was dry - bgs donates 'belo	upon completion							
	8 – – 2.5											
U - 6 100071	9											
	11 — — 3.5											
10100031112												
	13 — 4.0 14 —											
	- 4.5											
	15											
2	16 —											

	REFERENC	E No.:		11205379								ENCLOSURE No.: 17
					BOREHOLE No.:	_	I	3H17	-22		B	OREHOLE REPORT
					ELEVATION:		82	.1 m				Page: <u>1</u> of <u>1</u>
	CLIENT: _I	Infrast	ructur	e Ontario (I.O.)	PROJECT: P	reli	minary	Geote	chnica	al Investigati	ion	LEGEND
2	LOCATION:		401	Smyth Road, Ottaw	a, Ontario							SS - SPLIT SPOON
: 1/9/	DRILLING R	RIG: _	Trac	k Drill Rig	DRILLING MET	НО	D: <u>203</u>	mm C	D Ho	llow Stem A	ugers	s 🖾 ST - SHELBY TUBE
L Date	DESCRIBED	O BY:	<u>D.</u> A	sh	CHECKED BY:		A. Kha	ndeka	r			▼ - WATER LEVEL
1+WEL	DATE (STAF	RT): _	12 J	uly 2022	DATE (FINISH)	: _	12 July	2022				
GRAPI	NORTHING:	:	5027	7619.3 m	EASTING:		449258	3.6 m		1		
9 SOIL LOG WITH	Depth	Elevation (m)	Stratigraphy		RIPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15cm/ RQD(%)	'N' Value/ SCR(%)	Shear test (Cu) \bigtriangleup Field Sensitivity (S) \Box Lab \bigcirc Water content (%) W_{p} W ₁ Atterberg limits (%) (blows / 12 in30 cm)
20537	Feet Metres 8	82.1			D SURFACE				%			10 20 30 40 50 60 70 80 90
File: N:/CATTORONTOPPROJECTS/662/11205379/TECH/LOG DATABASE/1205379 - PARKING GARAGE ADDITION.GPJ LIbrary File: 11205379 GHD_GEOTECH_V05.GLB Report: 11205379 SOIL LOG WITH GRAPH+WELL Date: 1/9/22	0 - - - - - - - - - 0.5 2 - - 0.7 - - - - - - - - - - - - -	81.4 81.0 81.0		FILL : GW-GM-GRAVEL trace clay, brown, Gravel : 52%, San : 2%, NATIVE : SP-GP-SAND and trace clay, brown, SHALE-BEDROCI brown,	with SAND, trace silt, moist, compact d : 39%, Silt : 7%, Clay GRAVEL, trace silt, moist, compact , weathered, light due to spoon and <u>LE :</u> at 1.14 m bgs upon completion		SS1	54		4-10-17-11 3-8-22-50/ 75mm	30	
File: ∧	16 —											

_	REFEREN	ICE No.	:	11205379								ENC	LOS	URE	No.:		18	
					BOREHOLE No.:	_	E	3H18	-22		B	OR	?Fŀ	IOI	ΕF	SED	ORI	г
			GHL		ELEVATION:		82	.1 m								f <u>1</u>		•
	CLIENT:	Infrast	tructur	e Ontario (I.O.)	PROJECT: P	eli	minary (Geote	chnica	al Investigati	ion	LE	EGE	ND				
	LOCATION	N:	401	Smyth Road, Ottaw	a, Ontario								SS	-	SPLIT	SPO	ЛС	
1/9/22	DRILLING	RIG:	Trac	k Drill Rig	DRILLING METI	ю	D: 203	nm C	D Ho	llow Stem A	ugers		ST	-		BY TU		
Date:	DESCRIB	ED BY:	D. A	sh	CHECKED BY:		A. Kha	ndeka	ır			LL T] RC			< COR ER LE\		
VELL				uly 2022								-	-					
RAPH+/	NORTHIN	G:	5027	7645.0 m	EASTING:		449256	.7 m										
Library File: 11205379 GHD_GEOTECH_V05.GLB Report: 11205379 SOIL LOG WITH GRAPH+WELL Date: 1/9/22	Depth	Elevation (m)	Stratigraphy		IPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15cm/ RQD(%)	'N' Value/ SCR(%)	Ser ⊖ w _p w	Nsitivii Wat Atte	st (Cu) y (S) er con rberg l /alue 12 in:	tent (% imits (% 30 cm)		ield ab	
20537	Feet Metres	82.1		GROUN	D SURFACE				%			10	20 3	0 40 5	50 60 7	70 80 9	0	
port: 112					GRAVEL with sand, y, grey/brown, moist,	M	SS1	62		9-8-10-4	18							
GLB Re	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	81.5 81.3		⊂ compact ∣Gravel : 73%, San	d : 21%, Silt : 5%, Clay∬	\mathbb{N}	SS2	83		2-11-27-50	38							
CH_V05.	4			NATIVE :	GRAVEL, trace silt,	Δ	002	00		2-11-27-50	00			-				
GEOTE	5 - 1.4 5 - 1.4 6	80.7		trace clay, moist, c SHALE-BEDROCI	ense		RC1	100		0								
79 GHD	7 <u>-</u> 2.0				K, moderately to highly													
112053	8 — <u> </u>		իկկկ	moderately strong	edded, very weak to grey/black													
ary File:	10 <u>-</u> 3.0						RC2	100		0								
یا Libr																		
z	12 — 13 — 4.0																	
	14																	
Ϋ́	15 — 16 — - 5.0						RC3	100		36								
PARKIN	17																	
05379 -	18 — 19 —																	
4SE/112	20 _ 6.0																	
DATAB/	21 —						RC4	100		51								
H/LOG	22 <u>-</u> 23 <u>- 7</u> .0																	
VTECH	23 <u>-</u> 7.0 <u>-</u> 7.1 24 <u>-</u>	75.0																
205379	25 —			END OF BOREHO														
362/11:	26 _ 8.0			NOTE : - End of Borehole														
ECTS	27 -			 Rock coring from Borehole was dry 	upon completion													
PROJE	28 —			- bgs donates 'belo	ow ground surface'								\square	\mp			-	
NTO/	29																	
VTORC	30 —											\vdash				$\left \right $	\vdash	
N:\CA	31											\square					\square	
File:	32 —																	

	REFEREN	CE No.	:	11205379								ENCLO	SURE	No.:		19
					BOREHOLE No.:	:		BH19	-22		B	ORE	ноі	EF	REP	ORT
					ELEVATION:		81	.1 m					ge: <u>1</u>			
ľ	CLIENT:	Infrast	ructur	e Ontario (I.O.)	PROJECT: P	reli	minary	Geote	chnica	al Investigat	ion	LEG	END			
~	LOCATION	N:	401	Smyth Road, Ottaw	a, Ontario							⊠ s	s -	SPLIT	SPO	N
1/9/2	DRILLING	RIG:	Trac	ck Drill Rig	DRILLING MET	ΉО	D: 203	mm C	D Ho	llow Stem A	ugers	⊠ S ∏ R			BY TU COR	
Date:	DESCRIBE	ED BY:	D. A	sh	CHECKED BY:		A. Kha	ndeka	ır			⊥⊥ ∩ Ţ			ER LE	
+WELL	DATE (STA	ART):	14 J	luly 2022	DATE (FINISH)	: _	14 July	/ 2022								
GRAPH	NORTHING	G:	502	7588.9 m	EASTING:		449046	6.7 m		1						
9 SOIL LOG WITH 0	Depth	Elevation (m)	Stratigraphy		RIPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15cm/ RQD(%)	'N' Value/ SCR(%)	Sensitiv OW: W _p W ₁ Att	ater con terberg l	tent (% imits (%	△ F □ L) 6)	
20537	Feet Metres	81.1			D SURFACE				%			10 20	30 40 5	50 60 7	0 80 9	0
CH_V05.GLB Report: 112	$ \begin{array}{c} 0 & - & 0.1 \\ - & & 0.1 \\ 1 & - & & - \\ - & & 0.5 \\ 2 & - & & 0.7 \\ \end{array} $	81.0		clay, brown, loose	AND, trace silt, trace		SS1	79		4-5-3-6	8	•				
File: N:/CATTORONTOPPROJECTS(662/11205379/TECH/LOG DATABASE/11205379 - PARKING GARAGE ADDITION.GPJ Library File: 11205379 GHD_GEOTECH_V05.GLB Report: 11205379 SOIL LOG WITH GRAPH+WELL Date: 1/9/22	$\begin{array}{c} & - & 0.9 \\ 3 & - & 1.0 \\ 4 & - & \\ & - & 1.4 \\ 5 & - & 1.5 \\ \end{array}$	80.2		Trace clay, brown, Gravel : 31%, San Clay : 7% SHALE-BEDROCI brown to grey/blac	d : 46%, Silt : 16%, <, weathered, light k		SS2	71		17-33-50/ 125mm	83/ 125mn	1				
(ING GARAGE ADDITION.GPJ LI	6 6 2.0 7 8 8 2.5			NOTE : - End of Borehole - Borehole was dry - bgs donates 'belo	upon completion											
VSE/11205379 - PARK	9 – 10 – 3.0															
CH/LOG DATAB/	+ 11 - - 3.5															
379/TEC	12 —															
11205.																
TS\662	13 - 4.0												++			
SOJEC	14 —												+			
NTO/PF													+			
TORO	15 — 4.5												++			
N:\CA\																
File:	16 —															

	REFEREN	CE No.	:	11205379								ENCLOSU	IRE No	.:	20	
					BOREHOLE No.:	_	Ν	/W20	-22		B	OREH	OLE		POI	RT
					ELEVATION:		81	.2 m						of <u>1</u>		
ľ	CLIENT:	Infras	tructur	e Ontario (I.O.)	PROJECT: P	reli	minary	Geote	chnica	al Investigati	ion	LEGEN	ID			
2	LOCATION	N:	401	Smyth Road, Ottaw	a, Ontario							🖂 ss	- SF	PLIT SPO	DON	
: 1/9/2	DRILLING	RIG:	Trac	ck Drill Rig	DRILLING MET	НО	D: <u>203</u>	mm C	D Ho	llow Stem A	ugers	⊠ ST ∎ RC		IELBY T CK CO		
- Date	DESCRIBE	ED BY:	<u>D.</u> A	Nsh	CHECKED BY:		A. Kha	ndeka	ır			Ţ		ATER L		
H+WEL	DATE (ST	ART):	14 J	luly 2022	DATE (FINISH)	: _	14 July	2022								
GRAPH	NORTHIN	G:	502	7656.2 m	EASTING:		44909	5.7 m	1	1		I				
9 SOIL LOG WITH	Depth	Elevation (m)	Stratigraphy		RIPTION OF D BEDROCK	State	Type and Number	Recovery/ TCR(%)	Moisture Content	Blows per 15cm/ RQD(%)	'N' Value/ SCR(%)	Shear test Sensitivity Wate Market Sensitivity Wate Market Sensitivity Wate Market Sensitivity Wate Market Sensitivity Wate Market Sensitivity Market Market Sensitivity Market M	(S) r conten perg limi ilue	□ t (%) ts (%)	Field Lab	
20537	Feet Metres	81.2			D SURFACE				%			10 20 30	40 50	60 70 80	90	
File: N.CATTORONTOPROJECTS(862/11205379)TECHLOG DATABASE/1205379 - PARKING GARAGE ADDITION.GPJ LIbrary File: 11205379 GHD_GEOTECH_V05.GLB Report: 11205379 SOIL LOG WITH GRAPH+WELL Date: 1/9/22	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	81.1 80.5 80.2 79.6		ASPHALT : 75 mn FILL : SM-GRAVELLY S clay, brown, moist Gravel : 36%, San Clay : 4% NATIVE : SP-GP-SAND and trace clay, brown, Gravel : 46%, San : 4% SHALE-BEDROCI Borehole terminate auger refusal END OF BOREHO NOTE : - End of Borehole - Monitoring well ir	AND, some silt, trace , compact d : 44%, Silt : 16%, GRAVEL, trace silt, moist, dense d : 41%, Silt : 9%, Clay K, weathered, grey ed due to spoon and LE :		SS1 SS2 SS3	58 87 100	5	6-10-8-5 8-21-29-27 50/ 75mm	18 50/ 75mm	0			m n	
CTS/662	16 - 5.0															
PROJE	17														\parallel	
ONTO															\parallel	
A/TOR	18 5.5													$\left \right $	+	
File: N:\C	19															



Clie	ent:	Infrastructure Ontario			Lab No.:	G-21-01	
	ject, Site:	Proposed Parking Structure Children's Hospital of Easterr 401 Smyth Road, Ottawa, Or	n Ontario Car Itario		Project No.:	11205379-80	
	Borehole No.:	B1-21			Sample No.:	SS2	
	Depth:	0.7-1.0r	n		Enclosure:	-	
	100						
	100						
	90						10
	80						20
	70						30
_	70						
assing	60						detaine
Percent Passing	50						Bercent Retained
Per	10						
	40						60
	30						70
	20						80
	10						90
	0.001	0.01	0.1 Diameter	r (mm)		10	100 <u>100</u>
		Clay & Silt		Sand		Gravel	
			Fine Size Limits as	Mediu per USCS (ASTM		Fine Coarse	
		Soil Description		Gravel (%)	Sand (%)	Clay & Silt (%)	
	s	and and Gravel, some Silt, trace Cl	ay	39	39	22	
		Clay-size particles (<0.002 mm)	:			7 %	
Rei	marks:						
_							
Pei	formed by:	Z. Mat	hurin		Date:	February 10, 202	21
Vei	ified by:	E. Ber	nett		Date:	February 17, 202	21



Client	:	Infrastructure Ontario		Lab No.:	G-21-01	
	ct, Site:	Proposed Parking Structure Children's Hospital of Eastern C 401 Smyth Road, Ottawa, Ontar	ntario Campus io	Project No.:	11205379-80	
Во	prehole No.:	B3-21		Sample No.:	SS2	
De	epth:	0.7-1.0		Enclosure:	-	
100 90 80)					0 10 20
70)					30
60 56 40 30 20 10		0.01 0.1 Clay & Silt	Diameter (mm)		I I	40 Percent Herein 40 For an and the second s
		Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)	
	Sand	d, some Gravel, some Silt, some Clay	19	50	31	
		Clay-size particles (<0.002 mm):		1	14 %	
Rema	rks:					
Perfor	med by:	Z. Mathurin		Date:	February 10, 202	:1
Verifie	ed by:	E. Bennett		Date:	February 17, 202	1



Client:		Infrastructure Ontario		Lab No.:	G-21-01		
	ject, Site:	Proposed Parking Structure Children's Hospital of Eastern 401 Smyth Road, Ottawa, Or	n Ontario Campus ntario	Project No.:	11205379-80	_	
	Borehole No.	BH1-21		Sample No.:	Grab		
	Depth:	0.1-0.3m		Enclosure:	-		
	100					0	
	90					10	
	80					20	
	70					30	
Percent Passing	60					Percent Retained	
ent P	50					50 50	
Perc						Perc	
	40					60	
	30					70	
	20					80	
	20					80	
	10					90	
						100	
	0.001	0.01	0.1 Diameter (mm) 1		10 100	J	
		Clay & Silt	Sand Fine Mediu	ım Coarse	Gravel Fine Coarse		
		Particle-Si	ze Limits as per USCS (ASTM				
		Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)		
		Gravel and Sand, trace Silt, trace Clay	48	41	11	-	
					3 %		
Rei	narks:						
				D-1-	Estation 40,0004		
	formed by:	Z. Mathu		Date: February 10, 202 ⁻			
Ver	ified by:	E. Benn	ett	Date:	February 17, 2021		



Client:		Infrastructure Ontario		Lab No.:	G-21-01	
Pro	ject, Site:	Proposed Parking Structure Children's Hospital of Eastern 401 Smyth Road, Ottawa, Or	n Ontario Campus Itario	Project No.:	11205379-80	
	Borehole No.	: BH2-21		Sample No.:	Grab	
	Depth:	0.1-0.3m		Enclosure:	_	
	100					
	90					10
	80					20
	70					
_	70					
assing	60					tetaine
Percent Passing	50					Percent Retained
Per	40					60 5
	40					60
	30					70
	20					80
	10					90
	10					
	0.001	0.01	0.1 Diameter (mm) 1		10	100 100
		Clay & Silt	Sand		Gravel	
			Fine Mediu ze Limits as per USCS (ASTM		Fine Coarse	
		Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)	
		Sand and Gravel, trace Silt, trace Clay	42	50	8	
					2 %	
Rei	narks:					
	_					
Per	formed by:	Z. Mathu	ırin	Date:		
Ver	ified by:	E. Benn	ett	Date:	February 17, 2021	



Client:		Infrastructure Ontario		Lab No.:	G-21-01		
Pro	oject, Site:	Proposed Parking Structure Children's Hospital of Eastern (401 Smyth Road, Ottawa, Onta	ntario Campus	_ Project No.:	11205379-80		
	Borehole No.:	BH2-21	10	Sample No.:	SS1		
	Depth:	0.5-0.8m		Enclosure:			
	Deptil.			Enclosure.			
	100					● 0	
	90					10	
	80					20	
	70					30	
assing	60					40 40 Hercent Bercent Bercent Bercent	
Percent Passing	50					50 50	
Perc						Perc	
	40					60	
	30					70	
	20						
	20					80	
	10					90	
	0					100	
	0.001	0.01 0.	Diameter (mm)		10	100	
		Clay & Silt	Sand Fine Medi	um Coarse	Gravel Fine Coarse	_	
		Particle-Size	imits as per USCS (ASTM		Fille Coarse		
		Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)		
	Sa	nd, some Silt, some Gravel, trace Clay	15	61	24		
		Clay-size particles (<0.002 mm):			6 %		
Re	marks:						
Pe	formed by:	Z. Mathurin		Date:	te: February 10, 2021		
Ve	rified by:	E. Bennet		Date:	February 17, 202	1	



Client:		Infrastructure Ontario		Lab No.:	G-21-01	
	ject, Site:	Proposed Parking Structure Children's Hospital of Eastern Ont 401 Smyth Road, Ottawa, Ontario	ario Campus	Project No.:	11205379-80	
	Borehole No.:	BH4-21		Sample No.:	SS1	
	Depth:	0.2-0.5m		Enclosure:	-	
-						
	100				· · · · · · · · · · · · · · · · · · ·	● 0
	90					10
	80					20
	70					
	70					30
Percent Passing	60					bercent Retained
ent Pa	50					50 50
Perc						Perc
	40					60
	30					70
	20					80
	10					90
	0					100
	0.001	0.01 0.1	iameter (mm)		10	100
		Clay & Silt	Sand		Gravel]
			Fine Medi ts as per USCS (ASTM		Fine Coarse	
						-
		Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)	
	C	Gravel and Sand, trace Silt, trace Clay	46	41	13	
					3 %	
Rer	narks:					
Per	formed by:	Z. Mathurin		Date:	February 10, 202	1
Ver	ified by:	E. Bennett		Date:	February 17, 202	1



Client:		Infrastructure Ontario		Lab No.:	G-21-01		
	ject, Site:	Proposed Parking Structure Children's Hospital of Eastern On 401 Smyth Road, Ottawa, Ontario		_ Project No.:	11205379-80		
	Borehole No.:	MW5-21		Sample No.:	Grab		
	Depth:	0.1-0.3m		Enclosure:	-		
	100					• • •	
	90					10	
	90					10	
	80					20	
	70					30	
_	10						
Percent Passing	60					40 40 Hercent Betained	
ent Pa	50					Sent Ba	
Perc						Perc	
	40					60	
	30					70	
	20					80	
	10					90	
	0.001	0.01 0.1	Diameter (mm)		10	100 <u>100</u>	
		Clay & Silt	Sand Fine Media	um Coarse	Gravel Fine Coarse		
		Particle-Size Li	hits as per USCS (ASTN]	
		Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)		
	C	Gravel and Sand, some Silt, trace Clay	43	41	16		
		Clay-size particles (<0.002 mm):			3 %		
Rer	narks:						
Per	formed by:	Z. Mathurin		Date:	February 10, 202 [.]	1	
	ified by:	E. Bennett		Date: February 17, 2021			



Cli	ent:	Infrastructure Ontario		Lab No.:	G-21-01	
	oject, Site:	Proposed Parking Structure Children's Hospital of Eastern On 401 Smyth Road, Ottawa, Ontario	ario Campus	Project No.:	11205379-80	
	Borehole No.:	MW5-21		Sample No.:	SS1	
	Depth:	0.5-0.8m		Enclosure:	-	
	100				· · · · · · · · · · · · · · · · · · ·	● 0
	90					10
	80					20
	70					30
bc						eq
Passir	60					Retain 05
Percent Passing	50					40 40 Bercent Bercent Bercent Bercent
4	40					60 •
	20					
	30					70
	20					80
	10					90
	0					100
	0.001	0.01 0.1	1 Diameter (mm)		10	100
		Clay & Silt	Sand Fine Mediu	um Coarse	Gravel Fine Coarse	
		Particle-Size Lir	hits as per USCS (ASTM		rine Coalse	
		Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)	
	(Gravelly Sand, some Silt, trace Clay	23	49	28	
		Clay-size particles (<0.002 mm):			8 %	
Re	marks:					
Pe	formed by:	Z. Mathurin		Date:	February 10, 202	1
Ve	rified by:	E. Bennett		Date:	February 17, 202	1



Clie	ent:	Infrastructure Ontario		Lab No.:	G-21-01	
Pro	ject, Site:	Proposed Parking Structure Children's Hospital of Eastern Or 401 Smyth Road, Ottawa, Ontario	tario Campus	- Project No.:	11205379-80	
	Borehole No.:	MW6-21		Sample No.:	SS2	
	Depth:	0.8-1.1m		Enclosure:	-	
	100					
	90					10
	80					20
	70					30
_	70					
assing	60					etaine
Percent Passing	50					Bercent Retained
Perc						Perc
	40					60
	30					70
	20					80
	10					90
	0					100
	0.001	0.01 0.1	Diameter (mm)		10	100
		Clay & Silt	Sand		Gravel	
			Fine Mediu nits as per USCS (ASTM		Fine Coarse	
		Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)	
	(Gravelly, Sand, some Silt, trace Clay	32	45	23	
		Clay-size particles (<0.002 mm):			7 %	
Rei	narks:					
Per	formed by:	Z. Mathurin		Date:	February 10, 2021	
Ver	ified by:	E. Bennett		Date:	February 17, 2021	



Client:		Infrastructure Ontario		Lab No.:	G-21-01			
	ject, Site:	Proposed Parking Structure Children's Hospital of Easte 401 Smyth Road, Ottawa, 0	ern Ontario Campus	Project No.:				
	Borehole No.:	MW8-2	1	Sample No.:	Grab			
	Depth:	0.0-0.3r	n	Enclosure:	-			
	100							
	90					10		
	80					20		
	80					20		
	70					30		
sing	60					40 in		
nt Pas						nt Ret		
Percent Passing	50					Generation Percent Retained		
	40					60		
	30					70		
	30					70		
	20					80		
	10					90		
	0		•			100		
	0.001	0.01	0.1 Diameter (mm)	1	10	100		
		Clay & Silt		nd Madium Caaraa	Gravel			
		Particle-	Fine Size Limits as per USCS	Medium Coarse	e Fine Coarse			
		Soil Description	Gravel	(%) Sand (%)) Clay & Silt (%)			
		Sandy Gravel, trace Silt, trace Clay	61	33	6			
					2 %			
Rer	narks: 							
Per	formed by:	Z. Mati	nurin	Date:	February 10, 20	21		
Ver	ified by:	E. Ber	inett	Date:	Date: February 17, 202			



Clie	nt:							Infr	astr	uct	ure	θO	ntar	rio						La	bl	No.:			G-22-03										
Pro	ject, S	Site:						С	hild	lrer	ו H	os	pital							_Pro	oje	ctl	No.	:	-			1	120)537	79			_	
	Boreł	hole No.:							BH	110-	-22								_	Sa	mp	le N	lo.:		_				SS	S-1					
	Dept	h:							0 -	0,6 ⁻	1 m	<u>1</u>							-	En	clos	sure	e:		-					-					
Percent Passing	100 90 80 70 60 50 30 20 10																										/	/						0 10 20 30 40 50 60 70 80 90	Percent Retained
	0.00	01	-	•		0.01						0.	¹ Di	iame	ter (r	nm)			1							1	0						100	100))
	Г																	nd						_				Grav	/el			7			
				Cla	ay 8	k Silt								ine				N	/ledi	um			ars	e		Fir				coar	se				
									Par	ticle	ə-Si	zel	Limit	is a	s pe	r US	SCS	(A	STN	1 D-24	487)													
				ę	Soil	Des	crip	otion	ı						(Gra	vel	(%)		S	and	(%))				Cla	у&	Silt	t (%))			
		Gravel a	and S	and,	wit	h Sor	ne S	Silt a	ind 1	Frac	ces	of	Clay	'			43					43	3						1	4					
	_		Clay			e pai irticle					mn	n):												1 [.] 3										-	
Bor	narks																																		
Rei	liains	• <u>Mor</u>	e info	orma	tion	is av	vaila	ible	upor	n re	que	est.																							
Per	forme	ed by:			_	\sim	\nearrow		J.	. La		lde	9								[Dat	e:		_		A	ugı	ust ⁻	15,	202	22			
Verified by: Date: August 24, 2022																																			



Client:	Infrastructur	re Ontario	Lab No.:	G-22-03	_
Project, Site:	Children F	Hospital	Project No.:	11205379	_
Borehole No. Depth:	: BH11-2: 0 - 0,61 r		Sample No.: Enclosure:	SS-1	_
Bemerke	Clay & Silt Clay & Silt Soil Description avel and Sand, with Traces of Silt and Silt-size particles (%) : Clay-size particles (%) (<0.002 m	m):	Medium Coarse		00 00 00 00 00 00 00 00 00 00
_					_
Performed by:	J. Lalo	onde	Date:	August 11, 2022	
Verified by: Date: August 24, 2022					



Infrastructure On	0	Lab No.:	G-22-03					
Children Hospi		Project No.:	11205379	_				
BH12-22 0 - 0,61 m	Sample No.: Enclosure:	SS-1						
Soil Description	meter (mm) Sand ne Medi	ium Coarse		0 10 20 30 40 50 50 50 60 70 80 90 100				
J. Lalopde		_ Date: Date:	August 11, 2022					
	Children Hospital BH12-22 0 - 0,61 m 0 - 0,61 m	$\begin{array}{ $	Project No.: BH12-22 Sample No.: 0 - 0,61 m Enclosure:	Children Hospital Project No.: 11205379 BH12-22 Sample No.: SS-1 0-0.61 m Enclosure: - 0 0-0.61 m Image: Construction of the second of the se				



Clie	ent:							In	frast	truc	Lab No.: G-22-03 Iren Hospital Project No.: 11205379 114-22 Sample No.: SS-1 0,61 m Enclosure: - 0 - - <																								
Pro	ject	, Site:	_						Chil	dre	n F	lo	spit	tal							Pro <u></u>	ject	No) .:	_			1	120)537	79			_	
	Bor	ehole No	.: _						BI	H14	-22	2									Sam	ple	No.	:	_				S	S-1					
	Dep	oth:							0 -	- 0,6	61 r	n									Encl	osu	re:		_										
Percent Passing	100 90 80 70 60 50 40 30 20																										/		7					10 20 30 40 50 60 70	Percent Retained
	10											•		-		+																	9	90	
	0 0.	001				0.0	1					(J).1	Diar	nete	r (mr	n)			1						1	0							100	
				с	lay	& S	Silt										;	San										Grav							
									Ра	rticl	le-S	ize) Lir	Fir mits		per	USC	CS (Mec AST				oar	se		Fir	ie			Coar	se				
					So	oil C	Descr	iptic	on							G	rave	el ('	%)			San	d (%	%)			(Cla	у&	Silt	: (%)			
			Sandy (Grav	el, v	with	n Trac	ces c	of Sil	t an	d C	la	y				6	6				:	22						1	12					
							parti																									_			
			Clay	/-siz	e p	art	icles	(%)	(<0.	002	m	m)	:																						
Rer	nark	(s: <u>N</u>	lore inf	orma	atio	on is	s avai	ilable	e upo	on re	equ	ies	;t.																					_	
Per	forn	ned by:				/		\sum		J. Li	alo	ne	lę_									Da	te:				A	ugı	ust	11,	202	22		_	
Ver	ifiec	l by:	_			< (\geq		6	2	2		\$									Da	te:		_		A	ugı	ust	24,	202	22			



Cli	ent:		Die No.: BH15-22 Sample No.: SS-1 0 - 0,61 m Enclosure: -																																		
Pro	oject	, Site:						C	Chilo	dre	n ŀ	Ho	spi	tal								Pro	jec	ct N	lo.	:	_			1	120)53	79				
	Bor	ehole No.:							Bŀ	H15	5-22	2								_		Sam	nple	e N	o.:						S	S-1					
	Dep	oth:							0 -	0,6	61 i	m								_		Enc	los	ure	:		_					-					
	100 ·							1																		-	ТТ					-•	┍─┍╸	┍	▶	0	
	90 -																													Ζ						- 10	1
	80 -																													, 						- 20	
																												$\left \right $									
	70 -																										/									- 30	
Percent Passing	60																																			- 40	Percent Retained
Percent	50				+					+														/	4								+	+	++-	- 50	Percent
	40 -									-												/	\downarrow										\vdash			- 60	1
	30 -									_																							\square	_		- 70	1
	20 -									_																										- 80	1
	10 -											•	-	~	1																					- 90	1
	0 -		-		+																															- 10	0
	0.0	001				0.01							0.1	Dia	ame	ter (mm)			1							1	0						10		
				С	ay	& Sili	t							-	ine			s	an	d Me	dir		-	60	arse			Fir		Gra		C	irse				
									Pa	rtic	le-S	Size	e Li				er U	ISC				D-24			ai 30								130				
					Soi	il De	scrip	ptio	n								Gra	ave	1 (%	%)			Sa	nd	(%)				Cla	ıy &	Sil	lt (%	5)			
		Sand a	nd Gr	avel,	wi	th Sc	me	Silt a	and	Tra	ice	s o	f C	lay				40)					47	,							13					
			0			ze pa																				10											
			Clay	/-SIZ6	e pa	artic	ies (%) (<0.0	J02	m	m)	:													3											
Re	mark	к s: <u>М</u> с	ore inf	orma	tio	n is a	availa	able	upo	n r	eqı	ues	st.																								
Pe	forn	ned by:		(6			<u> </u>	J	. L	alc (nd	le									-	D	ate	e :		_		А	۱ug	ust	11,	, 20	22			
Ve	rified	l by:			$\overline{(}$	\sim	\geq	Ċ		2	2	5							Date: August 24, 2022																		



Client: Infrastructure Ontario Lab No.: Project, Site: Children Hospital Project No.: Borehole No.: BH16-22 Sample No.: Depth: 0-0.61 m Enclosure: 100 0 0 0 90 0 0 0 100 0 0 0 90 0 0 0 90 0 0 0 90 0 0 0 90 0 0 0 90 0 0 0 90 0 0 0 90 0 0 0 90 0 0 0 90 0 0 0 90 0 0 0 90 0 0 0 90 0 0 0 90 0 0 0 90 0 0 0 90 0 0 0 90 0														(G-2	2-0	3																				
Pro	ject	, Site	:							Chil	ldre	en H	Ю	spi	tal							Pro	ojec	ct N	lo.:		_			1	120	537	79			_	
	Bor	ehole	No.:							В	3H10	6-22	2							_		San	nple	e No	D.:						SS	S-1					
	Dep	oth:		_						0	- 0,	61 ı	m									Enc	los	ure			_					-	·	·			
	100																			Π											-•	-•	-	••	Т'	0	
	90	-																											\vdash				_		·	10	
	80																											ł	-				+			20	
	70	-																									/						-			30	þé
nt Passin																										/							+			40	Percent Retained
Perce																								/	/											50 60	Perce
																						/														70	
	20																					<i></i>														80	
	10										-			┢	~		1																		?	90	
	0 0.	001		•	•		0.	01						0.1	Dia	nete	r (mi	 m)			1							10)						 100	100	
																		:	Sar	d									(Grav	/el						
					C	lay	/ &	Silt		De	artic	-lo_9	Siz	ألم			nor		<u> </u>						irse	•		Fin	e		C	oar	se				
													512			-	per					0-24					-									7	
						So	oil	Desc	riptio	on							G	rav	el (%)			Sa	nd	(%))				Cla	у&	Silt	: (%)			
			Sand	and				vith T				and	IC	lay				4	4					45							1	1					
				Clay				e part ticles				2 m	m)):												9 2											
Rei	marl	(S:	Mor	e inf	orm	atio	on	is ava	ailable	e up	on r	equ	ues	st.																							
L														-l -									_										0.0.1			_	
		ned b	y :			Ć	_		7		J. L	alc.) N	de								-		ate			_				ust 1					_	
Vei	rified by:															-	D	ate	:		_		A	ugu	ust 2	24,	202	22		_							



Clie	90 90 80 70 60 50 50 50 50 50 50 50 50 50 5												-																								
Pro	ject,	Site:	_						C	Chilo	drei	n⊦	los	spit	al							_Pr	roje	ect	No	.:					112	053	379	1			-
	Bore	ehole No	.: _							Bł	H17	-22	2									Sa	amp	ole N	lo.:						S	SS-1	1				-
	Dep	th:	_							0 -	0,6	1 r	n									En	nclo	sure	э:							-					-
Percent Passing	90 - 80 - 70 - 60 - 50 -																													/						0 10 20 30 40 50 60 70 80 90	C C C C C C C C C C C C C C C C C C C
	0.0	01	-			0	0.01						C).1	Dia	met	ter (r	mm)			1				<u> </u>				10						1	⊥ ₁₍ 00	00
	[Cla		Silt												Sa	and										Gra	avel]		
						ya				Pa	rticl	e-S	Size	Li		ne as	s pe	er U	scs			ium VI D-2	248		oars	se		Fi	ne			Coa	arse	<u>)</u>	-		
	l r																			. (.,				1									1
					S	oil	Des	scrij	otio	n							C	Gra	vel	(%)		S	Sano	d (%	%)				Cl	ay 8	& Si	ilt (S	%)			
	-	S	Sandy	Gra	vel	, w	ith T	race	es of	f Silt	t an	d C	Clay	/					52					3	9							9					
							e pa																				7										
	ļ		Cla	iy-si	ize	ра	rticl	es (%) (<0.(002	mı	m):			_										2	2										
Rei	nark	s: <u>N</u>	lore in	forn	nati	ion	is a	vaila	able	upo	on re	equ	les	t.																							- -
Per	form	ed by:	_			_		\		J	نم ا	alo	nd	е								_		Dat	e:					Au	gus	t 9,	, 20)22			-
Ver	ified	by:	_																																		



Clie	ent:		_						Infr	astr	uct	ure	e 0	ntari	0					_L	ab N	lo.:				G-22-03 11205379 SS-1 - - 0 10 20 30 40 90 40 90 10 10 10 10 10 10 10 10 10 1								
Pro	ject	, Site:	_						C	Child	ren	H	osp	oital						_P	roje	ct N	lo.:				11	1205	5379	9				
		ehole No).: _								118-								_		ampl							SS	-1					
	Dep	oth:	_							0 -	0,6′	1 m	1						_	E	nclos	sure						-						
Percent Passing	100 90 80 70 60 50 40 30 20																															- 10 - 20 - 30 - 40 - 50 - 60 - 70	Percent Retained	
	10								-		•	-•		-+	-	+	-	-	-								-					- 90)	
	0.0	001	•			C	0.01	-					0.1	1 Dia	amete	er (mr	n)		1	1						10					1(10	
					Cla	y 8	& Silt										5	San				_			_		irave							
										Par	ticle	ə-Si	ze l	Fi Limits	ine s as	per	USC		Med ASTI				arse		FI	ne		C	oars	e	-			
					s	ioil	l Des	scrij	ptio	n						Gı	rave	əl (%	6)		Si	and	(%)			C	Clay	/& \$	Silt ((%)				
		ç	Sandy	Gra	vel	, w	ith T	race	es of	Silt	and	I CI	ay				7	3				21						6						
				S	ilt-s	siz	e pa	rtic	les (%):														5										
			Cla	ıy-si	ize	ра	articl	les ((%) (<0.0	02 I	mm	ו):											1										
Rer	nark	(s: <u>N</u>	/lore in	lforn	nat	ion	ı is a	vaila	able	upoi	n re	que	est.																					
Per	forn	ned by:	_		/			7		J.	Lą	lor	nde)								Date):			А	ugı	ust §	9, 20)22				
Ver	ifiec	l by:	_		$\langle $	2	\leq		0	20	2	Ł								_	[Date	:		August 9, 2022 August 24, 2022									



Clie	nt:	Ehole No.: BH19-22 Sample No.: SS-2 oth: 0.76 - 1.37 m Enclosure: -										
Proj	ect, Site:	Children H	ospital		Project No.:	11205379						
	Borehole No.	: ВН19-22		_	Sample No.:	SS-2						
	Depth:	0,76 - 1,37	m		Enclosure:	<u> </u>						
Percent Passing		Clay & Silt	Diame	Sand			- 10 - 20 - 30 - 40 peuisaa - 50 peuisaa - 50 peuisaa - 60 - 70 - 80 - 90					
			(0)									
	Sand	and Gravel, with Some Silt and Traces Silt-size particles (%) :	of Clay	31	46	23						
		Clay-size particles (%) (<0.002 mm	ו):		7							
Ren	iarks: <u>M</u>	lore information is available upon reque	est.									
Perf	ormed by:	J. Lajor	nde		Date:	August 17, 2022						
Veri	fied by:	- Coal			Date:	August 24, 2022						



Clie	nt:	Infrastructure	e Ontario		Lab No.:	G-22-03 11205379 SS-1 - 0 10 20 30 40 90 50 90 100						
Pro	ject, Site:	Children H	lospital		Project No.:	11205379						
	Borehole No Depth:	p.: MW20-22 0,00 - 0,61			Sample No.: Enclosure:							
Percent Passing	100 90 80 70 60 50 40 30 20 10 0.001 Sance	Image: Clay & Silt Clay & Silt Soil Description	Fine ize Limits a	ter (mm) 1 Sand Sand Gravel (%)		Gravel Fine Coarse Clay & Silt (%) 20	- 10 - 20 - 30 - 40 - 100 - 50 - 100					
		Silt-size particles (%) : Clay-size particles (%) (<0.002 mn	n).		16							
		More information is available upon requ	est.				 					
	formed by: ified by:	J. Lalo	nde)		Date:	August 9, 2022						
ver	ineu by.)		Date.	August 24, 2022						



Clie	ent:							Inf	rast	ruc	tur	re (Onta	ario						La	b١	lo.:			_			G	i-22	2-03				-
Pro	ject, Sit	e:						(Chil	dre	n F	Hos	spita	al						_Pro	oje	ct I	۱o.	:	_			11	205	5379	9			-
	Borehole Depth:	e No.:							M\ 0,61	W2										Sa En		e N sure			_				SS- -					-
Percent Passing						0.01								Fine			Sa		ledi	um		Cos	arse			10	G						0 10 20 30 40 50 70 80 90 10	Percent Retained
									Ра	rtic	le-S	Size	Lim	its a	as p	er U	SCS	6 (A	STN	1 D-24	487)												
					So	il De	escri	iptio	n							Gra	vel	(%)		Sa	and	(%)			c	Clay	& S	Silt (%)			
		Gra	avel	and	Saı	nd, ⁻	Trace	es of	Silt	and	d C	lay					46					41							13	3				
			Clay				oartic cles				m	m):	:											9 4										
Rei	marks:	Mor	e inf	orma	atio	n is	avai	lable	upc	on r	equ	Jes	t.																					-
Per	formed	by:			1				L	J. L	alq	nd	е								0	Date	e:		_		A	ugu	ıst 9	9, 20)22			_
Ver	ified by:				\langle	\geq	\sim	k	X	X	2	<u>Y</u>	*								0	Date	e:		_		Αι	ıgu	st 2	3, 2	022	2		-



Client:		l	Infrastructure Or	ntario		Lab no.:	G-20-01
Project/Site:		CHEO P	roposed New Pa	arking Garage		Project no.:	11205379-80
Borehole no.:	BH3		Sample no.:		SS2	Depth: Date sampled:	0.6-1.2m 18-Jan-21
Apparatus: Liquid limit device no.: Sieve no.:	Hand		Balance no.: Oven no.: Glass plate no.:		1 1 1	Porcelain bowl no.: Spatula no.:	11
	Liquid Limit (LL):	I	Soil Preparati	on:		
	Test No. 1	Test No. 2	Test No. 3		Cohesive <425 µn		Dry preparation
Number of blows	30	25	20		Cohesive >425 µn	ו 🗹	Wet preparation
	Water Conte	nt:			Non-cohesive		
Tare no.	S39	S11	S32	4		Results	
Wet soil+tare, g	32.39	33.80	32.26	38.0			
Dry soil+tare, g	29.85	30.89	29.53	36.0			
Mass of water, g	2.54	2.91	2.73				
Tare, g	21.63	21.65	21.60	0.45 Water Content (%)			
Mass of soil, g	8.22	9.24	7.93	er Col			
Water content %	30.9%	31.5%	34.4%	Å 32.0			
Plastic Limit (P	L) - Water Conte	ent:					
Tare no.	S37	S18		30.0			
Wet soil+tare, g	28.17	28.51		28.0			
Dry soil+tare, g	27.24	27.53			15 17 19	21 23 25 27 Nb Blows	29 31 33 35
Mass of water, g	0.93	0.98			Soil	Plasticity Chart	
Tare, g	21.98	22.23		70		LL 5D	
Mass of soil, g	5.26	5.30		60	Low plasticity	High plastic Inorganic cl	ity
Water content %	17.7%	18.5%		۔ 50 –	Inorganic clay	Сн	
Average water content %	18.	1%		[#] / _− 40			
Natural Wate	er Content (W ⁿ)	:		tity Inde			
Tare no.	G		-	lastic	Low compressibility		MH and CH
Wet soil+tare, g	445.80			° 20 −	-Ilnorganic silt	 High inorg 	compressibility janic silt
Dry soil+tare, g	393.10			10		norganid sil	compressibility janic silt ianic clay npressibility t
Mass of water, g	52.70			0 +		ML and OL - Organic clay 30 40 50 60	70 80 90 100
Tare, g	0.00			0	10 20 3	20 40 50 60 Liquid Limit LL	10 00 90 100
Mass of soil, g	393.10			Liquid Limit	Plastic Limit (PL)	Plasticity Index (PI)	Natural Water Content W
Water content %	13.4%		-	(LL) 32	18	14	13
Remarks:	1		1			1	
Performed by:		Ali E	lhaddad		Date:	Feb	ruary 12, 2021
Verified by:		FI	Bennett		Date:	Feb	ruary 18, 2021



Client:			nfrastructure On	tario		Lab no.:	G-22-03
Project/Site:			Children Hospi	tal		Project no.:	11205379
Borehole no.:	BH13-22		Sample no.:		SS-2	Depth:	0,61 - 1,22 m
Soil Description:						Date sampled:	
Apparatus:	Hand	Crank	Balance no.:	8033	3031049	Porcelain bowl no.:	1
Liquid limit device no.:		1	Oven no.:	B23	-04645	Spatula no.:	1
Sieve no.:	015	5690	Glass plate no.:		1		
	Liquid Limit	(LL):		Soil Preparati	on:		
	Test No. 1	Test No. 2	Test No. 3		Cohesive <425 µr	n 🗸	Dry preparation
Number of blows					Cohesive >425 µr	n 🗆	Wet preparation
	Water Conte	ent:			Non-cohesive		
Tare no.						Results	
Wet soil+tare, g				2.0			
Dry soil+tare, g							
Mass of water, g				(%)			
Tare, g				ntent			
Mass of soil, g				Water Content (%)			
Water content %				Wat			
Plastic Limit (Pl	L) - Water Cont	ent:					
Tare no.							
Wet soil+tare, g				0.0			
Dry soil+tare, g					15 17	19 21 Nb Blows	23 25 27
Mass of water, g					Soil	Plasticity Chart AST	M D2487
Tare, g				70		LL 50	
Mass of soil, g				60	Lean clay (CL)	Fat clay (
Water content %				ын 1 50 —			
Average water content %						Organic cla	ау ОН
Natural Wate	r Content (W ⁿ):			Orga	nic clay OL	
Tare no.					ty clay (CL (ML)	7 Ela	astic silt MH
Wet soil+tare, g				20 —		Org	anic silt OH
Dry soil+tare, g				10		Organic silt	
Mass of water, g				0	10 20 3	ML OL 01	70 80 90 100
Tare, g						Liquid Limit LL	
Mass of soil, g				Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	Natural Water Content W ⁿ
Water content %							
Remarks:	Non-Plastic S	Sample		-			
Performed by:			atonde		Date:	Sente	ember 13, 2022
			V				
Verified by:	-	jage	3		Date:	Septe	ember 13, 2022
Laboratory Location:	179 Col	onnade Rd. S	uite 400, Ottawa	, Ontario			



Client:			Infrastructure On	tario		Lab no.:	G-22-03
Project/Site:			Children Hospi	tal		Project no.:	11205379
Borehole no.:	BH19-22	2	Sample no.:		SS-2	Depth:	0,76 - 1,37 m
Soil Description:						Date sampled:	
Apparatus:	Hand	Crank	Balance no.:	8033	3031049	Porcelain bowl no.:	1
Liquid limit device no.:		1	Oven no.:	B23	-04645	Spatula no.:	1
Sieve no.:	015	5690	Glass plate no.:		1	-	
	Liquid Limit	(LL):		Soil Preparati	on:		
	Test No. 1	Test No. 2	Test No. 3	7	Cohesive <425 µr	n 🗸	Dry preparation
Number of blows					Cohesive >425 µr	n 🗆	Wet preparation
	Water Conte	ent:			Non-cohesive		
Tare no.						Results	
Wet soil+tare, g				2.0			
Dry soil+tare, g							
Mass of water, g				(%)			
Tare, g				ntent (
Mass of soil, g				Water Content (%)			
Water content %				Wat			
Plastic Limit (Pl	L) - Water Cont	tent:					
Tare no.							
Wet soil+tare, g				0.0			
Dry soil+tare, g			1		15 17	19 21 Nb Blows	23 25 27
Mass of water, g					Soil	Plasticity Chart ASTI	M D2487
Tare, g			1	70		LL 50	
Mass of soil, g				60 -	Lean clay (CL)	Fat clay	
Water content %				14 			
Average water content %		1		50 — = IT-ЪГ ичех ы		Organic cla	ау ОН
Natural Wate	r Content (W ⁿ):			Orga	anic clay OL	
Tare no.				Last Si	ty clay (CL (ML)-	T EI	astic silt MH
Wet soil+tare, g				20		Org	anic silt OH
Dry soil+tare, g				10		Organic silt	
Mass of water, g			1	0	10 20 3	ML OL 60	70 80 90 100
Tare, g			1			Liquid Limit LL	
Mass of soil, g				Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	Natural Water Content W ⁿ
Water content %							
Remarks:	Non-Plastic S	Sample	·				
Performed by:	\frown		Alonde		Date:	Sent	ember 13, 2022
Verified by:	$\langle $	In	\mathbf{V}		Date:		ember 13, 2022
	$\overline{}$	<u>here</u>	5	.	Date:	3ept	51110GE 13, 2022
Laboratory Location:	179 Col	onnade Rd. S	uite 400, Ottawa	, Ontario			



Client:			Infrastructure On	tario		Lab no.:	G-22-03
Project/Site:			Children Hospi	ital		Project no.:	11205379
Borehole no.:	MW20-22	2	Sample no.:		SS-2	Depth:	0,61 - 1,22 m
Soil Description:						Date sampled:	
Apparatus:	Hand	Crank	Balance no.:	8033	3031049	Porcelain bowl no.:	1
Liquid limit device no.:		1	Oven no.:	B23	3-04645	Spatula no.:	1
Sieve no.:	015	5690	Glass plate no.:		1		
	Liquid Limit	(LL):		Soil Preparati	on:		
	Test No. 1	Test No. 2	Test No. 3		Cohesive <425 µr	n 🗸	Dry preparation
Number of blows					Cohesive >425 µr	n 🗆	Wet preparation
	Water Conte	ent:			Non-cohesive		
Tare no.						Results	
Wet soil+tare, g				2.0			
Dry soil+tare, g							
Mass of water, g				(%)			
Tare, g				ntent (
Mass of soil, g				Water Content (%)			
Water content %				Wat			
Plastic Limit (Pl	L) - Water Cont	ent:					
Tare no.							
Wet soil+tare, g				0.0			
Dry soil+tare, g					15 17	19 21 Nb Blows	23 25 27
Mass of water, g			-		Soil	Plasticity Chart ASTI	M D2487
Tare, g				70		LL 50	
Mass of soil, g				60 —	Lean clay (CL)	Fat clay	
Water content %				н - 50 -			
Average water content %						Organic cla	ау ОН
Natural Wate	r Content (W ⁿ):			Orga	Inic clay OL	
Tare no.				Last Si	lty clay (CL (ML)	T EI	astic silt (MH)
Wet soil+tare, g				20 —		Org	anic silt OH
Dry soil+tare, g			1	10		Organic silt	
Mass of water, g					10 20 3	ML OL 01	70 80 90 100
Tare, g				, i i i i i i i i i i i i i i i i i i i	10 20 0	Liquid Limit LL	
Mass of soil, g			1	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	Natural Water Content W ⁿ
Water content %							
Remarks:	Non-Plastic S	Sample				•	
Performed by:		<u> </u>	alonde		Date:	Sent	ember 13, 2022
			<u> </u>				
Verified by:	$-\epsilon$	100	5		Date:	Septe	ember 13, 2022
Laboratory Location:	179 Col	onnade Rd. S	uite 400, Ottawa	ı, Ontario			



Moisture Content of Soils (ASTM D 2216)

Client:	Infrastr	ucture Ontar	io		Lab No.:		G-22-03	
Project/Site:	Childr	en's Hospita	I		Project No.	:	1120	5379
Apparatus Used for Testing	Oven No.:	B23-0	04645	Scale No.:	80330	31049		
BH No.:					BH10-22	BH10-22	BH11-22	BH11-22
Sample No.:					SS1	SS2	SS1	SS2
Depth:					0,0-2,0	2,0-3,3	0,0-2,0	2,0-4,0
Container no.					32	25	28	4
Mass of container + wet soil (g)					70.50	70.00	75.70	72.80
Mass of container + dry soil (g)					68.90	66.80	74.40	68.10
Mass of container (g)					14.80	14.60	14.70	14.80
Mass of dry soil (g)					54.1	52.2	59.7	53.3
Mass of water (g)					1.6	3.2	1.3	4.7
Moisture content (%)					3.0	6.1	2.2	8.8
BH No.:	BH12-22	BH12-22	BH14-22	BH14-22	BH15-22	BH15-22	BH16-22	BH16-22
Sample No.:	SS1	SS2	SS1	SS2	SS1	SS2	SS1	SS2
Depth:	0,0-2,0	2,0-4,0	0,0-2,0	2,0-4,0	0,0-2,0	2,0-3,5	0.0-2,0	2,0-4,0
Container no.	42	15	14	35	18	9	13	23
Mass of container + wet soil (g)	83.70	74.40	79.40	74.00	61.00	62.70	78.90	58.40
Mass of container + dry soil (g)	81.60	71.80	77.90	71.10	59.50	60.20	77.00	55.40
Mass of container (g)	14.60	14.80	14.80	15.10	15.00	14.70	14.80	15.10
Mass of dry soil (g)	67.0	57.0	63.1	56.0	44.5	45.5	62.2	40.3
Mass of water (g)	2.1	2.6	1.5	2.9	1.5	2.5	1.9	3.0
Moisture content (%)	3.1	4.6	2.4	5.2	3.4	5.5	3.1	7.4
Remarks:								
Performed By:	J A Ba	antiste		Date:		. July 2	7, 2022	
Verified by :	= 000			Date:	August 3, 2022			



Moisture Content of Soils (ASTM D 2216)

Client:	Infrastr	ucture Ontar	io		Lab No.:	G-2	G-22-03	
Project/Site:	Childr	en's Hospita	I		Project No.:	1120	5379	
Apparatus Used for Testing	Oven No.:	B23-(04645	Scale No.:	80330310	949		
MW No.:	BH9-22	BH9-22						
Sample No.:	SS1	SS2						
Depth:	0,0-2,0	2,5-4,5						
Container no.	9	32						
Mass of container + wet soil (g)	59.30	55.60						
Mass of container + dry soil (g)	56.90	54.30						
Mass of container (g)	14.70	14.90						
Mass of dry soil (g)	42.2	39.4						
Mass of water (g)	2.4	1.3						
Moisture content (%)	5.7	3.3						
MW No.:	BH14	BH20-22	BH20-22					
Sample No.:	SS3B	SS1	SS2					
Depth:	2,4-5,1	0,5-2,5	2,5-4,5					
Container no.	23	16	28					
Mass of container + wet soil (g)	54.30	48.50	58.60					
Mass of container + dry soil (g)	52.60	47.00	56.40					
Mass of container (g)	15.00	14.90	14.90					
Mass of dry soil (g)	37.6	32.1	41.5					
Mass of water (g)	1.7	1.5	2.2					
Moisture content (%)	4.5	4.7	5.3					
Remarks:								
Performed By:	J A Ba	aptiste		Date:		July 27, 2022		
Verified by :	bce	<u>}</u>		Date:		August 3, 2022		

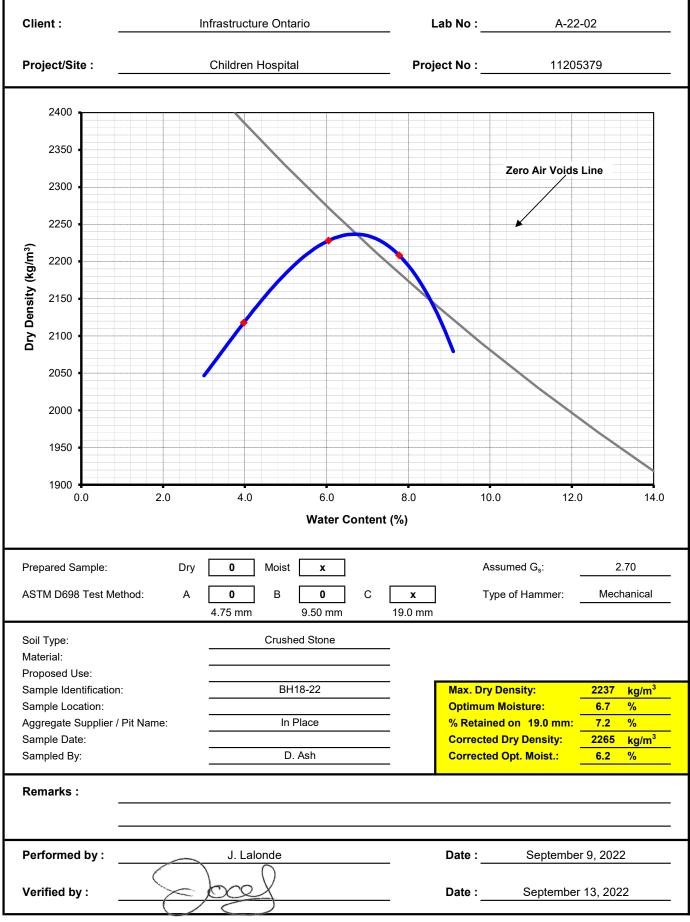
GHD

Standard Proctor Test (ASTM D698)

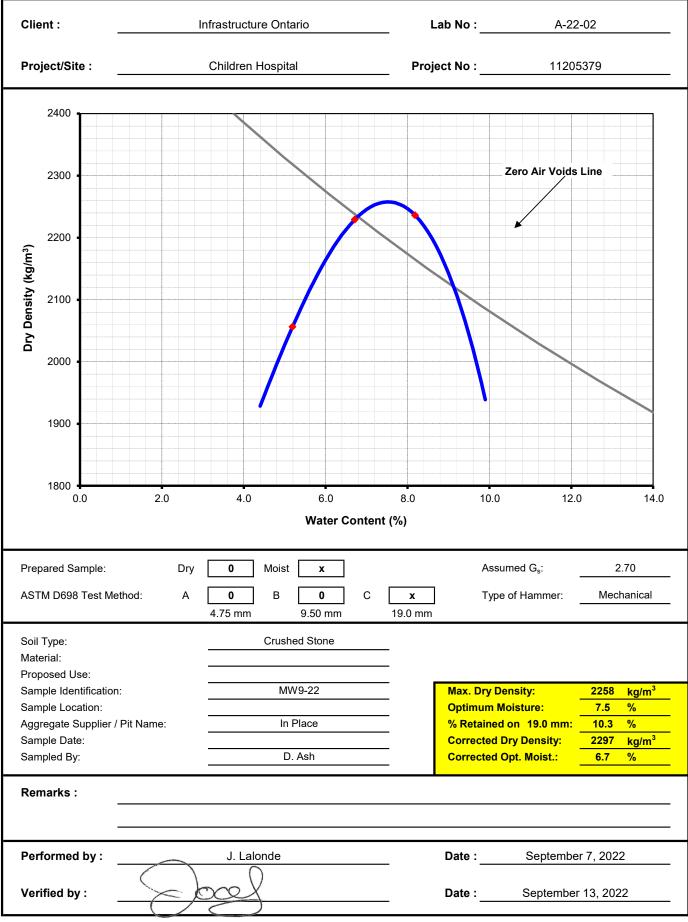
Client :	Ir	frastructure Ontari	0	Lab N	No :	A-22-02
Project/Site :		Children Hospital		Project N	No :	11205379
2400						
2300 •					Zero Air	Voids Line
2200 ·		/				
Dry Density (kg/m ³)						
کم 2000 •						
1900						
1800	2.0	4.0	6.0 Water Conte	8.0 ent (%)	10.0	12.0 14.0
Prepared Sample ASTM D698 Tes		0 Moist [0 B [4.75 mm S	x 0 C	x 19.0 mm	Assumed G _s : Type of Hamn	2.70 ner: Manual
Soil Type: Material:		Crushed				
Proposed Use: Sample Identifica Sample Location Aggregate Suppl		BH11 In Pla		OI	ax. Dry Density: ptimum Moisture: Retained on 19.0	2254 kg/m ³ 6.4 % mm: 2.8 %
Sample Date: Sampled By:		D. A		C	orrected Dry Dens orrected Opt. Mois	ity: 2254 kg/m ³
Remarks :						
Performed by	:	J. Lalonde		Da	ite : Sep	tember 2, 2022
Verified by :		bæl		Da	ite :Sep	tember 6, 2022

GHD

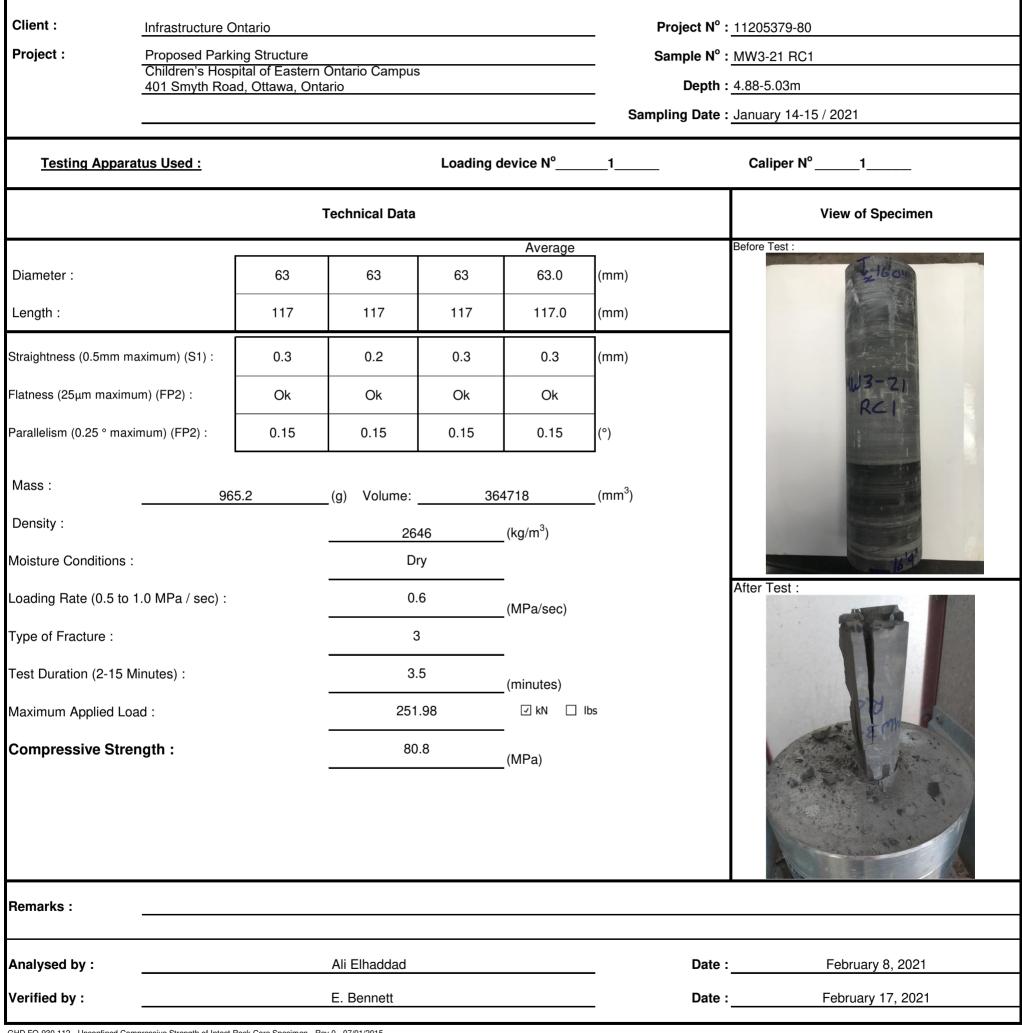
Standard Proctor Test (ASTM D698)



Standard Proctor Test (ASTM D698)









Client : Project :	Infrastructure C Proposed Parki Children's Hosp 401 Smyth Roa	ng Structure bital of Eastern	Ontario Campus ario		Project Nº : <u>11205379-80</u> Sample Nº : <u>MW3-21 RC2</u> Depth : <u>6.4-6.55m</u>			
Testing Appara	tus lleed :				device N ^o	Sampling 1	g Date : <u>·</u>	January 14-15 / 2021 Caliper Nº1
			Technical Data			'		View of Specimen
					Average	7	E	Before Test :
Diameter :		63	63	63	63.0	(mm)		
Length :		74	74	74	74.0	(mm)		21'0"
Straightness (0.5mm m	aximum) (S1) :	0.2	0.2	0.2	0.2	(mm)		
Flatness (25µm maximu	ım) (FP2) :	Ok	Ok	Ok	Ok			MW3-21
Parallelism (0.25 ° maxi	mum) (FP2) :	0.1	0.1	0.1	0.15	(°)		RC2
Mass : Density :	6	12	_(g) Volume:	23		(mm ³)		
				53	_(kg/m ³)			
Moisture Conditions :			Dr	Ŷ	-		-	After Test :
Loading Rate (0.5 to	1.0 MPa / sec) :		0.	6	(MPa/sec)			
Type of Fracture :			3	3	_			
Test Duration (2-15 M	linutes) :		4	Ļ	(minutes)			
Maximum Applied Lo	ad :		335	.49	🗹 kN 🗌	lbs		
Compressive Stre	ngth :		107	7.6	(MPa)			
								4
Remarks :								
Analysed by :			Ali Elhaddad				Date :	February 8, 2021
Verified by :			E. Bennett			_	Date :	February 17, 2021
			<u></u> , _,					



Client :	Infrastructure C	Intario				Pro	oject Nº :	11205379-80
Project :	Proposed Parki	ng Structure				Sar	mple N ^o :	MW3-21 RC3
	Children's Hosp 401 Smyth Roa	oital of Eastern <u>d, Ottawa, Ont</u> a	Ontario Campus ario	\$ 			Depth :	7.92-8.07m
						Samplii	ng Date :	January 14-15 / 2021
Testing Appara	itus Used :			Loading	device Nº	1		Caliper Nº1
			Technical Data					View of Specimen
Diameter :		63	63	63	Average 63.0	(mm)		Before Test :
Length :		78	78	78	78.0	(mm)		726'0'
Straightness (0.5mm m	aximum) (S1) :	0.3	0.2	0.3	0.3	(mm)		
Flatness (25µm maximu	um) (FP2) :	Ok	Ok	Ok	Ok	_		MW 3-21 RC3
Parallelism (0.25 ° maxi	mum) (FP2) :	0.1	0.15	0.1	0.15	(°)		
Mass :	65	6.6	(g) Volume:	24	3145	(mm ³)		
Density :	0		_	00	_(kg/m ³)	()		
Moisture Conditions :			Di	ry				16150
Loading Rate (0.5 to	1.0 MPa / sec) :		0.	.6	_ _(MPa/sec)			After Test :
Type of Fracture :			3	3				
Test Duration (2-15 M	linutes) :		3.	.5	_ (minutes)			
Maximum Applied Loa	ad :		260	0.09	✓ kN	lbs		111/22
Compressive Stre	ngth :		83	3.4	(MPa)			
								· · ··································
								The test of the second
Remarks :								
Analysed by :			Ali Elhaddad			_	Date :	•
Verified by :			E. Bennett			_	Date :	February 17, 2021



Client : Project :	Infrastructure C Proposed Parki Children's Hosp 401 Smyth Roa	Ontario Campus ario		Project N° : 11205379-80 Sample N° : MW3-21 RC5 Depth : 9.63-9.75m Sampling Date : January 14-15 / 2021				
Testing Appara	tus Used :			Loading	device Nº	1		Caliper Nº1
			Technical Data					View of Specimen
					Average			Before Test :
Diameter :		63	63	63	63.0	(mm)		J 31'74
Length :		91	91	91	91.0	(mm)		
Straightness (0.5mm ma	aximum) (S1) :	0.2	0.3	0.3	0.3	(mm)		MW 2-21
Flatness (25µm maximu	ım) (FP2) :	Ok	Ok	Ok	Ok			RC5
Parallelism (0.25 ° maxi	mum) (FP2) :	0.15	0.15	0.15	0.15	(°)		
Mass :	73	6.3	_(g) Volume:	28	3669	(mm ³)		
Density :			259	96	(kg/m ³)			
Moisture Conditions :			Dr	ſУ				
Loading Rate (0.5 to ⁻	I.0 MPa / sec) :		0.	6	(MPa/sec)			After Test :
Type of Fracture :			3	3				
Test Duration (2-15 M	linutes) :		4		(minutes)			
Maximum Applied Loa	ad :		251	.57	🗹 kN 🗌	lbs		-
Compressive Stre	ngth :		80	.7	_(MPa)			
Remarks :								
Analysed by :			Ali Elhaddad				Date :	February 8, 2021
Verified by :			E. Bennett			_	Date :	February 17, 2021



Client :	Infrastructure C	Intario				Project № : <u>11205379-80</u>			
Project :	Proposed Parki Children's Hosp	ng Structure bital of Fastern (Ontario Campus			Sam	ple Nº : <u>N</u>	/W6-21 RC2	
	401 Smyth Roa	d, Ottawa, Onta	ario					I.75-4.88m	
						Sampling	g Date : <u>.</u>	lanuary 14-15 / 2021	
Testing Appara	itus Used :			Loading o	levice N°	1		Caliper N ^o 1	
		٢	Fechnical Data					View of Specimen	
Diameter :		63	63	63	Average 63.0	(mm)	E	Before Test :	
						_			
Length :		86	86	86	86.0	(mm)			
Straightness (0.5mm m	aximum) (S1) :	0.3	0.3	0.3	0.3	(mm)		2130	
Flatness (25µm maximu	ım) (FP2) :	Ok	Ok	Ok	Ok			MW6-21	
Parallelism (0.25 ° maxi	mum) (FP2) :	0.15	0.15	0.15	0.15	(°)		RC2	
Mass :	70	2.4	(g) Volume:	26	8083	(mm ³)			
Density :			26		_(kg/m ³)	(,)		15'7" -16'	
Moisture Conditions :			Di		_(,				
Loading Rate (0.5 to	1.0 MPa / sec) :		0.	6	- (MPa/sec)		7	After Test :	
Type of Fracture :			3	}					
Test Duration (2-15 N	linutes) :		4	Ļ	- (minutes)			Carlo and the	
Maximum Applied Loa	ad :		294	4.5	_ (lbs			
Compressive Stre	ngth :		94	.5	(MPa)			THE REAL OF	
								A Company of the second se	
Remarks :									
Analysed by :			Ali Elhaddad			_	Date :	February 8, 2021	
Verified by :			E. Bennett				Date :_	February 17, 2021	



Client :	Infrastructure C	Intario				Project № : <u>11205379-80</u>		
Project :	Proposed Parki Children's Hosp	ng Structure pital of Eastern	Ontario Campus	3		Sam	ple Nº : <u>№</u>	IW6-21 RC4
	401 Smyth Roa	id, Ottawa, Onta	ario					.65-6.81m
						Sampling	g Date : Ja	anuary 14-15 / 2021
Testing Appara	tus Used :			Loading o	device N°	1		Caliper N ^o 1
		-	Technical Data					View of Specimen
Diamator :		63	63	63	Average	(mm)	B	efore Test :
Diameter :					63.0	(mm)		and the second
Length :		82	82	82	82.0	(mm)		72'0"
Straightness (0.5mm ma	aximum) (S1) :	0.3	0.3	0.3	0.3	(mm)		The second second
Flatness (25µm maximu	ım) (FP2) :	Ok	Ok	Ok	Ok			221
Parallelism (0.25 ° maxi	mum) (FP2) :	0.15	0.15	0.15	0.15	(°)		MW6-21
Mass :	67	6.1	(g) Volume:	25	5614	(mm ³)		
Density :			_	45	(kg/m ³)	_ ` ` `		Tan' WII E
Moisture Conditions :			Di		_()			C C C
Loading Rate (0.5 to ⁻	1.0 MPa / sec) :		0.	.6	- (MPa/sec)		А	fter Test :
Type of Fracture :			3	3	_(0.000)			
Test Duration (2-15 M	linutes) :		4	1	- (minutes)			
Maximum Applied Loa	ad :		311	.75	✓ kN	lbs		CTER! -
Compressive Stre	ngth :		100	0.0	(MPa)			
								and the second second
Remarks :								
Analysed by :			Ali Elhaddad			_	Date : _	February 8, 2021
Verified by :			E. Bennett				Date :	February 17, 2021



Client :	Infrastructure C	Ontario				Proje	ct N° :	11205379-80
Project :	Proposed Parki Children's Hosp	ng Structure	Ontorio Compus			Samp	le N° :	MW6-21 RC5
	401 Smyth Roa	id, Ottawa, Onta	ario	·		D	epth :	7.98-8.10m
						Sampling	Date :	January 14-15 / 2021
Testing Appara	itus Used :			Loading o	levice Nº	1		Caliper Nº1
		-	Fechnical Data					View of Specimen
Diameter :		63	63	63	Average 63.0	(mm)		Before Test :
						(mm) 		
Length :		93	93	93	93.0	(mm)		26'2
Straightness (0.5mm ma	aximum) (S1) :	0.3	0.3	0.3	0.3	(mm)		
Flatness (25µm maximu	um) (FP2) :	Ok	Ok	Ok	Ok			MWG-1
Parallelism (0.25 ° maxi	mum) (FP2) :	0.15	0.15	0.15	0.15	(°)		RCS
Mass :	77	6.4	(g) Volume:	28	9904	(mm ³)		
Density :			-	78	_(kg/m ³)	()		
Moisture Conditions :			D		_(((g),))			
Loading Rate (0.5 to	1.0 MPa / sec) :		0.	.6	- (MPa/sec)			After Test :
Type of Fracture :				1	(INF a/Sec)			
Test Duration (2-15 N	linutes) :		5	5	- (minutes)			
Maximum Applied Loa	ad :		318	8.7	_((()))	lbs		
Compressive Stre	ngth :		102	2.2	(MPa)			
					_ ` ` ` '			Par Kith
Remarks :								
Analysed by :			Ali Elhaddad			_	Date :	February 8, 2021
Verified by :			E. Bennett			_	Date :	February 17, 2021

Client :	Infrastructure C	Ontario				Project N°	: 11205379
Project :	Children's Hos	pital				Sample N ^o	: MW9-22 r.1
						Depth	: 3,20 - 3,31 m
						Sampling Date	:
Testing Appar	ratus Used :			Loadin	g device N°_9	9130	Caliper N°_1
		-	Technical Data				View of Specimen
					Average		Before Test :
Diameter :		63.09	63.09	63.21	63.13	(mm)	
Length :		109.59	108.25	109.84	109.23	(mm)	
Straightness (0.5mm n	naximum) (S1) :	0.4	0.4	0.4	0.4	(mm)	
Flatness (25µm maxim	um) (FP2) :	Ok	Ok	Ok	Ok	(μm)	
Parallelism (0.25 ° max	kimum) (FP2) :	0.15	0.20	0.20	0.18	(°)	After Test :
Mass :	91	3.8	_(g) Volume:	34	1893	_ (mm ³)	
Density :			267	73	_(kg/m ³)		
Moisture Conditions	:		Dr	У	_		The second s
Loading Rate (0.5 to	o 1.0 MPa / sec) :		0.5	58	(MPa/sec)		
Type of Fracture :			Multiple F	Fracture	_		
Test Duration (2-15	Minutes) :		12	3	(seconds)		
Maximum Applied Lo	oad :		222	.24	_ _(kN)		
Compressive Stre	ength :		71.	.0	_(MPa)		
Remarks :							
Analysed by :	J.Lalonde	\frown				Date	8/18/2022
Verified by :		<u>ez</u>				Date	8/25/2022
		and the second second					

Client :	Infrastructure C	Ontario				Project N ^o	: 11205379	
Project :	Children's Hos	oital				Sample N ^o	: MW9-22 r.2	
						Depth	: 4,04 - 4,14 m	
Testing Appar	atus Used :			Loadin	ng device N°_	9130	Caliper N ^o	_1
			Technical Data					View of Specimen
					Average		Before Test :	
Diameter :		63.18	63.20	63.00	63.13	(mm)		-
Length :		96.49	95.36	95.29	95.71	(mm)		「東部」
Straightness (0.5mm m	aximum) (S1) :	0.1	0.1	0.2	0.1	(mm)		
Flatness (25µm maxim	um) (FP2) :	Ok	Ok	Ok	Ok	(μm)		
Parallelism (0.25 ° max	imum) (FP2) :	0.05	0.10	0.10	0.08	(°)	After Test :	
Mass :	79	8.9	_(g) Volume: _	29	9563	(mm ³)		
Density :			266	57	(kg/m ³)			
Moisture Conditions	:		Dr	y	_			and the second sec
Loading Rate (0.5 to	1.0 MPa / sec) :		0.4	8	(MPa/sec)			
Type of Fracture :			Multiple F	racture	_			
Test Duration (2-15 I	Minutes) :		118	8	(seconds)			
Maximum Applied Lo	bad :		175.	67	_(kN)			
Compressive Stre	ength :		56.	1	_(MPa)			
Remarks :								
Analysed by :	Analysed by : J. Lalonde					Date	: 8/18/2022	
Verified by :	\rightarrow	bael	ξ			Date	: 8/25/2022	
			/	January 2021	1			

Client :	Infrastructure C	Ontario				Project N ^o	: 11205379	
Project :	Children's Hosp	pital				Sample N ^o	: BH13-22 r.3	
						Depth	: <u>3,61 - 3,71 m</u>	
						Sampling Date	:	
Testing Appara	itus Used :			Loadir	ng device N°_	9130	Caliper Nº_1	
			Technical Data				View of Specimen	
					Average		Before Test :	
Diameter :		63.00	63.09	63.15	63.08	(mm)		
Length :		100.38	100.26	100.38	100.34	(mm)	C. M. C.	
Straightness (0.5mm ma	aximum) (S1) :	0.2	0.3	0.2	0.2	(mm)		
Flatness (25µm maximu	m) (FP2) :	Ok	Ok	Ok	Ok	(μm)		
Parallelism (0.25 ° maxi	mum) (FP2) :	0.15	0.15	0.15	0.15	(°)	After Test :	
Mass :	83	1.5	_(g) Volume: _	31	3579	(mm ³)		
Density :			265	52	_(kg/m ³)			
Moisture Conditions :			Dr	у	_			
Loading Rate (0.5 to	1.0 MPa / sec) :		0.3	3	(MPa/sec)			
Type of Fracture :			Multiple F	Fracture	_			
Test Duration (2-15 N	linutes) :		10	8	(seconds)			
Maximum Applied Lo	ad :		112.	31	_(kN)			
Compressive Stre	ngth :		35.	9	_(MPa)			
Remarks :								
Analysed by :	J. Latonde					Date	: 8/18/2022	
Verified by :		<u>cef</u>				Date	: 8/25/2022	
h	and the second sec							_

Client :	Infrastructure (Ontario				Project N ^o :	11205379
Project :	Children's Hos	pital				Sample N ^o :	MW23-22 r.2
						Depth :	6,93 - 7,03 m
						Sampling Date :	
Testing Appar	atus Used :			Loadin	ng device N°_9	9130	Caliper Nº_1
		-	Fechnical Data				View of Specimen
					Average	7	Before Test :
Diameter :		63.11	63.04	63.06	63.07	(mm)	
Length :		100.32	100.27	100.42	100.34	(mm)	
Straightness (0.5mm m	naximum) (S1) :	0.2	0.1	0.2	0.2	(mm)	
Flatness (25µm maxim	um) (FP2) :	Ok	Ok	Ok	Ok	(μm)	
Parallelism (0.25 ° max	kimum) (FP2) :	0.10	0.15	0.15	0.13	(°)	After Test :
Mass :	84	15.1	(g) Volume:	31	3469	_(mm ³)	
Density :			269	6	_(kg/m ³)		
Moisture Conditions	:		Dr	y	_		
Loading Rate (0.5 to	1.0 MPa / sec) :		0.3	9	(MPa/sec)		
Type of Fracture :			Multiple F	racture			
Test Duration (2-15	Minutes) :		12	1	(seconds)		
Maximum Applied Lo	oad :		146.	16	_(kN)		
Compressive Stre	ength :		46.	8	_(MPa)		
Remarks :							
Analysed by :	J. Lalonde	\bigcirc				Date :	8/18/2022
Verified by :	\rightarrow	Dal				Date :	8/25/2022
				Jonuary 2021			



CLIENT NAME: GHD LIMITED 455 Phillip St WATERLOO, ON N2V1C2 (519) 884-0510 ATTENTION TO: Jennifer Balkwill PROJECT: 11205379-RPT8 AGAT WORK ORDER: 21Z712939 SOIL ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer DATE REPORTED: Mar 01, 2021 PAGES (INCLUDING COVER): 5 VERSION*: 1

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

<u>*Notes</u> VERSION 1:Excluding Sulphide in Soil analysis

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may
 incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days following analysis, unless expressly agreed otherwise in writing. Please contact your Client Project Manager if you require additional sample storage time.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of
 merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines
 contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

AGAT Laboratories (V1)

Member of: Association of Professional Engineers and Geoscientists of Alberta	
(APEGA)	
Western Enviro-Agricultural Laboratory Association (WEALA)	

(APEGA) Western Enviro-Agricultural Laboratory Association (WEALA) Environmental Services Association of Alberta (ESAA) AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. Measurement Uncertainty is not taken into consideration when stating conformity with a specified requirement.

Page 1 of 5



Certificate of Analysis

AGAT WORK ORDER: 21Z712939 PROJECT: 11205379-RPT8 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

CLIENT NAME: GHD LIMITED

SAMPLING SITE:

ATTENTION TO: Jennifer Balkwill

SAMPLED BY:

Corrosivity Package

DATE RECEIVED: 2021-02-19								I	DATE REPORTE	D: 2021-03-0)1
						11205379-BH4-		11205379-MW6-	11205379-BH7-		11205379-MW8-
				SAMPL	E DESCRIPTION: 2	21-SS2-0.7-1.0m		21-SS2-0.7-1.0m	21-SS2-0.7-1.0m		21-SS2-1.1-1.3m
					SAMPLE TYPE:	Soil		Soil	Soil		Soil
				I	DATE SAMPLED:	2021-01-18		2021-01-13	2021-01-19		2021-01-18
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	2122180	RDL	2122181	2122182	RDL	2122183
Chloride (2:1)	µg/g		4	2021-02-24	2021-02-24	440	2	253	69	4	562
Sulphate (2:1)	µg/g		4	2021-02-24	2021-02-24	439	2	395	6	4	195
pH (2:1)	pH Units		NA	2021-02-24	2021-02-24	6.35	NA	7.4	7.23	NA	7.95
Electrical Conductivity (2:1)	mS/cm		0.005	2021-02-24	2021-02-24	1.21	0.005	0.936	0.163	0.005	1.40
Resistivity (2:1) (Calculated)	ohm.cm		1	2021-02-24	2021-02-24	826	1	1070	6130	1	714
Redox Potential 1	mV		NA	2021-02-23	2021-02-23	428	NA	389	429	NA	377
Redox Potential 2	mV		NA	2021-02-23	2021-02-23	446	NA	394	416	NA	379
Redox Potential 3	mV		NA	2021-02-23	2021-02-23	432	NA	397	414	NA	377

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

2122180-2122183 EC, pH, Chloride and Sulphate were determined on the extract obtained from the 2:1 leaching procedure (2 parts DI water: 1 part soil). Resistivity is a calculated parameter.

Redox potential measured on as received sample. Due to the potential for rapid change in sample equilibrium chemistry with exposure to oxidative/reduction conditions laboratory results may differ from field measured results.

Redox potential measurement in soil is quite variable and non reproducible due in part, to the general heterogeneity of a given soil. It is also related to the introduction of increased oxygen into the sample after extraction. The interpretation of soil redox potential should be considered in terms of its general range rather than as an absolute measurement.

Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)



Certified By:



5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

Quality Assurance

CLIENT NAME: GHD LIMITED

PROJECT: 11205379-RPT8

SAMPLING SITE:

AGAT WORK ORDER: 21Z712939 ATTENTION TO: Jennifer Balkwill SAMPLED BY:

Soil Analysis

RPT Date: Mar 01, 2021				UPLICAT	E		REFERE	NCE MA	TERIAL	METHOD	BLANK	SPIKE	MATRIX SPIKE		KE	
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured		ptable nits	Recovery	Lin	ptable nits	Recovery	1.10	Acceptable Limits	
		ld					Value	Lower	Upper		Lower	Upper		Lower	Upper	
Corrosivity Package																
Chloride (2:1)	2129123		42	42	0.0%	< 2	93%	70%	130%	102%	80%	120%	104%	70%	130%	
Sulphate (2:1)	2129123		3	3	NA	< 2	100%	70%	130%	107%	80%	120%	106%	70%	130%	
pH (2:1)	2122180 2	2122180	6.35	6.38	0.5%	NA	100%	90%	110%							
Electrical Conductivity (2:1)	2122180 2	2122180	1.21	1.40	14.6%	< 0.005	105%	80%	120%							
Redox Potential 1	1						100%	90%	110%							

Comments: NA signifies Not Applicable.

pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.

Duplicate NA: results are under 5X the RDL and will not be calculated.





AGAT QUALITY ASSURANCE REPORT (V1)

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Page 3 of 5



5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

Method Summary

CLIENT NAME: GHD LIMITED

PROJECT: 11205379-RPT8

AGAT WORK ORDER: 21Z712939 **ATTENTION TO: Jennifer Balkwill**

SAMPLED BY:

SAMPLING SITE:		SAMPLED BY:	
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis	1		
Chloride (2:1)	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate (2:1)	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
pH (2:1)	INOR 93-6031	MSA part 3 & SM 4500-H+ B	PH METER
Electrical Conductivity (2:1)	INOR-93-6036	modified from MSA PART 3, CH 14 and SM 2510 B	EC METER
Resistivity (2:1) (Calculated)	INOR-93-6036	McKeague 4.12, SM 2510 B,SSA #5 Part 3	CALCULATION
Redox Potential 1	INOR-93-6066	modified G200-09, SM 2580 B	REDOX POTENTIAL ELECTRODE
Redox Potential 2	INOR-93-6066	modified G200-09, SM 2580 B	REDOX POTENTIAL ELECTRODE
Redox Potential 3	INOR-93-6066	modified G200-09, SM 2580 B	REDOX POTENTIAL ELECTRODE

hain of Custody Reco	If this is a l	Orlnking Water s	ample, pleas	se use Drink	king Water Chain of Custody Form (potal	ble water	consum	ed by h	umans)							5	4.01	18.6	14.	N S
Report Information: Company: GHD Limited Contact: Jennifer Balkwill Address: 455 Phillip St Unit 1 Phone: 519-340-4286	papary: GHD Limited stact: Jennifer Balkwill rress: 455 Phillip St Unit 100A, Waterloo, ON, N2L 3X2 one: 519-340-4286 pris to be sent to: jennifer balkwill@ghd.com				gulatory Requirements: check all applicable boxes) agulation 153/04 ble Indicate One Ind/Com Res/Park Agriculture	e	_	anitary Regio	n ⊟ s	-		No Tur Rej	ntes: rnarc gular		Time Most Ana	alyses)	") Requ			□N//
Conorts to be cost to:	com			Soil Te	exture (check One) (Coarse		Obj		s (PWQ e One	0)	-		L D	Busine ays R Date			Busines ays sh Surcha] Next E Day ay Apply):	
Project Information: Project: <u>11205379-RPT8</u> Site Location: Sampled By:				Rec	this submission for a cord of Site Condition? Yes INO	Ce		ate o	f Ana					AT is ex	clusive	e of wee	r notifical kends ar ease con	d statuto	ory holld	-
Please note: if quotation num Invoice Information: Company: Contact: Address: Email:		be billed full price for a		В	aple Matrix Legend Biota Ground Water Oil Paint Soil Sediment Surface Water	Field Filtered - Metals, Hg, CrVI, DOC	& Inorganics	Metals - 🗆 CrVI, 🗆 Hg, 🗆 HWSB	BTEX, F1-F4 PHCs Analyze F4G if required 🗆 Yes 🛛 No	Bs 🗆 Arochor	1	Disposal Characterization TCLP: Mist Thurre Thank Thereis Theres	SPLP Rainwater Le	Metals L VOCS L SVOCS Soils Characterization Peckage	ICPMS Metals, BLEX, F1-F4	Corrosivity				
Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y/N	Metals	Metals -	BTEX, F1-F4 Analyze F4G	PAHS Total PCBs	voc		Excess	Excess S	Salt - EC/SAR	Cor				
11205379- BH4-21 - SS2 - 0.7-1.0m	2021-01-18	AM PM AM PM AM PM	1	Soil	Corrosivity					-	-		-							
11205379- MW6-21 – SS2 - 0.7-1.0m 11205379- BH7-21 – SS2 - 0.7-1.0m 11205379- MW8-21 – SS2 - 1.1-1.3m	2021-01-13 2021-01-19 2021-01-18	AM PM AM PM AM PM	1 1 1	Soil Soil Soil	Corrosivity Corrosivity Corrosivity															
		AM PM AM PM AM PM AM FM																		
		AM PM	Time		Samples Received By (Print Name and Sign)	<u>()</u>				1,01	811	0	Tim	200	-					



CERTIFICATE OF ANALYSIS

Work Order	: WT2214174	Page	÷ 1 of 5
Client	: GHD Limited	Laboratory	: Waterloo - Environmental
Contact	: Rick Hawthorne	Account Manager	: Rick Hawthorne
Address	: 455 Phillip Street	Address	: 60 Northland Road, Unit 1
	Waterloo ON Canada N2L 3X2		Waterloo ON Canada N2V 2B8
Telephone	:	Telephone	: +1 519 886 6910
Project	: 11205379-100	Date Samples Received	: 14-Sep-2022 10:30
PO	: 735-004287	Date Analysis	: 15-Sep-2022
		Commenced	
C-O-C number	:	Issue Date	: 16-Sep-2022 16:35
Sampler	: CLIENT		
Site	:		
Quote number	11205379-100-SSOW 735-004287		
No. of samples received	: 8		
No. of samples analysed	: 8		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	Position	Laboratory Department
Greg Pokocky	Supervisor - Inorganic	Inorganics, Waterloo, Ontario
Joseph Scharbach		Centralized Prep, Waterloo, Ontario
Walt Kippenhuck	Team Leader - Inorganics	Inorganics, Waterloo, Ontario



General Comments

for analysis.

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance. Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample

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

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

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

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

>: greater than.

<: less than.

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

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

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



Analytical Results

WT2214174-001

Sub-Matrix:Soil

(Matrix: Soil/Solid)

Client sample ID: 11205379- BH16-SS2 Client sampling date / time: 14-Sep-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
conductivity (1:2 leachate)		2650 FR5.	10.0	µS/cm	E100-L	16-Sep-2022	16-Sep-2022	648051
moisture		10.4	0.25	%	E144	-	15-Sep-2022	648057
oxidation-reduction potential [ORP]		436	0.10	mV	E125	15-Sep-2022	15-Sep-2022	648056
pH (1:2 soil:CaCl2-aq)		8.26	0.10	pH units	E108A	15-Sep-2022	15-Sep-2022	648054
resistivity		380	100	ohm cm	EC100R	-	16-Sep-2022	-
Leachable Anions & Nutrients								
chloride, soluble ion content	16887-00-6	1300	5.0	mg/kg	E236.CI	16-Sep-2022	16-Sep-2022	648053
sulfate, soluble ion content	14808-79-8	498	20	mg/kg	E236.SO4	16-Sep-2022	16-Sep-2022	648052

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

Analytical Results

WT2214174-002

Sub-Matrix:Soil (Matrix: Soil/Solid) Client sample ID: 11205379- BH20-SS2 Client sampling date / time: 14-Sep-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
conductivity (1:2 leachate)		422 FR5,	10.0	µS/cm	E100-L	16-Sep-2022	16-Sep-2022	648051
moisture		10.1	0.25	%	E144	-	15-Sep-2022	648057
oxidation-reduction potential [ORP]		419	0.10	mV	E125	15-Sep-2022	15-Sep-2022	648056
pH (1:2 soil:CaCl2-aq)		7.78	0.10	pH units	E108A	15-Sep-2022	15-Sep-2022	648054
resistivity		2370	100	ohm cm	EC100R	-	16-Sep-2022	-
Leachable Anions & Nutrients								
chloride, soluble ion content	16887-00-6	19.6	5.0	mg/kg	E236.CI	16-Sep-2022	16-Sep-2022	648053
sulfate, soluble ion content	14808-79-8	173	20	mg/kg	E236.SO4	16-Sep-2022	16-Sep-2022	648052

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

Analytical Results

WT2214174-003 Sub-Matrix:**Soil**

(Matrix: Soil/Solid)

Client sample ID: 11205379- MW17-SS1 Client sampling date / time: 14-Sep-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
conductivity (1:2 leachate)		231 FR5.	10.0	µS/cm	E100-L	16-Sep-2022	16-Sep-2022	648051
moisture		<0.25	0.25	%	E144	-	15-Sep-2022	648057
oxidation-reduction potential [ORP]		419	0.10	mV	E125	15-Sep-2022	15-Sep-2022	648056
pH (1:2 soil:CaCl2-aq)		8.26	0.10	pH units	E108A	15-Sep-2022	15-Sep-2022	648054
resistivity		4330	100	ohm cm	EC100R	-	16-Sep-2022	-
Leachable Anions & Nutrients								
chloride, soluble ion content	16887-00-6	8.6	5.0	mg/kg	E236.CI	16-Sep-2022	16-Sep-2022	648053
sulfate, soluble ion content	14808-79-8	54	20	mg/kg	E236.SO4	16-Sep-2022	16-Sep-2022	648052

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



Analytical Results

WT2214174-004

Sub-Matrix:Soil

(Matrix: Soil/Solid)

Client sample ID: 11205379- MW18-SS3 Client sampling date / time: 14-Sep-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests							Date	
conductivity (1:2 leachate)		1310 FR5,	10.0	µS/cm	E100-L	16-Sep-2022	16-Sep-2022	648051
moisture		8.45	0.25	%	E144	-	15-Sep-2022	648057
oxidation-reduction potential [ORP]		398	0.10	mV	E125	15-Sep-2022	15-Sep-2022	648056
pH (1:2 soil:CaCl2-aq)		8.16	0.10	pH units	E108A	15-Sep-2022	15-Sep-2022	648054
resistivity		760	100	ohm cm	EC100R	-	16-Sep-2022	-
Leachable Anions & Nutrients								
chloride, soluble ion content	16887-00-6	734	5.0	mg/kg	E236.Cl	16-Sep-2022	16-Sep-2022	648053
sulfate, soluble ion content	14808-79-8	215	20	mg/kg	E236.SO4	16-Sep-2022	16-Sep-2022	648052

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

Analytical Results

WT2214174-005

Sub-Matrix:Soil

(Matrix: Soil/Solid)

Client sample ID:	11205379- BH11-22-SS2
-------------------	-----------------------

Client sampling date / time: 14-Sep-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
conductivity (1:2 leachate)		2540 FR5.	10.0	µS/cm	E100-L	16-Sep-2022	16-Sep-2022	648051
moisture		6.72	0.25	%	E144	-	15-Sep-2022	648057
oxidation-reduction potential [ORP]		393	0.10	mV	E125	15-Sep-2022	15-Sep-2022	648056
pH (1:2 soil:CaCl2-aq)		7.28	0.10	pH units	E108A	15-Sep-2022	15-Sep-2022	648054
resistivity		390	100	ohm cm	EC100R	-	16-Sep-2022	-
Leachable Anions & Nutrients								
chloride, soluble ion content	16887-00-6	1420	5.0	mg/kg	E236.CI	16-Sep-2022	16-Sep-2022	648053
sulfate, soluble ion content	14808-79-8	219	20	mg/kg	E236.SO4	16-Sep-2022	16-Sep-2022	648052

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

Analytical Results

WT2214174-006

Sub-Matrix:Soil	
Oub-Inaulix.com	

(Matrix: Soil/Solid)

Client sample ID: 11205379- BH16-22-SS2 Client sampling date / time: 14-Sep-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
conductivity (1:2 leachate)		430 FR5,	10.0	μS/cm	E100-L	16-Sep-2022	16-Sep-2022	648051
moisture		6.03	0.25	%	E144	-	15-Sep-2022	648057
oxidation-reduction potential [ORP]		354	0.10	mV	E125	15-Sep-2022	15-Sep-2022	648056
pH (1:2 soil:CaCl2-aq)		7.85	0.10	pH units	E108A	15-Sep-2022	15-Sep-2022	648054
resistivity		2320	100	ohm cm	EC100R	-	16-Sep-2022	-
Leachable Anions & Nutrients								
chloride, soluble ion content	16887-00-6	83.2	5.0	mg/kg	E236.CI	16-Sep-2022	16-Sep-2022	648053
sulfate, soluble ion content	14808-79-8	116	20	mg/kg	E236.SO4	16-Sep-2022	16-Sep-2022	648052

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



Analytical Results

WT2214174-007

Sub-Matrix:Soil

(Matrix: Soil/Solid)

Client sample ID: 11205379- BH17-22-SS2 Client sampling date / time: 14-Sep-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
conductivity (1:2 leachate)		622 FR5.	10.0	µS/cm	E100-L	16-Sep-2022	16-Sep-2022	648051
moisture		7.97	0.25	%	E144	-	15-Sep-2022	648057
oxidation-reduction potential [ORP]		350	0.10	mV	E125	15-Sep-2022	15-Sep-2022	648056
pH (1:2 soil:CaCl2-aq)		7.47	0.10	pH units	E108A	15-Sep-2022	15-Sep-2022	648054
resistivity		1610	100	ohm cm	EC100R	-	16-Sep-2022	-
Leachable Anions & Nutrients								
chloride, soluble ion content	16887-00-6	609	5.0	mg/kg	E236.Cl	16-Sep-2022	16-Sep-2022	648053
sulfate, soluble ion content	14808-79-8	94	20	mg/kg	E236.SO4	16-Sep-2022	16-Sep-2022	648052

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

Analytical Results

WT2214174-008

Sub-Matrix:Soil

(Matrix: Soil/Solid)

Client sampling date / time: 14-Sep-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
conductivity (1:2 leachate)		5560 FR5.	10.0	µS/cm	E100-L	16-Sep-2022	16-Sep-2022	648051
moisture		6.16	0.25	%	E144	-	15-Sep-2022	648057
oxidation-reduction potential [ORP]		371	0.10	mV	E125	15-Sep-2022	15-Sep-2022	648056
pH (1:2 soil:CaCl2-aq)		6.81	0.10	pH units	E108A	15-Sep-2022	15-Sep-2022	648054
resistivity		180	100	ohm cm	EC100R	-	16-Sep-2022	-
Leachable Anions & Nutrients								
chloride, soluble ion content	16887-00-6	611	5.0	mg/kg	E236.Cl	16-Sep-2022	16-Sep-2022	648053
sulfate, soluble ion content	14808-79-8	6500	20	mg/kg	E236.SO4	16-Sep-2022	16-Sep-2022	648052

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



QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: WT2214174	Page	: 1 of 11
Client	: GHD Limited	Laboratory	: Waterloo - Environmental
Contact	: Rick Hawthorne	Account Manager	: Rick Hawthorne
Address	: 455 Phillip Street	Address	: 60 Northland Road, Unit 1
	Waterloo ON Canada N2L 3X2		Waterloo, Ontario Canada N2V 2B8
Telephone	:	Telephone	: +1 519 886 6910
Project	: 11205379-100	Date Samples Received	: 14-Sep-2022 10:30
20	: 735-004287	Issue Date	: 16-Sep-2022 16:35
C-O-C number	:		
Sampler	: CLIENT		
Site	:		
Quote number	: 11205379-100-SSOW 735-004287		
No. of samples received	: 8		
No. of samples analysed	: 8		

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

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

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

Summary of Outliers Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

• No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

• No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

• No Quality Control Sample Frequency Outliers occur.

RIGHT SOLUTIONS | RIGHT PARTNER

Page	: 3 of 11
Work Order	: WT2214174
Client	: GHD Limited
Project	: 11205379-100



Analysis Holding Time Compliance

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

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

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

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

latrix: Soil/Solid					E١	aluation: × =	Holding time exce	edance ; 🔹	= Within	Holding T
Analyte Group	Method	Sampling Date	Ext	traction / Pi	reparation			Analys	sis	
Container / Client Sample ID(s)			Preparation	Holdin	g Times	Eval	Analysis Date	Holding	g Times	Eval
			Date	Rec	Actual			Rec	Actual	
eachable Anions & Nutrients : Water Extractable Chloride by IC										
Glass soil jar/Teflon lined cap										
11205379- BH11-22-SS2	E236.Cl	14-Sep-2022	16-Sep-2022	30	3 days	1	16-Sep-2022	28 days	0 days	✓
				days						
eachable Anions & Nutrients : Water Extractable Chloride by IC										
Glass soil jar/Teflon lined cap										
11205379- BH16-22-SS2	E236.Cl	14-Sep-2022	16-Sep-2022	30	3 days	1	16-Sep-2022	28 days	0 days	1
				days						
eachable Anions & Nutrients : Water Extractable Chloride by IC										
Glass soil jar/Teflon lined cap										
11205379- BH16-SS2	E236.Cl	14-Sep-2022	16-Sep-2022	30	3 days	1	16-Sep-2022	28 days	0 days	1
				days						
eachable Anions & Nutrients : Water Extractable Chloride by IC										
Glass soil jar/Teflon lined cap										
11205379- BH17-22-SS2	E236.CI	14-Sep-2022	16-Sep-2022	30	3 days	1	16-Sep-2022	28 days	0 days	1
				days						
eachable Anions & Nutrients : Water Extractable Chloride by IC										
Glass soil jar/Teflon lined cap										
11205379- BH20-SS2	E236.CI	14-Sep-2022	16-Sep-2022	30	3 days	1	16-Sep-2022	28 days	0 days	1
				days						
eachable Anions & Nutrients : Water Extractable Chloride by IC										
Glass soil jar/Teflon lined cap										
11205379- MW09-22	E236.CI	14-Sep-2022	16-Sep-2022	30	3 days	1	16-Sep-2022	28 days	0 days	✓
				days						
eachable Anions & Nutrients : Water Extractable Chloride by IC										
Glass soil jar/Teflon lined cap										
11205379- MW17-SS1	E236.Cl	14-Sep-2022	16-Sep-2022	30	3 days	1	16-Sep-2022	28 days	0 days	✓
				days						

Page	: 4 of 11
Work Order	: WT2214174
Client	: GHD Limited
Project	11205379-100



atrix: Soil/Solid					Ev	/aluation: × =	Holding time exce	edance ; •	= Within	Holding T
Analyte Group	Method	Sampling Date	Ext	traction / Pr	eparation			Analys	sis	
Container / Client Sample ID(s)			Preparation	Holding	g Times	Eval	Analysis Date	Holding	g Times	Eval
			Date	Rec	Actual			Rec	Actual	
eachable Anions & Nutrients : Water Extractable Chloride by IC										
Glass soil jar/Teflon lined cap										
11205379- MW18-SS3	E236.Cl	14-Sep-2022	16-Sep-2022	30	3 days	1	16-Sep-2022	28 days	0 days	✓
				days						
eachable Anions & Nutrients : Water Extractable Sulfate by IC				-						
Glass soil jar/Teflon lined cap										
11205379- BH11-22-SS2	E236.SO4	14-Sep-2022	16-Sep-2022	30	3 days	1	16-Sep-2022	28 days	0 days	✓
				days						
eachable Anions & Nutrients : Water Extractable Sulfate by IC									1	
Glass soil jar/Teflon lined cap										
11205379- BH16-22-SS2	E236.SO4	14-Sep-2022	16-Sep-2022	30	3 days	1	16-Sep-2022	28 days	0 days	✓
				days						
eachable Anions & Nutrients : Water Extractable Sulfate by IC										
Glass soil jar/Teflon lined cap										
11205379- BH16-SS2	E236.SO4	14-Sep-2022	16-Sep-2022	30	3 days	1	16-Sep-2022	28 days	0 days	1
				days						
eachable Anions & Nutrients : Water Extractable Sulfate by IC										
Glass soil jar/Teflon lined cap										
11205379- BH17-22-SS2	E236.SO4	14-Sep-2022	16-Sep-2022	30	3 days	1	16-Sep-2022	28 days	0 days	✓
				days						
eachable Anions & Nutrients : Water Extractable Sulfate by IC										
Glass soil jar/Teflon lined cap										
11205379- BH20-SS2	E236.SO4	14-Sep-2022	16-Sep-2022	30	3 days	1	16-Sep-2022	28 days	0 days	✓
				days						
eachable Anions & Nutrients : Water Extractable Sulfate by IC										
Glass soil jar/Teflon lined cap										
11205379- MW09-22	E236.SO4	14-Sep-2022	16-Sep-2022	30	3 days	1	16-Sep-2022	28 days	0 days	1
				days						
eachable Anions & Nutrients : Water Extractable Sulfate by IC										
Glass soil jar/Teflon lined cap										
11205379- MW17-SS1	E236.SO4	14-Sep-2022	16-Sep-2022	30	3 days	1	16-Sep-2022	28 days	0 days	1
				days						
eachable Anions & Nutrients : Water Extractable Sulfate by IC										
Glass soil jar/Teflon lined cap										
11205379- MW18-SS3	E236.SO4	14-Sep-2022	16-Sep-2022	30	3 days	1	16-Sep-2022	28 days	0 days	1
				days						

Page	: 5 of 11
Work Order	: WT2214174
Client	: GHD Limited
Project	11205379-100



atrix: Soil/Solid			-				Holding time exce			riolaling
Inalyte Group	Method	Sampling Date		traction / Pr	-			Analys		
Container / Client Sample ID(s)			Preparation Date	Holding Rec	g Times Actual	Eval	Analysis Date	Rec	g Times Actual	Eval
hysical Tests : Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)										
Glass soil jar/Teflon lined cap 11205379- BH11-22-SS2	E100-L	14-Sep-2022	16-Sep-2022				16-Sep-2022	30 days	2 days	~
hysical Tests : Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)										
Glass soil jar/Teflon lined cap 11205379- BH16-22-SS2	E100-L	14-Sep-2022	16-Sep-2022				16-Sep-2022	30 days	2 days	1
hysical Tests : Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)					1					
Glass soil jar/Teflon lined cap 11205379- BH16-SS2	E100-L	14-Sep-2022	16-Sep-2022				16-Sep-2022	30 days	2 days	1
Physical Tests : Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)										
Glass soil jar/Teflon lined cap 11205379- BH17-22-SS2	E100-L	14-Sep-2022	16-Sep-2022				16-Sep-2022	30 days	2 days	1
hysical Tests : Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)										
Glass soil jar/Teflon lined cap 11205379- BH20-SS2	E100-L	14-Sep-2022	16-Sep-2022				16-Sep-2022	30 days	2 days	1
hysical Tests : Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)										
Glass soil jar/Teflon lined cap 11205379- MW09-22	E100-L	14-Sep-2022	16-Sep-2022				16-Sep-2022	30 days	2 days	1
hysical Tests : Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)										
Glass soil jar/Teflon lined cap 11205379- MW17-SS1	E100-L	14-Sep-2022	16-Sep-2022				16-Sep-2022	30 days	2 days	1
hysical Tests : Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)								1		
Glass soil jar/Teflon lined cap 11205379- MW18-SS3	E100-L	14-Sep-2022	16-Sep-2022				16-Sep-2022	30 days	2 days	1
hysical Tests : Moisture Content by Gravimetry								1		
Glass soil jar/Teflon lined cap 11205379- BH11-22-SS2	E144	14-Sep-2022					15-Sep-2022			

Page	: 6 of 11
Work Order	: WT2214174
Client	: GHD Limited
Project	· 11205379-100



/latrix: Soil/Solid					E	/aluation: × =	Holding time exce	edance ; ·	🗸 = Within	Holding T
Analyte Group	Method	Sampling Date	Ex	traction / Pi	reparation			Analys	Analysis	
Container / Client Sample ID(s)			Preparation Date	Holdin Rec	g Times Actual	Eval	Analysis Date	Holding Rec	g Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap 11205379- BH16-22-SS2	E144	14-Sep-2022					15-Sep-2022			
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap 11205379- BH16-SS2	E144	14-Sep-2022					15-Sep-2022			
Physical Tests : Moisture Content by Gravimetry									11	
Glass soil jar/Teflon lined cap 11205379- BH17-22-SS2	E144	14-Sep-2022					15-Sep-2022			
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap 11205379- BH20-SS2	E144	14-Sep-2022					15-Sep-2022			
hysical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap 11205379- MW09-22	E144	14-Sep-2022					15-Sep-2022			
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap 11205379- MW17-SS1	E144	14-Sep-2022					15-Sep-2022			
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap 11205379- MW18-SS3	E144	14-Sep-2022					15-Sep-2022			
hysical Tests : ORP by Electrode										
Glass soil jar/Teflon lined cap 11205379- BH11-22-SS2	E125	14-Sep-2022	15-Sep-2022				15-Sep-2022	180 days	1 days	1
hysical Tests : ORP by Electrode										
Glass soil jar/Teflon lined cap 11205379- BH16-22-SS2	E125	14-Sep-2022	15-Sep-2022				15-Sep-2022	180 days	1 days	1

Page	: 7 of 11
Work Order	: WT2214174
Client	: GHD Limited
Project	11205379-100



Matrix: Soil/Solid					Ev	aluation: × =	Holding time exce	edance ; •	= Within	Holding Ti
Analyte Group	Method	Sampling Date				Analys				
Container / Client Sample ID(s)			Preparation Date	Holding Rec	g Times Actual	Eval	Analysis Date	Holding Rec	g Times Actual	Eval
Physical Tests : ORP by Electrode										
Glass soil jar/Teflon lined cap 11205379- BH16-SS2	E125	14-Sep-2022	15-Sep-2022				15-Sep-2022	180 days	1 days	~
Physical Tests : ORP by Electrode										
Glass soil jar/Teflon lined cap 11205379- BH17-22-SS2	E125	14-Sep-2022	15-Sep-2022				15-Sep-2022	180 days	1 days	4
Physical Tests : ORP by Electrode										
Glass soil jar/Teflon lined cap 11205379- BH20-SS2	E125	14-Sep-2022	15-Sep-2022				15-Sep-2022	180 days	1 days	1
Physical Tests : ORP by Electrode										
Glass soil jar/Teflon lined cap 11205379- MW09-22	E125	14-Sep-2022	15-Sep-2022				15-Sep-2022	180 days	1 days	*
Physical Tests : ORP by Electrode										
Glass soil jar/Teflon lined cap 11205379- MW17-SS1	E125	14-Sep-2022	15-Sep-2022				15-Sep-2022	180 days	1 days	1
Physical Tests : ORP by Electrode										
Glass soil jar/Teflon lined cap 11205379- MW18-SS3	E125	14-Sep-2022	15-Sep-2022				15-Sep-2022	180 days	1 days	1
Physical Tests : pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received										
Glass soil jar/Teflon lined cap 11205379- BH11-22-SS2	E108A	14-Sep-2022	15-Sep-2022				15-Sep-2022	30 days	1 days	~
Physical Tests : pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received									1	
Glass soil jar/Teflon lined cap 11205379- BH16-22-SS2	E108A	14-Sep-2022	15-Sep-2022				15-Sep-2022	30 days	1 days	1
Physical Tests : pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received									1	
Glass soil jar/Teflon lined cap 11205379- BH16-SS2	E108A	14-Sep-2022	15-Sep-2022				15-Sep-2022	30 days	1 days	1

Page	: 8 of 11
Work Order	: WT2214174
Client	: GHD Limited
Project	· 11205379-100



Matrix: Soil/Solid					E١	aluation: × =	Holding time exce	edance ; 🔹	<pre>/ = Within</pre>	Holding Tim
Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Rec	g Times Actual	Eval	Analysis Date	Holding Rec	Times Actual	Eval
Physical Tests : pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received										
Glass soil jar/Teflon lined cap 11205379- BH17-22-SS2	E108A	14-Sep-2022	15-Sep-2022				15-Sep-2022	30 days	1 days	4
Physical Tests : pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received										
Glass soil jar/Teflon lined cap 11205379- BH20-SS2	E108A	14-Sep-2022	15-Sep-2022				15-Sep-2022	30 days	1 days	1
Physical Tests : pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received										
Glass soil jar/Teflon lined cap 11205379- MW09-22	E108A	14-Sep-2022	15-Sep-2022				15-Sep-2022	30 days	1 days	1
Physical Tests : pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received										
Glass soil jar/Teflon lined cap 11205379- MW17-SS1	E108A	14-Sep-2022	15-Sep-2022				15-Sep-2022	30 days	1 days	4
Physical Tests : pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received				1						
Glass soil jar/Teflon lined cap 11205379- MW18-SS3	E108A	14-Sep-2022	15-Sep-2022				15-Sep-2022	30 days	1 days	*

Legend & Qualifier Definitions

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



Quality Control Parameter Frequency Compliance

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

Matrix: Soil/Solid	Evaluation: \times = QC frequency outside specification; \checkmark = QC frequency within spec							
Quality Control Sample Type		· ·	Co	ount		Frequency (%)		
Analytical Methods	QC Lot #	QC	Regular	Actual	Expected	Evaluation		
Laboratory Duplicates (DUP)								
Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)	E100-L	648051	1	8	12.5	5.0	✓	
Moisture Content by Gravimetry	E144	648057	1	8	12.5	5.0	✓	
ORP by Electrode	E125	648056	1	8	12.5	5.0	~	
pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received	E108A	648054	1	8	12.5	5.0	✓	
Water Extractable Chloride by IC	E236.CI	648053	1	8	12.5	5.0	✓	
Water Extractable Sulfate by IC	E236.SO4	648052	1	8	12.5	5.0	✓	
Laboratory Control Samples (LCS)								
Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)	E100-L	648051	2	8	25.0	10.0	1	
Moisture Content by Gravimetry	E144	648057	1	8	12.5	5.0	✓	
ORP by Electrode	E125	648056	1	8	12.5	5.0	✓	
pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received	E108A	648054	1	8	12.5	5.0	✓	
Water Extractable Chloride by IC	E236.Cl	648053	2	8	25.0	10.0	✓	
Water Extractable Sulfate by IC	E236.SO4	648052	2	8	25.0	10.0	✓	
Method Blanks (MB)								
Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)	E100-L	648051	1	8	12.5	5.0	1	
Moisture Content by Gravimetry	E144	648057	1	8	12.5	5.0	✓	
Water Extractable Chloride by IC	E236.CI	648053	1	8	12.5	5.0	✓	
Water Extractable Sulfate by IC	E236.SO4	648052	1	8	12.5	5.0	~	



Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Soil (1:2 Soil:Water Extraction) (Low Level)	E100-L Waterloo - Environmental	Soil/Solid	CSSS Ch. 15 (mod)/APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a soil sample that has been added in a defined ratio of soil to deionized water, then shaken well and allowed to settle. Conductance is measured in the fluid that is observed in the upper layer.
pH by Meter (1:2 Soil:0.01M CaCl2 Extraction) - As Received	E108A Waterloo - Environmental	Soil/Solid	MOEE E3137A	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally $20 \pm 5^{\circ}$ C) and is carried out in accordance with procedures described in the Analytical Protocol (prescriptive method). A minimum 10g portion of the sample, as received, is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil by centrifuging, settling, or decanting and then analyzed using a pH meter and electrode.
ORP by Electrode	E125 Waterloo - Environmental	Soil/Solid	APHA 2580 (mod)	Oxidation Redution Potential (ORP) is reported as the oxidation-reduction potential of the platinum metal-reference electrode employed in the analysis, measured in mV.
Moisture Content by Gravimetry	E144 Waterloo - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Water Extractable Chloride by IC	E236.Cl Waterloo - Environmental	Soil/Solid	EPA 300.1	Inorganic anions are analyzed by Ion Chromatography with conductivity and /or UV detection using a soil sample that has been added in a defined ratio of soil to deionized water, then shaken well and allowed to settle. Anions are measured in the fluid that is observed in the upper layer.
Water Extractable Sulfate by IC	E236.SO4 Waterloo - Environmental	Soil/Solid	EPA 300.1	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection using a soil sample that has been added in a defined ratio of soil to deionized water, then shaken well and allowed to settle. Anions are measured in the fluid that is observed in the upper layer.
Resistivity Calculation for Soil Using E100-L	EC100R Waterloo - Environmental	Soil/Solid	APHA 2510 B	Soil Resistivity (calculated) is determined as the inverse of the conductivity of a 2:1 water:soil leachate (dry weight). This method is intended as a rapid approximation for Soil Resistivity. Where high accuracy results are required, direct measurement of Soil Resistivity by the Wenner Four-Electrode Method (ASTM G57) is recommended.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 Waterloo - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.

Page	: 11 of 11
Work Order	: WT2214174
Client	: GHD Limited
Project	: 11205379-100



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil : 0.01CaCl2 - As Received for	EP108A	Soil/Solid	MOEE E3137A	A minimum 10g portion of the sample, as received, is extracted with 20mL of 0.01M
pH				calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is
	Waterloo -			separated from the soil by centrifuging, settling or decanting and then analyzed using a
	Environmental			pH meter and electrode.
Preparation of ORP by Electrode	EP125	Soil/Solid	APHA 2580 (mod)	Field-moist sample is extracted in a 1:2 ratio with DI water and then analyzed by ORP
				meter.
	Waterloo -			
	Environmental			
Anions Leach 1:10 Soil:Water (Dry)	EP236	Soil/Solid	EPA 300.1	5 grams of dried soil is mixed with 50 grams of distilled water for a minimum of 30
				minutes. The extract is filtered and analyzed by ion chromatography.
	Waterloo -			
	Environmental			
Distillation for Acid Volatile Sulfide in Soil	EP396-L	Soil/Solid	APHA 4500S2J	Acid Volatile Sulfide is determined by colourimetric measurement on a sediment sample
				that has been treated with hydrochloric acid within a purge and trap system, where the
	Waterloo -			evolved hydrogen sulfide gas is carried into a basic solution by argon gas for analysis.
	Environmental			



QUALITY CONTROL REPORT

Work Order	WT2214174	Page	: 1 of 4
Client	: GHD Limited	Laboratory	: Waterloo - Environmental
Contact	: Rick Hawthorne	Account Manager	: Rick Hawthorne
Address	: 455 Phillip Street	Address	: 60 Northland Road, Unit 1
	Waterloo ON Canada N2L 3X2		Waterloo, Ontario Canada N2V 2B8
Telephone	:	Telephone	: +1 519 886 6910
Project	: 11205379-100	Date Samples Received	: 14-Sep-2022 10:30
PO	: 735-004287	Date Analysis Commenced	: 15-Sep-2022
C-O-C number	:	Issue Date	16-Sep-2022 16:35
Sampler	: CLIENT		
Site	:		
Quote number	: 11205379-100-SSOW 735-004287		
No. of samples received	: 8		
No. of samples analysed	:8		

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

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

Signatories

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

Signatories	Position	Laboratory Department
Greg Pokocky	Supervisor - Inorganic	Waterloo Inorganics, Waterloo, Ontario
Joseph Scharbach		Waterloo Centralized Prep, Waterloo, Ontario
Walt Kippenhuck	Team Leader - Inorganics	Waterloo Inorganics, Waterloo, Ontario

Page	: 2 of 4
Work Order	: WT2214174
Client	: GHD Limited
Project	: 11205379-100



General Comments

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

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

= Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: Soil/Solid							Labora	tory Duplicate (D	UP) Report		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC	Lot: 648051)										
WT2214174-006	11205379- BH16-22-SS2	conductivity (1:2 leachate)		E100-L	10.0	μS/cm	430	438	1.84%	20%	
Physical Tests (QC	Lot: 648054)										
WT2214174-008	11205379- MW09-22	pH (1:2 soil:CaCl2-aq)		E108A	0.10	pH units	6.81	6.82	0.147%	5%	
Physical Tests (QC	Lot: 648056)										
WT2214174-007	11205379- BH17-22-SS2	oxidation-reduction potential [ORP]		E125	0.10	mV	350	430	20.5%	25%	
Physical Tests (QC	Lot: 648057)										
WT2214174-008	11205379- MW09-22	moisture		E144	0.25	%	6.16	6.68	8.05%	20%	
Leachable Anions 8	Nutrients (QC Lot: 648	052)									
WT2214174-006	11205379- BH16-22-SS2	sulfate, soluble ion content	14808-79-8	E236.SO4	20	mg/kg	116	118	1	Diff <2x LOR	
Leachable Anions 8	Nutrients (QC Lot: 648	053)									
WT2214174-006	11205379- BH16-22-SS2	chloride, soluble ion content	16887-00-6	E236.Cl	5.0	mg/kg	83.2	83.3	0.136%	30%	

Page	: 3 of 4
Work Order	: WT2214174
Client	: GHD Limited
Project	: 11205379-100



Method Blank (MB) Report

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

Sub-Matrix: Soil/Solid

Analyte	CAS Number Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 648051)					
conductivity (1:2 leachate)	E100-L	5	µS/cm	<5.00	
Physical Tests (QCLot: 648057)					
moisture	E144	0.25	%	<0.25	
Leachable Anions & Nutrients (QCLot: 6480	52)				
sulfate, soluble ion content	14808-79-8 E236.SO4	20	mg/kg	<20	
Leachable Anions & Nutrients (QCLot: 6480	53)				
chloride, soluble ion content	16887-00-6 E236.CI	5	mg/kg	<5.0	

Laboratory Control Sample (LCS) Report

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

Sub-Matrix: Soil/Solid						Laboratory Co	ntrol Sample (LCS)	Report	
					Spike	Recovery (%)	Recovery	Limits (%)	
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 648051)									
conductivity (1:2 leachate)		E100-L	5	µS/cm	1409 µS/cm	98.8	90.0	110	
Physical Tests (QCLot: 648054)									
pH (1:2 soil:CaCl2-aq)		E108A		pH units	7 pH units	100	98.0	102	
Physical Tests (QCLot: 648057)									
moisture		E144	0.25	%	50 %	101	90.0	110	
Leachable Anions & Nutrients (QCLot: 64	8052)								
sulfate, soluble ion content	14808-79-8	E236.SO4	20	mg/kg	5000 mg/kg	100	70.0	130	
Leachable Anions & Nutrients (QCLot: 64	8053)								
chloride, soluble ion content	16887-00-6	E236.Cl	5	mg/kg	5000 mg/kg	101	80.0	120	



Reference Material (RM) Report

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

Sub-Matrix:						Refere	nce Material (RM) Re	port	
					RM Target	Recovery (%)	Recovery L	.imits (%)	
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Physical Tests (QCLot: 648051)								
	RM	conductivity (1:2 leachate)		E100-L	3239 µS/cm	100	70.0	130	
Physical Tests (QCLot: 648056)								
	RM	oxidation-reduction potential [ORP]		E125	475 mV	102	80.0	120	
Leachable Anior	ns & Nutrients (QCLot: 6	648052)							
	RM	sulfate, soluble ion content	14808-79-8	E236.SO4	217 mg/kg	98.5	60.0	140	
Leachable Anior	ns & Nutrients (QCLot: 6	648053)							
	RM	chloride, soluble ion content	16887-00-6	E236.CI	673 mg/kg	94.1	70.0	130	

>

Page

Ś COC Number: 22 ď

		下 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	ł				ſ		[[ΗЭ	ÐA	ЯC	018	IELD: DED SET	XTE/	3												NITIATED) YES 🗆 N/A		tern the second		TIMES (2)
Environment	Waterioo	いていつして								E Telephone: + 1 31 C	re tr/l') below																				SAMPLE RECEIPT DETAILS (ALS use only)		ipt Notification:	C YES C N/A Sample Custody Seals Intact: C YES	FINAL COOLER TEMPERATURES	しょん	FINAL SHIPMENT RECEPTION (ALS use only)	
	Turnaround Time (TAT) Requeste	Routine [R] if received by 3pm M-F - no surcharoes an	4 day [P4] if received by 3pm M-F - 20% rush surchar	3 day [P3] if received by 3pm M-F - 25% rush surchary	【12 day [P2] if received by 3pm M-F - 50% rush surcharg [11] 1 day (EE) if received by 7cm M-F - 100% and burcharg	ay [E2] if received by 10am M-S - 200% rush su	Additional fees may apply to rush requests on w(Date and Time Required for all E&P TATs:	For all tests with rush TATs requested, plo	Analysis	Indicate Filtered (F), Preserved (P) or Filtere.										-											Cooling Method: KANNE DICE DICE PACKS DIPOZEN	Submission Comments Identified on Sample Receipt Notification:	Cooler Custody Seals Intact: 👘 🗂 YES 👘 NA	INITTAL COOLER TEMPERATURES °C		FINAL SHIPMENT	Received by: ND Days
		C Routine	0 4 day [□ 3 day				Date			ש: ש	INI	A	LN	0;	E (0	8EK		_	<u>د</u>									 		Cooling	Submiss	Cooler C			and the second second	Time:
	Reports / Recipients	Select Report Format: 🔄 PDF 🔲 EXCEL 🔲 EDD (DIGITAL)	A E YES	Compare Results to Criteria on Report - provide details below if box checked	Select Distribution: 🖬 EMAIL 🗆 MAIL 🗍 FAX	Email 1 or Fax jennifer.balkwill@ghd.com	Email 2	Email 3	Invoice Recipients	Select Invoice Distribution: 🔲 EMAIL 🔲 MAIL 🗍 FAX	Email 1 or Fax	Email 2	il and Gas Required		Majar/Minor Code: Routing Cade:	Requisitioner:	Location:	ALS Contact: Sampler:	Date Time Sample Type	-											Notes / Specify Limits for result evaluation by selecting from drop-down below	(Excel COC only)					INITIAL SHIPMENT RECEPTION (ALS use only)	Received by:
	Contact and company name below will appear on the funal report	GHD Limited	Jennifer Balkwill	519-340-4286	Company address below will appear on the final report	455 Phillip Street, Unit 100A	Waterloo, Ontario		Same as Report To 3 YES D NO	Copy of Invoice with Report 🛛 YES 🗍 NO			Project Information		0	735-003472-1		ALS Lab Work Order # (ALS use only):	Sample Identification and/or Coordinates (This description will annear on the renot)	$\frac{1}{1205379 - RH/h - CC}$	0 1 0 1	-	1	11205379 - MW/ 18-552	11205379 ~ BH 11-22-552	11205379 - R.H. 16 - 22 - 55 2	11205379 - BH17.22-552	11206379 - MW09-22			Drinking Water (DW) Samalas 1 (cliant use)				nan		(client use)	1 Time: Time:
	Report To	Company:	Contact:	Phone:		Street:	City/Province:	Postal Code:	Invoice To		Company:	Contact:		ALS Account #/ Quote #:	Jab#:	PO / AFE:	LSD:	ALS Lab Work	ALS Sample # (ALS use only)							and the second second					Drinking	Summa .	Are samples take		Are samples for I	- YES		Released by: