



<b>To:</b>	Martin Turpin	<b>Date:</b>	June 12, 2024
<b>c:</b>	Luke Morris	<b>Memo No.:</b>	TM01
<b>From:</b>	Shawn Matthies	<b>File:</b>	704-ENG.WARC04016-03
<b>Subject:</b>	Geotechnical Input for Archives Parking Lot Expansion Yukon University, Whitehorse, Yukon		

## 1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) was retained by Yukon University (YU) to provide geotechnical input for a parking lot expansion at the Yukon University Whitehorse (Ayamdigut) campus. This memorandum summarizes a geotechnical drilling program completed by Tetra Tech and provides recommendations for site preparation and granular structure for the parking lot expansion.

We understand Stantec Architecture Ltd. (Stantec) has been retained by YU to design the parking lot.

## 2.0 PROJECT DESCRIPTION

The proposed parking lot expansion is located south of the Yukon Archives building within the Yukon University Whitehorse (Ayamdigut) campus. The expansion extends to the south from an existing paved parking area; the expansion will be surfaced with asphalt pavement.

## 3.0 SITE INVESTIGATION

Tetra Tech retained Donjeck Drilling Ltd. of Whitehorse to complete a geotechnical drilling program consisting consisted of four solid stem auger boreholes advanced to depths ranging from 3.0 m to 6.1 m. The drilling program was completed on March 26 and 27, 2024. Boreholes were logged in the field by a geotechnical engineer from Tetra Tech's Whitehorse office. Disturbed samples were collected and returned to Tetra Tech's Whitehorse office for geotechnical index testing, including determination of natural moisture content on all samples and grain size distribution (sieve) testing on selected samples. Borehole logs and laboratory testing results are included in Appendix B.

## 4.0 SITE CONDITIONS

### 4.1 Surface Conditions

The proposed parking lot area was clear of trees and brush, with sparse grass covering some areas. The ground surface sloped slightly to the south and appeared to have been previously levelled by cutting and filling. Steep banks sloping down beyond the south and west sides of the parking lot expansion area indicate about two to four metres of fill had been placed. A cut bank was visible about 20 m east of the expansion area, indicating original ground surface may have been higher than existing ground surface on the east side.

The area had been used as a snow dump over the winter and snow piles were present along the perimeter of the proposed parking lot area. Small pieces of garbage and debris were observed throughout the site.

## 4.2 Subsurface Conditions

Glaciofluvial soil and local fill were encountered in all of the boreholes. The glaciofluvial soil ranged in composition from gravel to sand, with silt content ranging from trace (<10%) to silty (>25%). Cobbles were occasionally returned on the auger flights. The composition of the fill was similar to that of the glaciofluvial soil, but with slightly higher silt content. The interface between local fill and original ground surface was difficult to assess due to their similar compositions.

Groundwater, bedrock, and permafrost were not encountered in the drilling program, and none are expected to influence the proposed development.

Borehole logs and laboratory testing results are included in Appendix B.

## 5.0 DISCUSSION AND RECOMMENDATIONS

Tetra Tech considers the site to be generally suitable for construction of a paved parking lot. Some soil encountered in the drilling program is considered to be frost-susceptible, and some subexcavation and construction of a granular subbase is recommended to limit the impact of frost heave on the pavement structure.

### 5.1 Site Preparation

The soil structure for the parking lot should be prepared in accordance with the following recommendations:

- Surficial soil should be subexcavated to remove unsuitable material (e.g., silty or organic soil and debris) and allow for the construction of a compacted granular subbase. The subexcavation depth should be the greater of:
  - 0.5 m, measured from existing grade; or
  - 1.7 m, measured from final grade.
- The exposed subgrade should consist of granular glaciofluvial soil and/or granular fill. Excavation should be completed using a smooth-edged bucket to minimize disturbance to the subgrade.
- The exposed subgrade should be inspected by a geotechnical engineer to confirm that suitable conditions have been achieved.
- After the subgrade has been approved, the subgrade should be moisture conditioned and compacted to at least 98% of the standard Proctor maximum dry density (SPMDD).
- Subbase fill should be composed of 80 mm pit run gravel conforming to the gradation in Table 1. Pit run gravel should be placed in maximum 300 mm-thick lifts, moisture conditioned, and compacted to at least 98% SPMDD. The minimum thickness of subbase material for the parking lot is 1.6 m; more may be required to reach civil design grades.
  - Some of the excavated material may be suitable for reuse as 80 mm pit run gravel. The contractor should stockpile selected fill if material will be reused, taking care to dispose of unsuitable material (e.g., silty or organic soil and debris). The stockpiled material should be approved by the engineer prior to use as fill.

- A minimum 100 mm-thick layer of 20 mm crushed basecourse gravel conforming to the gradation in Table 1 should be placed immediately underlying asphalt pavement. Basecourse gravel should be moisture conditioned and compacted to at least 98% SPMDD.

**Table 1: Recommended Gradations for Granular Fill Materials**

80 mm Pit Run Gravel		20 mm Crushed Basecourse Gravel	
Particle Size (mm)	% Passing by Mass	Particle Size (mm)	% Passing by Mass
80.0	100	–	–
25.0	55 - 100	20.0	100
12.5	42 - 84	12.5	64 - 100
5.00	26 - 65	5.00	36 - 72
1.25	11 - 47	1.25	12 - 42
0.315	3 - 30	0.315	4 - 22
0.080	0 - 8	0.080	3 - 6

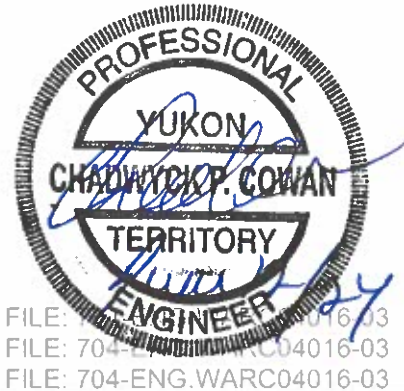
## 6.0 LIMITATIONS OF REPORT

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## 7.0 CLOSURE

We trust this technical memo meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,  
Tetra Tech Canada Inc.



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/et

Enclosure: Appendix A: Tetra Tech's Limitations on the Use of this Document  
Appendix B: Borehole Logs and Laboratory Testing Results

PERMIT TO PRACTICE TETRA TECH CANADA INC.	
SIGNATURE	<i>[Signature]</i>
Date	<i>June 17/24</i>
PERMIT NUMBER PP003 Association of Professional Engineers of Yukon	

## APPENDIX A

### TETRA TECH'S LIMITATIONS ON THE USE OF THIS DOCUMENT

# LIMITATIONS ON USE OF THIS DOCUMENT

## GEOTECHNICAL

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If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

### 1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

### 1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by third parties other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

### 1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this document, at or on the development proposed as of the date of the Professional Document requires a supplementary exploration, investigation, and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

## 1.7 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, TETRA TECH has not been retained to explore, address or consider and has not explored, addressed or considered any environmental or regulatory issues associated with development on the subject site.

## 1.8 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems, methods and standards employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. TETRA TECH does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

## 1.9 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

## 1.10 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historical environment. TETRA TECH does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional exploration and review may be necessary.

## 1.11 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

## 1.12 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

## 1.13 INFLUENCE OF CONSTRUCTION ACTIVITY

Construction activity can impact structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques, and construction sequence are known.

## 1.14 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, and the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

## 1.15 DRAINAGE SYSTEMS

Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function. Where temporary or permanent drainage systems are installed within or around a structure, these systems must protect the structure from loss of ground due to mechanisms such as internal erosion and must be designed so as to assure continued satisfactory performance of the drains. Specific design details regarding the geotechnical aspects of such systems (e.g. bedding material, surrounding soil, soil cover, geotextile type) should be reviewed by the geotechnical engineer to confirm the performance of the system is consistent with the conditions used in the geotechnical design.

## 1.16 DESIGN PARAMETERS

Bearing capacities for Limit States or Allowable Stress Design, strength/stiffness properties and similar geotechnical design parameters quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition used in this report. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions considered in this report in fact exist at the site.

## 1.17 SAMPLES

TETRA TECH will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the Client's expense upon written request, otherwise samples will be discarded.

## 1.18 APPLICABLE CODES, STANDARDS, GUIDELINES & BEST PRACTICE

This document has been prepared based on the applicable codes, standards, guidelines or best practice as identified in the report. Some mandated codes, standards and guidelines (such as ASTM, AASHTO Bridge Design/Construction Codes, Canadian Highway Bridge Design Code, National/Provincial Building Codes) are routinely updated and corrections made. TETRA TECH cannot predict nor be held liable for any such future changes, amendments, errors or omissions in these documents that may have a bearing on the assessment, design or analyses included in this report.

## APPENDIX B

### BOREHOLE LOGS AND LABORATORY TESTING RESULTS



# TERMS USED ON BOREHOLE LOGS

## TERMS DESCRIBING CONSISTENCY OR CONDITION

**COARSE GRAINED SOILS** (major portion retained on 0.075mm sieve): Includes (1) clean gravels and sands, and (2) silty or clayey gravels and sands. Condition is rated according to relative density, as inferred from laboratory or in situ tests.

DESCRIPTIVE TERM	RELATIVE DENSITY	N (blows per 0.3m)
Very Loose	0 TO 20%	0 to 4
Loose	20 TO 40%	4 to 10
Compact	40 TO 75%	10 to 30
Dense	75 TO 90%	30 to 50
Very Dense	90 TO 100%	greater than 50

The number of blows, N, on a 51mm O.D. split spoon sampler of a 63.5kg weight falling 0.76m, required to drive the sampler a distance of 0.3m from 0.15m to 0.45m.

**FINE GRAINED SOILS** (major portion passing 0.075mm sieve): Includes (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as estimated from laboratory or in situ tests.

DESCRIPTIVE TERM	UNCONFINED COMPRESSIVE STRENGTH (KPA)
Very Soft	Less than 25
Soft	25 to 50
Firm	50 to 100
Stiff	100 to 200
Very Stiff	200 to 400
Hard	Greater than 400

**NOTE:** Slickensided and fissured clays may have lower unconfined compressive strengths than shown above, because of planes of weakness or cracks in the soil.

## GENERAL DESCRIPTIVE TERMS

**Slickensided** - having inclined planes of weakness that are slick and glossy in appearance.

**Fissured** - containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical.

**Laminated** - composed of thin layers of varying colour and texture.

**Interbedded** - composed of alternate layers of different soil types.

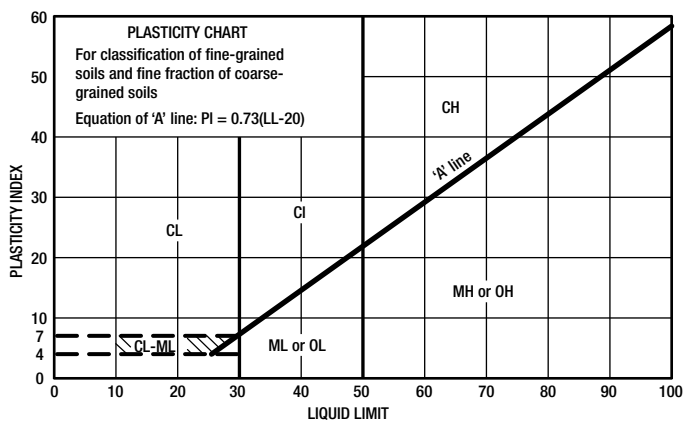
**Calcareous** - containing appreciable quantities of calcium carbonate.;

**Well graded** - having wide range in grain sizes and substantial amounts of intermediate particle sizes.

**Poorly graded** - predominantly of one grain size, or having a range of sizes with some intermediate size missing.

# MODIFIED UNIFIED SOIL CLASSIFICATION

MAJOR DIVISION		GROUP SYMBOL	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA		
<b>COARSE - GRAINED SOILS</b> More than 50% retained on No. 75 µm sieve*	<b>GRAVELS</b> 50% or more of coarse fraction retained on No. 4 sieve	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	Classification on basis of percentage of fines GW, GP, SW, SP GM, GC, SM, SC Borderline classification requiring use of dual symbols	$C_u = D_{60} / D_{10}$ Greater than 4 $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3	
		GP	Poorly-graded gravels and gravel-sand mixtures, little or no fines		Not meeting both criteria for GW	
		GM	Silty gravels, gravel-sand-silt mixtures		Atterberg limits plot below 'A' line or plasticity index less than 4	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
		GC	Clayey gravels, gravel-sand-clay mixtures		Atterberg limits plot above 'A' line and plasticity index greater than 7	
		<b>SANDS</b> More than 50% of coarse fraction passes No. 4 sieve	<b>CLEAN SANDS</b>		SW	Well-graded sands and gravelly sands, little or no fines
	SP			Poorly-graded sands and gravelly sands, little or no fines	Not meeting both criteria for SW	
	<b>SANDS WITH FINES</b>		SM	Silty sands, sand-silt mixtures	Atterberg limits plot above 'A' line and plasticity index less than 4	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
			SC	Clayey sands, sand-clay mixtures	Atterberg limits plot above 'A' line and plasticity index greater than 7	



\* Based on the material passing the 75 mm sieve  
 † ASTM Designation D 2487, for identification procedure see D 2488 USC as modified by PFRA

## GROUND ICE DESCRIPTION

ICE NOT VISIBLE				VISIBLE ICE LESS THAN 50% BY VOLUME			
GROUP SYMBOL	SYMBOL	SUBGROUP DESCRIPTION		GROUP SYMBOL	SYMBOL	SUBGROUP DESCRIPTION	
N	Nf	Poorly-bonded or friable		V	Vx	Individual ice crystals or inclusions	
	Nbn	No excess ice, well-bonded			Vc	Ice coatings on particles	
	Nbe	Excess ice, well-bonded			Vr	Random or irregularly oriented ice formations	
					Vs	Stratified or distinctly oriented ice formations	
<b>NOTES:</b> <ol style="list-style-type: none"> <li>Dual symbols are used to indicate borderline or mixed ice classifications.</li> <li>Visual estimates of ice contents indicated on borehole logs ± 5%</li> <li>This system of ground ice description has been modified from NRC Technical Memo 79, Guide to the Field Description of Permafrost for Engineering Purposes.</li> </ol>				<b>VISIBLE ICE GREATER THAN 50% BY VOLUME</b>			
<b>LEGEND:</b> Soil <span style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; background-color: white;"></span> Ice <span style="display: inline-block; width: 15px; height: 15px; background-color: black;"></span>				ICE	ICE + Soil Type	Ice with soil inclusions	
				ICE	ICE	Ice without soil inclusions (greater than 25 mm thick)	

# BOREHOLE KEYSHEET

## Water Level Measurement



Measured in standpipe, piezometer or well



Inferred

## Sample Types



A-Casing



Core



Disturbed, Bag, Grab



HQ Core



Jar



Jar and Bag



75 mm SPT



No Recovery



Split Spoon/SPT



Tube



CRREL Core

## Backfill Materials



Asphalt



Bentonite



Cement/Grout



Drill Cuttings



Grout



Gravel



Sand



Slough



Topsoil Backfill



Undisturbed

## Lithology - Graphical Legend<sup>1</sup>



Asphalt



Bedrock



Cobbles/Boulders



Clay



Coal



Concrete



Fill



Gravel



Limestone



Mudstone



Organics



Peat



Sand



Sandstone



Shale



Silt



Siltstone



Conglomerate



Topsoil



Till

1. The graphical legend is an approximation and for visual representation only. Soil strata may comprise a combination of the basic symbols shown above. Particle sizes are not drawn to scale

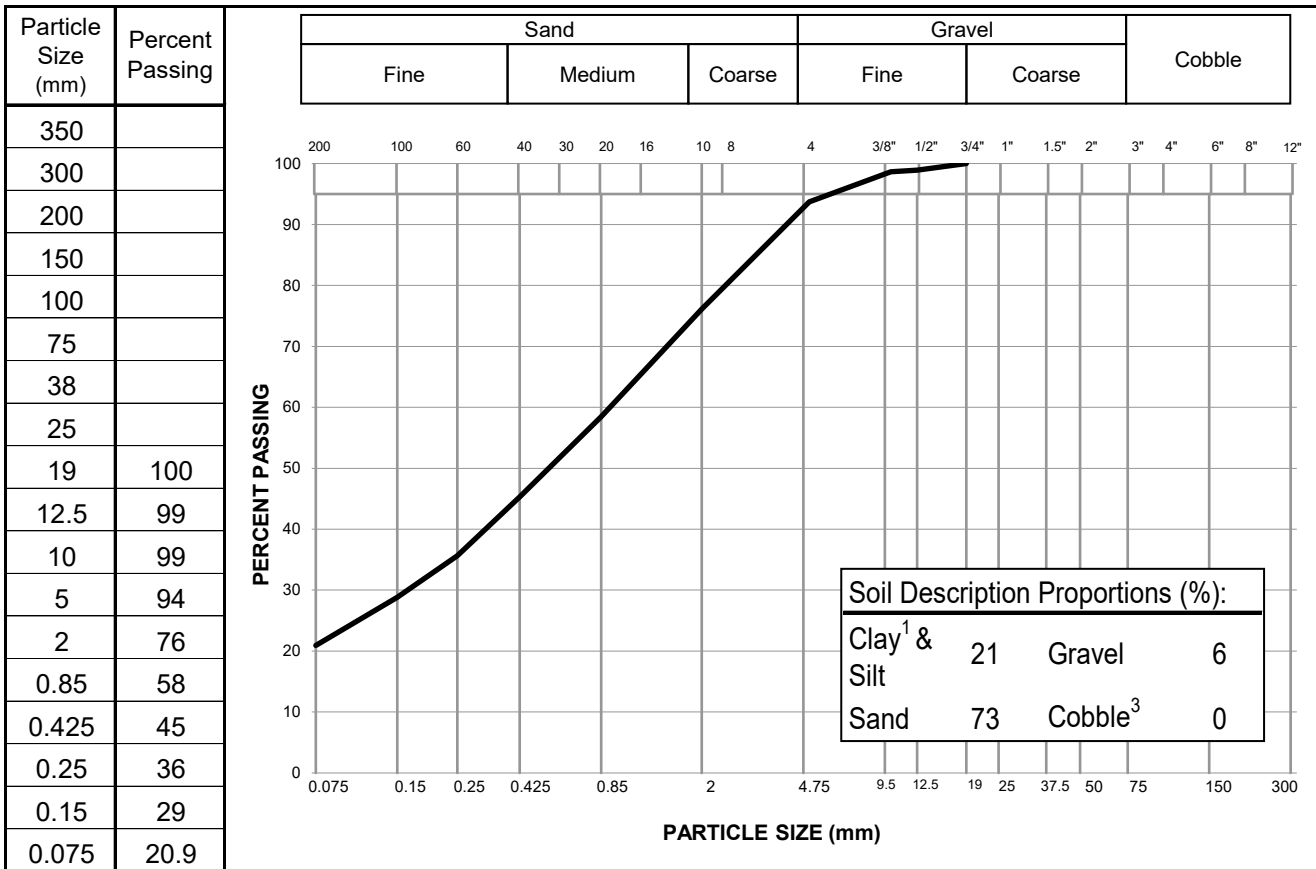
Depth (m)	Method	Soil Description	Ground Ice Description	Sample Type	Sample Number	Moisture Content (%)	Plastic Limit Moisture Content Liquid Limit	Depth (ft)
0							20 40 60 80	0
0 to 6.10	Solid stem auger	SAND (FILL) - silty, trace gravel, fine to coarse grained sand, fine grained subrounded gravel, brownish grey	Unfrozen Seasonally frozen	G01 G02 G03 G04	4.5 3 3.6 3.4	● ● ● ●		1 to 20
		GRAVEL (GLACIOFLUVIAL) - sandy, trace silt, fine to coarse grained subrounded gravel, fine to coarse grained sand, damp, grey	Unfrozen					
		- moist - rootlet inclusions						
		SAND AND GRAVEL (GLACIOFLUVIAL) - trace silt, fine to coarse grained sand, fine to coarse grained subrounded gravel, damp, grey						
6.10		END OF BOREHOLE (6.10 metres) Note: Target depth reached						21



## PARTICLE SIZE ANALYSIS REPORT

ASTM D7928 & C136

Project:	Yukon University Archives Parking Lot	Sample No.:	G01
Project No.:	ENG.WARC04016-03	Material Type:	-
Site:	Yukon University Whitehorse Campus	Sample Loc.:	BH24-01
Client:	Yukon University	Sample Depth:	0.9 - 1.1 m
Client Rep.:	Luke Morris	Sampling Method:	Grab
Date Tested:	April 4, 2024	By:	BW
Date Tested:	April 4, 2024	Date Sampled:	March 26, 2024
Soil Description <sup>2</sup> :	SAND - silty, trace gravel	Sampled By:	SAM
		USC Classification:	SM      Cu: #N/A
Moisture Content:	4.5%		Cc: #N/A



- Notes: <sup>1</sup> The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual 2023  
<sup>2</sup> The description is visually based on & subject to Tt WM4400 description protocols  
<sup>3</sup> If cobbles are present, sampling procedure may not meet ASTM C702 & D75

Specification: \_\_\_\_\_

Remarks: \_\_\_\_\_  
 \_\_\_\_\_

Reviewed By: *Chad Pearson* P.Eng.

Data presented hereon is for the sole use of the stipulated client. Tetra Tech is not responsible, nor can be held liable, for use made of this report by any other party, with or without the knowledge of Tetra Tech. The testing services reported herein have been performed to recognized industry standards, unless noted. No other warranty is made. These data do not include or represent any interpretation or opinion of specification compliance or material suitability. Should engineering interpretation be required, Tetra Tech will provide it upon written request.



Depth (m)	Method	Soil Description	Ground Ice Description	Sample Type	Sample Number	Moisture Content (%)	Plastic Limit	Moisture Content	Liquid Limit	Depth (ft)
0							20	40	80	0
0 - 1	Solid stem auger	SAND (FILL) - some silt, trace gravel, fine to coarse grained sand, fine grained subrounded gravel, damp (thawed by drilling), tan	Unfrozen							0 - 1
1 - 2			Seasonally frozen							1 - 2
2 - 3		- moist	Unfrozen	G05	3.8					2 - 3
3 - 4		- trace to some silt, brownish tan		G06	5.7					3 - 4
4 - 5				G07						4 - 5
5 - 6		SAND (POSSIBLE GLACIOFLUVIAL) - gravelly, trace silt, occasional cobbles, fine to coarse grained sand, fine to coarse grained subrounded gravel, damp, brownish grey		G08						5 - 6
6 - 7										6 - 7
7 - 7.5			END OF BOREHOLE (6.10 metres) Note: Target depth reached							



Contractor: Donjeck Drilling Ltd.

Completion Depth: 6.1 m

Equipment Type: Truck mounted CME-75

Start Date: 2024 March 26

Logged By: SAM

Completion Date: 2024 March 27

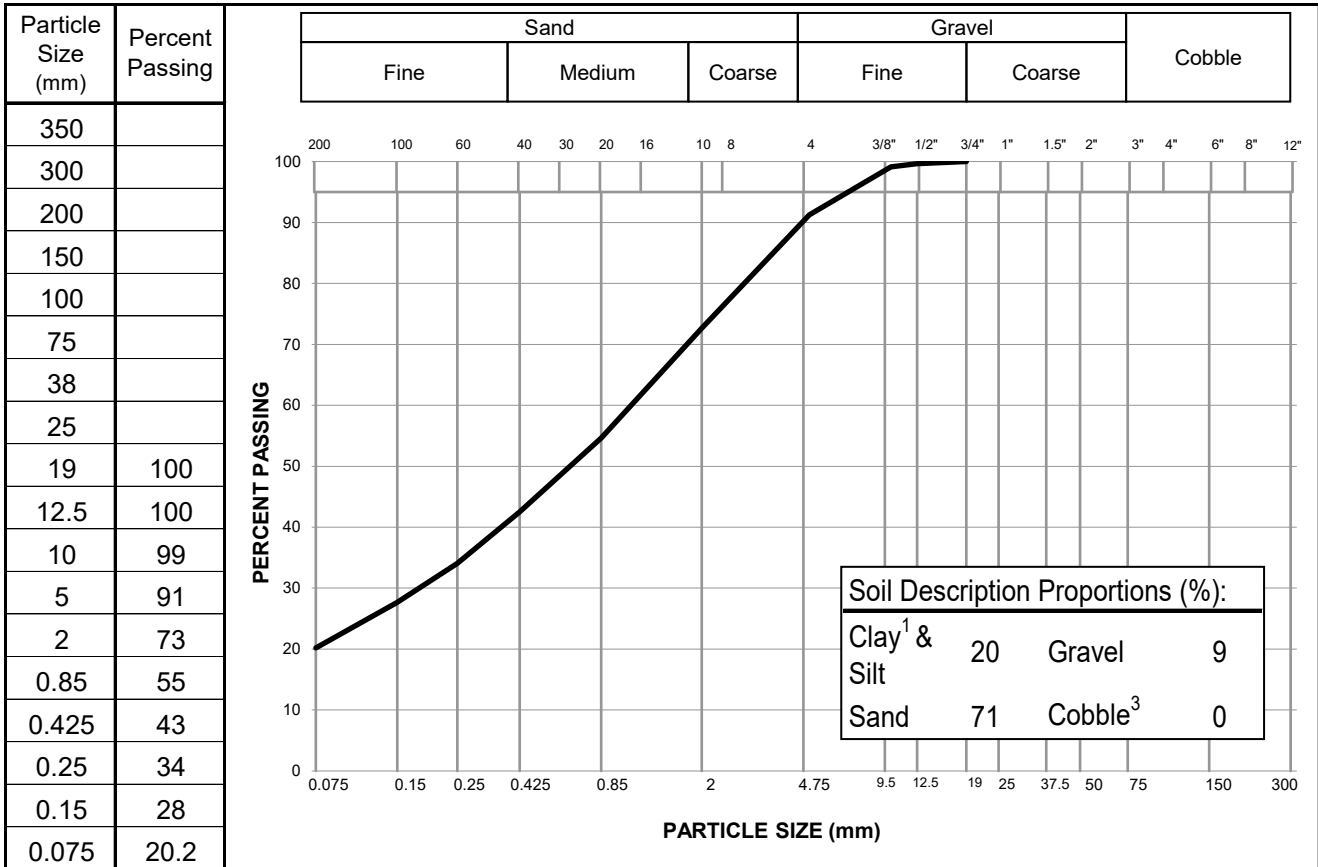
Reviewed By: CPC

Page 1 of 1

# PARTICLE SIZE ANALYSIS REPORT

ASTM D7928 & C136

Project:	Yukon University Archives Parking Lot	Sample No.:	G05
Project No.:	ENG.WARC04016-03	Material Type:	-
Site:	Yukon University Whitehorse Campus	Sample Loc.:	BH24-02
Client:	Yukon University	Sample Depth:	1.1 - 1.2 m
Client Rep.:	Luke Morris	Sampling Method:	Grab
Date Tested:	April 4, 2024	By:	BW
Date Tested:	April 4, 2024	Date Sampled:	March 26, 2024
Soil Description <sup>2</sup> :	SAND - some silt, trace gravel	Sampled By:	SAM
		USC Classification:	SM      Cu: #N/A
Moisture Content:	3.8%		Cc: #N/A



Notes: <sup>1</sup> The upper clay size of 2 μm, per the Canadian Foundation Engineering Manual 2023  
<sup>2</sup> The description is visually based on & subject to Tt WM4400 description protocols  
<sup>3</sup> If cobbles are present, sampling procedure may not meet ASTM C702 & D75

Specification: \_\_\_\_\_

Remarks: \_\_\_\_\_

Reviewed By: *Chad Caon* P.Eng.

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Depth (m)	Method	Soil Description	Ground Ice Description	Sample Type	Sample Number	Moisture Content (%)	Plastic Limit	Moisture Content	Liquid Limit	Depth (ft)
0							20	40	80	0
0 - 1.0	Solid stem auger	SAND AND GRAVEL (FILL) - trace silt, fine to coarse grained sand, fine grained subrounded gravel, brownish grey	Unfrozen							0 - 1
1.0 - 2.0		- damp	Seasonally frozen							1 - 2
2.0 - 3.0			Unfrozen	G09	3.4					2 - 3
3.0 - 4.0				Unfrozen	G10	3.3				3 - 4
4.0 - 6.1			SAND - (GLACIOFLUVIAL) - gravelly, trace silt, medium to coarse grained sand, fine grained subrounded gravel, grey							
6.1 - 7.5		END OF BOREHOLE (6.10 metres) Note: Target depth reached								6 - 7.5



Contractor: Donjeck Drilling Ltd.

Completion Depth: 6.1 m

Equipment Type: Truck mounted CME-75

Start Date: 2024 March 27

Logged By: SAM

Completion Date: 2024 March 27

Reviewed By: CPC

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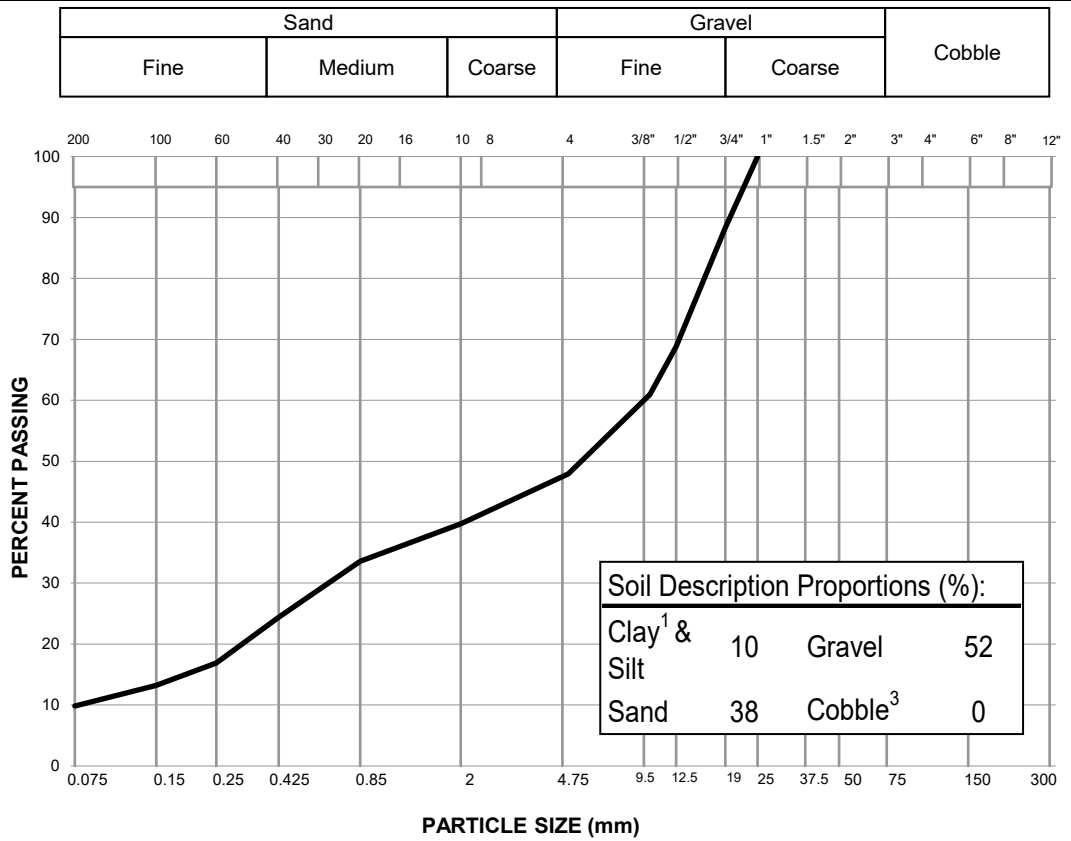


# PARTICLE SIZE ANALYSIS REPORT

ASTM D7928 & C136

Project:	Yukon University Archives Parking Lot	Sample No.:	G09
Project No.:	ENG.WARC04016-03	Material Type:	-
Site:	Yukon University Whitehorse Campus	Sample Loc.:	BH24-03
Client:	Yukon University	Sample Depth:	0.9 - 1.1 m
Client Rep.:	Luke Morris	Sampling Method:	Grab
Date Tested:	April 4, 2024	By:	BW
Date Tested:	April 4, 2024	Date Sampled:	March 27, 2024
Soil Description <sup>2</sup> :	GRAVEL and SAND - trace silt	Sampled By:	SAM
Moisture Content:	3.4%	USC Classification:	GP      Cu: 122.7 Cc: 0.6

Particle Size (mm)	Percent Passing
350	
300	
200	
150	
100	
75	
38	
25	100
19	88
12.5	69
10	61
5	48
2	40
0.85	34
0.425	24
0.25	17
0.15	13
0.075	9.8



Notes: <sup>1</sup> The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual 2023  
<sup>2</sup> The description is visually based on & subject to Tt WM4400 description protocols  
<sup>3</sup> If cobbles are present, sampling procedure may not meet ASTM C702 & D75

Specification: \_\_\_\_\_

Remarks: \_\_\_\_\_

Reviewed By: \_\_\_\_\_

P.Eng.

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Depth (m)	Method	Soil Description	Ground Ice Description	Sample Type	Sample Number	Moisture Content (%)	Plastic Limit Moisture Content Liquid Limit	Depth (ft)
0								0
0 to 3.05	Solid stem auger	SAND AND GRAVEL (FILL) - trace silt, fine to coarse grained sand, fine grained subrounded gravel, brownish grey	Unfrozen ----- Seasonally frozen					0 to 10
3.05								10
3.05		GRAVEL (GLACIOFLUVIAL) - sandy, trace silt, fine to coarse grained subrounded gravel, medium to coarse grained sand, damp, grey	Unfrozen		G13	2.6		10
3.05		GRAVEL (GLACIOFLUVIAL) - sandy, trace silt, fine to coarse grained subrounded gravel, medium to coarse grained sand, damp, grey	Unfrozen		G14	2.1		10
3.05		END OF BOREHOLE (3.05 metres) Note: Target depth reached						10



Contractor: Donjeck Drilling Ltd.

Completion Depth: 3.05 m

Equipment Type: Truck mounted CME-75

Start Date: 2024 March 27

Logged By: SAM

Completion Date: 2024 March 27

Reviewed By: CPC

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