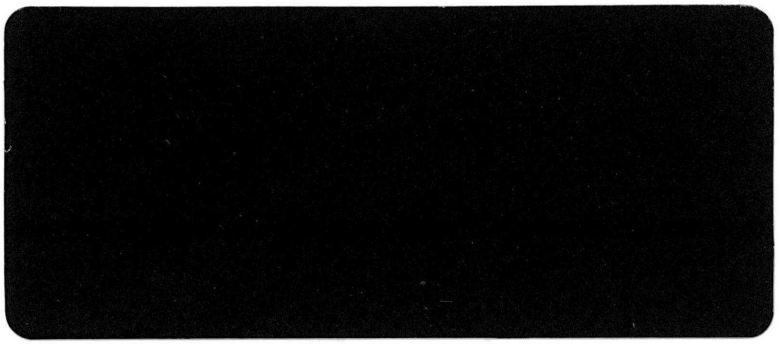
EBA Engineering Consultants Ltd.

Civil, Geotechnical and Materials Engineers



FOUNDATION EVALUATION
PROPOSED ROCKFILL CAUSEWAY
NORTH FORK - ROSE CREEK
CURRAGH MINE, FARO, Y.T.

Submitted to:
CURRAGH RESOURCES LTD.

0201-4661
APRIL, 1987

EBA Engineering Consultants Ltd.

Civil, Geotechnical and Materials Engineers

1987 04 23

Curragh Resources Ltd.
117 Industrial Road
Whitehorse, Yukon
Y1A 2T8

EBA File No: 0201-4661

ATTENTION: Mr. Robert Grant

Dear Sir:

Subject: Foundation Evaluation
Proposed Rockfill Causeway
North Fork - Rose Creek

Please find enclosed our brief report outlining soil and permafrost conditions at the subject site. The data presented herein was obtained from a backhoe test pit program conducted on April 10 and 11, 1987. General comments relating to foundation stability for the proposed causeway are also presented.

Please call if you have any questions, or if we can provide further assistance.

Yours truly,

EBA Engineering Consultants Ltd.

J.R. Trimble, P. Eng.
Project Director
Office Manager

JRT/was

Attached.

3167-3rd Avenue, WHITEHORSE, Yukon, Canada Y1A 1G4

▪ Telephone (430) 668-3068 ▪ Facsimile Copier: (403) 668-4349 ▪

1.0 INTRODUCTION

EBA Engineering Consultants Ltd. was retained by Curragh Resources Ltd. to undertake an evaluation of existing soil and permafrost conditions beneath a proposed rockfill causeway at the Mine near Faro, Yukon

The proposed causeway will cross Rose Creek (North Fork) to the southeast of the area presently known as the Zone 2 Dump within the Mine Site. This causeway is part of the proposed Vangorda Road that will provide access to the Vangorda Plateau, and new ore deposits.

The work was authorized by Mr. Robert Grant of Curragh Resources Ltd. on April 7, 1987.

2.0 SITE EVALUATION

2.1 Test Pit Program

A total of 5 test pits were completed to a maximum penetration of 6.0 m, on April 10 and 11, 1987. The test pits were excavated on the site at the approximate locations shown on the Site Plan (Drawing No. 4661-A-1) in Appendix A. All test pits were excavated with a track-mounted Caterpillar 245 backhoe. This equipment and operator was provided by Curragh Resources Ltd.

Ground access was made from the waste dump to the west of the proposed causeway site, then along an existing cat trail. Subsurface information and soil samples were obtained by examining the test pit walls in the upper portion and by examining the excavated material in the lower portion of the pits. Ground temperatures of the sides of the pit walls were taken using a hand held temperature probe and multimeter.

2.2 Laboratory Testing

All soil samples were returned to EBA's Whitehorse laboratory for basic classification testing. Natural moisture contents were determined for all samples, and selected samples were tested for grain size characteristics. The results of the laboratory tests are presented on the test pit logs, where applicable, and on the attached particle size distribution curves.

3.0 SITE CONDITIONS

3.1 Surface Features

Surface features at the site consist of thin moss cover supporting spruce trees and other small shrubs. These trees were generally up to 200 mm in diameter at the trunk and generally no more than 15 m in height. The trees have been cleared on the north side of the creek in the central portion of the creek crossing.

Due to snow cover at the time of the investigation, it was not possible to determine drainage characteristics. It is believed that the site is generally well-drained with surface runoff draining to the creek, however, water may pond in sporadic shallow depressions. The creek follows the bottom of the valley as the main drainage channel for the area.

On the north side of the creek the toe of the existing rockfill is within approximately 25 m of the creek at the closest point. Several large boulders from the fill had been placed along the creek, in preparation for construction of the rock drain.

3.2 Subsurface Soil Condition

The test pit logs are enclosed in Appendix A. The subsoils at the site consist predominantly of glacial till deposited in at least two stages, as evidenced by the buried peat layer in 3 of the 5 test pits. Numerous boulders were encountered, which made excavation difficult in all holes, and precluded penetration below 0.7 m during three attemts at TP 4661-5 (see Site Plan and logs). Alluvial silt, sand and gravel was encountered below 3.0 m in TP 4661-1, indicating an ancient channel at this location. All other holes encountered glacial till.

3.3 Seasonal Frost and Permafrost

Frozen ground was encountered in every hole, and it was difficult to ascertain the base of the seasonal frost and top of permafrost. Previous experience shows that seasonal frost penetration at this latitude and elevation is approximately 2.5 m, and thus "true" permafrost was encountered in only one test pit -- TP 4661-3. The seasonal frost; however, was noted to relatively ice rich, with ground ice contents up to Vr, Vc, Vs 20% by volume. The permafrost detected is classified as "warm" permafrost, with temperatures just below freezing (-0.2°C) and consisting of a pliable soil matrix with stratified and randomly oriented clear ice formations (Vr, Vs) up to 15% by volume.

4.0 CONCLUSIONS

On the basis of information obtained from the present site investigation program, it is believed that foundation stability for the proposed rockfill causeway will not be a problem. There is some permafrost which will thaw after the causeway is constructed, but the resulting settlement from this as well as from the compression of the softer unfrozen

foundation soils will not be sufficient to affect a 60 m high rockfill. This conclusion is further substantiated by the fact that the existing waste piles show no sign of instability, and are constructed at a steeper sideslope angle than the 37° proposed for the causeway.

Finally, it is believed the major affect of foundation conditions on the proposed structure will be with respect to settlement within the rock drain itself. Sufficient thickness of coarse rock should be maintained so that the flow of water is not significantly impeded due to differential foundation settlement.

Respectfully Submitted,

EBA Engineering Consultants Ltd.

J.R. Trimble, P. Eng.
Project Director
Office Manager

JRT/was

EBA ENGINEERING CONSULTANTS LTD.

GEOTECHNICAL REPORT
GENERAL CONDITIONS

A.1 USE OF REPORT AND OWNERSHIP

This geotechnical report pertains to a specific site and development. It is not applicable to adjacent sites nor is it valid for types of development other than that to which it refers. Any variation from the site, or development, necessitates a geotechnical review in order to determine the validity of the design concepts evolved herein.

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A.2 NATURE AND EXACTNESS OF SOIL DESCRIPTION

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

Classification and identification of soil and geologic 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.

A.3 LOGS OF BORINGS

The boring logs are a compilation of conditions and classification of soils as obtained from field observations and laboratory testing of selected samples. Soil zones have been interpreted. Change from one geologic zone to the other, indicated on the logs as a distinct line, is in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil zone transition elevations may require special evaluation.

A.4 STRATIGRAPHIC AND GEOLOGIC SECTIONS

The stratigraphic and geologic sections indicated on drawings contained in this report are evolved from logs of borings. Stratigraphy is known precisely only at the locations of the borings. Actual geology and stratigraphy between borings may vary from that shown on these drawings. Natural variations in geologic conditions are inherent and a function of historic environment. EBA does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of exact locations of geologic units is necessary, it is cautioned that such determination requires special attention.

A.5 GROUNDWATER CONDITIONS

Groundwater conditions represented in this report refer only to those observed at the times recorded on logs of borings, and/or within the text of this report. These conditions vary with geologic detail between borings; annual, seasonal and special meteorologic conditions; and with construction activity. Where instruments have been established to record groundwater variations on an ongoing basis, the records will be specifically referred to. Interpretation of groundwater conditions from observations and records is judgmental and constitutes an evaluation of circumstances as influenced by geology, meteorology and construction activity. Deviations from these observations, may occur. No other warranty, express, or implied, is made by EBA.

A.6 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geologic materials to meteorological elements. Many geologic materials deteriorate rapidly upon exposure to climatic elements. Severe deterioration of materials may be caused by precipitation and/or the action of frost on exposures. Unless otherwise specifically indicated in this report, walls and floors of excavations must be protected from elements, particularly all forms of moisture, desiccation from arid conditions and frost action.

A.7 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise advised, support of excavation walls, ground adjacent to anticipated construction activity and of structures adjacent to the construction, must be provided. The support of ground and structures adjacent to the anticipated construction, with preservation of adjacent ground and structures from the adverse impact of construction activity, is therefore required.

A.8 INFLUENCE OF CONSTRUCTION ACTIVITY

There is a direct correlation between construction activity and adjacent structural performance. The influence of all anticipated construction activities should by considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques are known. EBA provides no warranty in respect to adverse circumstances resulting from construction activity.

A.9 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geologic deposits, the judgmental character of the art of soil and foundation engineering, as well 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 then may serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein to the benefit of the project.

A.10 DRAINAGE SYSTEMS

Where drainage systems are installed within or around a structure, the systems which will be installed must protect the structure from loss of ground due to internal erosion and must be designed so as to assure continued performance of the drains. Specific design detail of such systems should be developed or reviewed by the geotechnical engineer. Unless otherwised specified, it is a condition of this report that effective drainage systems are required and that they must be considered in relation to project purpose and function.

A.11 BEARING CAPACITY

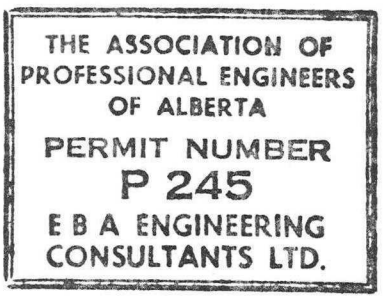
Design bearing capacities, loads and allowable stresses quoted in this report relate to a specific soil type and soil condition. Construction activity and environmental circumstances can materially change a soil condition. The elevation at which a soil type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geologic materials of the type and in the condition assumed. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil conditions assumed in this report exist in fact.

A.12 SAMPLES

EBA will retain all soil and rock samples for 30 days. Further storage or transfer of samples can be made at owner expense upon written request.

A.13 STANDARD OF CARE

Services performed by EBA for this report are conducted in a manner consistent with that level and skill ordinarily exercised by members of the profession currently practicing under similar conditions. No other warranty, express or implied, is made.



SYSTEM INTERNATIONAL CONVERSIONS

AREA

1 km^2	= 3.861 x 10^{-1} mi^2	1 km^2 = 100 hectares
1 km^2	= 2.471 x 10^{+2} acre	
1 m^2	= 1.196 yd^2	
1 m^2	= 1.076 x 10^{+1} ft^2	
1 mm^2	= 1.550 x 10^{-3} in^2	see note 1

DENSITY

1 Mg/m^3	= 6.243 x 10^{+1} lb_m/ft^3	see note 2
1 kg/m^3	= 6.243 x 10^{-2} lb_m/ft^3	

FORCE

1 N	= 2.248 x 10^{-1} lb_f	

HEAT

ENERGY (E)

1 kJ	= 9.478 x 10^{-1} BTU (IST)	1 BTU = 252 cal
1 J	= 2.388 x 10^{-1} cal (IST)	

HEAT FLUX (Q)

1 W/m^2	= 3.170 x 10^{-1} $BTU/(ft^2 \cdot hr)$	

SPECIFIC HEAT CAPACITY (c)

1 $kJ/(kg \cdot C^\circ)$	= 2.388 x 10^{-1} $BTU/(lb_m \cdot F^\circ)$	

THERMAL CONDUCTIVITY (k)

$W/(m \cdot C^\circ)$	= 5.778 x 10^{-1} $BTU/(ft \cdot hr \cdot F^\circ)$	

COEFFICIENT OF HEAT TRANSFER (c_s)

1 $W/(m^2 \cdot C^\circ)$	= 1.761 x 10^{-1} $BTU/(ft^2 \cdot hr \cdot F^\circ)$	see note 3

LENGTH

1 km	= 6.214 x 10^{-1} mi (statute)	
1 m	= 1.094 yd	
1 m	= 3.281 ft	
1 mm	= 3.937 x 10^{-2} in	

MASS

1 Mg	= 1.102 T	1 T = 2000 lb_m
1 Mg	= 2.205 x 10^3 lb_m	Mg is equivilant to tonne
1 kg	= 2.205 lb_m	

POWER

1 W	= 1.341 x 10^{-3} HP	1 HP = 550 $ft \cdot lb_f/s$

PRESSURE, STRESS or ELASTIC MODULI

1 MPa	= 1.044 x 10^{+1} T_f/ft^2 [TSF]	see note 4
1 kPa	= 1.044 x 10^{-2} T_f/ft^2 [TSF]	
1 kPa	= 1.450 x 10^{-1} lb_f/in^2 [psi]	
1 kPa	= 3.346 x 10^{-1} ft of water	hydrostatic pressure of water at 1 ft. depth
1 Pa	= 2.089 x 10^{-2} lb_f/ft^2 [psf]	

TEMPERATURE

$^\circ C$	= $(^\circ F \cdot 32)/1.8$	0°C = 273.15° K
C°	= 1.8 F°	1 C° = 1 K°

TIME

1 Ms	= 3.171 x 10^{-2} yr	for one year equal to 365 days
1 ks	= 1.157 x 10^{-2} day	
1 s	= 3.171 x 10^{-8} yr	

VISCOSITY

DYNAMIC (η)

1 $Pa \cdot s$	= 1.000 x 10^{+3} centipoise	

KINEMATIC (ν)

1 mm^2/s	= 1.000 cenistoke	

VOLUME

1 m^3	= 8.107 x 10^{-4} acre · ft	
1 m^3	= 1.308 yd^3	
1 m^3	= 3.531 x 10^{+1} ft^3	
1 m^3	= 2.200 x 10^{+2} gal (Imperial)	1 m^3 = 1000 L
1 cm^3	= 3.520 x 10^{-2} fl oz	see note 1
1 cm^3	= 6.102 x 10^{-2} in^3	

VOLUME RATE OF FLOW

1 m^3/s	= 1.901 x 10^{-1} mgpd (Imperial)	
1 m^3/s	= 3.531 x 10^{+1} ft^3/s	

COEFFICIENTS

VOLUME COMPRESSIBILITY OR SWELLING (m_v or m_s)

1 m^2/MN;	= 9.579 x 10^{-2} ft^2/T_f	

CONSOLIDATION OR SWELLING (c_v or c_s)

1 m^2/yr	= 1.076 x 10^{+1} ft^2/yr	
1 m^2/yr	= 2.949 x 10^{-2} ft^2/day	
1 m^2/yr	= 3.171 x 10^{-4} cm^2/s	

HYDRAULIC CONDUCTIVITY (k)

1 m/s	= 2.835 x 10^{+5} ft/day	see note 5

NOTES:

1. *The use of cm^2 and cm^3 for area and volume is permissible.*
2. *To convert mass density (ρ) to weight per unit volume use:*
   $F = ma_g$
   i.e. $\rho Mg/m^3 \times 9.807\ m/s^2 = 9.807\rho \frac{Mg \cdot m}{s^2 \cdot m^3} = 9.807\rho \frac{kN}{m^3}$
   kg_f/m^3 is not a valid SI density unit.
3. *The inverse of the 'coefficient of heat transfer' is 'thermal resistance' or the 'R' value.*
4. *kg_f/m^2 is not a valid SI stress unit.*
5. *Hydraulic conductivity is a proportionality coefficient defined in Darcy's Law:* $v = k_w \frac{\partial h}{\partial s}$, *where v = velocity of flow*
   $\frac{\partial h}{\partial s}$ *= hydraulic gradient*
6. *All conversion factors have been rounded to four significant figures.*

SYSTEM INTERNATIONAL UNITS

QUANTITY	NAME	SYMBOL	EXPRESSED IN TERMS OF OTHER SI UNITS	EXPRESSED IN TERMS OF BASE AND SUPPLEMENTARY UNITS
SI UNITS				
length	metre	m		
mass	kilogram	kg		
time	second	s		
electric current	ampere	A		
thermodynamic temperature	kelvin	K		
amount of substance	mole	mol		
luminous intensity	candela	cd		
SI SUPPLEMENTARY UNITS				
plane angle	radian	rad		
solid angle	steradian	sr		
EXAMPLES OF SI DERIVED UNITS WITH SPECIAL NAMES				
frequency	hertz	Hz	1/s	s^{-1}
force	newton	N	$m \cdot kg/s^2$	$m \cdot kg \cdot s^{-2}$
pressure, stress	pascal	Pa	N/m^2	$m^{-1} \cdot kg \cdot s^{-2}$
energy, work, quantity of heat	joule	J	$N \cdot m$	$m^2 \cdot kg \cdot s^{-2}$
power, radiant flux	watt	W	J/s	$m^2 \cdot kg \cdot s^{-3}$
EXAMPLES OF SI DERIVED UNITS WITHOUT SPECIAL NAMES				
velocity - linear	metre per second		m/s	$m \cdot s^{-1}$
- angular	(radian per second)		rad/s	$rad \cdot s^{-1}$
acceleration - linear	(metre per second) per second		m/s^2	$m \cdot s^{-2}$
- angular	(radian per second) per second		rad/s^2	$rad \cdot s^{-2}$
concentration (of amount of substance)	mole per cubic metre		mol/m^3	$mol \cdot m^{-3}$
dynamic viscosity	pascal second		$Pa \cdot s$	$m^{-1} \cdot kg \cdot s^{-1}$
moment of force	newton metre		$N \cdot m$	$m^2 \cdot kg \cdot s^{-2}$
surface tension	newton per metre		N/m	$kg \cdot s^{-2}$
heat flux density, irradiance	watt per square metre		W/m^2	$kg \cdot s^{-3}$
heat capacity, entropy	joule per kelvin		J/K	$m^2 \cdot s^{-2} \cdot K^{-1}$
specific heat capacity, specific entropy	joule per kilogram kelvin		$J/(kg \cdot K)$	$m^2 \cdot s^{-2} \cdot K^{-1}$
specific energy	joule per kilogram		J/kg	$m^2 \cdot s^{-2}$
thermal conductivity	watt per metre kelvin		$W/(m \cdot K)$	$m \cdot kg \cdot s^{-3} \cdot K^{-1}$

OTHER UNITS PERMITTED FOR USE WITH SI

QUANTITY	NAME	SYMBOL	DEFINITION
time	minute	min	1 min = 60 s
	hour	h	1 h = 3,600 s
	day	d	1 d = 86,400 s
	year	a	
plane angle	degree	°	1° = (π/180) rad
	minute	′	1′ = (π/10,800) rad
	second	″	1″ = (π/648,000) rad
area	hectare	ha	1 ha = 10,000 m^2
volume	litre	L	1,000 L = 1 m^3
temperature	degree Celsius	°C	0° C = 273.15° K
			temperature interval 1 C° ≡ 1 K°
mass	tonne	t	1 t = 1,000 kg = 1 Mg

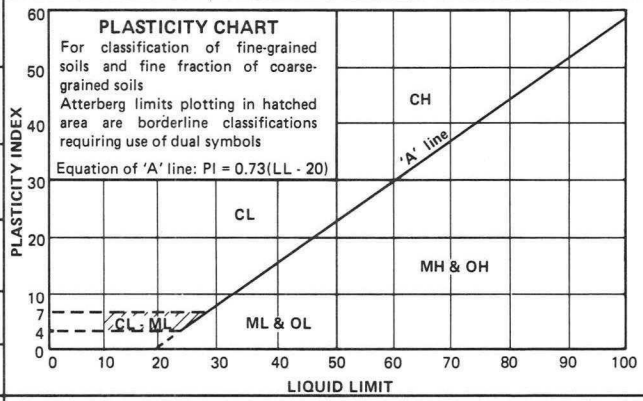
MULTIPLYING FACTOR	PREFIX	SYMBOL	MULTIPLYING FACTOR	PREFIX	SYMBOL
$1,000,000,000,000,000,000 = 10^{18}$	exa	E	$0.1 = 10^{-1}$	deci*	d
$1,000,000,000,000,000 = 10^{15}$	peta	P	$0.01 = 10^{-2}$	centi*	c
$1,000,000,000,000 = 10^{12}$	tetra	T	$0.001 = 10^{-3}$	milli	m
$1,000,000,000 = 10^{9}$	giga	G	$0.000,001 = 10^{-6}$	micro	μ
$1,000,000 = 10^{6}$	mega	M	$0.000,000,001 = 10^{-9}$	nano	n
$1,000 = 10^{3}$	kilo	k	$0.000,000,000,001 = 10^{-12}$	pico	p
$100 = 10^{2}$	hecto*	h	$0.000,000,000,000,001 = 10^{-15}$	femto	f
$10 = 10^{1}$	deca*	da	$0.000,000,000,000,000,001 = 10^{-18}$	atto	a

* *to be avoided where possible*

UNIFIED SOIL CLASSIFICATION†

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES	CLASSIFICATION CRITERIA	
COARSE-GRAINED SOILS More than 50% retained on No. 200 sieve*	GRAVELS 50% or more of coarse fraction retained on No. 4 sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	$C_u = D_{60}/D_{10}$ 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	
		GRAVELS WITH FINES	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	
	SANDS More than 50% of coarse fraction passes No. 4 sieve	CLEAN SANDS	SW	Well-graded sands and gravelly sands, little or no fines	$C_u = D_{60}/D_{10}$ Greater than 6 $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3	
			SP	Poorly-graded sands and gravelly sands, little or no fines	Not meeting both criteria for SW	
		SANDS WITH FINES	SM	Silty sands, 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
			SC	Clayey sands, sand-clay mixtures	Atterberg limits plot above 'A' line and plasticity index greater than 7	
FINE-GRAINED SOILS 50% or more passes No. 200 sieve*	SILTS AND CLAYS Liquid limit 50% or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands		
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		
			OL	Organic silts and organic silty clays of low plasticity		
	SILTS AND CLAYS Liquid limit greater than 50%		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts		
			CH	Inorganic silts of high plasticity, fat clays		
			OH	Organic clays of medium to high plasticity		
HIGHLY ORGANIC SOILS			PT	Peat, muck and other highly organic soils		

Classification on basis of percentage of fines
Less than 5% pass No. 200 sieve GW, GP, SW, SP
More than 12% pass No. 200 sieve GM, GC, SM, SC
5% to 12% pass No. 200 sieve Borderline classification requiring use of dual symbols



*Based on the material passing the 3 in. (75 mm) sieve
†ASTM Designation D 2487, for identification procedure see D 2488

GROUND ICE DESCRIPTION

ICE NOT VISIBLE

GROUP SYMBOLS	SYMBOLS	SUBGROUP DESCRIPTION	
N	Nf	Poorly-bonded or friable	
	Nbn	No excess ice, well-bonded	
	Nbe	Excess ice, well-bonded	

VISIBLE ICE LESS THAN 50% BY VOLUME

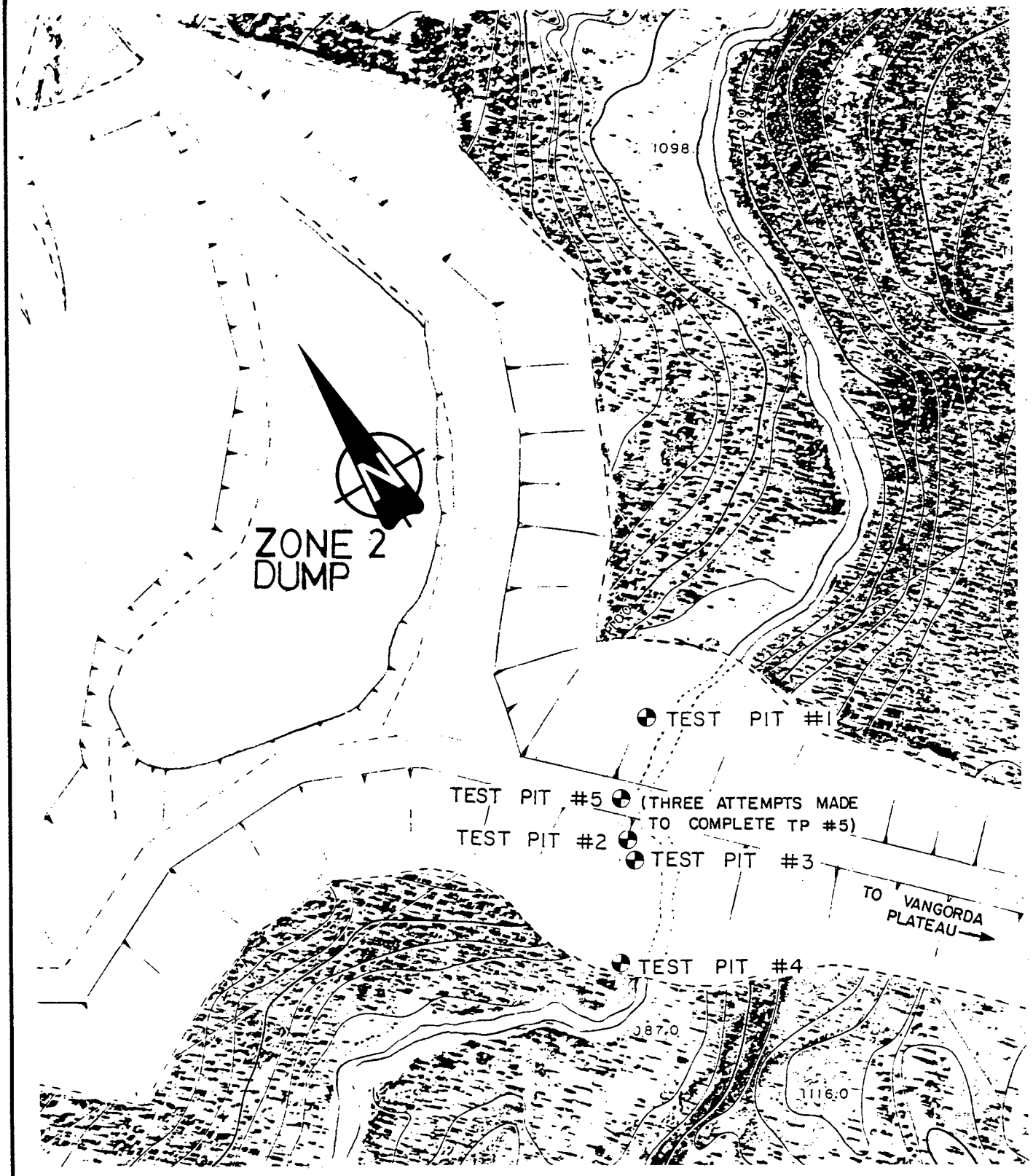
GROUP SYMBOLS	SYMBOLS	SUBGROUP DESCRIPTION	
V	Vx	Individual ice crystals or inclusions	
	Vc	Ice coatings on particles	
	Vr	Random or irregularly oriented ice formations	
	Vs	Stratified or distinctly oriented ice formations	

VISIBLE ICE GREATER THAN 50% BY VOLUME

ICE	ICE + Soil Type	Ice with soil inclusions	
	ICE	Ice without soil inclusions (greater than 25 mm (1 in.) thick)	

NOTE:
1. *Dual symbols are used to indicate borderline or mixed ice classifications*
2. *Visual estimates of ice contents indicated on borehole logs ± 5%*
3. *This system of ground ice description has been modified from NRC Technical Memo 79, Guide to the Field Description of Permafrost for Engineering Purposes*

LEGEND
Soil Ice



EBA Engineering Consultants Ltd.			PROJECT	ROCKFILL CAUSEWAY - PERMAFROST EVALUATION	
CLIENT CURRAGH RESOURCES LTD.			TITLE	SITE PLAN & APPROXIMATE TEST PIT LOCATIONS	
DATE 1987-04-22	DWN WAS	CHKD	DWG NO.	4661-A-1	0201-4661

PROJECT NUMBER: 0201-4661 COMPLETION DEPTH: 5.5 m LOGGED BY: MAV
CLIENT: CURRAGH RESOURCES LTD. EQUIPMENT USED: CAT 245 BACKHOE

SAMPLE TYP	SAMPLE NO.	SAMPLE Q	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMP C
			PEAT(Pt)-moss,rootlets and organic silt; frozen due to seasonal frost; very dark brown to black	Frozen	
	1		SAND TILL(SM)-gravelly,some silt,trace clay;with occasional cobbles and boulders throughout;quartz and schist fragments;iron oxide staining;subrounded to subangular gravel		-0.7
			-silt content increasing with depth		
	2		-with randomly orientated ice formations (Vr Vc 5-10%)	Vr Vc 5-10%	-0.1
			-seasonal frost to 2.0 m		
			-ground water infiltrating side-wall of test pit		
			PEAT(Pt) AND ORGANIC SILT-with decayed organic matter;strong organic odour;black		
			SAND(SM)-silty;coarse to fine-grained sand;wet;nonplastic;orange		
	3		SILT(ML)-trace of fine-grained sand; with mica platlets disseminated throughout;uniform;homogeneous; wet;nonplastic;dark grey		
			GRAVEL(GM)-sandy,some silt;with occasional cobbles/boulders throughout; rounded to subrounded,smooth gravel;wet;orange		
			END OF TEST PIT 5.5 m TEST PIT TERMINATED DUE TO SLOUGHING SOILS		

PLASTIC LIMIT — WATER CONTENT(%) — LIQUID LIMIT
20 40 60 80

SPECIAL TESTS | UNIT

DEPTH (m): 0 1 2 3 4 5 6 7
DEPTH (ft): 0 2 4 6 8 10 12 14 16 18 20 22

ROCKFILL DRAIN-PERMAFROST EVALUATION
NORTH FORK ROSE CREEK
FARO, YUKON
DATE EXCAVATED: 1987-04-10

SAMPLE TYPE
SHELBY | GRAB
NO RECOVERY | CRREL
SPT | CORE

EBA ENGINEERING CONSULTANTS LTD.
WHITEHORSE YUKON
DRAWING NUMBER
4661-A-2

BOREHOLE NUMBER
4661-1

BOREHOLE LOG AND LABORATORY TEST RESULTS

PROJECT NUMBER: 0201-4661 COMPLETION DEPTH: 1.4 LOGGED BY: MAV

CLIENT: CURRAGH RESOURCES LTD. EQUIPMENT USED: CAT 245 BACKHOE

SAMPLE TYP	SAMPLE NO.	SAMPLE Q	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMP
			PEAT(Pt)-moss,rootlets,and organic silt; with occasional cobbles through-out;with stratified and randomly orientated ice formations (Vr Vs 30%), ice lenses to 20 mm thick;dark brown	Frozen	
			VOLCANIC ASH-with stratified and randomly orientated clear ice formations, ice lenses to 3 mm thick;white -boulders encountered		
			PEAT(Pt)-and fibrous organics;dark brown -boulders encountered,unable to penetrate past 1.4 m		
			END OF TEST PIT 1.4 m TEST PIT TERMINATED DUE TO COBBLES AND BOULDERS.		

PLASTIC LIMIT — WATER CONTENT(%) — LIQUID LIMIT

20 40 60 80

SPECIAL TESTS

UNIT

DEPTH (m): 0 1 2 3 4 5 6 7

DEPTH (ft): 0 2 4 6 8 10 12 14 16 18 20 22

ROCKFILL DRAIN-PERMAFROST EVALUATION
NORTH FORK ROSE CREEK
FARO, YUKON
DATE EXCAVATED: 1987-04-10

SAMPLE TYPE
SHELBY
NO RECOVERY
SPT
GRAB
CRREL
CORE

EBA ENGINEERING CONSULTANTS LTD.
WHITEHORSE YUKON

DRAWING NUMBER
4661-A-3

BOREHOLE NUMBER
4661-2

BOREHOLE LOG AND LABORATORY TEST RESULTS

PROJECT NUMBER: 0201-4661 COMPLETION DEPTH: 6.0 m LOGGED BY: MAV

CLIENT: CURRAGH RESOURCES LTD. EQUIPMENT USED: CAT 245 BACKHOE

SAMPLE TYP	SAMPLE NO.	SAMPLE Q	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMP C
			PEAT(Pt)–moss and rootlets at surface; with fibrous organics and organic silt;brown	Frozen	
			–with occasional cobbles		
			–with occasional lenses of volcanic ash		
	1		SAND TILL(SM) AND SILT–trace gravel,trace clay;with occasional cobbles throughout;subrounded to angular gravel;with randomly orientated ice formations (Vr 5–10%) to 2 mm thick;iron oxide staining;low plastic;olive grey	Vr 5–10%	–0.9
	2		–with stratified ice formations (Vs 40%) to 10 mm thick	Vc Vs 5%	–0.6
			–gravelly,trace organics;with stratified ice formations (Vs Vc 5%)		
	3		–cobbles	Vr Vs 15–20%	–0.2
			–with stratified and randomly orientated clear ice formations (Vr Vs 15–20%);olive		
			–easy digging with backhoe;soil is pliable with clear ice lenses		
	4		–ice lenses to 5 mm thick (Vr Vs 15%)	Vr Vs 15%	–0.2
			END OF TEST PIT 6.0 m TEST PIT TERMINATED DUE TO SLOUGHING SOIL AT 2.9 m. GROUND WATER INFILTRATING TEST PIT.		

PLASTIC LIMIT — WATER CONTENT(%) — LIQUID LIMIT

20 40 60 80

SPECIAL TESTS

UNIT

DEPTH (m): 0 1 2 3 4 5 6 7

DEPTH (ft): 0 2 4 6 8 10 12 14 16 18 20 22

ROCKFILL DRAIN–PERMAFROST EVALUATION
NORTH FORK ROSE CREEK
FARO, YUKON
DATE EXCAVATED: 1987-04-11

SAMPLE TYPE
SHELBY
NO RECOVERY
SPT
GRAB
CRREL
CORE

EBA ENGINEERING CONSULTANTS LTD.
WHITEHORSE YUKON
DRAWING NUMBER
4661-A-4

BOREHOLE NUMBER
4661-3

BOREHOLE LOG AND LABORATORY TEST RESULTS

PROJECT NUMBER: 0201-4661 COMPLETION DEPTH: 6.0 m LOGGED BY: MAV

CLIENT: CURRAGH RESOURCES LTD. EQUIPMENT USED: CAT 245 BACKHOE

DEPTH (m)	SAMPLE TYP	SAMPLE NO.	SAMPLE Q	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMP C
0				PEAT(Pt)-root mat,moss and organics	Frozen	
		1		SAND TILL(SM) AND SILT-some gravel, some clay,trace coal fragments; with occasional cobbles;sub-rounded to angular gravel;iron oxide staining;low to nonplastic; olive brown	Vr Vs 10%	-0.8
1				-with stratified and randomly orientated ice formations (Vr Vs 10%)		
		2		-easy digging	Vr Vs 5%	-0.1
				PEAT(Pt)-and organics,black		
2		3		SAND TILL(SM) AND SILT-some gravel,some clay,trace organics;rounded to subrounded,smooth gravel;with iron oxide staining;wet;soft to firm(estimated);low plastic; olive		0
3						
4		4				
5						
6				END OF TEST PIT 6.0 m TEST PIT TERMINATED DUE TO SLOUGHING SOIL AT 2.0 m. GROUND WATER INFILTRATING TEST PIT.		
7						

PLASTIC LIMIT | WATER CONTENT(%) 20 40 60 80 | LIQUID LIMIT

SPECIAL TESTS | UNIT

DEPTH (ft) 0 2 4 6 8 10 12 14 16 18 20 22

ROCKFILL DRAIN-PERMAFROST EVALUATION
NORTH FORK ROSE CREEK
FARO, YUKON
DATE EXCAVATED: 1987-04-11

SAMPLE TYPE
SHELBY | GRAB
NO RECOVERY | CRREL
SPT | CORE

EBA ENGINEERING CONSULTANTS LTD.
WHITEHORSE YUKON
DRAWING NUMBER
4661-A-5

BOREHOLE NUMBER
4661-4

BOREHOLE LOG AND LABORATORY TEST RESULTS

PROJECT NUMBER: 0201-4661 COMPLETION DEPTH: 0.7 m LOGGED BY: MAV
CLIENT: CURRAGH RESOURCES LTD. EQUIPMENT USED: CAT 245 BACKHOE

SAMPLE TYP	SAMPLE NO.	SAMPLE Q	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMP
			PEAT(Pt)-moss,rootlets and organic silt; dark brown to black -volcanic ash	Frozen	
			SAND TILL(SM) AND SILT-some gravel,trace clay;with occasional cobbles throughout;subrounded to sub-angular gravel;nonplastic; olive brown -hard digging due to seasonal frost and cobbles -unable to penetrate past 0.7 m due to cobbles/boulders.		
			END OF TEST PIT 0.7 m TEST PIT TERMINATED DUE TO COBBLES AND BOULDERS.		
			NOTE: Three attempts made at different locations to complete Test Pit#5. Backhoe unable to penetrate past cobbles/boulders encountered.		

PLASTIC LIMIT | WATER CONTENT(%) | LIQUID LIMIT
20 40 60 80

SPECIAL TESTS | UNIT

DEPTH (m): 0 1 2 3 4 5 6 7
DEPTH (ft): 0 2 4 6 8 10 12 14 16 18 20 22

ROCKFILL DRAIN-PERMAFROST EVALUATION
NORTH FORK ROSE CREEK
FARO, YUKON
DATE EXCAVATED: 1987-04-10

SAMPLE TYPE
SHELBY, NO RECOVERY, SPT, GRAB, CRREL, CORE

EBA ENGINEERING CONSULTANTS LTD.
WHITEHORSE YUKON
DRAWING NUMBER
4661-A-6

BOREHOLE NUMBER
4661-5

BOREHOLE LOG AND LABORATORY TEST RESULTS

EBA Engineering Consultants Ltd.

PARTICLE - SIZE ANALYSIS OF SOILS

Project: Rock Causeway - Permafrost Evaluation
North Fork Rose Creek, Faro, Yukon

Project Number: 0201-4661

Date Tested: 1987-04-15

Borehole Number: TEST PIT #1

Depth: 0.8 - 1.0 m

Soil Description: SAND TILL (SM) - gravelly, some silt

Cu:

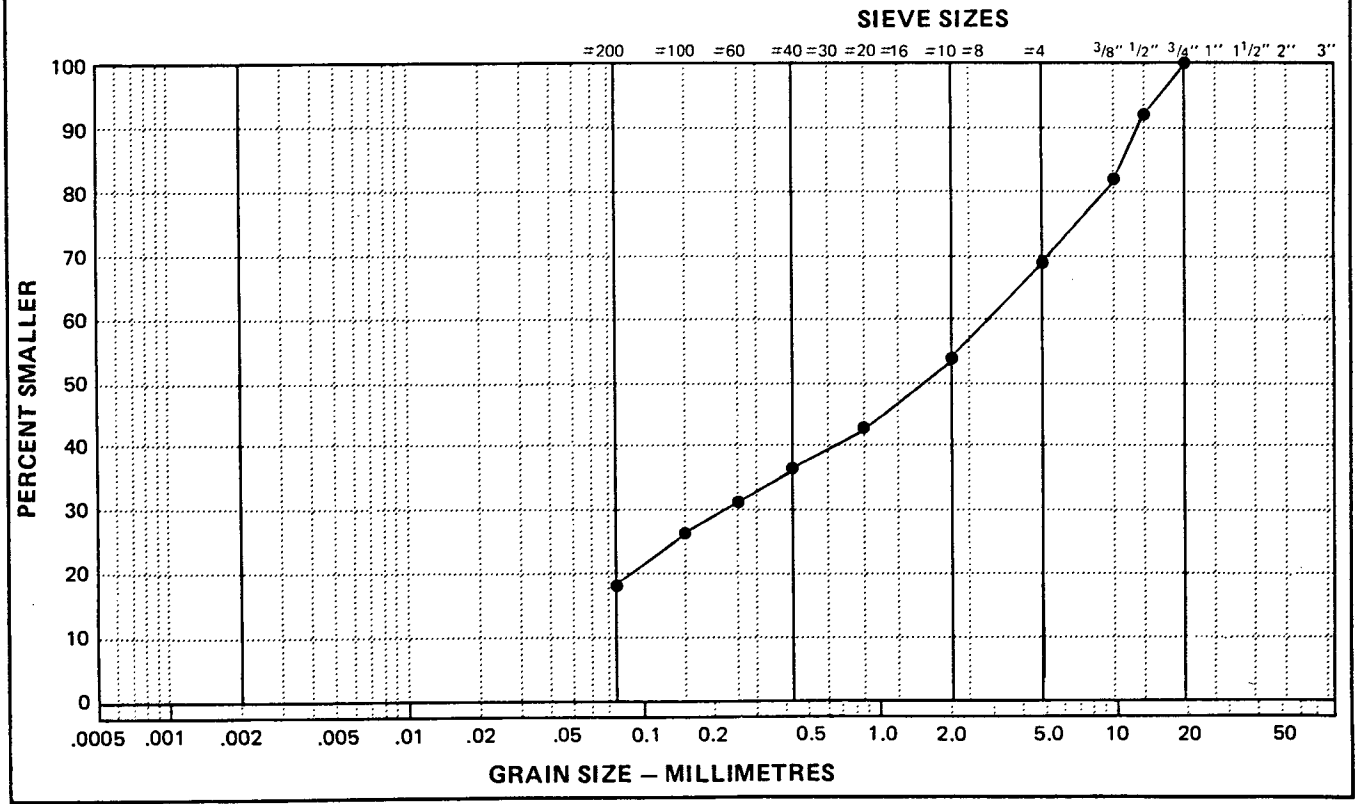
Cc:

Natural Moisture Content: 9.7 %

Remarks:

SIEVE	PERCENTAGE PASSING
3"	
1 1/2"	
1"	
3/4"	100
1/2"	92
3/8"	82
No. 4	69
No. 10	54
No. 20	43
No. 40	36
No. 60	31
No. 100	26
No. 200	18

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Tested in accordance with ASTM D422 unless otherwise noted.

EBA Engineering Consultants Ltd.

PARTICLE - SIZE ANALYSIS OF SOILS

Project: Rock Causeway - Permafrost Evaluation
North Fork Rose Creek - Faro, Yukon

Project Number: 0201-4661

Date Tested: 1987-04-15

Borehole Number: TEST PIT #3

Depth: 0.5 - 1.0 m

Soil Description: SAND TILL(SM) AND SILT - trace gravel, trace clay

Cu:

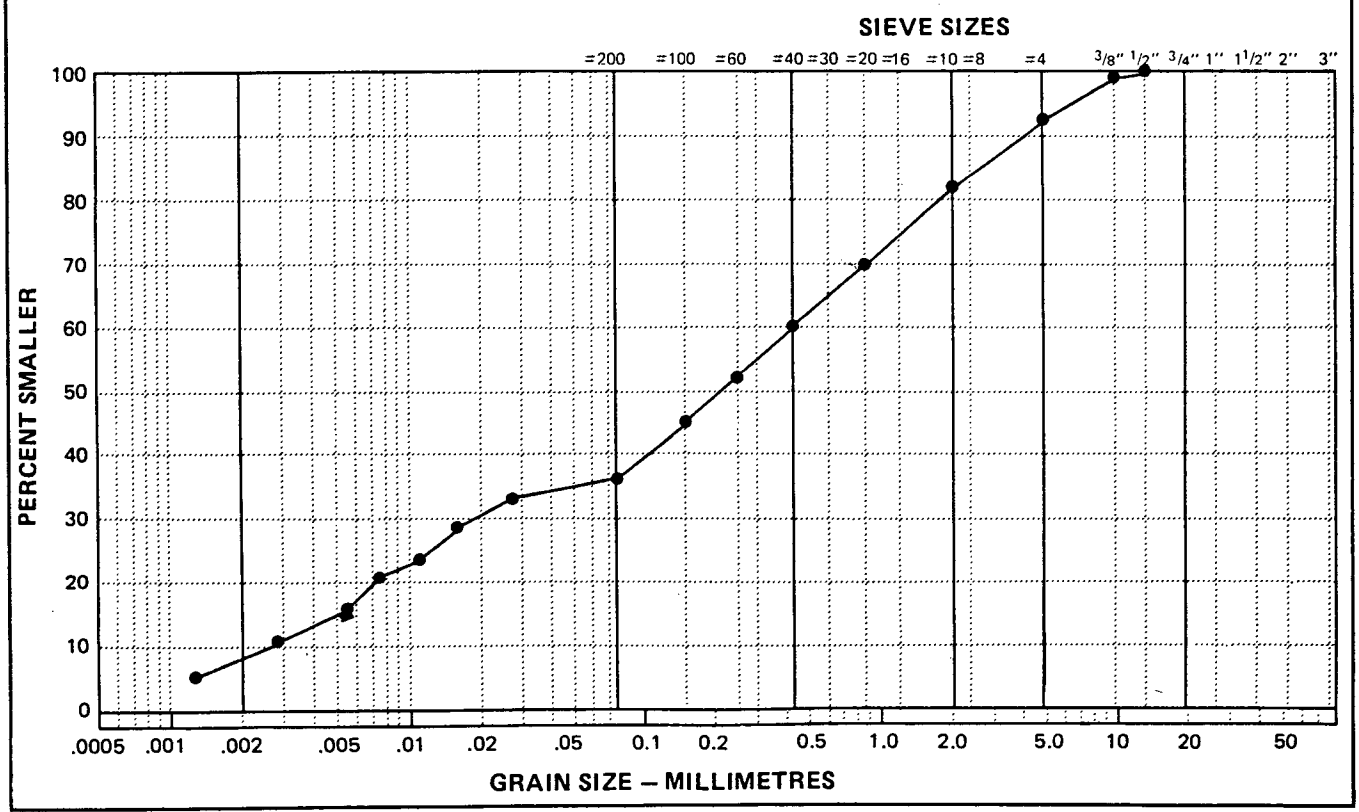
Cc:

Natural Moisture Content: 15.2 %

Remarks:

SIEVE	PERCENTAGE PASSING
3"	
1 1/2"	
1"	
3/4"	
1/2"	100
3/8"	99
No. 4	93
No. 10	82
No. 20	70
No. 40	60
No. 60	52
No. 100	45
No. 200	36

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Tested in accordance with ASTM D422 unless otherwise noted.

EBA Engineering Consultants Ltd.

PARTICLE - SIZE ANALYSIS OF SOILS

Project: Rock Causeway, Permafrost Evaluation
North Fork Rose Creek - Faro, Yukon

Project Number: 0201-4661

Date Tested: 1987-04-15

Borehole Number: TEST PIT #4

Depth: 3.9 - 4.1 m

Soil Description: SAND TILL (SM) AND SILT - some gravel, some clay

Cu:

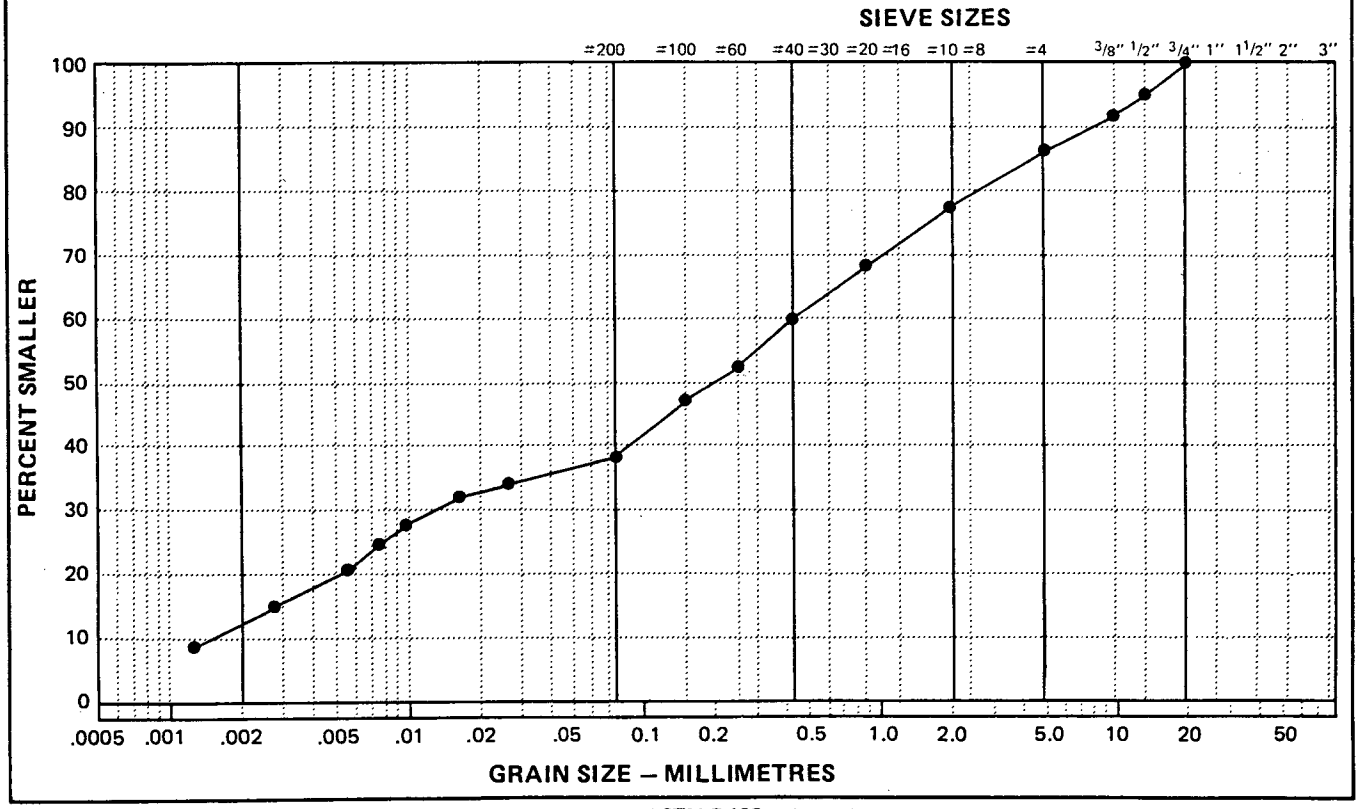
Cc:

Natural Moisture Content: 15.9 %

Remarks:

SIEVE	PERCENTAGE PASSING
3"	
1 1/2"	
1"	
3/4"	100
1/2"	95
3/8"	92
No. 4	86
No. 10	77
No. 20	68
No. 40	60
No. 60	53
No. 100	47
No. 200	38

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Tested in accordance with ASTM D422 unless otherwise noted.