EBA Engineering Consultants Ltd.

September 1, 1998

N A Jacobsen, Civil Engineering Consultant
P.O. Box 4686
Whitehorse, Yukon
Y1A 3V7

EBA File: 0201-98-13541

Attention: Mr. Niels Jacobsen, P. Eng.

Dear Sir:

Subject: **Geotechnical Evaluation for**
New Access Road to Beringia Centre, Whitehorse, YT

In accordance with our proposal submitted in conjunction with N A Jacobsen and Underhill Geomatics, dated August 11, 1998; EBA Engineering Consultants Ltd. (EBA) has conducted a geotechnical exploration and evaluation of the above referenced site. The purpose of this evaluation was to define the subsurface conditions in the area proposed for access road construction, and to provide recommendations pertaining to this development.

The results of the exploration including recommendations pertaining to geotechnical aspects of site development are summarized below.

Verbal authorization to complete this work was provided by yourself in mid-August. The information and recommendations presented in this report incorporates and is subject to EBA's attached General Conditions, which forms a part of this report.

1.0 THE SITE AND PROPOSED DEVELOPMENT

It is understood that a new access into the Beringia Centre is to be constructed from the Alaska Highway, in conjunction with a turnaround and small parking area in front of the Beringia Centre, and a road link to the existing parking lot located to the north of the building. The design vehicle is a large articulated tour bus, and the new access and parking lot is to be paved with hot mix asphalt, and will include a small section of concrete curb, gutter and sidewalk.

2.0 SITE EXPLORATION

The field work was completed on 1998 08 24 by Mr. James Buyck with a Case 580 C rubber tired backhoe supplied and operated by Arctic Backhoe Services. As shown on the attached Site Plan, a total of seven testpits were excavated within the development area. All testpits with the

exception of TP 13541-01 and 13541-06 were excavated within the fill pad in front of the Beringia Centre. TP 13541-04 was excavated in an area of the pad proposed (by YTG) for fill.

Soil samples were obtained at regular intervals from the excavated testpits and were returned to EBA's Whitehorse laboratory for moisture content determination. Several representative samples were also selected for grain size analysis. The results of the laboratory and field testing programs are shown on the EseBase format logs which follow the Site Plan attached to this report.

Photos were taken at various stages of the investigation, and are available upon request.

3.0 SITE CONDITIONS

The soil conditions encountered in the testpits excavated within the fill area located west of the existing Beringia Centre consisted mainly of SILT. Varying contents of gravel and sand, along with some asphalt and concrete debris was encountered throughout the testpits. The fill material is non-plastic, is in a loose, damp state throughout, and averaged approximately 2.0 m in thickness. The underlying natural soil material contained a surficial organic layer and is also predominantly SILT. Testpit 13541-01, located near the existing parking area is consistent with what was found beneath the fill material. A 0.5 m thick SILT layer, containing roots and rootlets was encountered overlying about 0.7 m of clean SAND. SILT was again encountered a depth of 1.2 m and contained some clay to clayey that increases in clay content with depth. Testpit 13541-06 was excavated to 2.2 m in the right-of-way of the Alaska Highway. Black organic peat and topsoil from the surface to a depth of 1.5 m overlie saturated SILT.

Detailed descriptions of encountered conditions can be found on the testpit logs which accompany this report.

No permafrost or groundwater was observed in any of the testpits advanced for this project.

4.0 RECOMMENDATIONS

4.1 General

The site proposed for construction of the new access road crosses natural terrain adjacent to the Alaska Highway which contains a significant thickness of organics, and then traverses a thick fill pad constructed of waste materials stockpiled from the construction of the Air Terminal Building in the early 1980's. The organics adjacent to the Alaska Highway are soft and compressible and must be removed from beneath the new road. The fill pad in front of the Beringia centre is silty,

frost-susceptible, contains construction debris, and was placed in an uncontrolled and uncompacted manner. This fill beneath the proposed roadway and new concrete must also be removed to the recommended subcut depth, and the entire subcut area must be reconstructed to design grades with an engineered non-frost susceptible (NFS) granular fill. Existing pad materials are not acceptable as fill within the road structure envelope.

4.2 Site Preparation and Roadway Structure

The recommended roadway structure is shown on Drawing No. 13541-01, following, and assumes a single axle articulated bus is the design vehicle, with 6 buses/day, 4 months/year, 20 year design life.

Initially, all fill must be removed down to the base of the subcut. If any fill remains, it must be compacted to at least 95% of Standard Proctor Maximum Dry Density (ASTM D698) and any soft areas either removed and replaced with drier fill from the excavated material, or else covered in non-woven geotextile (Armtec 200, or approved alternate). All imported granular fill above this must conform to the Yukon Government's Granular E specification, or to EBA's Recommended Gradation Limits for Non Frost Susceptible Fill (Figure 1) following.

Recommended compaction specifications are also shown on Drawing No. 13541.01.

4.3 Flagpole Foundations

It is understood that the existing three flagpoles are to be relocated. It is recommended that the existing foundation be examined when removed, and identical construction be used for the new foundation. If this is not possible, then the suggested foundation system is to auger a 406 mm (16") hole to about 2.0 m depth, insert the appropriate reinforcing steel and flagpole base connectors, then fill the hole with concrete.

4.4 Concrete

It is recommended that all concrete be designed, mixed and placed in accordance with the Canadian Standards Association standard CAN/CSA-A23.1-M94.

The water soluble sulphate content of the soils at this site were not determined; however, similar glaciolacustrine soils in the Whitehorse area had negligible soluble sulphate contents. Therefore,

cast-in-place or pre-cast concrete used for foundations or services at this site may be designed with Type 10 Normal Portland cement, a minimum 28-day compressive strength of 25 MPa, and a maximum water cement ratio of 0.50. The entrained air content of this class of concrete should be 4% to 7% for 20 mm nominal maximum sized aggregate.

Concrete must not be poured onto or over frozen subgrade and it must be protected from freezing for the period specified by CAN/CSA-A23.1-M94

It is recommended EBA be given the opportunity to review details of the design and specifications related to the geotechnical aspects of this project prior to construction. Past experience has shown that this action may prevent inconsistencies that may lead to disputes.

Furthermore, it is recommended that engineering field services such as base of excavation inspection, backfill compaction testing, and concrete testing be performed to ensure that the requirements of this report are followed. EBA would be pleased to perform these services, if requested.

5.0 CLOSURE

The information and recommendations presented in this report are based on observations obtained from seven testpits advanced on the site. Conditions and assumptions reported are believed to be reasonable and representative of the site and the development. However, should different conditions be encountered during subsequent phases of the development, we request that EBA be notified so that our recommendations can be re-evaluated accordingly. Additional information regarding the use of this report is found in the General Conditions, attached, which forms a part of this report.

Respectfully submitted,
EBA Engineering Consultants Ltd.

James S. Buyck
Engineering Assistant

J. Richard Trimble, P.Eng.
Project Director, Yukon Region

EBA Engineering Consultants Ltd. (EBA)
GEOTECHNICAL REPORT - GENERAL CONDITIONS

This report incorporates and is subject to these "General Conditions"

A.1 USE OF REPORT AND OWNERSHIP

This geotechnical report pertains to a specific site, a specific development, and a specific scope of work. It is not applicable to any other sites nor should it be relied upon for types of development other than that to which it refers. Any variation from the site or development would necessitate a supplementary geotechnical assessment.

This report and the recommendations contained in it are intended for the sole use of EBA's client. EBA does not accept any responsibility for the accuracy of any of the data, the analyses or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than EBA's client unless otherwise authorized in writing by EBA. Any unauthorized use of the report is at the sole risk of the user.

A.2 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems and methods 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. EBA 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.

A.3 LOGS OF TEST HOLES

The test hole 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.

A.4 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

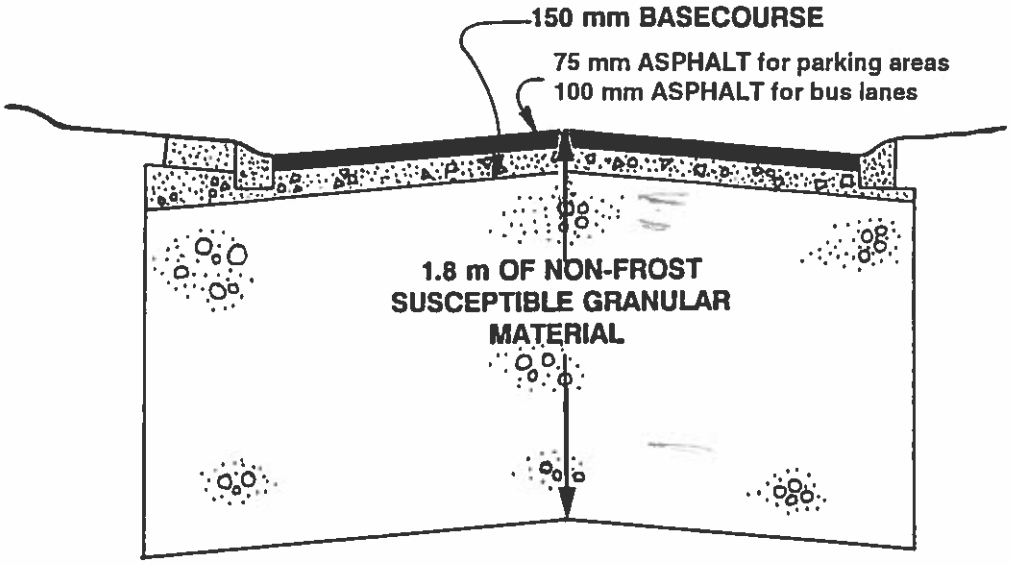
The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historic environment. EBA 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 investigation and review may be necessary.

A.5 SURFACE WATER AND GROUNDWATER CONDITIONS

Surface and groundwater conditions mentioned in this report are those observed at the times recorded in the report. These conditions vary with geological detail between observation sites; annual, seasonal and special meteorologic conditions; and with development activity. Interpretation of water conditions from observations and records is judgmental and constitutes an evaluation of circumstances as influenced by geology, meteorology and development activity. Deviations from these observations may occur during the course of development activities.

A.6 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.

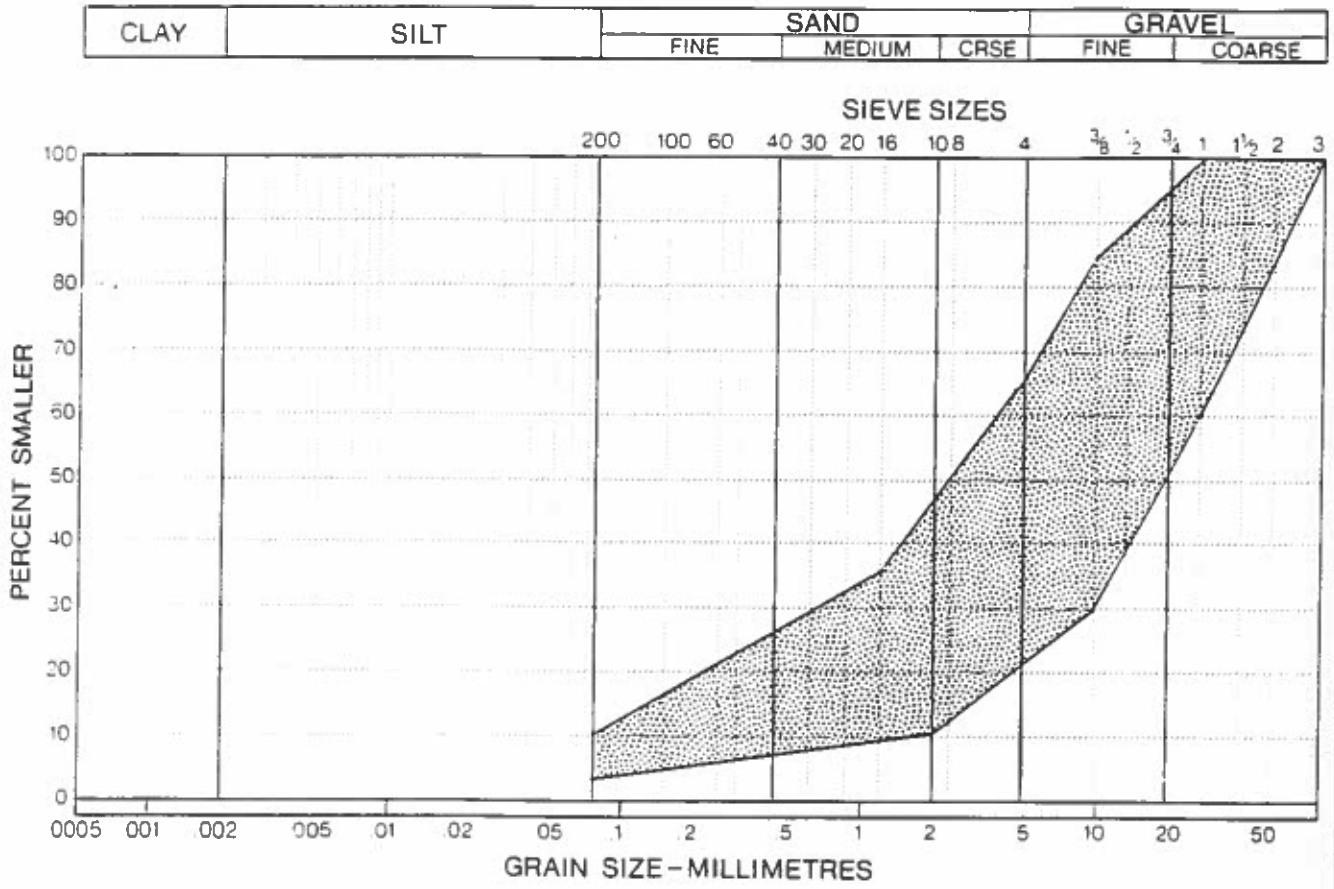


MINIMUM COMPACTION SPECIFICATIONS

ASPHALT - 98% MARSHALL DENSITY
BASECOURSE - 98% STANDARD PROCTOR DENSITY
GRANULAR SUB-BASE - 98% STANDARD PROCTOR DENSITY
TOP 200 mm OF SUBGRADE - 98% STANDARD PROCTOR DENSITY
TOP METRE OF TRENCH BACKFILL - 98% STANDARD PROCTOR DENSITY
TRENCH BACKFILL BELOW TOP METRE - 95% OF STANDARD PROCTOR DENSITY

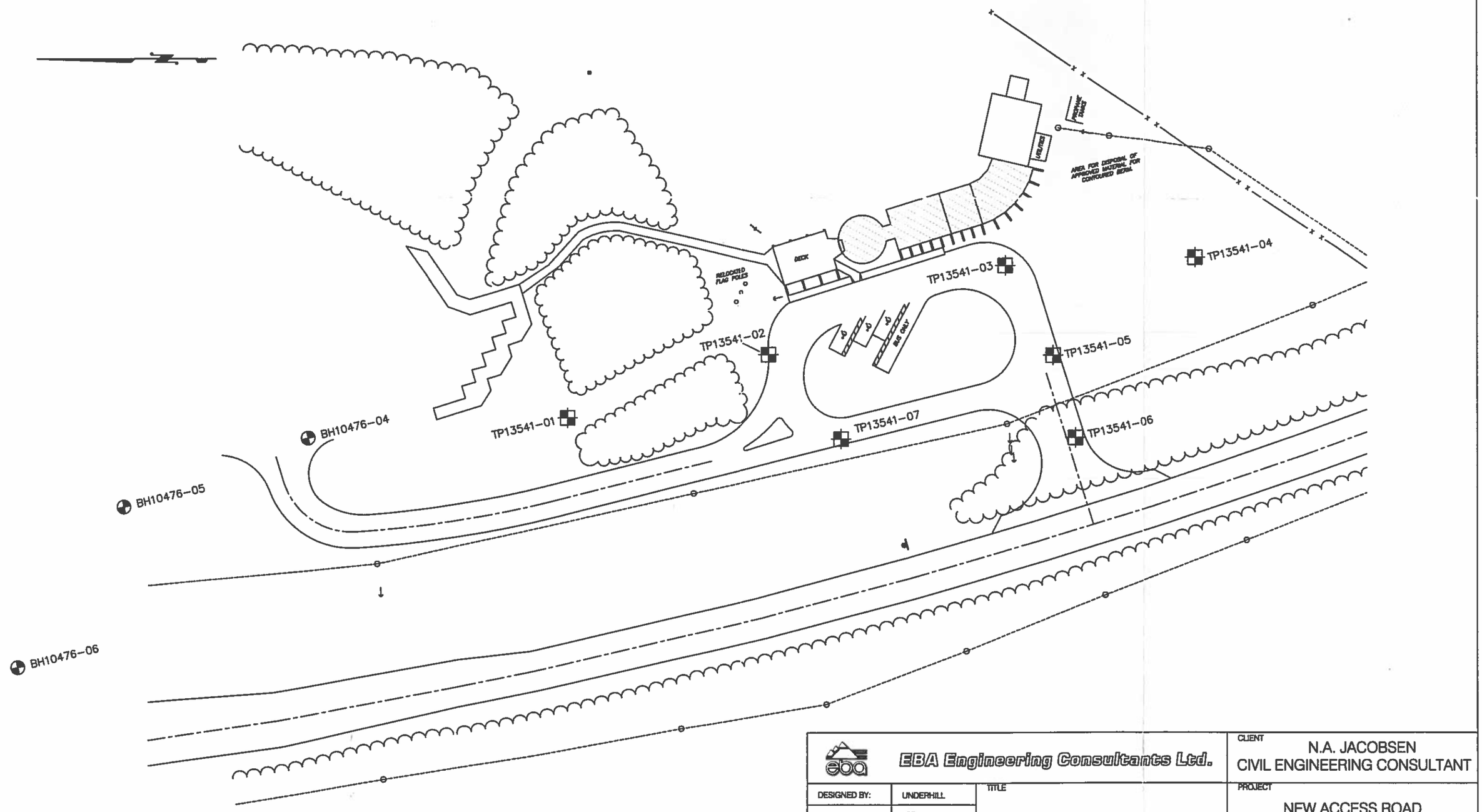
NOTE: NOT TO SCALE

EBA Engineering Consultants Ltd.		PROJECT	NEW ACCESS ROAD TO BERINGIA CENTRE WHITEHORSE, YT
CLIENT	N. A. JACOBSEN CIVIL ENGINEERING CONSULTANT	TITLE	TYPICAL ROADWAY CROSS SECTION SHOWING SPECIFIED COMPACTION REQUIREMENTS
DATE August/98	DWN. JRT / CHKD. JRT	FILE NO. 0201-98-13541	DRAWING NO. 13541-01



C.G.S.B Sieve Designation (μm)	Weight Passing (%)
75,000	100
25,000	60 - 100
12,500	40 - 90
5,000	20 - 65
1,250	9 - 35
315	5 - 23
80	2 - 10

FIGURE 1 RECOMMENDED GRADATION LIMITS FOR NON-FROST SUSCEPTIBLE BACKFILL



BASE PLAN PROVIDED BY UNDERHILL GEOMATICS LTD

EBA Engineering Consultants Ltd.

DESIGNED BY:	UNDERHILL
DRAWN BY:	JSB
DATE:	AUGUST /98
SCALE:	1:1000
FILE NO.	0201-98-13541
ACAD FILENAME:	13541 BERINGIA

TITLE

SITE PLAN SHOWING
TESTPIT LOCATIONS

CLIENT

N.A. JACOBSEN
CIVIL ENGINEERING CONSULTANT

PROJECT

NEW ACCESS ROAD
Beringia Centre
Whitehorse, Y.T.

DRAWING NO.

0201-98-13541J01

NEW ACCESS ROAD	CLIENT: N.A. JACOBSEN –CIVIL ENG. CONSUL	TEST PIT NO: 13541–TP1
BERINGIA CENTRE	DRILL: CAT 426 RUBBER TIRED	PROJECT NO: 0201–98–13541
WHITEHORSE, YT	UTM ZONE: 8 N6730455.9 E495625.83	ELEVATION: 703.307 m

SAMPLE TYPE ■ GRAB ⊘ NO RECOVERY

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION
0.0					
		1			SILT – trace of sand, trace of clay, non–plastic, fine grained, firm, damp, light grey
1.0		2	SP		SAND – trace of silt, fine to med. grained sand, firm, damp to moist, mottled reddish brown, black and grey
2.0		3			SILT – some clay to clayey, trace of sand, low plastic, very firm, moist, med. grey
					END OF TESTPIT @ 2.3 m – no water table encountered – little to no sloughing
3.0					
4.0					
5.0					

■ STANDARD PENETRATION ■ 10 20 30 40

PLASTIC M.C. LIQUID 10 20 30 40

■ PERCENT GRAVEL ■ 20 40 60 80

● PERCENT SAND ● 20 40 60 80

▲ PERCENT SILT OR FINES ▲ 20 40 60 80

◆ PERCENT CLAY ◆ 20 40 60 80

DEPTH(ft): 0.0, 2.0, 4.0, 6.0, 8.0, 10.0, 12.0, 14.0, 16.0

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Whitehorse, Yukon

LOGGED BY: JSB	COMPLETION DEPTH: 2.3 m
REVIEWED BY: JRT	COMPLETE: 98/08/24
Fig. No:	Page 1 of 1

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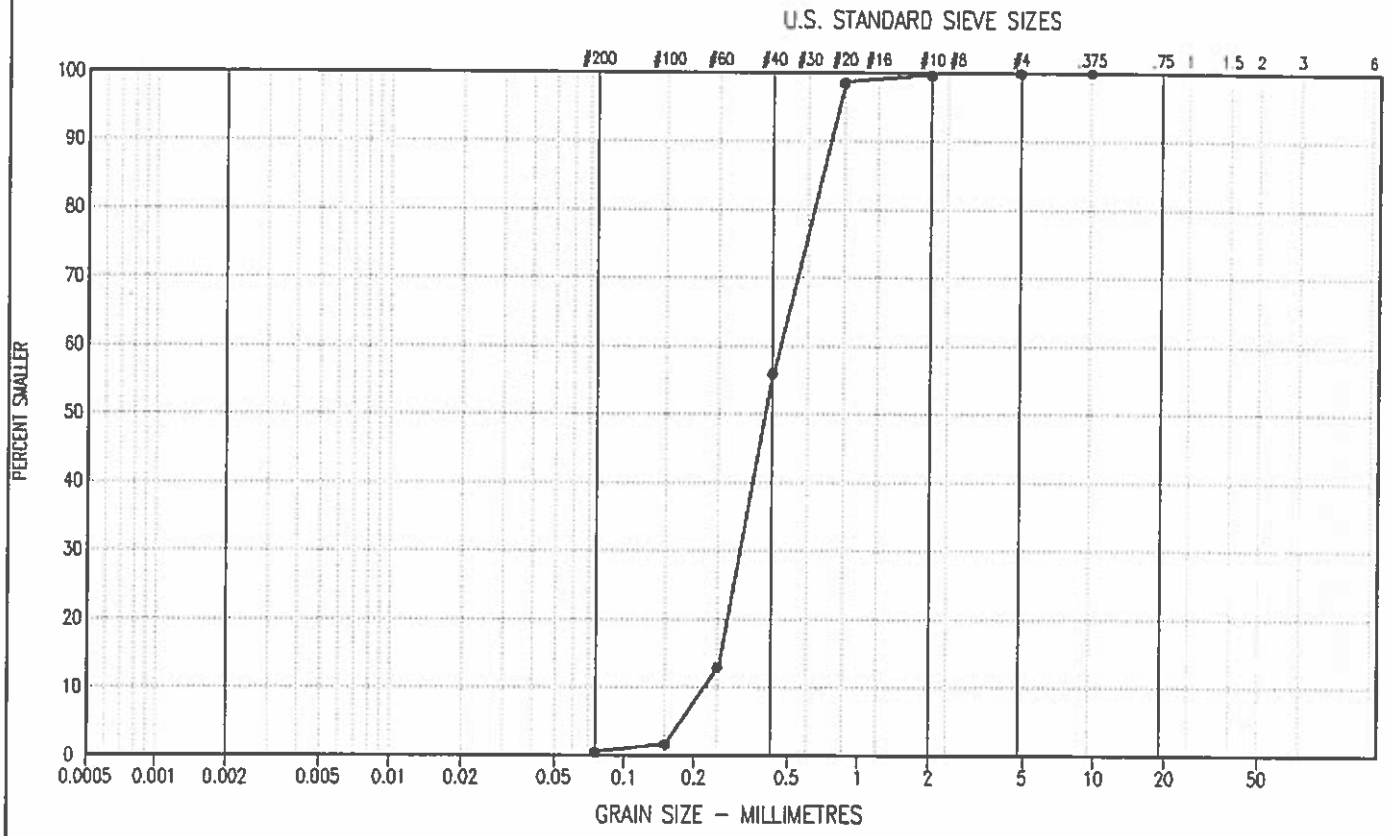
PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION			Cu	Cc	U.S.C
			CLAY & SILT %	SAND %	GRAVEL %			
●——●	13541-TP1	0.80 – 1.00	0	100	0	2.1	1.0	SP

Project: 0201-98-13541 Date Tested: 98/08/28 BY: KD

Tested in accordance with ASTM D422 unless otherwise noted.

NEW ACCESS ROAD	CLIENT: N.A. JACOBSEN –CIVIL ENG. CONSUL	TEST PIT NO: 13541–TP2
BERINGIA CENTRE	DRILL: CAT 426 RUBBER TIRED	PROJECT NO: 0201–98–13541
WHITEHORSE, YT	UTM ZONE: 8 N6730400.13 E495655.48	ELEVATION: 703.643 m

SAMPLE TYPE ■ GRAB ⊘ NO RECOVERY

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION
0.0					SILT (FILL) – some sand, some gravel, non–plastic, fine grained sand, fine to med. grained gravel, very compact, damp, light and med. grey
	■	4			
1.0	■	5			
	■	6			SAND & SILT – organics and rootlets, fine grained, non–plastic, very dense, damp to moist, mottled black, grey and brown – trace of silt, no organics or rootlets below 1.8 m – no gravel below 1.8 m
2.0					
					SILT – some clay to clayey, trace of sand, low plastic, fine grained, dense, moist, med. grey
	■	7			
3.0					END OF TESTPIT @ 3.0 m – no water table encountered – no sloughing
4.0					
5.0					

■ STANDARD PENETRATION ■ 10 20 30 40

PLASTIC M.C. LIQUID 10 20 30 40

■ PERCENT GRAVEL ■ 20 40 60 80

● PERCENT SAND ● 20 40 60 80

▲ PERCENT SILT OR FINES ▲ 20 40 60 80

◆ PERCENT CLAY ◆ 20 40 60 80

DEPTH(ft): 0.0, 2.0, 4.0, 6.0, 8.0, 10.0, 12.0, 14.0, 16.0

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LOGGED BY: JSB	COMPLETION DEPTH: 3 m
REVIEWED BY: JRT	COMPLETE: 98/08/24
Fig. No:	Page 1 of 1

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NEW ACCESS ROAD	CLIENT: N.A. JACOBSEN –CIVIL ENG. CONSUL	TEST PIT NO 13541–TP3
BERINGIA CENTRE	DRILL: CAT 426 RUBBER TIRED	PROJECT NO: 0201–98–13541
WHITEHORSE, YT	UTM ZONE: 8 N6730333.89 E495669.76	ELEVATION: 704.849 m

SAMPLE TYPE ■ GRAB ▨ NO RECOVERY

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION
0.0	■	8			SILT (FILL) – some sand, some gravel, non–plastic, fine grained sand, fine to med. grained sub–angular sub–rounded gravel, very compact, damp, light and med. grey
					SAND (FILL) – gravelly, some silt to silty, well graded sand, well graded sub–rounded gravel, very compact, moist, greyish brown
1.0	■	9			– chunks of asphalt and concrete throughout top 1.8 m of testpit
	■	10			
					SILT – some sand, trace of organics and rootlets
2.0	■	11			SAND – trace of silt, fine to med. grained sand, firm damp, mottled reddish brown, black and grey
	■	12			– becomes some silt to silty, moister, colour changes to grey below 2.8 m
3.0					END OF TESTPIT @ 3.0 m – no water table encountered – little to no sloughing
4.0					
5.0					

■ STANDARD PENETRATION ■ 10 20 30 40

PLASTIC M.C. LIQUID 10 20 30 40

■ PERCENT GRAVEL ■ 20 40 60 80

● PERCENT SAND ● 20 40 60 80

▲ PERCENT SILT OR FINES ▲ 20 40 60 80

◆ PERCENT CLAY ◆ 20 40 60 80

DEPTH(ft): 0.0, 2.0, 4.0, 6.0, 8.0, 10.0, 12.0, 14.0, 16.0

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LOGGED BY: JSB	COMPLETION DEPTH: 3 m
REVIEWED BY: JRT	COMPLETE: 98/08/24
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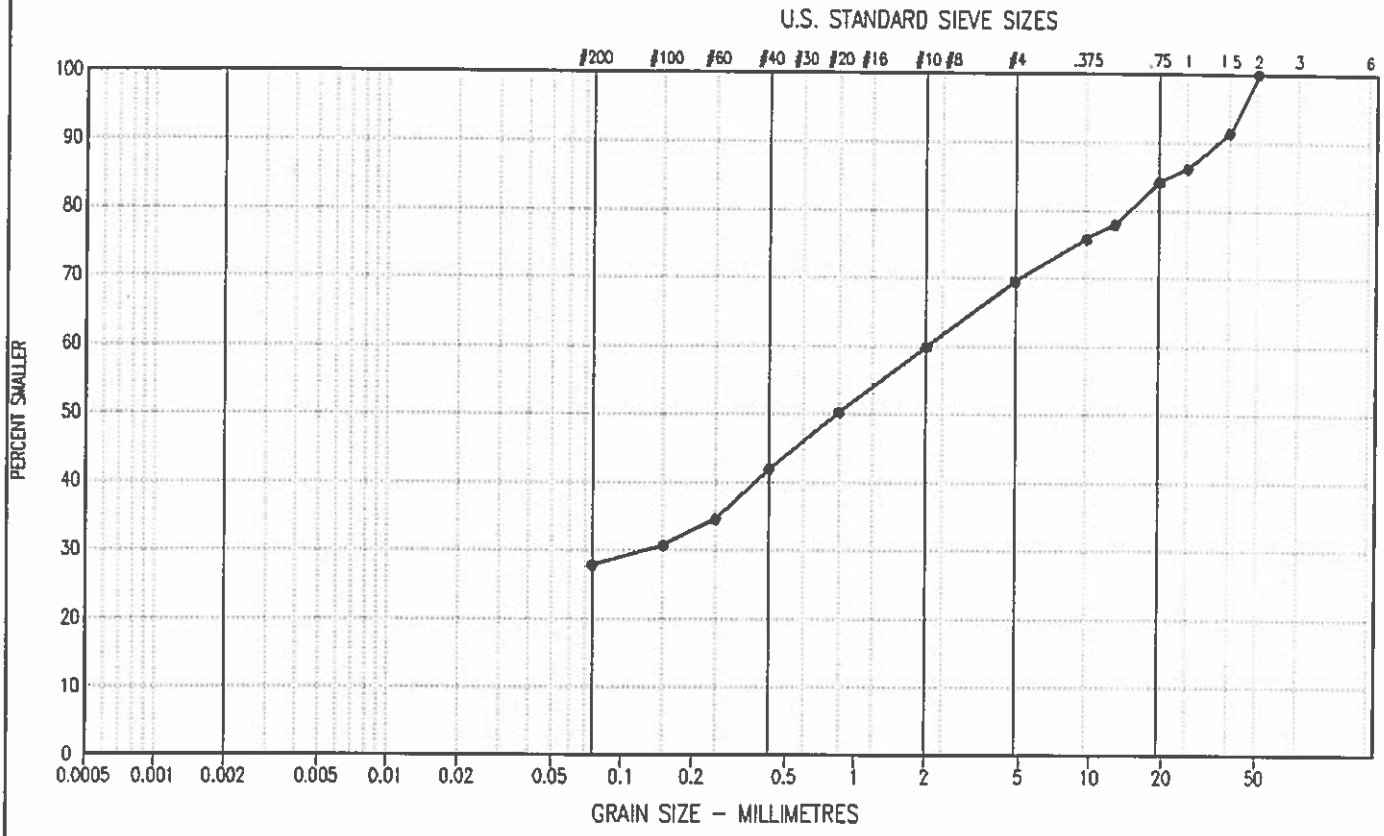
PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION			Cu	Cc	U.S.C
			CLAY & SILT %	SAND %	GRAVEL %			
●——●	13541-TP3	1.00 – 1.20	28	42	31	–	–	

Project: 0201-98-13541 Date Tested: 98/08/28 BY: KD

Tested in accordance with ASTM D422 unless otherwise noted.

NEW ACCESS ROAD	CLIENT: N.A. JACOBSEN –CIVIL ENG. CONSUL	TEST PIT NO: 13541–TP4
BERINGIA CENTRE	DRILL: CAT 426 RUBBER TIRED	PROJECT NO: 0201–98–13541
WHITEHORSE, YT	UTM ZONE: 8 N6730281.28 E495671.92	ELEVATION: 704.7 m

SAMPLE TYPE ■ GRAB ⊘ NO RECOVERY

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION
0.0					SILT (FILL) – gravelly, sandy, non–plastic fine grained sand, well graded sub–rounded gravel, very compact, damp, light and med. grey
	■	13			– chunks of asphalt and concrete throughout testpit
1.0					END OF TESTPIT @ 1.0 m

■ STANDARD PENETRATION ■ 10 20 30 40

PLASTIC M.C. LIQUID

10 20 30 40

■ PERCENT GRAVEL ■ 20 40 60 80

● PERCENT SAND ● 20 40 60 80

▲ PERCENT SILT OR FINES ▲ 20 40 60 80

◆ PERCENT CLAY ◆ 20 40 60 80

DEPTH(ft): 0.0, 2.0, 4.0, 6.0, 8.0, 10.0, 12.0, 14.0, 16.0

EBA Engineering Consultants Ltd. Whitehorse, Yukon	LOGGED BY: JSB	COMPLETION DEPTH: 1 m
	REVIEWED BY: JRT	COMPLETE: 98/08/24
	Fig. No:	Page 1 of 1

98/09/01 08:14AM (YUKON-TS)

NEW ACCESS ROAD	CLIENT: N.A. JACOBSEN –CIVIL ENG. CONSUL	TEST PIT NO: 13541–TP5
BERINGIA CENTRE	DRILL: CAT 426 RUBBER TIRED	PROJECT NO: 0201–98–13541
WHITEHORSE, YT	UTM ZONE: 8 N6730320.61 E495644.48	ELEVATION: 704.547 m

SAMPLE TYPE ■ GRAB ⊘ NO RECOVERY

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION
0.0	■	14			SILT (FILL) – gravelly, sandy, non–plastic, well graded sub–rounded gravelly, fine grained sand, very compact, damp, light and med. grey
1.0					– 0.6 m sized boulders @ 1.2 m depth
	■	15			
2.0	■	16			
					– organic layer – brown moss, strong sulphuric odour
3.0	■	17			SAND – some silt to silty, fine to med. grained sand, firm, very moist, grey
					SILT – clayey, some sand low plastic, soft, very moist, dark grey
4.0	■	18			
5.0					END OF TESTPIT @ 4.3 m – no water table encountered – no sloughing

■ STANDARD PENETRATION ■ 10 20 30 40

PLASTIC M.C. LIQUID 10 20 30 40

■ PERCENT GRAVEL ■ 20 40 60 80

● PERCENT SAND ● 20 40 60 80

▲ PERCENT SILT OR FINES ▲ 20 40 60 80

◆ PERCENT CLAY ◆ 20 40 60 80

DEPTH(ft): 0.0, 2.0, 4.0, 6.0, 8.0, 10.0, 12.0, 14.0, 16.0

EBA Engineering Consultants Ltd. Whitehorse, Yukon	LOGGED BY: JSB	COMPLETION DEPTH: 4.3 m
	REVIEWED BY: JRT	COMPLETE: 98/08/24
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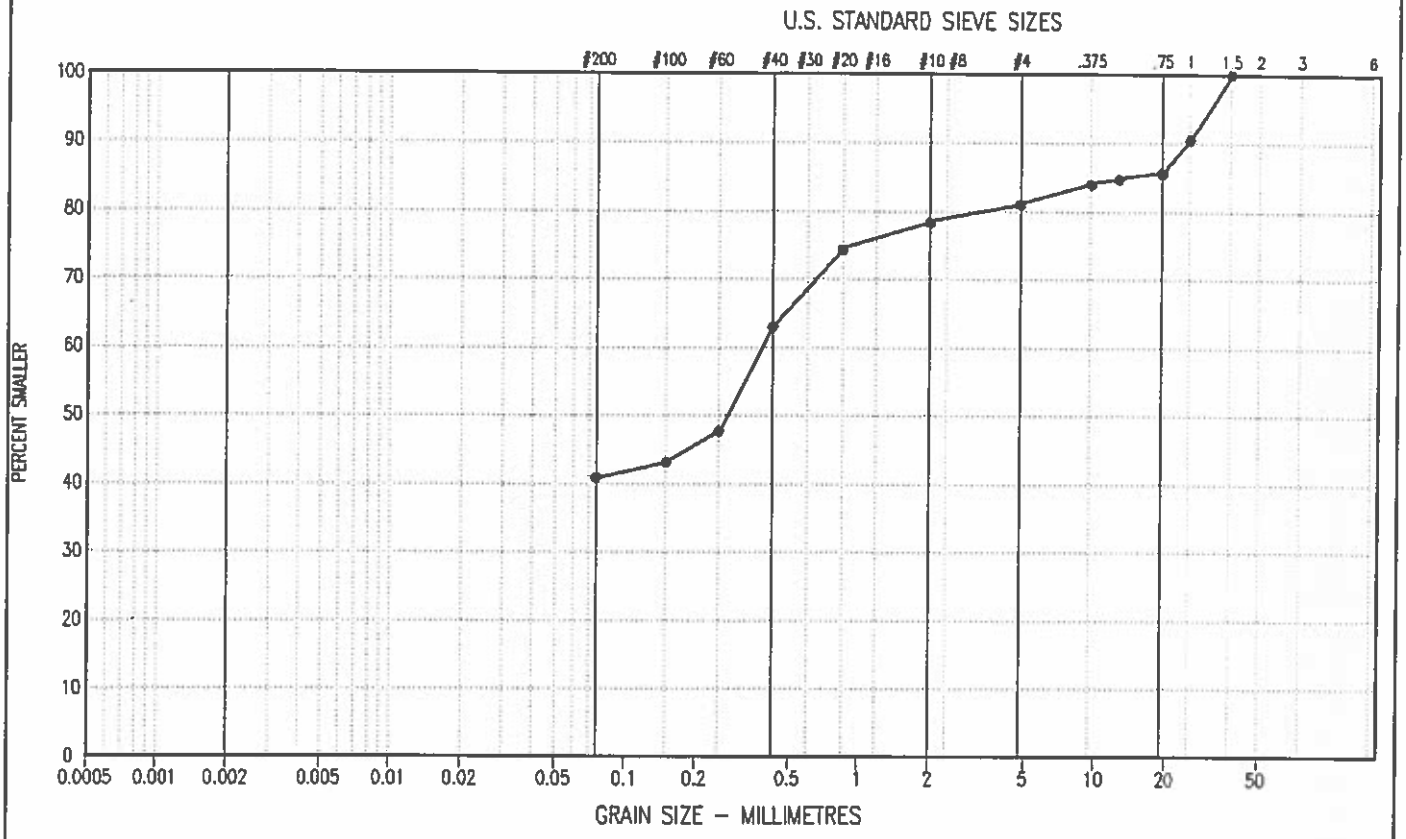
PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION			Cu	Cc	U.S.C
			CLAY & SILT %	SAND %	GRAVEL %			
●——●	13541-TP5	1.30 – 1.50	41	40	19	–	–	

Project: 0201-98-13541 Date Tested: 98/08/28 BY: KD

Tested in accordance with ASTM D422 unless otherwise noted.

NEW ACCESS ROAD	CLIENT: N.A. JACOBSEN -CIVIL ENG. CONSUL	TEST PIT NO: 13541-TP6
BERINGIA CENTRE	DRILL: CAT 426 RUBBER TIRED	PROJECT NO: 0201-98-13541
WHITEHORSE, YT	UTM ZONE: 8 N6730314.38 E495621.68	ELEVATION: 701.32 m

SAMPLE TYPE ■ GRAB ⊘ NO RECOVERY

SOIL DESCRIPTION

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION
0.0					GRASS AND ROOTMAT
	■	19			ORGANIC SILT – clayey, some sand, soft, very moist, med. grey
					TOPSOIL (black soil) – organic rich, soft, very moist, dark brownish black
1.0	■	20			
	■	21			SILT – some sand, trace of gravel, non-plastic, fine grained, soft, moist, light greyish brown – some clay, no gravel below 1.8 m – very wet below 1.8 m – color change to blueish med. grey
2.0	■	22			
					END OF TESTPIT @ 2.2 m – no water table encountered – little to no slough
3.0					
4.0					
5.0					

■ STANDARD PENETRATION ■ 10 20 30 40

PLASTIC M.C. LIQUID 10 20 30 40

■ PERCENT GRAVEL ■ 20 40 60 80

● PERCENT SAND ● 20 40 60 80

▲ PERCENT SILT OR FINES ▲ 20 40 60 80

◆ PERCENT CLAY ◆ 20 40 60 80

DEPTH(ft): 0.0, 2.0, 4.0, 6.0, 8.0, 10.0, 12.0, 14.0, 16.0

EBA Engineering Consultants Ltd.
Whitehorse, Yukon

LOGGED BY: JSB	COMPLETION DEPTH: 2.2 m
REVIEWED BY: JRT	COMPLETE: 98/08/24
Fig. No:	Page 1 of 1

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NEW ACCESS ROAD	CLIENT: N.A. JACOBSEN –CIVIL ENG. CONSUL	TEST PIT NO: 13541-TP7
BERINGIA CENTRE	DRILL: CAT 426 RUBBER TIRED	PROJECT NO: 0201-98-13541
WHITEHORSE, YT	UTM ZONE: 8 N6730377.8 E495621.97	ELEVATION: 703.971 m

SAMPLE TYPE ■ GRAB ⊘ NO RECOVERY

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION
0.0					SAND (FILL) – silty, trace of gravel, non–plastic, well graded sub–rounded gravel, fine grained sand, very compact, damp, light and med. grey
	■	23			
1.0					– trace of gravel below 0.8 m
	■	24			
2.0	■	25			– organic root mat
					SILT – some sand, trace of clay, low plastic, soft, very moist. dark grey
3.0					
	■	26			SAND – trace to some silt, fine to med. grained sand, soft, very wet, med. grey
4.0					END OF TESTPIT @ 3.9 m – no water table encountered – no sloughing
5.0					

■ STANDARD PENETRATION ■ 10 20 30 40

PLASTIC M.C. LIQUID 10 20 30 40

■ PERCENT GRAVEL ■ 20 40 60 80

● PERCENT SAND ● 20 40 60 80

▲ PERCENT SILT OR FINES ▲ 20 40 60 80

◆ PERCENT CLAY ◆ 20 40 60 80

DEPTH(ft): 0.0, 2.0, 4.0, 6.0, 8.0, 10.0, 12.0, 14.0, 16.0

EBA Engineering Consultants Ltd.
Whitehorse, Yukon

LOGGED BY: JSB	COMPLETION DEPTH: 3.9 m
REVIEWED BY: JRT	COMPLETE: 98/08/24
Fig. No:	Page 1 of 1

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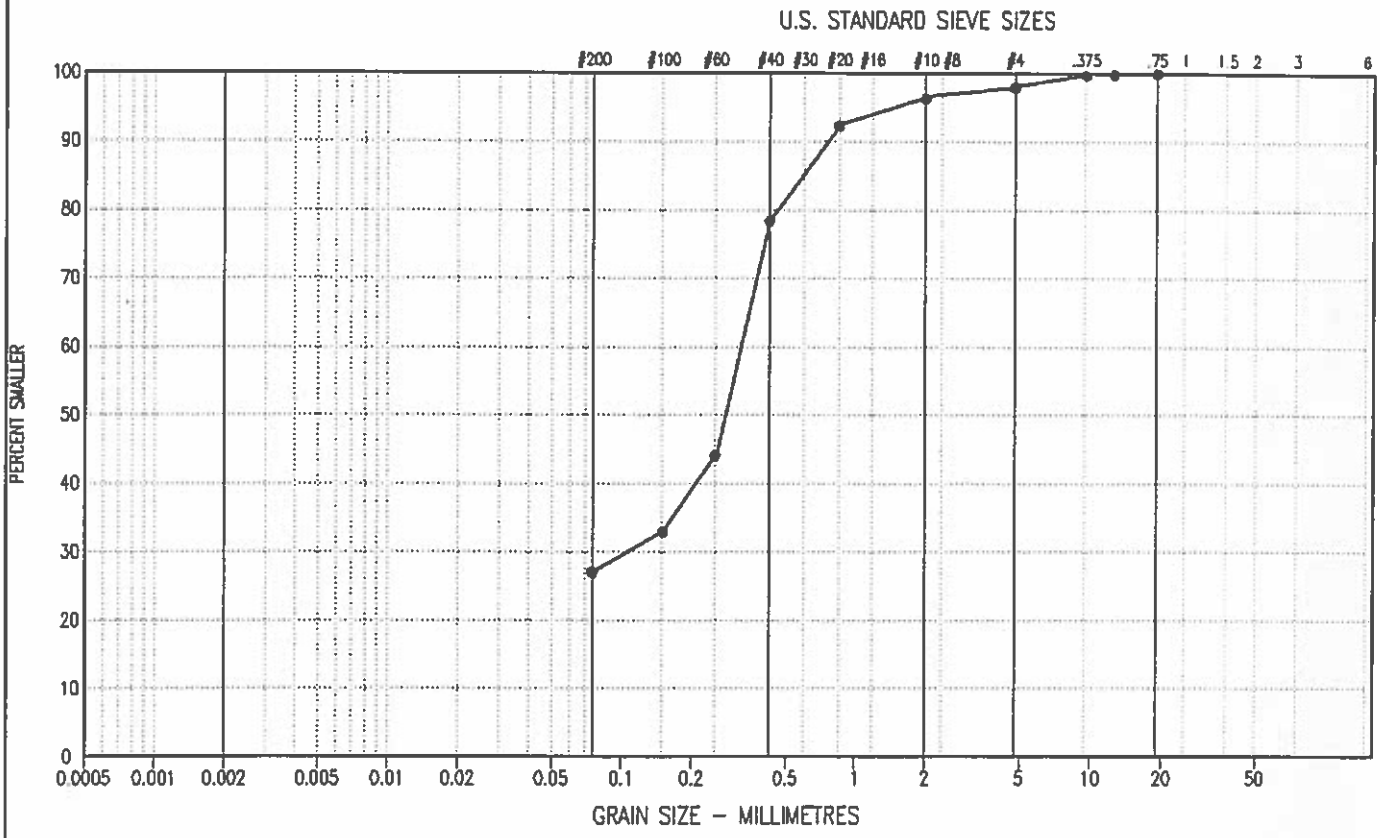
EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION			Cu	Cc	U.S.C
			CLAY & SILT %	SAND %	GRAVEL %			
●——●	13541-TP7	0.20 – 0.40	27	71	2	–	–	

Project: 0201-98-13541 Date Tested: 98/08/28 BY: KD

Tested in accordance with ASTM D422 unless otherwise noted.

VISITOR RECEPTION CENTRE	CLIENT: YTG–DEPT OF GOVERNMENT SERVICES	BOREHOLE No. 10476–04
GEOTECHNICAL INVESTIGATION	DRILL RIG: CME 750 SOLID SHAFT AUGERS	Project No: 0201–10476
WHITEHORSE, YUKON	UTM ZONE: 8 N6730316.00 E495740.00	ELEVATION 708.30 (m)

SAMPLE TYPE ■ GRAB SAMPLE ▨ NO RECOVERY ▩ STANDARD PEN. ▤ 75 mm SPOON ▯ 75 mm CRREL ▮ 100 mm CRREL

DEPTH (m)	SAMPLE TYPE	SAMPLE NO	USC	SOIL/ROCK DESCRIPTION
0.0				SAND(SM)–silty, trace to some gravel, fine to medium sand, fine grained, subrounded gravel, dry to damp, loose (est.), brown
	■	1	SM	– volcanic ash inclusions at 0.3 m
				– becomes orangey brown below 0.4 m
1.0				– becomes moist to wet and olive brown below 0.9 m
2.0	■	2	SM	
				SILT(ML)–some clay to clayey, trace of fine sand, wet, soft, olive brown
3.0	■	3	ML	
				END OF BOREHOLE AT 3.0 m
4.0				
5.0				
6.0				
7.0				

■ STANDARD PENETRATION ■ 20 40 60 80

PLASTIC M.C. LIQUID 20 40 60 80

■ PERCENT GRAVEL ■ 20 40 60 80

● PERCENT SAND ● 20 40 60 80

▲ PERCENT FINES ▲ 20 40 60 80

DEPTH (ft): 0.0, 2.0, 4.0, 6.0, 8.0, 10.0, 12.0, 14.0, 16.0, 18.0, 20.0, 22.0

EBA Engineering Consultants Ltd. Whitehorse, Yukon	COMPLETION DEPTH 3.0 m	COMPLETE 90/10/15
	LOGGED BY MCP	DWG NO.
		Page 1 of 1

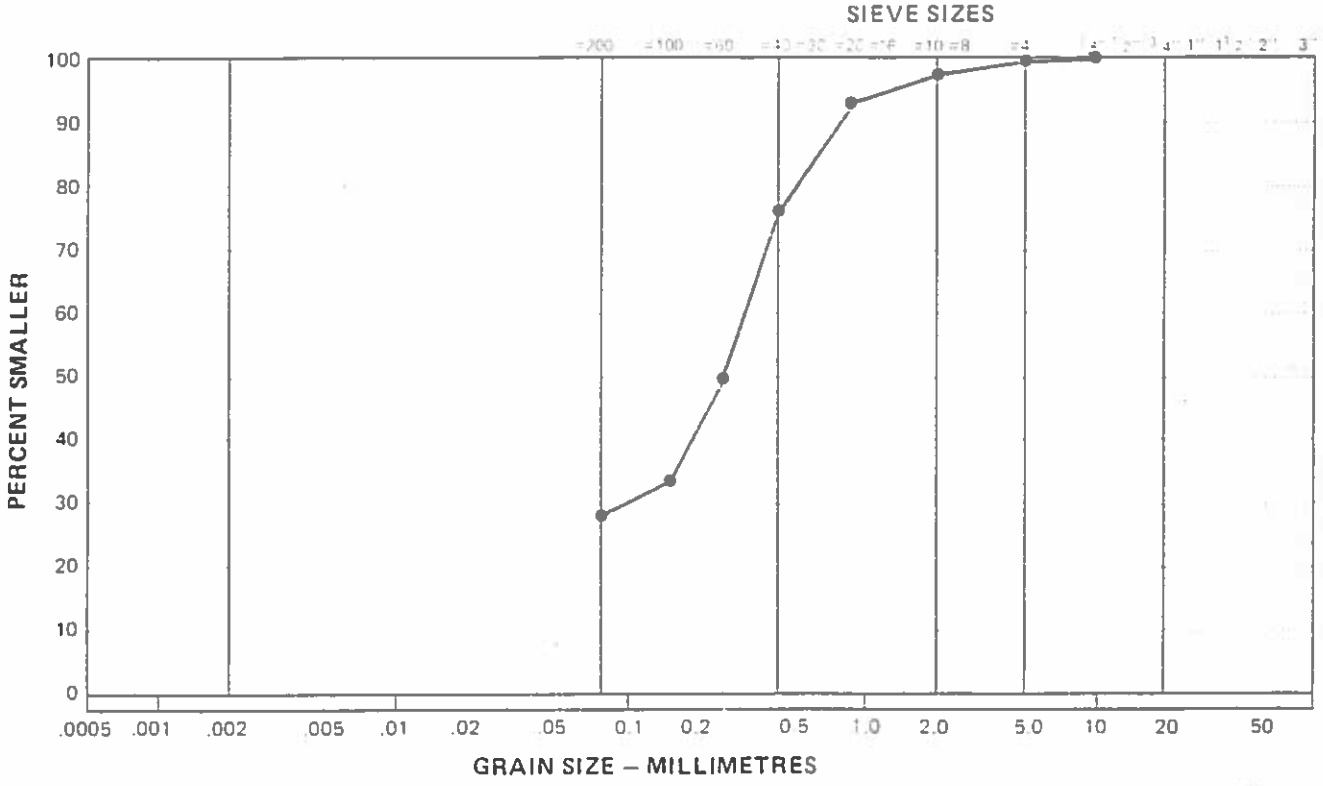
EBA Engineering Consultants Ltd.

PARTICLE - SIZE ANALYSIS OF SOILS

Project: Visitor Reception Centre
Whitehorse, Yukon
Project Number: 0201-10476
Date Tested: 1990-10-16
Borehole Number: 10476-04
Depth: 0.5 m
Soil Description: SAND(SM)-silty, medium to fine grained
Cu:
Cc:
Natural Moisture Content: 6.2 %
Remarks:

SIEVE	PERCENTAGE PASSING
3"	
1 1/2"	
1"	
3/4"	
1/2"	
3/8"	100
No. 4	99
No. 10	97
No. 20	93
No. 40	76
No. 60	50
No. 100	34
No. 200	28

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Tested in accordance with ASTM D422 unless otherwise noted.

VISITOR RECEPTION CENTRE	CLIENT: YTG–DEPT OF GOVERNMENT SERVICES	BOREHOLE No. 10476–05
GEOTECHNICAL INVESTIGATION	DRILL RIG: CME 750 SOLID SHAFT AUGERS	Project No: 0201–10476
WHITEHORSE, YUKON	UTM ZONE: 8 N6730383.00 E495721.00	ELEVATION 707.70 (m)

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▯ 75 mm CRREL ▯ 100 mm CRREL

DEPTH (m)	SAMPLE TYPE	SAMPLE NO	USC	SOIL/ROCK DESCRIPTION
0.0	■	1	SM/SP	SAND(SM/SP)(POSSIBLY FILL)–trace of silt, trace of fine gravel, damp, loost (est.), olive brown with some rusty brown mottling
1.0	■	2	SM/SP	
2.0				SILT(ML)–some clay, trace of fine sand, moist, firm to soft (est.), olive brown
3.0	■	3	ML	
4.0				END OF BOREHOLE AT 3.8 m
5.0				
6.0				
7.0				

■ STANDARD PENETRATION ■ 20 40 60 80

PLASTIC M.C. LIQUID 20 40 60 80

■ PERCENT GRAVEL ■ 20 40 60 80

● PERCENT SAND ● 20 40 60 80

▲ PERCENT FINES ▲ 20 40 60 80

DEPTH (ft): 0.0, 2.0, 4.0, 6.0, 8.0, 10.0, 12.0, 14.0, 16.0, 18.0, 20.0, 22.0

EBA Engineering Consultants Ltd. Whitehorse, Yukon	COMPLETION DEPTH 3.8 m		COMPLETE 90/10/15
	LOGGED BY MCP	DWG NO.	Page 1 of 1

VISITOR RECEPTION CENTRE	CLIENT: YTG–DEPT OF GOVERNMENT SERVICES	BOREHOLE No. 10476–06
GEOTECHNICAL INVESTIGATION	DRILL RIG: CME 750 SOLID SHAFT AUGERS	Project No: 0201–10476
WHITEHORSE, YUKON	UTM ZONE: 8 N6730426.00 E495658.00	ELEVATION 708.40 (m)

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▯ 75 mm CRREL ▮ 100 mm CRREL

DEPTH (m)	SAMPLE TYPE	SAMPLE NO	USC	SOIL/ROCK DESCRIPTION
0.0				SAND AND GRAVEL(SP)(FILL)–trace of silt, damp, compact (est.), greyish brown
	■	1	SP	SAND(SP)–trace of silt, fine to medium grained, damp, loost(est.), olive brown
-1.0				
				– becomes moist and olive grey at 1.5 m
-2.0				
	■	2	SP	
-3.0				SILT(ML)–some clay to clayey, trace of fine sand, moist to wet, soft to firm (est.), olive brown
				END OF BOREHOLE AT 3.8 m
-4.0				
-5.0				
-6.0				
7.0				

■ STANDARD PENETRATION ■ 20 40 60 80

PLASTIC M.C. LIQUID 20 40 60 80

■ PERCENT GRAVEL ■ 20 40 60 80

● PERCENT SAND ● 20 40 60 80

▲ PERCENT FINES ▲ 20 40 60 80

DEPTH (ft): 0.0, 2.0, 4.0, 6.0, 8.0, 10.0, 12.0, 14.0, 16.0, 18.0, 20.0, 22.0

EBA Engineering Consultants Ltd. Whitehorse, Yukon	COMPLETION DEPTH 3.8 m	COMPLETE 90/10/15
	LOGGED BY MCP	DWG NO.
		Page 1 of 1

EBA Engineering Consultants Ltd.

PARTICLE - SIZE ANALYSIS OF SOILS

Project: Visitor Reception Centre
Whitehorse, Yukon

Project Number: 0201-10476

Date Tested: 1990-10-16

Borehole Number: 10476-06

Depth: 0.9 m

Soil Description: SAND(SP)-trace of silt, medium grained sand

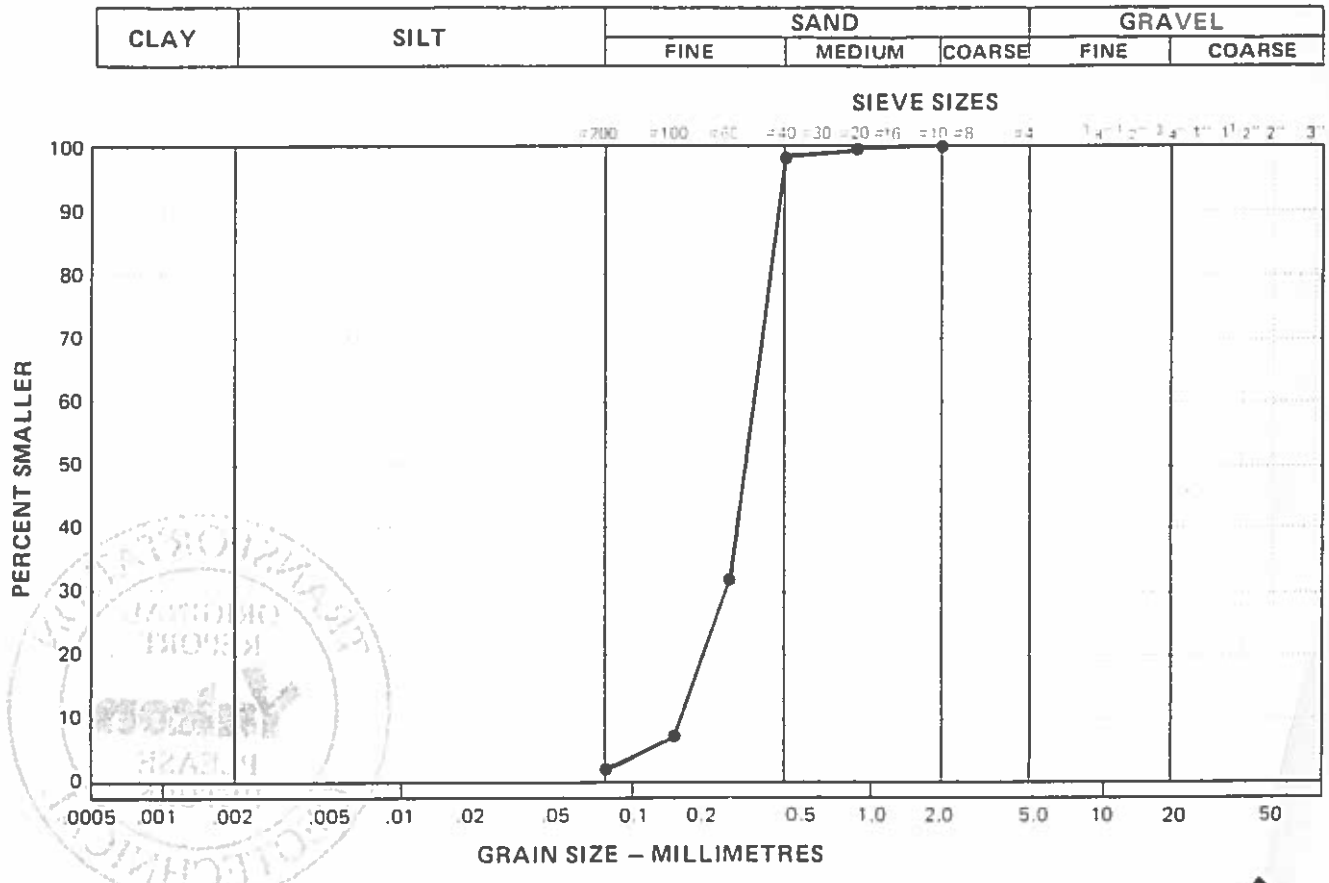
Cu: 1.8

Cc: 1.2

Natural Moisture Content: 6.8 %

Remarks:

SIEVE	PERCENTAGE PASSING
3"	
1 1/2"	
1"	
3/4"	
1/2"	
3/8"	
No. 4	
No. 10	100
No. 20	99
No. 40	98
No. 60	32
No. 100	7
No. 200	3



Tested in accordance with ASTM D422 unless otherwise noted.